



# LABQUIP

WORLDWIDE EDUCATION SOLUTIONS



## Educational Resources Catalogue

[www.labquip.co.uk](http://www.labquip.co.uk)





# LABQUIP

WORLDWIDE EDUCATION SOLUTIONS

## What we do

At Labquip Projects Ltd we understand how science comprehension can unveil some of the beauty of the world we live in, and help us to understand it better. That's why we're so passionate about enhancing science education around the world  
**- at many levels and in many languages.**

## How we do it

### Curricular Partnerships and Project Work

Our true speciality at Labquip Projects Ltd is working with people or groups to achieve mutually beneficial aims in the educational sphere. We have an expert team of educators and technical advisors who can work with our partners to take an idea and turn it into reality, and we have the practical resources to do so. Be it complete lab fit-outs, specialised individual products or total curriculum solutions, we are continually developing ways of delivering better science education, tailored to fit the specific needs of teachers around the world.

## Resources

Since our development of Microscience® we have always been at the cutting edge of science education around the world, and are continually expanding our resource range to make learning and teaching safer, more fun, more economical and more effective. We are firm believers that learning science means doing science, and this is at the core of what we do and the resources we provide. That's why we're constantly adding inquiry-based, hands-on learning resources to our range and producing supplemental resources - such as our library of curriculum-linked teacher's notes and student worksheets. They help guide the students through the scientific process and cut down on session preparation time, leaving teachers more time to actually teach.

## Customer Service

We have a dedicated, efficient, friendly team of customer service and technical advisors. Coupled with our large warehouse facility and huge range of stock items, this allows us to provide customer service which is second-to-none. Not only can we offer same-day despatch on all stock items, but in the unlikely event there may be a problem with the order then our no-quibble guarantee makes it painless for all involved.



# About the Catalogue

We've assigned the products to a few broad categories and also some smaller, more specific ones. Within these categories the products are arranged intuitively, placing related items or similar knowledge areas near to each other, to highlight the overlap between different areas of learning. Labware is the exception, which lends itself better to an alphabetically based sequence. If you're looking for something specific please consult the comprehensive index at the back of this volume.

Where possible we've used SI units to refer to our products, but in a few cases we've found it appropriate to use both metric and imperial units. In rare cases, where it matters for the usage of a product, we have quoted the manufacturer's specifications rather than introduce conversion inaccuracies.

Many of our resources are linked to the UK or US curriculum. For your easy reference a table listing US grades, UK key stages and the associated age ranges is below.

We've tried to include as much relevant product information as possible, but if there's something more you'd like to know about any of our products, then please don't hesitate to get in touch - we'll be only too happy to help.

## Check out our new ranges:

### **Inquiry Investigations®** (see pages 176-183)

From the creators of the NeoSci® Range, these curriculum modules combine lots of activities across several curriculum areas, culminating in inquiry-based investigations which draw on knowledge gained in the earlier activities to bring together a comprehensive grasp of the real-world applications of many spheres of science.

### **Edu-Logger®** (see pages 264-269)

This data-logging system utilises state-of-the-art technology to provide extensive functionality which is extremely simple to use. The independently programmable sensors coupled with superb PC integration give this system a host of unique features that open up a world of new learning possibilities.

### **Lab Fit-out Service** (see pages 5-7)

Equipping a science laboratory is quite an undertaking. But working with Labquip Projects Ltd can make it a breeze. We guide the process from the drawing board to reality with our complete fit-out service, right down to fixtures and fittings if required. Our team will work with you to tailor our total fit-out packages (Edu-Lists®) which allows you to hit the ground running and deliver total curriculum teaching in any or all of the sciences - depending on your requirements.

### **EZ-Prep®** (see pages 162-163)

A totally new concept in the realm of solution preparation. No more messy mixing and measuring - simply add an ez-prep capsule to water, stir and go!

### **MSW** (see page 4)

Also new for 2010 is the Mobile Science Workstation. Developed by science educators to provide a one-stop mobile workstation that can easily be tailored to meet your specific curricular and budgetary requirements. It turns any room into a science classroom, and can be wheeled away for safe storage at the end of the day.

## Ongoing Development Programmes:

Our library of curriculum linked worksheets and Teacher's notes is constantly expanding to cover more products and curriculum areas. Many of these are already available for free download from our website ([www.labquip.co.uk](http://www.labquip.co.uk)).

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### Age / US Grades / UK Key Stages - Comparison Chart

Age	US Grade System	Welsh/English National Curriculum Key Stages
10-11	Grade 5	KS2 SATS exams this year
11-12	Grade 6	Key Stage 3
12-13	Grade 7	Key Stage 3
13-14	Grade 8	KS3 SATS exams this year
14-15	Grade 9	Key Stage 4 GCSE study
14-16	Grade 10	GCSE exams

## The Edu-Lab 'MSW' - Mobile Science Workstation

### ...science on the move!

Turn **ANY** classroom into a science lab, at the push of a trolley.  
Then... **wheel it away, at the end of the day!**

EduLab MSW's are specifically equipped to meet your curriculum and are 'multi-discipline'. Deliver Biology, Chemistry and Physics lessons from the same Teacher's Bench.

#### Mobile

The 'WHEEL-IN' Science laboratory

#### Modular

Basic unit can be combined and integrated with additional options to provide the optimum solution

#### Secure

Can be returned to a locked and secure area at the end of the day

#### Flexible

Deliver secondary level Biology, Chemistry and Physics lessons from the same Teacher's Bench

#### Integrated

Unique bundled Science platform of equipment, learning materials and software in your language\*, all integrated and mapped to your National Curriculum

#### Customised

Delivered in local language and mapped to any national curriculum or IGCSE



**Computer included**  
(unless requested otherwise)



**Designed and specified by experienced science teachers and educators.**

\*Learning materials currently available in several languages. We have an on-going program of translation to broaden the available range. Please enquire.



**4** Packed with an extensive list of Labquip catalogue products selected by YOU, in collaboration with our team of highly experienced educators.

from concept  
...to completion  
the unique fit-out service  
that completes the project

### Unique 'Turnkey' Package

- Refurbishment or new build:
  - Structural**
  - Fixtures & Fittings**
  - Services**
  - Interior finishes**
  - Benching & furniture**
  - Lab Equipment**
- Lab layouts to Architect designs
- Worldwide experience
- Cost effective, efficient fit-out
- Equipment supply & installation
- EduList science equipment:
  - Compiled by teachers**
  - Curriculum linked**
  - Itemised listings**
  - General or subject focused**
  - Tailored to specific needs**
  - Specialist equipment**
- Fully operational laboratories
- Fit for purpose
- Legislation compliant
- Hands-on training option
- On-going teacher support



equipping schools for the future

## equipping schools for the future

Just because the fixtures and fittings are in place, it doesn't mean a laboratory is ready to use ...or fit for purpose.

Equipment is the heart of every science laboratory.

Without it, you just have a nice new building without functionality.

Recognising this key fact, and with considerable experience equipping laboratories around the world, Edu-Lab have put together a **unique package** that not only provides an efficient fit-out service, but completes the job by supplying and 'installing' the science equipment itself.

Whether a refurbishment or new build, we offer a complete supply and installation service for everything needed in a fully operational science laboratory.

Not only are all our 'turn-key' projects completed efficiently and cost effectively but when the staff and pupils take up occupancy, everything they need to **'hit the road running'** is there, in place.

### How it works

Working with architects and designers, Labquip provide laboratory layouts that comply with all necessary legislation, health & safety requirements and that are relevant to the national curriculum.

Then depending on the teaching requirements at the facility we provide an equipment listing ...an 'Edu-List' using our detailed knowledge of the specific needs for the level of education being provided.

These fully itemised listings are included with our quotation for the complete fit-out project.

We are able to source specialist products and features that fall outside our standard catalogue range to tailor the proposal to your particular requirements. Even down to the finest detail, such as adapting cupboards and drawers for safe storage of glassware and delicate equipment.



## all about the Edu-List®

Edu-Lists have been compiled by teachers and technicians and are linked to the requirements of the UK and International Curricula ...at all levels of education!

They are universally recognised as comprehensive and complete lists of all the equipment required to fulfil science education needs.

Grouped into 11 categories they cover all ages and science disciplines as well as offering more general options where teaching needs are more diverse.

### The Edu-Lists

1. Early Years
2. Primary
3. Middle School Combined
4. Secondary Combined
5. Secondary Chemistry
6. Secondary Physics
7. Secondary Biology
8. A-Level IGSCCE Combined
9. A-Level IGSCCE Chemistry
10. A-Level IGSCCE Physics
11. A-Level IGSCCE Biology

### Selecting an Edu-List®

If the laboratory is being equipped for all three sciences then a Combined Edu-List is ideal.

If, however, the laboratory is dedicated to one science, then a choice of one or more can be made from the specific lists. Items common to all sciences, such as bunsen burners, will be repeated in all lists.

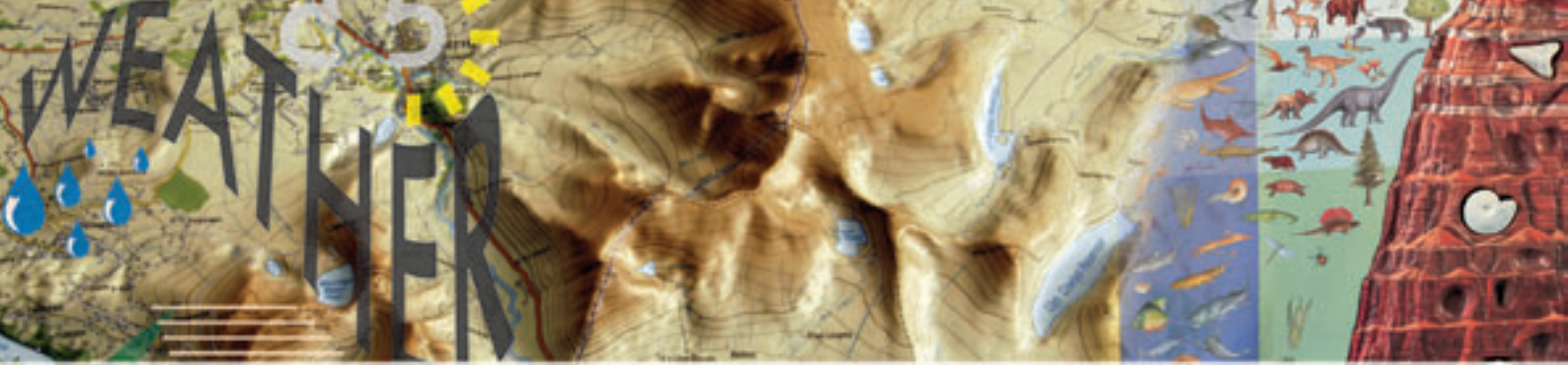
The resources are curriculum linked and based on class sizes of 25-30.

While many of the products assume group working, some items, such as the Combostills, can be used for individual work.

Some of the more complex or expensive items are intended only for use in class demonstrations.

Individually priced and referenced back to the Edu-Lab catalogue to access more detailed information on each item.





# Planetary & Earth Science

Environmental, renewable energy, weather, rocks & soils, fossils, maps, solar system, earth, pollution, recycling, seismology, water.



## Planetary & Earth Science

### 101 Orbiter

Sun, Earth and Moon manually revolve around one another on this gear-driven model. Effectively demonstrates daylight, night, seasons, and phases of the Moon. Arm is 380mm long, Sun is 150mm in diameter. Includes study guide.

### Illuminated Orbiters

151 110 Volt, US version

152 230 Volt, European version

Sun, Earth and Moon manually revolve around one another on this gear-driven model. Effectively demonstrates daylight, night, seasons, and phases of the Moon. Arm is 381mm long, Sun is 152mm in diameter. Includes study guide.



### 110 Astronomy Study Prints

This set of 12 Study Prints includes interesting facts and full colour illustrations depicting various aspects of astronomy.



### 1510 Astronomy Transparencies

Illustrate your point with this set of 6 overhead transparencies and one overlay. Topics include: Seasons, Moon, Eclipses, Star Chart, Solar System, and Day & Night.



### 155 Earth Moon System Lab Materials

This kit includes our Orbiter and Microslide® Viewer and lesson sets along with a 44-page Teacher's guide with activities using these two products and many other hands-on experiments and extension activities.

### 196 Earth Moon System Teacher's Guide

44-page Teacher's Guide with activities using the Orbiter and Microslide® Viewer.





**3066 Sun Scale Kit**  
**3064 Sun Scale Kit, set of 15**

Students measure several Sun-related phenomena. The kit includes 1 hardwood half-metre track, 1 adjustable calibrated projection screen and an instruction guide. Measurements can be made of the Sun's diameter, the distance of Sun from Earth and solar eclipses. Maths skills are integrated with science investigation.



**Motorized Orrery with Teacher's Guides**

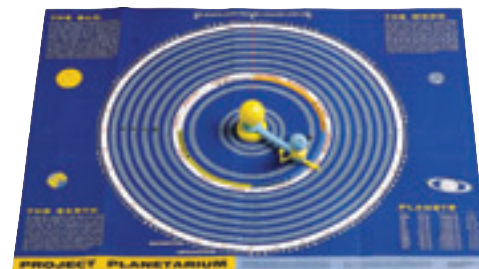
- 201 110 Volt, US version**  
**202 230 Volt, European version**

Internally gear-driven motor revolves planets around the sun in their relative orbits. Users can manually adjust planets according to the planet position table with the 360° scale on the base. Model is exceptionally quiet and includes a lesson plan to help explain orbit and speed.



**160 Project Planetarium Set**  
**162 Project Planetarium Set, set of 10**

Explore the mysteries of the solar system with a Project Planetarium Set. For individual or small group use, our set lets students plot eclipses, Moon phases and planet positions. Includes a study guide, solar system chart and mini Sun-Moon-Earth model.



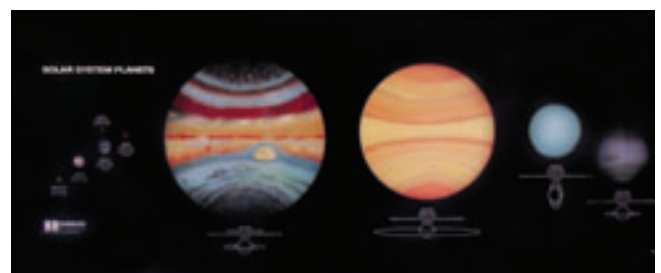
**200 Solar System Simulator**

Give your students the chance to see the solar system in action. The calendar at the base allows the positioning of planets according to date and shows the relative position between individual planets and the sun. Lesson plan facilitates explanation of orbit and speed.



**238-P Solar System Planet Poster**

Developed from the latest satellite information, this dramatic representation of our solar system has been approved for accuracy and detail by the Adler Planetarium. The large 457 x 1143mm format depicts planet size differential, planet colour and information about rings and moons. Printed on heavy paper stock to withstand classroom use.



## Exploring the Solar System

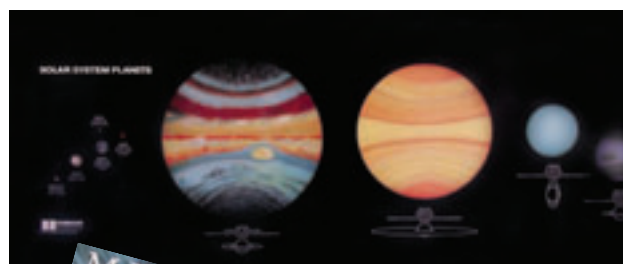
203 Lab Materials  
195 Teacher's Guide

Twenty complete lessons include hands-on activities that combine our best selling products, the Solar System Simulator and the Microslide® Viewer and lesson sets, to further investigate our solar system. Teacher's Guide included but also available separately.



## 238 Solar System Planet Plaque

Developed from the latest satellite information, this dramatic representation of our solar system has been approved for accuracy and detail by the Adler Planetarium. The large 457 x 1143mm format depicts planet size differential, planet colour and information about rings and moons. Plaque is vacuum formed in 3D raised relief.



## SR-ES1315 Meteorites Poster, 760 x 520mm 1315M Meteorites Poster plus Meteorite

Discover the world of meteorites with a colourful and thought-provoking poster. Actual photographs of meteorite fragments billions of years old are accompanied by detailed descriptions of their composition and their discovery sites all around the world.



## Microslides®

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (code: EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

### T403 The Planets (pk10)

Mercury (Mariner), Venus (Mariner), Mars (Viking), Jupiter (Voyager), Saturn (Voyager), Uranus (Voyager), Neptune with Moon, Pluto (Pair at 24 Hours).

### T410 The Moon (pk10)

The (almost) Full Moon, Craters and More Craters, Lunar Rock and Roll, Mountains and Plains, Crater Copernicus, Lunar Sightseeing, The Tides (the Bay of Fundy), A Lunar Eclipse.

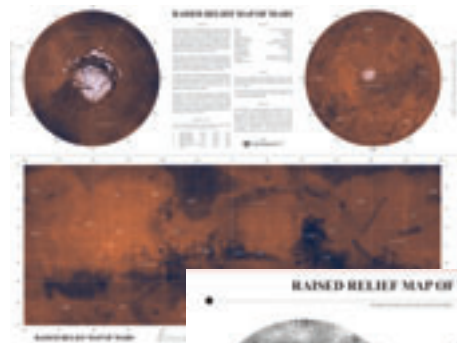


More of the Microslide® series, covering other subjects, can be found throughout this catalogue.



### 503-001 Mars Raised Relief Map

A raised relief map of the surface of Mars, showing the polar regions and the equatorial region as well as locations of spaceship landing sites.  
Size 26 x 34". Scale 1:1575000 1" = 421 miles.



### 503-002 Moon Raised Relief Map

A raised relief map of the surface of the Moon, showing the near and far sides and lunar mission landing sites.  
Size 22 x 34". Scale 1:1,500,000 1" = 240 miles.



### 26-20-4163 Exploring Mars Lab Investigation

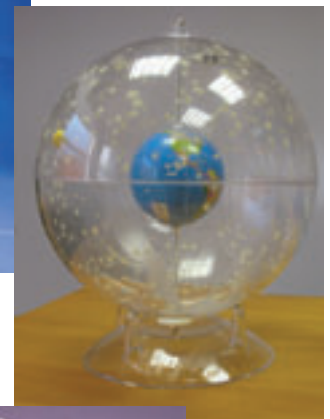
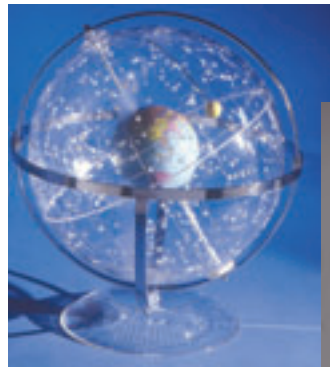
Take a field trip to Mars! Explore Mars with a CD-ROM which contains the latest images of the Red Planet. View the surface of our closest neighbour in three dimensions, using the special lenses provided. Explore the properties of minerals that have been found on Mars and draw inferences about the nature of the planet using soil that models the Martian terrain. Included CD also contains a special feature that allows both student and teacher alike to create presentations and assessments. An inquiry based activity encourages students to discuss the possibility that Mars once contained surface water.



### Celestial Star Globes

- 300 Celestial Star Globe
- 310 Basic Transparent

Unique 300mm diameter globe design gives visual aid to students' conception of Earth in space. Shows constellations and many other cosmic phenomena in a 3-D format. Globe can be set to reflect constellation position according to date. Includes a detailed study guide.



### 422 Sky Challenger

This combination of our star finder and six game wheels will test your celestial knowledge. A great way to review constellations and planet locations. Sky Challenger will provoke students' curiosity about the stars.



## 3010 Globe Kit

Developed as part of the Earth Science Curriculum Project, the Globe Kit enables students to participate directly in Earth measurements, solving astronomy problems and understanding seismology. Kit contains a 203mm diameter Earth globe, a transparent globe, internal Earth cone disk, flexible kilometer scale and a 203mm protractor. Teacher's Guide takes you through several activities.



## 26-20-4573 Earth Shakes Laboratory Kit

Simulate and demonstrate the power of an earthquake. It will be easy for your students to understand the forces that cause earthquakes to occur after they complete the activities in Earth Shakes. Using an interactive approach, students will model a strike-slip fault and see its possible destruction as the plate slips to relieve pressure! They will demonstrate S waves and P waves and will then assume the role of a wave in an earth shake! It will be easy to find the perimeter of an earthquake using new understandings to solve the puzzle.



## 3274 Seismograph Paper, pk 4

Seismograph paper, for use with seismographs such as our Seismology Model (code: 541).

## 541 Seismograph Model

Newly revised Seismograph model gives students a better understanding of how earthquakes are measured and calculated to intensity. This small table top unit will captivate your students as they try to top the Richter Scale. Simulate your own earthquakes and the Seismograph will accurately record their intensity. Complete with a detailed Teacher's Guide.



## 610 Physiographic Relief Globe

Study Earth's anatomy inside and out with this unusual 300mm globe. Special two piece construction gives students a cross-sectional view of the Earth's interior, depicting crust, mantle, inner and outer cores. Detailed notations specify temperatures, air densities, distances, and atmospheric layers. Globe surface shows all major landforms in raised relief. Markable globe. Includes comprehensive Teacher's Guide.



## 23-30-1160 Volcano Activity Model

Safely and easily demonstrate the principles of volcanism with this realistic model which erupts internally - just like a real volcano! The model is accompanied by comprehensive, fully illustrated teacher and student literature, detailed reference information and step-by-step instructions. Size: 295mm (D) x 100mm (H).





## BD0082 Volcano Model

Colourful, hand painted model offers an enlightening, cutaway view of a volcano and its associated processes.  
Size: 390(L) x 200(W) x 170mm(H).



## 23-35-1036 Visualizing Earth's Processes

Poster - 890 x 584mm

Vivid resource on key geologic processes. Features detailed overview of the rock cycle, as well as such key earth processes as faulting and folding, earthquakes, volcanism, weathering, erosion, and more!



## 23-30-1105 Tectonics Activity Model

Model faults, folds and other tectonic processes with this easy-to-use, hands-on model.



## 2523 Investigating Plate Tectonics

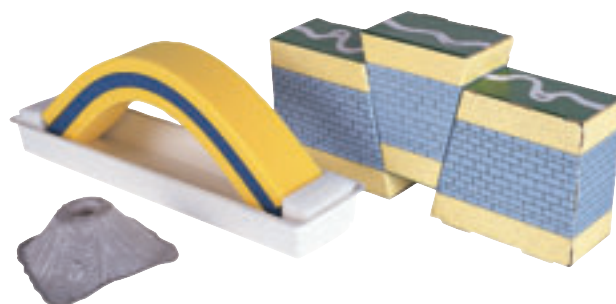
Framed Chart - 600 x 450mm

The evidence supporting the theory of Plate Tectonics is shown on this chart. Rock specimens that illustrate the variety of processes related to the Earth's dynamic crust are mounted on this 450 x 600mm wooden-framed chart.



## 555 Landform Demonstration Kit

Recreate, in your own classroom, the geological forces that have shaped the planet Earth. Over 20 activities are included in this kit that will enable your students to develop a thorough understanding of volcanic action, faulting and folding, as well as many other geologic processes. Kit includes demonstration tray, three pieces of flexible foam, three simulated rock structures, an erupting volcano, miscellaneous project materials and comprehensive Study Guide.



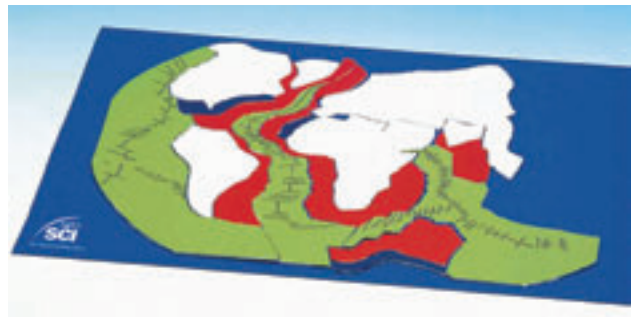
## 3057 Geology History Kit, set of 10

Students can recreate geologic processes by preparing stratified layers with 4 packs of Pleistocene clay, 1 roller, 1 cutting tool, and plastic sheets. Includes Teacher's Guide.



## 30-1150 Sea Floor Spreading Activity Model

Recreate the oceanic expansion of the past 150 million years. When Alfred Wegener was astute enough to propose continental drift in the early 1900s, he was unable to explain what natural force could move entire continents. That explanation would not come until years later as scientists began to understand the concept of sea floor spreading. Now you can demonstrate to your class the forces behind continental drift: the creation of new lithosphere at mid-ocean ridges which serves to push the tectonic plates apart. You'll be able to retrace the process over the past 150 million years, providing visual 'snapshots' as the earth evolved through the Jurassic and Cretaceous Periods and into the Cenozoic Era. Includes comprehensive Teacher's Guide. Size 600mm (L) x 350mm (W).



## Ocean Floor Raised Relief Maps

436 Map - 990 x 660mm

446 Map with Activity Guide\*

This map of the World captures the geography of the land and ocean floor. Ridges, trenches, mountains, continental shelves, continental slopes and islands are depicted. Framing options available.

\*Teacher's Guide with activities on making an ocean floor profile and studying continental margin types and earthquake and volcano distribution.



## 1520 Geology 1 Transparencies, set of 6

This unique, colourful set of 6 transparencies will help students comprehend basic geological processes. In combination with the Teacher's Guide, these interactive overheads with 4 overlays and movable parts will enhance students' understanding of geological formation. Includes: Volcano, Folded Mountain, Fault Mountain, Glaciation, Rock Cycle, and Geologic Time.



## 1525 Geology 2 Transparencies, set of 12

Continue to expand students' knowledge of geology with these twelve unique transparencies. Eight overlays and movable parts help to explain Dome Mountains, Faults - Normal and Reverse, Faults - Strike/Slip, Unconformity, Continental Glaciation, Coastlines, Stream Development, Drainage Patterns, Ground Water, Petroleum, Dip and Strike, Earth's Core. Includes Teacher's Guide.

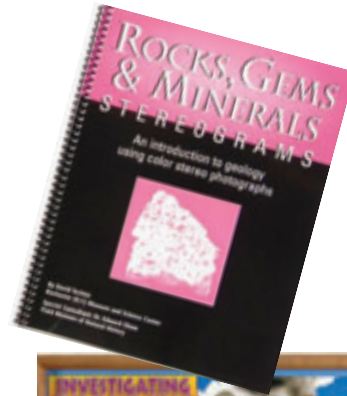




## Rocks, Gems and Mineral Stereogram Books

- 596 Stereogram Book
- 597 Stereogram Book, set of 10
- 595 Stereogram Book with glasses

Used with stereo glasses these matched pairs of stereo photos of rock, mineral and gem specimens will jump off the page. The 64-page book also features stereo photos of lunar rocks and the six crystal systems. Stereo glasses also available separately (code: 575).



## 2521 Rock Cycle Framed Chart

- 600 x 440mm

Rock specimens are mounted on a colour chart complete with wooden frame.



## 2124 Rock & Rock Forming

- Mineral Collection

24 specimens including 6 each of the following: rock-forming minerals; igneous rocks; sedimentary rocks; metamorphic rocks. Also includes a Study Guide.



## 2185 Advanced Earth Science Collection

105 specimens packaged in 9 separate units to correspond with the following subjects: Cleavage and fracture, streak, colour and lustre, rock-forming minerals, basic igneous, sedimentary and metamorphic rocks, and selected fossils. Also includes 9 specimens of the scale of hardness, streak plate, magnet, magnifier, geologic time chart and the Rocks & Mineral Study Guide.



## Rock Collections

- 2221 Igneous
- 2226 Metamorphic
- 2231 Sedimentary

Individual sets contain 15 representative specimens of rocks, each approx. 37 x 37mm.



## 2220 Expanded Rock Collection

45 specimens, approximately 38 x 38mm, includes 15 each of igneous, sedimentary and metamorphic rocks. Each category of rock is well represented and forms an integrated classroom study unit.



## 2251 Ores of Common Metals Collection

The term 'ore' is used in connection with a rock or mineral mass when it contains enough of an element or compound to make it economically feasible to mine. 15 specimens of the more important ores are included.



## 2215 Rock Collection - Introductory

Provides a primary presentation of the basic rock types. Includes five each of igneous, sedimentary and metamorphic rocks, totalling 15 specimens, approximately 37 x 37mm.



## 2217 Rock Study Kit

A great introduction to studying the basic rock types. Includes five each of igneous, sedimentary, and metamorphic rocks - with activity guide and magnifying glass.



## SR-1429 Rocks Clever Catch® Ball

24" (600mm) inflatable ball tests your students' knowledge on rock specimens. A creative way for children to learn!



## Rock Box Collections

- 7960 Igneous Rocks
- 7961 Metamorphic Rocks
- 7962 Sedimentary Rocks
- 7966 Geological Oddities

Four great collections of nine specimens all enclosed in a special plastic case and all with identifying labels and information. Perfect for the young budding geologist!





## Framed Charts - 600 x 440mm

- 2506 Igneous Rock
- 2511 Metamorphic Rock
- 2516 Sedimentary Rock

Rock specimens mounted on a colour chart complete with wooden frame.



## 2343 Introductory Mineral Study Kit

Students learn to identify these 15 common minerals by observing and testing their physical properties. Activity guide, magnifying glass, streak plate, and nail included. An excellent study kit for introduction to minerals.



## 2253 Classification of Minerals Collection

This collection includes examples of silicates, oxides, sulfates, phosphates, and other major mineral groups as classified in Dana's Textbook of Mineralogy. 50 specimens approximately 25 x 25mm, each specimen is labelled for identification.



## 2175 Introductory Earth Science Collection

Basic unit of 75 rocks and minerals demonstrates the major rock-forming minerals; the scale of hardness; and recognized physical properties. Unit includes 75 number-coded specimens, each size 32 x 20mm, a streak plate, magnet, magnifier and compartmented container.



## 7964 Minerals - Rock Box Collection

A great collection of nine specimens all enclosed in a special plastic case and all with identifying labels and information. Perfect for the young budding geologist!



## SR-1430 Minerals Clever Catch® Ball

Test your students' knowledge on mineral specimens. Are they hard or soft? Are they dull or shiny? Cleavage, Streak, Colour, Lustre. These are just a few properties of Minerals and the 600mm inflatable ball gives you 95 different facts to review these properties.



## D5310 Minerals of the World

Poster - 1372 x 990mm

52 beautiful photographs of minerals from around the world with detailed descriptions of each. Size: 1372 x 990mm.



## 25-35-1061 Common Minerals & their uses

Poster - 890 x 584mm

View highly detailed photos of common materials and explore their applications to our daily lives. Size: 890 x 584mm.



## 20-3033 Household Uses of Rocks & Minerals

An inquiry-based activity on the properties and uses of natural resources in the home. Did you know that most of the items used in our homes are mined from the earth? Fluorite is used in toothpaste and paint pigments, feldspar is found in soaps, and halite in mouthwashes - among many, many others! Your students will perform a series of hands-on experiments to determine the properties of various rocks and minerals as well as their common uses. Based upon their investigations, they will even try to identify new applications for particular rocks and minerals. Class size – 40 students.



## 2761 Chemical Composition of Minerals

Framed Chart

The relationship of predominant elements of the Earth's crust to the recipes for minerals will be explained in this project. Minerals of the Silicate, Sulfate, Sulfide, Oxide, Halide, Carbonate and Native Element families are mounted on this 440 x 600mm wooden framed chart.



## 6450 Mineral Test Kit

This kit supplies students with the tools necessary for rock, mineral, and fossil identification. The Test Kit includes streak plate, glass plate, hand lens, dropper bottle, magnet, nail, penny, and hardness scale. Comes in a zip-lock pouch.





## Scale of Hardness Collections

**2357** 9 pieces

**2358** 10 pieces with diamond

This collection is the traditional Mohs' Scale which assigned a 'hardness' to ten key minerals with talc the softest and diamond the hardest. The first 9 minerals are included in this set. 9 specimens approx. 25 x 38mm and number coded.



**9215** **Black Streak Plates**, pk of 10

**9211-S** **White Streak Plates**, pk of 10

These 25 x 50mm unglazed porcelain tiles are ideal for streak testing of minerals. The streak test is essential in mineral identification because it retains the colour of the mineral.



**9212-S** **Glass Streak Plates**, pk of 10

These 6mm thick glass plates are excellent for testing minerals. After scratching the plates, students separate hard and soft minerals. Size: 25 x 50 x 6mm.



## Microslides®

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (code: EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

**T303** **Minerals & Crystal System (pk10)**

Cubic - Halite (10x), Hexagonal - Vanadinite (10x) / Quartz (15x), Rhombohedral - Calcite on Calcite (25x), Tetragonal - Chalcopyrite (15x), Monoclinic - Muscovite (5x), Orthorhombic - Arsenopyrite (15x) / Aurichalcite (15x), Triclinic - inesite (35x), Twin Diamond (20x).

**T306** **Mineral Characteristics & Identification (pk 10)**

Colour - Malachite and Azurite (25x); Streak - Pyrite (1x) Vs. Gold (2x); Lustre - Turquoise (5x), Sphalerite (25x) and Asbestos (5x); Form & Crystal Structure - Malachite (5x) Vs. Prolistite (40x); Form & Crystal Structure - Malachite (5x) Vs. Prolistite (40x); Cleavage & Fracture - Galena (5x) Vs. Obsidian (1x); Chemical Properties - Acid on Calcite (35x); Special Properties - Luminescent Minerals (1/8x).

**T309** **Sand (pk 10)**

Olivine Sand - Arizona (30x), Garnet Sand - Namibia (25x), Volcanic Sand - Hawaii (25x), Stream Worn Sand - Montana (20x), Pebble Sand - California (25x), Beach Sand - California (25x), Desert Sand - New Mexico (15x), Trinitite - New Mexico (20x), Flugerite - Sahara (15x).



**More of the Microslide® series, covering other subjects, can be found throughout this catalogue.**

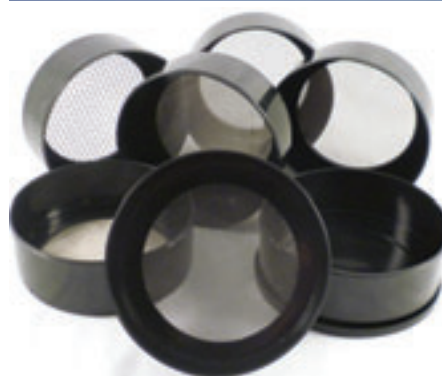
## 26-20-4143 Classification of Soils Kit

Discover the conditions that caused your local soils to form! Easy-to-use, portable and practical soil cards allow students to construct a soil profile in the field and then analyse it when they get back to the lab - with far less mess than using core samples!



## 3070-6 Screen Sieves, set of 6

Six screen mesh sizes (5, 10, 35, 60, 120, 230) will let students separate and grade soil and rock samples in order to determine the make-up of soil strata. Set includes bottom pan and lid with Teacher's Guide.



## 3196 Soil Profile Kit

### 3197 Soil Profile Kit, set of 10

Exhibit natural soil layers of the Earth with this kit. Soil should be arranged into the tubes to give a complete profile from topsoil down through subsoil, and parent material to bedrock. Includes two clear plastic tubes, 152 x 25mm, with caps and Teacher's Guide.



## HANNA® 'Backpack Lab'

### 510-007 Soil Quality Educational Test Kit

A new portable test kit specifically designed for teachers and students to get the most out of field trip testing.

This kit is designed to look at the main parameters for agriculture, containing all the important tests for evaluating soil quality and fertility, and relates these measurements to the principles of plant metabolism.

Supplied in a tough rucksack, the kit contains lesson plans and activities tied together by a comprehensive Teacher's manual that includes information about each parameter. Including detailed testing procedures, along with all the sample cups and chemicals to complete each task.

#### Included in each pack:

50 tests for: Nitrogen, Phosphorous, Potassium, pH; Waterproof pH/C tester; Waterproof Conductivity/TDS/C tester; HI-145 digital thermometer; Backpack style carrying case to hold all components; Extensive teachers manual with a curriculum that meets the National Science; Teachers Association Standard; Overhead transparencies with summaries for each parameter; Laminated instruction cards with step by step procedures; Lab activity worksheets with instructions, goals, hypothesis results and comments; Glossary of terms.

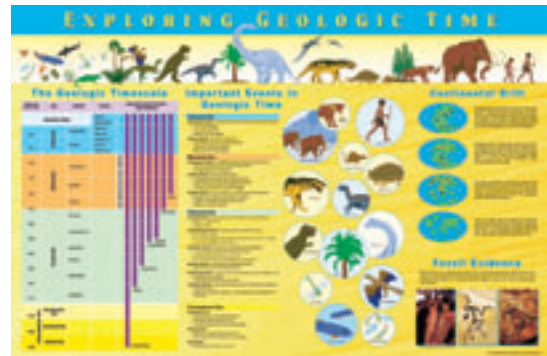




## 25-35-1146 Exploring Geologic Time

Poster - 890 x 584mm

Take a trip back in time and see the plants and animals that lived then! Get budding palaeontologists excited about geologic time with this History poster. Students discover the plants and animals that lived during the major divisions of geologic time - Era, Periods, and Epochs. They'll also visualise the milestones of geologic history in the order they occurred and learn how they are related to continental drift. Includes a detailed Teacher's Guide.



## 23-20-1553 Fossil Formation & Identification

Learn how fossils help in studying the Earth's past. Students will learn how fossils form under various conditions and identify several different kinds of fossils by casting actual models of them. They'll also use the included fossil collection and Geologic Time Chart to trace many different life forms that have existed throughout the march of time.



## 3051 Variation and Evolution Fossil Kit

Introduce your students to intraspecific and interspecific variation with this fossil collection. Students use callipers and rulers to measure internal and external dimensions of 50 fossil brachiopods embedded in reproduction plastic rocks. Includes Teacher's Guide, callipers, reproduction rock formations and rulers.



## 567 Life on Earth - A Fossil History

This fossil history model is an exciting product designed to help students understand how life has changed over vast periods of geologic time. Constructed of durable vinyl, the 23.5" x 24.5" colourful 3-D model allows students to correlate 21 replica fossils to realistic looking rock layers. Illustrations and 'fossils' include both marine and terrestrial life forms from the Pre-Cambrian through to the present. Eons, eras, periods, epochs and years are clearly shown on the chart.

The Teacher's Guide includes: classroom activities, pre/post tests, reference materials and glossary.



## 571 Fossil Reproductions, 5 sets of 21

Ideal for use with 'Life on Earth - A Fossil History' above. (code: 567).

**566 Fossil Laboratory**  
**564 Fossil Laboratory, set of 5**

The 20 plastic fossils and detailed Laboratory Manual in this kit will let your students become practising palaeontologists. Kit conveys importance of fossil study to investigations in geology, history, mapping, and stratigraphic correlation.



**3785 Fossil Hunt Kit**

Students learn to identify different fossils after digging them out of a gravel mixture. Kit contains 1lb bag of gravel mixture with 12 real fossils (2 each of 6 different) and corresponding large identified specimens, magnifier, forceps, and Teacher's Guide.



**3015-S Advanced Fossil Collection**

This comprehensive collection of 30 fossils contains demonstration specimens of animal phyla and plants from the Paleozoic, Mesozoic and Cenozoic periods. Collection is complete with an identification key sheet and geological time chart. Key Stage 3, 4 & 5.



**2830 Fossil Premium Collection**

A collection of premium geology specimens. The Fossil Collection is packaged in an attractive tray for permanent use and storage. Each collection includes 12 extra large specimens (50 x 75mm), 12 identification cards with detailed information, 4 high-quality hand lenses, student log book, and a comprehensive Teacher's Guide.



**7965 Fossils - Rock Box Collection**

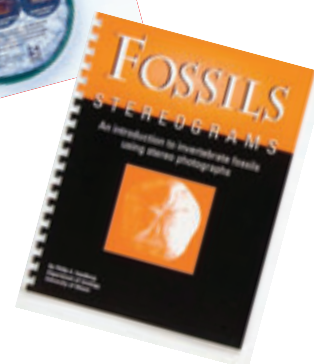
A great collection of nine specimens all enclosed in a special plastic case and all with identifying labels and information. Perfect for the young budding geologist!



**Fossils Stereogram Books**

- 585 Stereogram Book**
- 586 Stereogram Book, set of 10**
- 583 Stereogram Book with glasses**

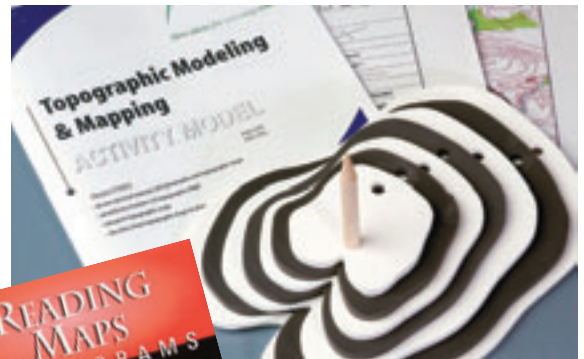
This stereogram book will give students a 3-D, detailed view of fossil images generated through a scanning electron microscope. More than 100 pages, 213 x 275mm. For use with Stereo Glasses (code: 575).





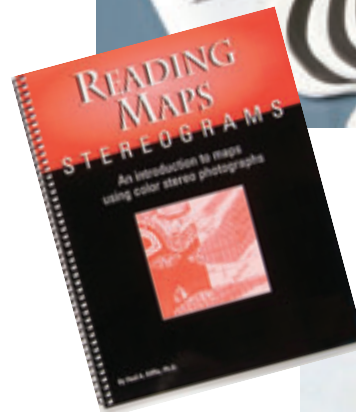
## 24-30-1325 Topographic Modelling & Mapping Activity Kit

Learn the basics of mapping by developing contour models. Additionally learn about map reading, map symbols, scale, latitude, longitude and direction. Includes an illustrated teacher's and student's guide with easy-to-follow instructions.



## 440 Reading Maps Stereogram Book

Help your students learn how to read and understand maps with this stereogram book. Aerial photographs are matched to corresponding map images to emphasize the correlation between map contours, topographical and actual features. Use with Stereo Glasses (code: 575) for 3-D effect.



## 560-001 Orienteering Compass

Graduated 0-360°. Liquid filled capsule. Declination metric scale within base plate. Magnifier 25mm diameter. With lanyard. Size: 108 x 60mm.



## PH0820A Plotting Compass, Economy

16mm dia., pk10

Dial marked with cardinal and ordinal points of the compass. Glass faced on one side in aluminium case. 16mm diameter.



## PH0822 Plotting Compass, 2 Glass Faces

20mm dia., pk10

Glass faced on both sides, mounted in aluminium ring of 20mm dia. Provided with a durable plastic case for storage.



## PH0823A Aluminium Pocket Compass

45mm

A small compass in aluminium case. 45mm diameter. Marked in degrees with N & S indications.



## PH0824 Pocket Compass with Cover

45mm

Graduated in degrees with compass points marked. During transportation the compass is protected by a locking mechanism for the needle and a hinged cover.



**452 Europe/Africa Geopolitical Map**  
1245 x 940mm

The Mundo Cartographic maps are 2-sided and laminated with durable plastic trim for hanging, with detailed charts and graphs that supply additional information. Appropriate for all grades.

**434 World Geophysical Map**  
800 x 550mm

A 3-D raised relief map highlighting physical features and showing countries, cities and oceans.

**520 Map, Europe Raised Relief**  
900 x 640mm

A 3-D raised relief map highlighting physical features and showing countries, cities and oceans.

**600 Land & Ocean Globe**

Students discover the intricate patterns of land and water covering the Earth with this 300mm diameter globe. Details of land masses and bodies of water are depicted in 3-D raised relief. Ocean sections are covered by clear plastic representing the ocean surface. Names of oceans, seas, currents, deep-sea ridges and basins are visible through the plastic covering. A Teacher's Guide is included.

**1244EVRR Globe: Madison Physical**

Globe for serious study of the world, over 4,000 place and feature names: canals, dams, falls etc, detail of city sizes, city & town populations, boundaries. Shows physical earth terrain, deserts, alpine & tundra, broadleaf forest etc, helping with the understanding of why some areas are very populated and some not. Shows water depths. Diameter 300mm. Scale: 1/42,000,000.

**304-CA Globe: Madison Political**

Globe for serious study of the world, over 4,000 place and feature names: canals, dams, falls etc, detail of city sizes, city & town populations, boundaries. Has additional Analemma symbol, how the earth tilts towards and away from the sun throughout the year, with months and dates - helping with the understanding of summer and winter in both hemispheres. Diameter 300mm. Scale: 1/42,000,000.

**617 Inflatable Globe - 600mm**

This inflatable World Globe is an inexpensive way to get a globe into the hands of each student. Countries, capitals, important cities, time zones and geographic features are just a few of the attributes of this 600mm, easy-to-inflate World Globe. Great for school and home use.





## SR-1457 World Geography Tumble 'n' Teach

This 178mm inflatable cube provides a new and exciting way to learn about world geography! Enclosed in this cube is a 51mm vinyl cube which has printed on its sides, 'Nation', 'Major City', 'River', 'Mountain', 'Ocean' and 'Desert'. The student will look through the top (a continent) to identify the topic on the smaller cube inside. For example, Continent = North America and Topic = Mountain; Answer = Rocky Mountains! This Tumble 'n' Teach cube may be tossed around the room or kicked about in a circle..



## 570 Earth in 3-D Stereographic Study Book

An effective visual introduction into geology. Aerial photographs of geological locations have been digitally transformed into fascinating 3-D views. There are sixteen aerial images included in this 3-D book, vividly illustrating dozens of landforms typically covered by earth science text books, such as mesas, landslides, faults, dunes, and volcanoes. A description of the location and a series of study questions accompany each photograph. Two pairs of 3-D glasses are included with each book.

## 601 Earth in 3-D, Teacher's Guide

Teacher's guide only for the Earth in 3-D (code: 570). Stereographic Study Books.

## 573 3-D Glasses for Earth in 3-D - set of 15 pairs

3-D glasses to accompany the Earth in 3-D (code: 570) Stereographic Study Books.



## Aerial Stereo

- 580 Photographs Book
- 581 Photographs Book, set of 10
- 579 Photographs Book with Stereo Glasses

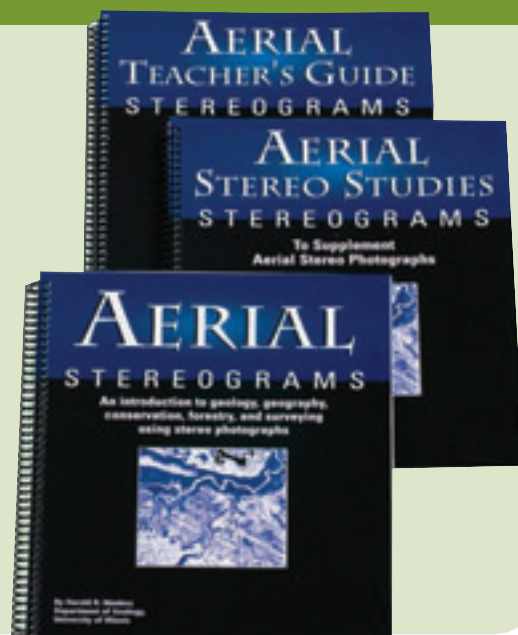
Emphasize elevations, depressions and contours of natural terrain with this 96-page, 207 x 280mm stereogram book. 3-D effect is dramatic with Stereo Glasses (code: 575).

## 588 Study Book

A unique book designed to supplement and enrich the collection of 3-D photographs contained in the Aerial Stereo Photographs Book (code: 580). Includes student activities with questions on the Aerial Stereo Photography Book. 48 pages.

## 584 Teacher's Guide

This Teacher's Guide accompanies the Aerial Stereo Study Book and contains answers to questions. 48 pages.



**456 Stereograms Contour Book**

Students will be able to read a landscape from a flat contour map after using this 32-page stereogram book. 10 typical landforms are depicted as topographic maps juxtaposed to stereo contour maps of each area viewed with stereo glasses (code: 575).

**575 Stereo Glasses**

**576 Stereo Glasses, set of 10**

Create the illusion of 3-D when used in conjunction with stereo pictures or aerial photos. Made of high impact, crystal - clear plastic with 2.2X magnification, adjustable inter-pupillary distance and folding legs for compact storage. Use with any of the stereogram books or stereogram photo sets.



**8455-DVD Physical Oceanography Videolab with DVD**

Hands-on lab activities approach the topic of physical oceanography. Activities include the topics of bathymetry, ocean floor profiles, tides, sand and sedimentation types, density, turbidity, and surface currents. Complete with Teacher's Guide.



**1035 Oceanography Transparencies 1**  
- set of 6

Help your students integrate basic oceanography using this set of six colour transparencies. Six detailed overlays facilitate explanation of Oceanographic Features, Ocean Currents, Earthquake Zones, Coral Reef, Deep Water Waves, Shallow Water and Waves.

**1036 Oceanography Transparencies 2**  
- set of 12

Developed as a tool to assist in explaining detailed scientific information, this set of 12 overhead transparencies focuses on the physical properties, composition and life systems of the sea. Two overlays add information about Guyots, Magnetism of the Sea Floor, Seismic Sea Waves, Oceanic Ridge-Rise System, Echo Sounding, Life in the Sea, Temperature in the Sea, Fracture Zones, Submarine Canyon, Beaches/Beach Cycles, Water Masses and Salinity of the Sea.



**1530 Meteorology Transparencies**

Set of 6 transparencies to help illustrate aspects of meteorology to learners.



## 8882 Water Cycle Model Activity Set

Make it rain in your classroom! Students can duplicate the individual processes of the water cycle (evaporation, condensation and precipitation) with this ingenious model. Accompanying set of ten 220 x 280mm full colour study prints (described below) and transparencies will aid students' understanding of the water cycle and enhance awareness of the various states of water.



## 8884 Water Cycle - Model Only

## 8883 Water Cycle Cards, set of 10

Water is not only the most significant liquid on Earth, it is also one of the most unusual. Help your students understand the properties of water with this set of ten, 22 x 27mm study cards.



## 3071 Stream Table Kit

## 3072 Stream Table Kit, set of 4

Basic and smaller version of the Hydro-Geology Stream Table, this kit includes a plastic tray, drain trough, tray support and siphon tube. This economical stream table will give your students the chance to create their own landforms and follow the changes in the stream as it ages. Includes Teacher's Guide. Great for use in the classroom or as an outdoor activity.

## 3151 Evaporation Kit

## 3150 Evaporation Kit, set of 15

Used to examine the process of evaporation and measure humidity, this kit includes a beam balance with wire hangers and a sponge that is cut into two equal pieces.



## Plastic Column Kit

## 3182 Kit with Beads

## 3181 Kit without Beads

## 3180 Kit without Beads, set of 15

How do porosity and permeability affect the distribution of aquifers? Help students study these concepts and integrate maths, measurement and percentage skills. Kit includes: tube, drainage fixture, screen, Teacher's Guide.

## Plastic Column Kit - Spares

## 3275 4mm Beads

## 3276 7mm Beads

## 3277 12mm Beads

## 3206 Drain Assembly, pk of 10

Replacement beads supplied in 500ml (approx.) packs.



**2691 Cloud Model Activity Set**

3-D model promotes basic understanding of cloud types in the classroom or outdoors, plus science and maths skills. Removable labels let students identify cloud structures and altitudes on a 600 x 450mm model. Includes 3-ring binder with glossary, key, blackline master and a full-colour overhead transparency.



**D2310 Cloud Chart**

This chart has been prepared to aid the interpretation of cloud reports in the International Cloud Figure Code. 35 images of different types of cloud formations complete with forecasts beneath. Size: 890 x 584mm.



**3216 Air Mass Generator Kit**

**3215-H Air Mass Generator Kit, set of 10**

Investigate how air mass is formed and how temperature relates to different types of air masses. Two add-ons at different heights inside a tube show how temperature varies with altitude. The set includes one 64 x 450mm transparent and markable tube with integral thermometers on a track, two-piece convection chamber, tubing, funnel, smoke generator and Teacher's Guide.



**3226 Coriolis Effect Kit**

**3225-H Coriolis Effect Kit, set of 10**

As the steel spheres track a pattern on the kit's turntable, students simulate the effect of the Earth's rotation on winds, ocean currents and material objects.



**13-35-1151 Poster - Weather and Climate**

Beautiful graphics and photos show how climate and weather are related! Observe how cloud vapour masses help drive the water cycle. Trace ocean currents and observe their influence on local weather conditions. Size: 890 x 584mm.



**26-35-1346 Poster - Predicting the Weather**

Teach students how to predict tomorrow's weather! Weather is an important part of everybody's life. It determines how we dress and what we do on a daily basis. Using this poster your students will learn how to read a weather map, recognise weather symbols, decode different types of weather maps, and describe the characteristics of a weather system using the hurricane as a model. Then you can challenge your students to predict your local weather! Size: 890 x 584mm. Includes an illustrated Teacher's Guide.





### SR-1431 Weather Clever Catch®

100 weather-related questions at multiple difficulty levels - answer the one below your thumb when you catch the ball. Comes with instructions/answer sheet.



### EDU1019 Thermometer - Max/Min

Mercury free, maximum/minimum thermometer. Environmentally friendly, reliable and accurate. Low temperature capability. ISO 9001: 2000 Quality assured manufacturer. Easy to read.



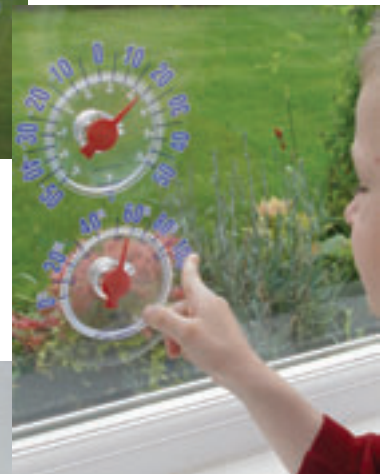
### EDU1021 Thermometer - Clock

Dual scale indoor/outdoor thermometer with clock, for a wide range of applications. Temperature range: -50° to 70°C. °C and °F switchable, 0.1°C resolution LCD display. Sampling cycle: 10 seconds AAA battery included. Size: 82 x 74 x 21mm.



### EDU1051 Thermometer - Windowpane

This innovative clear, flexible and virtually transparent window thermometer with a centre suction attachment adheres firmly to windows or glass doors using electro-static technology. It has been designed to allow air to circulate around the thermometer to stop exaggerated readings caused by heat radiation through the glass. Range: -50°C to 50°C. Diameter 80mm. Will stand up to 20mm from window.



### EDU1200 Thermometer & Hygrometer

Innovative clear, flexible, and virtually transparent thermometer with hygrometer (humidity).

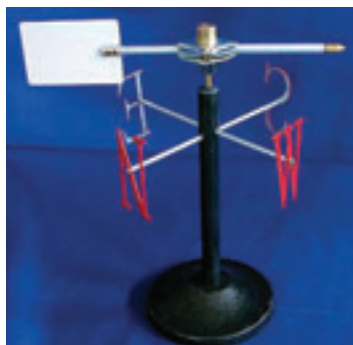
### 530-001 Weather Station

Wooden weather station for 'Globe' project work. Louvered, front hinged door. Sloped roof with ventilation holes in side and rear. Nuts and bolts provided for mounting on post. For mounting weather instruments (not included). Size: 450 x 350 x 220mm.



**530-002 Weather Vane**

Wind vane on metal stand.



**PH0241A Rain Gauge, Copper, BA Pattern**

127mm funnel, an inner receiving vessel and outer body all of copper and a glass measuring cylinder graduated 0 to 10mm x 0.1mm (100 divisions).



**PH0241B Spare Glass Measure** for Rain Gauge

Glass measuring cylinder graduated 0 to 10mm x 0.1mm (100 divisions). Spare part for BA Pattern Rain Gauge (code: PH0241A).

**3106 Sling Psychrometer Kit**

**3105-H Sling Psychrometer Kit, set of 15**

Measure relative humidity with this simple sling psychrometer. Consists of wet and dry bulbs and Celsius thermometers that rotate on a plastic handle. Correlate with other instruments in weather investigations.



**PH0246 Aneroid Barometer**

100mm dial graduated 28 to 31" of mercury and 960 to 1060 millibars with plated bezel, cover glass and index. Plastic base approx. 160mm dia.



**PH0248 Aneroid Barometer (demonstration)**

Enclosed in a transparent plastic case for demonstration purposes. A pressure bulb is provided to force the movements for educative demonstration.





## Science Skills Games - Key Stage 3

### About the Science Skills Games Range

Comprehensive Coverage of the Current NSES Standards for Grades 1 - 8 (ages 5-14 years).

#### Each set features:

25 Sets of 30 standards-based review cards - a total of 750 review cards. Each set is focused on a specific curriculum topic and leveled by content & readability.

12 Double-sided, laminated game boards.

Comprehensive Teacher Planning & Resource Guide

Presentation CD featuring interactive review questions for use on a PC, Mac or projection unit.

Free introductory online subscription to access interactive content, activities and assessments.

The Curriculum Mastery Games are written by teachers using research-based principles and tested in the classroom, each Class-Pack game includes enough materials for 36 students!

# Science Skills



### 101-139 Grade 6 Science Skills Game

Introduction to Earth Science; Maps as Models of the Earth /Contour Models; Rocks; Earth's Energy Resources; Earth's Fresh Water; Groundwater Resources; Earth's Atmosphere; Our Solar System; Studying & Exploring Space; Diversity of Life; Cells: The Basic Units of Life; Genetics: Study of Heredity; Plant Processes; Plant Reproduction; Introduction to Animals; Sponges, Cnidarians & Worms; Molluscs, Arthropods & Echinoderms; Fishes, Amphibians & Reptiles; Birds & Mammals; Ecosystems, Food Chains & Food Webs; Introduction to Matter; Solids, Liquids & Gases; Electricity and Electromagnetism.



### 101-140 Grade 7 Science Skills Game

Earthquakes; Volcanoes; Weathering of Rocks & Soil Formation; Agents of Erosion & Deposition; Climate; Exploring the Oceans /Oceanography; The Sun-Earth-Moon System; Our Solar System; The World of Life Science; Cell Processes; Cell Reproduction; Introduction to Animals; Bacteria and Viruses; Protists & Fungi; Introduction to Plants; Ecosystems, Food Chains & Food Webs; Chemistry in Our World; Technology in Our World; Work & Machines; Motion; Forces; Energy & Energy Resources; Mixtures, Solutions & Compounds; Elements & the Periodic Table; Acids, Bases & Salts.



### 101-141 Grade 8 Science Skills Game

Minerals; Fossils; Geologic Time; Plate Tectonics; Movement of Ocean Water; Understanding Weather; Stars, Galaxies & the Universe; Our Impact on Earth; Modern Genetics; The Evolution & Interaction of Living Things; Bones, Muscles & Skin; The Digestive System & Nutrition; Circulation & Immunity; Respiration & Excretion; The Nervous System; The Endocrine System & Reproduction; Elements & the Periodic Table; Properties of Atoms; Chemical Reactions; Mixtures, Solutions & Compounds; Forces in Fluids; The Energy of Waves; Sound; Light; Heat & Heat Technology.



## Science Skills Games - Key Stage 3

### 101-142 Middle School Science Skills Game

Introduction to Earth Science; Maps as Models of the Earth /Contour Models; Minerals; Rocks; Fossils; Earth's Energy Resources; Geologic Time; Plate Tectonics; Earthquakes; Volcanoes; Weathering of Rocks & Soil Formation; Earth's Fresh Water; Groundwater Resources; Agents of Erosion & Deposition; Exploring the Oceans/Oceanography; Movement of Ocean Water; Earth's Atmosphere; Understanding Weather; Weather Patterns; Climate; Studying & Exploring Space; Stars, Galaxies & the Universe; The Sun-Earth-Moon System; Our Solar System and Our Impact on Earth.



### 8485DVD Earth Science Videolab + 2 DVD's

'Thunderstorms: Nature's Fury' & 'Hurricanes: Earth's Greatest Storms'

There are hands-on activities that help students understand the basic weather conditions and concepts that produce our most common storms! Also includes Teacher's Guide, instructions for twelve complete stations, answer sheets and teaching tips.



### SR-1566 Clever Catch® Natural Disasters

Natural Disasters are in the news with increasing frequency. They are changing our daily lives and affecting the global environment. This ball has topics pertaining to storms, plate tectonics, wild fires, tsunamis and more.



### 101-122 Earth Science Flipchart

- Middle School

Middle School Earth Science Flipchart - Minerals; Rocks; Fossils; Geologic Time; Plate Tectonics; Earthquakes; Weathering of Rocks & Soil Formation; Earth's Atmosphere; Understanding Weather & Our Solar System.

#### About the Science Flipchart sets:

10 set series presents leveled review of Grades 1 - 8 (5-14yrs) science standards.

#### Each Curriculum Mastery flipchart set features:

- 10 Double-sided, laminated charts.
- Full-sized, 30 x 45cm charts.
- Activity Guide featuring black-line copy-masters
- Sturdy easel for years of classroom application
- Activity chart featuring questions, labelling exercises, vocabulary review & more.





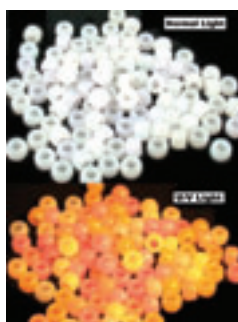
- 3112**      **Radiation Kit**
- 3109**      **Radiation Kit**, set of 8
- 3110**      **Radiation Kit**, set of 15

This simple experiment allows students to measure how the colour of an object affects its ability to absorb and to emit heat. Each kit contains 2 containers (one dark and one light in colour), 2 insulating lids, 2 thermometers, lamp, reflector and 150 watt bulb. Teacher's Guide included.



### **EDU1249**   **UV Detecting Beads**, pk of 100

These UV sensitive beads turn from white to varying bright colours when exposed to sunlight or other UV sources. The beads can be used, for example, to test the effectiveness of UV protection in sunglasses or to create a simple bracelet which can function as a UV detector.



### **4701**      **Solar Furnace**

Demonstrate the extraordinary power of the Sun by concentrating solar energy with this 305mm diameter parabolic dish. Using its reflective mirror, the furnace can generate extreme temperatures to heat materials placed in the attached copper receptacle.



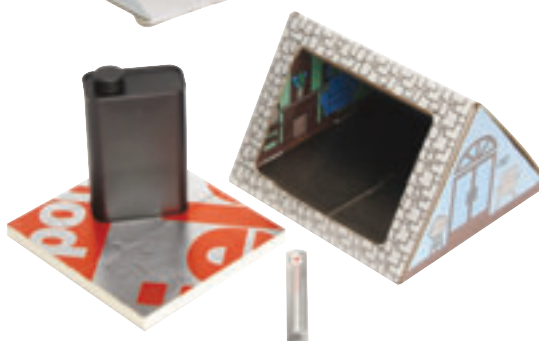
### **4702**      **Solar Oven**

Gain experience with solar radiation using this solar oven. It has reflective surfaces that concentrate heat radiation in the central chamber, resulting in temperatures up to 350 degrees centigrade. An accompanying Teacher's Guide gives suggestions for classroom experiments.



### **4706**      **Sunpower House**

Expand students' understanding of energy costs with this working model of a passive solar house. The 275 x 275 x 200mm model comes complete with a detailed Teacher's Guide containing activities in basic science, solar energy and energy conservation.



### **4730**      **Suntracker**

With this fascinating sky dome, students can plot the position of the Sun for any given time and date. An effective tool for illustrating Earth/Sun relationships, the Suntracker gives students the opportunity to participate in the process of discovery while practising actual science skills. The 300 x 150mm unit includes a Teacher's Guide.



## **QUAD** Quadrat Frame, Folding

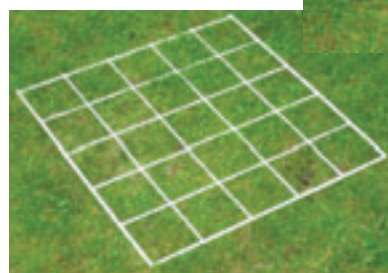
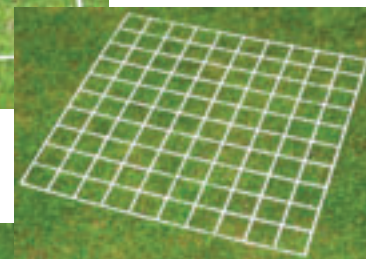
Set of 4 wires, screws and nuts which assemble into a square. Manufactured in nylon-coated mild steel with screws in zinc plated mild steel. Dimensions: 500 x 500mm.



## **QUAD100** Grid Quadrat, 100 squares

Subdivided into 100 squares for easy percentage cover calculations or presence and absence and constructed from heavy gauge steel wire, plastic-coated at high temperature to strengthen the welds. Ideal for dense vegetation or sites with lower numbers of species. Dimensions: 500 x 500mm.

**Note:** Due to the amount of wire and welds involved this quadrat is not exactly 500 x 500mm external dimensions.



## **QUAD25** Grid Quadrat, 25 squares

Subdivided into 25 squares and constructed from heavy gauge steel wire, plastic-coated at high temperature to strengthen the welds. Ideal for dense vegetation or sites with lower numbers of species. Dimensions: 500 x 500mm.

## **310-016** MicroLife Water Field Kit

The kit is designed for use in the lab or in the field. It allows users to study: Biological Oxygen, Dissolved Oxygen, Orthophosphates, Turbidity, E.Coli, Nitrate, pH, Conductivity, Nitrite, Temperature. User-friendly worksheets and other resource materials are included. This kit is designed for educational use. Results require confirmation with suitable reference methods.



## **310-017** MicroLife Water Monitoring Kit

The kit is designed to provide a simple, affordable and safe method of performing basic water quality tests. The written material applies to the testing of surface water from rivers and dams, however some of the tests can be done on ground water too. The test for residual chlorine applies to treated water only. The kit contains enough equipment to enable most of the chemical tests to be conducted on ten different water samples. Armed with the results of the various tests you complete, you should be able to safely conclude whether the water you are testing is in a good, fair or bad condition. You should then be able to make some recommendation or determine appropriate actions to improve not only the quality of the water, but also the lives and living conditions of the people who depend on this natural resource. Your samples will require confirmatory testing at a recognised reference centre. Results generated with this kit are to be used as a rough qualitative guide only and are for educational purposes only.





### 33-20-1153 Why is the Water Green?

- Laboratory Kit

Investigate how common pollutants effect pond microlife. Understand how nitrogen and phosphorous contribute to environmental problems. Observe the effects of different pollutants on the growth of algae. Calculate the growth rate of algae.



### 33-20-1213 Ground Water Contamination

- Laboratory Kit

Visualise the potential contamination of groundwater. Construct mini-groundwater models showing the movement of a simulated, coloured pollutant. Determine under what conditions contamination occurs from a variety of sources such as spills, farms, and buried tanks and how polluted groundwater eventually reaches the drinking water supply.



### 20-1513 Water Pollutants and Purification

- Laboratory Investigation

Demonstrate the key concepts of water treatment. What is the source of our drinking water? How are its impurities removed? What route does it take on the way to our taps? What is the difference between hard and soft water? These are just a few of the questions your students will answer as they perform a series of hands-on activities investigating the water we use in our everyday lives. They'll also explore the primary sources of water pollution and the most effective means to prevent it and to repurify water. Class size – 40 students.



### 34-20-3543 Dissolved Oxygen Testing Kit

A complete water science lesson in each kit! Test for this critical indicator of water quality. Includes fifty tablets to conduct simple colour reaction tests. Class size – 40 students.



### 34-20-3523 Testing Waste Water Kit

A complete water science lesson in each kit! The perfect complement to the Testing Drinking Water Kit with a focus on where our wastewater goes and the importance of the treatment process. Includes fifty test strips each for chlorine, phosphates and nitrates/nitrite. Class size – 40 students.

### 34-20-3503 Testing Drinking Water Kit

A complete water science lesson in each kit! An excellent introduction to the sources of drinking water, how our bodies use water and how water reaches our homes. Includes fifty test strips each for pH, alkalinity, hardness, fluoride and chlorine. Class size – 40 students.



### 34-20-3513 Testing Ponds & Streams Kit

A complete water science lesson in each kit! Learn about the water cycle, watersheds, acid rain and the sources of non-point-specific pollution. Includes fifty test strips each for alkalinity, phosphates, pH and nitrates/nitrite. Class size – 40 students.

### HANNA® 'Backpack Lab' Educational Test Kit 550-003 Water Quality

Everything students need to know about environmental water parameters - in one backpack!

This portable kit contains well constructed lessons and activities, and will allow the teacher to get the most out of their classroom or fieldwork time. Backpack Lab™ is designed with all the necessary components in one place, reducing the chance of misplacing an item. This durable backpack is ideal to take to the field for on-site measurements. The components are tied together by a comprehensive teacher's manual that includes information about each parameter, classroom activities designed to introduce students to each parameter, and detailed field testing procedures. HANNA® parameter test kits and pocket testers provide teachers with a valuable tool in helping students assess the water quality of streams, rivers and lakes.

#### Included in each pack:

- 110 tests for: Acidity; Alkalinity
- 100 tests for: Carbon Dioxide; Dissolved Oxygen; Hardness; Phosphate; Nitrate
- Waterproof pH/C tester
- Waterproof Conductivity/TDS/C tester
- Backpack style carrying case to hold all components
- Extensive teacher's manual with a curriculum that meets the National Science Teachers Association Standard
- Overhead transparencies with summaries for each parameter
- Laminated instruction cards with step-by-step procedures
- Lab activity worksheets, with instructions, goals, hypothesis results and comments
- Glossary of terms





### 550-002 Water Sampler

Our unbreakable plastic water sampler is the right choice for schools. Impact resistant gray PVC body with soft rubber seals holds 1.75 litres. Our exclusive custom closing needs no messenger - just jerk the line sharply to close. Includes: 20m line on styrofoam winding float. Do not use in salt water.



### 33-20-1223 Do Landfills Really Work?

- Laboratory Investigation

Investigate the effectiveness of landfills in disposing of solid waste. Build your own mini landfill, investigating the biodegradability of various waste in a sanitary versus an open configuration. Using the results, determine the advantages and disadvantages of these two standard types of landfills and explore their long term effects on the environment.



### SR-1460 Alternative Energy Clever Catch®

When you catch the ball it's your turn to read and answer, true or false, multiple choice or fill-in-the-blank question. Students can play by themselves or they can play in small groups. Comes with an answer key and a repair patch (just in case!). Includes questions such as: Another term for solar cell is \_\_\_\_? In modern hybrid autos, fuel is a combination of: a) diesel & gasoline b) ethanol & gasoline c) gasoline & battery-powered) solar & diesel.



### 3980 Natural Energy Kit

This kit has 19 hands-on activities which explore electric, wind, solar, geothermal, biomass and nuclear energy. Kit includes: a Teacher's Guide and lab materials for five students.



### 4774 Energy Model

A basic understanding of energy is central to every scientific discipline. The Energy Model will provide an overview of energy types in association with their origins and processing requirements in the U.S. Actual samples include crude oil, coal, natural biomass and a solar cell. Dimensions: 610 x 400 x 50mm.

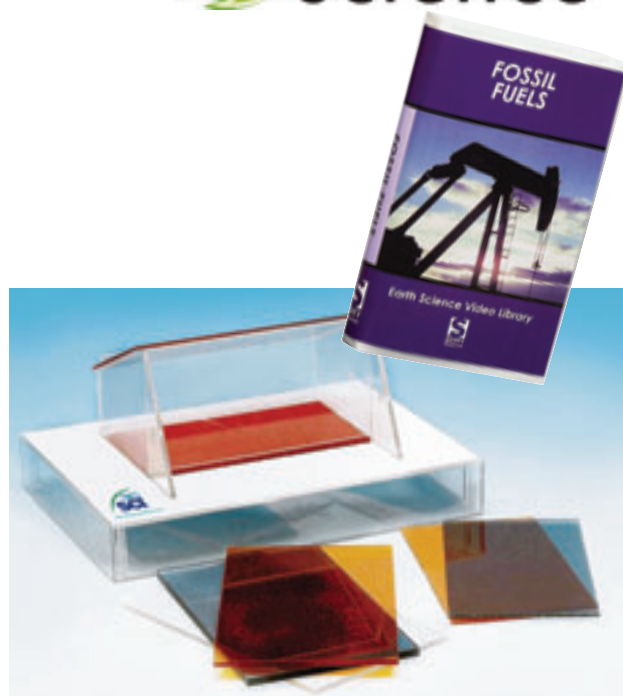


## SR-8460 Fossil Fuels VHS Video

Shows how petroleum, natural gas, coal and other fossil fuels have formed over millions of years, yet are extracted at a much faster rate. Explores the options we have to reduce our use of fossil fuels.

## 30-1320 Greenhouse Effect Activity Model

Model the impact of atmospheric gases upon our climate! What happens to the sun's rays that reach the Earth's surface? Now your students can model and quantify the effects of thermal radiation and the selective transmission of heat on our climate. Innovative model allows your class to simulate the Greenhouse Effect and actually quantify their observations by measuring temperatures under various conditions. Includes four selective filters - red, orange, blue and transparent - and four interchangeable bases and covers, allowing you to change variables such as light wavelength. Size: 12" (L) x 9" (W) x 8" (H).



## 1710 Environment Transparencies, set of 6

Six colour transparencies and twelve overlays focus on the use and misuse of the Earth's natural resources. Subjects are pollution, erosion, flooding, forest fires, soil depletion and natural resources. Includes complete Teacher's Manual.



## 2565 Non-Renewable Resources

Chart - 590 x 460mm

Representative natural materials and corresponding everyday products are mounted in a sturdy, wooden-framed world map. This colourful, visually striking chart clearly illustrates the sources and related products for many common materials vital to our way of life. Students can investigate regions worldwide where we mine various categories of ores and fossil fuels that will not replenish naturally during one human life span. This chart complements the Investigating Renewable Resources Chart.

## 2566 Renewable Resources

Chart - 590 x 460mm

The relationship between resources that are renewable in one human life span and the associated products is clearly illustrated on this visually appealing chart. Investigate the worldwide resources for materials used everyday. The chart is mounted on a sturdy wood frame and complements the Investigating Non-Renewable Resources Chart.





## 8585DVD Earth Science Recycling Videolab

Students will view the 'Recycling; Conserving Natural Resources' DVD and perform ten hands-on activities that focus on our renewable and non-renewable resources. These increasingly important concepts are highlighted in a week long unit which is easy for any teacher to use. The Teacher's Guide contains complete teacher instructions, learning outcomes, individual station directions and student answer sheets.



## SR-1459 Recycling Clever Catch®

Play involves two or more players who toss the ball to each other and answer the question found on the ball under their left thumb. Directions and answers are included. This 600mm vinyl ball comes with 95 true or false, multiple choice or fill in the blank questions. Sample questions include: Which of the following contributes to groundwater pollution? A. Smoke stack B. Sunlight C. Leaky Landfills.; The 3 R's of Recycling are?



## R-APK1 Air Pollution Kit R-APKR Replacement Supplies

Using a controlled environment and common air pollutant, your students will observe the direct effects sulphur dioxide has on plants. Squash and Marigold plants are germinated and then placed in an SO<sub>2</sub> saturated environment where growth is monitored and recorded. Teacher's Guide and reproducible student worksheets are also included.



## 20-3563 Air Quality Lab Investigation

Create particle traps and identify pollutants in our air! Air pollution causes a wide variety of health concerns and comes from many different sources. These include man-made origins such as factories and vehicles as well as natural sources such as wildfires; microorganisms; windblown dust and pollen; and volcanic eruptions. Your students will perform various hands-on activities to identify air pollution sources and the types of pollutants they emit. Then they'll apply their knowledge to develop ways to reduce this contamination. Your class will also conduct microscopic examinations of bacteria, fungi and other microorganisms found in the air. Class size – 40 students. Your students will...

- Identify potential sources of air pollution
- Collect, observe and identify various airborne pollutants
- Observe & identify the various microorganisms present in the air
- Study the effects of air pollution on plant and animal life



## Horizon Fuel Cell Technologies

Horizon Fuel Cell Technologies are working in conjunction with the London Hydrogen Partnership to organise the London Schools Hydrogen Challenge, an annual event involving schools from all 33 London boroughs. To find out more about this interactive science-education programme, or to register your school to take part, please go to [www.lshc.co.uk](http://www.lshc.co.uk)

### FCJJ-11 Fuel Cell Car Science Kit

Use this kit to construct a hydrogen fuel cell car and teach the principles of fuel cell technology. Explore how the PEM (Proton Exchange Membrane) fuel cell converts the chemical energy of hydrogen and oxygen into electrical energy to power the motor. Once constructed, the car uses a steering mechanism to drive around obstacles. The 14-page user manual provides background information about fuel cell technology and full assembly instructions.

#### Contents:

Reversible fuel cell; Car chassis and wheels; Electric motor; LED lights; Water vessels; Gas collectors; Connector cables; Syringe; Battery pack; User manual.



### FCJJ-18 H-Racer & Solar Hydrogen Station

The H-racer is the smallest and coolest hydrogen fuel cell car in the world! Witness the power of new energy technology in the palm of your hand. That's right - this car does not need batteries! The car uses a real fuel cell and its own on-board hydrogen storage system. The Hydrogen Station will provide your H-racer with an unlimited supply of clean energy. To create free hydrogen fuel at the flick of a switch, just add water to the station's tank! Fuelling is animated by a special blue light display.



### 502-001 Horizon Fuel Cell Software Adapter

An educational hydrogen fuel cell evaluation board with measurement software for graphical display of performance characteristics. Experiments and function tests of hydrogen fuel cells will now be quantifiable in real time for voltage, current and power. Compatible with any Horizon Fuel Cell kit.

### 502-002 H-Racer 2.0 - with I.R. Control

Horizon's iconic H-Racer refuelling fuel cell car has entered the next generation, with infra-red remote control, steering capability, plus a faster driving speed due to a new generation of miniature PEM fuel cells. The H-Racer 2.0 embodies the design concepts behind today's cutting edge automobile designs and clean fuel systems. Assemble your own H-Racer in an education kit with experiments that explore the latest in high-technology.





## 502-003 Hydrocar

Coming straight from the year 2099, the Hydrocar uses clean hydrogen stored in water using a reversible Polymer Electrolyte Membrane (PEM) fuel cell. Its new design offers a next-century feel for what transportation technology could evolve towards. Watch as oxygen and hydrogen gases are formed in two transparent water containers at the back of the vehicle. The car steers independently of the user once it hits a barrier, and cool blue LED's flash from inside the cockpit



## 502-004 Renewable Energy

- Education Set

This is a modular experiment set designed to demonstrate the workings of a complete clean energy technology system on a miniature scale. With this kit an entire renewable energy system can be constructed in the laboratory. Including a wind turbine kit, a solar photovoltaic panel, an electrolyser, a PEM fuel cell and a hydrogen storage system, this kit encourages users to learn the system step-by-step, configure the system in different ways, and to visualise the workings of clean energy principles from start to finish.



## 8495DVD Acid Rain : The Invisible Threat

- Videolab with DVD

Measure the pH of water samples, investigate the effect of rain on plants and soils, create acid rain posters, chart the path of acid rain from source to deposition and estimate the contribution of automobiles to the acid rain problem. Includes DVD, Teacher's Guide and enough materials for nine lab stations.



## 33-20-1493 Simulating Acid Rain Effects

- Lab Investigation

A startling look at one of our most important environmental challenges. What causes acid rain? What effect does it have on the environment? How can it be prevented? These are just a few of the questions your students will explore through a series of inquiry-based investigations focused on this key environmental topic. Students will explore the causes of this by-product of industrial growth and gain a firsthand view of its effect on plants and organisms as well as common building materials. Class size – 40 students.



## SR-1391 Green Earth Clever Catch®

Energy conservation, Recycling and Global Warming! These topics and more are included on this 61cm, latex-free Green Earth Clever Catch®. Environmental issues are popular topics today, both in the news and in the science world. Primary students toss the Clever Catch® around the classroom and where ever their left thumb lands determines the question they must answer. 107 questions. A Teacher's Guide with answers is provided.



## 7-1874 Windmill

This exciting kit allows students to build and test a fully-functional wind turbine. The comprehensive guide contains in-depth information about history, turbine design, and wind energy. Students use a multimeter (included) to monitor how much power their wind turbine produces.

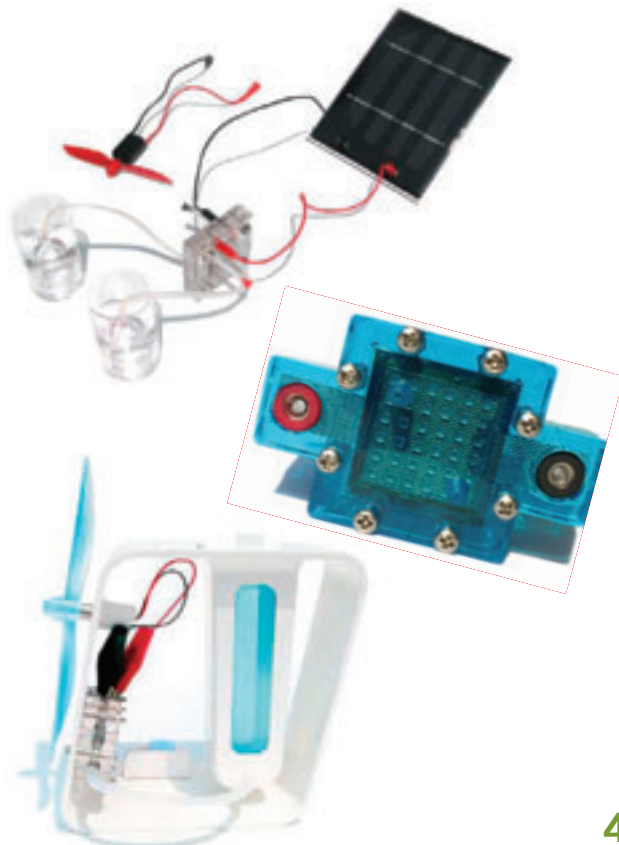


## 502-006 Wind Hydrogen Education Kit

Harness the energy of the wind! With this set you have the freedom to invent clean energy applications using fuel cells and renewable hydrogen created using wind and water. This kit includes a real wind turbine, an optimal tool for inspiration and education during learning activities, enabling students to develop their own applications using zero-carbon fuel.

## 502-005 Solar Hydrogen Education Kit

With this set you have the freedom to create your own clean energy applications using fuel cells and renewable hydrogen created using sunlight and water



## 502-007 Horizon PEM Fuel Cell, set of 5

Set of 5 PEM fuel cells for use in conjunction with Horizon Fuel Cell products.

## 502-008 Bio-Energy Discovery Kit

This kit demonstrates the latest in fuel cell technology, using ethanol as its fuel source. Whereas currently fuel cells use hydrogen or methanol as fuel, this kit directly converts ethanol to electricity silently and without combustion. The device runs non-stop for days, providing an amazing demonstration of next-generation fuel cell technology.



## leXsolar Solar Experiment System 502-020 leXsolar Experiment - Small

The true beauty of this system is in its modularity. By choosing an appropriate combination of modules, a set can be tailored for particular learning applications at particular ability levels. All the modules are intercompatible and can be ordered in any combination. Target age: 7-15 years.

leXsolar-Experiment Small is easy to handle, ready for use and cost-efficient. Hence, it is the ideal product to introduce solar energy experiments in schools. This starter product includes a manual explaining the solar cell and possible experiments with the system.

### Technical data:

Motor (starting current 20mA); Solar module (0,5V, 350mA).

### Components:

Acrylic stand with motor and solar module; Propeller; Colour discs and optical illusions incl. mount; Instructions manual.

### Experiments:

The solar cell as voltage source; Angle dependence of the solar cell; Differences in brightness; Colour mixtures; Properties of colours; Optical illusions.



## leXsolar Solar Experiment System 502-012 leXsolar Experiment - Medium

All the modules are intercompatible and can be ordered in any combination, and there are spaces provided in the purpose-built cases for extra components to be added in.

Students can learn the basics of solar energy with exciting and experiential experiments using solar cells. Numerous experiments dealing with electricity and optics make the system an inseparable part of physics and natural sciences classes for the ages 10 - 15 years. Students' manuals (code: 502-013) are available to accompany this kit.

### Experiments:

#### Part 1: Solar energy + electricity lesson

The characteristics of differently sized solar cells, series and parallel connection of solar cells, shadowing effects of solar cells, series and parallel connection of glow lamps, rotational direction of the motor, starting current and operating current of the motor etc. (around 15 trials with detailed instructions).

#### Part 2: Optics

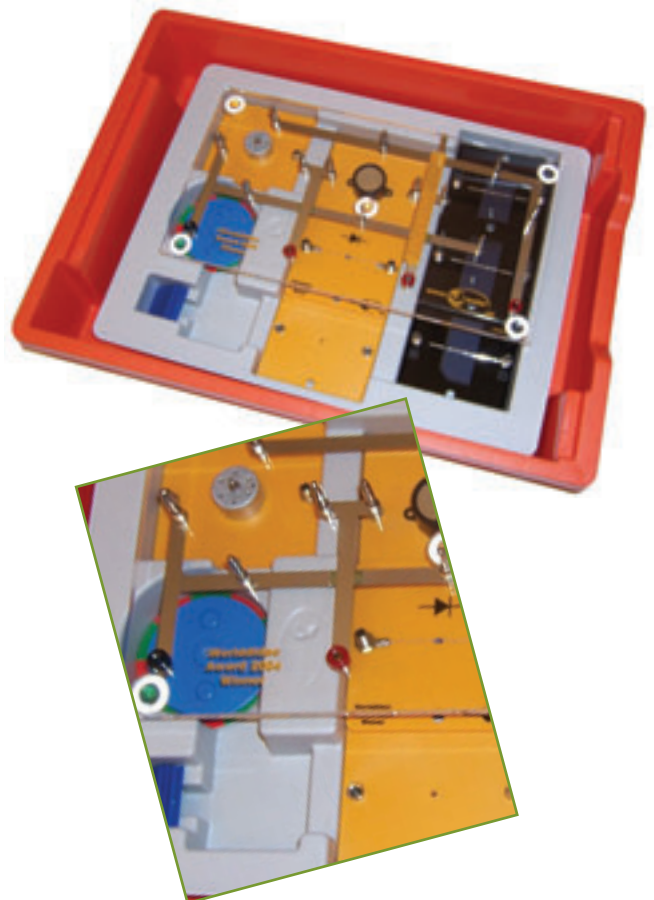
Differences in brightness, tilt of the solar cells, diffused radiation, direct radiation, albedo radiation, colour characteristics, colour mixtures, optical illusions (around 12 trials with detailed instructions). Students' manual contains 27 trials. 20 of these are of pure qualitative nature and can be carried out without a multimeter.

### Contents:

Instructions on CD included; Colour screens with mounting; 3 x Small solar module; 1 x Main board; 1 x Connection diagram; 1 x Diode module; 4 x Solar cell cover; 1 x Glow lamp module; 1 x Buzzer module; 1 x Motor module.

### Additional requirements:

2 x Multimeters; 4 x Measuring Tapes.



## leXsolar Solar Experiment System 502-014 leXsolar Experiment - Large

All the modules are intercompatible and can be ordered in any combination, and there are spaces provided in the purpose-built cases for extra components to be added in. Correlating school physics with practical usage of the photovoltaic cells is a speciality of this system. These uniquely innovative educational systems are the first choice when it comes to experiments related to solar energy, since winning the Worlddidac Award, being the only experiment system in photovoltaic cells. Students' manual available covering 17 different activities.

### Experiments:

Series and parallel connection of solar cells, dependence of the capacity on face of the solar cell, dependence of the capacity on the angle of incidence, dependence of capacity on level of illumination, determination of efficiency ratio of energy conversion, internal resistance of solar cell, dark characteristic curve of solar cell, inhibiting and conducting direction in illumination and darkness, IV characteristic and filling factor of the solar cell, IV characteristic of the solar cell in dependence on the level of illumination, dependence of the solar cell capacity on temperature, shadowing effect of solar cells in series connection, shadowing effect of solar cells in parallel connection, the solar cell as transmission measure, dependence of solar cell capacity on the frequency of incident light.

### Contents:

Instructions on CD included; 3 x Small solar module; 1 x Large solar module; 1 x Lighting module; 1 x Resistance module; 1 x Potentiometer module; 1 x Gear motor module; 4 x Solar cell cover; 3 x Colour filter; 1 x Main board; 1 x Connection diagram; 1 x Diode module; 4 x Solar cell cover.

### Additional requirements:

2 x Multimeters; 6 x Measuring Tapes; 1 x Lab Thermometer; 1 x Power Supply Unit\*.

\*The system has been designed so that most of the experiments can be conducted under normal lighting conditions, but a few of them require the use of the (included) leXsolar Lighting Model, which requires an external power source.

- 511-404 Resource Guide
- 511-405 Basic Guide
- 511-406 Workbook for the Fuel Cell

Guides containing the theoretical basis of the topics with which the leXsolar Solar Experiment System and its expansions deal but also detailed specifications to the experiments for the teacher. With specially prepared foil layouts and instructions for the pupils it is possible to impart the content of the lesson without much preparation work. The Solar Experiment CD tops it off with interactive experiments, films and electronic versions of all the printed booklets.





## leXsolar Solar Experiment System

### 502-016 Ready-To-Go

With its integrated accessory set, all packaged together in a sturdy plastic case with heavy-duty foam inserts, the Ready-to-Go Experiment Set contains everything you need to execute a wide range of experiments.

#### Contents:

Instructions on CD included; 1 x Lab thermometer; 3 x Teachers manual; 1 x Small solar module; 1 x Large solar module; 1 x Lighting module; 1 x Resistance module; 1 x Potentiometer module; 1 x Gear motor module; 1 x Solar cell cover; 3 x Colour filter; 1 x Glow lamp module; 1 x Buzzer module; 1 x Motor module (without gear); 1 x Main board; 1 x Power unit; 2 x Digital multimeter; 6 x Measuring lines.



### 502-017 Measurements Without Measuring Tools Extension Set

This extension module facilitates various leXsolar experiments without the need to use any type of measuring tools. This makes the leXsolar system more easily accessible for younger age groups, particularly the 8-10 year bracket.

#### Contents:

1 x Glow lamp module; 1 x Buzzer module; 1 x Motor module without gear; Colour screens with mounting.



### 511-402 Fuel Cell

An extension for the leXsolar Experiment System which can also be used stand-alone.

**Type:** Reversible, alkaline fuel cell.

**Short :** Short circuit current: max. 350mA

**Power:** Max. 150mW



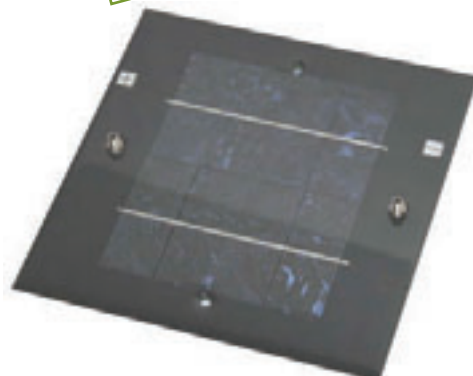
### 511-403 Solar Module

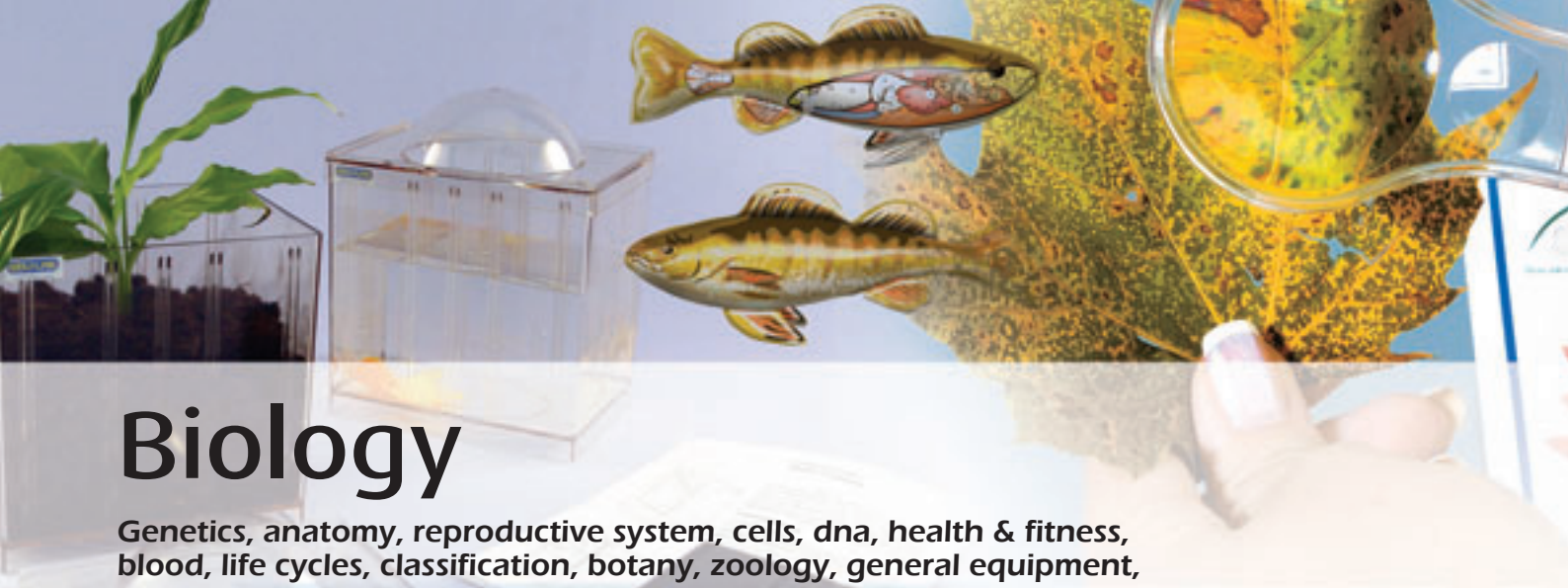
To simulate a solar hydrogen cycle this module can be used together with the fuel cell (code: 511-402) for the leXsolar Experiment System.

**Dimensions:** 200mm x 200mm

**Voltage:** Max. 4.5Volts

**Amperage:** Max. 300mA





# Biology

Genetics, anatomy, reproductive system, cells, dna, health & fitness, blood, life cycles, classification, botany, zoology, general equipment, microbiology, prepared microscope slides.





## Biology

### 13-20-1093 Turning Genes 'On' and 'Off'

- Lab Investigation

Explore how genes respond to their environment Use a safe, commonly found microbe to investigate and predict the effect of temperature on gene regulation and expression. Expression of this particular gene is easily recognized by the production of a pigment which turns the bacteria colonies red for a striking visual demonstration of gene manipulation. Further investigations allow students to design their own experiments to identify other variables which may affect gene expression. Your students will:

- Observe the varying colours of bacteria grown under different temperature conditions
- Explain why different bacterial colours are produced at different temperatures
- Infer the mechanisms involved in gene expression
- Understand the relationship between gene expression and environment



### 13-20-1163 Genes & Probability

- Lab Investigation

Discover the fundamental principles of genetics. Study the patterns of inheritance and the genetic probability of easily observed and tested traits. Students use game-like exercises to explore gametogenesis and fertilization; monohybrid and dihybrid crosses; laws of dominance, segregation, and recombination; independent assortment and other key elements of this important and relevant topic. Your students will:

- Apply the laws of chance to genetics
- Demonstrate the effect of dominance in a monohybrid cross
- Demonstrate the effect of incomplete dominance
- Model a dihybrid cross to demonstrate the law of independent assortment



### R-100872 Frufly Genetics

This unique kit contains simple activities designed to teach basic fruit fly genetics without using live flies. *Drosophila Melanogaster* is used without the inconvenience of maintaining live fruit fly cultures. Students can perform crosses using plastic pieces printed with features allowing them to observe and simulate sex determination, single factor inheritance, double factor inheritance, sex linkage, dominance and recessiveness. Includes 15 sheets each, with snap apart features showing male and female and 4 types of fruit flies. Teacher's Guide and Student instruction sheet included.



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

## Microslides®

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a pocket to store the Microslides®.

### T252 The Drosophila (pk 10)

Drosophila (20x), Drosophila Female (30x), Drosophila Egg (40x), Drosophila Larva (30x), Drosophila Pupa (30x), Chromosome (3000X), Drosophila Eyes - Normal (60X) / (Mutant 30X), Another Mutant (75X)



### 16-20-4073 Genetic Detectives Kit

Analyse a family trait - from roots to offspring! Students are cast in the role of genetic detectives and challenged to resolve various genetic scenarios. Provided with information about a family with a unique trait, they will use karyotyping, simulated gel electrophoresis, family history and pedigree analysis to track down the genetic roots for the trait. In pursuit of the answer to their mystery, they'll investigate autosomal dominant, autosomal recessive, and sex linked genetics. This versatile yet simple activity will get students excited about the fascinating world of genetics and heredity.



### EDU505 Microslide® Viewers set of 10

For viewing microslides, which appear throughout the catalogue.



### R-DNA1 DNA Model Kit, single pk R-DNA DNA Model Kit, 12 pk

Build a segment of DNA; Adenine, Thymine, Cytosine & Guanine. Colour-coded pieces designate certain molecules making up the four nucleotides in DNA. The single pack comprises enough material to make a segment of 6-paired bases. The 12 pack kit includes 12 packets of model parts, instructions and reproducible student worksheets.



### 14-30-1335 DNA Activity Model

Affordable, easy-to-understand replica of the 'molecule of life'. At last - a realistic DNA model that fits within your budget! Your students will construct their own double helix model complete with cytosine, adenine, guanine and thymine nucleic acid bases' connecting phosphate strands and a centre rod representing hydrogen bonds. Easy-to-assemble, three-dimensional model is made of durable plastic components for years of classroom use. Colour-coded parts feature specially shaped ends to ensure proper base pair alignment and can be unzipped to demonstrate DNA replication. Includes comprehensive, illustrated student and teacher guides. Features sturdy, metal base for easy rotation and classroom display. Size: 19" H x 7.5" D.



## T-602 Teaching about DNA - Model

Reveal a double strand of DNA and duplicate the gene. Synthesize normal blood then mutate it to produce sickle-cell blood. These are only 2 of 7 great classroom demonstrations that can be performed with this model.

## T603 Teaching Genetics Made Easy™

'Mate' a sperm and egg containing selected genes, then have your students produce *Drosophila* with dozens of different traits. Demonstrate the steps of mitosis by dividing chromosomes for the class (26 exciting hands-on demonstrations). Comes complete with 750 x 1000mm demonstration board, mounting legs, Teacher's Guide with detailed lesson plans plus reproducible student worksheets.

## Poppit Beads, bags of 200

EDU1250 Green

EDU1251 Red

EDU1252 Yellow

Poppit beads are a useful laboratory modelling unit. They can represent disaccharide and polysaccharide molecules in demonstrating carbohydrate metabolism and can also be used to represent genetic code as well as whole chromosomes, or as amino acids, dipeptides, monosaccharide, polypeptides and proteins in protein metabolism.

## 13-30-1035 Karyotyping of Chromosomes

- Activity Model

Graphically model & manipulate chromosomes. Provide your class with hands-on, visual representations of key genetic processes. Your students will model meiosis and mitosis. Additionally, they will recreate karyotypes of normal and abnormal human chromosomes, including Down's Syndrome, Turner's Syndrome and Klinefelter Syndrome. Durable, plastic model is transparent for convenient use with an overhead projector. Includes comprehensive teacher's and students' guides. Size: 299mm (L) x 216mm (W) x 44.5mm (H)



## Microslides®

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

## T81 Chromosomes & Genes in Action(pk 10)

DNA Molecule, Coiling in chromosomes, Lamp Brush, Loop of Lampbrush & Giant Chromosomes, Chromosomes Puffs, Tagged, Nuclear pores, Ribosomes.

## T265 Mutation (pk 10)

The Fruit Fly -Eye Colour Mutation, Sickle-cell Anaemia, An Albino, Colour Blindness, Polydactylism, Tongue Rolling, Earlobe Attachment, Ornamental Corn.



**50** More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

## 13-20-1353 Observing the Growth of Mutant Corn Seeds

- Lab Investigation

Investigate the effects of mutation on plant growth. Challenge your class to discover the role of chlorophyll in photosynthesis as they observe, measure and compare the growth of normal vs. albino corn seeds. While both contain sufficient food to sprout, at some point the albino sprouts die. Since they lack chlorophyll they cannot carry out photosynthesis, leaving them without necessary nutrition once the initial food supply is depleted. Class size – 40 students.



## 20-3293 Understanding the Human Genome

- Lab Investigation

Comprehensive, hands-on curriculum on human genetics. Your class will develop their own genotypes for various physical traits and determine the frequency of their occurrence. They'll also study the patterns of inheritance through the construction and analysis of a human pedigree. The students will also investigate common genetic disorders and the location of the corresponding genetic mutations that cause them. Finally, they explore the goals and objectives of the Human Genome Project and the ethical issues emanating from the advances in genetics. Class size - 40 students. Your students will:

- Determine their own possible genotypes for several physical traits
- Study the multiple allelic inheritance of blood groups through use of simulated blood samples
- Analyze unknown karyotypes and determine whether they represent a normal male, normal female or an abnormal genotype
- Learn how DNA is analyzed through the use of the DNA fingerprinting techniques
- Simulate the detection of human genetic disorders



## Battery-Powered Electrophoresis Hardware System

### 13-20-1083 Lab Investigation

### 13-20-1085 Refill for additional classes

Biotechnology for Young Scientists. Introduce your students to electrophoresis with this complete, safe, affordable and easy-to-use system. Expose your students to the physical and chemical properties of DNA using electrophoresis. This economical system includes a battery-operated electrophoresis chamber - featuring pure platinum electrodes and ten capillary micropipets. Also included are ready-to-use reagents to isolate DNA from wheat germ, onion, bacteria, or even liver as well as solutions to run and stain the DNA. The investigation also includes a unique activities book, Biotechnology Projects for Young Scientists, which explores dozens of other projects which can be easily performed with readily available materials. Class size - 40 students. Your students will:

- Isolate and observe DNA from onion cells
- Describe the appearance and physical characteristics of isolated DNA
- Understand the principles and practice of electrophoresis
- Demonstrate the use of electrophoresis
- Identify advances and uses of biotechnology and discuss its risks and benefits



## 13-55-1110 Electrophoresis Lab Station 1

A complete system for introductory agarose gel electrophoresis studies. Now you can economically outfit your classroom with the latest in electrophoresis technology! In addition to a double-gel tank and power supply, you'll also receive a lab investigation to introduce your students to the basic principles of agarose gel electrophoresis; an accurate and highly reliable micropipet; and a highly interactive CD which will allow your students to recreate their investigations in a virtual lab. Accommodates 2 groups of 4 students.

### The Electrophoresis Lab Station 1 includes:

- 1 Double-Gel Electrophoresis Chamber
- 1 Variable Voltage Power Supply \*
- 1 Agarose Gel Electrophoresis Lab Investigation
- 1 Fixed Volume Micropipet, 10 microlitres
- 1 DNA Technology & Biotechnology CD-ROM



## 13-55-1120 Electrophoresis Lab Station 2

Run up to four gels simultaneously! Affordably expand your classroom's electrophoresis capacity with twice the hardware and accessories included in Lab Station I. Accommodates 4 groups of 4 students.

### The Electrophoresis Lab Station 2 includes:

- 2 Double-Gel Electrophoresis Chamber
- 1 Variable Voltage Power Supply \*
- 1 Agarose Gel Electrophoresis Lab Investigation
- 2 Fixed Volume Micropipet, 10 microlitres
- 1 DNA Technology & Biotechnology CD-ROM



## 13-55-1130 Electrophoresis Lab Station 3

An affordable way to run up to six gels at one time! Economically outfit your lab with additional capacity - all at a low, bundled price Accommodates 6 groups of 4 students.

### The Electrophoresis Lab Station 3 includes:

- 3 Double-Gel Electrophoresis Chamber
- 1 Variable Voltage Power Supply \*
- 1 Agarose Gel Electrophoresis Lab Investigation
- 3 Fixed Volume Micropipet, 10 microlitres
- 1 DNA Technology & Biotechnology CD-ROM



\* 230V PSU (code: 605-004) included instead, when applicable

## 13-55-1094 Double Gel Electrophoresis

Run two gels simultaneously! The leak-free, one-piece moulded chamber is constructed from durable, clear acrylic and has pure platinum electrodes for superior conductivity and longevity. The system includes two casting gel trays and six 12-well forming combs and patch cords. Specially designed casting trays hold melted agarose without the use of tape or snap-on ends. Wells can be formed at the end or the centre of the gel. Built-in safety features prevent the student from using the chamber unless the lid is locked in place.

Tank size: 155mm(L) x 88mm(W) x 62.5mm(H).  
Tray size: 100mm(L) x 75mm(W).



## 605-004 Electrophoresis Power Supply

Three sets of output connectors, allowing the user to run up to three chambers simultaneously. LED screen, illuminated power switch, CE certification, overcurrent protected.

Variable Voltage: 25V, 75V, 110V  
Power Input: 230V, AC, 50/60Hz



## 605-005 Electrophoresis Power Supply

The Edu-Lab electrophoresis power supply provides 3 groups of output of 60V to 150V in 1V steps or 10 to 150mA constant current in 5mA steps. Voltage Display is by 3-digit, 7-segment green LED. The transformers are protected by thermal fuses and the primary is protected by a 1A slow blow fuse. Output current is limited to maximum of 150mA. All three groups of outputs are monitored and controlled by micro-processor.

Input: 230V  $\pm$ 10%, 50Hz.  
Output: 3 groups of outputs with same output value of 60V  
Output voltage accuracy:  $\pm$ 2V.  
Output current:  $\pm$ 3.5% of full scale (i.e.  $\pm$ 5mA).  
Replacement fuse: 1A (T).  
Dimensions: 200 x 150 x 70mm.  
CE certification



## 13-55-1140 Biotechnology Laboratory System

An affordable way to build your own biotech lab! Take your electrophoresis studies to the next level. Includes all of the hardware found in Lab Station 3 (code: 13-55-1130) plus a white light transilluminator and microcentrifuge. The microcentrifuge will allow you to efficiently complete your pre-lab preparation while the transilluminator will help you get the most from your results. Accommodates 6 groups of 4 students. The system includes:

- 3 Double-Gel Tanks
- 1 Variable Voltage Power Supply
- 1 Agarose Gel Electrophoresis Lab Investigation
- 3 Fixed Volume Micropipets, 10 microlitres
- 1 White Light Transilluminator
- 1 Microcentrifuge
- 1 DNA Technology & Biotechnology CD-ROM



\* 230V PSU (code: 605-004) included instead, when applicable

## Understanding Biotechnology Techniques

### 13-20-2103 Lab Investigation

Fun and engaging simulated activities to learn about biotechnology. Study the process of electrophoresis, simulating every step without the need for equipment or even any prior knowledge! With this completely reusable kit, students use pop-beads to assemble DNA strands, digest them with restriction enzymes and electrophorese them on a paper gel. In doing so, they'll learn the scientific principles behind electrophoresis, the action of restriction enzymes, the creation of recombinant organisms and the countless applications of this process in biology and medicine. Class size – 40 students.



## 14-20-3363 Diagnosing Gene Defects

- Lab Investigation

Examine the genetic mutation responsible for sickle-cell anaemia. Your students will use agarose gel electrophoresis to study sickle cell anaemia - a painful and ultimately fatal condition resulting from a genetic mutation which alters the body's haemoglobin. They'll search for changes in a non-human DNA sample to diagnose this hereditary blood disease. In the process, They'll learn about genes and how genetic mutations can cause disease. Class size - 40 students.



## 14-40-0090 DNA Electrophoresis Manual

Incorporate the latest in biotechnology techniques into any life science curriculum. Over 150 pages packed with information on the principles and practice of agarose gel electrophoresis as well as other related biotechnology topics. An indispensable tool for the novice and expert alike, the manual features a dozen investigations covering gel electrophoresis, DNA fingerprinting, DNA restriction enzymes, DNA plasmids, recombinant DNA techniques, genetic diseases, DNA mapping, genetic diagnosis of disease, as well as many other current topics. Each investigation includes comprehensive teacher and student sections as well as detailed background information.



## Analyzing Chromosomes through Karyotyping

13-20-1173 Lab Investigation

Construct & analyze karyotypes. Using the supplied chromosome spreads, students identify pairs of homologous chromosomes and construct a karyotype. Students will identify pairs of chromosomes by their length, centromere position and banding pattern to determine the sex of the individual and identify genetic disorders such as Down Syndrome or Turner's Syndrome. Class size - 40 students. Your students will:

Prepare a human karyotype from an unknown chromosome spread

Predict diseases by the presence of genetic abnormalities

Determine the sex of an individual by analyzing the sex chromosomes present.



## 14-20-3353 Simulating DNA Paternity Testing

- Lab Investigation

Use agarose gel electrophoresis to test family ties. Simulate how DNA fingerprinting can be used to identify the genetic relationship between a child and an alleged father. Your class will use the results of an electrophoresis of non-human DNA, their knowledge of human inheritance and their scientific problem-solving skills to solve a scenario-based paternity case and determine the identify of a child's father. Class size - 40 students.



## Demonstrating Biotechnology using Bioluminescent Proteins 13-20-2343 Lab Investigation

A hands-on exploration of bioluminescence in nature! Your students will learn first hand how bioluminescence occurs and how, through biotechnology, this unique trait of select ocean organisms can be transferred through genetic cloning. Class size - 40 students. Your students will:

- Learn about bioluminescence and why it occurs
- Demonstrate bioluminescence in the laboratory
- Understand the process of enzyme catalysis
- Review the process of genetic cloning and demonstrate its applications
- Learn about applications of the bioluminescent trait in biotechnology.



## 14-20-2903 Simulating Natural Selection - Lab Investigation

Game-like format simulates the natural selection that has occurred in peppered moths! Your class will learn the key steps of natural selection as they simulate what occurred in the peppered moth population as the selection pressures in the environment changed in England during the Industrial Revolution. The students are provided with backgrounds that simulate the colour of various tree trunks along with peppered moth cutouts. They'll find that as the tree trunks darkened, the darker peppered moths were more likely to survive and reproduce. Class size - 40 students.



## 14-20-3393 Genetic Diagnosis of Cancer - Lab Investigation

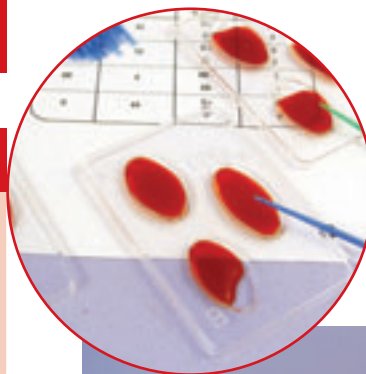
Investigate the use of gene technology in the prediction of cancer. Your students will learn how revolutionary breakthroughs in gene technology can be used to not only detect cancer but predict its occurrence based upon hereditary traits. They'll use the electrophoresis results of non-human DNA samples to simulate this procedure. In the process, They'll detect a specific cancer and study the hereditary tendencies of the condition. Class size - 40 students.



## Neo/BLOOD® Simulated Blood

### Neo/BLOOD® Simulated Blood Typing Lab Investigations:

Conduct realistic blood typing activities without exposure to the hazards of real blood! Neo/BLOOD® looks and behaves like real blood, provides quick, easy and completely safe results and realistically simulates agglutination. Contains simulated, microscopic blood cells which can be viewed and counted under a microscope or used with a haemocytometer.



### ABO-Rh Blood Typing using Neo/BLOOD®

**13-20-2113 Lab Investigation**

**13-20-2115 Refill for additional classes**

Realistically simulate blood typing without the hazards of real blood. Using actual blood typing procedures, your students will classify four unknown samples of simulated Neo/BLOOD®. Neo/BLOOD® realistically simulates agglutination - without the hazards. Students will learn about Rh incompatibilities and other blood testing techniques, such as blood smearing, blood cell counts and much more! Class size - 40 students.



### Linking Blood Donors and Recipients

**13-20-2123 Lab Investigation**

**13-20-2125 Refill for additional classes**

Investigate blood transfusions and blood banking. Accurate blood typing is essential for safe transfusions and blood banking. A transfusion conducted with an incompatible blood type could cause blood cells to clump together, potentially leading to death. Your class will be challenged with a realistic medical emergency scenario. They'll be asked to classify blood types according to the presence or absence of certain antigens attached to the surface of red blood cells. In the process, they'll gain a firsthand insight into the importance of blood typing in transfusions. They'll also learn to identify which individuals are 'universal donors' and which are 'universal recipients'. Class size - 40 students.



### Understanding the Genetics of Blood

**13-20-2133 Lab Investigation**

**13-20-2135 Refill for additional classes**

Hands-on instruction on the fundamental concepts of human inheritance. Certain traits have genes with more than two alleles, known as 'multiple alleles'. Blood groups are a classic example of multiple allelic inheritance. Your students will type several unknown samples of Neo/BLOOD® to study the inheritance of blood groups. In the process, they'll also learn about genetic blood disorders and how they can be passed between generations. Class size - 40 students.



**The Frequency of Blood Types using Neo/BLOOD®**  
**13-20-2953 Lab Investigation**  
**13-20-2955 Refill for additional classes**

Safely simulate the distribution of blood types in a given population. Students determine the ABO blood types of unknown simulated blood samples and pool their class data to calculate the frequency of each blood group in a given population. Various scenarios can be set up to simulate the blood group distribution in over a dozen populations. Additionally, students can study the composition of blood by preparing a simulated blood smear. The smear is examined under the microscope to locate and identify simulated red blood cells and white blood cells, as well as estimate the number of simulated blood cells in a given sample. Class size - 40 students.



**13-35-1021 Poster - Visualising Blood**

Extraordinary electron micrograph images provide a stunning close-up look at human blood cells. Vivid illustrations detail blood types, agglutination and clotting. Also common blood disorders, leukemia, sickle cell and others. Size 23"W x 35"H (584 x 890mm).



**406-001 Haemocytometer**

Haemocytometer, Improved Neubauer Pattern for estimating particles in suspension. Cell with two counting grids, separated by a central trough, divided into 400 squares 0.05 x 0.05mm. Complete with coverslips.



**310-014 ABO-Rh Blood Typing Kit**

This ABO-Rh Blood Typing Kit contains written material, chemicals and equipment. Real blood is not used, uses artificial blood and sera. Simulates actual blood typing. Rh factor determination. A, B, O and AB types are included. Genetic considerations to settle paternity question. Determines possible blood donors.



**Microslides®**

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

**T95 Human Blood (pk 10)**

Human blood smear, Red corpuscles, White corpuscles (leucocytes), Phagocytosis, Blood type B, Fibrin, Sickle cells, Infected blood

**More of the Microslide® series, covering other subjects, can be found throughout this catalogue.**





## Understanding Agarose Gel Electrophoresis 13-20-3303 Lab Investigation

An introduction to the electrophoretic process. Use specially formulated, multicoloured dyes to explore the basic concepts and techniques of one of biotechnology's cutting edge procedures - electrophoresis. Your students will learn how electrical charge and molecular size is used to separate the dyes on an agarose gel into an array of colours so brilliant that they can be easily analyzed - even without the use of a stain! They'll use their findings to draw a standard curve of the molecular weights to determine the size of unknown dye fragments separated on the gel. Class size - 40 students.



## Identifying DNA Fragments Through Electrophoresis 13-20-3313

Separate & identify DNA fragments using agarose gel electrophoresis. Explore the key role that restriction enzymes play in genetic engineering! Study the techniques used in separating and identifying DNA fragments by using DNA restricted with a variety of enzymes. Then plot a standard curve of measured migration distance against the known actual base pair size for each band. Use this data to determine the size of unknown fragments based upon their migration distance on the gel. In the process, your class will learn the function of restriction enzymes, their use in creating recombinant organisms and their overall importance in genetic engineering. Includes pre-digested DNA-ready for electrophoresis and a highly sensitive, safe DNA stain which provides quick results. Features comprehensive coverage of the principles and practice of electrophoresis. Class size - 40 students.



## 13-20-3323 Plasmid DNA Analysis - Lab Investigation

Study the structure and function of plasmid DNA. Using agarose gel electrophoresis, your students will analyze the structure of plasmid DNA and learn how plasmids are used to transfer genes to other hosts. They'll also explore the function of plasmids in bacteria and learn how antibiotic resistance is transferred between cells. Class size - 40 students.



## 13-20-3343 DNA Fingerprinting - Lab Investigation

Simulate DNA fingerprinting using agarose gel electrophoresis. Explore the latest techniques in identification technology. Your students will use agarose gel electrophoresis to conduct basic DNA fingerprinting exercises. In the process, they'll gain an understanding of the impact of this cutting edge technique on forensics, disease identification and determining familial relationships. Class size - 40 students.



## Restriction Enzyme Site Mapping of DNA 16-20-3333 Lab Investigation

Locate and identify genes using agarose gel electrophoresis DNA mapping is the process where landmarks - such as the digestion site of restriction enzymes - are identified along a segment of DNA. These landmarks and the distances between them are then used to create an actual DNA map. In this investigation, your students will map the genome of lambda DNA from data provided as well as from the actual results achieved through their agarose gel. Class size - 40 students.



## Investigating Inheritance Patterns 13-20-3373 Lab Investigation

Trace inherited traits using DNA fingerprinting. Use agarose gel electrophoresis to study patterns of inheritance and their role in human genetics. Your students will simulate the DNA fingerprints of the family of famed Russian czar, Nicholas II. Then they'll use their gel results to trace the family's genetic lineage to investigate the hereditary transmission of haemophilia among the family members. Class size - 40 students.



## 13-20-1463 Extracting DNA - Lab Investigation

Lab Investigation - Isolate & observe actual DNA in your classroom! Most of your class may think that it is impossible to see DNA with the naked eye. With a little help, though, they can actually do just that! Your students will use a simple and quick method to isolate DNA and observe its physical characteristics using a variety of sources, including onion, liver, thymus gland, wheat germ and others. Class size - 40 students.

Your students will:

- Isolate and observe DNA from onion cells and describe its appearance
- Identify advances and uses of biotechnology. Debate the risks and benefits.



## 404-002 DNA/Chromosome Staining - Lab Activity

Students prepare their own microscope slides, using the plant tissue, to view actual cells in different stages of mitosis. Specially grown and preserved plant root tips are included in the kit. Students first prepare and stain their samples, then perform a cell squash for microscopic observation.

The material is grown and harvested under specific conditions to ensure maximum mitotic activity is occurring at the time of preservation, allowing for multiple examples of every stage of mitosis on each microscope slide prepared. Students will learn about cell division and gain valuable experience in techniques such as tissue staining and microscopic observation. The kit contains enough material for 30 students working individually.

### Materials Included in the kit:

- 1 Vial of root tips
- 2 Bottles of hydrochloric acid, 6M
- 2 Bottles of DNA/chromosome stain
- 1 Box of microscope slides/coverslips
- 30 Aluminium trays
- 30 Pairs of forceps



## 13-35-1356 Human Inheritance

Poster - 584 x 890mm

Review the basics of Human Inheritance including Chromosomes, Karyotypes, Pedigrees, Sex-Linked Traits, Crossing Over, Mutations, and Genetic Diseases. See at a glance how chromosomes, karyotypes and pedigrees are related to each other. Size 23"W x 35"H (584 x 890mm).

## 13-35-1016 Human Genetic Disorders

Poster - 584 x 890mm

A visual guide to the human genome Detailed view of all 23 human chromosome pairs and the location of the genes which cause some of the most common genetic disorders discovered, to date, as part of the Human Genome Project. Some genetic disorders shown include breast cancer, melanoma, deafness, muscular dystrophy, Parkinson's disease, Tay-Sachs disease, cystic fibrosis, colour blindness and many others. Also shown is a detailed 3-D view of a cell, chromosome, double-helix DNA as well as the karyotypes representing Down's Syndrome and Turner's Syndrome. Size: 23" (W) x 35" (H). (584 x 890mm).

## 13-35-1011 Visualizing Cells

Poster - 584 x 890mm

This laminated poster graphically depicts the complex architecture of a cell membrane, golgi apparatus, nucleus and nuclear pores, endoplasmic reticulum, chloroplasts and mitochondria in an easy-to-see, easy-to-understand format. Detailed illustrations and photography are perfect for instructing your class about the differences and similarities of bacterial, animal and plant cells. Size: 23" (W) x 35" (H). (584 x 890mm).

## BEZ0122 Animal Cells

Poster - 760 x 520mm

Detailed illustrations of an animal cell.

## 2057 Plant and Animal Cell Model

Activity Set

Students can explore plant and animal cell structures with these 8" diameter cell models. Teacher's notebook includes: background information, basic understandings, blackline master, two colour overhead transparencies, key structure and a glossary.

## 2055 Animal Cell Model

## 2056 Plant Cell Model

Students can explore cell structures with this 8" diameter cell model. Also available as part of the Plant and Animal Cell Model Activity Set (code: 2057).



## Microslides®

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

### T58 The Cell Structure (pk 10)

Cork (300x), Onion Skin (200x), Green Leaf (300x), Cheek Cells (900x), Blood Cells (900x), Nerve Cells (300x), Bacteria (1500x), Virus (50,000x).

### T66 The Ultra-Structure of Animal Cells (pk 10)

Gland cells, Plasma cell, Nerve cell membrane, Golgi body and vacuole, Mitochondrion, Centriole, Lamp-brush chromosomes, Muscle cell fibrils.

### T248 The Cell Nucleus (pk 10)

Animal Cell Nucleus, Plant Cell Nucleus, Nuclear Reproduction, Human Blood Cells, Voluntary Muscle Cells, The Nuclear Membrane, Nuclear Membrane Surface, Endoplasmic Reticulum.

### T11 Cells of Plants (pk 10)

Onion skin cells, Green cells of a leaf, Cells of a woody stem (100x), Cells of a woody stem (40x), Cells of the anther, Cells of the lily ovary, Spirogyra cell, Bacteria.

### T230 The Cell Membrane (pk 10)

Epithelial Cells, Cell Membrane, Paramecium (dying) Cilia, Blood Cells (Structures), Blood Cells (Functions), White Blood Cells (Recognition), Onion Skin Cells .



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

### 2058 Bio2® Inflatable Plant Cell Model

This inflatable plant cell provides classrooms with a stimulating visual aid and effective teaching tool. Great for reviewing cell parts and building vocabulary. 300 x 200 x 400mm.



### 2059 Bio2® Inflatable Animal Cell Model

This inflatable animal cell provides classrooms with a stimulating visual aid and effective teaching tool. Great for reviewing cell parts and building vocabulary. 600mm diameter.



## 13-20-1813 Osmosis & Diffusion

- Lab Investigation

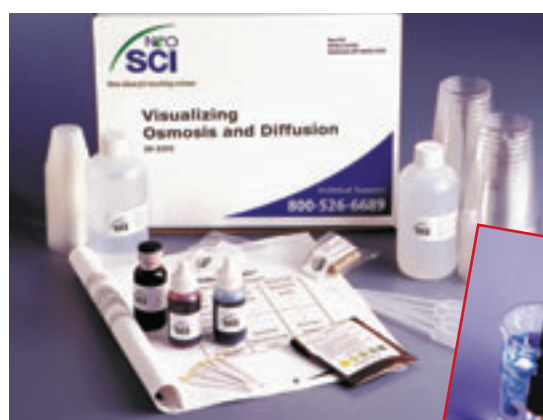
Explore the essential processes of homeostasis. Graphically demonstrate that a cell's membrane is selective in determining which substances it allows to pass in and out. Using a semipermeable membrane model that simulates a living cell, your class will observe how this process of diffusion allows the cell to absorb vital nutrients and eliminate wastes. Additionally, students will investigate the process of osmosis and learn how this passive transport of water through the cell's membrane maintains equilibrium. As a result, they will also learn what factors affect osmosis and how to quantify the rate of this critical process. Class size – 40 students.



## 13-20-2253 Visualizing Osmosis & Diffusion

- Lab Investigation

Vividly demonstrate selective permeability using coloured solutions. Starting with a model cell and a mixture of special dye solutions, your students will observe how the cell's membrane allows one dye to pass, while the other remains within the cell. The resulting colour change provides a vivid demonstration of selective permeability and how the cell absorbs nutrients and discharges wastes. The class will also learn how osmosis and diffusion permit the maintenance of equilibrium through the passive transport of water through the cell's semipermeable membrane. Class size – 40 students.



## 13-30-1030 Osmosis Activity Model

### 13-30-1031 Osmosis Model Refill

Simplify the concept of osmosis with this easy-to-use, easy-to-understand activity model. Just fill the base of the model with a solution and place water in the other chamber. Water will diffuse across the semipermeable membrane which separates the chambers until equilibrium is reached. Simply measure the level of liquid in the vertical tube to quantify the amount and rate of diffusion which has transpired. Your students can also vary the concentration or type of solution in order to determine the effect of these factors on the homeostatic process. Includes comprehensive teacher's and student's guides. Size: 95mm L x 95mm W x 381mm H.



This refill kit provides all the consumable materials. Refer to the Teacher's and Student's Guides provided with the demonstration model for complete information. **Contents:**

1 Food colouring solution, 30 mL ; 20 Semipermeable membrane sheets; 171 g Sucrose.

## 13-30-1125 Osmosis Simulation Model

A striking, visual demonstration of osmosis! Quick and easy demonstration provides a solid understanding of osmosis and how it occurs. Your students will gain insight into this critical process as water diffuses across a semipermeable membrane from an area of higher concentration to an area of lower concentration. The process can be repeated using a variety of solutes in varying concentrations to observe the change in results. The outcome can even be quantified by measuring the amount of liquid that traveled across the membrane. Includes display stand. Size: 165mm (L) x 38mm (W) x 178mm (H).



## The Virtmac System

The Virtmac system represents a whole new approach to teaching some of the trickier aspects of cell biology, using magnetic pieces to represent atoms, molecules and ions. Between the three kits, up to 30 different topics can be covered, so the cumulative familiarity with this symbolic representation of cell processes leads to a much more unified and coherent understanding of the subject than traditional teaching methods. Also, with their low price and wide subject coverage these kits deliver excellent value for money. But as we all know - the real reward is watching students *really* grasping difficult concepts. To see a short video of these teaching tools in action, please visit [www.virtmac.com](http://www.virtmac.com).



Kit 3

### 404-004 Membrane/Protein - Kit 1 - Magnetic Teaching Aid

Add creativity and flexibility to your demonstrations of protein processes with this set of magnetic model pieces. Using the included magnets, you can model basic cell structure, cell size, ETC cellular respiration, ETC photosynthesis, nerve impulse, membrane transport, diffusion, endocytosis, exocytosis and more. Begin by building a simple cell membrane using only phospholipids. From that point, proteins and sugars are added, increasing the complexity of the membrane. You can continue to increase the complexity by building organelles using the same pieces. This unique kit, developed by John MacLellan allows you to illustrate how the same molecules are used repeatedly in different biological processes. Partial assembly required. Includes a DVD with easy to follow instructions and video lessons.

#### Contents:

23 Straight pieces 2.5 x 8.5" (6.25 x 21.25cm); 12 curved phospholipid bilayers; 9 different proteins; 7 glucose molecules; 4 oxygen atoms; 4 hydrogen atoms; 4 electrons; 5 sodium ions; 2 potassium ions; 2 calcium ions; 1 coenzyme NAD; 1 coenzyme FAD; 1 coenzyme NADP; 1 DVD; 6 laminated coloured legends.

### 404-005 DNA/RNA Protein - Kit 2 - Magnetic Teaching Aid

Realistically illustrate protein synthesis, DNA replication, Lac Operon, mitosis, meiosis, and more with this innovative set of magnetic model pieces. The design of the kit's contents allows you to show students how the same molecules are used repeatedly in different biological structures. Highlight the relationship between DNA, RNA, and proteins by arranging the magnets to show proteins exchanging DNA nucleotides between chromosomes during meiosis. You can also help students visualize RNA nucleotides in introns, exons, mRNA, tRNA, primers, and as a structural component of ribosomes. Partial assembly required. Includes a DVD with easy to follow instructions and video lessons.

#### Contents:

40 DNA nucleotides; 20 RNA nucleotides; 10 proteins; 4 amino acids; 3 glucose molecules; 1 galactose molecule; 1 DVD; 4 coloured laminated legends.

### 404-006 Folding/Enzyme Structure - Kit 3 - Magnetic Teaching Aid

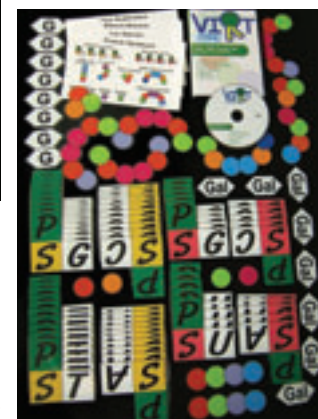
The versatility of this magnetic manipulative set enables you to demonstrate the four levels of protein folding in three-dimensions. Build an alpha helix on your chalkboard or whiteboard with the layers built in 3-D. This realistic representation clarifies any student misconceptions of protein folding. Using the same polypeptide chains produced in the protein folding, you can then demonstrate the induced fit model, enzyme substrate complex, denatured proteins, active sites, allosteric sites, as well as competitive and non competitive inhibitors. The kit contents reveal how the same molecules are used repeatedly to build simple to complex structures in different biological processes. Partial assembly required. Includes a DVD with easy to follow instructions and video lessons.

#### Contents:

80 individual amino acids; 3 glucose molecules; 1 galactose molecule; 1 DVD; 1 coloured laminated legend.



Kit 1



Kit 2

## 13-20-1193 Understanding Enzymes

- Lab Investigation

Investigate the catalysts of life. Teach your students how enzymes control a variety of chemical reactions. They safely conduct hands-on investigations using a variety of provided enzymes that are used by cells to catalyze reactions. They also study the essential role that enzymes play in cells as well as their optimum environment. Additionally, the class explores the application of enzymes in common commercial products and processes such as detergents, waste remediation, food processing and pharmaceutical production.

Class size – 40 students.



## 14-20-1453 Biotech Cheesemaking Lab

Put one of biotechnology's oldest applications to use in your own classroom. The ancient art of cheesemaking provides a perfect example of how biotechnology can be used to improve a process and its end-product. Your class will get the opportunity to actually make cheese using enzymes produced through the advances of biotechnology. In the process, they'll explore the science behind cheesemaking and observe the accompanying chemical and microbiological changes and the resulting physical changes. Additional investigations are included which will allow students to further explore the complexities of cheesemaking by changing such variables as temperature, pH, enzyme concentration, milk fat content and more. Class size – 40 students.



## 13-20-2173 Modelling Proteins, Fats & Carbohydrates

A 3-D study of some of life's most important molecules. Colour-coded, plastic model allows your class to simulate the structure of proteins, fats and carbohydrates. Students will construct three-dimensional subunits of amino acids, fatty acids and monosaccharides. They'll then link the amino acids to form protein molecules and illustrate their primary, secondary and tertiary structure. Similarly, they'll link fatty acids to represent fats and monosaccharides to model carbohydrates. Includes comprehensive teacher and student guides which overview the structure and function of each of these molecules and their importance in sustaining life. Completely reusable, providing for years of study!  
Class size – 40 students.



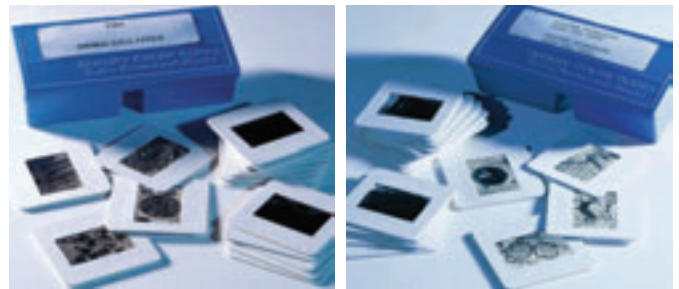
## T-604 Teaching Cell Respiration

Convert ADP to ATP. Follow the KREB's cycle. Move an electron through the Electron Transport System. Demonstrate Glycolysis and more. (7 fog-dispelling demonstrations).



**35mm slides, set of 20**  
**R-EMA Animal Cell Types**  
**R-EMP Plant Cell Types**

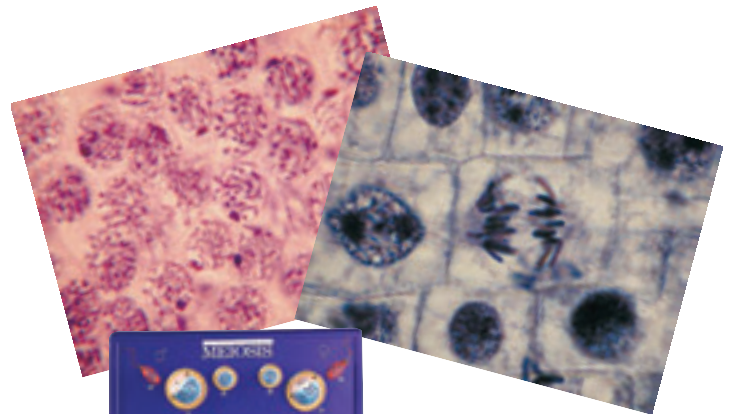
A brilliant series of twenty 35mm slides illustrating the ultrastructure of a typical cell. A leaflet describing each slide is enclosed.



**ZCO-002 Cell Division Slide Set**

Set of 9 microscope slides illustrating chromosome division in animal and plant cells:

- Locusta testis VS
- Rana ova various stages
- Lillium ovary meiosis
- Allium root apex LS mitosis
- Allium root tip squash preparation
- Mammal testis TS showing spermatogenesis
- Locusta testis squash showing meiosis
- Lillium anther three stages of development TS
- Insect salivary gland squash, acetic orcein, for giant chromosomes



**2668 Meiosis Model Activity Set**

Help explain individual human characteristics and genetic differences. Visualization and understanding of meiotic cell division are promoted through enlarged views of chromosomes, cytoplasm and chromatic and polar bodies.



**Microslides®**

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

**T92 Meiosis (pk 10)**

Primary Oocyte - Tetrads Formed, Primary Oocyte - Dyads separated, Primary Oocyte - Tetrads on Spindle, Primary Oocyte - First Polar Body Forming (750x), Secondary Oocyte - Chromosomes Formed (750x), Mature Egg (750x), Pronucleus Stage (750x), Zygote Ready for First Cleavage (750x).

**T53 Animal Mitosis (pk 10)**

The zygote, pro-metaphase, metaphase, metaphase - polar view, early anaphase, Anaphase, Telophase, Late Telophase.

**T55 Plant Mitosis (pk 10)**

Early prophase, Prophase, Metaphase, Early anaphase, Anaphase, Late Anaphase, Telophase, Late telophase .



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

**BEZO120 Mitosis**  
Poster - 760 x 520mm

Clearly shows the processes of mitosis starting with the interphase and ending with the telophase.



**2667 Mitosis Model Activity Set**

Illustrate somatic cell division with this informative model. Enlarged views detail five phases of mitosis. Includes: cytoplasm nucleus, nucleolus, chromatic threads, centrioles, aster, spindle, chromosomes and centromere.



**13-20-2183 Mitosis Simulation**  
Lab Investigation

An easy, graphic way to visualize the process of mitosis. Learn about chromosome function and structure by constructing models using coloured pop beads. Students will then use these "chromosomes" to model each stage of mitosis. In the process they'll gain a better understanding of what happens during cell division. Additionally, they'll learn to distinguish between plant and animal mitosis. Class size - 40 students.



**13-35-1066 Classification of Living Things**  
Poster - 890 x 584mm

A close-up view of Kingdoms of Life! Stunning photographs and detailed illustrations provide your students with a stimulating view of similarities and differences of life on Earth. Includes representative organisms from the Archaeobacteria, Eubacteria, Protista, Fungi, Plantae and Animalia Kingdoms.



**OHP Transparencies**  
**1595 Plants, set of 12**

Twelve colour transparencies introduce basic structures and functions of plants. Includes: Tree Buds, Tree Structure, Leaf Identification, Deciduous Trees, Evergreens, Grafting, Photosynthesis, Transpiration, Germination, Fertilization, Mould and Mushrooms.

**1660 Invertebrates, set of 12**

Explore the specific characteristics of the ten invertebrate phyla with these 12 full-colour transparencies with 5 overlays.

**1665 Vertebrates, set of 12**

Discover how warm-blooded vertebrates are different from cold-blooded ones with this set of 12 transparencies.



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

## Microslides®

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### T241 Five Kingdoms of Life (pk 10)

Eugena - A classification puzzle (400x), The Kingdom Monera - Nitrogen Fixing Bacteria (2000x), The Kingdom Monera - Geocapsa (1000x), The Kingdom Protista - Paramecium (100x), The Kingdom Protista - Spirogyra (150x), The Fungi Kingdom - The Mushroom (1/2 & 400x), The Plant Kingdom - Onion & Elodea (150x), The Animal Kingdom - (750x).

### T238 The Animal Kingdom (pk 10)

Amphiuma Liver Cells ST, Sponge, Hydra, Planaria, Soil Nematode, Ascarid Roundworm, Earthworm, Starfish, Ammocoetes Larva.

### T239 The Plant Kingdom (pk 10)

Onion Skin, Bean Seeding, Moss Plant, Fern, Female Pine Cone, Tulip Flower, Pistil, Monocot Seed.

### T214 The Fungi Kingdom (pk 10)

Achlya, Rhizopus, Saccharomyces, Peziza, Mushroom (2x) Mushroom (400x), Epidermophyton Floccosum, Lichen.

### T222 The Protista Kingdom (pk 10)

Amoeba / Actinophrys (200x) - Phylum Sarcodina, Paramecium (100x) - Phylum Ciliophora, Plasmodium Vivax (100x) - Phylum Sporozoa, Trypanosoma Gambiense Smear - Stained (800x) - Phylum Zoomastigina or Mastigophora, Euglena (400x) - Phylum Euglenapyta, Spirogyra Stained (175x) - Phylum Gamophyta, Noctiluca SP (63x) - Phylum Chrysophyta.

### T213 The Monera Kingdom (pk 10)

Staphylococcus Aureus (1000x), Bacillus Subtilis (1000x), Sirillium Volutans (1000x), Mycoplasma Pneumonia (60,000x), Rickettsia Rickettsi (45,000x), Geocapsa (1000x), Oscillatoria (400x), Nostoc - W.M. (100x) X.S. (400x).

### 13-35-1071 Visualizing Protists

Poster - 890 x 584mm

A close-up view of over 25 protists! Stunning photos of every phylum, divided into three major groups - plant-like protists, animal-like protists and fungus-like protists. Also includes detailed illustrations depicting the intricate structure of Euglena, Amoeba, Paramecium and Saprolegnia.

### 24-35-1096 Microcosmos

Poster - 890 x 584mm

Explore the relationship of macrocosm to microcosm. Unique poster bridges the gap between Biology and Geology by connecting a geologic timeline with the appearance of the five kingdoms of life. Students can explore the relationship of size by connecting selected macroscopic and microscopic life forms and particles.



### T19 Helpful Bacteria (pk 10)

Bacteria of Decay (2000x), Bacteria of Fermentation (2000x), Nitrogen-Fixing Bacteria (in soil), Nitrogen-fixing Bacteria (in Nodule), Nitrogen-fixing Bacteria (in Roots), Vinegar Bacteria, Cheese Bacteria, Sour Milk Bacteria.

### T20 Harmful Bacteria (pk 10)

Diphtheria (2000x), Typhoid Fever Bacteria (2000x), Pneumonia Bacteria (2000x), Bacteria of Tuberculosis (2000x), Bacteria of Food Poisoning (2000x), Bacteria of Potato Ring-Rot, Bacteria of Apple Fire-Blight (2000x).

### T202 Protozoa (pk 10)

Condylostoma (200x), Vorticella (75x), Deleptus (100x), Chlamydomonas (400x), Volvox (150x), Amoeba and Actinophrys (200x), Diffugia (200x), Radiolarians (25x).

### T216 Marine Plankton (pk 10)

Diatoms (200x), Asterionella (200x), Gymnodinium (200x), Ceratium (30x), Foraminifera (20x), Radiolarians (30x), Zooplankton (50x), Zoa (25x).

### T201 Algae (pk 10)

Anabaena, Merismopedia, Acetabularia, Scenedesmus, Amoeba and Actinophrys, Diffugia, Radiolarians.



## 13-35-1051 Viruses & Bacteria

Poster - 890 x 584mm

Take a closer look at the most prevalent viruses and bacteria known to man! Learn how to identify these agents and how they cause harm to humans. Includes detailed illustrations and photographs.



## 13-20-2233 Gram Staining of Bacteria

- Lab Investigation

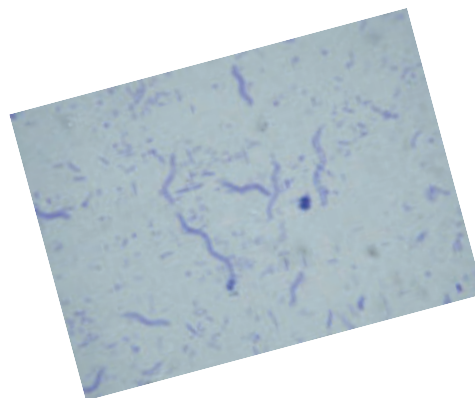
Identify bacteria safely and conveniently! Engage your students with a hands-on lesson in bacteria morphology! Revolutionary 'snap & stain' ampoules provide the safest and easiest way to stain bacteria smears. Completely safe design minimizes student contact and eliminates storage and disposal issues. Contains five ampoule sets, each including crystal violet, Gram's iodine, safranin and a decolourizing solution. Contains enough stain for forty slides. Also includes three MicroLIVE® cultures for student identification. Comes complete with detailed Teacher's and student's guides as well as a prepared reference slide featuring bacterial smears of cocci, bacilli and spirilla.



## BBS-612 Bacteria Slide Set

Set of 12 microscope slides:

Mixed bacteria - bacilli, cocci and spirillum; Cocci, Gram positive and negative; Bacilli, Gram positive and negative; Myobacterium tuberculosis in tissue; Escherichia coli; Bacillus subtilis; Bacillus megaterium; Rhizobium in root nodule; Vibrio Spirillum; Streptococcus lactis; Staphylococcus epidermis.



## Microbe Scavenger Hunt

15-20-1073 Lab Investigation

15-20-1075 Refill for Additional Classes

Explore the microworld in your environment. Hunt for various kinds of micro organisms - including bacteria, fungi and protists - in water, air, soil and even food, employing a ready-to-use growth media. The specially formulated gel, which requires no autoclaving or special equipment, makes it easy for students to design experiments that explore the subvisible world around them, collecting and identifying a wide variety of microbes. The investigation also includes a dichotomous key to moulds, bacteria, and protists; a specially formulated dried Microlife Mix that allows you to explore the diversity of pond organisms; and a guide to appropriate viewing techniques. Your students will:

- Grow bacteria, fungi and protists collected from various microhabitats
- Prepare wet mounts of microbes and stain slide preparations
- Observe and identify microbes under the microscope
- Investigate pondlife organisms



## Investigating Spontaneous Generation 13-20-1313 Lab Investigation

Recreate Pasteur's classic experiment. Can life arise from non-life? In 1864, noted French scientist Louis Pasteur dispelled this concept, termed "spontaneous generation", through one of science's most famous experiments. Pasteur showed that microorganisms in a sterilized nutrient broth did not develop spontaneously. Now your students can recreate Pasteur's findings. They'll grow organisms in flasks exposed to particles in the atmosphere. Then they'll compare them to those grown in flasks with special s-shaped necks, exposed to air but not particulate matter. In the process they gain firsthand insight into the fundamentals of evolution. Class size – 40 students.



## Examining Bacteria Through Infusion 16-20-1333 Lab Investigation

A totally safe means to explore the microscopic world of bacteria. Recreate the classic experiments of Anton van Leeuwenhoek, the famed Dutch discoverer of bacteria! Challenge your class to prepare various infusions, using peppercorns, hay and beans, to culture diverse microbiological communities. The students then study and identify various bacteria types by producing smears, staining them and observing the results under the microscope in order to calculate the diversity index for each microcommunity.



## Growing Biofilms 16-20-3493 Lab Investigation

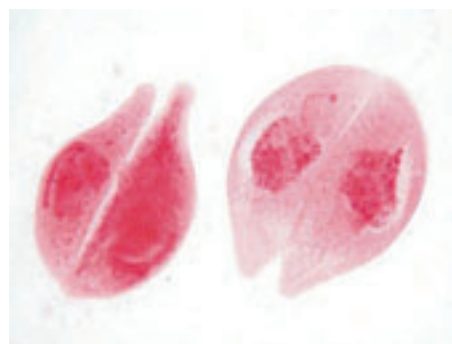
A firsthand view of the beneficial and detrimental effects of biofilms! On certain wet surfaces, various bacterial species, fungi, protozoa and algae secrete a film which fosters a complex living community. These 'biofilms' are found virtually everywhere in nature and industry. While some biofilms are beneficially used in the bioremediation and biofiltering of water, others can cause damage to industrial equipment and even human diseases. In this hands-on investigation, your students will create an actual 'biofilm rack' and expose it to various conditions to determine the ideal conditions for biofilm formation. They'll also get a close-up view of these biofilms by staining their preparations and examining them under the microscope. Finally, your class will be challenged to apply the knowledge they've gained to real commercial applications and develop solutions to prevent biofilm formation.



## BBS-440 Protozoa & Algae Slide Set

Set of 20 microscope slides showing all the most commonly studied protozoa and freshwater algae:

Amoeba E; Foraminifera, mixed; Radiolaria, mixed; Euglenia E; Paramecium, E; Paramecium, conjugating E; Paramecium, fission E; Diatoms, mixed E; Vorticella E; Chlamydomonas E; Pandorina E; Volvox, with daughter colonies E; Cladophora E; Spirogyra, conjugation E; Chlorella E; Desmids, mixed, E; Spirogyra, vegetative filaments E; Nostoc, filaments with heterocysts E; Trypanosoma, in blood smear; Plasmodium sp (malaria) in blood smear.



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### T91 Measurement Under the Microscope

Calibrating - Planaria, Average - Onion Root Tip, Volume - Starfish Egg, Volume - Spirogyra, Counting - Trypanosoma Gambiense Smear, Thickness - Taste Buds, Growth - 48-Hour Chick Embryo, Growth - 96-Hour Chick Embryo .



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### MIA100 Lens Cleaning Tissues, pk of 100

Used for cleaning camera, spectrometer & microscope lenses.



### 13-35-1006 Exploring with a Microscope

Poster - 890 x 584mm

A graphic overview of the working of a microscope. Features detailed illustrations of the microscope and its functions. Explains magnifications, dark field vs. bright field microscopy, slide making techniques and other techniques using a microscope.



### 601-258 Digital Microscope USB Powered

Head: Digital, monocular, 360° rotating, 45° inclined  
Eyepiece: WF10x/16mm  
Nosepiece: Triple  
Objectives: Achromatic 4x, 10x, 40x  
Working stage: Rotating round stage dia. 90mm, moving range 5mm with slide clips  
Focusing system: Coarse and fine with different axis  
Illumination: White LED powered through USB connection to PC  
Digital camera resolution: 800 x 600 pixels, 480Kpx  
Output: USB port  
Software: OPMIAS (Optika Micro Image Analysis Software)



### 601-006 Extreme Monocular Microscope

LED technology means never needing to change the lamp again. Intensity control. Iris diaphragm. 10x wide field eyepiece. Achromatic objectives 4x, 10 & 40x. 120 x 110mm plan stage with clips. Separate coarse and fine focusing with tension control.

## 601-273 Monocular Microscope with Rechargeable Batteries

Head: Monocular, inclined 45° and rotating 360°  
 Eyepiece: WF10x/16mm  
 Objectives: 4x, 10x, 40x  
 Magnification: 40x - 100x - 400x  
 Movable round stage with clips  
 LED illuminator with rechargeable batteries

## 601-010 Monocular Biological Microscope

Head: Monocular  
 Eyepiece: WF10x/18mm  
 Objectives: Achromatic 4x, 10x, 40x  
 Magnifications: 40x, 100x, 400x  
 Focusing system: Coarse  
 Stage: 100 x 90mm with sample clips  
 Condenser: Disc diaphragm  
 Illumination: 42mm dia. mirror

## 601-020 Monocular Biological Microscope

Head: Monocular  
 Eyepiece: WF10x/18mm  
 Objectives: Achromatic 4x, 10x, 40x  
 Magnifications: 40x, 100x, 400x  
 Focusing system: Coarse and fine  
 Stage: 120 x 110mm with sample clips  
 Condenser: Disc diaphragm  
 Illumination: 50mm dia. mirror

## 601-021 Monocular Biological Microscope 601-022 Monocular Biological Microscope

Head: Monocular, 45° inclined, 360° rotating  
 Eyepiece: WF10x/18mm  
 Focusing system: Coaxial coarse and fine  
 Stage: 120 x 110mm with sample clips  
 Condenser: Disc diaphragm  
 Illumination: 20W with tungsten bulb  
 Objectives (601-021): Achromatic 4x, 10x, 40x  
 Objectives (601-022): Achromatic 4x, 10x, 60x  
 Magnifications (601-021): 40x, 100x, 400x  
 Magnifications (601-022): 40x, 100x, 600x

## 601-023 Monocular Biological Microscope

Head: Monocular, 45° inclined, 360° rotating  
 Eyepiece: WF10x/18mm  
 Objectives: Achromatic 4x, 10x, 40x  
 Magnifications: 40x, 100x, 400x  
 Focusing system: Coaxial coarse and fine  
 Stage: 120 x 110mm with sample clips  
 Condenser: Disc diaphragm  
 Illumination: Low voltage 10W halogen bulb



EDU-LAB working with OPTIKA





## 601-040 Monocular Biological Microscope LED

Head: Monocular, 45° inclined, 360° rotating  
Eyepiece: WF10x/18mm  
Objectives: Achromatic 4x, 10x, 40x  
Magnifications: 40x, 100x, 400x  
Focusing system: Coarse and fine  
Stage: 90mm dia., 360° rotating, moving range 5mm with sample clips  
Condenser: Disc diaphragm  
Illumination: 1W white LED, with intensity control

## 601-046 Monocular Biological Microscope 601-047 Monocular Biological Microscope

Head: Monocular, 45° inclined, 360° rotating  
Eyepiece: WF10x/18mm  
Objectives: Achromatic 4x, 10x, 40x  
Magnifications: 40x, 100x, 400x  
Focusing system: Coarse and fine  
Stage: 120 x 110mm with sample clips  
Condenser: 0.65 N.A., with iris diaphragm  
Illumination (601-046): 20W with tungsten bulb  
Illumination (601-047): Low Voltage 10W halogen bulb

## 601-048 Monocular Biological Microscope LED

Head: Monocular, 45° inclined, 360° rotating  
Eyepiece: WF10x/18mm  
Objectives: Achromatic 4x, 10x, 40x  
Magnifications: 40x, 100x, 400x  
Focusing system: Coarse and fine  
Stage: 120 x 110mm with sample clips  
Condenser: 0.65 N.A., with iris diaphragm  
Illumination: LED

## 601-065 Monocular Biological Microscope

Head: Monocular, 45° inclined, 360° rotating  
Eyepiece: WF10x/18mm  
Objectives: Achromatic DIN 4x, 10x, 40x  
Focusing system: Separate coarse & fine controls  
Stage: 125 x 130mm with sample clips  
Condenser: 0.65 N.A., with iris diaphragm  
Illumination: 5W fluorescent tube

## 601-066 Monocular Biological Microscope

Head: Monocular, 45° inclined, 360° rotating  
Eyepiece: WF10x/18mm  
Objectives: Achromatic DIN 4x, 10x, 40x, 100x  
Focusing system: Separate coarse and fine controls  
Stage: 125 x 130mm mechanical  
Condenser: 1.25 N.A., with iris diaphragm  
Illumination: 5W fluorescent tube



## 601-067 Monocular Biological Microscope LED

Head: Monocular, 45° inclined, 360° rotating  
 Eyepiece: WF10x/18mm  
 Objectives: Achromatic DIN 4x, 10x, 40x, 60x  
 Focusing system: Coaxial coarse and fine controls  
 Stage: 125 x 130mm 2-layer mechanical  
 Condenser: 1.25 N.A., with iris diaphragm  
 Illumination: LED



## 601-068 Monocular Biological Microscope LED, Rechargeable Battery

Head: Monocular, 45° inclined, 360° rotating  
 Eyepiece: WF10x/18mm  
 Objectives: Achromatic DIN 4x, 10x, 40x, 60x.  
 Focusing system: Coaxial coarse and fine controls  
 Stage: 125 x 130mm 2-layer mechanical  
 Condenser: 1.25 N.A., with iris diaphragm  
 Illumination: LED

## 601-069 Binocular Biological Microscope

Head: Binocular, 30° inclined, 360° rotating  
 Eyepiece: WF10x/18mm  
 Objectives: Achromatic DIN 4x, 10x, 40x, 100x (oil)  
 Focusing system: Coaxial coarse and fine controls  
 Stage: 125 x 130mm 2-layer mechanical  
 Condenser: 1.5 N.A., with iris diaphragm  
 Illumination: 5W fluorescent tube



## 601-070 Binocular Biological Microscope LED, Rechargeable Battery

Head: Binocular, 30° inclined, 360° rotating  
 Eyepiece: WF10x/18mm  
 Objectives: Achromatic DIN 4x, 10x, 40x, 100x (oil)  
 Focusing system: Coaxial coarse and fine controls  
 Stage: 125 x 130mm - layer mechanical  
 Condenser: 1.5 N.A., with iris diaphragm  
 Illumination: LED

## 601-086 Monocular Biological Microscope Polarising

Head: Monocular, 30° inclined, 360° rotating  
 Eyepiece: WF10x/18mm  
 Objectives: Achromatic DIN 4x, 10x, 40x  
 Focusing system: Coarse and fine  
 Stage: 120mm dia., 360° rotating  
 Condenser: 0.65 N.A., with iris diaphragm  
 Polarizer filter and analyzer filter



## 601-099 Monocular Biological Microscope LED

Head: Monocular, 45° inclined, 360° rotating  
Eyepiece: WF10x/18mm  
Nosepiece: 4-positions  
Objectives: Achromatic 4x, 10x, 40x 100x (oil)  
Magnifications: 40x, 100x, 400x, 1000x  
Focusing system: Coaxial coarse and fine controls  
Stage: Double layer with mechanical sliding, 125 x 115 mm, moving range 50 x 30 mm  
Condenser: 1.25 N.A., with iris diaphragm, centrable/focusable  
Illumination: 3W white LED, with intensity control

## 601-256 Monocular Biological Microscope LED, Solar Cell Power

Head: Monocular, 45° inclined, 360° rotating  
Eyepiece: WF10x/16mm  
Objectives: Achromatic 4x, 10x, 40x  
Magnifications: 40x, 100x, 400x  
Focusing system: Coarse and fine  
Stage: 90mm dia., 360° rotating, moving range 5mm, with sample clips  
Condenser: Disc diaphragm  
Illumination: 1W white LED, with intensity control

## 601-100 Binocular Biological Microscope LED

Head: Binocular, 30° inclined, 360° rotating  
Eyepiece: WF10x/18mm  
Nosepiece: 4-positions  
Objectives: Achromatic 4x, 10x, 40x 100x (oil)  
Magnifications: 40x, 100x, 400x, 1000x  
Focusing system: Coaxial coarse and fine controls  
Stage: Double layer with mechanical sliding, 125 x 115 mm, moving range 50 x 30 mm  
Condenser: 1.25 N.A., with iris diaphragm, centrable/focusable  
Illumination: 3W white LED, with intensity control

## 601-101 Trinocular Biological Microscope LED

Head: Trinocular, 30° inclined, 360° rotating  
Eyepiece: WF10x/18mm  
Nosepiece: 4-positions  
Objectives: Achromatic 4x, 10x, 40x 100x (oil)  
Magnifications: 40x, 100x, 400x, 1000x  
Focusing system: Coaxial coarse & fine controls  
Stage: Double layer with mechanical sliding, 125 x 115 mm, moving range 50 x 30 mm  
Condenser: 1.25 N.A., with iris diaphragm, centrable/focusable  
Illumination: 3W white LED, with intensity control



## 601-114 Binocular Biological Microscope LED

Head: Binocular, 30° inclined, 360° rotating  
 Eyepiece: WF10x/20mm  
 Nosepiece: 4-positions  
 Objectives: Achromatic 4x, 10x, 40x 100x (oil)  
 Magnifications: 40x, 100x, 400x, 1000x  
 Focusing system: Coaxial coarse and fine controls  
 Stage: Double layer with mechanical sliding, 160 x 142mm, moving range 76 x 52mm  
 Condenser: 1.25 N.A., with iris diaphragm, centrable/focusable  
 Illumination: 3W white LED, with intensity control



## 601-115 Trinocular Biological Microscope LED

Head: Trinocular, 30° inclined, 360° rotating  
 Eyepiece: WF10x/20mm  
 Nosepiece: 4-positions  
 Objectives: Achromatic 4x, 10x, 40x 100x (oil)  
 Magnifications: 40x, 100x, 400x, 1000x  
 Focusing system: Coaxial coarse and fine controls  
 Stage: Double layer with mechanical sliding, 160 x 142mm, moving range 76 x 52mm  
 Condenser: 1.25 N.A., with iris diaphragm, centrable/focusable  
 Illumination: 3W white LED, with intensity control



## 601-116 Binocular Biological Microscope LED

Head: Binocular, 30° inclined, 360° rotating  
 Eyepiece: WF10x/20mm  
 Nosepiece: 5-positions  
 Objectives: PLAN achromatic 4x, 10x, 40x, 100x (oil)  
 Magnifications: 40x, 100x, 400x, 1000x  
 Focusing system: Coaxial coarse & fine controls  
 Stage: Double layer with mechanical sliding, 160 x 142mm, moving range 76 x 52mm  
 Condenser: 1.25 N.A., with iris diaphragm, centrable/focusable  
 Illumination: 3W white LED, with intensity control



## 601-117 Trinocular Biological Microscope LED

Head: Trinocular, 30° inclined, 360° rotating  
 Eyepiece: WF10x/20mm  
 Nosepiece: 5-positions  
 Objectives: PLAN achromatic 4x, 10x, 40x, 100x (oil)  
 Magnifications: 40x, 100x, 400x, 1000x  
 Focusing system: Coaxial coarse & fine controls  
 Stage: Double layer with mechanical sliding, 160 x 142mm, moving range 76 x 52mm  
 Condenser: 1.25 N.A., with iris diaphragm, centrable/focusable  
 Illumination: 3W white LED, with intensity control





## 601-158 Stereo Monocular Microscope

Head: Monocular, 45° inclined, 360° rotating  
Eyepiece: WF10x/18mm  
Objective: 2x  
Magnification: 20x

## 601-165 Stereo Binocular Microscope

Head: Binocular, vertical  
Eyepieces: WF10x/20mm  
Objective: 2x  
Magnification: 20x

## 601-166 Stereo Binocular Microscope

Head: Binocular, vertical  
Eyepieces: WF10x/20mm  
Objective: 2x  
Magnification: 20x  
Illumination: Incident 10W, tungsten bulb

## 601-167 Stereo Binocular Microscope

Head: Binocular, vertical  
Eyepieces: WF10x/20mm  
Objective: 2x  
Magnification: 20x  
Illumination: Incident & transmitted, 10W tungsten bulb

## 601-168 Stereo Binocular Microscope

Head: Binocular, 45° inclined (rear)  
Eyepieces: WF10x/20mm  
Objective: 2x  
Magnification: 20x  
Illumination: Incident, 10W tungsten bulbs

## 601-169 Stereo Binocular Microscope

Head: Binocular, 45° inclined (rear)  
Eyepieces: WF10x/20mm  
Objective: 2x  
Magnification: 20x  
Illumination: Incident & transmitted 10W, tungsten bulbs





## 601-170 Stereo Binocular Microscope

Head: Binocular, 45° inclined (rear)  
 Eyepieces: WF10x/20mm  
 Objective: 1x / 3x  
 Magnification: 10x / 30x  
 Illumination: Incident & transmitted 10W, tungsten bulbs



## 601-171 Stereo Binocular Microscope

Head: Binocular, 45° inclined (rear)  
 Eyepieces: WF10x/20mm  
 Objective: 1x / 3x  
 Magnification: 10x / 30x  
 Illumination: Incident & transmitted 10W, tungsten bulbs



## 601-172 Stereo Binocular Microscope

Head: Binocular, 45° inclined (rear)  
 Eyepieces: WF10x/20mm  
 Objective: 1x / 3x  
 Magnification: 10x / 30x  
 Illumination: Incident & transmitted 10W, tungsten bulbs



## 601-173 Stereo Binocular Microscope LED

Head: Binocular, 45° inclined (rear)  
 Eyepieces: WF10x/20mm  
 Objective: 1x / 3x  
 Magnification: 10x / 30x  
 Illumination: Incident & transmitted LED



## 601-175 Stereo Binocular Microscope

Head: Binocular, 45° inclined, 360° rotating  
 Eyepieces: WF10x/20mm  
 Objective: 2x / 4x  
 Magnification: 20x / 40x  
 Illumination: Incident & transmitted 10W, halogen bulbs

## 601-176 Stereo Binocular Microscope

Head: Binocular, 45° inclined, 360° rotating  
 Eyepieces: WF10x/20mm  
 Objective: 2x / 4x  
 Magnification: 20x / 40x  
 Illumination: Incident & transmitted 10W, halogen bulbs with intensity control

## 601-177 Stereo Binocular Microscope Long Arm

Head: Binocular, 45° inclined (front)  
Eyepieces: WF10x/20mm  
Objective: LWD 2x  
Magnification: 20x  
Illumination: Incident 10W, halogen bulb

## 601-178 Stereo Binocular Microscope LED, Long Arm

Head: Binocular, 45° inclined (front)  
Eyepieces: WF10x/20mm  
Objective: LWD 2x  
Magnification: 20x  
Illumination: LED, with flexible arm

## 601-201 Stereo Binocular Microscope

Head: Binocular, 45° inclined, 360° rotating  
Eyepieces: WF10x/20mm  
Objective: 2x / 4x, 95mm working distance  
Magnification: 20x / 40x  
Illumination: Incident & transmitted 10W, halogen bulbs with intensity control

## 601-202 Stereozoom Binocular Microscope

Head: Binocular, 45° inclined, 360° rotating  
Eyepieces: WF10x/20mm  
Objective: 1x - 4x zoom, 95mm working distance  
Magnification: 10x to 40x  
Illumination: Incident & transmitted 10W, halogen bulbs with intensity control

## 601-219 Stereozoom Binocular Microscope

Head: Binocular, 45° inclined, 360° rotating  
Eyepieces: WF10x/20mm, high-point  
Objective: 0.7x - 4.5x zoom, 100mm working distance  
Magnification: 7x to 45x  
Illumination: Incident & transmitted 15W, halogen bulbs with intensity control

## 601-220 Stereozoom Trinocular Microscope

Head: Trinocular, 45° inclined, 360° rotating  
Eyepieces: WF10x/20mm, high-point  
Objective: 0.7x - 4.5x zoom, 100mm working distance  
Magnification: 7x to 45x  
Illumination: Incident & transmitted 15W, halogen bulbs with intensity control



## 601-274 Digital Stereozoom Microscope with Built-In Camera

Specifically designed for laboratory and industry applications, this microscope offers professional quality at an affordable level whilst combining ease of use with excellent image quality. A range of accessories is available, offering the flexibility to tailor this microscope to a wide range of applications. The built-in camera with USB port facilitates quick and simple connection to a PC.

### Technical Specifications:

Head: Binocular 45° inclined, 360° rotating.  
 Interpupillary distance: 51-75mm. Adjustable dioptic compensation on both eyepiece-tubes. The head contains a digital camera of 1.3 Mp resolution with USB 2.0 port.  
 Eyepieces: Extra-Wide field WF10x/20mm  
 Nosepiece: Turret type objective mounted  
 Objectives: Parafoal achromatic zoom 0,7x...4,5x (6,428:1 zoom factor)  
 Total Magnification: Continuous magnification from 7x to 45x  
 Working distance: 100mm with standard objectives  
 Stage: Black/White and frosted glass stage, with clip-holders  
 Stand: Pillar stand 30mm diameter, 250mm height. Stand base of 260 x 200mm which houses the transmitted illumination system.  
 Focusing: By means of a rack and pinion focusing pair of knobs  
 Illumination: Adjustable illuminator for incident and transmitted light, 12V/15W halogen bulbs, with light intensity adjustments on both illuminators. Simultaneous incident & transmitted light.  
 Accessories: Glass plate, black/white plate, dust cover, manual instructions, software (Optika Vision Lite).

### Technical data about the built-in camera:

Resolution: 1208 x 1024 pixels (1.3Mpixels)  
 Sensor: CMOS 1/2"  
 Pixel size: 5.2µm x 5.2µm  
 Imaging area: 6.67 x 5.33mm  
 Frame rate at full resolution: 7.5 frames/second  
 Frame rate at half resolution: 15 frames/second  
 Optical format: 1/2"  
 Aspect ratio: 5:04  
 S/N ratio: max 45dB  
 Dynamic range: 68.2 dB  
 ADC: 10 -bit  
 Data Output: 3 x 8-bit  
 Exposure range: 24-bit  
 Sensivity: 0-70ms  
 C-mount lens adapter: no  
 Software: Optika Vision Lite, Twain interface  
 Capture features: Continuous auto white balance and exposure  
 Included with the camera: Software, 1.5m USB 2.0 cable  
 System requirements: Windows 2000/XP SP2, USB 2.0 port

## 601-243 Digital Monocular Microscope

Head: Monocular, 45° inclined, 360° rotating  
 Eyepiece: WF10x/16mm  
 Nosepiece: Triple  
 Objectives: Achromatic 4x, 10x, 40x  
 Stage: Rotating dia. 90mm, moving range 5mm with slide clips  
 Focusing system: Coarse and fine with different axis  
 Illumination: White LED, non-rechargeable, brightness control  
 Camera resolution: 800 x 600 pixels, 480K  
 Output: USB port  
 Software: OPMIAS (Optika Micro Image Analysis Software)





## 601-244 Digital Monocular Microscope

Head: Monocular, 45° inclined, 360° rotating  
Eyepiece: WF10x/18mm Nosepiece: Quadruple, reversed  
Objectives: Achromatic 4x, 10x, 40x  
Stage: Double layer, mechanical sliding, 125 x 115mm, moving range 50 x 30mm  
Condenser: 1.25 N.A. Abbe type  
Focusing system: Coaxial coarse and fine with focusing stop mechanism  
Illumination: White LED, non-rechargeable, brightness control  
Camera resolution: 800 x 600 pixels, 480Kpx  
Output: USB port  
Software: OPMIAS (Optika Micro Image Analysis Software)

## 601-245 Digital Binocular Microscope

Head: Binocular, 30° inclined, 360° rotating  
Eyepieces: WF10x/20mm Nosepiece: Quadruple, reversed  
Objectives: Achromatic 4x, 10x, 40x, 100x (oil)  
Stage: Double layer mechanical sliding 160 x 142mm, moving 76 x 52mm.  
Condenser: 1.25 N.A. Abbe type, with centering system  
Focusing system: Coarse and fine with different axis and focusing stop mechanism  
Illumination: White LED, non-rechargeable, brightness control  
Camera resolution: 1600 x 1200 pixels, 2.0Mpx  
Output: USB 2.0 port  
Software: OPMIAS (Optika Micro Image Analysis Software)

## 601-246 Digital Binocular Microscope

Head: Binocular, 30° inclined, 360° rotating  
Eyepieces: WF10x/20mm Nosepiece: Quadruple, reversed  
Objectives: PLAN achromatic 4x, 10x, 40x, 100x (oil)  
Stage: Double layer mechanical sliding 160 x 142mm, moving 76 x 52mm  
Condenser: 1.25 N.A. Abbe type, with centering system  
Focusing system: Coarse and fine with different axis and focusing stop mechanism  
Illumination: White LED, non-rechargeable, brightness control  
Camera resolution: 2048 x 1536 pixels, 3.2Mpx  
Output: USB 2.0 port

## 601-257 Digital Binocular Microscope LCD Screen and Light

Head: Binocular, 30° inclined, 360° rotating  
Eyepieces: WF10x/20mm Nosepiece: Quadruple, reversed  
Objectives: PLAN achromatic 4x, 10x, 40x, 100x (oil)  
Stage: Double layer mechanical sliding 160 x 142mm, moving 76 x 52mm  
Condenser: 1.25 N.A. Abbe type, with centering system  
Focusing system: Coarse and fine with different axis and focusing stop mechanism  
Camera resolution: 3.14Mpx connects directly to television  
Internal memory: 16MB. Slot for memory card up to 3GB  
Output: USB 2.0 port



## Edu-Cam® Multimedia Video Cameras

The Edu-Cam® video cameras are especially designed to meet the various requirements in the educational field. When connected to a professional monitor or simply to a TV set, Edu-Cam® is able to carry out many different functions. It can be used as an episcope, for the reproduction of texts, documents, photographs; as an enlarger, to enlarge small objects, insects, minerals; for video-microscopy, connected to microscopes; as an overhead projector, for the projection of drawings; as a camera for conferences, assemblies, meetings; as a camera for filming, with the help of a video recorder.

Its ultra-high sensitivity enables clear recording even in low light. The special lens enables you to focus from 0.76mm up to infinity. An extremely sensitive microphone (only on Multimedia models), captures the teacher's voice during the lesson (or surrounding sounds) that can be heard via a TV or separate amplification system. The microphone can be switched off if required.

The special 50 or 65cm flexible arm (12mm dia.) and the heavy weight of the base (approx. 2.7 kg) make Edu-Cam® versatile, sturdy and stable. The CCD camera is placed on the end of the flexible arm that can be safely twisted in any position (even projecting from the base) without affecting the system's stability. A special joint allows the head to rotate without damaging the wires inside. All models are equipped with an external power supply and dual adapter for video-microscopy (for biological and stereo microscopes). Electronic shutter, Automatic gain control, Automatic white balance, Microphone, Microscope adapter included. For connecting to a PC, a USB Video Grabber (code: 601-255) is available.

**601-247 Video Camera - 50cm arm**

**601-248 Video Camera - 65cm arm**

### Specifications:

<b>CCD:</b> 1/3"	<b>Resolution:</b> 380 lines	<b>Total pixels:</b> 290,000
Signal/noise ratio: >48 dB	Sensitivity (lux/F): 1 lux	
Video signal: PAL (NTSC opt.)	Working distance: >0.76 mm	
Objective: 8mm	Magnifications: > 90x	
Audio signal: analogue	Voltage: 12V d.c.	
Power adapter: 220/12Vdc included		
Flexible arm length: 50cm or 65cm (601-248)		
Base diameter: 17cm		
Weight: 3.4Kg or 3.5Kg (601-248)		

**601-249 Video Camera, Student - 50cm arm**

**601-250 Video Camera, Student Pro - 65cm arm**

### Specifications:

<b>CCD:</b> 1/4"	<b>Resolution:</b> 330 lines	<b>Total pixels:</b> 270,000
Signal/noise ratio: >48dB	Sensitivity (lux/F): 1.5 lux	
Video signal: PAL (NTSC opt.)	Working distance: >0.76mm	
Objective: 8mm	Magnifications: > 90x	
Audio signal: analogue	Voltage: 12V d.c.	
Power adapter: 220/12V d.c. included		
Flexible arm length: 50cm		
Base diameter: 17cm		
Weight: 3.3Kg & 3.4Kg (601-250)		





Digital Video Cameras for use with PC. Universal System for video and still image capture through eyepieces at mid resolution. Can be used with both biological and stereo microscopes.

## 601-252 Digital Video Camera for Microscope

Resolution: 640 x 480 pixels (0.35 Mp) Sensor: CMOS 1/4"  
Pixel Size: 5.6µm x 5.6µm Imaging Area: 3.59 x 2.69 mm  
Frame Rate: full resolution, 30 frames/s; half resolution, 40 frames/s  
Optical Format: 1/4" Aspect Ratio: 4:3  
S/N Ratio: max 45dB Dynamic Range: 60dB  
ADC: 10-bit  
Data Output:(Uncompressed Video) 24-bit  
Exposure Range: 0-70 ms Sensitivity: 2.0 V/Lux-second  
Software: Optika Vision Lite, TWAIN interface,  
plus freeware for image elaboration.  
Capture Features: Continuous auto white balance & exposure  
System Requirements: Windows 2000 / XP SP2, USB 2.0 port  
**Also included:** 1.5m USB cable; adapters for stereomicroscopes (Ø30mm & 30.5mm) lens mount cap; box.



## 601-253 Digital Video Camera for Microscope

Resolution: 1280 x 1024 pixels(1.3 Mp) Sensor: CMOS 1/2"  
Pixel Size: 5.2µm x 5.2µm Imaging Area: 6.67 x 5.33mm  
Frame Rate: full resolution, 7.5 frames/s; half resolution, 15 frames/s  
Optical Format: 1/42" Aspect Ratio: 5:4  
S/N Ratio: max 45dB Dynamic Range: 68.2dB  
ADC: 10-bit  
Data Output:(Uncompressed Video) 24-bit  
Exposure Range: 0-70 ms Sensitivity: 2.0 V/Lux-second  
Software: Optika Vision Lite, TWAIN interface,  
plus freeware for image elaboration.  
Capture Features: Continuous auto white balance & exposure  
System Requirements: Windows 2000 / XP SP2, USB 2.0 port  
**Also included:** 1.5m USB cable; adapters for stereomicroscopes (Ø30mm & 30.5mm) lens mount cap; box.



## 601-275 Digital Microscope Desktop/Handheld

Magnification: 10x - 100x (continuously adjustable)  
Field of view: 20mm (10x) - 2mm (100x)  
Image sensor: 1/4" CMOS VGA, 640 x 480 pixels



## 601-276 Digital Camera Microscope or Standalone use

Digital camera, fitted with USB connection and AV output for TV/monitor. All you need to capture, or simply view, the images coming from your microscope contained in one single model which is equally at home used as a high-quality, standalone digital camera. The camera has a resolution of 8MP (12MP through interpolation), with 3X optical zoom and a very bright 3" LCD display. The system also includes an adaptor that fits all Opti-Lab microscopes and stereomicroscopes that have an eyepiece holder of 23mm or 30mm diameter. A complete series of digital imaging software allows you to process, file and work with the captured images. 1GB memory card included.



## 601-255 USB Video Grabber Analogue to Digital Converter

Analogue to Digital signal converter for PC. Real-time video capture from camcorder, VCR or camera. User-friendly software stores and manages images & videos. Real time, full size video capture window. Video capture resolution 352 x 288px, image capture resolution 1600 x 1200px. Video conference software enclosed. The USB video grabber comes with drivers for Windows 98 SE, ME, 2000 and XP. It also includes the following software: Win TV-32; Win TV2000; Microsoft NetMeeting; DVD Movie Factory.



## B72 Microtome

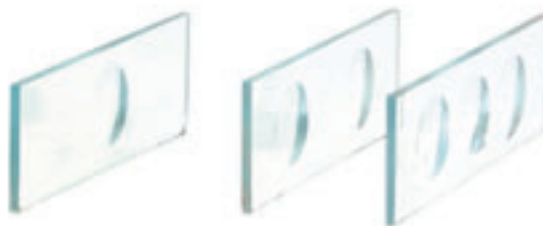
Hand cylinder microtome with a wide flat top to guide the sectioning razor and to protect the hand. The feed screw has a 1mm pitch and a wide milled flange so that the embedded material may be advanced very gradually and thin sections cut easily. Dimensions: Cutting table 50mm diameter; Central well 16mm diameter.



## Microscope Slides

Polished spherical concavities are 16 to 18mm dia. 0.5 to 0.6mm deep and made of non-corrosive glass with bevelled and polished edges and corners. 75 x 25mm, 1.5mm thick.

- B86A** One Cavity, pk of 10
- B86B** Two Cavity, pk of 10
- B86C** Three Cavity, pk of 10



## EDU164 Glass Microscope Slides 75 x 25 x 1.35mm, pk of 50

High quality clear and optically flat glass slides with ground and polished edges. Pre-cleaned. Variation in slide dimensions:  $\pm 1$ mm in length and width,  $\pm 0.2$ mm in thickness.



## EDU745 Microscope Cover Glasses 22 x 22mm, pk of 100

Pre-cleaned cover glasses. Dimension: 22 x 22mm Square. Approximately 100 pieces (10g) per box.



## B116 Microscope Slide Case

This wooden slide case safely holds 100 (75 x 25mm) glass microscope slides with good shock resistance characteristics. The fully lined case is fitted with brass clips and an aluminium index cardholder.



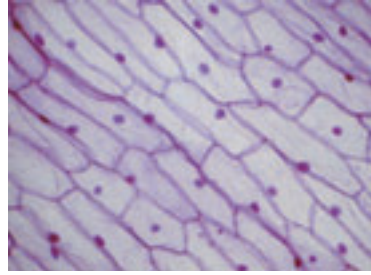


## Microscope Slide Sets

### BBS-003 Beginners Slide Set set of 12 slides

Selected for their suitability for young and inexperienced microscopists.

Housefly wing; Butterfly wing scales; Housefly leg; Hydra; Water organisms; Onion skin; Cork section; Cotton material; Paper fibres; Water flea; Twig section; Letter 'e'.



### BBS-310 Basic Zoology Slide Set set of 25 slides

Aspects from a wide range of the Animal Kingdom.

Amoeba E; Paramecium E; Hydra, body wall TS; Sycon, colony TS; Fasciola (liver fluke) E; Taenia, mature paraglottid E; Ascaris, male TS; Periplaneta, trachea E; Rana (frog) ovary TS; Rana, testis, for spermatogenesis; Amphioxus, young E; Euglena E; Hydra, extended E; Hydra, body wall LS; Planarian TS; Taenia (tapeworm) scolex LS; Pediculus (louse) male E; Periplaneta (cockroach) head E; Ocyctolagus (rabbit) embryo, body TS; Pieris (butterfly) imago, proboscis; Musca (housefly) imago, head E; Scyliorhinus (dogfish) skin with placoid scales VS; Lumbricus (earthworm) typhlosole TS; Lumbricus, reproductive region E; Ascaris (roundworm) female TS.



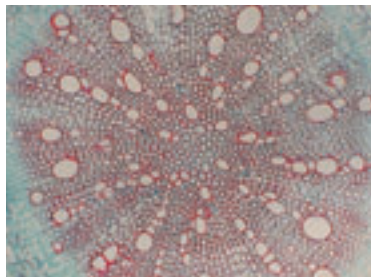
### ZCO-001 Hydra Slide Set set of 6 slides

Hydra, extended E; Hydra, TS and LS; Hydra, with testis TS; Hydra, with ovary TS; Hydra, with bud LS; Hydra, with ingested animal LS.



### BBS-411 Basic Biology Slide Set set of 25 slides

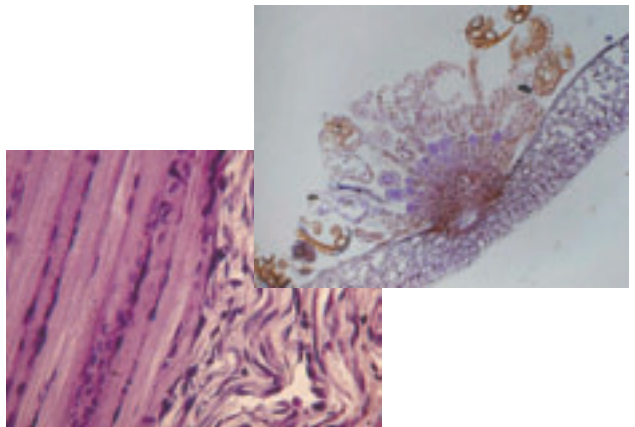
Amoeba E; Hydra with bud E; Fasciola (liver fluke) E; Human blood smear; Artery and vein TS; Lung VS; Ileum TS; Ovary TS; Testis TS; Euglena E; Spirogyra E; Mucor, conjugation E; Zea stem TS; Zea (maize) root TS; Mnium, archegonia VS; Mnium (moss) antheridia VS; Helianthus leaf TS; Helianthus stem TS; Helianthus (sunflower) root TS; Allium (onion) root apex LS; Dryopteris (fern) prothallus E; Cucurbita (marrow) stem TS; Marchantia, thallus, antheridia VS; Marchantia, thallus, archegonia VS; Marchantia (liverwort) developing sporogonium VS.



### BBS-411C Comprehensive Biology Slide Set set of 50 slides

Covers most requirements to GCSE and beyond. Consists of 25 slides from Basic Biology Set (code: BBS-411) plus the following:

Paramecium E; Paramecium conjugation E; Hydra TS; Hydra with ovary TS; Hydra with testis TS; Taenia (tapeworm) scolex E; Taenia proglottid E; Compact bone TS; Cardiac muscle LS; Nerve cells smear; Spirogyra conjugation E; Lycopodium strobilus LS; Lillium anther TS; Lillium ovary TS; Yeast E; Kidney VS; Spinal cord TS; Skin, hair insertion VS; Striated muscle LS; Stigma with pollen tube LS; Helianthus stem, second thickening; Lumbricus (earthworm) typhlosole TS; Cucurbita (marrow) stem TS; Tilia (lime) young and old stems TS; Dryopteris (fern) pinnule with sori TS.

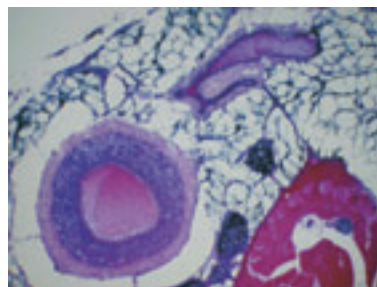


## BBS-475 Basic GCSE Slide Set

set of 25 slides

As specified for GCSE Biology syllabus.

Human blood smear; Kidney TS; Lily anther tetrads TS; Skin, sweat glands VS; Ovary VS; Spinal Cord TS; Yeast (saccharomyces) E; Dicot stem apex LS; Dicot stem separate bundles TS; Monocot (zea) root TS; Allium root tip, mitosis LS; Allium root tip, squash; Monocot leaf epidermis E; Artery and vein TS; Squamous epithelium; Kidney injected VS; Lung VS; Skin, hair insertion VS; Lung injected VS; Testis TS; Pancreas TS; Mucor asexual E; Moss leaf, for cells; Dicot leaf TS; Dicot stem old TS.

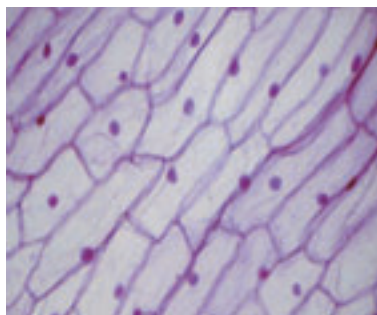


## BBS-485 GCSE Food Science Slide Set

set of 20 slides

Suitable for GCSE courses.

Meat (muscle LS uncooked); Onion skin for cells; Meat (muscle LS cooked); Adipose tissue TS; Fish (cod uncooked); Fish (cod cooked); Fish skin VS (herring); Bacteria mixed; Yeast (saccharomyces); Mucor asexual; Aspergillus; Penicillium; Psalliota VS (mushroom); Potato (solanum) cooked; Carrot TS; Starch grains E; Wholemeal flour E; White flour E; Potato uncooked showing starch; Areolar showing collagen and elastic fibres.



## BBS-001 Insect Anatomy Slide Set

set of 9 slides

Set of 9 slides showing anatomical insect parts:

Apis (bee), legs E; Apis, spiracles E; Apis, head and eyes VS; Apis, wing E; Pieris, imago, proboscis E; Pieris (butterfly), imago, antenna E; Periplaneta (cockroach), trachea E; Periplaneta, mouthparts, disarticulated E; Musca (house fly) imago, proboscis E.



## Microslides®

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

### T18 Insect Parts (pk 10)

Body of an insect, Insect mouths, Insect legs, Honey bee leg, Insect wings, Antennae, The compound eye, Breathing holes.

### T235 Honey Bee (pk 10)

Mouth Parts, Antenna, Compound Eye, Wing Hooks, Pollen Comb, Pollen Basket, Honeycomb Cells, Sting & Poison Sac, Sting.



**More of the Microslide® series, covering other subjects, can be found throughout this catalogue.**



## Dissection Equipment

### Dissection Pans, Pads & Covers

Available in 3 sizes. Pans won't rust. Pads are reusable and no need to melt wax.

#### 9423 Small, set of 15

Perfect for the beginner's dissection project, earthworms, small frog, clam or grasshopper 10" x 7".

#### 9424 Standard, set of 15

Perfect for general use and medium sized specimens such as perch, frog and crayfish - 11.5" x 7.5".

#### 9425 Large, set of 15

An excellent pan for larger specimens, foetal pig, bull frog and star fish - 12.75" x 9".

### Dissection Pads

Reusable dissecting pads. Made from 'high grip' materials which eliminates need for use of wax!

#### 9426 Small, 10" x 7"

Also serves as replacement pad for Small Dissection Pan, code: 9423

#### 9427 Standard, 11.5" x 7.5"

Also serves as replacement pad for Standard Dissection Pan, code: 9424

#### 9428 Large, 12.75" x 9"

Also serves as replacement pad for Large Dissection Pan, code: 9425

### 430-001 Dissecting Tray with Wax

Size: 300 x 200 x 45mm.

### 9432 Economy Dissection Student Kit

A beginner's dissection kit for the student learning the basics of dissection! Watch the excitement when the student uncovers for the first time the dissection of an earthworm, frog or grasshopper. Specimens sold separately from your preserved specimen supplier. Kit includes beginner's instruments, Teacher's Guide, pan, pad and cover (10" x 7").

### 430-004 Dissecting Set, Basic Instruments

Set of 14 stainless steel dissecting instruments in a canvas case. Scissors x 2, forceps x 2, needles x 4, scalpel x 1, B.P. handle with blade x 1, razor x 1, magnifying glass x 1, chain and hook x 1, blow pipe x 1.



- 9440 Student Collection Mount**  
**9442 Student Collection Mount, set of 15**

Our Student Collection Mounts have no sharp edges or little pins to lose. Students collect and mount their treasures of nature on the soft matting, and display in two different sized mounts! If they get dirty, submerge in water to clean. 212 x 275mm.



## Dissecting Scissors

- B156 Straight, Finepointed, 125mm**

Straight, stainless steel scissors with closed shanks and very fine points for delicate work.

- B158 Blunt, 125mm**

Blunt end, stainless steel scissors with closed shanks.

- B160 Curved, Finepointed, 110mm**

Curved stainless steel scissors with fine points and open shanks.



## Stainless Steel Forceps

- B168A 110mm, Fine point, pk of 10**

- B170A 125mm, Blunt Tip, pk of 10**



## Nylon Forceps,

- 13097A 125mm Blunt Tip, pk of 20**

Nylon Forceps, glass filled, straight, blunt tip.



- B179 Seekers, Stainless Steel**

Plain stainless steel 35mm seekers with blunt end needle. 70mm length including handle.



- BIO164 Wooden Handle Needle**  
 100mm length, pk of 5

Dissecting needle, straight, with hardwood handle. Needle length 33mm. Handle length 100mm.



- BIO166A Stainless Steel Needle, pk of 5**

Dissecting needle, straight, stainless steel. Total length 95mm.





## B180 Scalpel, Complete

High quality steel scalpels with handle length 130mm and blade length 45mm.



## B182A Scalpel Handle Size No 3

## B182B Scalpel Handle Size No 4

Strong, slotted, alloy handles to accept blades.



## Scalpel Blades

Quality sterile, disposable carbon steel blades, individually packed in quick peel aluminium foil.

**B184A1** Size 10, No 3 Handle, pk of 10

**B184A2** Size 11, No 3 Handle, pk of 10

**B184A3** Size 12, No 3 Handle, pk of 10

**B184A4** Size 15, No 3 Handle, pk of 10

**B184B1** Size 20, No 4 Handle, pk of 10

**B184B2** Size 21, No 4 Handle, pk of 10

**B184B3** Size 22, No 4 Handle, pk of 10

**B184B4** Size 23, No 4 Handle, pk of 10

**B184B5** Size 24, No 4 Handle, pk of 10



## Microslides®

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

## T99 The Senses (pk 10)

Pacinian corpuscles (30x), Pacinian corpuscles (65x), Meissner's corpuscles, Free nerve ending, Cochlea of ear, Organ of Corti, Taste buds, Nasal epithelium, Eye, Retina, Rods and cones.

**More of the Microslide® series, covering other subjects, can be found throughout this catalogue.**



## 20-1443 Understanding Human Senses

- Lab Investigation

Explore the capabilities & limitations of the human sensory system. The human senses are continuously bombarded by an infinite array of stimuli. The information gathered by our senses tells us most of what we know about our surrounding environment. Relayed from the senses to the central nervous system, this information is processed and interpreted for the body's use. Students will investigate the effects of various stimuli on the sensory system and determine the capabilities and limitations of our sensory organs. Specifically, students will test the tongue's sensitivity to various solutions; map the skin's responsiveness to heat and cold; study the distribution and sensitivity of touch receptors; test the response to sound from different directions and distances; measure the sense of vision and its limitations; and test the human body's reflexes. Class size - 40 students.



## 6213 Sight and Sound Lab

Specially designed equipment helps your students investigate the structure and function of two important senses: sight and sound. Topics include learning how a lens affects vision, measuring field of vision and capturing sound waves.

Kit contains: vision disk, pinhole viewer, lenses, eye chart, masks, flashlight, rubber balls, extensive pack of activities and Teacher's Guide.



## 2640 Eye Model Activity Set

This anatomical eye model clearly illustrates details of the eye with three removable pieces: the body of the eye, the lens and a multi-coloured transparent cover depicting the venation, sclera and cornea. A separate diagram panel also shows components of the retina. Set includes 18 x 24" model and a comprehensive activity guide.



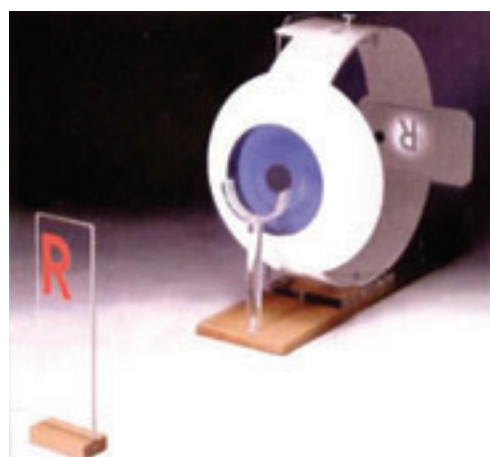
## 402-101 Small Functioning Eye Model

## 402-102 Large Functioning Eye Model

With these models the functions of the human eye can be taught very effectively. By moving the retina, the shape of the eye can be changed. The lens and ciliary body are made of silicone to allow the change of form and thickness of the lens. Pictures can be projected on the retina that allow you to demonstrate:

- Accommodation of the lens
- Near point of vision
- Myopia (near sightedness)
- Hypermetropia
- Presbyopia
- How to correct these problems with glasses

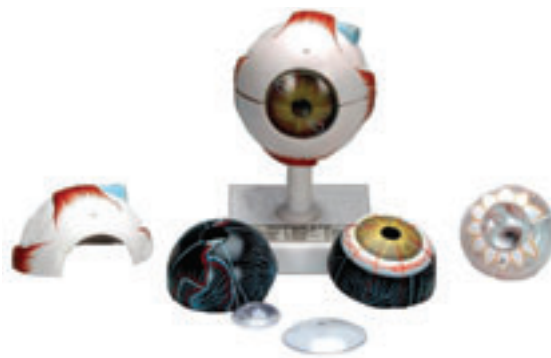
Comes with detailed instruction manual.





## AM26 Human Eye Model - 7 parts

This model is three times full size. The upper half of the sclera with cornea and eye muscle attachments, both halves of choroid with iris and retina, lens and vitreous humour are removable. On base and numbered with key card.



## AM36 Eye Model - 6 parts

This model is approximately five times full size. Sectioned horizontally and separates into 6 parts, upper half of the sclerotic membrane, choroid membrane (2), retina with vitreous humour, lens, lower half of the sclerotic membrane. On base and numbered with key card.



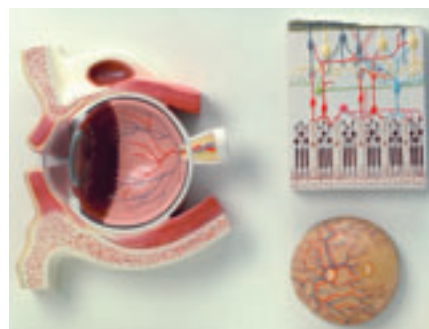
## 20-4093 Exploring the Eye-Brain Connection - Lab Investigation

Investigate why seeing is not always believing! Learn that sight is as much about perception as it is about reality. Sure to be a hit with your class, this unique lab explores the function of each part of the eye and shows how they can contribute to 'tricking' the brain through optical illusions. Your students will use the illusions and explanations provided to experience different types of optical illusions. Then they'll use what they learn to create their own optical illusion. Engaging process makes learning the parts of the eye and their function interesting and fun! Class size - 40 students.



## AM0037 Human Eye Demonstration Model

The eye enlarged 5 times, shows the eye socket with the sagittal cutaway showing the fine structure of the retina as seen with an electron microscope.



## 16-35-1353 Human Vision Poster - 890 x 584mm

Test visual acuity, determine dominant eye, find blind spots and more. Examine the cross-section of a normal eyeball and observe how slight changes in the shape of the eyeball cause nearsightedness, farsightedness, and astigmatism. Also covers common diseases of the eye and colour vision.

## 6015 Vision Disk

Students measure field of vision, and can read field and peripheral vision using this unique device.



## 2650 Ear Model Activity Set

A 3-dimensional model of the human ear includes a removable eardrum, semicircular canals and cochlea. Magnified structures facilitate hands-on learning as they are followed by a full-colour transparency and comprehensive study guide.



## 6027 Reaction Timer

Using a reaction timer, students measure response time to various stimuli including light, sound and touch.



## 6216 Balance and Movement Lab

By performing these laboratory exercises, students will learn to relate balance and equilibrium to basic body functions including vision, muscle fatigue and body position. Activities challenge students to determine the factors involved in safety-related problems associated with balance. Kit includes: wooden balance board, balance rope, foot pads, chart and activity packet with Teacher's Guide.



## 6036 Breath Control Meter

Breath Control Meter only, from Breathing Fitness Lab code: 6212.



## 6043 Grip Tester

Measure physical grip strength with this pneumatic grip tester. May be adjusted for different strength levels. Also available as part of a Flexibility/Strength Kit with other useful items and Teacher's Guides, code 6218.

## 6050 Lung Volume Kit, set of 4

Lung capacity is a significant indicator of physical fitness. The lung volume kit gives students the opportunity to understand their own physiology more thoroughly. Kit includes: a durable plastic bag calibrated to 6 litres, mouthpiece and mouthpiece holder.

**6033 Mouthpiece Holders, set of 4**

**6035 Mouthpieces, set of 8**

**6034 Bags, set of 4**

Replacement sets for Lung Volume Kit, code: 6050.



## 6212 Breathing Fitness Lab

Investigate the pulmonary system by measuring breath rate, breath volume, breath recovery, breath control, lung volume and the amount of CO<sub>2</sub> in exhaled air. Kit includes: breath control meter, lung volume bag, breath volume bag and valve, metre tape, mouth pieces, chemicals, 3 charts, plus a Teacher's Pack with activity plans. Additional or replacement supplies sold separately.



## 6214 Heart Fitness Lab

Involve the entire class in a variety of activities as they learn about the function of the heart and importance of physical fitness with this informative lab. By monitoring heart rates, recovery times and collecting data, students measure the effects of exercise and the impact of added weight to their heart rate. Kit contains a stethoscope, weight backpack and Teacher's Pack with 5 activity plans. Stethoscope available separately, [code: EDU1006](#).



## SR-1479 Exercise Tumble 'n Teach® Cube

Drop and give me twenty!' Doesn't sound like too much fun, but turning exercise into a GAME can be fun with the new Tumble'nTeach® Exercise Cube. From stretching and running to good old 'jumping jacks', this Tumble'nTeach® has a variety of basic exercises to get your students' blood flowing. Ideal for classroom, gym or even outdoors.



## 6215 Action/Reaction Lab

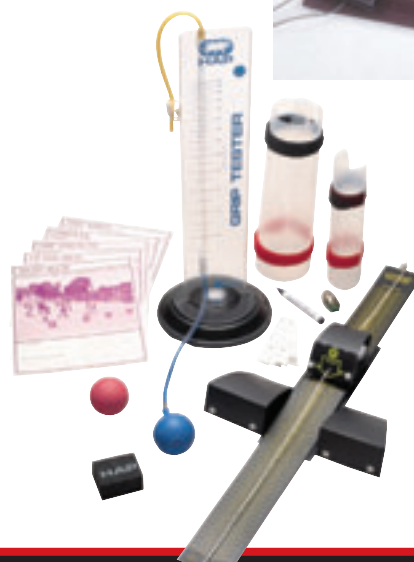
Investigate functions of the nervous system with this interactive laboratory activity. Using a reaction timer, students measure response time to various stimuli including light, sound and touch. Materials are included allowing students to develop their own personal training programs and to chart the results. Ultimately, students relate reaction time to general health and mental alertness. Kit includes: reaction timer, game board and pieces, chart, pack of activities and Teacher's Guide.

Reaction Timer available separately, [code: 6027](#).



## 6218 Flexibility/Strength Kit

Students measure flexibility and strength with the unique apparatus in this kit, including a grip tester and limber gauge. The many activities outlined step-by-step in the Teacher's Guide will improve students' awareness of their own flexibility and strength. This lab kit includes: limber gauge, grip tester, gripper, splints, 3 charts, miscellaneous parts and chart labelling supplies.



## SR-1428 Tobacco Use Prevention Clever Catch®

A fun and engaging way for students to learn about the harmful effects of smoking. As always, the student will answer the question under his left thumb when the ball is caught. A fun way to practice and learn!



## Effects of Smoking

14-30-1235 Demonstration Kit

14-30-1236 Refill

Graphically demonstrate the impact of smoking on the lungs! Simply place a cigarette that you provide in the mouth of the 'Smoking Man' and draw smoke into his 'lungs' using the syringe pump included. The results will amaze you as you watch his lungs start to darken after only a few short puffs! Includes detailed teacher and student guides that provide extensive background information on the dangers of smoking as well as scenarios to test various cigarette brands for tar content under various conditions.



## R-100590B Effects of Smoking Kit

R-100611B Refill

Kit includes: 25 filters, filter holder with durable plexiglas base, aspirator bulb, colour chart for quantitative determination of tar content and instructions for 5 complete activities.



## Microslides®

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### T73 Smoking & Health (pk 10)

Normal Bronchial Epithelium (175x), Thickened Bronchial Epithelium (175x), Loss of Cilia - Bronchial Epithelium, Early Cancerous Invasion - Bronchial Epithelium, Normal Lung Tissue, Blackened Lung Tissue (65x), Fibrosis and Emphysema - lung tissue, Alpha Virus on E. Coli (60,000x).

### T90 Air Pollution & Human Health (pk 10)

Pollen Grains (40x), Volcanic Dust (840x), Inert (24,000x), Sulfuric Acid Droplet (62,800x), Quartz Sand (210x), Blackened White House Walls (210x), Blackened Lungs (65x).



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

## SR-1440 CPR/First Aid Clever Catch®

A simple and fun way to learn about the basics of CPR and First aid. The ball is perfect for the beach, at school in organised classroom activities, on the playground or at home. 100 educational questions for players to answer.

## SR-1465 Drugs & Alcohol Clever Catch®

Start learning about the effects that drugs and alcohol have on our bodies, relationships and lifestyles. The Clever Catch® ball provides an easy way to introduce an often difficult topic.

## 3574 Breathalyser Kit

Students explore the science behind alcohol and the body. They simulate blood volume, add 'drinks' and conduct tests to show how Blood Alcohol Content is measured using a disposable breathalyser tube.

## 14-20-3533 Effects of Drugs and Alcohol on Daphnia - Lab Investigation

Measure Daphnia's heart rate in response to stimulants and depressants. Study the effects of various chemicals on the human body through the use of a model organism - Daphnia. Your students will observe firsthand the effects of various stimulants and depressants on the organism's heart rate. They'll also learn to predict and classify various chemicals as either stimulants or depressants.

Note: Includes a redeemable coupon for requesting the perishable Daphnia culture. Your students will:

- Identify the microcrustacean Daphnia and its major anatomical features
- Predict the effects of stimulant and depressant chemicals on the heart rate of a model organism
- Measure the heart rate in a model organism under different chemical conditions
- Classify chemicals as depressants or stimulants after observing their effects on heart rate

## R-101316 Effects of Drug Abuse - Lab Investigation

Bring an important social issue into the classroom as students study the physiological aspects of drugs. By using a culture of Daphnia, (not included) students test commonly used drugs and observe changes in the circulatory and nervous systems of the organism. A 'drug wheel' reference chart enables the study of illegal drugs as well as over-the-counter drugs. Enough materials are provided for 30 students working in pairs. Kit includes: Ringer's solution, drugs (adrenaline, lactic acid, aspirin, caffeine, nicotine, and ethyl alcohol), drug dial sheet and chambers. Reproducible student worksheets and Teacher's Guide are also included. Includes MSDS.



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### T208 Drug Abuse Under the Microscope(pk 10)

Heroin - Heart Muscle (50x), Cocaine - Nasal Epithelium (20x), Glue Sniffing - Liver (100x), Alcohol - Oesophagus (20x), Smoking - Lung (130x & 50x), Pain Pills - Kidney (50x), Aspirin - Stomach (20x).

### T50 Animal Tissues 1 (pk 10)

The Trachea (50x), The Trachea (180x), Ciliated columnar epithelium, Simple cuboidal epithelium, Cartilage, Oesophagus epithelium, Simple squamous epithelium, The urinary bladder.

### T51 Animal Tissues 2 (pk 10)

Voluntary muscle cells, Involuntary muscle cells, Heart Muscle, Areolar connective tissue, Bone, Blood, Adipose tissue, Spinal cord.

### T10 Cells of your Body (pk 10)

Cheek, Blood, Lymph Gland, Bone, Voluntary muscle, Involuntary muscle, Nerve, Gland Cells.

### T249 Basic Human Histology (pk 10)

Bone XS - Stained, Cartilage, Fat Cells, Epithelial Tissue / Ciliated Epithelial Cell, Nerve Cells - Stained, Striated Muscle Cells, Red Blood Cells, White Blood Cells.



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

### 1810-H Drug Abuse OHP Transparencies, set of 8

This set includes Lesson Plan and set of 8 transparencies on: Uses/Abuses, Marijuana, Stimulants, Depressants, Hallucinogenic Drugs, Narcotic Drugs, Glue Sniffing, Drugs and the Law.

### SR-1482 Substance Abuse Prevention Tumble 'n Teach Cube

This cube is for serious conversations about how the use and abuse of tobacco, alcohol and drugs can affect your family and friends, school or work situations, and your body - both physically and mentally. Ideal both as an ice-breaker in one-to-one situations, or when used as a discussion tool for the entire class.

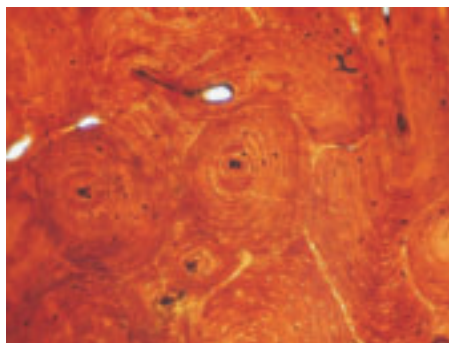




## BBS-210 Basic Histology Slide Set

Set of 25 microscope slides to be used as an introduction to histology. Illustrating major tissue types.

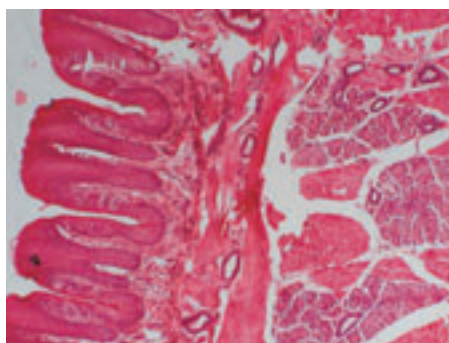
Human blood, thin film; Stratified squamous epithelium, oesophagus TS; Adipose tissue, section; Lung, connective tissue stain TS; Stomach wall, fundic VS; Myelinated nerve, teased; Cerebellum VLS; Columnar epithelium TS; Eye, entire VS; Liver TS; Spinal cord TS; Kidney TS; Ovary showing follicles TS; Testis, for spermatogenesis TS; Duodenum showing Brunner's glands TS; Non-striated (involuntary) muscle E; Striated muscle, showing striations and nuclei LS; Pseudostratified ciliated columnar epithelium TS; Areolar tissue, stained for fibres and cells E; Compact bone, for Haversian canals and lamellae TS; Skin, showing hair insertions and sebaceous glands VS; Pancreas showing islets of Langerhans TS; Ileum, showing villi and goblet cells TS; Artery and vein, stained to show elastic fibres, collagen and tunica TS; Cardiac muscle, showing nuclei, striations and intercalated discs LS.



## BBS-210C Comprehensive Histology Slide Set

Set of 50 microscope slides covering major animal histology topics. Consists of 25 slides from Basic Histology Set, **code: BBS-210**, plus the following:

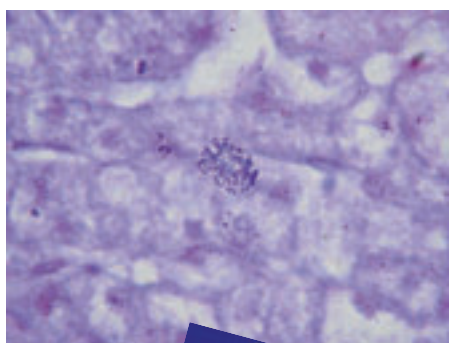
Spleen, TS; Kidney, injected, thick section; Tendon, teased, TS; Articulation, joint, VS; Medulla oblongata, VS; Heart, entire organ, LS; Ciliated epithelium; Adrenal gland, TS; Thyroid gland, TS; Stomach wall, cardiac region, VS; Spermatozoa smear; Colon, showing tubular glands, TS; Lymphatic, TS; Salivary gland, parotid, TS; Hyaline cartilage; Sciatic nerve, LS; Cerebrum, VS; Cochlea, guinea pig, VS; Ureter, TS; Stomach wall, pyloric region, VS; Tongue showing taste buds, VS; Pituitary gland TS; Transitional epithelium, bladder wall, TS; Squamous epithelium, isolated cells from mouth; Elastic connective tissue, pinna, elastic tissue stain, VS.



## BBS-211 Human Histology Slide Set

Set of 25 microscope slides showing a cross-section of human histology:

Cerebellum, section; Spinal cord, section; Nerve, TS and LS; Artery and vein, TS; Cardiac muscle, section; Lymph node, section; Spleen, section; Scalp, VS; Cervix, section; Oesophagus, section; Testis, section; Thyroid gland, section; Ileum, section; Skin, heavily pigmented section; Duodenum, section; Appendix, section; Colon, section; Pancreas, section; Liver, section; Kidney, section; Ovary, section; Uterus, section; Striated muscle, section; Mammary gland, section; Stomach, fundic portion, section.



## 13-35-1041 Systems of the Human Body

Poster - 890 x 584mm

Unique anatomical perspectives of major human body systems are presented in a clear, concise format for contrast and comparison. Features all major body systems, including skeletal, muscular and integumentary, circulatory and immune, respiratory, digestive and urinary, endocrine, nervous and reproductive.



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

## Microslides®

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

### T68 The Circulatory System (pk 10)

Human Blood, Phagocyte, Artery & vein, Lung capillaries, Lymph vessel & valves, Rat Heart (4x), Rat heart (6x), Valve at aorta.

### T72 The Respiratory System (pk 10)

Bronchial tree (human), Trachea and gullet, Chea cartilages, Epithelial lining of respiratory passages, Air sacs of lung, The capillary networks, Pigment.



## 2613 Master Set of Human Body Systems

- Activity Sets, set of 6

Human Body System Model Activity Sets illustrate the functions of the body's major systems. Each set includes a full-colour 24 x 18" markable model of durable vinyl and an activity guide with background information, basic understandings, teacher-developed activities, a glossary, a key to model structures, colour transparencies and a blackline master.



## 2671 Circulatory System Model

- Activity Set

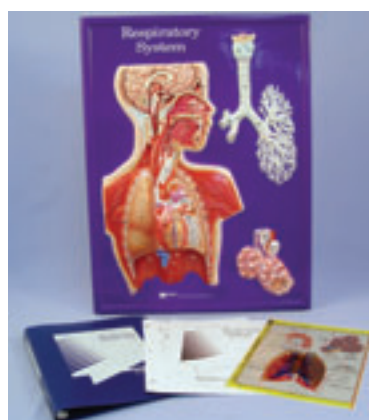
Set includes a full-colour markable model of durable vinyl and an activity guide with background information, basic understandings, teacher-developed activities, a glossary, a key to model structures, colour transparencies and a blackline master. A cutaway view of the interior of the heart can be seen and studied. The circulation process is reinforced with a colourful three-overlay transparency of the heart. Trace vessels throughout the body while viewing an enlarged cutaway section of a vein and an artery.



## 2672 Respiratory System Model

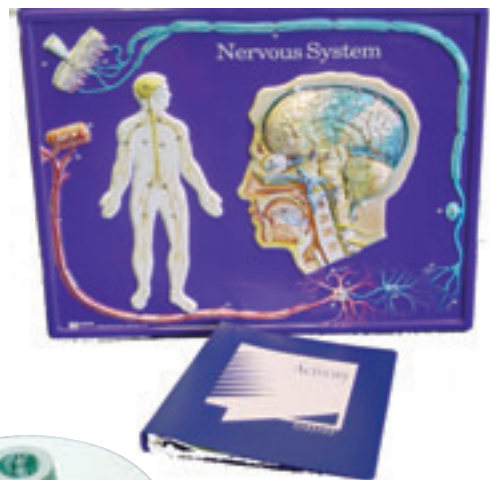
- Activity Set

Aids in the study of breathing and the anatomical complexities of the human respiratory system. Illustrates a cutaway section of the upper human torso and head, enlarged image of a bronchial tree and a magnified alveolus partially sectioned. Complete with activity guide and OHP transparencies



## 2674 Nervous System Model Activity Set

Set includes a full-colour 600 x 450mm markable model of durable vinyl and an activity guide with background information, basic understandings, teacher-developed activities, a glossary, a key to model structures, colour transparencies and a blackline master. Illustrates the structure of the central and peripheral nervous systems. Includes a close examination of the human brain with a removable transparent overlay defining the brain lobes. Diagrams illustrate locations of the brain, spinal cord and spinal nerves, dendrites, axons and synapses. Complete with activity guide and OHP transparencies.



## 13-30-1090 Lung Activity Model

A firsthand view of how the lungs work! This simple, yet effective apparatus consists of two sacs which represent the lungs, a rubber membrane which serves as the diaphragm and a clear plastic enclosure which models the chest cavity. By making the diaphragm relax and contract the students can see how the lungs are emptied and filled with air. Comes complete with comprehensive student's and Teacher's Guides. Size: 6.5" (D) x 5" (H).



## BEN114 Human Lungs Poster - 760 x 520mm

This poster deals with interesting facets of information which relate to the functions and structure of human lungs. Printed in full colour on coated artboard and laminated for added protection.



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### T69 The Central Nervous System (pk 10)

Monkey eye, retina, Mammal brain, Human spine, Grey matter of cord, Neuron, Nerve, Sweat gland.

### T221 Nerve and Muscle Action (pk 10)

Single Cell, Synapse, Axons, Myelinated Axons, Nerve- Muscle Junction, Synaptic Knobs, Striated Muscle Cell, Sarcomeres - relaxed & contracted.

### T70 The Reflex Arc (pk 10)

Pacinian corpuscle (80x), Pacinian corpuscle (360x), Spinal ganglion & nerve, Spinal cord & nerve, Spinal cord, Grey matter, Motor neuron, Motor end plates.

### T71 The Endocrine System (pk 10)

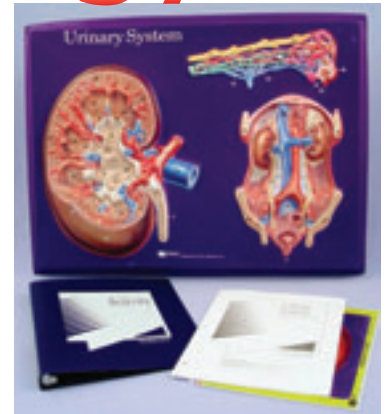
The Pancreas (25x), Islands of Langerhans (190x), Thyroid gland (420x), Parathyroid Gland (45x), Adrenal Gland (7x), Adrenal Cortex (180x), Pituitary Gland (5x), Anterior Pituitary (90x).



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

## 2675 Urinary System Model Activity Set

Kidneys are shown in detail, including a magnified nephron. The dissected kidney is enlarged to illustrate the cortex, pyramid, calyx and papilla. Complete with activity guide and OHP transparencies.



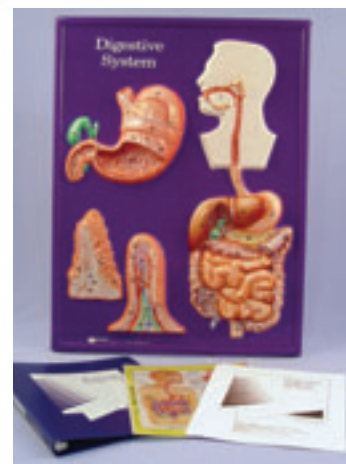
## 403-003 Digestive System Walk-Through

Get your students up out of their seats and literally walk the path of the human digestive system! Book illustrations and hand-out diagrams for the digestive system are boring. The Digestive Walk-Through mat measures 1780 x 1780mm and comes with a convenient storage bag. This is a perfect review and quiz product for your students. A Teacher's Guide provides additional information, activities, and assessment sheets for the classroom.



## 2673 Digestive System Model Activity Set

The digestive system is shown with details of the mouth, salivary glands, oesophagus, stomach, liver, pancreas and intestines. Also includes cutaway sections and enlargements of the stomach and intestine. Complete with activity guide and OHP transparencies.



## AM94 Human Digestive System Model

Representation of nose, mouth cavity and pharynx, oesophagus, the gastrointestinal tract, liver with gall bladder, pancreas and spleen. Duodenum, cecum and rectum are opened. The transverse colon is removable. Mounted on board and numbered with key card.



## AM84 Stomach Model

Showing external details, Life size model on base with numbered key card.



## AM0085 Stomach Model - 2 parts

Both longitudinal and circular muscle layers are shown on this life size model. Separates into two parts, cardiac and pylorus sections, showing mucous membrane, gastric canal, arteries, nerves, position of the peritoneum.

## AM0095 Digestive Canal Model

Shows the structure of the digestive canal. Supplied in three parts as illustrated.



## AM0099 Human Stomach Wall Model

Gradational model of the human stomach wall.



## S006/B MicroChem Teachers Resources Food & Enzyme Analysis

A series of worksheets to assist in the teaching of chemistry and biology at Key Stages 3, 4 and AS Level. The resources cover a wide range of practical experiments using the Innovative Microscience System. Each file contains notes on use and care of Microscale equipment. Unrestricted photocopying of teaching materials permitted for the use of purchasing schools. Each worksheet includes: Risk assessment; List of equipment and chemicals required; Relevant specifications covered for AQA, EDEXCEL, OCR and QCA; Detailed instructions.



## 2694 Nutritional Model

A three-dimensional model of the food pyramid and hands-on classroom activities incorporate nutrition with body chemistry. Packed with activities that demonstrate how the body converts food to energy. A Teacher's Guide and manipulatives are included.



## Microslides®

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More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

### T67 The Digestive System (pk 10)

Salivary gland, Taste buds, Gullet (Oesophagus), smooth muscle, Junction of gullet & stomach, Stomach lining & gastric glands, small intestine, Intestinal glands & villi.

### T209 Nutrition (pk 10)

Vitamin A Deficiency- Cornea (200x), Vitamin B2 Deficiency - Skin (40x & 100x), Vitamin B3 Deficiency- Skin (50x), Vitamin D Deficiency - Bone (40x & 100x), Iodine Deficiency - Thyroid (400x), Potassium Deficiency - Heart Muscle (100x), Iron Deficiency - Blood (300x), Vitamin B1 Deficiency - Heart Muscle (250x).

### T223 The Skeletal System (pk 10)

Bone, Membranous Bone, Bone Marrow - normal, Leukemia, Bone Fracture - arm X-RAY, Ligament at a joint, Muscle-Tendon-Bone Connections.



## 20-2553 Milk Madness

- Lab Investigation

Explore a host of key scientific concepts using a familiar drink - milk! Your class will follow a guided, inquiry-based set of activities to learn about the scientific method, molecular bonds and chemical reactions, water molecules, organic compounds and health, food and nutrition. Includes comprehensive teacher and student guides. Developed by Professor Abour H. Cherif (Columbia College).  
Class size - 40 students.



## 16-20-3883 Simulated Diabetes Testing

In the UK there are more than 2 million people known to have diabetes and it is estimated that well over a million people have the condition without being aware of it. More than 18 million Americans have diabetes while another 20 million are in a pre-diabetic state.

Students will investigate the disease, including its types, causes, symptoms, and treatment options. Provided with several medical histories and simulated Neo/Blood and urine samples, they'll perform a series of standard diagnostic tests. Based upon their diagnosis and the patient's medical history, they will be challenged to construct a plan for managing the individual's condition. The class will also take a 'diabetic risk test' to assess their own potential for developing the disease.



## 16-35-1351 Scientific Method Poster

- 890 x 584mm

The cyclical nature of the Scientific Method is the focus of the poster. Each step of the process is defined and illustrated in a clear, easy-to-follow illustration. The importance of careful observation and an open mind is shown by the accidental discovery of penicillin, X-Rays, and Velcro.



## Exploring the Human Body

157 Lab Materials & Teacher's Guide  
197 Teacher's Guide Only

Breathe new life into Life Science! Our Exploring The Human Body kit brings together the popular 3-D Human Torso Model with the Microslide® Lesson Set series in a highly effective multimedia teaching tool. A Teacher's Guide includes: comprehensive lesson plans, easy hands-on experiments, reproducible student worksheets, assessment notes, extension activities, background information, references and detailed tables and illustrations. 31 complete lessons promote active learning, and cover the Digestive, Respiratory, Circulatory, Nervous, Urinary and Musculo-Skeletal Systems. Kit includes: Human Torso Model, 10 Microslide® Lesson Sets, Microslide Viewer® (code: EDU-505) and a complete Teacher's Guide (code: 197).





## SR-1433 Human Anatomy Clever Catch®

A fun and engaging way for students to learn about the Human Body- as always, the student will answer the question under his left thumb when the ball is caught. A fun way to practise and learn!



## HDM110 Life-Sized Skeleton Model

This life size plastic skeleton has detachable skull with a full set of permanent teeth, removable cranium and movable joints. Mounted on a roller stand and includes a dust cover.



## 1580 Human Body OHP Transparencies, set of 12

This set of 12 full-colour transparencies details the structures and functions of the human body. Includes: 12 overlays which are valuable in the presentation and testing on anatomical material. Topics include: Ear, Tooth, Heart, Skin, Eye, Vision Defects, Skeletal System, Bone Joints, Circulatory System, Respiratory System, Digestive System, and Nervous System.



## Basic Torso 2009 Discovery pack 2006 Model only

Constructed of durable laminated vinyl, this colourful 3-D Torso Model is ideal for class demonstration or self-directed study of anatomy. The large model is keyed to an instructional CD and workbook to help students identify internal organ structure and function. The transparent plastic cover is markable for instruction purposes and represents the outer skin. Appropriate for health and science classes. Discovery Pack includes: Torso Model, Instructional audio CD, reproducible student workbook and Teacher's Guide.



## 2000 Torso Model with Teacher's Guide

Constructed of high-impact plastic, this 28" model is perfect for everyday classroom use. The exterior depicts superficial muscular and skeletal features of a young boy. Torso opens to expose respiratory, circulatory, digestive, urinary and nervous systems. Internal organs are removable for closer study. Includes: 54-page Teacher's Guide with extensive background information, numerous activities, observation and data sheets.



**AM2 Torso with Head Model**  
**10 Parts**

Easily removable parts make them an excellent teaching aid. Natural size, 10 parts, without sterno abdominal wall but with ribs, sternum clavicle with their attachments. Thoracic and abdominal organs detachable individually. Lungs, stomach, liver, intestine and heart sectioned in two parts for further detail. Half of skull cap removed and brain can be taken out, exposing the interior of the skull. Sectioned head and neck depicts internal organs of the region. Sexless. Dimensions overall 435 x 270 x 900mm. approx. Highly finished, on base and numbered with key card.



**AM4 Torso with Head Model**  
**7 Parts**

Similar to AM2. Model divides into 7 parts.

**AM6 Torso without Head Model**  
**8 Parts**

Unbreakable and finished in natural fast colours. This model is suitable for the teaching of elementary internal gross anatomy. All the major anatomical details are featured. The heart, stomach, liver and intestine are removable for closer examination and to expose the posterior surface of the abdominal wall. The major blood vessels are shown and the heart, lung and kidney are sectioned to expose internal details. Finished on base and numbered with key card.



**AM10 Torso without Head Model**  
**12 Parts**

Dissectible into 12 parts. With male or female reproductive organs which can be removed and dissected into 2 parts.

**AM0009 Torso with Muscles Model**  
**17 Parts**

Life size 17 part model on base. Half of brain, eye with muscles and optic nerve, 2 lung halves, 2 part heart, bronchial tree, liver, stomach, small and large intestines, appendix flap, half of kidney, bladder with pelvic floor and first lumbar vertebra. Part of neck and back are opened to show vertebral column, spinal cord and its meninges and nerves.



**AM0001 Interchangeable Sex Organ Torso Model**  
**24 Parts**

Model has cutaway spine showing the head with nasal and buccal cavity, half brain, eye with optic nerve. Removable female breast with rib insertions, 2 part heart, 2 lung halves, liver with gall bladder, stomach, large and small intestines with appendix flap opening and covered, half of the kidney, male genital organs in 4 parts and female genital organs in 2 parts with embryo in the 3rd month of pregnancy. The back shows the vertebral column, spinal cord with nerve endings and the 7th dorsal vertebra is removable. Mounted on base with numbered key card.

## 101-121 Middle School Human Body Flipchart - KS3

Middle School Human Body Flipchart - Bones, Muscles & Skin; The Digestive System; Nutrition; The Circulatory System; The Immune System; The Respiratory System; The Excretory System; The Nervous System; Endocrine System & The Reproductive System.

### About the Science Flipchart sets:

10 set series presents leveled review of Grades 1 - 8 (ages 5-14) science standards.

### Each Curriculum Mastery flipchart set features:

10 Double-sided, laminated charts; Full-sized, 30 x 45cm charts; Activity Guide featuring black-line copy-masters of the charts along with review questions, vocabulary terms, suggested activities and more; Sturdy easel for years of classroom application; Activity chart featuring questions, labelling exercises, vocabulary review & more.

## 403-002 Human Heart Walk-Through

Book illustrations and hand-out diagrams for the human heart are boring. Get your students up out of their seats and literally walk the path of blood through the heart! The Human Heart Walk-Through mat measures 1270 x 1524mm and comes with a convenient storage bag. This is a perfect review and quiz product for your KS2 and KS3 students. A teacher's guide provides additional information, activities, and assessment sheets for the classroom.

## AM0073 Human Heart Model 7 parts

Enlarged, sectioned so that both ventricles and atria open to expose the valves. Large blood vessels near the heart and musculature of the heart are shown. Separates into 7 parts.

## AM0081 Human Heart Model 2 parts

Natural size, dissectible into 2 parts. Mounted on stand with key card.

## AM0082 Human Heart Muscle Model

Shows ultrastructure of the human heart muscle. 220 x 220 x 370mm. On base, numbered with key card.



## AM134 Human Knee Joint Model

A model of the human knee joint, showing the essential internal structure, mounted on a base.



## AM136 Human Elbow Joint Model

A model of the human elbow joint, showing the essential internal structure, mounted on a base.

## 2677 Endocrine System Model Activity Set

Seven endocrine glands are depicted in whole and a magnified section in detail, as well as closely related organs. Included are the pituitary, thyroid, parathyroid and adrenal glands, as well as the pancreas, ovaries and testes. Complete with activity guide and OHP transparencies.



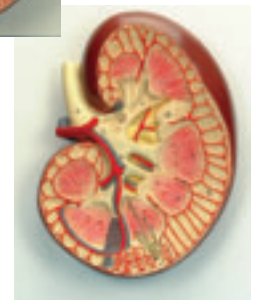
## AM108 Kidney Section Nephrons & Blood Vessels and Kidney Glomerulus

Kidney section, 3 times full size. Nephrons and Blood Vessels 120 times full size and Kidney Glomerulus opened, 700 times full size. Size approximately 290 x 520 x 90mm. Numbered with key card.



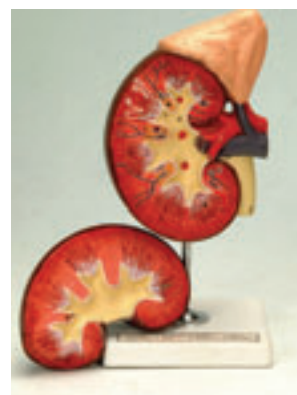
## AM106 Kidney Section Model

This model is 3 times full size Longitudinal section of right kidney. Model shows kidney glomerulus, tubes, one collection tube, pyramids, kidneys orifice system, kidney pelvis, upper section of the urethra and the kidney blood vessels. On board and numbered with key card.



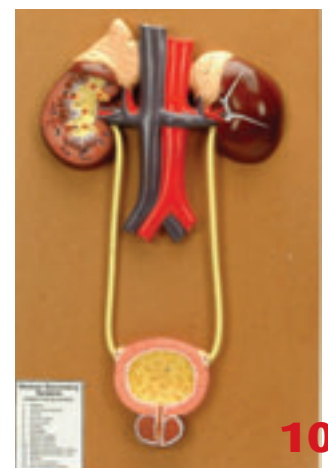
## AM110 Kidney with Adrenal Gland Model 2 Parts

This model shows kidney with adrenal gland as well as renal and adrenal vessels and upper portion of urethra. Front half of kidney is removable to show cortex medulla and vessels as well as renal pelvis. On base, numbered with key card.



## AM112 Urinary Organs Model Kidneys with Bladder, 3 Parts

Natural size, separates into 3 parts. Kidneys, ureters, adrenal glands, bladder with prostate and major blood vessels shown. Right kidney sectioned and bladder prostate are removable. On base, numbered with key card.



## 13-20-1113 Modelling Kidney Function

- Lab Investigation

Model the action of a kidney for a striking demonstration. Students construct a model of a kidney using a semi-permeable membrane to filter a completely safe solution which simulates blood. The resulting blood solution contains simulated cells which can not cross the semipermeable membrane, remaining in the kidney model. The resulting filtrate resembles urine, which students test for salt and other waste products. The simulated blood cells can also be seen and counted under a microscope - just like real blood! Students learn about the urinary system, urine formation and kidney function. Class size – 40 students.



## 13-20-1123 Urinalysis and Disease Identification

- Lab Investigation

Use simulated urine to identify a variety of physiological conditions. Test and observe the physical and chemical characteristics of simulated urine, relating the results to a variety of diseases which can be diagnosed through urinalysis. The kit includes a unique formulation of safe, simulated urine which looks and acts like the real thing. Students will gain a basic understanding of urinalysis and the important role it plays in the diagnosis of medical disorders as they test the simulated urine for pH, protein, sugar, crystals and simulated blood cells, which can be viewed under a microscope. Class size – 40 students.



## EDU008 Visking Tubing, 30m, Size 2

Size 2 dialysis visking tubing, 30m length, flat packed.



## MEDICLIPS Visking Tubing Clips, pk 10

The Mediclip is a single size plastic clip designed to meet the general needs of tubing users and is ideal for most situations where membranes of up to 40mm flat width are being used (to Size 7). Reusable and autoclavable. Overall length when closed: 53mm. Width: 11mm. Thickness: 6mm. Pack of 10.



## Microslides®

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## T67 The Human Brain (pk 10)

The Whole brain, Cerebrum, Pyramidal cells, Axons in the Corpus Callosum, Thalamus (MRI) & nerve tracts, Eyes & Occipital Lobes (MRI) & optic Nerve, Motor & Sensory Areas (MRI) & Motor Neurons, Cross over of Nerves, Purkinje Cells.



**106** More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

## AM12 Half-Size Torso Model, 6 parts

Made from reinforced glass fibre & PVC material. Youth model, 600mm high, dissectible into 6 parts. The brain fixed in skull, seen after removing the skull cap. Lungs, liver, stomach and intestine are removable to show the internal structure. Dimensions overall 260 x 235 x 560mm. approx. Comes numbered with key card.

## AM14 Torso Miniature without Head

Similar to AM12 but without head. *NOT SHOWN*



## AM13 Half-Size Torso Model, 12 parts

Youth model approx 450mm in height. Dissectible into 12 parts with numbered key card supplied.

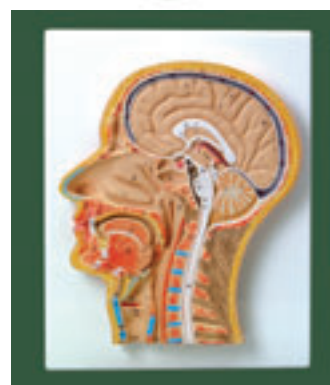
## AM16 Head and Brain Model, 3 parts

A life size model of the human head mounted on base. The brain, dissectible into 2 parts, can be removed to show the cranial nerves and the important internal parts of the skull. Numbered with key card.



## AM18 Half of the Head Model, Median Section

Natural size, shows median section of head, brain, nose, mouth and pharynx, larynx and vertebral column of the neck. On base and numbered with key card.



## AM20 Brain Model, 4 parts

A life size 4 part model of the human brain. The model is a median section. The right hemisphere has the cerebellum and the stem with occipital lobe. On base and numbered with key card.



## AM22 Brain Model, 2 parts

A life size 2 part model of the human brain. The model is a median section. The right hemisphere has the cerebellum and the stem with occipital lobe. On base and numbered with key card.



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### T237 The Human Brain (pk 10)

The Whole brain, Cerebrum, Pyramidal cells, Axons in the Corpus Callosum, Thalamus (MRI) & nerve tracts, Eyes & Occipital Lobes (MRI) & optic Nerve, Motor & Sensory Areas (MRI) & Motor Neurons, Cross over of Nerves, Purkinje Cells.

### T57 Skin (pk 10)

Sole of the foot, Skin of the chest, Blood supply, Sweat glands, Hair, Fingernail, Frog mucus & Frog poison glands.



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

### AM0089A Skin Model

75 times life-size model gives detail structure of 3 layers of the skin in different planes. The model shows hair follicles with sebaceous gland, sweat glands, receptors, nerves and vessels.

### AM88 Skin Model

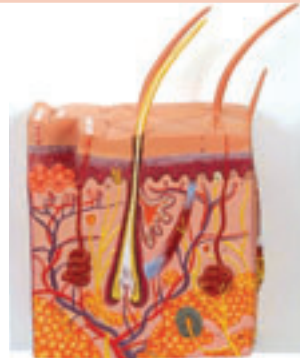
Model shows three layers of the skin from the head. Hair follicles with sebaceous glands, sweat glands, receptors, nerves and vessels.

### 2630 Skin Model Activity Set

Students will explore skin with this Model Activity Set. An enlarged cross-section of the human skin illustrates the skin layers, hair follicles, sweat glands, nerve endings, blood vessels and more. Set also includes a study guide and OHP transparency.

### 6217 Skin Temperature Lab

Help students understand the body's thermo-regulating ability as they record skin temperature at various points and check heat loss and recovery patterns. Lab includes investigation of insulating capacity of different fabrics. Kit includes: temperature strip, thermometer, heat escape chamber, fabric samples, supply items and complete activity pack with Teacher's Guide.



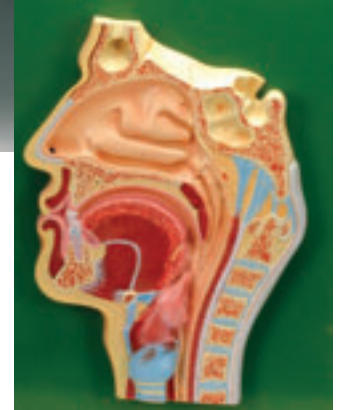
## 6083 Liquid Crystal Temperature Strip

Fascinating measurement tool, this temperature strip measures surface temperature of any object or subject. 12" long with elastic fastening cord. Includes user's instructions.



## AM24 Nose Model

This life size model shows Median section of the head, brain, nose, mouth and pharynx, larynx and vertebral column of the neck. Supplied on base with numbered key card.



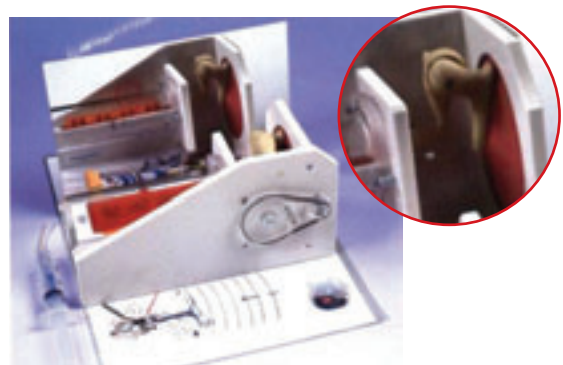
## AM38 Ear Model 3 Parts

The model is 2 times full size and dissects into 3 parts, showing external, middle and internal portions. Ossicles and labyrinth can be removed.



## 402-103 Functioning Ear Model

This model shows how the tympanic membrane, ossicles and the complex internal ear with the cochlea and the oscillations of the basilar hearing membrane operate and interact. The enclosed mirror enables operation of the model for the study of various ear-functions from different angles at the same time. Several students simultaneously in an action-orientated learning situation may study one model. Includes a four-colour explanatory chart. Wt: 1.2kg, 300 x 150 x 180mm.



## AM40 Giant Ear Model 2 Parts

This model is five times full size. Representation of outer middle and inner ear. Removable auditory ossicles and labyrinth with cochlea and vestibulocochlear nerve. On base and numbered with key card.



## AM42 Human Ear Model 5 Parts

This model is approximately four times full size. The petros portion of the temporal bone section of the auditory canal are removable, with labyrinth which can be taken out and opened. The tympanic membrane with malleus and incus can be removed in 5 removable parts. On base and numbered with key card.



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### T220 Teeth & Gums (pk 10)

Incisors, Canines, Molars, Molars x.s, Cavity (25x) & X-ray, Periodontal disease, Plaque Deposits, Dental Flossing.

### EDU2017 Teeth & Gums Microslide® and Viewer

This specially designed teaching tool for viewing slides is a precision instrument unconditionally guaranteed against breakage for one year. The viewer does not require electricity or batteries and can be used outdoors as well as in the classroom. The white reflector provides sufficient light for a bright image in the normal light of a classroom. Viewer brings 5X magnification. With the viewer is a Teeth & Eating Lesson Plan containing a Microslide®, worksheet and Teacher's Guide.

The viewer can also be used in conjunction with many other Microslide® Lesson Sets

### 2676 Teeth Model Activity Set

The composition of teeth is easily illustrated with this three-dimensional model. A side view of upper and lower teeth makes this a 'three models in one' teaching tool. Includes activity guide, a transparency and activities.

### AM46 Upper Triple Root Molar with Caries 2 Parts

Longitudinal section through crown, 2 roots and pulp cavity are all shown on this 2 part model.

### AM48 Upper Triple Root Molar with Caries 6 Parts

This model is fifteen times full size Longitudinal section through crown, two roots and pulp cavity. Removable pulp and three tooth inserts with different stages of advanced caries. On stand and numbered with key card.

### AM47 Human Teeth Models

Five different models illustrate every major tooth type. The lower incisor features a removable half of the crown, the lower canine separates into two longitudinally, the lower molar with one root is one-piece and two roots separate into three parts showing dental caries at various stages. The first upper molar with three roots separates into three parts. Each model is magnified 8X and mounted on a stand with base.



## AM0053 Dentition Development

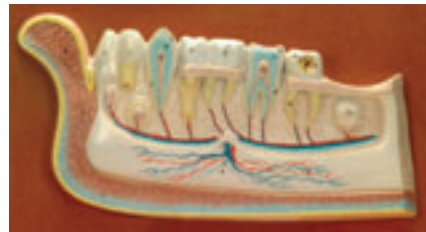
set of 4 models

Cast from natural specimens, 4 upper and lower jaw halves at 4 different stages of development: new born; approx. 5 year old child; approx. 9 year old child and young adult,



## AM0056 Lower Jaw with Teeth Model

Enlarged model on base. Internal wall is removable to show incisors, milk canine, milk premolar, molars, permanent canine and permanent premolar in full view as well as the arteries, veins and nerves serving them.



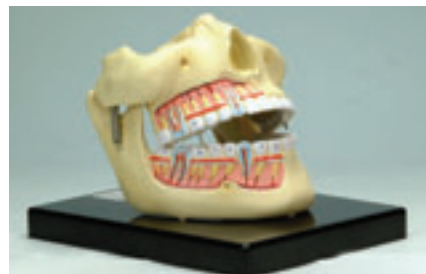
## AM52 Upper & Lower Jaw Model

This model is 3 times full size Showing the tooth roots, Spongiosa, vessels and nerves. On base and numbered with key card.



## AM54 Human Upper & Lower Jaw Model

A model showing various positions of teeth in the upper and lower jaws. Internal wall is removed to show the incisors, permanent canine and permanent premolar, milk canine, milk premolars, permanent incisors in full view and also the arteries, veins and nerves serving them. On base and numbered with key card.



## AM60 Larynx Model

Shows larynx, wind pipe, ligaments, muscles and thyroid gland. Model is equally divided - one half removable.



## AM64 Larynx with Tongue Model

Natural size. Larynx: Cartilages, ligaments, muscles, relief of mucous membrane and thyroid gland are shown. Tongue: The front part of the lower jaw, detachable, separates into two parts, median section, sublingual gland and sub mandibular gland are shown. Separates into 3 parts. On base and numbered with key card.



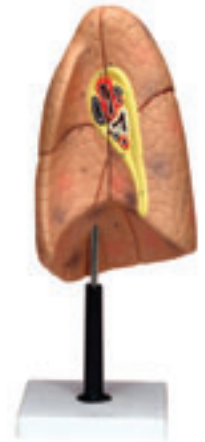
## **EDU1006 Stethoscope**

Basic medical stethoscope with bell and diaphragm heads. For listening to pulse and breathing. Spare diaphragm and ear pieces included.



## **AM66 Human Lung Model** **2 parts**

Dissectible model showing all the important parts of the lung.



## **AM70 Heart with Lung and Larynx Model**

Showing the detailed structure enlarged. Mounted on large size base and numbered with key card. Dimensions overall: 450 x 450 x 175mm.



## **AM72 Extra Large Heart Model** **4 parts**

Extra large size showing finer details. The heart is cut by a vertical line towards the level of the ventricular septum and separates into 2 parts, after the arch of aorta and superior venacava have been removed. Both auricles and ventricles with the bicuspid and tricuspid semilunar valves as well as the sigmoid valves can be seen. Separates into 4 parts. On base and numbered with key card.



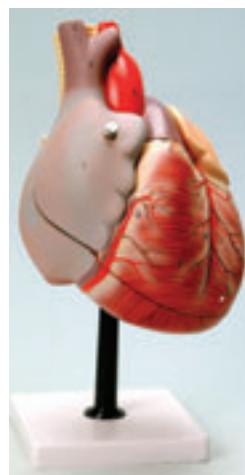
## **AM74 Heart Model** **4 parts**

Enlarged 3 times actual size and sectioned so that both ventricles and atria open to expose the valves. Large blood vessels near the heart and musculature of the heart are shown. Separates into 4 parts. On base and numbered with key card.



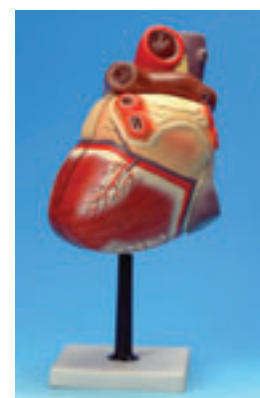
## **AM76 Heart Model** **3 parts**

Enlarged 3 times actual size and sectioned through the ventricles and auricles. The bicuspid and tricuspid semilunar and sigmoid valves are shown. Separates into 3 parts. On base and numbered with key card.



## **AM78 Human Heart Simplified Model**

Enlarged 3 times actual size, dissectible into 2 parts, showing clearly the chief blood vessels. Structure of auricles and ventricles shown. On base and numbered with key card.



## AM86 Human Liver with Gall Bladder Model

Life size model on base with numbered key card. Shows the four lobes of liver, peritoneum, gall bladder and vessels.



## AM92 Human Circulatory System Model

Explaining complete circulation in veins and arteries. Mounted on board with numbered key card.



## 402-100 Functioning Heart and Circulation System - Model

This amazing working model will bring your lecture to life! A complete schematic model of the human circulatory system with 'blood' (coloured water) that flows through the transparent veins, arteries, capillaries and heart chamber. This model's special design portrays venous blood, a deep reddish purple and arterial blood, a bright red to give visual reinforcement to the oxygenation and deoxygenation of haemoglobin as it travels the body's vascular network. Shows the work of the valves, contractions of the ventricles and the atriums.

Made of plexiglass and silicon and mounted on a baseboard with support legs. Supplied with Teacher's guide, red colour and syringe for refilling the system. 350 x 370mm.



## AM96 Abdomen Section Model

Transverse section model at level of omentum foramen.

## 1750 Human Reproduction OHP Transparencies, set of 6

Transparencies identify the major parts of the male and female reproductive systems. Topics include: Male, Female, Menstruation, Fertilisation, Embryo to Birth, Glands and Growth. Lesson plan included.



## Microslides®

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### T62 Human Reproduction (pk 10)

Sperm Cell (1800x), Ovum - Fertilization, Zygote (200x), Two-celled Embryo - First Cleavage, Chromosomes - Squash (400x), Balls of Cells (200x), Blastula - hollow ball of cells (200x), Embryo - Five Weeks (3x).

More of the Microslide® series, covering other subjects, can be found throughout this catalogue.





## 2614 Human Reproductive System Models

Master set of 9

Full-colour Human Reproduction System Models clarify the functions of male and female reproductive systems. Each Model Activity Set consists of a 24 x 18" markable model of durable vinyl and an activity guide which includes background information, teacher-developed activities, a glossary, a key to model structures, colour transparencies and a blackline master. Includes all nine Human Reproductive System Model Activity Sets: Menstrual Cycle, Male Reproductive System, Female Reproductive System, Meiosis, Mitosis, Cell to Embryo, Four-Month Foetus, Full-term Foetus and Birth model.

Activity Sets also available separately.



## AM8 Torso with Interchangeable Sex Organs

14 parts

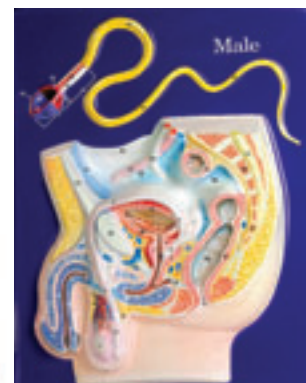
Easily removable parts make them an excellent teaching aid. Natural size, 14 parts. Highly finished, on base and numbered with key card.



## 2660 Male Reproductive System Model

Activity Set

Students discuss topics included in a bound activity set file. Model depicts all male reproductive organs in relationship to one another, as well as a magnified section of the sperm. Complete with activity guide and OHP transparencies.



## AM118 Male Pelvis Section Model

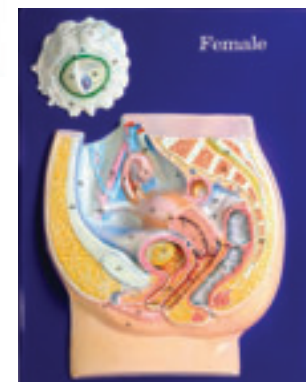
Natural size model on base with numbered key card Shows the rectum, bladder with prostrate and testicular ducts and external genital organs.



## 2661 Female Reproductive System Model

Activity Set

Aids in the discussions of women's health issues and pregnancy. Detailed lateral section of the lower female torso shows partially sectioned organs and a magnified, cross-section of the ovum. Complete with activity guide and OHP transparencies



## AM01178 Female Pelvis Section Model

2 parts

Median section of a female. One half of genital organs with bladder and removable rectum, the other half is shown at the normal position in the pelvis. Supplied with numbered key card.



**2665 Menstrual Cycle Model**  
Activity Set

Illustrates the menstrual cycle, depicting the four stages of the average 28-day cycle. Two magnified ovaries show ovum development. Complete with activity guide and OHP transparencies.



**AM0115B Human Egg Model**

Human egg model, mounted on base.

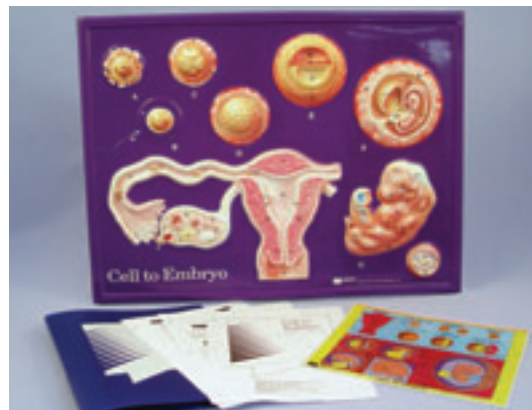


**AM0115C Human Sperm Model**

Human sperm model, mounted on base.

**2666 Cell to Embryo Model**  
Activity Set

Understanding the development from egg fertilization to a 35-day old embryo is easy with 3-D illustrations of the ovum, ovulation, fertilization, initial cell division and implantation. Complete with activity guide and OHP transparencies.



**AM0121C Human Foetus Model**  
3 parts

Three part model of the human foetus showing the relationship between the foetus, foetus membrane and the uterus.



**AM122 Period of Gestation Set**  
9 models

Set of nine models, each mounted on a stand, showing various stages of embryonic and foetal development.



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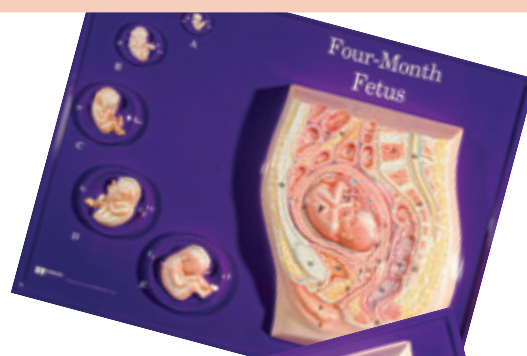
### T61 Embryology (pk 10)

A ball of cells, The gastrula, Neural groove, Neural tube, Hatching stage, Eye section, Ear section, Section below head.



### 2662 Four-Month Foetus Model Activity Set

Realistic life-sized models of the embryo/foetus at 6, 8, 10, 12, and 14 weeks are sequenced next to the 16 week foetus within a model of the womb. The model illustrates the size, physical features and positioning of the embryo/foetus, so it is a great graphic instructional aid on reproduction topics. Complete with activity guide and OHP transparencies.



### 2663 Full-Term Foetus Model Activity Set

Illustrated in graphic detail is a life-sized foetus in normal pre-birth position. Removable transparent covering depicts the amnion. A magnified inset shows the placental wall and umbilical cord. Complete with activity guide and OHP transparencies.



### 2664 Birth Model Activity Set

Detailed illustration of a normal foetal birth position displaying the placenta, umbilical cord, cervix and vagina. Complete with activity guide and OHP transparencies.



### 6222 Growth Trends Lab 6120 Calipers only

Investigate human growth trends by collecting data associated with changes in body proportions. Using callipers, measuring tapes, charts and other supplies, students can compare growth trends for many different age groups. Additional materials include: newborn baby chart, game cards, complete package of activity plans and Teacher's Guide.



## 13-35-1081 Ecology of Vernal Pools

Poster - 890 x 584mm

Spectacular photography from the Peterson Institute depicts various organisms to include invertebrates, salamanders, frogs and toads. Also included is an illuminating overview of the amphibian life cycle. Your students will gain an understanding of the fragile ecology of a vernal pool and its importance to the life cycle of many invertebrates and amphibians.



## 16-20-4663 Pond Organisms Kit

An exploration of pond life and its environment! This extensive kit provides the class with a detailed exploration of pond life. Students will perform six investigations including how organisms move, investigating form and function, looking at larger organisms, looking at smaller organisms, comparing organisms and studying Daphnia. Includes a comprehensive Teacher and student guide.



## 16-35-0058 From Egg to Tadpole Video

Follow the remarkable journey to life! Your class will be amazed by this dramatic video chronology of the tadpole's development. Using time-lapse photography to compress events that take hours or even days into mere seconds, the students will view the major events of the embryogenesis of the African toad *Xenopus*. The spectacular video covers the initial cycle of cell division; gastrulation; neurulation; elongation of the embryo and its escape from the egg membrane; and the ultimate transformation of the simple embryo into a tadpole. Easy-to-understand video is a must for every life science and biology class!



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### T12 Pondlife (pk 10)

Fish & Plants, Algae (175x), Amoeba (250x), Paramecium (30x), Volvox (150x), Bladderwort (5x), Hydra (11x), Daphnia (10x).

### T16 From Tadpole to Frog (pk 10)

Frog's egg, Frog embryo, Tadpole - early stage, Tadpole - outside gills, Tadpole - inside gills, Young frog, Young frog - tail disappearing, Adult frog

More of the Microslide® series, covering other subjects, can be found throughout this catalogue.



## 16-35-1341 The Life Cycle of a Frog

Poster - 890 x 584mm

Stunning photographs bring the life cycle of a frog into a classroom!



## 2750-H Frog Model Activity Set

The anatomy of all frog organs and systems is presented in ventral and dorsal dissected views. Abdominal organs expose a representation of the female reproductive organs from the left, and the male is shown from the right. A separate inset details the structure of a frog's three-chambered heart. Set includes: 24"W x 18"H model, activity notebook with glossary, key, blackline master and colour transparency.



## ZM20 Frog Development Model

A set of 24 models showing the various stages in the development of a frog, from egg to adult. Arranged on a large size wooden board.



## ZM22 Frog Dissection Model

Model showing section of frog. This model shows detailed internal structure of a frog. A large model on wooden base.

## T-618 Individual Mi-Own® Frog Models

MI-OWN® Frog Models permit safe, humane, inexpensive, accurate and individual frog dissection. Each Frog is life size (8" high). They are washable, reusable, unbreakable and require no magnets, glue or velcro. Won't chip or tear. Each Frog is accompanied by a reproducible student worksheet set, a Teacher's Guide and a key card. 22 removable parts.



## Full-colour Dissectograms

Large 19 x 11" laminated sets of detailed Dissectograms provide information for several standard lab study animals: Frog, Crayfish, Perch, Clam, Foetal Pig, Earthworm, Grasshopper and Cat. Students are guided step-by-step through the dissection process, reducing the frustration of misunderstanding and mistakes. An exceptional aid for reviewing dissection.

**2191** Frog, set of 4

**2192** Crayfish, set of 4

**2193** Grasshopper, set of 4

**2194** Perch, set of 4



### 2752 Crayfish Model Activity Set

A commonly dissected invertebrate, the crayfish is shown in 3-D so learners can study the organs and structure of an animal with an exoskeleton. Colourful model illustrates the special adaptations the crayfish has for life under water with an inset of the gill structure. Set includes: 24 x 18" model, activity notebook with glossary, key, blackline master and colour transparency.



### 2753 Grasshopper Model Activity Set

Representation of an insect, this model shows the wing and has a portion of the exoskeleton cut away to reveal the internal organs. The often studied mouth is shown in a separate inset, illustrating the frontal view of the head as well as dissected in magnified detail. Model measures 24 x 18" and is accompanied by comprehensive activity notebook with glossary, key, blackline master and colour transparency.



### 2754 Perch Model Activity Set

Learners view the special adaptations aquatic vertebrate have for exchanging oxygen and carbon dioxide. Organ systems are graphically illustrated in 3-D. Two inset diagrams of gas exchange in the gills and the complete skeletal system are also presented. Includes: 24 x 18" model, activity notebook with glossary, key, blackline master and colour transparency.



## Full-colour Dissectograms

Large 19 x 11" laminated sets of detailed Dissectograms provide information for several standard lab study animals: Frog, Crayfish, Perch, Clam, Foetal Pig, Earthworm, Grasshopper and Cat. Students are guided step-by-step through the dissection process, reducing the frustration of misunderstanding and mistakes. An exceptional aid for reviewing dissection.

**2195** Clam, set of 4

**2196** Earthworm, set of 4

**2197** Foetal Pig, set of 4

**2198** Cat, set of 4



## 2755 Clam Model Activity Set

Unique model shows exaggerated perspective of a mollusk gill structure as well as cut-away section of the shell, foot and mantle to reveal internal organs. Two separate inset diagrams show the circulatory and nervous system. Activity set includes: a 24 x 18" raised relief model, detailed activity notebook with glossary, key, blackline master and colour transparency.



## 2756 Earthworm Model Activity Set

Classical relief of the anterior portion of the earthworm shows the internal organs and systems representative of primitive invertebrates. Model clearly illustrates the body in cross section and enhances or replaces the use of animal specimens in the classroom. Set includes: 24 x 18" model, activity notebook with glossary, key, blackline master and colour transparency.



## SR-1610 Bio2® Inflatable Perch

This very realistic inflatable model of a Perch will allow the student to see the numbered internal organs with ease and no mess! The other side is the actual appearance of a Perch. This model is 525mm long x 200mm fin to fin! Fun exploration for the students and interesting discussion topics for the teacher! Teacher's Guide is included with detailed organ identification key.



## SR-1611 Bio2® Inflatable Turtle

This depiction of a freshwater turtle is perfect for understanding the internal organs during a dissection or in place of an actual specimen. Students have the ability to view these organs and discuss the topics in the enclosed Teacher's Guide. The overall length is 650mm x 450mm wide by 275mm tall, a nice size model that is easily inflated and deflated for storage. All organs are numbered for easy identification.



## Microslides®

Microslides® are sets of 8 related 35mm images as photographed through a microscope to be viewed through a Microslide® Viewer (EDU-505). Arrows and callouts help the students locate important features being studied. Accompanied by a detailed text folder designed to stimulate, inform and question the students about the topic. Each text folder has a handy pocket to store the Microslides®.

### T232 The Earthworm (pk 10)

Mouth (1x Clitellum), Ovary, Sperm - in seminal vesicle, Male Gonopore, Setae, Digestion, Ventral Blood Vessel, Heart, Nephridiopore & Epidermis, Nervous System.

**More of the Microslide® series, covering other subjects, can be found throughout this catalogue.**

### ZCO-003 Earthworm Slide Set

Set of 6 microscope slides:

Lumbricus through crop region TS; Lumbricus typhiosole region TS; Lumbricus reproductive region LS; Lumbricus reproductive region TS; Lumbricus showing insertion of setae TS; Lumbricus anterior VLS.

### 2757 Foetal Pig Model Activity Set

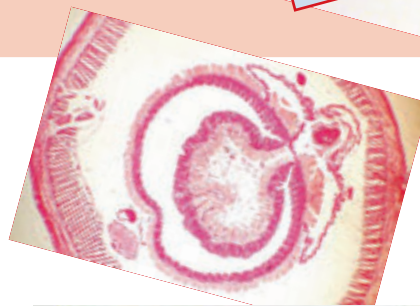
This model illustrates a dissected portion of the abdominal and thoracic organs. The male reproductive system is shown ventrally and a dorsal view allows examination of the female reproductive organs, as well as the brain, muscles and nervous system. Inset diagram outlines the circulatory system. Set includes: 24 x 18" model, activity notebook with glossary, key, blackline master and two colour transparencies.

### 2758 Zoology Models Master Set of 7

Introduce students to anatomy with seven dissection models shown in raised relief. Each markable model is constructed of durable vinyl and illustrates internal structures in graphic detail. All models are 18 x 24" and are accompanied by a 3-ring notebook which includes instructor background information, student basic understandings, learner activities, a glossary, colour transparencies, blackline master and a key to model structures.

### 15-35-1156 Plants and Plant Processes Poster - 890 x 584mm

Clearly labelled illustrations and micrographs bring the plant kingdom to life and reinforce basic concepts for complete understanding. This one-of-a-kind poster allows both Teachers and students to easily study the many parts of a plant as well as key plant processes - including the life cycle, photosynthesis, pollination, fertilization and tropisms.



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

## Microslides®

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### T87 Marchantia - The Life Cycle (pk 10)

Gametophyte generation, Male sex organ, Female sex organ, Archegones with eggs, Sporophyte generation, Germinating spores, Young gametophyte, Gemma cup, Gemmae.

### T236 Plant Evolution (pk 10)

Gametophytes (Marchantia), Gametophytes (Moss), Archegone (Marchantia), Sporophyte (Marchantia), Gametophyte (Fern), Archegone (Fern), Sorus(fern), Young Gametophyte (Fern), Germinating Pollen.

### T88 Moss - The Life Cycle (pk 10)

Gametophyte, Female and male plants, Sex organs, Sporophyte, Spores, Germinating spores, Buds, Sphagnum protonem.



### T86 Fern - The Life Cycle (pk 10)

Sporophyte leaf, Spore cases, Germinating spores, Mature gametophyte, Sex organs, Archegone, Embryo sporophyte, Young sporophyte.

## 13-20-1363 Plant Life Cycle Kit

A fascinating, hands-on exploration of seed germination & plant growth.

- Identify the stages in the plant life cycle
- Observe, record and graph changes in plant size and growth pattern throughout the life cycle
- Identify the parts of a flower and observe pollination and seed production
- Understand the significance of sexual reproduction in plants.



## 2850 Germination Model Activity Set

3-D MONOCOT and DICOT plant germination is shown on this markable 24 x 18" model. The included activities support the teaching of seed development. Includes a Teacher's Guide with an overhead transparency, blackline master, student activities, key and glossary.



## SAPS Plant Enzyme Kit

- 15E470 Microzyme Phosphatase
- 15M035 MicroChemicals Kit

A manual is provided with every kit. This kit was developed at SAPS (Science and Plants for Schools), Homerton College, Cambridge, UK. The kit uses Microscience techniques to help students understand the various factors that influence enzyme activity. Starting with Mung Beans, an extraction of Phosphatase is accomplished followed by a series of semi-quantitative measurements. These include: Phosphatase activity; Effect of pH on activity; Effect of concentration on rate; Effect of temperature (Heat Stability); Effect of time on product formation; Effect of inhibitors on activity.



## Teaching Tank®

### 6150 Teaching Tank®, 12" Basic

This unique teaching tool was developed to implement basic science skills of observation and conceptual learning. Perform easy classroom experiments and view roots, worms, or ants! Includes a Teacher's insert. From Nursery to College! Add a 12" Expansion Kit (code: 6155) and complete a wider variety of hands-on science experiments. Turn your Teaching Tank® into a small aquarium.

### 6151 Teaching Tank®, 12" Sampler

In the Sampler Kit you not only get the large tank, but also the 20-page Discovery Book Sampler, with 8 fully developed lessons to get you started. Includes a Teacher's insert.

### 6152 Teaching Tank®, Starter Kit

With the Starter Kit you receive not only the large tank (12 x 12"), but you also get the Teaching Tank® Discovery Book Vol. 1 with 50 fully developed lessons that can be adjusted to different levels of investigation.

### 6154 Teaching Tank®, 8" Basic

Perform easy classroom experiments and view roots, worms, ants etc. Includes a Teacher's insert. With applications from nursery to college! Add an 8" Expansion Kit (code: 6156) and complete a wider variety of hands-on science experiments.

### 6155 Teaching Tank®, Expansion Kit - 12"

This is an affordable way to change your 12" Teaching Tank® into an aquarium or a tank for an experiment which needs more volume.

### 6156 Teaching Tank®, Expansion Kit - 8"

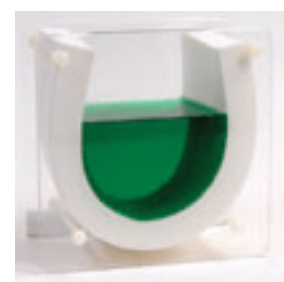
This is an affordable way to change your 8" Teaching Tank® into an aquarium or a tank for an experiment which needs more volume.

### 6161 Teaching Tank®, Discovery Book Vol 1

The 50 lessons in this volume are observational and written to be hands-on for the student and teacher. Topics covered are the Life Sciences, Earth Sciences, and Physical Science. A complete material list for each and every experiment is included. This book will complement and help students discover how easy and fun doing science experiments can be. 118 pages.

### 6162 Teaching Tank®, Discovery Book Vol 2

The 50 lessons in Volume 2 are clearly designed and easy to understand. Included are 2 additional sections: Emphasised Skills and Application to the Real World, which will allow you to quickly see the relevance of the concept being investigated. A complete material list for each and every experiment is included. 110 pages.



## 13-20-1383 The Soil-less Garden

### Hydroponics Activity Kit

Discover the fascinating world of hydroponics!

Observe and understand the requirements for plant growth and development

Compare the growth of seedlings grown in hydroponics system versus soil

Discover that plant growth is not directly dependent upon soil itself, but what the soil supplies to the plant.



## R-DUALL Du-All® Box

This Du-All® box can be used for many different activities; mini aquarium, terrarium, ant farm, earthworm study, solar still - the list goes on and on! Multi-purpose design includes two dividers and a cover, all constructed of clear plexiglas.

Box measures 7"(L) x 5"(W) x 7"(D).



## 6168 Poly Crystals, 4oz

Poly crystals for use with Teaching Tanks®. Not only can you grow plants in them, but you can investigate the concept of cells, monitor water absorption and lots more.



## 13-20-2913 Investigating Photosynthesis

Explore how plants and algae carry out photosynthesis. Study the importance of photosynthesis to plants and algae as well as the conditions needed in order for it to occur. Your students will demonstrate that light is needed for the production of starch during this critical process. They will also determine the wavelength at which the rate of photosynthesis is optimized in *Chlorella*, by measuring their rate of growth and release of oxygen. Using the prepared microscope slides which are included, your class will also identify and study the leaf structures necessary for photosynthesis and their respective functions. Includes everything needed for a class of 40 students, including a *Chlorella* MicroLIVE™ culture.



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### T59 Photosynthesis (pk 10)

Green leaf (110x), Green leaf (350x), Root hair, Vascular bundles, Leaf with and without sunlight, Leaf - Variegated, Starch grains, Bean seed.

### T90 Air Pollution & Plant Health (pk 10)

Pore in leaf epidermis, Air spaces inside leaf, Salt particles from the air, Sulphuric acid droplets, Fly ash, Dust layer on pine leaf, Healthy pine needle, Fluoride damaged pine needle.



**124** More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

## Plant Pigments & Photosynthesis

13-20-1393 Lab Investigation  
13-20-1395 Refill

Study plant pigments through chromatography - safely and easily! The class can now safely use paper chromatography to separate plant pigments without the use of hazardous developers.



## Radiation Effects on Plant Growth

13-20-1413 Lab Investigation  
13-20-1415 Refill

Safely explore the impact of radiation on plant development.

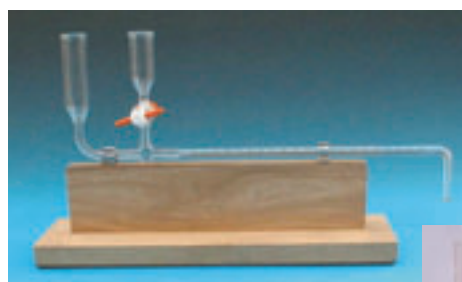
- Observe the effects of ionizing radiation on plants
- Understand what radiation is and how it can cause mutations
- Distinguish between non-ionizing radiation and its sources
- Predict the effects of varying levels of radiation exposure on the growth and development of plants.

Class size - 40 students.



## B192 Ganong's Potometer

For demonstration of transpiration rates and rates of water absorption by a cut shoot under various external conditions. A plant shoot is sealed into a stopper which fits the end tube and the whole apparatus is filled with water. The open end of the capillary tube is dipped into a beaker of water. The position of the air bubble may easily be adjusted by opening the glass stopcock to admit water from the reservoir. The whole apparatus is mounted on a varnished wooden base by spring clips. Base: 20 x 80mm; Capillary Bore: 1mm.



## B198 H-Type Potometer

Suitable for individual student use. The cut shoot is attached to the side arm with tubing and the wide glass tube acts as a reservoir. Glass tube length 160 x 20mm dia. Side arm 8mm dia. Capillary tube length 140mm. Bore: 1mm.



## B200 Farmer's Potometer

For measuring the rate of uptake of water by a cut plant shoot. The apparatus consists of a central reservoir with a three-hole stopper holding a capillary tube graduated in millimetres, a funnel with stopcock and a short length of 10mm glass tubing, to hold the plant shoot. Reservoir 100mm high x 65mm dia., capillary tube 390mm long with 1mm bore, graduated 0-300mm x 1mm, funnel 25ml.



## B218 Respirometer

A compact unit for comparing rates of absorption or evolution of gases by small organisms during respiration. The apparatus consists of two stoppered boiling tubes connected by three way taps to either limb of a graduated manometer. One tube holds the organisms and has a syringe for altering the level of liquid in the manometer during set up. The other tube acts as a control thermo-barometer. CO<sub>2</sub> given off by the respiring organism is absorbed by potassium hydroxide in the experimental chamber resulting in a change in the level of liquid in the manometer tube.

## B244 Clinostat - Electric

Essential for studies on geotropism and phototropism on seedlings, cut shoots and small potted plants. The seedlings are pinned to the cork table which is rotated by an electric motor. The Clinostat is supplied with a 70mm diameter cork lined/faced disc with a fitting to take a specimen tube. The angle is adjustable by a thumb screw with a clear plastic cover. The clockwork motor rotates 5 revolutions per hour. Complete with 3 core cable. 220V, 50Hz. 300mm (H). Disc diameter: 100mm.



## BBS-111 Basic Botany Slide Set

Set of 25 microscope slides with botanical specimens representing the major plant groups:

Chlamydomonas E; Spirogyra, vegetative E; Spirogyra, conjugation E; Mucor, conjugation; Zea (maize), root TS; Helianthus, stem TS; Pinus (pine) leaf TS; Prunus (cherry) leaf TS; Zea, stem TS; Mnium, archegonial head VS; Mnium (moss) antheridial head VS; Saccharomyces (yeast) budding; Penicillium, mycelium and conidia Marchantia (liverwort) thallus, antheridia VS; Marchantia, thallus, archegonia VS; Marchantia, developing sporogonium VS; Dryopteris (fern), pinnule with sori TS; Dryopteris prothallus with antheridia and archegonia E; Fucus, dioecious antheridial and oogonial conceptacles; Helianthus (sunflower) young root TS; Tilia (lime) young and old stem TS; Cucurbita (marrow) stem, for sieve tubes LS; Ranunculus (buttercup) flower bud LS; Pollen grains, wind and insect distribution E; Allium (onion) root apex, mitosis LS.



## T-GP Green Plants Microslide® Set and Viewer

This Microslide® Viewer is a specially designed teaching tool for viewing Microslides®. It is a precision instrument unconditionally guaranteed against breakage for 1 year. The viewer does not require electricity or batteries and can be used outdoors as well as in the classroom. The white reflector provides sufficient light for a bright image in the normal light of a classroom. Viewer brings 5X magnification. Each slide is accompanied by a detailed lesson plan designed to stimulate, inform and question the students about the topic under study. Set contains:

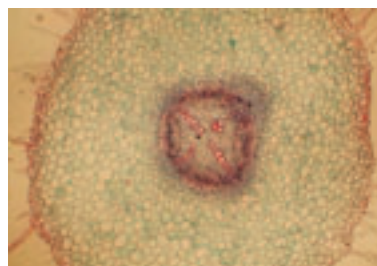
T10A - Cells of Plants; T59A - Photosynthesis; T77A - The Root of a Flowering Plant; T78A - The Stem of a Flowering Plant; T80A - The Flower of a Flowering Plant; T102A - Cells of Plants & Animals; T106A - From Flowers to Fruit; T109A - How Seeds Travel; T210A - Monocots & Dicots; 1 x Microslide® Viewer (code: EDU-505).



## BBS-002 Basic Plant Anatomy Slide Set

Set of 20 microscope slides showing the major aspects of vascular plant structure:

Vicia, root apex LS; Zea (maize), stem TS and LS; Tilia, old stem RLS; Dicot, stem, apex LS; Prunus (cherry), leaf TS; Lilium, anther TS; Lilium, ovary TS and LS; Lilium, ovary, various stages TS; Stigma with pollen tubes; Pollen grains; Zea, seed LS; Vicia (bean), young root TS; Cucurbita (marrow), stem TS and LS; Helianthus, stem, bundles TS; Helianthus, old stem TS and LS; Tilia (lime), young and old stem TS; Helianthus (sunflower), young and old root TS; Capsella, mature cotyledon stage LS; Monocot, epidermis, for stomata E; Ammophila (marram grass), leaf TS; Allium (onion) root apex, mitosis LS.



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### T211 Plants without Flowers (pk 10)

Spirogyra - Conjugating Tubes, Yeast, Bread Mould, Mushrooms, Moss, Fern (Fossil), Fern, Conifer.

### T231 Vegetative Propagation (pk 10)

Stem Cutting, Leaf Cutting, Stolons, Layering, Rhizomes, Bulbs, Stem Grafting, Potato Eyes.

### T77 The Root of a Flowering Plant (pk 10)

Buttercup Root, Central Cylinder, Epidermis and Cortex, Root Cap and Zone of Growth, Zone of Elongation, Zone of Maturation, Root Tip - Root hairs.

### T78 The Stem of a Flowering Plant (pk 10)

Corn Stem, Fibrovascular Bundle (corn), Red Clover Stem, Basswood Stem (1 yr old) (18x), Basswood Stem (2 & 3 yrs old) (18x), An Annual Ring, Coleus Bud, Lenticil in Elderberry Stem.

### T79 The Leaf of a Flowering Plant (pk 10)

Lilac Leaf, Working layers of the leaf, Upper Epidermis and Palisades, Chloroplast, Epidermis, Stomata, Air Space and Spongy Layer, Abscission.



### T80 The Flower of a Flowering Plant (pk 10)

Complete Flower, Stamens, Anther, Pollen Grains, Pistil, Ovary, Ovule, Pollen Grain, Pollen Tube, Double Fertilization.

### T210 Monocots & Dicots (pk 10)

A MONOCOT Seed, a DICOT Seed, Petunia Seeding, MONOCOT and DICOT Leaves, MONOCOT or DICOT, MONOCOT and DICOT Stems, DICOT Stems, MONOCOT Flower .

**More of the Microslide® series, covering other subjects, can be found throughout this catalogue.**

## MONOCOT & DICOT T.S. Models

Mounted on bases. Numbered parts with key cards included.

### BM12 DICOT Stem T.S.

DICOT stem showing internal tissues and vascular bundles.

### BM16 MONOCOT Stem T.S.

MONOCOT stem showing vascular bundles in transverse section.

### BM20 DICOT Leaf V.S.

DICOT leaf showing internal details of a typical mesophytic leaf.

### BM24 DICOT Root T.S.

DICOT root showing internal details.

### BM26 MONOCOT Root T.S.

MONOCOT root showing internal details in transverse section.



## 15-20-4083 Plant & Leaf Identification

Lab Investigation

Learn how to easily identify common plant structures! Learn how to distinguish one from another with microscope slides, micrographs and detailed illustrations. Study is also included on flowers and fruit. Set includes plant identification cards as well as a leaf scrapbook, which can be used to perform fieldwork and for collecting plant samples.



## EDU2023 Plants UK - CD-ROM

3 databases

Wild Flowers, Trees & Shrubs and Grasses. Easy identification of plants for everyone. Step by step identification of Wild Flowers, Trees, Shrubs and Grasses most likely to be found in school grounds, parks and open spaces. Original full colour illustrations of all species, combining beauty with botanical accuracy. Plants UK provides the following:

*Botanical details of all plants:* Latin Name, Division, Class, Distribution and Habitat.

*Interactive investigations:* Creating plant Keys, Food webs, Photosynthesis, Adaptations and others.

*Spreadsheets:* Prepared and ready for recording plants.

All in an A5 folder, with a 'Problems Identifying Plants' information sheet, Teacher's Project Sheet and eleven photocopiable worksheets for pupils.



## BM2 Typical Flower Model

Large size beautiful model of a typical flower, all parts detachable. Ovary with a single ovule inside. On base and numbered with key card.



## BM4 Typical Flower Model ,L.S.

Showing L.S. of flower. Dimensions overall 330 x 250 x 65mm. approx. Mounted on board and numbered with key card.



## 2830-H Flower Model Activity Set

Here is an enlarged view of a typical flower with cut away sections to show the major parts: stem, sepal, petal, stamen and pistil. Students can trace the transmission of male gamete to female gamete within the ovary. Model measures 24"H x 18"W and includes a comprehensive activity guide with black-line master and colour transparency.



## 2840-H Root-Stem-Leaf Model Activity Set

This 3-D model shows all the major structures within a seed-bearing woody plant. It also uniquely promotes the understanding of plant anatomy through the use of cross, transverse and longitudinal sections. Set includes 24" x 18" model, activity guide and colour transparency.



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### T244 Transport In Plants & Animals (pk 10)

Paramecium Normal (200x) / Cytolytic (400x), Daphnia (w.m. 25x), Human Heart x.s. (1.5x), Human Vein and Artery (50x), Human Lymphatic Vessel (50x), Radish Root - L.s. (25x), Monocot Stem x.s. - (20x) / Monocot Leaf x.s. (350x), Dicot Stem - x.s. (8x) / Dicot Leaf - x.s. (175x).

### T96 Path of Water in Plants (pk 10)

Epidermal cell root hair, Buttercup root, Basswood stem, Red clover stem, Celery, Basswood, Celery vascular bundle, Lilac leaf, Network of veins in leaf, Air space and stomata.



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

### BPOT Potometer on White Stand

Used to show transpiration which occurs in small plant shoots. The apparatus is submerged and the specimen placed in the tube. When transpiration occurs, the bubble within the capillary moves. A syringe is used to zero the scale.



### EDU793 Tulgren Funnel

A soil sample is placed on the perforated plate and a 220V heating lamp is held above the soil, driving the organisms down through the funnel into a collecting jar. Supplied with coarse and fine mesh, glass collecting beaker and 3 core cable. (Retort Rod and Base not included).

### EDU2022 Animals UK CD-ROM 8 databases

Mammals, Birds, Land Invertebrates, Water Reptiles, Invertebrates, Butterflies, Amphibians and Freshwater Fish. Easy identification of animals for everyone. Step by step identification of creatures most likely to be found in school grounds, parks, gardens, ponds, rivers and lakes. Original full colour illustrations of all species, combining beauty with biological accuracy. Animals UK provides the following:

*Details of Animals:* Latin Name, Class, Order, Distribution, Lifestyle and Habitat.

*Interactive investigations:* Creating Keys, Food webs, Classification, Adaptations and others.

*Spreadsheets:* Prepared and ready for recording animals.

Animals UK CD Rom is presented in an A5 folder, which holds a Teacher's Project Sheet and ten photocopiable worksheets for pupils.





## Gatekeeper Identification Guides

Gatekeeper Guides are wipe-clean A3 laminated and folded Identification Keys. These are double sided with a different set of keys on each side. The Guides provide easy identification using key questions that are easy to follow and clear, coloured illustrations which are attractive to study. Robust and easy to handle, these are a perfect wildlife reference for schools and nature lovers of all ages.

### Key to Identifying...

#### K1 Freshwater Invertebrates

Wipe-clean A3 laminated and folded. Printed on both sides. Easy identification, with key questions that are easy to follow and clear, original full colour illustrations, which are attractive to study. Robust, easy to handle and perfect wildlife references for schools and Nature lovers of all ages.

Side 1: Creatures with 6 legs.

Side 2: Creatures with 0 legs, 8 & 14 legs.

#### K8 Common Birds

Identification starts by beak shape. One side identifies birds which have thin, delicate beaks and hooked beaks. The reverse side shows birds with beaks which are standard, long, stout and straight, strong.

#### K9 Flowers of the Hedgerow

Identification starts by number of petals. One side identifies flowers with six or more petals and irregular petals. The reverse side shows flowers with up to four petals and flowers with five petals.

#### K10 Common Fungi

Identification starts by Fungi shape. One side identifies Fungi which have caps and stems. The reverse side shows Fungi with other shapes such as shelf-shaped, cup-shaped, ball-shaped, club-shaped, branched or just a blob.

#### K11 Flowers of Chalk Grassland

Identification starts by Petal number and type. One side identifies flowers with six or more regular petals or irregular petals. The reverse side shows flowers with five petals and four or less.

#### K7 Common Grasses

Side 1: Flower shape Bunched/Cylinder, Bunched/Stiff bristles, Spreading/Chunky, Spreading/Delicate.

Side 2: Bunched/One sided, Long/ZigZag, Spreading/Straight/Bent bristles.



## K2 Wild Flowers of Grassland

Side 1: Flowers with 5 irregular petals.

Side 2: Flowers with 4 & 6 plus petals.

## K4 Trees & Shrubs

Side 1: Trees and Shrubs with oval leaves.

Side 2: Trees and shrubs with other leaf shapes.

## K3 Land Invertebrates

Side 1: Creatures with 6 legs.

Side 2: Creatures with 0 legs, 8 legs, 14 legs, More than 14 legs, Insects with large wingspan.

## K5 Dispersal of Fruits and Seeds

Side 1: Fruits with Wings, Hairs, Fleshy or Pepper-pot shaped.

Side 2: Pods, Cones, Buoyant, Hard or Hooked.

## K6 Common Butterflies

Side 1: Butterflies with wing colour Copper, Yellow, White, White/Orange, Red/Black/White /Orange.

Side 2: Wing colour Brown/Orange, Brown/Grey, Blue, Red/black.



## 15-35-1166 Monarch Butterfly Life Cycle

Poster - 890 x 584mm

Exquisite photos display the four stages of metamorphosis! Each stage of the butterfly life cycle is beautifully depicted on this colourful, informative poster. Photographs of the egg, larva, pupa and adult stages are complemented by detailed explanations.



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## T256 The Monarch Butterfly (pk 10)

Eggs on Milkweed, Larvae, Close-up of Larvae, Moulting Caterpillar, Monarch Pupa, Monarch Emerging from Pupa, adult Monarch Butterfly, Eggs on Milkweed .



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### T204 Body Defences Against Infection (pk 10)

The Skin (200x), Epithelial Lining of Respiratory Tract (175x) / Isolated Cell from Wind Pipe (1400x), Pyloric Stomach (100x) / Eyelid (30x), White Blood Corpuscles (500x) / Phagocytosis (25,000x), Lymph Gland (40x), Tonsils and Adenoids (7x), The Liver (20x), Plasma Cell (37,000x).

### T229 Immunity (pk 10)

Blood Phagocyte, Phagocytosis, Monocyte, Macrophage, Bone Marrow, Lymph Gland, Thymus Gland, Normal T-cells, HIV Budding from T-cell, Plasma Cell, Normal Red Blood Cells, Agglutinated Cells, Eosinophil, Basophil.

### T246 AIDS (pk 10)

Simian Virus - E.M. (87,500x), Macrophage at work (1,000x), Healthy T-Cell - S.E.M. (3,500x), HIV on T-Cell - S.E.M. (6,000x), HIV Budding from T-Cell - S.E.M. (50,000x), Pneumonocystis Carinii S.E.M (710x), Candida Albicans - S.E.M. (3,000x), Karposi's Sarcoma (1x).

### T224 Malaria (pk 10)

An Anopheles Mosquito - Whole Mount (5x), Sporozoite Stage - Plasmodium Vivax (1100x), Trophozoite Stage - Plasmodium Vivax (1000x), Schizont Stage - Plasmodium Ovale (1000x), Merozoite Stage - Plasmodium sp. (700x), Microgametes and Macrogametes - Plasmodium falciparum (110x), Fertilization - Plasmodium sp. (1300x), Oocyst - Plasmodium sp. (520x).

### T75 Animal Parasites of Man (pk 10)

Trichina worms, Adult hookworm, Hookworm larva, Trypanosoma gambiense, Malarial parasite, Tapeworm scolex, Tapeworm cyst, Tick larvae.

### T-600 Teaching About Immunity Kit T-600TG Teacher's Guide only

This kit clearly displays the interrelated workings of the Immunity System. Attack an invading antigen with a phagocyte or monocyte. Produce macrophages. T-Cells, B-Cells, Plasma Cells, and antibodies. Clot T and B cells to produce Helper, Killer, Memory and Suppression cells. Demonstrate the operation of AIDS, Cancer, Vaccines, Allergies, Autoimmune reactions and more right on the board. Students can readily participate in the hands-on activities. The Plastic pieces will not break, chip, tear, peel or wear out! Comes complete with a 30 X 40" Demonstration Board, mounting legs and Teacher's Guide with detailed lesson plans plus reproducible student worksheets.



More of the Microslide® series, covering other subjects, can be found throughout this catalogue.

### T240 Human Diseases (pk 10)

Viral Diseases - Influenza Virus (320,000x), Bacterial Diseases - Tuberculosis (100x & 1000x), Protist Diseases - Amoebic Dysentery (100x), Fungal Diseases - Trichina Worm (65x), Genetic Diseases - Sickle Cell Anaemia (400x), Environmental illnesses - Normal Lung (150x) / Blackened Lung (65x), Multifactorial Diseases - Atherosclerosis (3x & 15x).

### T97 The Virus (pk 10)

Lambda Phage on E Coli (45,000x), Disrupted Phage (280,000x), Human Viruses - Influenza Virus/Polio Virus (290,000x), Measles Virus Attach (400x), Animal Viruses - Newcastle Disease/Vaccinia Virus (120,000x), Viruses Emerging From Cell (90,000x), Tobacco Mosaic Virus (TMV) - Virus Particles (30,000) / Virus Crystal (1,500x), Cancer Viruses - Papilloma Virus (7000x) / Rauscher Leukemia Virus (90,000x)



## 2692 HIV Model Activity Set

The Human Immunodeficiency Virus (HIV) Model depicts the anatomy of the basic viral unit and the related infection cycle. Includes: a large, markable model (24 x 30?) constructed of durable vinyl, a set of plastic colour-coded pieces to construct a segment of DNA and a Model Activity Guide in a three ring binder. The Activity Guide includes: background information, basic understandings, classroom activities, glossary, key to model structures and 5 Full-colour overhead transparencies depicting the detail of the infection process.



## 14-20-2963 ELISA: HIV/AIDS Test Simulation Lab Investigation

Investigate the principles behind AIDS testing Explore the immunological principle that antibodies bind to specific antigens. Your class will learn how ELISA 'Enzyme Linked Immunoassay' is a fundamental clinical tool used for the detection of the AIDS virus. They will conduct simulated ELISA screening assays on simulated blood sera of ten individuals to determine their HIV status. In the process, they will learn about basic immunology as well as specifics concerning the assay 'positive' and 'negative' controls as well as what 'false positive' and 'false negative' results mean.

Class size - 40 students. Your students will:

- Learn about basic immunology concepts
- Understand how the ELISA HIV screening test works
- Observe simulated ELISA antibody/antigen reactions
- Analyze ELISA test results



## 310-013 MicroBio® Simulated AIDS Testing Kit

This simulated HIV/AIDS Testing Kit contains written materials, chemicals and equipment.

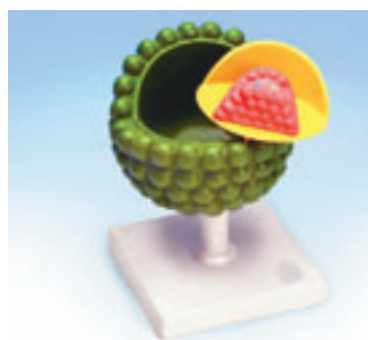
- Real blood is not used
- Allows learners to do simulated tests
- Creates better understanding of the disease
- Creates confidence in the test
- Provides educational material about HIV/AIDS
- Re-enacts a number of different patient case studies
- Provokes discussion and learning about the disease



## 15-30-1370 AIDS Virus Model

Enlarged millions of times for detailed view! HIV model shows the outer lipid layer and surface proteins. Cutaway view provides a close look at the matrix, capsid RNA, and reverse transcriptase. Includes comprehensive key card.

Size: 5"L x 5"W x 7"H.





## 13-20-1323 Battling Germs with Disinfectants

Lab Investigation

Safely learn how to stop the spread of bacteria! What effects do alcohol, soap and bleach have on the growth of micro-organisms? Show how various disinfectants affect the growth of bacteria. Then use this knowledge to examine the most efficient ways to prevent the spread of these organisms and the relationship between handwashing techniques and bactericidal effectiveness. Class size – 40 students.



## 101-123 Middle School Life Science Flipchart KS 3

Cell Processes; Cell Reproduction; Modern Genetics; Bacteria & Viruses; Protists & Fungi; Plant Processes; Sponges, Cnidarians & Worms; Mollusks, Arthropods & Echinoderms; Fishes, Amphibians & Reptiles & Birds and Mammals.

### About the Science Flipchart Sets:

10 set series presents leveled review of Grades 1 - 8 (ages 5-14) science standards.

### Each Curriculum Mastery flipchart set features:

- 10 Double-sided, laminated charts.
- Full-sized, 30 x 45cm charts.
- Activity Guide featuring black-line copy-masters of the charts along with review questions, vocabulary terms, suggested activities and more.
- Sturdy easel for years of classroom application
- Activity chart featuring questions, labelling exercises, vocabulary review & more.



## 101-143 Middle School Life Science Skills Game KS3

Middle School Life Science Skills Game - The World of Life Science; Diversity of Life; Cells: The Basic Units of Life; Cell Processes; Cell Reproduction; Genetics - Study of Heredity; Modern Genetics; The Evolution & Interaction of Living Things; Bacteria & Viruses; Protists & Fungi; Introduction to Plants; Plant Processes; Plant Reproduction; Introduction to Animals; Sponges, Cnidarians & Worms; Mollusks, Arthropods & Echinoderms; Fishes, Amphibians & Reptiles; Birds & Mammals; Bones, Muscles & Skin; The Digestive System & Nutrition; Circulation & Immunity; Respiration & Excretion; The Nervous System; The Endocrine System & Reproduction; Ecosystems, Food Chains & Food Webs.

### About the Science Skills Games range:

Comprehensive Coverage of the Current NSES Standards for Grades 1 - 8 (ages 5-14 years).

### Each set features:

- 25 Sets of 30 standards-based review cards - a total of 750 review cards. Each set is focused on a specific curriculum topic and leveled by content & readability.
- 12 Double-sided, laminated game boards.
- Comprehensive Teacher Planning & Resource Guide
- Presentation CD featuring interactive review questions for use on a PC, Mac or projection unit.
- Free introductory online subscription to access interactive content, activities and assessments.



The Curriculum Mastery Games are written by teachers using research-based principles and tested in the classroom, each Class-Pack game includes enough materials for 36 students!

## 430-005 Bioterrorism and World Epidemics

Poster - 978 x 660mm

A great poster describing, in words and pictures, 40 of the most dangerous biological, chemical, and nuclear agents that threaten the health of the people of this world. Printed in full colour on glossy poster stock with an additional UV-protective gloss coating to protect against colour fading. Comes with 280mm x 432mm information sheet. Subjects include: Anthrax, Smallpox, West Nile Virus, Botulism, Cholera, Dengue Fever, SARS, Avian Flu, Aflatoxin, Dysentery (Shigella), Ebola, E. coli, Encephalitis, Hantavirus, HIV, Influenza, Legionnaire's, Lyme Disease, "Mad Cow" Disease, Melioidosis / Glanders, Plague, Pneumonia, Salmonella, Staph, Tuberculosis, Tularemia, Q Fever, Brucellosis, CJD, T-2 Mycotoxin, Stachybotrys (toxic molds), Ricin, Chemical agents, and Nuclear Explosion.



### Magnifiers, Folding

**P500A Magnification 4X (pk of 10)**

**P500B Magnification 7X (pk of 10)**

**P500C Magnification 10X (pk of 10)**

Folding magnifiers fitted in frame, superior quality.



**P502B Magnifier, Folding  
Magnification 10X**

Folding magnifier with plano-convex lens of extra white glass. Unbreakable plastic lens holder and aluminium anodised cover. Superior quality.



**P503 Magnifier, Pocket  
Magnification 3.5X**

Single. Diameter 40mm. Supplied with pouch.

### Magnifiers, Reading

**P506A Glass - 50mm**

**P506B Glass - 60mm**

**P506D Glass - 75mm**

In durable plastic mount with handle.



### Magnifiers, Reading

**P510A Glass - 50 x 100mm, 3.5x**

**P510B Glass - 60 x 150mm, 2.5x**

**P510C Glass - 60 x 200mm, 2.25x**

**P510D Glass - 75 x 150mm, 2.5x**

**P510E Glass - 75 x 200mm, 2.25x**

**P510F Glass - 100 x 150mm, 2.5x**

**P510G Glass - 100 x 120mm, 2.25x**

In a metal frame with bakelite handle. Chrome plated.



**430-002 Magnifier, Giant  
Magnification 2X**

Giant magnifier with folding stand. Ideal for viewing rock specimens etc.





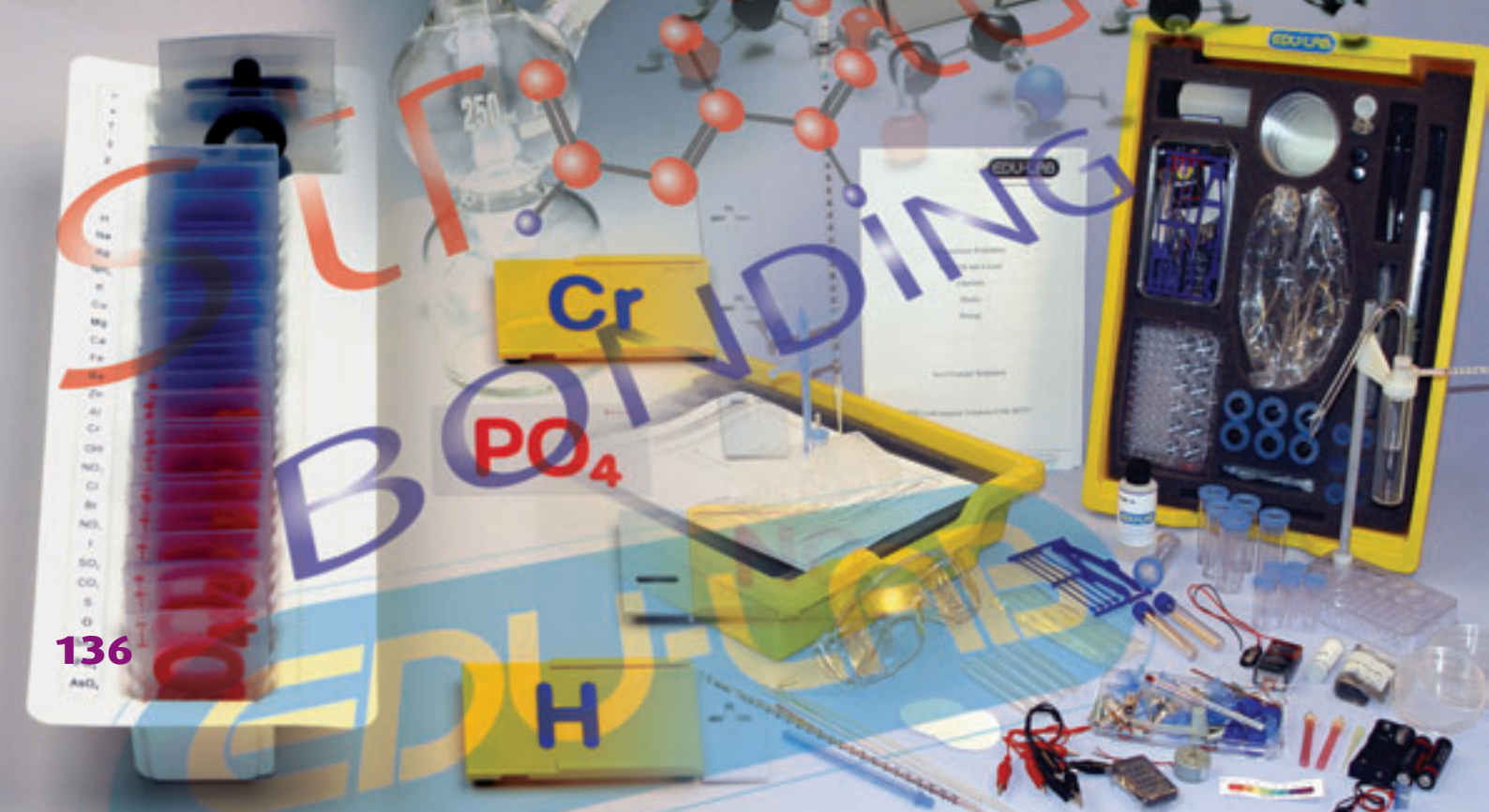
chemistry

# Chemistry

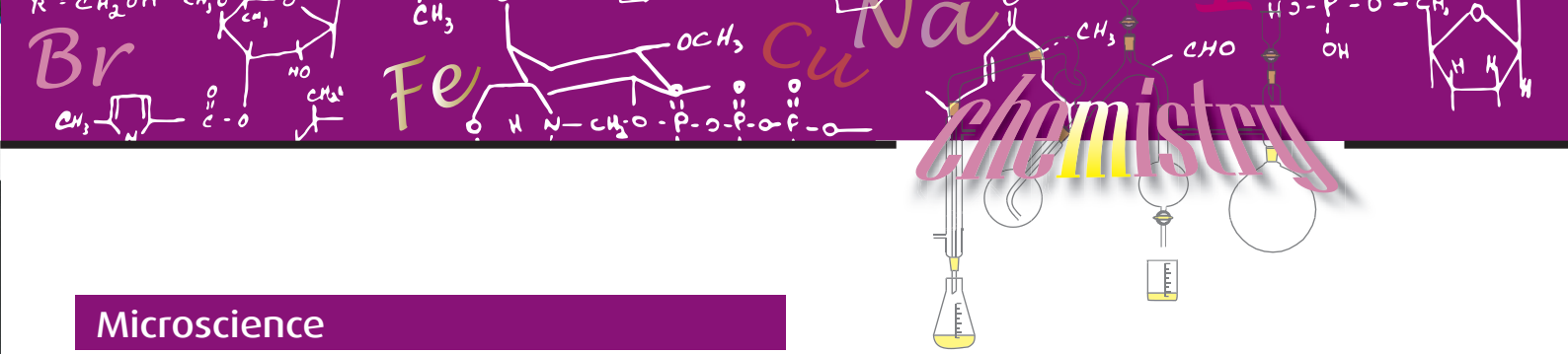
Microscience, EZ-Prep chemistry, lab investigations, structures, periodic table, glassware, general equipment.



# Glassware



Cr  
PO<sub>4</sub>  
H



## Microscience

### EDU131 Microscience Workstation

This is a Microscience Kit which encompasses a large proportion of the Year 10 (Key Stages 3 & 4) Practical Curriculum. It is designed for individual use or for use in small groups. Curriculum based worksheets and guides are available. The system is recognized by curriculum and examination authorities. The Microscience Workstation covers Biology, Chemistry & Physics.

worksheets and guides available to complement this workstation cover many experiments, for example:

#### Chemistry curriculum:

- To grow crystals using alum or copper sulphate
- To separate mixtures using a variety of techniques: filtration; evaporation; distillation; paper chromatography
- To investigate the pH of a variety of materials using the pH scale
- To prepare a sample of oxygen by decomposing H<sub>2</sub>O<sub>2</sub> using MnO<sub>2</sub> as a catalyst (word equation and chemical equation)
- To prepare carbon dioxide (word equation and chemical equation) and show that it does not support combustion
- To conduct a qualitative experiment to detect the presence of dissolved solids in water samples, and test water for hardness
- Titration, e.g. to titrate HCl against NaOH and prepare a sample NaCl
- To investigate the reaction between zinc and HCl, and test for hydrogen (word equation and chemical equation)
- To carry out an experiment to demonstrate that oxygen and water are necessary for rusting

#### Physics curriculum:

- To identify different forms of energy and carry out simple experiments to show the following energy conversions -
  - Chemical energy to electrical energy to heat energy
  - Electrical energy to magnetic energy to kinetic energy
  - Light energy to electrical energy to kinetic energy
- To investigate and describe the expansion of solids, liquids and gases when heated, and contraction when cooled.

#### Biology curriculum:

- The action of catalase on hydrogen peroxide
- The action of amylase on starch
- The action of amylase on starch over a period of time
- The effect of temperature on the activity of the amylase
- The effect of pH on the activity of amylase
- The effect of rennin on milk
- The effect of bromelain on gelatine
- Benedict's test for reducing sugar
- Benedict's test for non-reducing sugar
- Iodine test for starch
- Iodine test for cellulose
- Emulsion test
- The grease spot test
- Biuret test for proteins
- Plant and Enzyme studies



#### Topics that may be covered with this workstation include:

- Materials and their properties - separating mixtures
- Acids & Bases
- Patterns of behaviour - metal
- Materials & their properties - useful products from oil
- Materials and their properties - rates of reaction
- Materials and their properties - the periodic table
- Materials and their properties - useful products from air
- Materials and their properties - energy transfer in reactions
- Materials and their properties - useful products from ores and rocks
- Chemical equilibrium
- Organic Chemistry
- Miscellaneous

*...many more experiments can be performed.*



## Common Microscience Equipment

Equipment specifically designed or selected for use in microscale applications, with all the usual attendant benefits of conducting science on a smaller scale.

### Microscience Spares

310-033 Spatulae and Forceps, pk of 20



310-025 Polyethylene Dropper Bottles - pk of 100



310-057 Test Tubes, 12mm , pk of 20



EDU884A Plastic Disposable Syringes, 2ml - pk of 10



310-020 Lead Electrodes, pk of 20



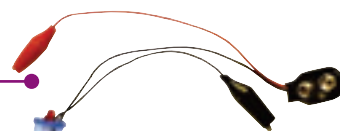
310-038 Straw Electrodes, pk of 20



310-021 Glass Combustion Tubes, pk of 20



310-022 LED Current Indicators, pk of 20



310-023 Magnifying Glasses, pk of 20



310-042 Gas Lids, No. 1, pk of 20



310-043 Gas Lids, No. 2, pk of 20



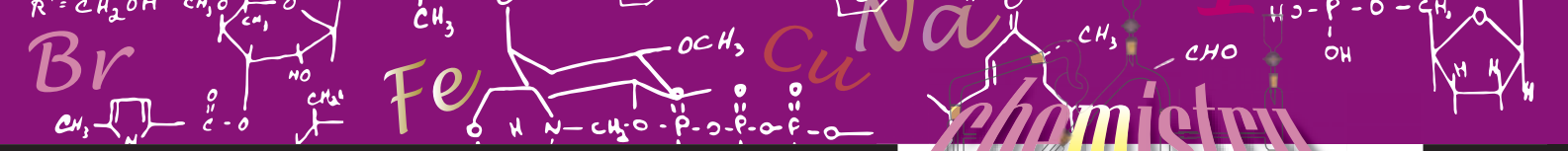
310-026 Microburners, pk of 20



310-039 Silicone Tubes with U bends, 25cm - pk of 20



*NOTE: These are the current, most commonly requested microscience spares. However we are always adding to our microscience range, so if there's anything you need but don't see here then please enquire. If we don't already have it ...we might soon start making it!*



310-027 Cross Arm Retort Stands, pk of 20

310-028 Upright Retort Stands, pk of 20

310-029 Thermometers, 0-50°C, pk of 10

310-032 Silicone Tubing, 5m

310-034 Small Organic Vials, pk of 20

310-035 Large Plastic Vials, pk of 20

310-040 Propettes, pk of 100

310-056 Thermometers, 0-150°C, pk of 10

310-044 Gas Lids, No. 3, pk of 20

310-048 Glass Distillation Tubes for Combostill  
- pk of 10

310-050 Reflux Tubes for Combostill  
- pk of 10

310-067 Funnels, pk of 20

310-063 Filter Papers, pk of 100

310-062 Gas Collecting Tubes and Lids  
- pk of 20





## Microchem

### 310-009 MicroChem Combostill

Winner of the WorldDidac Award 2000, the Combostill® comes highly recommended by leading educators and is widely used in school labs around the world, while also having applications in research. Designed to replace expensive organic chemistry apparatus, microscale apparatus provides many significant advantages over more traditional methods. Most activities can be set up and conducted in roughly a third of the time of traditional methods while the smaller volumes of chemicals required mean huge cost savings and a much safer lab environment. Moreover, the cost, safety and simplicity of microscale methods make it much easier to implement teaching where smaller groups or even individuals conduct their own experiments, resulting in much better learning outcomes. The Combostill® comes with a Comboplate included, and has the following features:

- Extremely safe
- Minimises chemical costs
- Time reduced drastically for any given experimental procedure
- Energy requirement very low in order to initiate reaction
- Realistic structure so students are led very comfortably into microscale procedures
- A starting manual is provided with each kit

Some topics which may be covered using this kit are:

- Refluxing
- Preparation of Bromobutane
- Preparation of esters
- Oxidation of Alcohols
- Unsaturated Compounds - Preparation and Identification
- Oil Extraction
- Distillation
- Steam Distillation

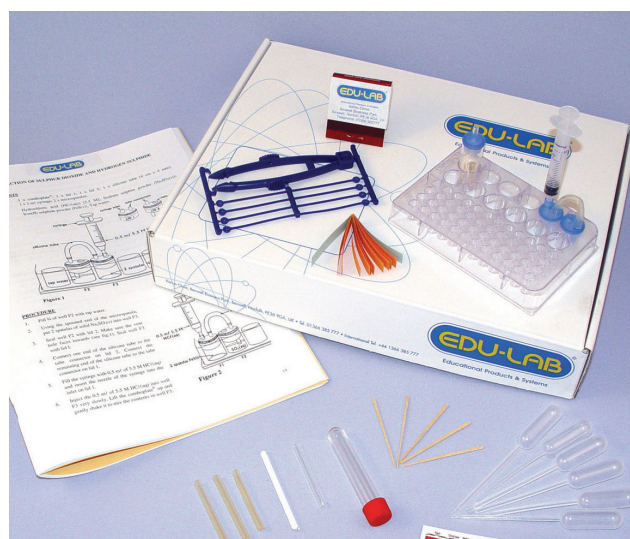


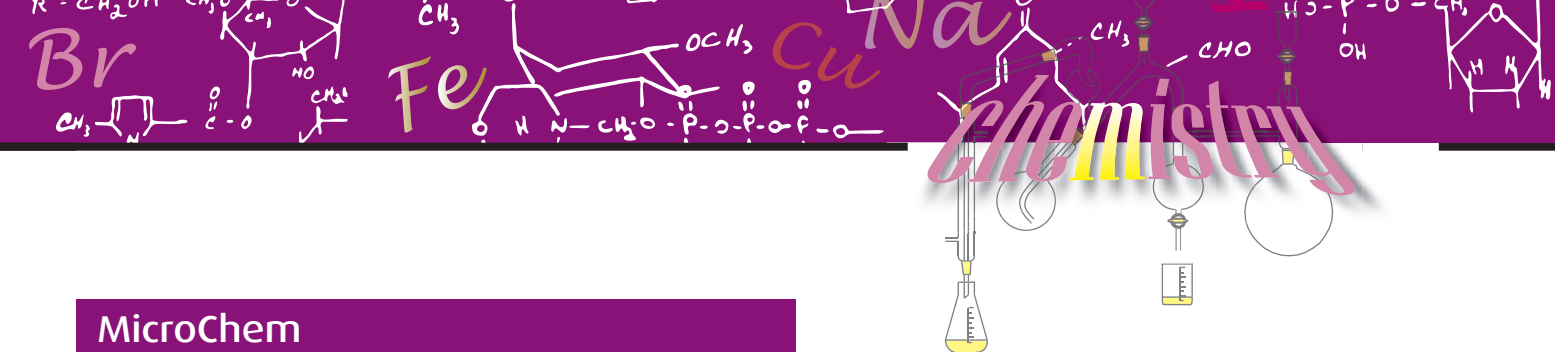
### 310-003 MicroChem Basic Kit

The development of the Comboplate inspired other developments in physical apparatus that allow students the opportunity of performing over a hundred chemical experiments previously requiring macro-scale apparatus.

Topics that may be covered with this kit include:

- Chemical Equilibrium
- Acid Base Chemistry
- Rates of Reaction
- Stoichiometry
- Reactions of Metals & Their Salt Solutions
- Enthalpy Changes
- Reactivity of Group 7 Elements
- Industrial Pollution
- Solubility of Sulphates in Water
- Diffusion





## MicroChem

### 310-004 MicroChem Advanced Kit

The Advanced MicroChem Kit provides all the physical hardware required to perform the experiments incorporated in the basic kit, and in addition the following topic avenues may be explored:

- Reduction of Copper Oxide
- The Zinc/Copper Cell
- Compounds
- Elements
- Pure Substances & Mixtures
- Conductivity & pH of Acids & Bases solutions
- Prep of Oxygen & Hydrogen
- Prep of Iron(III) Chloride
- Prep of Copper(II) Chloride
- Organic Chemistry: Saturated & Unsaturated Hydrocarbons
- Extraction and Purification of Gold from its Ore - an Analogy using Copper
- The Reactions of a Metal with Oxygen



### 310-012 MicroChem Microburette Kit

To be used in conjunction with the comboplate, the Microburette is highly recommended by leading education institutions and has a place in over 10,000 schools worldwide. Durable and easy to maintain, the Microburette can be used for accurate and efficient titrations by secondary school students. Regularly achieving reproducibility coefficients of 0.98 and providing accuracy up to 2 decimal places, results compare very well with traditional Class B glassware.

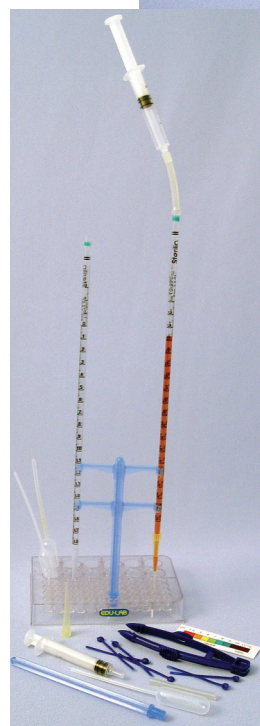
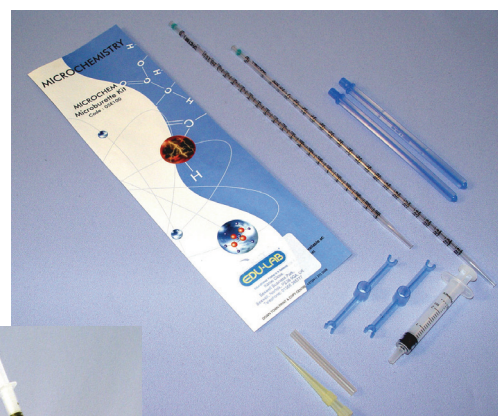
### 310-011 MicroChem Microtitration Kit

The MicroTitration kit is designed for accurate and efficient titrations in secondary school experiments:

- Accuracy up to 2 decimal points
- Results compare very well with traditional Class B glassware
- Reproducibility coefficients of 0.98 achieved
- Equipment is durable and easy to maintain
- Self-contained kit

#### Examples of some procedures that can be performed with the Microburette and Microfiltration Kits are:

- The standardisation of Hydrochloric Acid using Sodium Carbonate
- The standardisation of Sodium Hydroxide using standard Hydrochloric Acid
- Calcium and Magnesium Ion Concentration
- A Conductometric Titration





## Microchem Teachers Resources

- S003/B** Teachers Resources, KS 3
- S004/B** Teachers Resources, KS 4
- S005/B** Teachers Resources, A Level

A series of worksheets to assist in the teaching of chemistry and biology at Key Stage 3. The resources cover a wide range of practical experiments using the innovative Microscience System. Each file contains notes on use and care of Microscale equipment. Photocopying unrestricted for recipient schools.

Each worksheet includes:

- Risk assessment
- List of equipment and chemicals required
- Relevant specifications covered for AQA, EDEXCEL, OCR and QCA
- Detailed instructions



## MicroChemicals Kits

- 05M421** MicroChemicals Kit, KS 3
- 05M422** MicroChemicals Kit, KS 4
- 05M423** MicroChemicals Kit, A Level

The majority of chemicals used with the Micro-Chem system are normal stock chemicals for most schools, but for extra convenience these class sets of chemicals are available. Within each set are all the chemicals needed for a particular Key Stage, provided in either 50ml or 50g bottles or vials, sufficient for approximately 100 determinations. Health and Safety CD & Booklet included.



## Comboplates

- 310-018** Clear Polypropylene, pk of 20
- 310-019** Opaque Polypropylene, pk of 20

60-well microplate used in general microtitration special procedures and hundreds of chemistry, biology and physics education experiments. This high grade plate is designed to the dimensions of standard 96 well and 48-well plates. The plate is divided into 2 sections 48 small wells (volume 0.3ml) and 12 large wells (volume approx 2.5ml). Each well is identified by a grid reference system. The small wells can be likened to 'micro test tubes' and the large wells to 'micro beakers'.

The optically clear polypropylene plates are suitable for a wide range of inorganic uses.

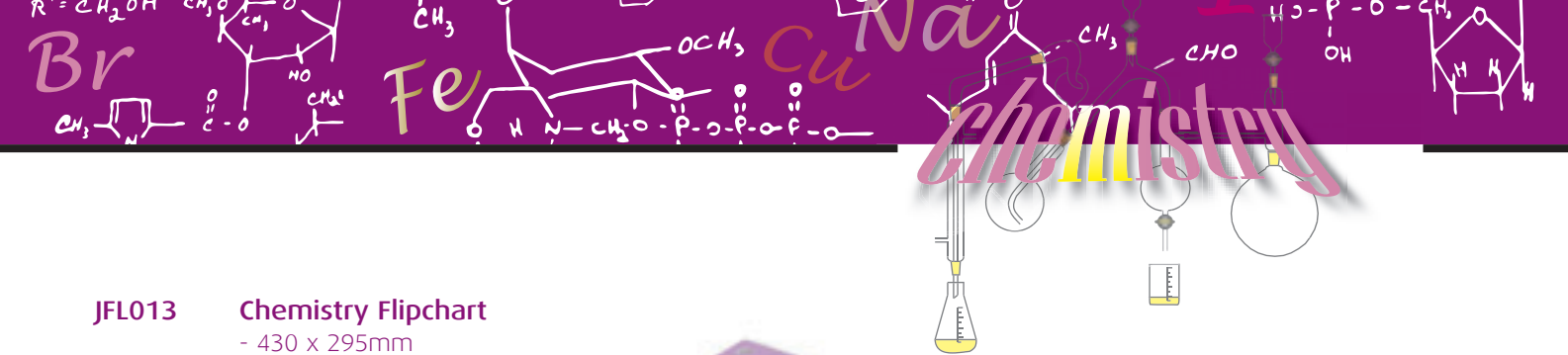
The polypropylene plates are opaque, resistant to most organic chemicals and autoclavable.



## SR-1434 Elements (Chemistry) Clever Catch®

Another great addition to the science classroom. Students really enjoy practising their lessons when they can play at the same time!





### JFL013 Chemistry Flipchart

- 430 x 295mm

Spiral bound A-frame stand containing ten clearly illustrated laminated charts:

Acids and Bases, Air, Carbon Dioxide, Hydrogen, Matter, Measurement of Matter, Nitrogen, Oxygen, Water ...and The Periodic Table.



### BES123 Carbon Dioxide Poster

- 760 x 520mm

Shows the element Carbon Dioxide, the invisible gas element, where it is found and how it is formed. One of a comprehensive, detailed set of posters specifically designed to simplify issues which are sometimes difficult to grasp. For teachers they provide core material which assists in formulating well-structured lessons.



## Green Chemistry

### 360-004 Determining the composition of an Unknown Mixture

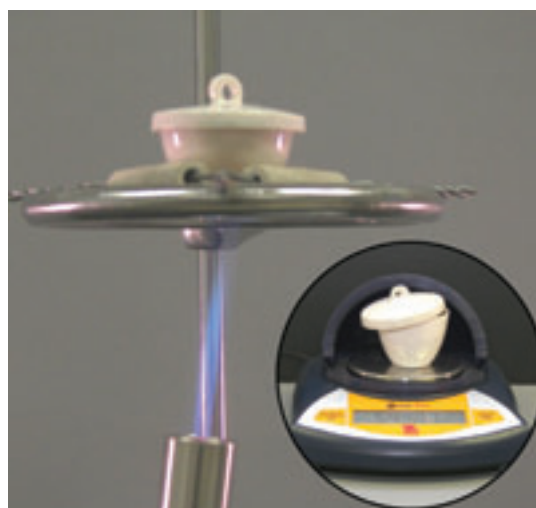
The composition of a mixture may contain a variety of unknown components. In some cases, the components of a mixture may be known but the exact quantities are not. Analytical chemists have a variety of tools and techniques to analyze unknown substances and arrive at conclusions on the compounds/percentages in the mixture. Students will determine the percentage composition of sodium carbonate and sodium bicarbonate in an unknown sample. The mixture is heated vigorously until the sodium bicarbonate is completely decomposed to sodium carbonate. The only other products of the reaction are carbon dioxide and water. After performing the necessary calculations, students will determine the percentage of sodium bicarbonate that was present in their original sample. There are enough materials for 15 groups. Teacher's manual and student copy masters are included.

#### Materials included in the kit:

- 1 Sodium carbonate, 200g
- 1 Sodium bicarbonate, 200g
- 5 Pre-labelled bottles (to prepare unknowns)

#### Materials needed but not included in the kit:

Ring stands with clay triangles; Bunsen burners; Porcelain crucibles with lids; Electronic balance (at least 0.01g resolution)





### 360-006 Detergents and the Environment

Understand the consequences of cultural nutrient overloading on the aquatic environment. Recognize that there may be alternative, more environmentally-friendly alternatives in typical consumer chemical goods. Demonstrate and monitor the effects of two detergent builders on natural water samples. Visually quantify the differences between phosphate and non-phosphate detergent builders on aquatic organisms. There are enough materials for 15 groups. Teacher's manual and student copy masters are included.

#### Materials included in the kit:

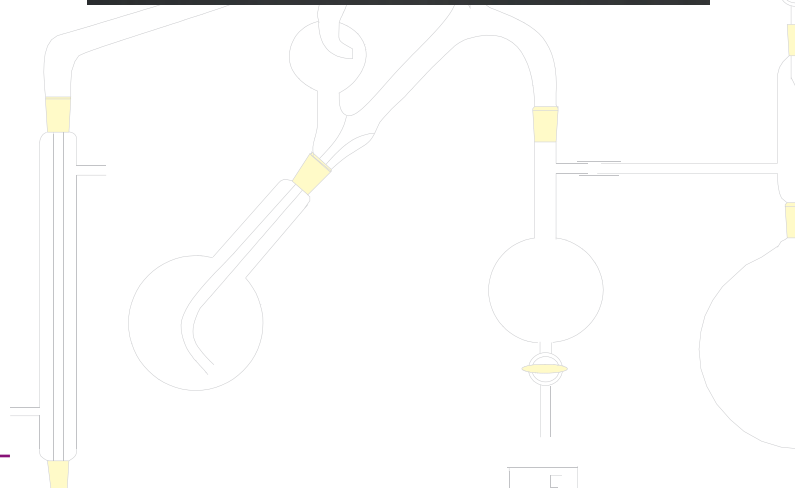
- 1 Phosphate builder (10% sodium phosphate) solution, 50ml
- 1 Non-phosphate builder (10% sodium silicate/5% citric acid) solution, 50ml
- 1 Control (deionized) water, 50ml
- 45 Plastic cups
- 1 bx Microscope slides
- 1 bx Coverslips

#### Materials needed but not included in the kit:

- Natural water sample (collected locally)
- Aged tap water
- Marking pens

#### Optional:

- Microscopes; Plastic wrap or similar



### 360-007 Electrochemical Remediation of Wastewater

Water pollution is one of the largest threats facing the global population. Water is a finite resource. Once polluted, it cannot be set aside in the hopes that the environment will 'make' new, clean water. One procedure often employed to treat wastewater is coagulation/flocculation. While the coagulation/flocculation procedure in wastewater treatment is effective, it involves the addition of chemical components to the water being treated. Recently, a great deal of attention has been given to less traditional alternatives to the typical process of coagulation/flocculation. One such approach receiving a good deal of attention is a process called electrocoagulation. Electrocoagulation is a coagulation process carried out by an electrical charge. There are enough materials for 15 groups. Teacher's manual and student copy masters are included.

#### Materials included in the kit:

- 30 Aluminum electrodes
- 15 Red connecting wires with alligator clips
- 15 Black connecting wires with alligator clips
- 1 Sodium sulphate, 15g
- 1 0.1% crystal violet, 15ml

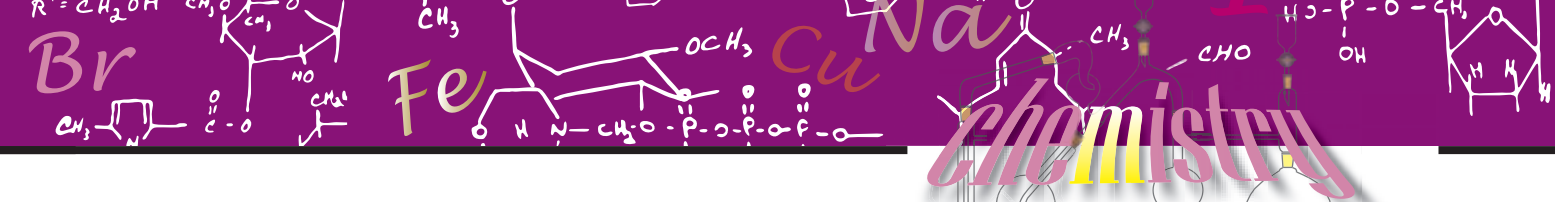
#### Materials needed but not included in the kit:

- 200ml Beakers
- 9-volt batteries

#### Optional:

- Funnels, Filter paper





### 360-008 An Alternative Iodine Clock Reaction

Learn the mechanisms and reactions in a clock reaction and understand how clock reactions provide insights into reaction kinetics. After assembling, performing, and obtaining data from several clock reactions students alter conditions and investigate the effects. The effects of both concentration and temperature are investigated. Sufficient materials for 15 groups. Teacher's manual and student copy masters are included. **Materials included in the kit:**

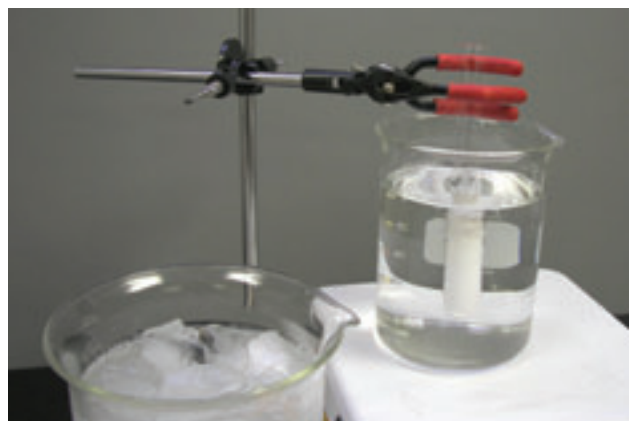
- 3 Ascorbic Acid 1.7%, 100ml
- 3 KI Dilute Lugol's Solution, 100ml
- 2 Hydrogen Peroxide 3%, 200ml
- 1 Starch, Soluble, 3g
- 30 Plastic Cups
- 30 Stir Sticks
- 60 Measuring Cups, Disposable
- 60 Pipettes, Disposable



### 360-009 Synthesis of Acetylsalicylic Acid

Show how to produce sodium salicylate acid from a naturally-occurring, renewable resource. Convert sodium salicylate to salicylic acid. Use a quick confirmatory test to examine for the presence of salicylic acid. The prepared salicylic acid can then be used to synthesize acetylsalicylic acid. There are enough materials for 15 groups. Teacher's manual and student copy masters are included. **Materials included in the kit:**

- 6 Sodium Hydroxide 3M, 25mL
- 6 Hydrochloric Acid 3M, 25mL
- 1 Methyl Salicylate, 25mL
- 2 Acetic Anhydride, 25mL
- 1 Phosphoric Acid 85%, 5mL
- 1 Ferric Nitrate, 5ml
- 15 Pipettes, Disposable



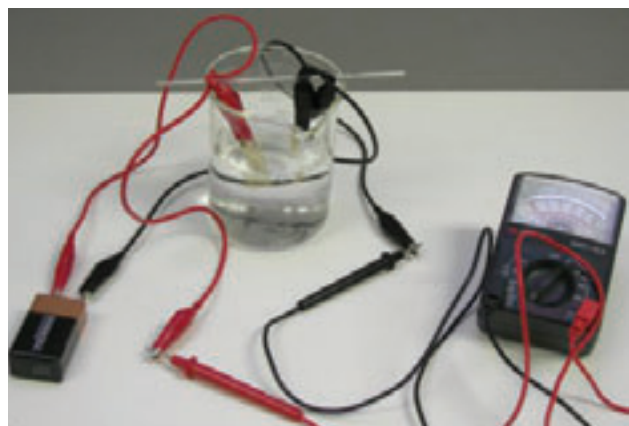
### 502-010 The Hydrogen Fuel Cell Demonstration

In this demonstration, energy will be produced from combining hydrogen and oxygen to form water. Platinum will serve as the catalyst and electrodes will be prepared by coating metal mesh with platinum. The hydrogen and oxygen will come from electrolysis. After the cell is set up, a brief current is applied (with a 9-volt battery) causing the formation of hydrogen gas bubbles on one electrode and oxygen gas bubbles on the other. Using a voltmeter, electricity produced by the recombining of hydrogen and oxygen, facilitated by the platinum metal catalyst, can be observed. Contains enough materials for 5 demonstrations. **Materials included in the kit:**

- 15 Brass metal mesh squares
- 2 Red connecting wires with alligator clips
- 2 Black connecting wires with alligator clips
- 1 D-cell battery holder with clips
- 1 Chloroplatinic acid 0.05M, 25ml
- 1 Glass rod

**Materials needed but not included in the kit:**

- Beaker, 50ml; 9-volt battery;
- Voltmeter (0-10V) or Multimeter;
- Water





## 502-011 Production of Biodiesel

In this activity, students will be performing a two-phase process to produce small batches of crude biodiesel. The crude biodiesel produced is of sufficient quality for use in the demonstration of the burning qualities of both biodiesel and vegetable oil. Included is an optional small-scale exercise where the students will use a washing procedure for the crude biodiesel if you wish to have the students experience the full process of producing biodiesel to meet quality levels necessary for use in vehicles. Sufficient materials for 15 groups. Teacher's manual and student copy masters are included. **Materials included in the kit:**

- 4 Vegetable oil, 500ml
- 15 Methyl alcohol, 25ml
- 1 Potassium hydroxide, 20g
- 2 Microburners

### Materials needed but not included in the kit:

- Beakers, 250ml
- Graduated cylinders, 25ml
- Graduated cylinders, 250ml
- Thermometers
- Hot plate/stirrers
- Electronic balance
- Parafilm® (or similar)
- Large pipettes and bulbs or separatory funnels or wash bottles

### Optional:

- Containers with sealable caps large enough to hold 200ml of liquid and Distilled Water (if performing the washing process)



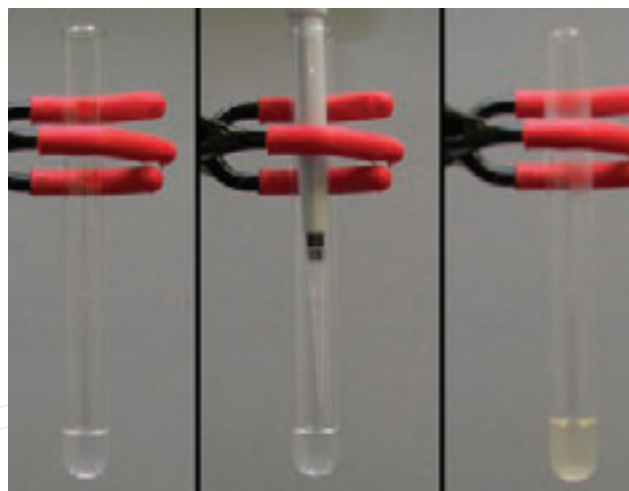
## 360-005 Synthesis of Silver Nanoparticles

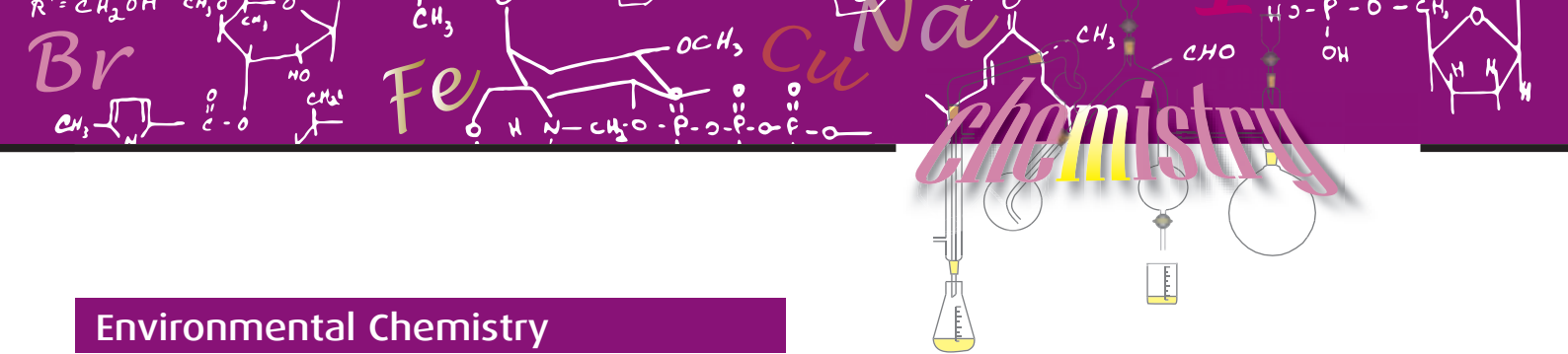
Nanotechnology is a field of technology that is described as the control and manipulation of matter in the 1 to 100 nanometer (nm) range. A nanometer is one billionth of a meter, or one millionth of a millimeter. To put it in perspective, an average sheet of copier paper is about 100,000 nanometers thick so a nanometer is 100,000th the thickness of a piece of copier paper. Certain materials, when prepared at nanoscale levels, display different physical and chemical properties than those of the same materials prepared on a larger scale. In this activity, students synthesize silver nanoparticles from silver nitrate. The particles are synthesized in glucose and starch, as opposed to the more hazardous reagents typically employed. There are enough materials for 15 groups. Teacher's manual and student copy masters are included. **Materials included in the kit:**

- 1 0.1M Silver nitrate, 1ml
- 1 0.1M Glucose, 5ml
- 1 Soluble starch (to make 50ml of 0.2% solution)

### Materials needed but not included in the kit:

- Micropipettes, 10-100µl
- Micropipette tips
- Small test tubes or similar





## Environmental Chemistry

### 501-010 Water Treatment and Filtration

Students will develop knowledge of the processes performed at a water treatment plant and understand the reasons for each process. They will perform, on a small-scale, several of the procedures that occur in a water treatment plant on 'polluted' water. They will examine the changes in the water after each treatment step is performed. They will also observe physical characteristics of water, such as clarity, colour, odour, and how they are affected from the beginning of the treatment process until the end. There are enough materials for 15 groups. Teacher's manual and student copy masters are included. **Materials included in the kit:**

- 1 Fine sand, 1500g
- 1 Coarse sand, 1500g
- 1 Fine gravel, 1500g
- 1 Activated charcoal, 3000g
- 1 Potassium aluminum sulfate (alum), 25g
- 1 Calcium oxide (lime), 25g
- 1 Kaolin (clay) powder, 5g
- 1 Green food colouring, 5ml
- 1 Odour agent (vinegar), 5ml
- 75 Plastic cups
- 15 Stirring sticks

#### Materials needed but not included in the kit:

Container large enough to prepare 'Untreated Water'  
Miscellaneous materials to prepare 'Untreated Water', such as: potting soil, lawn clippings, dried and crushed leaves, small twigs, mulch, etc.  
Sharp item (such as a nail or dissecting probe) for students to poke small holes in the cups used for filtration.



### 501-011 Nitrates, Phosphates and Eutrophication

#### Lab Investigation

Understand the importance and value of fresh water and the need to protect and conserve this valuable resource. Realize that a variety of factors, including natural ones, contribute to the overall problem of water pollution. After completing this lab, students should understand the difference between point source and non-point source pollution and understand the role of nitrates and phosphates in the process of eutrophication. They will observe and examine the effects of nitrates, the effects of phosphates, and the effects of a combination of nitrates and phosphates in miniature 'ponds'. There are enough materials for 15 groups. Teacher's manual and student copy masters are included. **Materials included in the kit:**

- 1 Nitrate (10% sodium nitrate) solution, 50ml
- 1 Phosphate (10% sodium phosphate) solution, 50ml
- 1 Nitrate/Phosphate (5% sodium nitrate/5% sodium phosphate) solution, 50ml
- 1 Control (deionized) water, 50ml
- 60 Plastic cups
- 1 bx Microscope slides
- 1 bx Coverslips

#### Materials needed but not included in the kit:

Natural water sample (collected locally), Aged tap water, Marking pens, Microscopes.





## 501-012 Acid Rain, Weathering and Erosion

Acid rain can be devastating to aquatic ecosystems and terrestrial areas. It not only affects naturally-occurring surfaces, such as rocky surfaces of mountainous regions, but manmade surfaces as well. Stones and metals used in buildings, statues and monuments may be affected by acid rain. Rates of erosion and weathering increase rapidly depending on the degree of acidic rain. In this activity, students expose naturally occurring and construction materials to an acidic environment and compare the reaction of these materials to those exposed to 'normal' rain (tap water). Sufficient materials for 15 groups. Teacher's manual and student copy masters are included.

### Materials included in the kit:

- 1 bg Marble chips
- 1 bg Brick chips
- 1 bg Granite chips
- 1 bg Limestone chips
- 1 bg Sandstone chips
- 1 bg Steel shot
- 1 bg Copper shot
- 1 bg Zinc shot
- 3 Sulphuric acid concentrate (to make 500ml each)
- 120 Measuring cups, disposable

### Materials needed but not included in the kit:

Tap water, Graduated cylinders (10 or 25ml)



## 360-002 Chemical Identification of Biomolecules

### Lab Investigation

Understand the importance of proteins, carbohydrates, and lipids in living organisms. Students will learn to identify a positive test result for proteins using biuret reagent, examine the reaction between Benedict's reagent and a simple sugar, use iodine/potassium iodide to test for the presence of starch, and test for the presence of lipids using a fat-soluble dye. There are enough materials for 15 groups. Teacher's manual and student copy masters are included.

### Materials included in the kit:

- 1 Iodine/potassium iodide solution, 25ml
- 1 Biuret reagent, 25ml
- 1 Benedict's solution, 25ml
- 1 1.0% Sudan III stain, 25ml
- 1 Vegetable oil, 25ml
- 1 Soluble starch, 10g
- 1 Albumin, 10g
- 1 Glucose, 10g





## Consumer Chemistry Science Kits

### IS9350 Properties of Toothpaste

The history of teeth cleaning agents actually goes back thousands of years. Toothpaste as we know it today however is a comparatively recent development. In this activity, students will investigate several properties of toothpaste samples, provided in the kit, including presence of fluoride, pH, abrasiveness, and foaming ability. As a second activity, students will use the included materials to create their own toothpaste. Contains enough materials for fifteen groups.

#### Materials included in the kit:

- 1 30ml Hydrochloric Acid UN1789
- 1 100ml Glycerin
- 1 25g Sodium Lauryl Sulfate UN1325
- 1 25g Gum Arabic
- 1 150g Calcium Carbonate
- 3 Tubes Toothpaste
- 1 Pk/50 Universal Indicator Strips
- 1 Pk/50 Fluoride Test Strips; 1 Pk/15 Acetate Sheets
- 45 Polystyrene Test Tubes; 45 Graduated Plastic Pipettes.



### IS9351 Properties of Soaps & Detergents

Though similar in function, soaps and detergents differ in chemistry and performance. Students will examine the similarities and differences in the properties of soap, hand dishwashing detergent, and machine dishwashing detergent, all provided in the kit. Activities include testing pH, examining the effect of soap and detergent on the surface tension of water, foaming ability, fat emulsification, and the performance of soap and detergent in hard water. Contains enough materials for fifteen groups. **Materials included in the kit:**

- 1 25ml Liquid Soap
- 1 25ml Dishwashing Detergent (Hand)
- 1 25ml Dishwashing Detergent (Machine)
- 1 60ml Vegetable Oil
- 1 60ml Calcium Chloride, 5% Solution
- 60 Disposable Medicine Cups
- 60 Polystyrene Test Tubes; 60 Capillary Tubes
- 60 Graduated Plastic Pipettes; 1 Pk/50 Universal Indicator Strips.



### IS9353 Properties of Shampoo

Different shampoos are manufactured from a variety of ingredients to perform a variety of tasks. In this investigation, students will not only learn about the role of several shampoo ingredients, but also test several properties of different shampoos which are included in the kit. Students will determine the relative viscosity, pH, flash-foam formation and retention, oil emulsification and contaminant dispersion abilities of different shampoos. Contains enough materials for fifteen groups.

#### Materials included in the kit:

- 1 30ml Shampoo #1
- 1 30ml Shampoo #2
- 1 30ml Shampoo #3
- 1 30ml Ink, Black, 10%
- 1 30ml Vegetable Oil
- 1 Pk/50 Universal Indicator Strips
- 1 Pk/45 Graduated Plastic Pipettes
- 1 Pk/25 Copper Balls; 45 Disposable Medicine Cups
- 45 Polystyrene Test Tubes; 3 Plastic Centrifuge Tubes.





## IS9352 Properties of Antacids

In this activity, students will learn about some of the more common active components in over-the-counter antacids as well as investigate the rate of acid neutralisation of five different antacids. Students will also compare the buffering ability of three different calcium carbonate based antacids. All antacid samples are included and the kit contains enough materials for fifteen groups. **Materials included in the kit:**

- 5 30ml Hydrochloric Acid; 1M Solution UN1789
- 2 30ml Universal Indicator UN1170
- 2 30ml Bromothymol Blue, 0.5% Aqueous Solution
- 1 Pk/7 Antacid #1, Tablet; 1 Pk/7 Antacid #2, Extra Strength
- 1 Pk/7 Antacid #3, Tablet; 2 Pk/2 Antacid #4, Tablets
- 1 60ml Antacid #5, Liquid; 1 Pk/15 Graduated Plastic Pipettes
- 2 Pk/50 Universal Indicator Strips; 90 Disposable Medicine Cups



## IS9354 Properties of Aspirin

Aspirin is the most widely-used painkiller and largest selling non-prescription medicine in the world. It is also prescribed in low doses to victims of ischemic strokes to help prevent recurrence. Students will learn about the development history of acetylsalicylic acid (aspirin) as well as test the performance of several different types of aspirin. Among the properties the students will examine are the solubility of aspirin in varying gastrointestinal environments, a comparison of active ingredients in regular and extra strength aspirin, and the differences between regular and buffered aspirin. All aspirin samples are included in the kit and there are enough materials for fifteen groups. **Materials included in the kit:**

- 5 30ml Hydrochloric Acid, 1M Solution UN1789
- 8 30ml Sodium Hydroxide, 1M Solution UN1824
- 1 30ml Phenolphthalein, 1% in Ethanol UN1170
- 1 Pk/50 Universal Indicator Strips
- 1 Pk/15 Graduated Plastic Pipettes; 45 Disposable Medicine Cups
- 1 Pk/75 Aspirin, Regular; 1 Pk/60 Aspirin, Buffered
- 1 Pk/45 Aspirin, Enteric Coated; 1 Pk/15 Aspirin, Extra Strength



## IS9355 In the Kitchen

This comprehensive kit incorporates a variety of scientific techniques all themed around common kitchen materials. Students will perform chromatography on commercial food colours, use chemical tests to identify an unknown cooking ingredient, examine the protein digesting ability of a common meat tenderizing enzyme, use titration to quantify vitamin C levels and then test an unknown juice or soda (not provided), and lastly examine some of the differences and similarities in the materials used to clean up (soap, hand and machine dish-washing detergents). Contains enough materials for fifteen groups. **Materials included in the kit:**

- 1 0.5ml Food Colour, Red; 1 0.5ml Food Colour, Blue
- 1 0.5ml Food Colour, Green; 1 0.5ml Food Colour, Yellow
- 1 25g Baking Powder; 1 25g Baking Soda; 1 25g 'Unknown'
- 1 25g Corn Starch; 1 30ml Acetic Acid, 5% Solution
- 1 30ml Iodine Solution; 1 5g Papain; 1 15g Gelatine
- 1 Capsule Ascorbic Acid; 3 30ml Iodine Potassium Iodide
- 1 30ml Starch Indicator Solution; 1 100ml Detergent (Hand) 5%
- 1 100ml Detergent (Machine); 1 100ml Liquid Soap, 5%
- 1 30ml Calcium Chloride, 5% Solution
- 1 Pk/15 Graduated Plastic Pipettes; 90 Disposable Medicine Cups
- 1 Pk/50 Universal Indicator Strips; 75 Polystyrene Test Tubes
- 1 Pk/4 Capillary Tubes; 15 Spot Plates
- 1 Pk/15 Chromatography Sheets; 1 box Toothpicks.





## Compact Chemistry

### 330-001 Compact Chem 01 Set of elements for magnetic board

This is a set designed for classroom magnetic boards to demonstrate bonds, equations and processes in organic and inorganic chemistry. The set enables the simple construction of molecule models (oxides, acids, alkalis, salts and organic compounds), and simple modelling of chemical reactions and their model and symbolic notations (together with selection of coefficients, dissociation and the ionic form of reaction equations). This set enables the introduction of the octet rule, bonds as a common pair of electrons, differentiation of bonds and a co-ordinate, semipolar bond. For simplification, metal symbols are marked in blue, non-metals in red and semi-metals in blue and red. The Compact Chem 01 includes an extensive Teacher's Handbook for conducting many illuminating lessons.

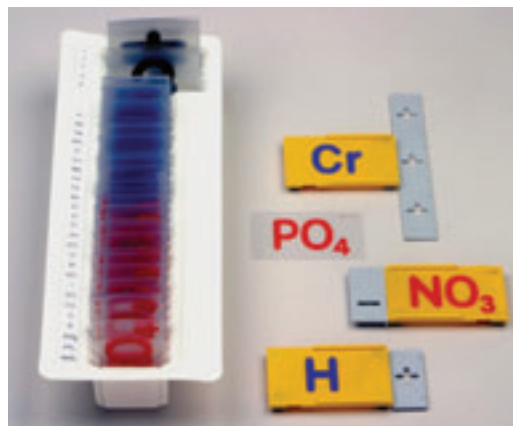


### 330-002 Compact Chem 02 Set of elements for magnetic board

Compact Chem 02 teaches how to handle bond notations, ion notation forms, recognise reaction mechanisms and factors influencing their speed. Contains an extensive Teacher's guide

### 330-003 Compact Chem 03 Set of elements for magnetic board

The demo set allows easy modelling of ion reactions and building ion bonds summary formulas. Plates to be attached to the magnetic board denote six types of ions. When the anion and cation are put together (+) and (-) signs exclude each other thus no charges are visible and the correct compound formula is shown. The set explains role of brackets and other factors in complex summary formulas and enables modelling of water, oxides, acids, bases, salts and metal oxide particles, dissociation and ion reactions. Cations are marked with blue and anions with red colour. In addition each cation and anion pattern foil is marked with a little charge sign which prevents their misuse when preparing for practice. The Compact Chem 03 includes an extensive manual with guidance for conducting many illuminating lessons.



### 53-30-1070 Atom Activity Model

An easy to understand graphic model of all the key components of the atom including the nucleus; the particles that constitute the atom including protons, neutrons and electrons and the electron layers. Facilitates clear comprehension of the atom's structure and such important concepts as atomic numbers, ionic and covalent bonding, electroneutrality, the filling of electron layers and the definition and calculation of ionic load. This durable plastic model is transparent for convenient use with an overhead projector. Includes comprehensive Teacher's Guide. 150mm D x 25mm H





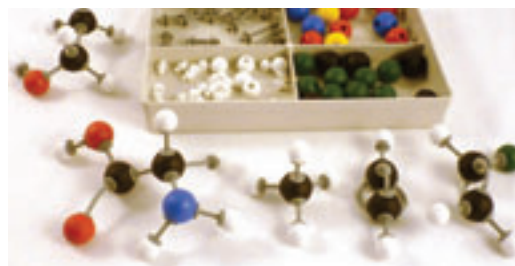
## structure BONDING

### Molecular Model Kits

This system is designed for teaching concepts related to molecular structure. Using high quality plastic moulded spheres and connectors a wide variety of atomic structures can be learned.

#### EDU1046 Basic Organic Kit

Designed to create open models. Kit contains: Spheres - 14 carbon, 8 oxygen, 9 halogen, 4 nitrogen, 2 sulphur, 25 hydrogen; 30 short links, 30 medium links and 15 long flexible links.



#### EDU1047 Classroom Organic Kit

Designed for a complete classroom, this kit is offered for demonstrating esters, alkanes, alkenes, alcohols, aldehydes and ketones. Spheres are included for carbon, oxygen, halogen and hydrogen. Kit contains: Spheres - 26 Carbon, 13 Oxygen, 13 Halogen, 4 Nitrogen, 1 Sulphur (II), 1 Sulphur (IV), 2 Metal (I), 1 Metal (II), 44 Hydrogen; 66 short links, 56 medium links and 28 long flexible links.



#### EDU1048 Inorganic/Organic Teacher Kit

Designed to make a wide range of open type models, such as inorganic acids, amines, metal oxides and simple organic structures. Kit contains: Spheres - 16 Metal, 8 halogen, 24 oxygen, 14 sulphur, 11 nitrogen, 6 carbon, 7 phosphorus and 16 hydrogen; 55 medium links and 39 long flexible links.



#### EDU1049 Biochemistry Teacher Kit

This kit is ideal for making a wide range of biochemistry molecular structures. Kit contains: Spheres - 46 carbon, (IV), 26 Carbon(II), 14 Nitrogen(IV) 14 Nitrogen (III), 12 Nitrogen (II), 22 Oxygen(II), 12 Oxygen(I) linear, 12 Oxygen(I), 2 Sulphur, 6 Phosphorus, 1 Metal, 5 Hydrogen, 110 Hydrogen; 110 short links.



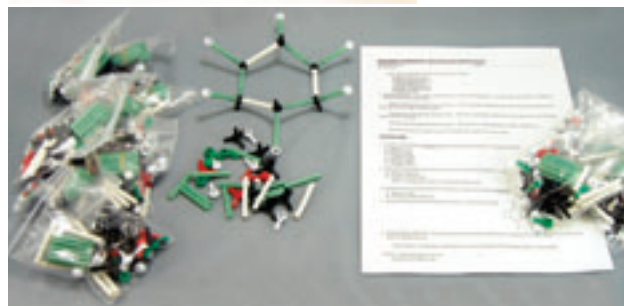
#### EDU1050 Biochemistry Student Kit

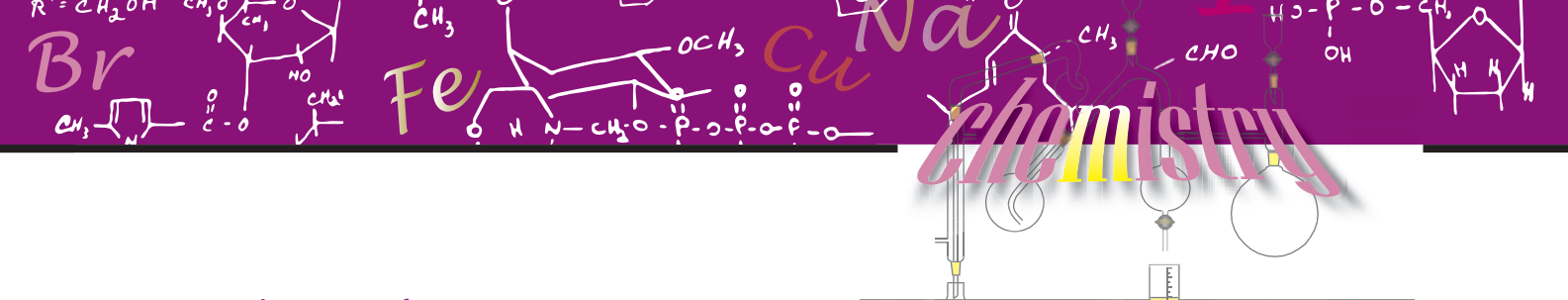
Open structure kit: Spheres - 14 Carbon (IV), 11 Carbon (III) 13 Oxygen (II), 2 Oxygen (I), 3 Nitrogen (IV), 6 Nitrogen (III), 1 Sulphur, 1 Phosphorus, 24 Hydrogen(I), 3 Hydrogen (II); 44 medium links.



#### R-MOD2 Organic Chemistry - Molecular Model Kit

Construct hydrocarbon molecules (alkenes, benzene, etc.), functional groups (alcohols, acids etc.) and isomers all with the same kit! Twelve individual packets each contain models of carbon atoms, oxygen atoms, hydrogen atoms, chlorine atoms and covalent bonds.

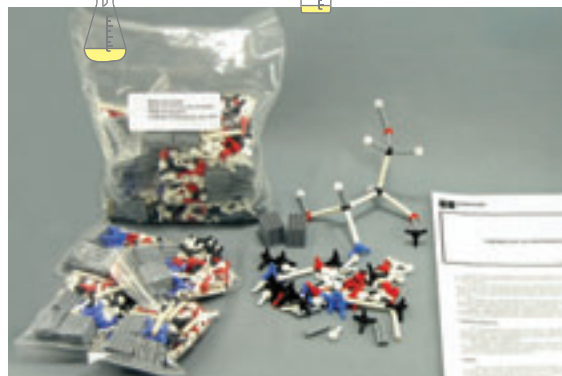




### R-MOD5 Chemistry of Nutrients

- Molecular Model Kit

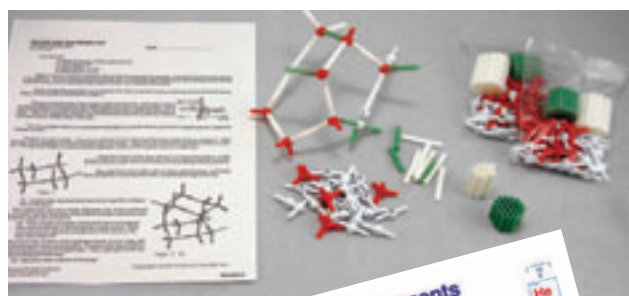
Construct models of all three nutrient groups: carbohydrates, fats and proteins. Viewing this chemistry in 3-D will help students build an understanding of the chemistry of hydrolysis and dehydration synthesis. Model kit includes: 12 individual sets each of carbon atoms, oxygen atoms, hydrogen atoms, nitrogen atoms and covalent bonds.



### R-MOD7 Water and Ice

- Molecular Model Kit

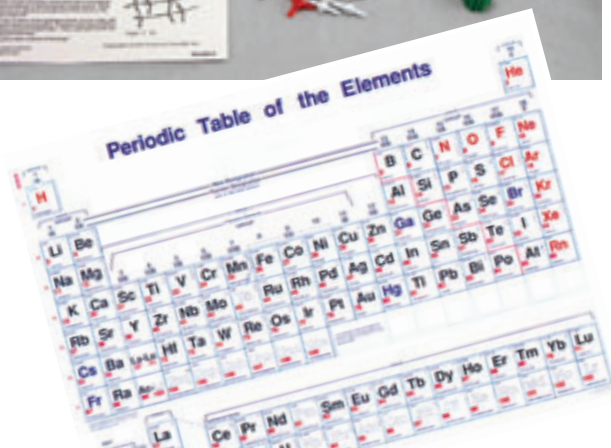
Students connect chemical properties with the familiar substances of water and ice by assembling two models. Each set contains a reproducible student master and 3 packets of model materials. This unique set is an excellent introduction to molecular models.



### 474 Periodic Table Wall Chart

1275 x 965mm

Large (1275 x 965mm) chart is printed in four colours to ensure easy visibility from every corner of the classroom. Durable material will withstand heavy classroom use. Updated in the year 2000.



### 479 Periodic Table

- A4 Notebook Chart, pad of 10

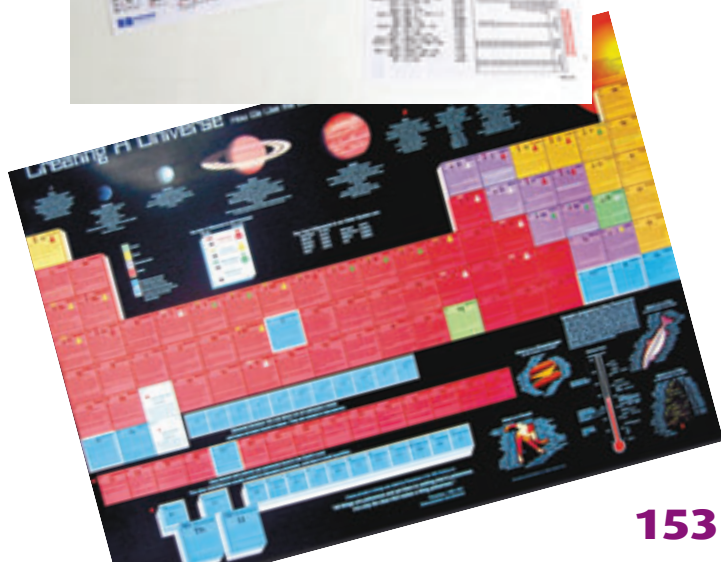
Durable material will withstand heavy classroom use. Updated in the year 2000.



### 53-35-1056 The Ultimate Periodic Table

Poster - 1370 x 990mm

A super sized look at the elements! Oversized, colour coded laminated chart provides an informative look at the periodic table. Each element is featured with standard information, such as atomic symbol and weight. However, also included is detailed information on the discovery of the element as well as its characteristics, availability, uses and role in life processes. The chart also includes fascinating information on the composition by element of the human body, the planets in our solar system, a fish, a tree - even a cheeseburger!





## 477 Understanding the Periodic Table

- Game Kit

Students build their own periodic table! Kit includes enough material for 4 students or small groups to work simultaneously. Complete instructions and guides included



## 15-35-1161 Cornerstones of Chemistry : The Mole

Poster - 890 x 584mm

Graphic depiction of the mole and its importance. This unique laminated poster lays a graphic foundation for one of the cornerstones of chemistry - the mole! Provides a clear and interesting presentation of Avogadro's Law, the uniqueness of the mole, molarity, molecular formulae and everyday uses of the mole in science and industry.



## 360-001 Acids, Bases and the pH Scale

Lab Investigation

In this lab, you will gain an understanding of the basic differences between the properties of acids and bases. Know the role of hydrogen and hydroxide ions in acids and bases. Comprehend the nature of the pH scale with regards to acid and base strength. Students will examine the effects of acids and bases on several chemical pH indicators, determine the pH of several common household materials, and use the knowledge gained to determine the composition of four unknown clear solutions. There are enough materials for 15 groups. Teacher's manual and student copy masters are included. **Materials included in the kit:**



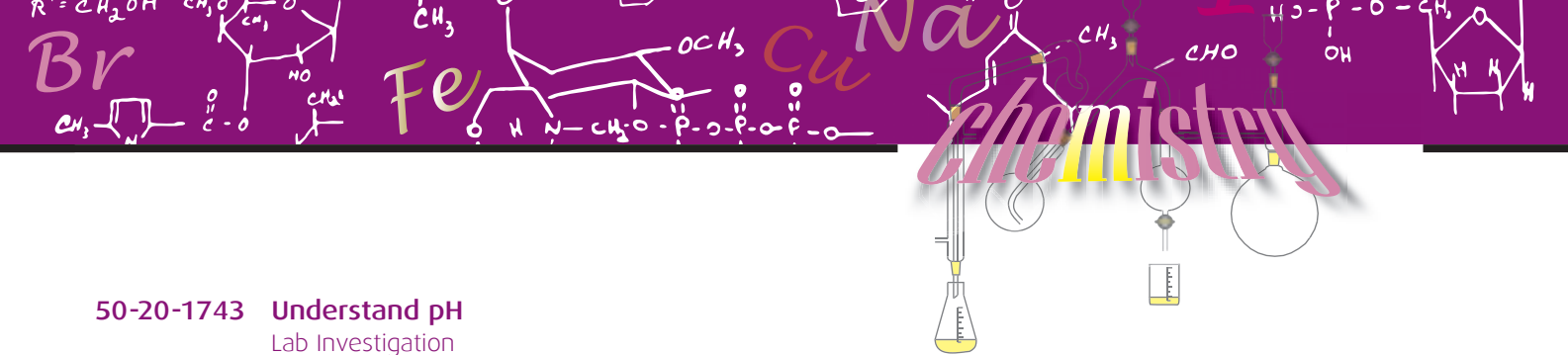
- 1 x Deionized water, 25ml
- 1 x Dilute acid (0.1M HCl), 25ml
- 1 x Dilute base (0.1M NaOH), 25ml
- 1 x 0.5% litmus, 25ml
- 1 x 0.02% methyl red, 25ml
- 1 x 0.5% bromothymol blue, 25ml
- 1 x 1.0% phenolphthalein, 25ml
- 1 x Vinegar, 25ml
- 1 x Household ammonia, 25ml
- 1 x Soap solution, 25ml
- 1 x Filtered water, 25ml
- 1 x Vitamin C solution, 25ml
- 2 x Wide-range pH test strips, pkg/50
- 1 x Unknown solution #1, 25ml (Water)
- 1 x Unknown solution #2, 25ml (Dilute base)
- 1 x Unknown solution #3, 25ml (Phenolphthalein)
- 1 x Unknown solution #4, 25ml (Dilute Acid)
- 15 x Reaction trays

## BES120 Acids & Bases

Poster - 760 x 520mm

Shows in picture form the two groups of substances that we use in our everyday lives. One of a comprehensive, detailed set of posters specifically designed to simplify issues which are sometimes difficult to grasp. For teachers they provide core material to assist in formulating well-structured lessons.





### 50-20-1743 Understand pH

#### Lab Investigation

An inquiry-based approach to understanding acidity and alkalinity. Measure the pH values of various common solutions and create a broad spectrum of colours. Discover the range of indicators required to determine acidity and alkalinity. Also discover the range of acidity and alkalinity of various foods and the effect of acids on the function of our digestive enzymes. As a result, students will understand the difficulties the body faces in maintaining fluids at a constant pH and learn the importance pH plays in the chemical reactions necessary for biological activities, including growth and development, tissue repair and cell activity.



### 53-20-1773 Closer Look at Aspirin

#### Lab Investigation

Investigate the chemistry behind aspirin's effects. Aspirin is the most widely used over-the-counter medication in the world. Do your students really know what aspirin does? What it's made of? How common brands differ? Your class will answer these and other questions as they perform a variety of tests on several brands of aspirin. In the process, they'll determine each brand's chemical effectiveness and composition as well as the cost-benefit relationships between these attributes.



### 53-20-1793 How Effective is an Antacid?

#### Lab Investigation

What's in an antacid? Millions of consumers use antacids every day. Are all antacids the same? Students will explore how antacids work and the chemistry behind them. By performing a variety of tests, the class will determine each brand's ability to neutralize acid and its reaction rate. With these results, they will evaluate the relative effectiveness and efficiency of various brands.



### 56-20-1763 Shampoo Chemistry Kit

What's in a shampoo? Learn the secrets behind shampoos - what they're made of and how they work! Become an informed consumer as you perform a variety of tests on various shampoo brands, which are included, to determine chemical and physical properties such as pH, foam retention, relative viscosity and oil dispersal.



### 56-20-1783 Closer Look at Toothpastes

How does toothpaste work? What is it made of? Are all brands the same? What criteria can be used to evaluate their effectiveness and efficiency? Students will enjoy this insightful look at this commonly used product. Using the toothpaste samples provided, they'll learn how to evaluate toothpaste and assess the quality of individual brands by determining such attributes as abrasiveness, pH, fluoride content and foaming ability.





## 360-012 Chemiluminescence

Lab Investigation

Most physical and chemical reactions that involve the release of light energy also involve the release of heat energy. One unique and interesting form of light-emitting reaction is called chemiluminescence, or 'cool light'. Similar to the familiar glow of a firefly, students will create a chemiluminescent reaction in the classroom, and then observe the fascinating blue glow of the reaction, which lasts for over ten minutes. This is chemistry that never fails to amaze students. The kit contains enough materials for 15 groups and includes:

- 15 x 25ml Luminol solution
- 1 x 25ml 6% hydrogen peroxide
- 15 Plastic cups, 30ml
- 15 Transfer pipettes, 1ml



## 56-20-1683 Introduction to Chromatography

### 56-20-1685 Refill for additional classes

Lab Investigation

Discover chromatography's applications in clinical, forensic and analytical laboratories. Class size - 40 students.

Students will:

- Understand the use of chromatography in identifying organic and inorganic compounds
- Determine how chromatography is used in clinical, forensic and analytical laboratories
- Learn how solvent and substrate variables affect chromatography
- Perform chromatography to identify the constituents of a mixture
- Calculate the  $R_f$  values of unknown dye samples



## 56-20-1693 Flame Test of Chemicals

### 56-20-1695 Refill of chemicals

Lab Investigation

Learn how elements can be identified using flames. Observe and record the colours emitted by metallic elements upon heating. Relate the results to known standards to identify unknown samples. Learn about the electronic structure of an atom. Explore the relationship between colour and energy in the electromagnetic spectrum. Class size - 40 students.

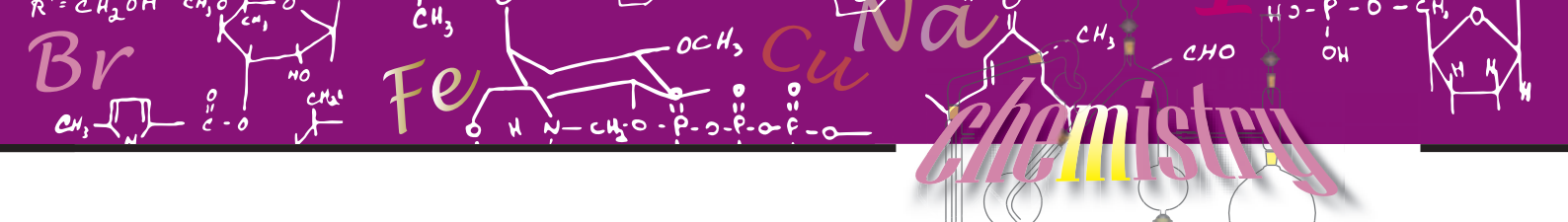


## 56-20-1713 Rust Race

Lab Investigation

An introduction to oxidation-reduction reactions. Perform oxidation-reduction reactions. Test metals for corrosion. Measure oxygen consumption during metal corrosion. Compare the effectiveness of rust inhibitors. Class size - 40 students





**PH0466 Steam Trap**

Cylindrical, borosilicate glass tube fitted with rubber bungs on both ends.

**CH0301A Liebig Condenser**

Borosilicate glass, inner tube integral with body. Narrow jacket for efficient cooling. 200mm jacket length.

**Filter Pumps**

**CH0397B Nickel plated Brass**

**CH0397c Borosilicate Glass**

**55-35-1171 Scientists & Their Discoveries: The Ideal Gas Law**

Poster - 890 x 584mm

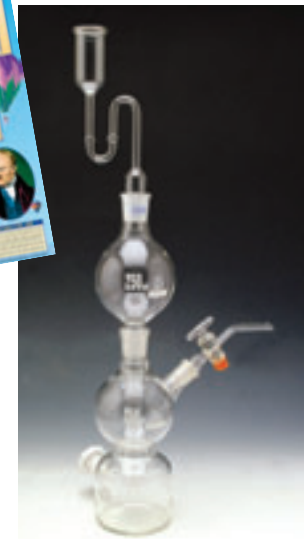
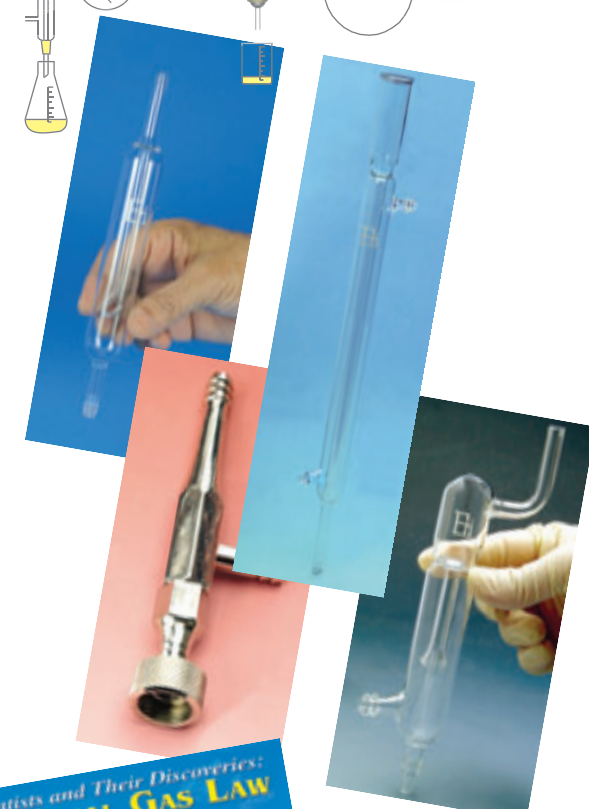
Discover the laws of the giants of chemistry. Students can observe how Boyle's Law, Avogadro's Law and Charles' Law combine to form the Ideal Gas Law. They'll also learn the importance of Dalton's Law of the partial pressures of gases. Graphic illustrations show how gases behave in different environments. Your younger students will become acquainted with these core contributors to chemistry and physics, while more advanced students will determine how each law contributes to the overall understanding of gas behaviour.

**CH0516C Kipps Gas Generator**

Borosilicate glass gas generator comprises three chambers. A rapid and effective apparatus to produce controllable amounts of common gases such as hydrogen sulphide, carbon dioxide, etc. The apparatus consists of a lower acid reservoir with stopper, a central bulb with tapered tube extending downwards into the reservoir, and a safety funnel. A rubber separator prevents the solid reactant in the middle bulb from falling into the reservoir. Capacity: 1000ml.

**CH0506 Simple Gas Preparation Kit**

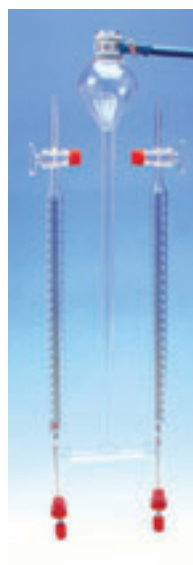
A simple gas preparation kit for producing gases which can be collected over water, e.g. oxygen, hydrogen and carbon dioxide. Comprises: plastic tank with lid, test tube stand, 5 test tubes 150 x 24mm with stoppers, thistle funnel, test tube with side arm and one-hole stopper, special gas chimney shelf, delivery tube and tubing connector. The tank and lid form a handy storage box for all the other components.





## CH0740B Hoffman's Voltmeter - with Electrodes

Used for demonstrating the decomposition of water, determination of chemical composition by electrolysis and with applications in the evaluation of the electrochemical equivalent of hydrogen. The glass unit has two connected limbs, each of approximately 50ml capacity (graduated 2 - 50ml), integral reservoir tube and funnel-shaped bulb, with a stopcock at the top of each limb. Supplied with electrodes, 2 carbon and 2 platinum. Requires 12V power supply. The apparatus should be set up vertically using a clamp and stand to hold it safely. Connect the terminals to a DC power source. Matches will be required to test for gases. Chemicals required: Water, molar sodium, or potassium sulphate or sulphuric acid. Supplied in neat, well-protected packing case.



## CH0740F Hoffman Voltmeter Stand incl. 600mm Rod

Metal stand with support clamp for use with Hoffman's Voltmeter. Supplied with 600mm rod.

## CH0740C Carbon Electrodes, pair

High quality electrodes in ready-to-use tubed format. Excellent connection terminals make for safe and efficient use. Comprises a pair of carbon electrodes in rubber stoppers, with crocodile clip socket terminals, for electrolysis of hydrochloric acid, sodium hydroxide and salt solutions.



## CH0740D Platinum Electrodes, pair

A pair of electrodes of rectangular foil, fused into a protective glass tube with an internal connection lead running through the tube and rubber stopper to screw terminals. The shape of the foil exposes as much metal as possible to the reactant.



## EL06886 Electrode Rods 100 x 5mm, pk of 50

Carbon rod 100 x 5mm for electrolysis.

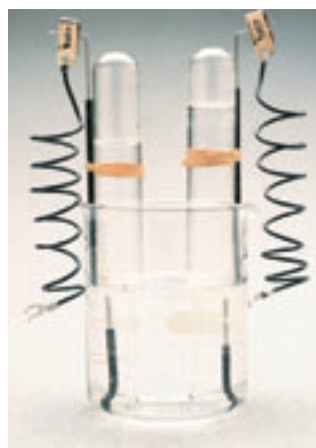
## PH0941 Voltmeter

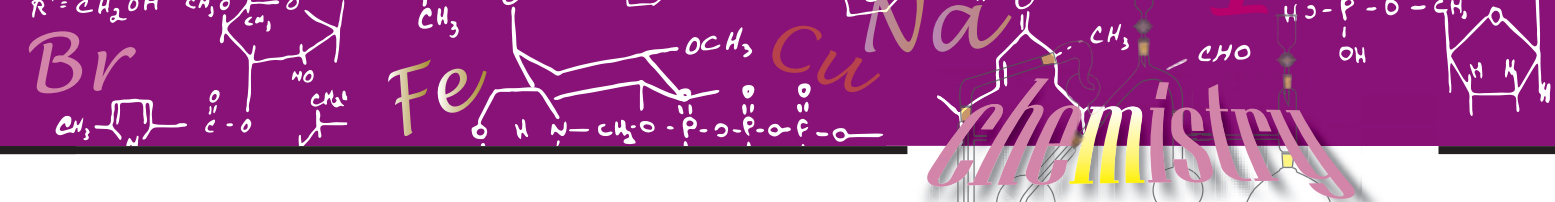
Platinum electrodes with two graduated test tubes of 10ml capacity. Mounted on base with terminals.



## 3556 Electrolysis Kit

This kit provides a means for breaking down water into hydrogen and oxygen to reaffirm the constitution of water. The two stainless steel electrodes are heavily insulated and the two electrical connection leads are equipped with extra-large clips. Also included are two rubber gaskets to provide positive seals for the filled test tubes while they are being inverted and placed into a beaker. Glassware is not included.





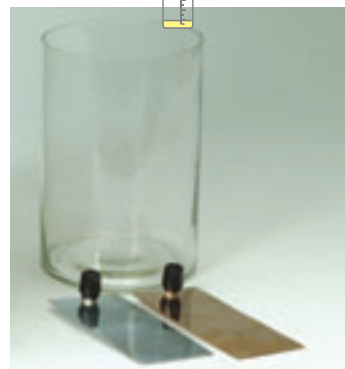
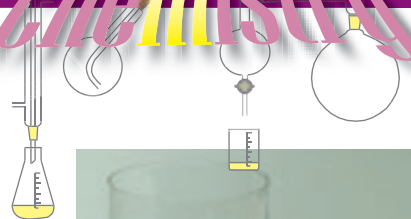
### PH0924 Simple Cell Kit

A 150mm high x 100mm diameter glass jar for making simple cells, complete with zinc and copper plates.

#### Plates for Simple Cell

- PH0926A Zinc, 1.5mm
- PH0926B Carbon, 6mm
- PH0926C Copper, 1.5mm
- PH0926D Lead, 1.5mm

Each plate is 125 x 50mm and fitted with 4mm socket terminals.



### PH0930 Daniel Cell, Copper Vessel 125 x 75mm dia.

Heavy-gauge copper outer vessel with an internal perforated shelf for copper sulphate crystals, a porous pot and amalgamated zinc rod fitted with supporting cap. The zinc rod and copper vessel are each provided with a 4mm socket terminal.



### 320-001 Daniel Cell, Porous Pot 150 x 50mm

Porous Pot for Daniel Cell (code: PH0930).

### Kinetic Theory Model

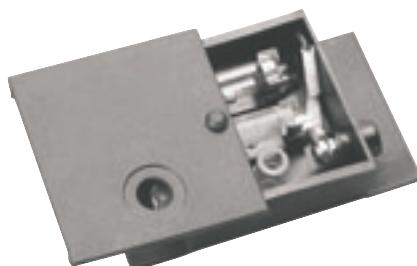
- EDU038 Model
- EDU038B Replacement Perspex Tube
- EDU038C Replacement Polystyrene Piston

This model provides in analogue form a visual representation of molecular movement in gases. A piston, in a wide perspex tube, is vibrated by a low-voltage electric motor housed in a box supporting the tube. Tiny metal spheres, simulating gas molecules, are propelled upwards in a tube by the piston's vibrations. The movements of the spheres are seen to be random both in direction and extent. The motor is provided with a speed control. Higher speeds give more extensive movements of the spheres. The electric motor requires a 6V DC power supply capable of providing a current of 2.5A. For demonstrations to larger groups illumination from the side and a black background are recommended, to highlight the spheres.



### WBSM Smoke Cell

For the observation of 'Brownian Motion' in smoke particles. Consisting of a box with plastic lid as well as flanges that allow easy attachment to standard microscopes. The box contains a smoke cell, cylindrical condensing lens and a 12V 3W festoon bulb. The apparatus has been preset to focus the light at the correct height. The set is supplied complete with detailed instructions and a squeeze-bottle type smoke generator. Dimensions: 90 x 46 x 20mm.





## Glassware

### Interchangeable Glassware

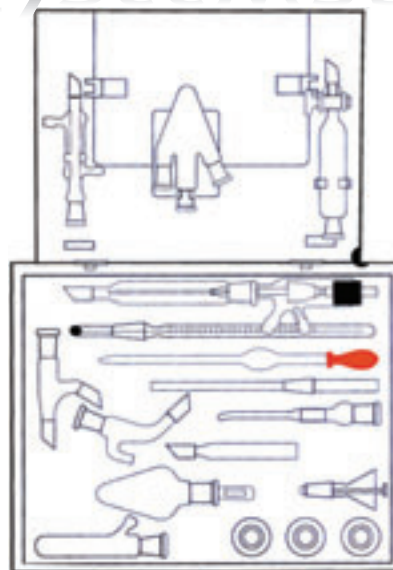
#### CH0874 Organic Chemistry Kit 10BU

This set contains 22 items all with size 10/19 ground joints for maximum versatility. Over 20 standard assemblies can be constructed from simple reflux to fractional distillation.

Designed for quantities of starting material up to 15g.

Housed in foam lined box. Consists of:

- |                               |                           |
|-------------------------------|---------------------------|
| 1 Liebig Condenser            | 1 Dropping funnel 20ml    |
| 1 Flask, pear shaped 25ml     | 1 Flask, three neck, 25ml |
| 3 Flask, round bottom 5ml     | 1 Air leak/ stream inlet  |
| 1 Thermometer - 10°C to 250°C | 1 Dropping pipette        |
| 1 Rubber teat                 | 1 Receiver adaptor        |
| 2 Stoppers                    | 1 Still head              |
| 1 Air condenser               | 1 Filter funnel           |
| 1 Receiver tube               | 1 Willstatter nail        |
| 1 Gas inlet tube              | 1 Drying tube             |
| 1 Stirrer                     |                           |



#### CH0876 Organic Chemistry Kit 27BU

This kit contains 9 items all with size 14/23 joints for maximum versatility. The foam-lined box protects the set in transit and acts as a storage unit. Consists of:

- |   |                         |
|---|-------------------------|
| 1 Flask, pear shaped 50ml                   | 1 Still Head            |
| 1 Liebig condenser                          | 1 Screwcap adaptor      |
| 1 Receiver adaptor                          | 1 Air leak/stream inlet |
| 1 Stopper                                   | 1 Thermometer           |
| 1 Dropping funnel 50ml with GP rotaflow tap |                         |



#### CH0878 Organic Chemistry Kit 34BU

This set contains 16 items and is housed in a diecast foam-lined box for safe storage and transit. Designed for quantities of starting material up to 150g. Consists of:

Item	Socket	Size (mm)	Cone Size (mm)
1 Still head		14/23	19/26
1 Receiver adaptor		19/26	24/29
1 Air leak/stream inlet		-	19/26
1 Liebig condenser		19/26	19/26
1 Dropping funnel 100ml		19/26	19/26
1 Reduction adaptor		19/26	24/29
1 Multiple adaptor		19/26	24/29
1 Flask, round bottom 50ml		24/29	-
1 Flask, Erlenmeyer 250ml		24/29	-
1 Flask, round bottom 250ml		24/29	-
2 Stoppers		-	19/26
1 Thermometer packet		-	14/23
1 Receiver adaptor		19/26	-
1 Flask, round bottom 100ml		24/29	-
1 Stopper		-	24/29



#### CH0880 Organic Chemistry Kit 46BU

This set contains 11 items with 19/26 ground joints. Housed in a foam lined box. Consists of:

- |   |                              |
|---|------------------------------|
| 1 Dropping funnel 100ml                     | 1 Air leak/stream inlet tube |
| 1 Liebig condenser                          | 1 Receiver adaptor           |
| 1 Stopper                                   | 1 Flask, round bottom 250ml  |
| 1 Cone/screwcap adaptor                     | 1 Still head                 |
| 1 Flask, pear shaped 100ml                  | 1 Flask, Buchner 100ml       |
| 1 Filter funnel, 24mm dia. perforated plate |                              |





### Interchangeable Glassware Joint Clips

- 717-001A 10/19, Red, pk of 10
- 717-001B 14/23, Yellow, pk of 10
- 717-001C 19/26, Blue, pk of 10
- 717-001D 24/29, Green, pk of 10

Joint safety clips for interchangeable glassware.  
Made from chemical resistant plastic.



### 16-20-2511 Clock Reaction Demonstration

Safely display the roles of temperature and concentration in chemical reactions. You'll mix one colourless solution with another. In a few seconds, the solution will suddenly turn dark blue. Increase the temperature of the solution, and the reaction occurs more rapidly. Dilute one of the solutions, and the reaction occurs more slowly. This modified version of the typical clock reaction uses safer chemicals to demonstrate the impact of changing temperature and concentration upon the outcome of chemical processes.



### 56-20-2501 Traffic Light Reaction

Demonstration Lab

Vivid demonstration of oxidation-reduction reactions. Once again, you'll amaze your class with the alluring 'magic' of chemistry. A flask containing pale yellow liquid is gently swirled until the solution turns red. Then the flask is shaken and the solution turns green! Explain the roles of oxidation and reduction behind this astonishing change.



### 53-20-2491 Chemiluminescence

Demonstration Lab

Learn the chemistry behind a firefly's glow. Explain the chemistry of nature to your class with this demonstration of chemical luminescence. They'll watch in fascination as you mix two clear solutions together. Turn out the lights and observe a luminescent blue glow which lasts for several seconds!



### 360-013 Polyurethane Foam

Chemistry Demonstration

Make your own foam and explain how when two viscous liquids are mixed together, they initiate a reaction producing a light weight polyurethane foam which expands 30 times the original volume of the two liquids. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 535g Polyurethane Foam System, Part A  
(Mixture - Polyfunction of Isocyanates)
- 1 x 490g Polyurethane Foam System, Part B  
(Mixture - Dichlorofluoroethane)





## EZ-Prep™ Chemistry

With Innovating Science's new EZ-Prep™ capsules, your lab preparation just got a whole lot easier. Just add the pre-measured capsules to water, stir, and relax!

Advantages include:

Pre-measured capsules guarantee the right solution every time

Eliminate the possibility of costly and time-consuming mistakes due to measurement errors

Reduced chemical inventory, small-scale packaging lets you make just what you need

No extra hazardous shipping charges

Save valuable storage space in the laboratory

Safer to handle, all chemical material is contained within the capsule

### EZ-Prep™ Capsules

801-021 Alizarin Yellow R, pk of 5  
Makes 5 x 1L 0.01% Solution

801-022 Ascorbic Acid  
Makes 1L 5% Solution

801-023 Ascorbic Acid, pk of 5  
Makes 5 x 50ml 5% Solution

802-008 Barium Chloride, pk of 3  
Makes 3 x 50ml 5% Solution

802-009 Barium Nitrate  
Makes 1L 0.1M Solution

802-010 Barium Nitrate, pk of 5  
Makes 5 x 50ml 0.1M Solution

802-011 Basic Fuschin  
Makes 3 x 50ml 5% Solution

802-012 Benedicts Reagent, pk of 2  
Makes 2 x 50ml Solution

802-013 Bromocresol Green  
Makes 100ml 0.4% Solution

802-014 Bromocresol Purple  
Makes 100ml 0.4% Solution

802-015 Bromocresol Yellow  
Makes 100ml 0.1% Solution

802-016 Bromothymol Blue, pk of 5  
Makes 5 x 1L 0.04% Solution

802-017 Bromothymol Blue 0.1%  
Makes 100ml 0.1% Solution

802-018 Bromothymol Blue 0.04%  
Makes 100ml 0.04% Solution

802-019 Bromothymol Blue 0.5%  
Makes 100ml 0.5% Solution

803-025 Calcium Chloride  
Makes 1L 0.1M Solution

803-026 Calcium Chloride, pk of 5  
Makes 5 x 50ml 0.1M Solution



The traditional way



The EZ-Prep™ way!

# EZ-Prep™ Chemistry

“cutting edge science for the classroom”

803-027 Congo Red, pk of 5  
Makes 5 x 1L 0.1% Solution

803-028 Congo Red  
Makes 100ml 0.1% Solution

803-029 Cresol Red  
Makes 100ml 0.2% Solution

803-030 Crystal Violet 0.1%  
Makes 100ml 0.1% Solution

802-031 Crystal Violet 1%  
Makes 100ml 1% Solution

802-032 Cupric Sulphate, pk of 5  
Makes 5 x 50ml 1.0M Solution

805-004 Eosin Y  
Makes 100ml 1% Solution

809-005 Iron Sulphate, pk of 5  
Makes 5 x 50ml 1.0M Solution

810-009 Lead Nitrate, pk of 5  
Makes 5 x 50ml 0.5M Solution

811-014 Magnesium Nitrate  
Makes 1L 0.1m Solution

811-015 Magnesium Nitrate, pk of 5  
Makes 5 x 50ml 0.1M Solution





### 360-014 Nylon 6-10 Rope Trick

Chemistry Demonstration

Show an example of polymer chemistry. Make your own nylon which is a synthetic compound of high molecular weight that consists of up to millions of repeated chemical units that are linked together. This polymer is referred to as Nylon 6-10. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 25ml Solution A  
(1,6-Hexanediamine, Sodium Hydroxide, Water) UN1760
- 1 x 25ml Solution B  
(Sebacyl Chloride, Hexane) UN1208



### 360-015 Oscillating Reactions: Yellow to Blue Then Back

Chemistry Demonstration

Prepare a flask containing a yellow solution, as you mix it on a magnetic stirrer the solution will turn from yellow to blue and back to yellow. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 3 x 25ml Hydrogen Peroxide, 12% UN2984
- 3 x 25ml Potassium Iodate, 0.2M Solution UN2796
- 1 x 75ml Starch Solution, 0.03%



### 360-016 Oscillating Reactions: The Traffic Light

Chemistry Demonstration

A flask containing a yellow solution is gently swirled and the solution turns red. When the flask is shaken the solution turns green. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 10g Sodium Hydroxide, Flake UN1823
- 1 x 100ml Indigo Carmine Solution
- 5 x 3g Dextrose



### 360-017 Thin Layer Chromatography

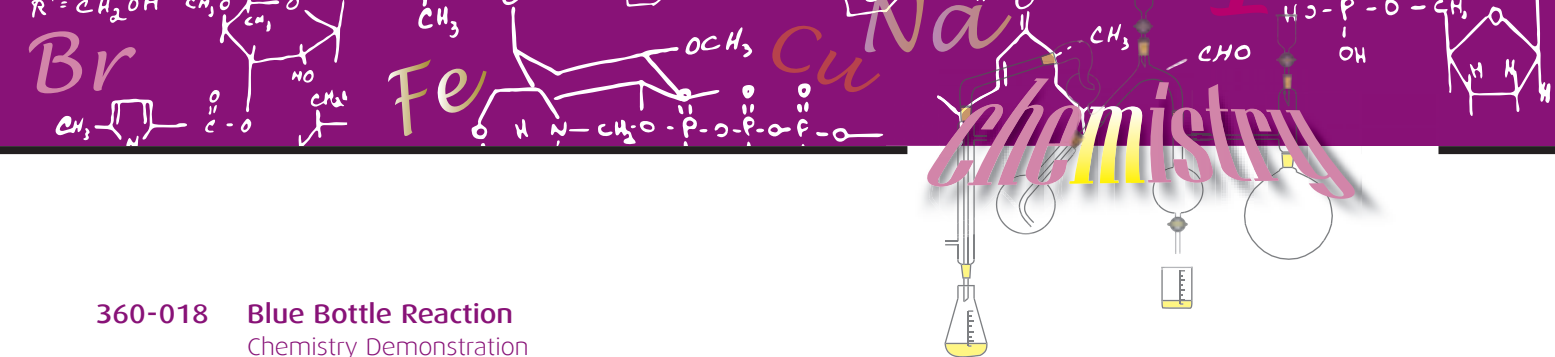
Chemistry Demonstration

TLC is a technique of separation chemistry, which provides a simple, rapid method of separating small amounts of compounds. A mixture of three dyes is prepared and then separated on a thin layer of the absorbent silica gel with the appropriate solvent. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 250ml Chromatography Solvent  
(Acetone / Ethyl Alcohol 9:1) UN1993
- Pack of 5 Thin Layer Chromatography Sheets (2.5 x 4")
- 1 x 3ml Sudan IV, 0.5% Solution UN1219
- 1 x 3ml Coumarin 314, 0.1% Alcohol Solution UN1170
- 1 x 3ml Methylene Blue Chloride, 1% Solution UN1170





### 360-018 Blue Bottle Reaction

#### Chemistry Demonstration

Discover the principle of oxidation-reduction. Compounds that change colour as a result of a change in their pH or oxidation state are called indicators. Illustrate this principle by mixing potassium hydroxide and dextrose and introducing oxygen by shaking the cylinder. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 250ml Potassium Hydroxide, 1.0M Solution UN1814
- 1 x 6ml Methylene Blue Chloride, 1% Solution
- 5 bags x 5g Dextrose (Glucose) Powder



### 360-019 Redox Flag

#### Chemistry Demonstration

You will be able to demonstrate the principles of a redox reaction. Paint the potassium thiocyanate solution and potassium ferrocyanide solution onto a filter paper. Once they are dry you can spray the filter paper with iron (II) chloride and watch blue and red colors appear. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 3 x 25ml Iron (III) Chloride 0.1M Solution UN2582
- 1 x 30ml Potassium Thiocyanate 0.1M Solution
- 1 x 30ml Potassium Ferrocyanide 0.1M Solution



### 360-020 Autocatalysis

#### Chemistry Demonstration

Catalysis is a basic principle of chemistry and biochemistry. Some reactions are autocatalytic; the product of the reaction actually catalyzes further reactions. The reaction proceeds only in an acidic environment. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 5ml Bromophenol Blue, 0.1% Solution
- 1 x 30ml Sulfuric Acid, 3.0M Solution UN2796
- 1 x 250ml Potassium Chlorate/Sodium Sulfite Solution



### 360-021 Colourful Vanadium

#### Chemistry Demonstration

A Multi-step Reduction Reaction. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 2 x 250ml Vanadium Solution
- 1 x 25g Zinc Amalgam





### 360-022 Synthetic Rubber

Chemistry Demonstration

Show how the first synthetic rubber was made in United States by a simple reaction of sodium polysulfide with ethylene chloride. This produces a simple condensation polymer consisting of repeating units of ethane and polysulfide. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 4 x 25ml Sodium Polysulfide Solution UN1760
- 1 x 25ml Ethylene Dichloride UN1184



### 360-023 Oxidation of Glycerin

Chemistry Demonstration

A small amount of potassium permanganate is placed in a petri dish. A few drops of glycerin are added and after a few seconds, a puff of smoke and violet flames are produced. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 30g Potassium Permanganate UN1490
- 1 x 25ml Glycerin



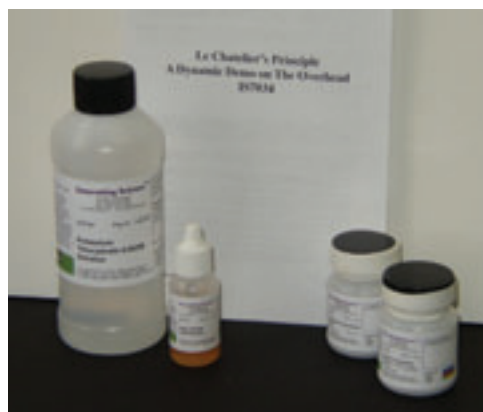
### 360-024 Le Chatelier's Principle

Chemistry Demonstration

Le Chatelier's Principle: A Dynamic Demo on the Overhead. Use an overhead projector to study the reaction of Le Chatelier's principle. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 140ml Potassium Thiocyanate, 0.002M Solution
- 1 x 10ml Iron (III) Nitrate, 0.2M Solution
- 1 x 5g Potassium Thiocyanate
- 1 x 5g Sodium Phosphate, Monobasic, Anhydrous



### 360-025 Synthesis of Rayon

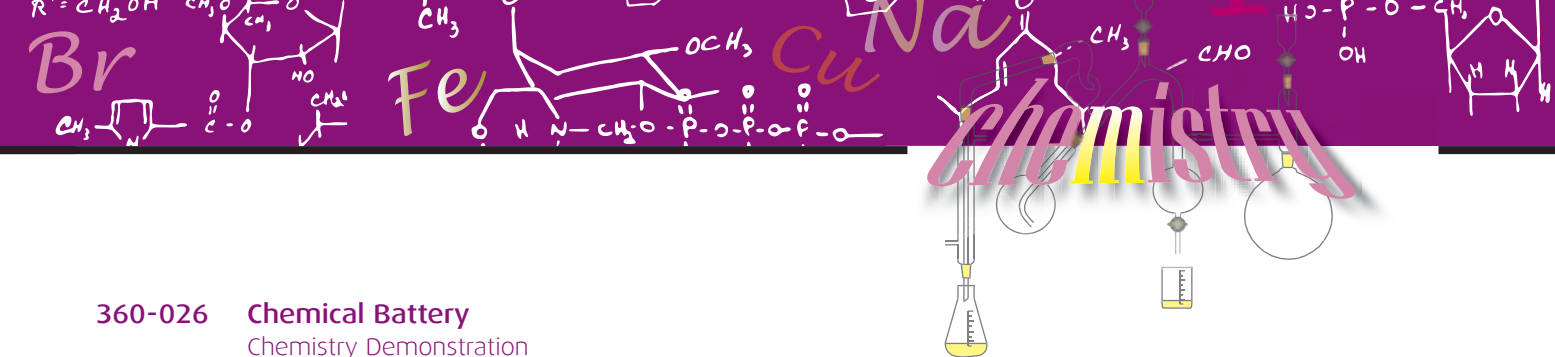
Chemistry Demonstration

Demonstrate polymer chemistry. Newsprint is dissolved in a solution of ammonium hydroxide and cupric sulfate. The solution is then added into a sulfuric acid solution and dark strands are formed. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 125ml Copper (II) Sulfate, 25% Solution
- 1 x 175ml Ammonium Hydroxide, 28-30% Solution UN2672
- 1 x 200ml Sulfuric Acid, 0.5M/1.0N Solution UN2796





### 360-026 Chemical Battery

#### Chemistry Demonstration

Construct a simple wet cell battery. When complete it will generate 1.5 volts for 20-30 minutes. Several cells can be connected in series to increase the voltage or in parallel to increase the current. Kit contains sufficient reagents for five demonstrations.

Contents:

- 1 x 100ml Copper (II) Sulfate, 0.5M Solution
- 1 x 200ml Sodium Sulfate, 0.5M Solution
- 2 x Magnesium Metal Strips UN1869, 6" long
- 2 x Copper Metal Strips, 0.75 x 5"
- 2 x 15.9mm Dialysis Tubing
- 1 x 25ml Hydrochloric Acid, 3% Solution UN1789
- 1 x Light Bulb & Wire Assembly
- 1 x Empty Jar with Lid



### 360-027 The Silicate Garden

#### Chemistry Demonstration

A few coloured crystals are added to a clear solution in a glass jar or beaker. Within a few minutes large, plant like structures extend from the crystals. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 2 x 30ml Sodium Silicate Solution, 40%
- 1 x 20g Iron (III) Chloride, Hexahydrate UN1759
- 1 x 20g Copper (II) Chloride, Dihydrate UN2802
- 1 x 20g Cobalt Nitrate, Hexahydrate UN1477
- 1 x 20g Zinc Sulfate, Heptahydrate



### 360-028 Formation of Eutectic Alloys

#### Chemistry Demonstration

Form a metal alloy as bismuth and tin are heated to the eutectic point of the two metals. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 100ml Glycerin (Glycerol)
- 1 x 50g Bismuth Metal Lumps
- 1 x 15g Tin Metal Mossy



### 360-029 Oxidation-Reduction of Complex Ions

#### Chemistry Demonstration

Hydrogen peroxide is added to a solution of sodium potassium tartrate and heated. Copper sulfate solution is added and the solution turns light blue. With continued heating the solution foams and turns orange-gold. Kit contains sufficient reagents for five demonstrations. Instructions included.

Contents:

- 1 x 250ml Hydrogen Peroxide, 3% Solution
- 1 x 250ml Potassium Sodium Tartrate, 0.3M Solution
- 1 x 10ml Copper (II) Sulfate, 1.0M Solution



New York City's leading science  
**Forensic Anthropology - Talking Bones**  
LAB INVESTIGATOR 20-4553

# frensic

# Forensics

Blood, Fingerprint, Drug  
& Crime Scene investigations



**271-005 C.S.I. Forensics poster**  
- 965 x 685mm

This colourful Crime Scene Investigation laminated poster contains 12 pictures and one large illustration on this popular and interesting science. The subjects of the pictures include:

- The forensic C.S.I. investigation kit
- Keeping the crime scene uncontaminated
- Photographing a murder scene; arson evidence
- Methods of investigation
- 7 things to remember while doing a crime scene investigation

..... and many more!



**14-20-3863 Crime Scene Investigations**  
Lab Investigation

A fascinating exploration of the science of criminal investigations. Examine the physical evidence of a crime scene and gather evidence. Perform various tests to analyse the evidence gathered. Identify the crime's victim through dental records and fingerprints. Perform tests to determine the cause of death. Analyse evidence to determine a suspect. Contains materials for up to 40 students.



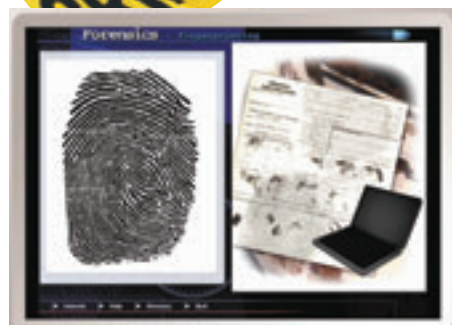
**60-5164 Crime Scene Tape (roll)**

Bright yellow Crime Scene Tape for use in forensics crime scene lessons.



**16-13-1651 Forensic Science: Dealing with Evidence**  
Individual Study CD-ROM

Explore the rapid advances in one of today's fastest growing and most alluring branches of science: forensics. Students will be introduced to the fundamentals of all the major aspects of forensic science, including fingerprinting, DNA analysis, ballistics, materials analysis, forgery and serology. Current techniques are presented via an engaging, on-screen format which is accompanied by complementary activities and relevant links.



**13-20-2163 Detective's Casebook**  
Lab Investigation

Develop problem-solving skills while solving a mystery! Students become junior detectives, honing their crime-solving skills by investigating the mysteries surrounding a fictitious crime scenario. To solve the mystery, they'll perform hands-on toxicology testing; chromatography; fingerprinting; document analysis; and simulated blood typing. They'll also learn how each of these processes can be used to support their final conclusion as to whether a crime was committed and, of course, 'whodunit!' Contains materials for up to 40 students.





## IS9011 Forensic Chemistry of Whodunit

Class Kit

Use your forensic techniques to solve the crime of the missing frogs. Four possible suspects have been identified. Use fingerprints, hair examination, and chemical analysis of ink by Thin-Layer Chromatography to help determine the most likely culprit. This activity includes a Teacher's Manual, Student Guide and Analysis copy-masters. There is material for 6 groups.

### Materials included in the kit:

- 1 bottle Fingerprinting Powder; 6 Fingerprinting Brushes;
- 6 Acetate Sheets; 1 Ink Pad; 6 Hand Magnifiers;
- 6 pairs Forceps; 4 different brands Felt Tip Markers;
- 1 bottle Chromatography Solvent; 1 box Coverslips;
- 6 Silica Gel Chromatography Sheets; 1 pack Capillary Tubes;
- 5 self-sealing Evidence Envelopes; 1 box Microscope Slides;

### Materials needed but not supplied:

- Chromatography Chambers (500 ml beakers); Test Tubes
- Aluminium Foil; Adhesive Tape; Illuminated microscope.



## 360-011 Forensic Chemistry of Unknown Substances

Class Kit

When collecting evidence at a crime scene, investigators may recover substances they are unable to identify in the field. Along with evidence such as fingerprints, hair, fibres, etc., there may be traces of unknown chemicals or powders left behind by the perpetrator or perpetrators. Evidence of this nature is sent to the crime lab for identification. In this experiment, you will use your observation skills, senses, and chemical tests on a series of known substances as well as two unknown substances. You will then attempt to identify the mystery substances based on your observations and recorded data. This activity includes a Teacher's Manual and Student Guide and Analysis copy-masters. There is enough material for 15 groups. **Kit includes:**

- Baking Powder; Baking Soda; Corn Starch; Talcum Powder;
- Salt; Gelatine (porcine and bovine origin); Mystery Substance #1;
- Mystery Substance #2; Biuret Reagent; Dilute Lugol's Iodine;
- Acetic Acid; 30 Reaction Plates



## IS9010 Forensic Chemistry of Drug Detection

Class Kit

Everyone who ate the school cafeteria's chilli became ill. Could someone have tainted it? You are a forensic toxicologist. It is your task to determine if any of the cafeteria ingredients could have been substituted with aspirin, which appears to have been stolen from the nurse's office. You will perform a series of chemical tests, including tests on control aspirin in the lab. This activity includes a Teacher's manual, Student's guide and Analysis copy-masters. There is enough material for 15 groups.

### Materials included in the kit:

- 1 bottle Control Acetylsalicylic Acid; 3 bottles chilli;
- 1 bottle Ferric Nitrate 0.1M Solution; 1 bottle Lugol's Iodine
- 15 Microreaction Plates



## IS9008 Forensic Chemistry of Blood Types

### Class Kit

Blood typing is a method of classifying blood based on the presence or absence of specific proteins, called erythrocytes, on the surface of red blood cells. Blood type, an inherited characteristic, is valuable to know in that it affects medical procedures, such as surgery and transfusions or paternity testing, as well as serving as evidence in criminal investigations. Determining blood type can help provide supporting evidence or eliminate a possible suspect's involvement in a crime. This activity includes a Teacher's Manual and Student Guide and Analysis copy-masters. There is enough material for 15 groups. Note: This activity uses Innovating Science Simulated Blood and is safe for classroom use.

#### Kit includes:

- Blood Typing Trays
- 4 Simulated Blood Samples:  
Victim; Suspect #1; Suspect #2; Crime Scene
- 1 set ABO/Rh Blood Typing Anti-sera
- 1 pack Mixing Sticks



## 271-003 Forensic Chemistry

### Hair Analysis

Discover how forensic scientists use hair in solving crimes. Uncover the differences between animal hair and the various types of human hair. Determine the origin of a hair sample from a crime scene in relation to hair samples from four known suspects. This activity includes a Teacher's Manual, Student Guide and Analysis copy-masters. There is enough material for 15 groups.

#### Materials included in the kit:

- 1 box Microscope Slides
- 1 box Coverslips
- 15 pairs Forceps
- Deer, Cat and 4 Human Hair Samples



## 13-20-1263 Fingerprinting: A Forensic Puzzle

### Lab Investigation

### 14-99-0005 Additional cards, pk of 20

Apply the scientific method using actual crime solving techniques. Using fingerprints lifted from a fictional crime scene, your students become forensic scientists and learn the proper techniques to make, observe, analyse and classify fingerprints according to the FBI's actual classification system. Includes everything needed to solve the mystery, including revolutionary 'Ink-less' fingerprint cards which can easily - and cleanly! - create fingerprints for analysis without the use of inkpads. Contains materials for up to 40 students.

#### Your students will:

- Understand what makes a fingerprint
- Take a 'direct' fingerprint
- Identify and classify fingerprint types using patterns of ridges on skin
- 'Lift' and identify latent fingerprints.





## 14-35-1101 Fingerprint Identification Poster

- 548 x 870mm

A detailed overview of the standard patterns of fingerprints as well as how ridgeline details are used to determine an identical match. Informative text describes the science of fingerprinting as well as how fingerprints are made, lifted and matched. 548 x 870mm.



## Forensic Chemistry

### 271-001 Dusting for Fingerprints

Class Kit

Utilise different types of fingerprints and distinguishing characteristics, as well as dusting for fingerprints, the most commonly used method of fingerprint detection. Includes a Teacher's Manual, Student Guide and Analysis copy-masters. There is enough material for 15 groups.

#### Materials included in the kit:

- 1 bag Fingerprinting Powder
- 15 Fingerprinting Brushes
- 15 Hand Magnifiers
- 1 Ink Pad
- 1 pack Acetate Sheet



### 271-002 Fuming for Fingerprints

Class Kit

Utilize forensics techniques of fuming for your own fingerprints. Activities include fingerprint analysis, iodine and cyanoacrylate fuming. Learn how to identify different types of fingerprints and distinguishing characteristics and two different methods of chemical fuming to capture fingerprints. Includes a Teacher's Manual, Student Guide and Analysis copy-masters. There is enough material for 15 groups.

#### Materials included in the kit:

- 1 tube Super Bonding Glue
- 1 bottle Iodine Crystals
- 1 bottle Fingerprint Fixative
- 30 Fuming Trays
- 15 sheets Black Plastic



### 271-004 Gunshot Residue

Presumptive Test Kit

This is a two-part test to determine whether a surface has been exposed to a discharged firearm. A rapid colour change takes place to verify the presence of nitrates and lead. Each kit contains instructions and enough materials for 30 tests.

#### Materials included in the kit:

- 1 Diphenylamine Sulfuric Acid Solution, 5 ml
- 1 Sodium Rhodizonate, 0.025g
- 1 Lead Nitrate, 5ml
- 1 Aqueous Solution, 0.05M
- 20 Alcohol Swabs



## 16-20-4553 Forensic Anthropology Kit

### Lab Investigation

Your students will work as forensic anthropologists within a lab to help solve a 'cold' case! The class explore the exciting world of anthropology. They will perform hands-on analysis of a bone recovered from the crime scene to determine the age, gender, and race of the victim. Further toxicology, microscopy, and soil analysis will lead to the elimination of suspects and the identity of the victim. Materials for up to 40 students.



## 16-20-4563 Forensic Science

### Lab Investigation

A multitude of comprehensive forensic investigations! As the lead investigators, the class will be exposed to many aspects of a forensic laboratory. They will be called upon to solve a murder mystery using a combination of forensic science tools such as fibre and soil composition analysis, density analysis, insect identification, and chemical analysis. Students will collect the evidence and analyse the results to solve a murder mystery. Contains materials for up to 40 students.



## IS9002 Blood Test Kit

Test for the presence of blood on materials using phenolphthalein. The test will not distinguish between animal and human blood. Further serology tests are needed. Includes instructions, blood standard and reagents for 30 tests.

### Materials included in the kit:

- 2 x 25ml Phenolphthalein, 2% Solution
- 2 x 25ml Ethyl Alcohol UN1170
- 1 x 50ml Hydrogen Peroxide, 3% Solution
- 5 Blood Standard Strips
- 50 Cotton Swabs



## IS9009 Chemiluminescence in Blood

### Demonstration Kit

Crime scene investigators examine the scene of a possible violent crime for evidence, such as fingerprints, hair, fibres, etc. After collecting the evidence, they notice there is no visible blood. Someone sprays the area with a liquid then turns out the lights. A strange, faint glow appears in certain areas of the scene. Learn how Luminol is used in scenes like this everyday. The special Luminol formulation does not require a separate hydrogen peroxide catalyst. Simply re-hydrate and use with the simulated blood haemoglobin to show your class. This activity includes an Instruction Manual with suggested activities. There is enough material for several demonstrations.

### Materials included in the kit:

- 2 bottles Luminol Powder
- 1 bottle Simulated Blood Haemoglobin





## 13-20-2143 The Mystery of the Bloody Stain

Lab Investigation Using Neo/BLOOD®

### 13-20-2145 Refill for Additional Classes

Your students will become forensic scientists as they try to solve a murder using a 'bloody stain' left at the scene of the crime using simulated Neo/BLOOD®. First, they'll identify whether or not the stain is actual blood by searching for simulated blood cells under the microscope. Then they'll solve the crime by performing ABO and Rh typing of the stain as well as of samples from the victim and several suspects. The match will help them 'nab' the perpetrator! As a result, the students will learn about blood groups, blood typing and how blood stains can be used in solving crimes.

#### About Neo/BLOOD® Simulated Blood Typing Lab Investigations:

Conduct realistic blood typing activities without exposure to the hazards of real blood! Neo/BLOOD® looks and behaves like real blood, provides quick, easy and completely safe results and realistically simulates agglutination. Contains simulated, microscopic blood cells which can be viewed and counted under a microscope or used with a haemocytometer. Contains materials for up to 40 students.



## IS9003 Forensic Chemistry of Chromatography

Class Kit

The school library's computers have been stolen. Left behind was a ransom note demanding money. Help solve the crime using Thin-Layer Chromatography to separate the ink on the ransom note and ink found in markers tied to possible suspects. It may be possible to provide evidence as to whether or not the ransom note could have been written with a particular marker. This activity includes a Teacher's Manual and Student Guide and Analysis copy-masters. There is enough material for 15 groups.

#### Materials included in the kit:

- 3 different brands Felt Tip Markers
- Chromatography Solvent ; Capillary Tubes
- 15 Silica Gel Chromatography Sheets

#### Materials needed but not supplied:

- 15 Chromatography Chambers (500 ml beakers)
- 15 Test Tubes ; Aluminium Foil



## IS9005 Physical Properties of Glass

Class Kit

Often, during a criminal investigation, police and crime scene investigators must use all available tools and pieces of evidence to work backwards and create the most likely scenario as to what might have occurred. Different types of evidence provide different pieces to the puzzle. Learn about the different chemical and physical characteristics and properties of glass. Find how forensic scientists use these differences to help provide evidence to solve crimes. This activity includes a Teachers Manual and Student Guide and Analysis copy-masters. There is enough material for 15 groups.

#### Materials included in the kit:

- 1 bottle Borosilicate Glass Beads
- 1 bottle Flint Glass Beads
- 1 bottle Soda-lime Glass Beads
- 1 set Refractive Index Solutions
- 15 Magnifiers



#### Note:

Although not essential, a standard UV light source will enhance some of the activities included in this kit.

## 16-20-3873 DNA Fingerprinting Simulation

### Lab Investigation

Study the process of DNA fingerprinting, simulating every step without the need for either equipment or prior knowledge! Using pop beads and other reusable manipulatives, students will assemble DNA strands and use them in various inquiry-based scenarios to learn about DNA finger-printing and its application to forensics. They'll discover how this technique can be used in disease identification and in determining familial relationships. The class will gain a clear understanding of not only DNA fingerprinting but also basic DNA structure and related genetic concepts. Materials for up to 40 students.

#### Your students will:

- Simulate the DNA fingerprinting procedure
- Compare and evaluate DNA fingerprint patterns
- Study the applications of the DNA fingerprinting process
- Gain an understanding of DNA structure and related genetic concepts.



## 13-20-1023 A DNA Murder Mystery

### Lab Investigation

Teach your class about the latest innovations in DNA technology and their application to forensic science. Given the completely reusable kit, the class is challenged to solve a murder by simulating each step of the DNA fingerprinting protocol and matching the 'pop bead' DNA fingerprints of suspects versus samples collected at the scene of the crime. They will learn the basics of DNA fingerprinting and become familiar with DNA structure and extraction, gel electrophoresis and autoradiography. Materials for up to 40 students.

#### Your students will:

- Simulate the DNA fingerprinting procedure
- Construct and interpret an autoradiogram
- Compare and evaluate DNA fingerprint patterns
- Compare the strengths/limitations of DNA profiling



## 13-20-3383 DNA Forensics

### Lab Investigation

Your students will become forensic scientists as they apply the latest innovations in DNA technology to a scenario-based DNA murder mystery. They'll compare the electrophoretic results of DNA samples from a 'crime scene' with those from various suspects. Using a simplified DNA fingerprinting procedure, they'll then solve the crime based upon the fragment patterns revealed on the gel. In the process they'll learn the basic concepts of DNA fingerprinting as well as insight into why this revolutionary process is so accurate. They'll also get a 'hands-on' education on DNA structure and extraction, gel electrophoresis and autoradiography. This activity brings the 'real-world' applications of biotechnology to life and will stimulate discussion on the ethical considerations associated with the use of cutting-edge technology. Materials for up to 40 students.



## Inquiry Investigations

### About Inquiry Investigations:

#### Hands-On Science for the Digital Age

Invite students to learn about their world with an innovative approach that makes science engaging, current, and comprehensible. Our exclusive Inquiry Investigations™ program integrates hands-on activities that employ the latest lab technology with an interactive virtual lab experience ... a winning combination for students and teachers alike.

#### Structured for Success

Inquiry Investigations™ modules are structured to engage students in problem-based science by focusing on real world challenges and solutions. Through active learning, students come to understand experimental design, observation, data interpretation, and analytical thinking. Each module features a comprehensive **Curriculum Guide**<sup>1</sup>, a **Curriculum Resource CD-ROM**<sup>2</sup>, and materials for 10 groups of 4 students, each in a handy storage centre.

#### Structured for How Students Learn Best

Studies show that active learning is the most effective way for students to grasp science concepts, which is why hands-on activities are the centrepiece of Inquiry Investigations. Explore the latest in science - including genomics, advanced electrophoretic separation technology, biodiversity analysis, forensic DNA profile analysis and more.

#### Going Beyond the Traditional Lab

Inquiry Investigations™ hands-on activities are accompanied by virtual labs. These innovative computer-based activities, conducted on a virtual workbench, allow students to expand their knowledge through additional experiments, including some that are too dangerous or equipment-intensive to be conducted in most classrooms. As with hands-on activities, results vary from student to student, adding to the authenticity of the virtual experience.

#### Structured for How You Teach

Inquiry Investigations™ modules link to core science concepts, making them an ideal complement to existing curricula. Each module comprises 3–7 units (labs) that investigate major themes, and a related interactive virtual lab. A comprehensive culminating activity invites students to synthesize and apply what they've learned in the module. For maximum flexibility, modules and many individual kits are available separately.



#### The Support You Need for Excellent Outcomes

You won't need a deep background in science to use this program—teacher support is found both in the Curriculum Guide and on the Curriculum Resource CD-ROM\* that accompany each module. Support includes background information, step-by-step activity instructions, expected outcomes, teaching tips, glossaries, customizable content and assessment, and other tools designed to make you and your students successful.

#### Thorough Assessment Monitoring

Inquiry Investigations™ includes questions and answers relating to each activity, as well as suggestions for additional activities to reinforce key concepts. Test questions are available in both practice and test modes and in five styles: multiple choice, concept mapping, matching, labelling, and essays.

### <sup>1</sup>The Curriculum Guide: Your Programme Roadmap

In the Curriculum Guide, you'll find everything you need to successfully implement Inquiry Investigations, including a module overview, detailed lab instructions, complete student resources, and a helpful appendix.

#### Curriculum Guide Features:

##### Module Overview

- Objectives, concepts & skills, and vocabulary
- Detailed inquiry-based activities
- How to collect, organize, understand, analyze, & record data
- Unit summary
- Pacing chart
- Teacher tips
- Kit materials list

##### Inquiry-Based Lab Investigations

- Objectives & time requirements
- What you need and pre-lab prep
- Step-by-step lab instructions
- Safety & disposal information
- Assessment questions
- Extensions & challenges
- Cross-curricular integration
- Standards correlations

##### Reproducible Student Guide

- Learning objectives
- Complete background information
- What you need
- Step-by-step procedures
- Copymasters
- Safety & disposal information
- Going further activities
- Topic-related references

##### Appendix

- Science safety rules and MSDS
- Science postulates
- How to keep a laboratory notebook
- Scientific notation
- Equivalents, formulas, and symbols
- Full glossary
- Reference guide

### <sup>2</sup>Curriculum Resource Software

A CD-ROM\*, included with each module, contains tools and information that help students to master the program's content and skills.

#### Curriculum Software Features:

##### Virtual Laboratory

- Students perform investigations by manipulating equipment on their virtual workbench.
- Full range of instructors desks; students workstations; base, wall, mobile, and specialty cabinets; and seating.
- Electronic notebook allows recording and analyzing results.

##### Helpful Tutorials

- Topic-related content features detailed illustrations.
- Hyper-linked glossary contains key concepts and terms.
- Dynamic multi-media tutorials and presentations are web-deliverable.

##### Assessment Tools

- Test questions can be accessed in either practice or test mode.
- Customizable tests and worksheets offer five question types - essay, multiple choice, concept map, matching, and labelling.

##### Teacher Resources

- Image gallery contains printable images for customizing presentations.
- Dynamic animations reinforce key concepts.
- Experimental results section provides in-depth experimental data analysis. Where applicable, graphs, tables, and images are included.
- Tips facilitate teaching each activity.

##### Correlations to Standards and Curricula

- Key concepts are correlated to the National Science Education Standards (NSES).
- Correlations to all 50 state standards are available via a website link.
- Alignments to popular textbooks are included online.

\* CD-ROM System Requirements: Windows 2000 or higher, VISTA-compatible, Mac 9.2 or higher (including OSX), 128 MB RAM. Network version available.



## 920-009 Kingdoms of Life

Scientific Inquiry Investigation

Explore the many kingdoms of life - in the classroom or field! Hands-on activities inspire students to learn by investigating life classification; how organisms create a food web; microbes- bacteria, fungi, and protists; plants and the plant life cycle; and animal behaviour. They also design their own experiment on environmental preference.

In the module's comprehensive culminating activity, students conduct six field surveys - site, forest, grassland, stream/river, microlife and soil - using collection, identification, and observation skills.

### Kingdoms of Life includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Three units of study (labs), each with 2-8 activities (17 activities total):

- Unit 1: Classifying Life
- Unit 2: Life's Kingdoms ;
- Unit 3: Comprehensive Inquiry Investigation

Posters on classification, viruses and bacteria, protists, plants, and the ecology of vernal pools

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-010 Physical Science Module 1

Scientific Inquiry Investigation

Engage students in explorations of energy, light, and electricity. Students develop a thorough understanding of concepts such as conductivity, transfer of heat, colour mixing, specific heat, and the scientific method. They hone skills through activities that include using a calorimeter, classifying materials, and building a simple circuit.

The module concludes with a comprehensive culminating activity in which students design an optical instrument to determine the salt concentration of an unknown solution.

### Physical Science Series 1 includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Five units of study (labs), each with 3-6 activities (19 activities total):

- Unit 1a: Exploring the Scientific Method
- Unit 1b: Exploring the Science of Measurement
- Unit 2: Exploring Heat and Energy
- Unit 3: Exploring Light and Optics
- Unit 4: Exploring Electricity
- Unit 5: Comprehensive Inquiry Investigation

Posters on light, heat, electricity, and the scientific method

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-011 Physical Science Module 2 Scientific Inquiry Investigation

Extend physical science exploration to magnetism, forces, and sound. Students further their understanding of physical science concepts such as conservation of energy, how sound travels, and magnetic fields. They experiment with collisions, produce waveforms, and learn how pulleys work as simple machines.

In the module's comprehensive culminating activity, students design a machine to detect counterfeit coins.

### Physical Science Series 2 includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Five units of study (labs), each with 3-6 activities (21 activities total):

- Unit 1: Exploring Gravity
- Unit 2: Exploring Magnetism
- Unit 3: Exploring Sounds Waves
- Unit 4a: Exploring Force and Motion
- Unit 4b: Exploring Simple Machines
- Unit 5: Comprehensive Inquiry Investigation

Posters on force and motion, magnetism, and sound

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-012 Genetics & Inheritance Scientific Inquiry Investigation

Unlock the secrets of the human genome. Students examine DNA structure and the genetic molecule, model monohybrid and dihybrid crosses, learn Mendelian Laws, model meiosis and fertilization, determine gene trait frequency, test the Hardy-Weiberg Principle, construct pedigrees, and determine genotypes and phenotypes. They also explore the human genome, learn karyotype analysis, diagnose and predict a genetic disease, and examine human diversity through blood groups.

Two comprehensive culminating activities confirm identities through DNA profile analysis and calculating trait frequency in a population.

### Genetics and Inheritance includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Four units of study (labs), each with 2-5 activities (20 activities total):

- Unit 1: The DNA Connection
- Unit 2: Genetics and Heredity
- Unit 3: Human Genetics and Inheritance
- Unit 4: Comprehensive Inquiry Investigations

A poster on human genetic disorders

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-013 Biotechnology Techniques

Scientific Inquiry Investigation

Explore the essentials of modern biotechnology methodology. Students investigate the macromolecule DNA and acquire skills in running electrophoretic separations of DNA and other molecules to determine mass and charge. They learn about recombinant DNA, restriction enzymes, and site mapping; investigate gene products; and observe gene expression.

Two comprehensive culminating activities have students examine gene expression – transferring genes from one host to another ...and the technology behind the DNA chip.

### Biotechnology Techniques includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Four units of study (labs), each with 1-5 activities (12 activities total):

- Unit 1: Understanding DNA
- Unit 2: Biotechnology Techniques I
- Unit 3: Biotechnology Techniques II
- Unit 4: Comprehensive Inquiry Investigations

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-014 Biotechnology Applications

Scientific Inquiry Investigation

Engage students with innovative applications of fundamental biotechnology principles. Hands-on activities lead students to investigate transgenic plants, bioremediate an oil spill, make cheese with a recombinantly-produced enzyme, learn to detect a gene defect, interpret a karyotype, create a pedigree, conduct Punnett square analyses, and perform gel electrophoresis to create and analyze DNA profiles.

Includes two comprehensive culminating activities in which students confirm identities through DNA profile analysis and predict the risk of exposure to SARS.

### Biotechnology Applications includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Four units of study (labs), each with 2-5 activities (15 activities total):

- Unit 1: Biotechnology in Agriculture and the Environment
- Unit 2: Biotechnology in Medicine
- Unit 3: Biotechnology in Forensic Science
- Unit 4: Comprehensive Inquiry Investigations

A poster on human genetic disorders

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-015 Cellular World Scientific Inquiry Investigation

Invite students into the fascinating microscopic world of cells. The 18 hands-on activities in Cellular World allow students to investigate cell types and cell organization, cell processes including osmosis and diffusion, how cells cycle energy, the cell cycle, and how cells reproduce and grow.

A comprehensive culminating activity asks students to develop a biochemical test for catalase, a cell enzyme. Students use their test to determine the presence of this enzyme in cells from the major kingdoms.

### Cellular World includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Seven units of study (labs), each with 2-4 activities (18 activities total):

- Unit 1: Cell Types and Organization
- Unit 2: Cell Structure and Function
- Unit 3: Cell Processes
- Unit 4: Cells and Energy
- Unit 5: Cell Reproduction and the Cell Cycle
- Unit 6: Cell Growth
- Unit 7: Comprehensive Inquiry Investigation

Posters on cell types, mitosis, and meiosis

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-016 Forensic Science Scientific Inquiry Investigation

Turn students into detectives as they investigate DNA, blood and fingerprint evidence. Students develop a thorough understanding of concepts such as Locard's Principle, genetic principles of inheritance, and chromatography. They acquire skills through activities such as making an impression cast, analyzing altered documents, and modelling a DNA profile. In each unit of study (lab), students perform both skill and case activities.

The module culminates in a comprehensive activity called: The Case of the Silent Sentinel.

### Forensic Science includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Six units of study (labs), each with 4-6 skill activities and 4-6 case activities (55 activities total):

- Unit 1: Fingerprint Evidence
- Unit 2: DNA Evidence
- Unit 3: Blood Evidence
- Unit 4: Trace Evidence – Particles, Fibres, and Marks
- Unit 5: Questioned Document Evidence
- Unit 6: Comprehensive Inquiry Investigation

A poster on fingerprinting

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-017 Human Biology & Health

Scientific Inquiry Investigation

Test the limits of the finely-tuned human machine. Hands-on activities give students a closer look at the body's organisation; human senses of touch, taste, hearing, thermo-reception and vision; simulated bloods and blood groups; food nutrient content; and how certain drugs can be delivered through the skin. They investigate kidney function and perform urinalysis on simulated urines. Students also examine health issues involving smoking and HIV transmission.

In two comprehensive culminating activities, students measure reaction time and vision range.

### Human Biology and Health includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Four units of study (labs), each with 2-8 activities (24 activities total):

- Unit 1: The Human Machine
- Unit 2: Human Physiology
- Unit 3: Human Health Issues and Disease
- Unit 4: Comprehensive Inquiry Investigations

Posters on blood and the systems of the human body

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-018 Environmental Issues & Solutions

Scientific Inquiry Investigation

Expand students' understanding of the environmental issues that affect their everyday lives. Students investigate landfills; effects of radiation on plants; bioremediation techniques (oil-degrading microbes); climate changes/greenhouse effect; water treatment processes; airborne, soil, and water pollutants; food webs; energy pyramids; and predatory-prey relationships. Learn how to determine the carrying capacity of a population and how to calculate a biodiversity index.

The module concludes with three comprehensive culminating activities which delve into water treatments processes, bio-remediation, and qualitative water assessment.

### Environmental Issues and Solutions includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Four units of study (labs), each with 1-5 activities (12 activities total):

- Unit 1: Environmental Issues
- Unit 2: Air, Water, and Soils
- Unit 3: Ecosystems, Energy, and Biodiversity
- Unit 4: Comprehensive Inquiry Investigations

Posters on food webs

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-019 Rocks, Minerals & Fossils Scientific Inquiry Investigation

Invite students to unlock the mysteries of Earth's natural bounty. Through hands-on activities, students investigate igneous, sedimentary, and metamorphic rocks; rock formation and the rock cycle. They also learn about mineral formation, streak, lustre, hardness, and specific gravity. They explore cleavage and fracture, fossils, geologic time scale, chemical and mechanical weathering, continental drift, soil structure, and soil horizons.

The module concludes with a comprehensive culminating activity in which students study unknown rock, mineral, and fossil samples.

### Earth's Resources includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Five units of study (labs), each with 1-9 activities (25 activities total):

- Unit 1: Exploring Rocks
- Unit 2: Exploring Minerals
- Unit 3: Hunting for Fossils
- Unit 4: Earth's Processes
- Unit 5: Comprehensive Inquiry Investigation

Posters on common minerals, geologic time, and Earth's processes

Storage cabinet with materials for 40 students, in clearly labelled drawers



## 920-020 Chemistry, a closer look at matter Scientific Inquiry Investigation

Engage students in investigating the chemistry principles that are integral to their daily lives. Students investigate atomic structure, molecular structure, the periodic table, matter and elements. They experiment with mixtures, compounds, gases (Boyle's gas law), chemical and physical reactions, endothermic and exothermic reactions, acids, bases, salts, and oxidation-reduction reactions.

In two comprehensive culminating activities, students apply what they've learned to demonstrate water purification and conservation of mass.

### Chemistry - A Closer Look at Matter includes:

Investigation literature and student guide, comprehensive Curriculum Guide, and a Curriculum Resources CD-ROM with a virtual lab

Four units of study (labs), each with 2-10 activities (27 activities total):

- Unit 1: Atom and Basic Molecular Structures
- Unit 2: Physical Changes
- Unit 3: Chemical Changes
- Unit 4: Comprehensive Inquiry Investigations

A poster on the mole and the ideal gas law

Storage cabinet with materials for 40 students, in clearly labelled drawers





# PHYSICS

## 101-124 Physical Science Flipchart, KS 3/4

Physical Science Flipchart - Work & Machines; Forces & Motion; Properties of Atoms; Elements & the Periodic Table; Chemical Reactions; Acids, Bases & Salts; Electricity; Magnetism; Sound & Light.

### About the Science Flipchart sets:

10 set series presents leveled review of Grades 1 - 8 (ages 5-14) science standards.

### Each Curriculum Mastery flipchart set features:

10 Double-sided, laminated charts.

Full-sized, 30 x 45cm charts.

Activity Guide featuring black-line copy-masters of the charts along with review questions, vocabulary terms, suggested activities and more.

Sturdy easel for years of classroom application

Activity chart featuring questions, labelling exercises, vocabulary review & more.



## 101-144 Middle School Physical Science Skills Game, KS 3

Middle School Physical Science Skills Game - Introduction to Physical Science; Introduction to Matter; Solids, Liquids & Gases; Mixtures, Solutions & Compounds; Motion; Forces; Forces in Fluids; Work & Machines; Energy & Energy Resources; Heat & Heat Technology; Properties of Atoms; Elements & the Periodic Table; Chemical Bonding; Chemical Reactions; Acids, Bases & Salts; Organic Compounds; Electricity; Magnetism; Electromagnetism; The Energy of Waves; Sound; Light; Mirrors & Lenses; Chemistry in Our World; and Technology in Our World.

### About the Science Skills Games range:

Comprehensive Coverage of the Current NSES Standards for Grades 1 - 8 (ages 5-14 years).

### Each set features:

25 Sets of 30 standards-based review cards - a total of 750 review cards. Each set is focused on a specific curriculum topic and leveled by content & readability.

12 Double-sided, laminated game boards.

Comprehensive Teacher Planning & Resource Guide

Presentation CD featuring interactive review questions for use on a PC, Mac or projection unit.

Free introductory online subscription to access interactive content, activities and assessments.

The Curriculum Mastery Games are written by teachers using research-based principles and tested in the classroom, each Class-Pack game includes enough materials for 36 students!



## SR-1435 Physics Clever Catch®

An excellent way for students to learn basic Physics concepts. 100 questions to get them started.

## 4103 The Ball Makes the Game

Poster - 850 x 610mm

Did you know that the launch speed of a golf ball is 170mph? Or that a ball with a rough surface flies more easily through the air than a smooth one? That a ball always bounces in the direction of its spin? This poster describes how the characteristics of different balls and the sizes of playing fields correspond to their respective sports. Activity guide is included.



## 44-35-1136 Physical Science Posters

890 x 584mm, set of 6

Strikingly illustrated and thought-provoking laminated reference charts, featuring detailed illustrations depicting key physical science topics.

Also available individually:

44-35-1106 Force and Motion

44-35-1126 Magnetism

44-35-1111 Heat

44-35-1131 Electricity

44-35-1121 Light

44-35-1116 Sound



## 231-016 Electroflash Electronics Kit

A superb resource for: investigating circuitry concepts; series and parallel bulbs; switches; resistors; incorporating meters to measure circuit values; exploring applied circuits (such as sensors, sirens, LED flashers, musical organs and more). Also invaluable for prototyping circuits. Enjoy exploring electronics with this revolutionary electronics kit.

Developed by a teacher for classroom use.

Attractive, easy to follow 'Learning Guide'.

Challenge sheets for the more adventurous.

Connection system said to be the easiest yet invented.

No tools needed



## R-669100 Fundamentals of Electronics

Introduce students to the basics of electronics. This kit includes solderless electronics breadboard, switches, connection wires, transistors NPN and PNP, red and green light emitting diodes (LED), capacitors, diode and photoresistor, resistors, a buzzer, 9 volt battery and a Teacher's Guide.



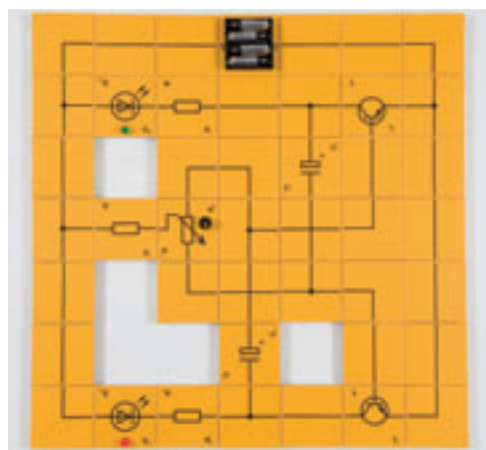
## 130-014 Compact 300 Electric Circuit Teaching Set

This set is designed as an aid for teaching the basics of electricity. The set's elements may be used to create simple electric circuits (e.g. series and parallel connections for lighting bulbs, a fused circuit with a switch, etc.) as well as working models of simple electrical devices (e.g. a model of a domestic electrical wiring system). An important feature of this set is the included straightforward schematic diagram of circuits, and the possibility of rearranging electronic elements without the necessity of dismantling the entire circuit. The set is equipped with Teacher instructions and class exercises. Compact 300 can be supplemented using pupils' Laboratory 300 sets (code: 130-016), enabling individual connection of electrical circuits presented by a Teacher on the class board.



## 130-015 Compact 301 Electric Circuit Teaching Set

This is a demonstration set for teaching physics and design technology in middle schools and secondary schools. Compact 301 serves as a magnetic board presentation set for various types of electrical and electronic circuits, including diodes, transistors, photo resistors and thermistors. The set enables pupils to test the characteristics of semiconductors and construct working models of electronic devices, even those as advanced as sensors, amplifiers, transmitters and radio receivers. The set is so constructed that electronic components may be rearranged without the necessity of dismantling the entire circuit. The included teacher instructions consist of approximately 100 pre-prepared transistor circuits. The great advantage of this set is the possibility of creating practically any circuit one has designed.



## 130-016 Laboratory 300 Electric Circuit Pupil Set

This is a pupil's set for individual studies and memorizing the basic issues relating to physics and electrical technology at middle school level. Individual creation of simple circuits helps the pupil learn to read schematic diagrams, the basics of the assembly process, and recognition of electrical elements. The work of pupils using this set may be performed according to the detailed instructions enclosed with the set or to the instructions of the Teacher using the Compact 300 (code: 130-014).



## 231-015 Worcester circuit Board

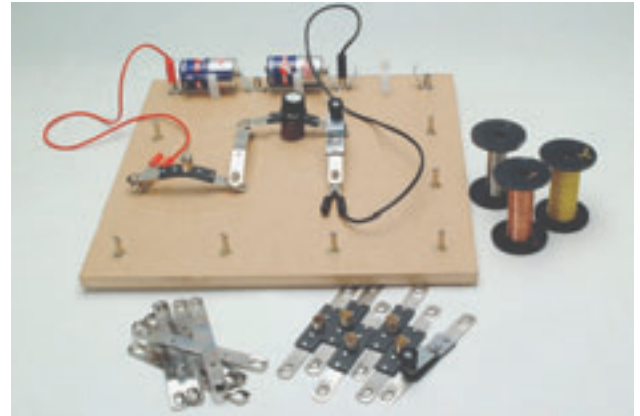
New Worcester circuit board ideal for KS2 and KS3. Strong plastic base and easy to fit metal connectors allow students to conduct a variety of circuit experiments. Manual included.



## EDU099 Worcester circuit Board

his product provides the basis for clear layouts of electrical circuits and reduces the number of connecting leads required. The main component is a base board fitted with cell holders and terminal posts. Also supplied are items for elementary experiments. By the addition of ammeters and voltmeters (not provided) such experiments can be developed to give quantitative results.

The cell holders accommodate three cells which can be used singly or in series combinations. Connections from the cells to the terminal posts are made with coloured leads, each with a 4mm plug on one end and a crocodile clip on the other. Plated and sprung brass straps are used to connect neighbouring terminal posts. These straps are particularly useful when setting up components 'in parallel'. Other connectors include crocodile clips, coloured leads with crocodile clips at both ends, bare and plastic covered copper wire. Included with the base-board are 1.25V, 0.25A bulbs with holders and straps for connecting to terminal posts. These bulbs can safely be used with 1.5V dry cells, making use of the voltage drop that occurs when current is taken. A  $50\Omega$  variable resistor (rheostat) fitted with connection straps, mounted bell pushes (which can double as switches), a fixed resistor, a rectifier (diode), a collection of conducting materials (bare copper wire, resistance wire, pencil leads, steel wool, etc.) and a hard-board disc which can be used with the iron nails provided, as a base board external to the main board.



### Suggestions for experiments:

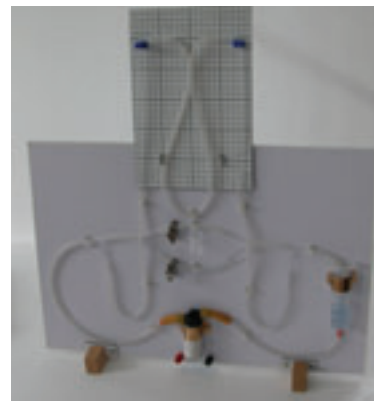
Series and parallel connections of light bulbs, with due regard to the source voltage(s) required.

- Using a light bulb as an indicator of current magnitude
- The conducting properties of different materials
- Control of currents using switches and variable resistor
- The properties of a variable resistor (rheostat) and a rectifier (diode).

For more advanced students these investigations can have a quantitative basis if suitable measuring instruments (voltmeter and ammeter) are available.

## 231-033 Electric Circuit Simulator Water Circuit Board

A working model which uses water to simulate an electric circuit and to assist in the understanding of the invisible nature of electricity. Water is pumped around a simple circuit to demonstrate movement of charge, resistors, an ammeter and a voltmeter. Size: 590 x 320 mm. Instructions included.



## 44-35-1131 Electricity Poster - 890 x 584mm

Striking illustrations and informative text on key electricity concepts. Learn about the sources of electricity; electrical circuits; power plants; and much more. Graphical depiction combines illustrations with stunning photography and illuminating background text.

## 1705 Electricity OHP Transparencies - set of 6

Six colour transparencies present the basic principles and applications of electricity, including Batteries, Circuits, Electric Bell, the Electric Motor, the Telephone and the Generating Station. Set includes 5 helpful overlays.



## 13-1141 Electricity and Electromagnetism CD-ROM

Explore electricity and electromagnetism! Your class will conduct virtual experiments to grasp the basic principles behind these fascinating topics. Coverage includes the definition and concepts of an electric charge; movement of charges through electric fields; potential differences; electric flux; Ohm's law; electromagnetic force; solenoid, relays and motors; and much more. Superb graphics and animation make these complex topics clear and easy to understand! System Requirements: Windows 98 to 2000. 64MB RAM.



## 310-015 MicroPhysics Basic Electricity Kit

This kit provides students working on an individual basis with an opportunity to study the basic principles of electricity. Topics covered with the kit include:

- Batteries & Current Flow
- Circuits: Direction
- Series & Parallel Circuits
- Magnetic Effects & Chemical Reactions
- Electricity in the Home



## EDU1036 Electricity Economy Kit

Basic assortment of components suitable for introductory electronics. Kit consists of:

- 10 x Crocodile Leads
- 3 x 1.5V Cell Holders
- 5 x DPDT Slide Switch
- 10 x MES Lampholders
- 10 x MES Bulbs
- 1 x 6V Buzzer with connecting leads
- 1 x 3-6V Electric Motor



## Investigating Electricity

### R-4000300 Kit

### R-4000301 Additional Workbooks, set of 10

How does electricity work? The series of activities in this kit explores parallel circuits, series circuits, resistance and fuses. Kit includes batteries, ammeter 0-1A, breadboard, jiffy mounts, jiffy clips and guides. The Teacher's Guide and two student workbooks provide for different levels of difficulty and interest.



## 310-041 Battery Snaps with Crocodile Leads

Battery connector with crocodile clips attached for easy connection.

## PH1052 Crocodile Clips with Leads, pk of 10

## 17-0380 Stackable Lead, Red 17-0385 Stackable Lead, Black 17-0386 Stackable Lead, Yellow

4mm stackable lead, 500mm length.

## Insulated Socket Terminals

PH1042A Black, pk of 50

PH1042B Red, pk of 50

PH1042C Yellow, pk of 50

For panel mounting, captive insulated head with 4mm socket, nuts and washers.

## 231-034 Component Holders, pk of 8

Mounted clips to hold components in physics investigations.

## EDU1092 Electrode Rod Holders, pk of 5

Plastic strip with 4mm socket terminals and two crocodile clips to hold electrode rods in place during use.

## EDU1125 Electrode Foil Holders, pk of 5

Plastic strip with 4mm socket terminals and two crocodile clips to hold electrode foils in place during use.

## EDU731 Economy Switches, pk of 25

Economy switch with Fahnstock clips.

## EDU764 Toggle Switches, DPDT, pk of 10

Standard toggle switch with on/off plate.  
Rated at 250V, 1.5A AC.



## PH0986 Contact Key

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## Knife Switches

- PH1000A Single pole, double throw
  - PH1000B Single pole, double throw on base
  - PH1002A Double pole, double throw
  - PH1002B Double pole, double throw on base
- 



## EDU765 Electric Motors, pk of 5

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A low-cost miniature DC motor suitable for many applications including models, robotics and educational demonstration equipment. The two flat sides make the motor ideal for mounting on a PCB. Rotates counter clockwise when viewed from the shaft end. Solder tag termination.

Operating voltage 1.5 to 4.5V DC. Dia: 20mm; Shaft length: 9.4mm; Shaft Diameter: 2mm; Width across flats: 15.1mm; Weight: approx 17g.



## PH1320 Solar Cell Unit

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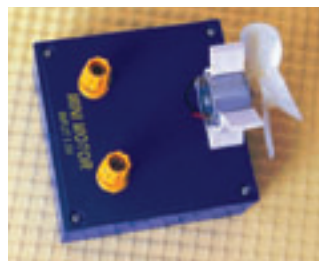
Solar cell unit comprising a solar cell mounted on a base with 4mm socket terminals for electrical output. When connected to the Mini Motor Unit (code: PH1319) it demonstrates the conversion of solar energy into mechanical energy.



## PH1319 Mini Motor Unit

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For use with Solar Cell Unit (code: PH1320). A small motor which operates from 1.5 to 4.5V DC.



## PH1321 Photo Cell Unit

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The kit allows students to use solar energy in an interesting and practical manner. The kit consists of a solar panel housed in a plastic box and a low consumption motor with fan, buzzer and LED.





## MATKIT Materials Kit

A selection of materials in the form of rectangular blocks intended to familiarise the student with appearance, feel, texture, hardness and density of a range of common substances. The set consists of 2 each of seventeen blocks:

50 x 40 x 30mm: softwood, hardwood, paraffin wax, aluminium, iron & foam polystyrene

20 x 20 x 100mm: perspex, glass, slate, aluminium, softwood, marble

50 x 50 x 20mm: lead

50 x 50 x 80mm: aluminium

50 x 50 x 200mm: hardwood

20 x 20 x 50mm: brass

40 x 40 x 20mm: iron



## Spares for Materials Kit

**MATKIT1** Glass Block, 20 x 20 x 100mm

**MATKIT10** Polystyrene Block, pk of 24  
50 x 40 x 30mm

**MATKIT11** Iron Block, pk of 4  
50 x 40 x 30mm

**MATKIT12** Slate Block, pk of 8  
20 x 20 x 100mm

**MATKIT13** Hardwood, pk of 8  
50 x 40 x 30mm

**MATKIT14** Softwood Block, pk of 8  
50 x 40 x 30mm

**MATKIT15** Aluminium Block, pk of 4  
50 x 40 x 30mm

**MATKIT16** Perspex Block, pk of 8  
20 x 20 x 100mm

**MATKIT2** Lead Block, pk of 4  
50 x 50 x 20mm

**MATKIT3** Marble Block, pk of 49  
20 x 20 x 100mm

**MATKIT4** Brass Block, pk of 4  
20 x 20 x 50mm

**MATKIT5** Aluminium Block, pk of 4  
20 x 20 x 100mm

**MATKIT6** Aluminium Block, 50 x 50 x 80mm

**MATKIT7** Iron Block, pk of 4  
40 x 40 x 20mm

**MATKIT8** Softwood Block, pk of 8  
20 x 20 x 100mm

**MATKIT9** Paraffin Wax Block, pk of 8  
50 x 40 x 30mm

## Metal Cylinders

**P110A** 30 x 10mm (dia.), set of 6

**P110B** 40 x 10mm (dia.), set of 6

Precision cylinders for experiments on density. Set of 6 cylinders: Brass, Lead, Iron, Copper, Aluminium and Zinc. Supplied in wooden block.



**3131** Density Kit

**3132** Density Kit, set of 10

Various shapes are used to teach students how to make measurements in the Metric System and how to use the formula:  $\text{Density} = \text{Mass}/\text{Volume}$ . Students use the various materials to demonstrate densities. Includes one aluminium bar, 3" x 1" x 0.25", two 0.5" aluminium cubes, one steel sphere, one glass sphere, and one dual-graduated scale, with 0-15 centimetres on one side and 0-6 inches on the other.



## Cubes for Density

**CBM10** Set of 7 x 10mm

Brass, Lead, Steel, Copper, Aluminium, Iron, Tin

**EDU892** Set of 6 x 20mm

Brass, Tin, Zinc, Copper, Aluminium, Iron

**CBM20** Set of 7 x 20mm

Brass, Lead, Steel, Copper, Aluminium, Iron, Tin

**EDU605** Aluminium, 20mm, pk of 5

**EDU606** Brass, 20mm, pk of 5

**EDU607** Copper, 20mm, pk of 5

**EDU608** Steel, 20mm, pk of 5

**EDU609** Lead, 20mm, pk of 5

**EDU752** Plastic, 20mm, pk of 5

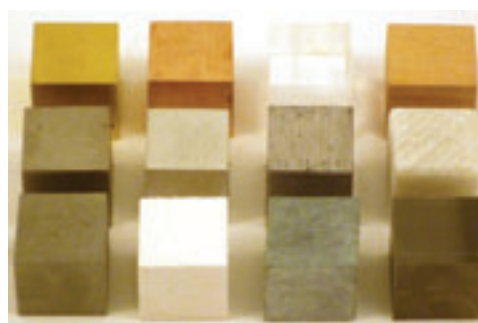
**EDU610** Wood, 20mm, pk of 5

**EDU611** Zinc, 20mm, pk of 5

**EDU612** Stone, 20mm, pk of 5

**EDU663A** Boxed set of 12, 20mm

Hardwood, Softwood, Brass, Tin, Zinc, Copper, Aluminium, Iron, Marble, Granite, Lead, Perspex



## 4100 Electromagnetic Spectrum Chart

- 850 x 610mm

We live in a sea of waves. With this exciting visual aid, students can explore the unique relationship between the unseen electric and magnetic waves surrounding us. See the difference between wavelength and frequency scales in addition to understanding radio and microwave usage, x-ray and gamma ray absorption and much more!. Accompanied by an explanatory sheet.



## MBEM Electromagnet

U-shaped core of circular section with armature and carrying hook. Wound with insulated copper wire and provided with barrel connections for use with 4-6 volts DC. Complete with keeper. 110 x 9mm (dia).

## 960-114 Electromagnet Investigation

A robust system allowing students to study the effect of current and number of coils on the strength of an electromagnet. Tapping at 100, 200, 300, 400, 500, 600 turns. The weights used are large paper clips. A variable DC low voltage supply is required.





## KEM007320 Westminster Electromagnet Kit

A comprehensive kit containing the essential items for basic experiments in electromagnetism. General investigation of Magnets, Eddy Current, Force Between Currents and Investigation of the Magnetic Field, are just some of the basic experiments that can be carried out with this kit.

Comprises: 8 anisotropic alloy magnets; 8 anisotropic ceramic ferrite magnets; 4 steel magnetic yokes; 6 plotting compasses; 5 hardboard formers of compasses; 1 bottle iron filings; 4 each double C Cores; clips for C Cores; aluminium rings; split aluminium rings; 4 support bases; armatures with axle rods; 8 split pins; 16 rivets; 1 length latex rubber tubing; 4 each formers of coils; reels of tape; reels of copper wire; 4 sheets of white paste board; plain postcards; reels of white cotton; 4 carbon resistors, 100Ω; flash lamp bulbs; 5 neon bulbs; 8 MES bulb holders; wood clamp; wood block.



## 605-008 Electromagnetic Power Supply

Low Voltage, high current power supply for uses with Westminster electromagnetic kits, Fleming's apparatus, etc. 1-0-1V nominal AC, allows students access to AC output of 1V, or 2V DC output is furnished by rectification of 2V AC (unsmoothed). Short-circuit current is 10A. Tolerates short circuit. Transformer is protected by thermal fuses and slow-blow fuse 40A Shottky barrier diode for robust and efficient rectification.

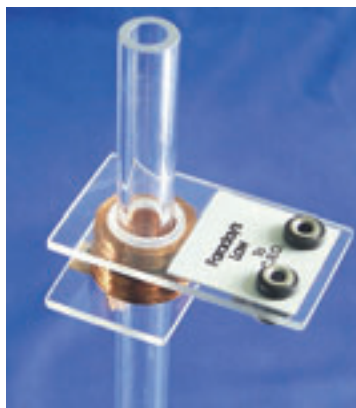
### Specification:

- Input voltage : 230V ±10%, 50Hz
- Outputs: 1-0-1V AC, 2V DC nominal
- Dimensions: 208 x 155 x 115mm (W x H x D).  
Height including handle is 187mm.



## 960-105 Faraday's Law Apparatus

An acrylic assembly holding a 100 turn coil with 4mm socket connections which can slide on a 300mm long, 15mm dia. acrylic tube. A small cylindrical magnet can be dropped down the tube so that a pulse of electricity is generated in the coil as it passes through. An oscilloscope is used to monitor the pulse and measure its amplitude. At different speeds the amplitude varies and can be used by A-Level students to investigate Faraday's Law while revising equations of motion to determine the speed. An alternative approach is that of an open investigation to study the amplitude as a function of coil position which should lead to similar results. Ideal for use with PC-based oscilloscopes.



## EDU045 Force on a Conductor Apparatus

Comprising a strong U-shaped magnet and a pair of brass rails with 4mm socket terminals. A brass axle with plastic discs is free to roll along the rails and completes the electrical contact between them. When the axle is placed on the rails between the poles of the magnet and a power supply connected, the axle is repelled and rolls along the rails away from the centre of the magnetic field.



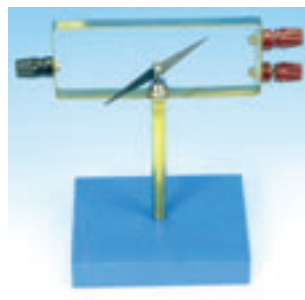
## EDU095 Induced Current Apparatus

Consists of a primary coil of insulated copper wire wound upon a cylinder with terminals, a secondary coil wound upon a cylinder into which the primary coil fits. A soft iron core fits the cylinder of the primary. Complete with terminals.



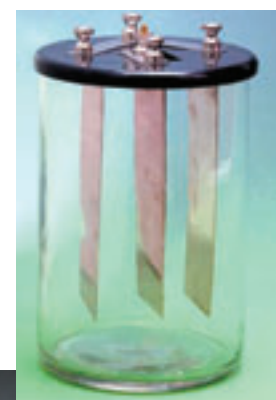
## PH0838 Oersted's Apparatus

To show the action of an electric current on a magnet. Cobalt steel needle 75mm long with agate bearing, supported by a pivot mounted on a plastic base. Needle is surrounded by a 130 x 50mm rectangular frame, in the vertical plane, fitted with two 4mm socket terminals at one end, one at the other.



## PH0942 Voltmeter, Copper

Three copper plates supplied with insulated cover and glass jar.



## PH0880 Conductors, 5cm dia, set of 3

## PH0881 Conductors, 8cm dia, set of 3

Made of brass, interchangeable on pillars, fitted with insulators of ebonite on metal base.

Sphere: 5cm / 8cm

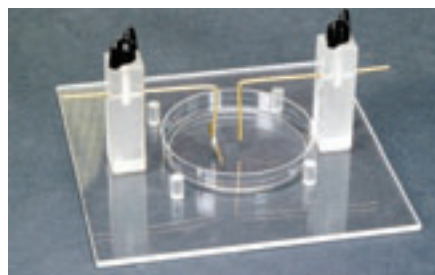
Cylinder: 5cm x 12.5cm / 8cm x 12.5cm

Cone: 5cm x 15cm / 8cm x 15cm



## ELAP Electric Field Apparatus

For demonstrating electric fields between electrodes. The apparatus includes a clear Petri dish 90mm dia. x 12mm depth. The transparent base (140 x 125mm) allows the pattern to be projected via an overhead projector system. Alongside each terminal is a thumbscrew system which permits fine adjustment of the electrodes. Six electrodes are supplied, 2 'point source', 2 'line source' and 2 circular rings of 35 and 70mm dia. The apparatus requires a safe, low current limited 0-5kV EHT supply (code: 605-006).



## PH0900 Malvern Electrostatic Kit

For a range of investigations and demonstrations of electrostatics. Contains:

- 1 x electroscope; 4 x metallised polystyrene spheres; 1 x reel nylon;
- 1 x cellulose acetate strip; 1 x polythene strip; 1 x wire stirrup;
- 1 x rubbing cloth; 1 x wire hook; 1 x electrophorus on handle;
- 1 x proof plane; 2 x polythene tiles; 2 x aluminium cans.



- FR1 Ebonite Friction Rod  
 FR2 Glass Friction Rod  
 P857 Perspex Friction Rod  
 P860 Glass/Brass Friction Rod  
 P862 Brass/Ebonite Friction Rod

Friction Rod for various experiments involving static electricity. 300 x 12mm.

- P864 Cloth for rubbing Friction Rods  
 P868 Silk for rubbing Friction Rods

300 x 300mm square of material for producing friction with friction rods.

### PH0852 Nylon Friction Rod

For electrostatics experiments, 300mm length, 13mm dia.

### PH0874 Proof Plane

Ebonite rod with 50mm diameter brass disc.

### P904 Electric Whirl

For demonstrating the effect of electrical discharge from points. The apparatus has a 60mm diameter three-pointed star wheel with all the points curved in one direction. The wheel rotates freely on a pivot point mounted on a short stand and the base incorporates a 4mm connection socket.

### 231-018 Electrostatic Kit with Support

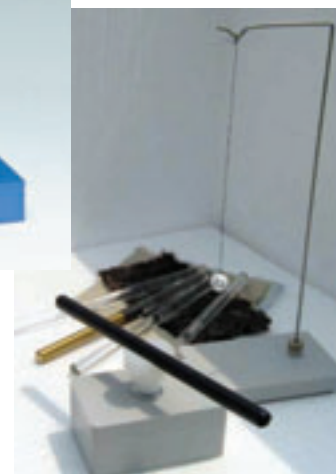
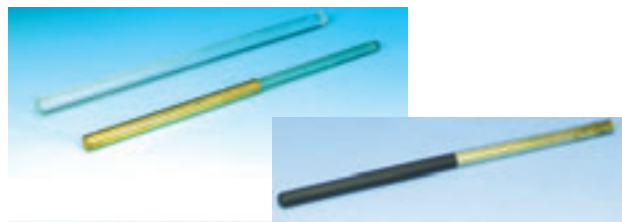
This kit contains various friction rods and fabrics for electrostatic experiments. A pith ball is suspended from the support and will clearly demonstrate attraction and repulsion.

### PH0902 Faraday's Pails, set of 4

Set of 4 aluminium, nesting, cylindrical containers each fitted with insulating feet. 150mm dia x 120mm high; 120mm dia x 110mm high; 90mm dia x 90mm high; 75mm dia x 75mm high.

### PH0912 Gold Leaf Electroscope in Flask

A glass conical flask, fitted with a rubber bung supporting a brass rod with gold leaf attached. Replacement Gold Leaves (code: PH0914) available separately



## PH0916A Electroscope

Rectangular cast metal case and polythene insulated lid with finger flap to facilitate removal. Fitted with a 4mm socket terminal. Front glass window slides up to allow insertion of ionising material in chamber. With gold leaf support plate and scale to show deflection. Replacement Gold Leaves (code: PH0914) available separately.



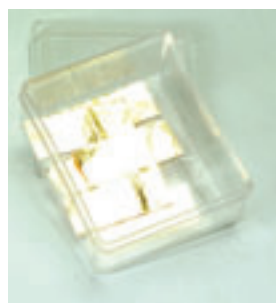
## PH0916B Electroscope, Dual Purpose

The 'Malvern' dual purpose gold leaf electroscope has a metal plate to which a single gold leaf may be attached and is supported by an insulating bush in a metal case with a 4mm socket earthing terminal. A scale is provided for measuring the deflection of the leaf. Replacement Gold Leaves (code: PH0914) available separately.



## PH0914 Gold Leaf in Plastic Case for Electroscopes, pk of 6

Gold leaves for use with electroscopes.



## PH0848A Wimshurst Electrostatics Machine

The ideal equipment for simple demonstration of electrostatics. No electrical power is required. The unit will quickly generate a charge with regular discharge. Under correct conditions the spark will travel 50mm in air between electrodes. Two plates are supported in two rigid uprights and driven by a belt in the opposite direction. The plates are heavy, high resistance plastic with sectors of aluminium sheet. Two leyden jars (condensers) are made from corning glass and aluminium foil. The apparatus is mounted on a polished wooden base for easy use and transportation. 200mm dia.



## P1170C Induction Coil, 20mm spark

## P1168 Induction Coil, 30mm spark

## PH1170B Induction Coil, 50mm spark

This traditional induction coil is capable of producing a spark with an input of 6-12V DC and is therefore ideal for use with vacuum tubes, eudiometers etc. A fully adjustable vibrator system is incorporated with spark suppression capacitors in the base. A pair of pointer electrodes is supplied with the instrument, the pointer electrode having an insulating handle for spark gap adjustment. Low voltage input is via a pair of baseboard mounted 4mm sockets.



## Van De Graaff Generator

**VDG** Van de Graaff Generator  
**VDG/SET** Van de Graaff Generator with Accessory Set

The Generator consists of a conducting sphere (the dome) supported by a plexiglass pillar and a rubber belt driven by an electric motor concealed in the metal base. Static electrical charge is produced by friction between this band and two rollers, one of polythene, the other of plexiglass. The charge is removed from the belt by a metal gauze and stored in the dome. The electric motor is driven from the mains supply. The base is fitted with a 4mm socket which can be used either for supporting a conducting sphere (fitted with a cranked rod support) or for a wire connection to a separate conducting sphere (fitted on a plexiglass rod). A blue cover is provided to keep the Van de Graaff free from dust when not in use. Spare belt (code: [VDG/BELT](#)) available separately.

Diameter of Generator Dome: 220mm

Total Height: 500mm.

Base (max) Dimensions: 218 x 182 x 93mm

Operating Voltage: 220 to 240V AC (with 5A cartridge fuse)

Dome Capacitance: (approx) 15pF

Maximum (intermittent) current: (approx) 6μA

Maximum Spark Length: (approx) 50mm

Diameters of Conducting Spheres: 100mm

### VDGACC Accessory Set

Accessory pack for Van de Graff Generator including various useful items for demonstrating and investigating the nature and behaviour of static electrical charge.

### VDG/BELT Spare Belt

Spare Belt only for Van De Graaff Generator.

### 231-017 Van de Graaff Generator electric or hand driven

Electric or hand driven model. Powered from DC source by laboratory power supply up to 12V. This gives user control of belt speed and charge. Can also be powered by use of the supplied hand crank. 400kV. Large dome and discharge rod. Hank of hair and electric whirl included. Other accessories and parts available on request.



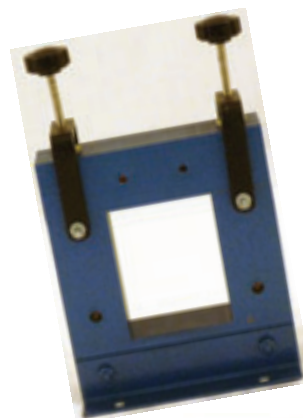
## 231-021 Demountable Transformer Kit

Laminated low-loss core for attaching different coils to demonstrate the step up and step down transformer principle. Attractive demountable transformer with clearly labelled coils for GCSE physics and science and A-Level physics demonstrations. The principles used show how transformers are used in domestic electrical appliances and in the National Grid for power transmission. The core (code: PH0849/1) is made up of highly permeable U-shaped metal sheeting, which can be closed via two clamps with tightening screws. Includes 1 230V mains coil of 1000 turns, 1A, 13.5Ω (code: 231-028) and 1 coil of 500 turns, 0.5A, 8.95Ω (code: 231-025). Dimensions: 'x' section 40 x 40mm; 150mm (L) x 170mm (H).



## PH0849/1 U-Core for Transformer Kit

U-Core from Demountable Transformer Kit (code: 231-021), including clamps. Coils are sold separately to allow you to choose the relevant coils for demonstration purposes, but for 230V mains connection the 1000-turn Mains Coil (code: 231-028) is required.



## Coils for Demountable Transformer Kits

- 231-022 Coil 50 turns, 4A, 0.15Ω
- 231-023 Coil 100 turns, 2A, 0.55Ω
- 231-024 Coil 200 turns, 1A, 2.5Ω
- 231-025 Coil 500 turns, 0.5A, 8.95Ω
- 231-026 Coil 1000 turns, 0.3A, 39.5Ω
- 231-027 Coil 2000 turns, 0.05A, 445Ω
- 231-028 Coil 1000 turns, 1A, 13.5Ω  
- 230V Mains Coil

Coils for Demountable Transformer Kit (code: 231-021). Can be used to supplement the Demountable Transformer kit or can be used in conjunction with the U-Core from this kit (code: PH0849/1) and any combination of the other coils (listed below) for your particular requirements. Has two front-mounted 4mm sockets and is clearly labelled. Note: For connection to 230V mains the 1000-turn Mains Coil (code: 231-028) is required.



## 231-029 Transformer Accessory, Set No.1

Used to demonstrate that step down transformers can produce currents that are large enough to weld metals or boil water. Requires mains coil (code: 231-028).



## 231-030 Transformer Accessory, Set No.2

Lenz's law transformer accessory to demonstrate the production of large magnetic fields and Lenz's law damping on pendulums with and without slits.



## 231-032 Demonstration Motor AC/DC

Produces AC/DC current simultaneously when the hand wheel is turned. The generation of AC/DC Voltage is represented by LEDs.



## EDU727 Demonstration Electric Motor

Simple form of DC electric motor having 2-pole armature wound with enamelled copper wire and a permanent magnetic field provided by a removable bar magnet. A disc-type commutator is incorporated and external connection to the phosphor-bronze brushes is by means of a pair of 4mm sockets. The motor operates on 6-8V DC.



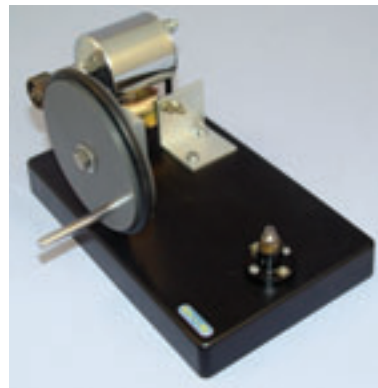
## EDU728 Demonstration Dynamo

This Model uses the same basic assembly as the EDU727 Demonstration Electric Motor except it is mounted on a base plate (230 x 90mm) which also carries a hand-drive pulley of 120mm diameter. It is coupled to the smaller dynamo pulley by a rubber belt to give a step-up ratio. Electrical output is via a pair of 4mm sockets and a lamp is provided as a simple output indicator. The model may also be used as a motor on 6-8V DC supply.



## BDYNAM Bicycle Dynamo

For demonstrating the use of a dynamo in lighting a lamp. This apparatus has a cycle dynamo mounted on a base connected with an MES lamp holder and 2.5V bulb. 220 x 115 x 105mm (H).



## P498 Hero's Engine

This is a model of a steam engine invented by Hero of Alexandria in about 60 AD. It represents an early example of a machine that will transform thermal energy into kinetic energy. Hero's engine illustrates transformations of energy and aspects of Newton's laws of motion. The engine operates similarly to a rocket engine. The thermal energy supplied by the bunsen burner (not supplied) is transformed into kinetic energy in the steam jets. These jets possess momentum, and by Newton's third law ('action and reaction are equal and opposite'), give backward momentum and hence backward force to the nozzles from which they emerge. These forces create a turning movement about the longitudinal axis of the glassware and hence the glass apparatus rotates.



## Malvern Energy Transfer Kit

The Malvern Energy Transfer Kit consists of a number of separately available units which enable the user to show conversions of one form of energy to another in a variety of different ways. All units have a base measurement of 165 x 100mm and have 4mm socket terminals where appropriate.

### PH0467A Malvern Motor/Generator, Large

For use as a driving unit/dynamo. Consists of a 2 to 6V DC motor provided with a 15mm dia. 'V' pulley and driving belt.



### PH0467B Malvern Motor/Generator, Small

For use with the larger motor/generator in comparing power input and output by driving each in turn with the other and metering the voltage and current.



### PH0467C Malvern Lamp Unit, Triple

Use with motor/generators to indicate output. Lamp holders are connected in parallel and supplied with 3 lamps (3.5V, 0.25A, MES).



### PH0467D Malvern Fly Wheel Unit

For use with a large motor/generator and a lamp unit to demonstrate the conversion of electrical energy to kinetic energy and back again. Comprising an iron flywheel of 115mm diameter and 1.2kg mass in cast bracket with bearings. Shaft has an aluminium 44mm diameter pulley for driving. Spring belt supplied.



### PH0467E Malvern Line Shaft Unit

For showing the conversion of electrical energy to potential energy by winding up a weight on a cord. One end of the 6mm steel shaft carries a 56mm diameter aluminium 'V' pulley and the other end is fitted with a cord anchoring collar. Supplied with a driving belt.



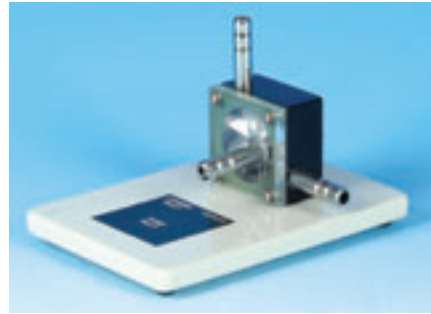
### PH0467F Malvern Spring Unit

Conversion of potential energy in a wound-up spring to electrical energy. This could also be used to wind a weight on a cord showing the change from potential energy to kinetic, and back, in the raised weight. The steel shaft carries a clock spring with a free wheel device, winding ratchet and a 56mm dia. aluminium 'V' pulley. Supplied complete with driving belt.



## PH0467G Turbine/Pump Unit

Use as a water turbine to drive a generator producing electricity or as a pump driven by a motor, raising a head of water to produce potential energy. The rotor has eight bucket blades and is housed in a block turbine chamber 50 x 50 x 25mm with a clear perspex front. Two inlet (for turbine and pump) and one outlet tubules are provided. The shaft carries a 15mm diameter pulley. A driving belt is supplied.



## PH0467H Malvern Head of Water Unit

Use with a turbine pump unit for an open or closed system to demonstrate the conversion of electrical to kinetic energy in the pump and potential energy in the head of water. The unit is supplied complete with two 80mm diameter basins and shaped glass tubes. The upper platform has a 38mm dia hole for use as a simple recirculation system with a single reservoir.



## PH0467I Malvern Handwheel Drive Unit

For use in driving a dynamo, line shafts, flywheels, pumps etc. The driving and output pulleys are both 75mm dia. and the intermediate pulley 20mm dia. giving a step-up ratio of 3.75.



## PH0467J Malvern Eddy Current Unit

For use in conjunction with Malvern Handwheel Drive Unit (code: PH0467I) to demonstrate eddy current braking. 120mm diameter aluminium disc with a 20mm driving pulley.



## PH0467K Malvern Mounted Motor for Solar Cell

Small low consumption electric motor designed to run directly from the output of the solar cell, to illustrate direct conversion of light energy to electrical and hence mechanical. The motor spindle carries a simple 16mm diameter pulley and is capable of raising a mass of at least 4g powered by the solar cell.



## PH0467L Malvern Mounted Solar Cell

For use with the motor to demonstrate the production of electrical energy directly from light energy. The apparatus comprises a selenium photo-voltaic cell.



## PH0467M Malvern Energy Transfer Lamp

For use in conjunction with the Malvern Mounted Solar Cell (code: PH0467L) and Malvern Mounted Motor for Solar Cell (code: PH0467K). Consists of a 12V, 24W S.B.C. bulb in a metal socket, mounted on a base with two 4mm sockets.



## PH0490 Diesel Engine, two stroke

A model of a two-stroke diesel engine made in aluminium alloy and gunmetal. Ignition is shown by means of a 1A bulb. Fuel supply is also sectioned. Mounted on base with hand crank provided for manual operation.



## PH0494 Gas Turbine/Turbo Jet Engine

This cutaway section model is constructed of light and strong metal and mounted on base. It shows air intake, axial flow, double stage compressor, fuel supply, combustion chamber, turbine rotor, jet thrust, exhaust etc.



## PH0497 Model Water Turbine with Dynamo

Conversion of mechanical energy into electrical energy. The turbine has a transparent cover, inlet and outlet tubes, directly connected to a dynamo and fitted on a sturdy plastic base.



## 44-35-1106 Force and Motion Poster

- 890 x 584mm

Graphically depicts force measurements; gravity and motion; Newton's Laws and much more!



## R-4000800 Investigating Force Kit

### R-4000801 Additional Workbooks, set of 10

Measure the forces of gravity and power with this complete kit! Nine experiments allow students to use the scientific method to understand the principles of force, friction, pressure, work and power. The Teacher's Guide gives helpful background information and the two student workbooks are wonderful introductions to physical science.



## 649 Wind Tunnel

Students can make a variety of aerodynamic studies with an actual wind tunnel. A wing can be made and lift calculations can be made to give students an idea of how efficient their wing is. Students can also visually analyse the efficiency of their creation using a smoke stream. Activity guide included.



## MAGD Magdeburg Hemispheres, Brass

To demonstrate the existence of atmospheric pressure. Made of brass and fitted with stopcock and handle. Dia. 75mm.



## 201-002 Magdeburg Hemispheres, plastic

Plastic model with wooden handles.



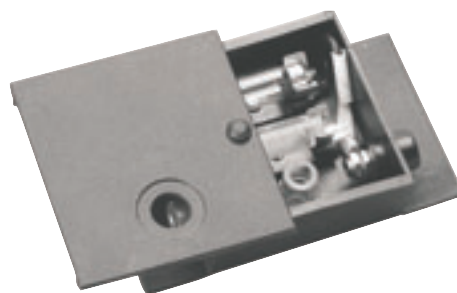
## 3572 Fire Syringe

Designed to provide a safe but very dramatic demonstration of the generation of heat by gas under compression. The piston inside a heavy-walled combustion tube is housed inside a transparent plastic outer cylinder to provide an unobstructed view of the action inside the tube. Cotton at the bottom of the tube ignites in a flash as the plunger rapidly compresses the gas inside the tube.



## WBSM Smoke Cell

For the observation of 'Brownian Motion' in smoke particles. Consisting of a box with plastic lid as well as flanges that allow easy attachment to standard microscopes. The box contains a smoke cell, cylindrical condensing lens and a 12V, 3W festoon bulb. The apparatus has been preset to focus the light at correct height. The set is supplied complete with detailed instructions and a squeeze-bottle type smoke generator. Dimensions: 90 x 46 x 20mm.



## 10-850 Static Cell

A self contained, sealed, acrylic enclosure measuring 180 x 180 x 40mm containing polystyrene spheres. When the top surface is lightly rubbed with a cloth, the static charge developed causes the spheres to jump around inside the unit. A convenient and dramatic demonstration of charged particle attraction and repulsion.



## 201-001 Kinetic Theory Model

Large demonstration model. Polystyrene balls included. 6V DC. Note: Power supply shown is not included.



## 211-401 Crushing Can

A light-walled tin plate can with an air-tight screw cap. Used to demonstrate force exerted by atmospheric pressure. 260 x 75mm (dia.)

## 251-002 Newton's Cradle

A quality wood-framed Newton's Cradle, used to demonstrate conservation of momentum and energy. Five steel balls on extra strong adjustable string.



## PH0342 Gyroscope, 7.5cm diameter with Stand

For showing the effect of precession. The brass wheel is 7.5cm in diameter, 3cm at its rim. Carefully balanced and all three pairs of pivots are adjustable. Complete with stand.



## 251-003 Gyroscope

Simple but accurate gyroscope that will run for more than five minutes once set in motion.

## 251-404 Force Table

With a large, 40cm diameter tabletop, 3cm thick support column and heavy cast base with levelling screws, this force table is suitable for use in any basic physics lab. The durable polymer tabletop carries an angle scale with  $0.5^\circ$  divisions, marked every  $10^\circ$  in both rotation directions. Four tableclamp pulleys are included, each has a circular cut-out with a fiducial mark for accurate angle measurements. Four sets of slotted masses, each 150g x 5g including hangers, are supplied with the table. The slotted masses have a keyhole pattern which secures them during adjustments. The cords include split rings for easy connection, allowing three-force and four-force equilibrium arrangements to be rapidly constructed. Includes spirit level. The table is 41cm high.



## P348 Force Board, 750 x 600mm

For demonstrating the principles of the parallelogram and polygon of forces. Fitted with metal brackets for fixing to a wall. Designed so a clear space is left all round the edge of the board for the attachment of pulleys etc. The board is supplied complete with mounting brackets, cords, pulleys and masses.



## Linear Air Track

**LINTRC** Linear Air Track and Accessories

**LINSET** Linear Air Track and Accessories with Blower

This kit is designed to provide a cost-effective system for the study of all aspects of dynamics in a virtually friction-free environment. It is particularly effective in the field of collisions where conservation of momentum is dramatically demonstrated. The kit contains everything required for a vast array of experiments covering: velocity; force and acceleration; potential energy; kinetic energy; conservation of energy; SHM; motion on level and inclined planes etc. The track itself measures 2 metres overall and is made from strong 56 x 56mm extruded aluminium. Gliders are designed to accept standard slotted masses for additional loads. It is supplied with a comprehensive accessory pack to facilitate every type of interaction.

Overall dimensions: 2055 x 224 x 180mm.

Total weight: 9kg.

Glider lengths: 120mm, 240mm.

Recommended operating temperature: 10 to 40°C.

Recommended operating humidity: <85%.

It is supplied with a range of accessories including vehicles with mass attachments, catapults, buffers and with or without the air blower (code: LINBLO). For measurement of glider speeds, light gates and timers are required.



## LINBLO Linear Air Blower

This electronically controlled unit is specifically designed for laboratory use and is recommended for use with our Linear Air Track. The product is well-packed and of attractive appearance. A constant volume and pressure can be delivered to the apparatus enabling more accurate results to be obtained. It has a flexible hose for connection to the Linear Air Track (code: LINTRC). Motor: 220-240V 50Hz, 700W.



## 30-750 Projectile Launcher

Constructed from white foam PVC, 35 x 35cm, with a detachable foot and vertical height scale in cm. A detachable support can be used when required to hold a second ball for two dimensional collision studies. Suitable for marbles or ball bearings 10 - 20mm dia. (2 x 12mm steel balls included).



## 30-800 Vacuum Bazooka

This amazing device attaches to a vacuum cleaner and launches lightweight, hollow projectiles at high velocity. When aimed vertically typical heights reached are 5 to 6 metres. Additional weights can be added to the projectiles for all manner of investigations into energy, acceleration, momentum etc. An essential item to brighten up the subject of dynamics or to amaze everyone on open days and science fairs. As featured in the book 'Vacuum Bazookas and Electric Rainbow Jelly' by Neil Downie. Overall dimensions 520 x 120 x 100mm. Vacuum cleaner required to operate (not supplied).



## 60-180 Pressure Toadstools, set of 5

A set of 5 clear, square-section acrylic rods ranging from 6 to 15mm thick. Each rod is 100mm long with a securely fastened top platform to support applied loads and the square section design makes area calculations simple. Unlike wooden dowels the acrylic does not absorb water and is far more durable. Supplied in a vacuum-formed tray, which can be used to hold the moist sand during the investigation.



## 260-701 Braking Car

A lightweight, three-wheeled dynamics vehicle measuring 150 x 80 x 70mm with a central plunger. This can be released by a simple mechanical trigger at a predetermined point on a track. The plunger provides a braking force due to friction which can be varied by adding standard slotted weights.



## 60-170 Hill and Dale

This apparatus easily unfolds to provide the 0.5m linked tracks with pulley for the 'diluted gravity' investigation. Supplied with two freely running model cars attached to a thread with provision for adding extra slotted masses. Wooden block height adjusters included. Overall dimensions 120 x 50 x 1000mm (extended). 50cm long in the folded form.



## EDU041 Dynamics Trolleys, pair, wooden

Wooden trolley (sold in pairs). 300mm long. Mounted on three wheels. A spring loaded rod is fitted to give impulse when released. It has a provision for stacking the trolleys on top of each other and fixing with removable pins. Supplied complete with 3 elastic rings, 3 springs, 8 pins (for stacking), 2 rubber corks, 2 needles and 1 releasing pin.



## 251-400 Dynamics Trolleys, pair

Made from rigid ABS plastic, these trolleys have accurately-aligned, very low friction wheels. Coupled with their low profile and accurate mass of 600g, this allows a range of kinematic experiments to yield high quality data. The two-position firing pins have a locking catch for safety and the trolleys have velcro pads for inelastic collision experiments. The trolleys are stackable and can withstand loads up to 60kg. Dimensions: 310mm (L) x 130mm (W) x 90mm (H).



## 970-114 Dynamic Track 4

The track bases are in thick MDF with hardwood side supports which give good resistance to flexing. Rounded corners avoid injuries. Support bar feet link with the support frame which provides a robust system for height adjustment. Support frame (code: 970-117) not included.

## 970-117 Track Support Frame

Sturdy hardwood construction with adjustable cross support allows students to change the slope angle in a simple and effective way.

## 970-118 Track Run-off Ramp

The run-off ramp can be used in conjunction with the track, and bridges the gap between the bottom of the track and the floor when a smooth run-off is required.



## EDU801B Force, Motion & Dynamics Kit

This apparatus comprises a high quality aluminium profile bench with a built in scale to make a variety of measurements. The system provides a highly motivational approach to conducting dynamics experiments. Investigate the effect of different accelerating forces on different masses, elastic and inelastic collisions between two trolleys, acceleration on an inclined plane, kinetic energy and many more.

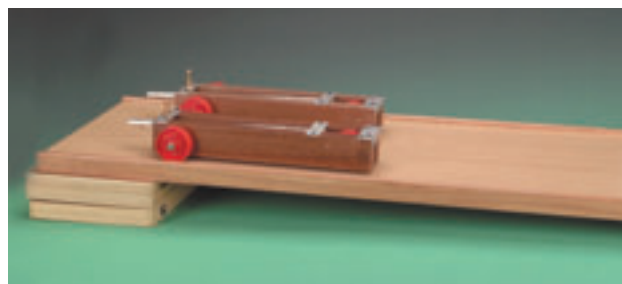
### Contents:

- 1 x Aluminium Profiled Bench, 1.2m rigid construction
- 1 x Spring Loaded Trolley, 740g low friction trolley
- 1 x Standard Trolley, 740g low friction trolley
- 1 x Trolley Weight (brick), 500g for additional mass
- 10 x 10g Masses, with securing hole
- 1 x Ticker Tape Timer, 6V AC operation
- 100 x Carbon discs, for ticker tape timer
- 5 x Ticker Tape Rolls, 30m length
- 1 x Line Level, for setting up bench
- 1 x Force Board, with legs for bench mounting
- 2 x Pulleys, with integral clamp for force board
- 1 x Reel of Cotton, accessory for force board
- 3 x Hooks, accessory for force board
- 1 x Pendulum Bob, accessory for force board
- 3 x Spring Balances, 10N/1kg, Beige



## EDU887 Dynamics System

Consisting of one pair of wooden trolleys. A 1500mm x 300mm wooden track with side rails is included. Plastic feet are mounted on the track to provide an easily inclinable surface for dynamics experiments.



## EDU043 Track & Accessories

Designed to suit curriculum based experiments for the topics of Force & Motion. The carefully designed and matched components provide an excellent medium for demonstrating these important principles. The unit comprises: Aluminium Track, 1.2m; 2 high-impact moulded trolleys (1 spring loaded); 1 trolley weight; 10 x 10g masses; 1 x ticker tape timer; 20 x carbon discs.



## EDU082 Capacitance Substitution Box

This unit has an easily selectable range of 11 preferred capacitors from  $100\mu\text{F}$  to  $0.47\mu\text{F}$ . The voltage rating for each range is 50 volts AC or DC. The unit is housed in a robust ABS case measuring  $75 \times 100 \times 40\text{mm}$  and has a high quality rotary selector switch plus two 4mm safety sockets.



## EDU086 Resistance Substitution Box

This switched compact unit contains 12 resistors, with preferred values in the range  $100\Omega$  to  $470\Omega$  mounted on a printed circuit in a robust black plastic box. Selection is via a rotary switch. External connections are by means of two 4mm yellow terminals, the colour indicating non-polarity. The tolerance of the resistance values is 5%. However, as is quite common, resistances can be closer to their nominal values. All the resistors have a maximum power rating of 1W.



## EDU092 Bar Breaking Apparatus

### EDU093 Spare Bars, pk of 10

To show the forces which can be exerted during thermal expansion or contraction. Comprising a heavy cast iron frame  $340 \times 120 \times 100\text{mm}$  with slotted end pillars to carry a stout iron bar. The bar is threaded at one end for a large tensioning nut and has holes at the other end to accommodate the cast iron breaking bars. The apparatus is supplied with a pack of ten breaking bars (code: EDU093).



## GFF G By Free Fall Apparatus

The apparatus consists of an electromagnet housed in a plastic moulded case supplied with a heavy steel sphere, an electromagnet unit with connections for an external timer and a platform unit containing a microswitch and terminals for the external timer. Action: The sphere is released by moving the switch on the electromagnet to the upward position. This action simultaneously starts the timer. As the sphere hits the cork mat on the platform unit it activates a microswitch to turn off the timer. It is recommended that this be used in conjunction with the Laboratory Timer (code: EDU096) which has an in-built power supply for the electromagnet, or both can be purchased together as a combined set (code: GFF/SET).

## GFF/SET G By Free Fall Apparatus with Laboratory Timer

G by Free Fall Apparatus complete with Laboratory Timer (code: EDU096).



## Pulleys

### Plastic In-line Pulleys

- BPULS** Single - 50mm dia.  
**BPULD** Double - 50 & 38mm dia.  
**BPULT** Triple - 50, 38 & 25mm dia.

Open sided frame with hooks at each end carrying pulleys with ball bearings. The open side frame allows for quick and easy stringing up as no threading is involved.

### Plastic Parallel Pulleys

- PLPUKSP** Single - 50mm dia, 2 hooks  
**PLPULD** Double - 50mm dia, 2 hooks  
**PLPULT** Triple - 50mm dia, 2 hooks

50mm diameter plastic pulleys with two hooks mounted in metal frame.

### Metal In-line Pulleys

- MPPULSL** Single - 50mm dia.  
**MPPULDL** Double - 50 & 38mm dia.  
**MPPULTL** Triple - 50, 38 & 25mm dia.

Open sided frame with hooks at each end carrying pulleys with ball bearings. The open side frame allows for quick and easy stringing up as no threading is involved.

### Aluminium Parallel Pulleys

- MPULS** Single - 50mm dia, 2 hooks  
**MPULD** Double - 50mm dia, 2 hooks  
**MPULT** Triple - 50mm dia, 2 hooks

50mm dia. pulleys with two hooks mounted in metal frame.

### PULRDM Rod Mounted

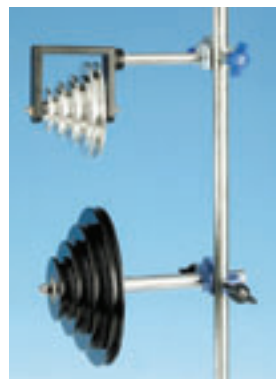
50mm diameter plastic pulley with ball bearing mounted on a 150 x 15mm diameter bar. Tapped holes are provided so that the nylon pulley (with ball bearing) may be fitted onto the boss with its axis of rotation in any one of the three planes.

### PH0282A Pulley, Differential Triple, Small

One-piece aluminium axle rod with 38, 50 and 62mm dia. pulley wheels, mounted within a metal frame with hook.

### PBBBP Bench Mounting, 50mm dia

50mm diameter pulley carried on an aluminium boss 20 x 20 x 110mm, with a hole and clamping screw to accommodate rods up to 13mm diameter. Tapped holes are provided so that the nylon pulley (with ball bearing) may be fitted onto the boss with its axis of rotation in any one of the three planes.



## PBM70 Bench Mounting, 70mm dia

70mm diameter bench-mounting pulley, made of light alloy, on a brass/silvered-steel bearing held in an alloy bracket with two clamping screws for bench or rod support. The bracket may be clamped to a bench edge or similar support of up to 38mm thickness, screwed to a flat surface or held on a 13mm dia. support rod.



## PBMES Bench Mounting, 'E' Shape

This aluminium, 50mm diameter bench-mounting pulley can be clamped to benches or boards of up to 28mm thickness.

## PH0292 Pulley Block Assembly

A set of components from which pulley blocks of many different configurations may be made. This versatile set is an economical alternative to using separate pulleys.

### The set contains:

15 plastic pulley frames; 5 each of single, double and triple sheaves - each provided with a removable bearing pin and a pair of hooks; 30 plastic plain bearing pulleys - 10 pulley wheels each of 25, 38 & 50mm dia.



## 3982 Wheels Mechanisms Kit

This kit will explore some different possibilities for creating simple pulley, gear, wheel and axle mechanisms and how to increase the efficiency of forces when applied to do work. Materials for 12 activities and 18-page Teacher's Guide.



## 4004 Simple Machines Kit

Challenging experiments with levers, wheel and axle mechanisms, pulleys and an inclined plane, for teaching students the principles behind motion and leverage. Kit includes a Teacher's Guide.



## LMP Lift Pump

Working model made of borosilicate glass.



## PH0182A Force Pump

Force pump constructed of high-quality borosilicate glass



## PH0182B Force Pump - Working Model Mounted on Stand



## MNMM Manometer, Mounted

Glass manometer with built-in stopcock mounted on backing plate. Scale 80-0-80 with 2mm subdivisions. Backplate dimensions: 400 x 80mm.

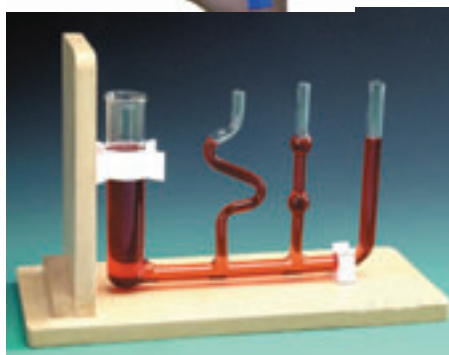
## 251-001 Hand Operated Vacuum Pump

A lightweight hand operated vacuum pump, drawing 15cm<sup>3</sup> per stroke, up to a maximum vacuum of 50mmHg. It can be used to produce positive gauge pressures up to 2atm.



## LILEV Liquid Level Apparatus

This apparatus can be used at an elementary level to demonstrate that several connected bodies of water will equalize at the same height due to the equal transmission of pressure through liquids, with gravity and air pressure, regardless of their shapes. More advanced variations on principles relating to pressure and liquids can also be explored.



## Displacement Vessels

PH0116	100 x 50mm
PH0117	115 x 90mm
PH0118	225 x 125mm



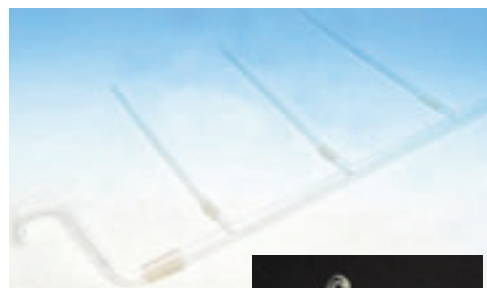
BUCKCS	Bucket and Cylinder, Small 50mm long, overall 115mm
BUCKSL	Bucket and Cylinder, Small 60mm long, overall 160mm



For demonstrating Archimedes' principle. This is a simple brass unit, suitable for class demonstration or individual use. The bucket has a suspension loop at the top and a hook at the bottom. The cylinder has a suspension hook at one end.

## PH0136 Bernoulli Tubes

For demonstrating that when a fluid passes through a tube and reaches a constriction the fluid speed increases with a loss in pressure. Three side arms extend from the horizontal tube and allow the attachment of glass tubes to form simple manometers.



## PH0194 Equality of Pressure in Liquids

To demonstrate the equal transmission by liquids of pressure in all directions. Comprising glass flask with holes and glass piston.



PH0196	Spouting Cylinder, Metal
PH0198	Spouting Cylinder, Perspex

For demonstrating the principle that pressure increases with depth. Comprising a 60mm diameter pipe with 3 orifices of the same size, at different heights down one side. Height of cylinder: 400mm. The clear perspex version allows easy visibility of variation in liquid height.



## PH0202A Capillary Tube Apparatus

For demonstrating the relationship between capillary pressure and the bore diameter of the capillary tube. The apparatus comprises a metal frame holding six capillary tubes of different bores vertically in a trough. The trough is filled with water and the difference in height of the resulting columns of water is immediately clear. Overall height of frame: 90mm. Length of capillary tubes: 150mm.



## PH0212 Fluid Pressure Apparatus

For demonstrating the transmissibility of fluid pressure. The apparatus comprises two brass cylinders of 19mm and 38mm diameter, fitted with pistons and connected by a brass tube. The pistons are provided with rods terminating in the circular platform, each 75mm diameter, for loading with masses (not supplied). The complete apparatus is mounted on a polished wooden base and the overall height with both pistons at the bottom of their cylinders is 245mm.



## PH0160 Guinea and Feather Apparatus

Demonstrates that objects fall at the same speed, regardless of weight, in a vacuum. Consisting of a 16mm diameter glass tube 50cm long, fitted with two rubber bungs, and a 40cm length of tube for connection to a vacuum pump. Two objects with different weight and air resistance (e.g. a mass and a piece of paper or a feather) can be placed at the foot of the tube, and when inverted the objects will fall back to the bottom of the tube at the same rate - in a vacuum. Further studies of the effects of air resistance can be carried out, such as timing the fall of paper through variations of air pressure in the tube, to gauge the effects of air resistance on the acceleration of an object under gravity.

## PH0318 Falling Bodies Apparatus

L-section launcher with holes for locating two 19mm diameter steel balls which act as projectiles. The launcher is released by push button and projects one ball forward while allowing the other to fall freely. The launching mechanism is mounted on a wooden block (size: 180 x 60 x 30mm) which may be bench clamped and has a convenient storage pocket for the balls. Apparatus comes complete with two steel balls.



## 30-680 Monkey & Hunter

An essential part of projectile studies is the 'monkey and hunter' problem. A monkey sees a hunter take aim. If he lets go when the hunter fires will he drop so that the bullet passes harmlessly overhead or should he sit still and watch the bullet pass harmlessly underneath since it is pulled down by the gravitational field? This apparatus allows for an interactive study of the problem by students.

A spring powered 'gun' fires ping pong ball 'bullets' at a model monkey supported from a small electromagnet. The electromagnet is switched off at the instant the projectile leaves the gun. Both monkey and bullet fall at the same rate and the bullet always hits the monkey regardless of how far away the monkey is. The system has everything required except a low voltage power supply and laboratory stand for the electromagnet.



## PH0323 Hooke's Law Apparatus

To demonstrate that the relationship between the extension on a spring is proportional to the load applied to it. This complete apparatus has a 150mm adjustable mirror scale to prevent parallax error and is marked in millimetres and mounted on a sturdy 300mm rod. Attached to the rod is a hook supporting a coiled spring with a mass hanger and indicator. Supplied complete with a 250g slotted weight set, the apparatus is mounted on a wooden base.



## 560-533 Strip Testing Clamps

A pair of aluminium clamps which allow strip material to be investigated for breaking strain, stretch etc. The clamps measure 65 x 50 x 20mm each and have wing-nut fixings and an attachment system which ensures freedom from slip. Typical investigations would include comparison of carrier bag material strength from various supermarkets, comparison of paper strength including the 'grain' of newspaper, stretch of fabrics and polythene, etc. Designed to hook on to the centre peg of a Forces Board System or a standard laboratory clamp. Loading of the bottom clamp is by means of standard slotted weights. Suitable for KS3 to A-Level.



## 560-534 Wire Testing Clamp

Wire and thread testing is often carried out in a similar way to strip material but an effective gripping system is hard to achieve. These clamps solve the problem and are used in a similar way to the strip clamps (code: 560-533). Sold in Pairs. Max load 10kg. Full instructions supplied.



## PH0324 Elastic Materials Kit

Containing: 2 x 130x50x50mm latex foam blocks, 4 elastic cords with eyelets, 4 soft rubber erasers, 1 x 900mm length of valve tubing, 2 x 40g reel of bare copper wire 0.28mm & 0.45mm diameter, 2 wide steel springs of 4.5 turns, 50mm diameter and 25 expandable steel springs with ends bent to form hooks for testing beyond the elastic limit.

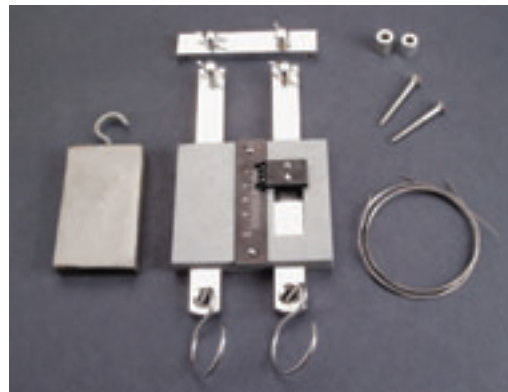
## PH0326 Youngs Modulus Apparatus Vernier Type, 10cm Brass Scale

Vernier type apparatus for the experimental determination of the relationship between a load applied to a wire and the resulting extension. The apparatus consists of an engraved 10cm brass scale and vernier with 0.1mm precision, complete with tension weight. No load masses or wires (code: PH0330) supplied.



## PH0329 Youngs Modulus Apparatus Vernier Type, 0-30mm Scale

Consists of a scale plate carrying a 0 to 30mm scale and a movable vernier readable to 0.1mm precision. Both have bars with clamping screws for the wires/hooks for the tension weight and masses. A ceiling clamp is provided for the upper ends of the wires, together with a pair of large wood screws for attaching it to a convenient overhead beam, door frame etc. A tension weight, mass 1.3kg approx., for the comparison wire is also included. (No load masses or wires supplied).



## PH0328A Youngs Modulus of Wires Apparatus with cast iron frame

## PH0328B Youngs Modulus of Wires Apparatus with brass frame

Searle's pattern apparatus. Spirit level mounted in two rectangular cast iron frames with one end resting on the point of the micrometer screw, fitted in one frame, the second end of a spirit level pivoted in the second frame. The micrometer has a vertical scale 10mm on either side of the zero and vernier graduated to 0.01mm precision. Complete with ceiling bracket having two self-centering chucks and tension weight. Supplied in case.



## PH0330 Set of Wires for Youngs Modulus Apparatus

A selection of six, 6m long wires for use with Youngs Modulus Apparatus: one each of 21 swg and 22 swg in brass, copper and stainless steel.



## PH0344 Lever, 1m Length, Wooden

Fulcrum lever is graduated in centimetres and is balanced on the knife edge of the fulcrum by a transverse groove cut midway in the length of the lever. Supplied with 2 sets of 100g weights.



## PH0340 Levers Kit

Designed as a kit for eight pupils consisting of five plywood beams 600 x 44 x 3mm graduated every 38mm. Each has a groove across its centre to locate the fulcrum point. Also included are 4x fulcrums 32 x 32 x 64mm and 40x 25mm square metal blanks. Masses of blanks are matched to  $\pm 1\%$ .



**EDU1097 Penny Weights, Brass, pk of 40**



## Pendulum Balls (Plumb Bobs)

**PBBR13** Brass 13mm  
**PBBR19** Brass 18mm  
**PBBR25** Brass 25mm  
**PBLE13** Lead 13mm  
**PBLE19** Lead 19mm  
**PBLE25** Lead 25mm



Comprising a solid sphere with a small hook for suspension.

## Steel Extension Springs

**SPHK55A** 15mm dia, 55mm, pk of 200  
**SP6225** 6mm dia, 225mm, pk of 200



**44-35-1111 Heat Poster**  
 - 890 x 584mm

A graphic depiction of key heat concepts. Includes an illustrated view of the sources of heat; the transfer of heat energy; heat absorption; the expansion and contraction of matter; and much more.



**3122 Heat Transfer Kit**  
**3121 Heat Transfer Kit, set of 5**  
**3120H Heat Transfer Kit, set of 15**

Used to observe and measure heat transfer, students fill one container with water at room temperature and the other with boiling water. A thermometer is then placed in each container. Students observe heat loss and gain. Includes two insulated containers with slotted lids, a U-shaped aluminium transfer bar and two thermometers.

## Heat Transfer Kit Components

**3205 Insulated Containers, pk of 10**  
**3262 High Temp Thermometers, pk of 15**  
**3266 Low Temp Thermometers, pk of 15**

Additional/replacement items for Heat Transfer Kit (code: 3122).



## BRNG Ball & Ring Apparatus

Two piece apparatus for demonstrating thermal expansion.



## P378 Bar & Gauge Apparatus

For illustrating expansion by heating and contraction by cooling. Comprising a bar of iron mounted on a support rod with wooden handle, and a brass gauge with a cut-out which barely admits the bar lengthways while cold, and a hole which passes the bar endways only while cold. Heating the bar and then comparing it to the gauge provides an excellent visual demonstration of thermal expansion.



## BIMET Bimetallic Strip

For demonstrating the differential expansion of two metals by the curvature produced when the strip is heated in a flame. Comprises a 200 x 15mm strip of brass and steel rivetted together with heat resistant rivets and mounted in a well-finished wooden handle.



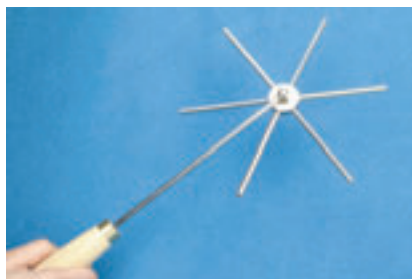
## PH0382 Bimetallic Strips, set of 10

With this kit students can easily investigate and utilise the effect of temperature change on a bi-metallic strip. The kit consists of a class set of 10 bi-metallic strips, measuring 100 x 8 x 0.5 mm, securely attached to wooden supports. The device can be held in a standard laboratory clamp. With a few leads, a battery or power supply, a buzzer and some crocodile clips students can invent a fire alarm while revising simple circuit work. The apparatus can form the basis of many other projects such as thermostats or investigations into expansion.



## PH0377 Conductometer

To demonstrate relative thermal conductivity of brass, copper, nickel, aluminium and iron. A rod of each metal is radially spaced equally on a brass hub. Each of the rods has a cavity at the outer end for holding paraffin wax. Using the wooden handle, hold the brass hub over a flame and see the wax melt at different rates.



## EDU083 Conductivity of Metal Apparatus

Strips of copper, brass, steel and aluminium mounted on a wooden ring and meeting in the centre. Gentle heating at the centre melts wax placed in the hollows at the end of each strip. Rates of conductivity in the different metals can be compared by the difference in time taken for each cup of wax to melt.



## Conductivity Rods

<b>CONCU</b>	<b>Copper</b> , pk of 3
<b>CONDFE</b>	<b>Iron</b> , pk of 3
<b>CONRD</b>	<b>Aluminium</b> , pk of 3

<b>211-003</b>	<b>Copper</b> , pk of 10
<b>211-004</b>	<b>Iron</b> , pk of 10
<b>211-005</b>	<b>Aluminium</b> , pk of 10

300mm long x 3mm dia. For thermal conductivity experiments.

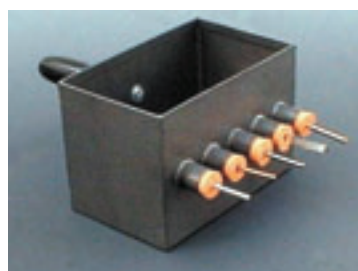
<b>PH0397</b>	<b>Combination set</b> , pk of 3
<b>PH0397G</b>	<b>Combination set</b> , pk of 6

Rods are 300mm long x 3mm diameter. Used for thermal conductivity experiments. Set of 3 contains: 1 each of copper, iron and aluminium. Set of 6 contains: 1 each of brass, copper, iron, lead, zinc and aluminium.



## EDU174 Ingenhausz Conductivity Apparatus

Five rods, one each of aluminium, brass, copper, zinc and iron, embedded along one side of a metal tank, size 150 x 90 x 100mm. Rates of melting compared by placing wax on the ends of the different rods thus demonstrates rates of conductivity in the different metals.



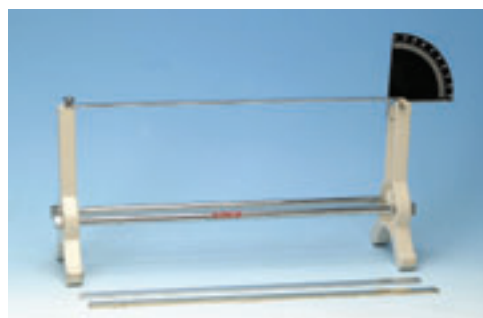
## PH0405 Cylinder, Wood and Metal

Comprising a cylindrical rod composed of two halves, one end of which is metal, the other wood. If paper is wrapped tightly round the cylinder and the rod is briefly held above a Bunsen flame, the portion in contact with the wood will be quickly scorched while the portion in contact with the metal will remain uncharred. 200 x 30mm dia.



## PH0368 Linear Expansion Apparatus

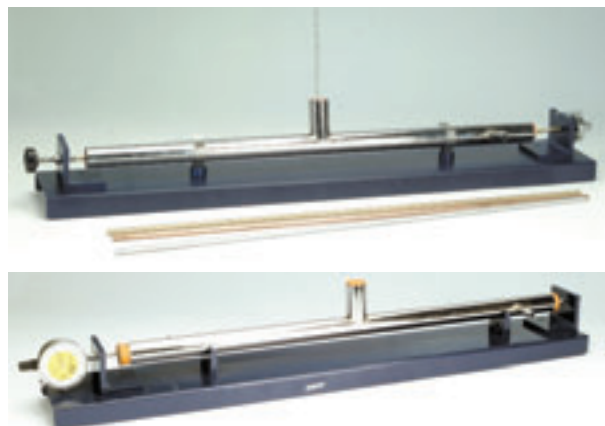
Two black metal pillars on a grey metal base, both drilled to hold metal specimens in the form of thin rods. Three rods of different metals are provided with thinner versions of two of these. An engraved scale with a sprung metal pointer is attached to one of the pillars to record the thermal expansion of the rods. Heating can be either by a spirit lamp or Bunsen burner. The spirit lamp has the advantage that it can be placed under each rod and left there. The Bunsen burner has to be hand-held but gives greater heating. The effective length of the rod when mounted between the pillars is 210mm. The pointer has a velocity ratio of 2.5. Moderate heating is sufficient to show that metals expand when heated and that different metals expand by different amounts. The apparatus, whilst clearly showing qualitative comparisons, is not intended to give accurate quantitative results.



## Linear Expansion Apparatus

PH0371A with Micrometer Screw  
PH0371B with Dial Gauge

Consisting of a 500mm long, 4.5mm dia. metal rod enclosed in a well lagged, nickel-plated brass tube with 3 tubules for steam inlet, outlet & thermometer. The metal rod to be investigated is supported in the steam jacket by detachable rubber bungs at each end of the tube. The apparatus is carried on a heavy-gauge channel base with an adjusting screw at one end. Supplied complete with copper, brass and iron rods but without thermometer. A micrometer screw (precise to 0.01mm) or dial gauge measures expansion.



## Bursting Bottles

EDU1035 with Stopper  
EDU1035A without Stopper

Designed to demonstrate the expansion of water on freezing. Comprises cast-iron bottle, 90 x 20mm, tapped to take threaded, square-shanked iron stopper.



## P411 Leslie Cube

Tinplate box with 130mm sides. The top opening is of 75mm diameter and is fitted with a lid. The apparatus is filled with water maintained at boiling point by a low bunsen flame. Infra-red sensors may be used to compare the relative radiant heat output from each of the four faces which are, respectively, blackened, roughened, varnished and polished.



## P388 Hope's Apparatus

Designed to show that water has a maximum density at 4°C. In winter, ponds and lakes are cooled from above. Convection then occurs throughout until a dense layer of water at 4°C forms on the bottom. The water above continues to cool until it freezes, then the ice provides an insulating layer that keeps the denser water beneath from cooling as quickly. The comparatively warm layer on the bottom enables aquatic life to survive. Were water not to have its maximum density at a temperature above its freezing point, then ponds and lakes would freeze throughout and, because heat conduction between air and ice is such a slow process, possibly fail to thaw even during the summer months.



## PH0428 Thermopile

Four 130mm long copper and iron wires twisted together to form seven junctions, four on one side and three on the other. Fitted with brass connectors.



## EDU094 Crookes' Radiometer

Comprising partly evacuated glass bulb approx 70mm dia., with contained at its centre a fine pivot which supports four lightweight metal arms. One side of each vane is blackened, the reverse side is white. Infrared radiation heats the black faces of the vanes more than the white, causing a pressure difference on either side of the vanes which drives the vanes round, providing a pleasant visual demonstration of several physical effects. Discussion of the mechanism turning the vanes covers several areas of physics including: thermal radiation and absorption; thermal transfer; air pressure; and momentum of gas molecules. The unit is mounted on a round plastic base.



## P410 Convection in Air Apparatus

Consists of a metal box 220 x 100 x 165mm, with a sliding glass front and two detachable glass chimneys. A candle holder is fixed to the base beneath the left chimney. Candles not included.



## PH0408B Convection in Water Apparatus 200x150mm

Comprising rectangle of 20mm borosilicate glass tubing fitted with a filling funnel to show convection in liquid. Supplied as tube only without clamps.



## EDU721 Boyle's Law Apparatus

Apparatus for the recording of pressure versus volumes and for investigating Boyle's Law. The vertical tube is part-filled with the coloured liquid and sealed. The trapped air is then compressed progressively, with pressure (p) and volume (v) readings taken at each stage. Before each pair of readings is taken, the liquid should be allowed to settle so that the heat caused by the compression is dissipated. Oil included.



## 251-401 Boyle's Law Apparatus

This apparatus provides an excellent method of demonstrating Boyle's Law. The unit is mounted on a sturdy Perspex board. The gauge and syringe are connected by a high pressure hose.



## 251-403 Boyle's Law Apparatus - Simple Type

A simple and economical apparatus for the demonstration of Boyle's Law. Consists of a sealed syringe mounted on wooden platforms. When loaded with different masses the air inside is compressed. Change in volume can be read from the syringe scale.



## CHLAW Charles' Law Apparatus

This apparatus can be used to demonstrate the thermal expansion of gases, to verify Charles' law and to estimate a Celsius value for the absolute zero of temperature. Apparatus provided: 1 x glass Charles' law tube, 1 glass beaker with stirrer. Supplied with specification and full instructions for use.



## BC-2004 Bourdon Gauge

This product is for both general and laboratory use. The gauge of rugged design is mounted on a heavy metal base giving great stability. The read-out is by a substantial black needle on a 100mm diameter white face. The back of the gauge is enclosed by clear Perspex, allowing the mechanism to be viewed. The input metal tube is rifflid and designed to fit rubber tubing of 8mm internal diameter.

**Calibration:** Scales are given on the white face in both kg/cm<sup>2</sup> (black) and psi (red). Conversion to SI units (pascals) can be obtained with sufficient accuracy by multiplying the kg/cm<sup>2</sup> readings by 105.

**Note:** The gauge is for positive pressures only (i.e. those in excess of atmospheric pressure). Connection to a source of negative pressure (e.g. vacuum pump) could result in damage to the apparatus.



## EDU079 Jolly's Bulb and Gauge

Comprising a thin-walled spherical bulb connected to a mechanical pressure gauge. The gauge gives instant pressure readings and reduces the inconvenience when using a manometer. Clamp (pictured) not included.



## PH0436 Immersion Heater

A sheathed miniature heater specially designed for use with metal block calorimeters. Electrical connection is via 300mm leads with heat resisting insulation and 4mm terminals. 12V, 50W.



## Calorimeter Heating Blocks

- CABLAL** Aluminium, 100 x 70mm dia.
- CABLBR** Brass, 108 x 40mm dia.
- CABLCU** Copper, 102 x 40mm dia.
- CABLST** Steel, 115 x 40mm dia.

For the experimental determination of the specific heat capacity of different metals. Cylindrical metal blocks, mass 1kg adjusted to an accuracy of  $\pm 2\%$ . Each block is drilled with two holes, a large central hole 12.5mm diameter for a special immersion heater and a smaller hole of 7.5mm diameter for a thermometer or temperature sensor.



## 310-001 Copper Calorimeter for Combostill

A copper calorimeter specially made to fit the Combostill (code: 310-009), enabling physics experiments to be performed on a microscale.



### Calorimeters

PH0438A Copper, 75 x 50mm dia.

211-007 Copper, 100 x 65mm dia.

PH0438B Copper, 100 x 75mm dia.

PH0440A Aluminium, 75 x 50mm dia.

PH0440B Aluminium, 100 x 75mm dia.

With parallel sides and rolled rim, without stirrer.

## PH0444 Calorimeters Polished Copper 75 x 50mm dia.

Resting on a felt pad inside an outer vessel 100 x 75mm (diameter). The outer vessel is fitted with a detachable clip-type thermometer support. Complete with stirrer.



## PH0452A Joules Calorimeter, Copper 75 x 50mm dia.

For the determination of the specific heat capacity of a liquid by the electrical method. The unit is a nickel-plated copper calorimeter 75 x 50mm (diameter), lagged and enclosed within an outer vessel 100 x 75mm (dia.). A close-fitting ebonite lid is provided with a wire stirrer, and a pair of 4mm socket terminals connected to a Constantan wire heating coil. The resistance of the coil is approximately  $6\Omega$  and should be used with a current 0.5A (with a maximum of 1A). Supplied without thermometer.



## 211-002 Calorimeter Set, Aluminium

### Comprising:

Outer vessel 125 x 145mm

Inner vessel 100 x 125mm

Fibre insulator

Stirrer

Rubber stopper

Transparent cover

Thermometer

Capacity: 1 litre. Weight: 700g.



## PH0458 Steam Generator, 1.5L with Handle

Steam generator constructed from copper. 280 x 115mm, capacity 1.5L. Neck is 23mm in dia. With side tube and water gauge



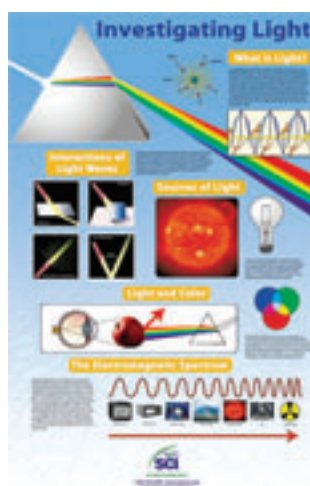
## 270-131 Thermistor System

This apparatus contains an NTC based thermistor, with a nominal resistance of 4.7k $\Omega$ , in a glass tube with electrical connection made by means of 4mm sockets. Students from Key Stage 3 to Post-16 can carry out practical investigations into the thermistor characteristics. Rod length: 220mm.



## 44-35-1121 Light Poster - 890 x 584mm

An illuminating look at light, its sources and applications.



## 1640 Light OHP Transparencies, set of 6

Illustrate the properties of light and the function of lenses with this set of six transparencies. Includes 4 overlays.



## 3091 Spectroscope Kit

## 3093 Spectroscope Kit, set of 15

Students will get to see and appreciate the prismatic qualities of sunlight by using this 1" in diameter diffraction grating spectroscope.



## 3565 Spectral Analysis Kit

Students observe the characteristic colour of a flame from various elements. They also observe that different elements produce very different, distinguishing colours. Using the spectroscope, students see the light emitted from familiar light sources and compare the appearances. Kit includes 24 spectroscopes, 15 handles, one 4-foot length of wire and one bottle each of chloride, cupric chloride, cupric nitrate, lithium chloride, potassium chloride, potassium nitrate, sodium hydrogen carbonate, sodium chloride, strontium chloride and strontium nitrate. Instructions and MSDS included.



## 3981 Light Energy Kit

Help your students to understand the properties of light energy with this kit. 18 activities, including light transmission, light theory and colour, light sources, reflection, refraction and diffraction of light. Teacher's Guide included.



## 4003 Reflection, Diffraction & Refraction Kit

These hands-on experiments reveal the mystery of how light travels. This kit includes instructions for reflecting and refracting light and includes light theories. A variety of translucent opaque objects and a Teacher's Guide are also included.



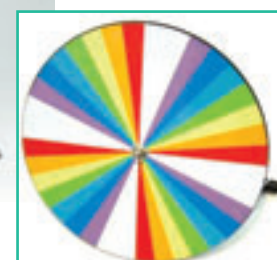
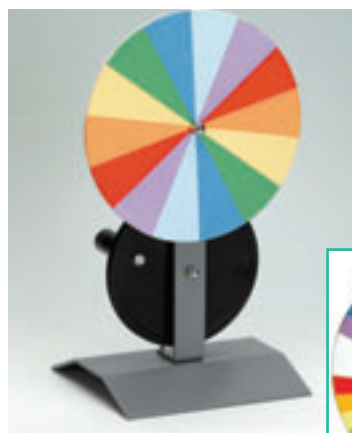
## 6016 Pinhole Viewer

With this device, students learn how the intensity of light and differently shaped lenses affect what the eye actually sees.



## P582F Newton's Colour Disc - Belt Spin model

Well finished product used for demonstrating that white light may be composed from all the spectral colours by rotation of the multi coloured disk. Mounted on a metal stand the 180mm diameter disk is driven by a belt with the help of the hand driven wheel.



## 241-001 Newton's Colour Disc - Hand Spin model

Well finished product used for demonstrating that white light may be composed from all the spectral colours by rotation of the multi coloured disk.

## 241-002 Xenon Stroboscope

Edu-Lab's digital xenon stroboscope is a lightweight, sturdy and compact instrument. A variable flashing rate adjustment is an important feature of the stroboscope. A 240V, 50Hz power supply is required.

**Specifications:** 60 to 18,000 RPM, 0.2 to 300Hz. External triggering signal. Actual Size: 215 x 140 x 150mm.



## 280-216 Fibre Optics System

This set provides a self contained system for demonstrating and using a fibre optic data link. The transmitter unit is housed in a small plastic case and contains all the electronics for producing the modulated light source as well as an easily accessible PP3 battery compartment. A choice of modulation is available. A variable frequency audio tone in the range 1Hz-1kHz and a 250kHz square wave for speed of light investigations which is brought out to 4mm sockets for monitoring on an Oscilloscope. The receiver is in a similar case and contains a variable gain amplifier with integral loudspeaker as well as direct monitoring sockets for an oscilloscope. The system comes complete with 5m and 20m sheathed polymer optical fibre coils terminated with clip housings to mate with the transmitter and receiver units. The wavelength used is in the visible red part of the spectrum and with the modulation set at 1Hz the pulsing beam can be easily seen. Full instructions for use are included as well as details of the speed of light experiment. Note the speed of light determination requires a high quality 20MHz oscilloscope for monitoring the signal delay. An un-terminated 20m coil of polymer fibre (code: 280-217) is available as an extra for general fibre optic work.



## 280-217 Polymer Fibre Coil, 20m, Unterminated

An un-terminated 20m coil of polymer fibre for general fibre optic work.



## ESR23 Light and Optics Kit

This kit is very useful for reflection, refraction and colour mixing experiments. The Mirrored Raybox (code: EDU528) consists of a light source (12V, 24W lamp) producing a convergent, divergent or parallel beam. On one end there is an adjustable cylindrical convex lens (for parallel beam) and a triple aperture system for colour mixing experiments at the other end. (Lateral aperture is provided with adjustable hinged mirror). All apertures in the box are provided with vertical channels to hold slit-plates and colour filters.

**The optical set includes:** acrylic blocks; a set of three mirrors; 2 black slit-plates, one with three narrow slits at one end and one narrow slit at the other, one with four narrow slits at one end and one wide slit at the other; a set of seven mounted colour filters.



## EDU767 Stroboscope

Hand held model. Ideal for use with Ripple Tank (code: EDU044) and other wave and motion studies.



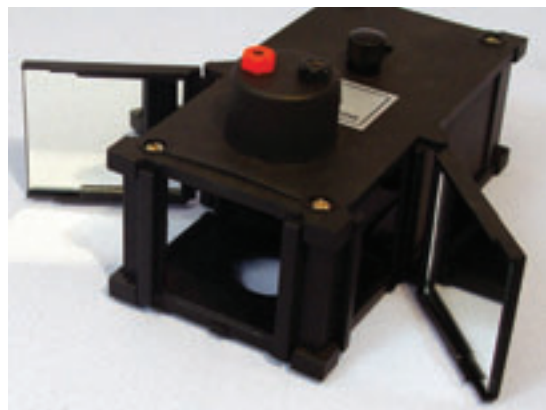
## EDU528 Raybox, Mirrored

As supplied in the Light & Optics Kit (code: ESR23) but with no accessories included.

### Raybox Accessories

CFSET6	Colour Filters, set of 7
EDU656	Slit-Plates, 1 Single & 1 Triple slit
PH0606E	Multiple Slit Comb
EDU659	Spare Rider, pk of 5
RAYBULB	Spare Bulb
EDU660	Bulb Holder, pk of 5
EDU661	Spare Lens, pk of 5

Accessories for Raybox (code: EDU528).



## EDU039N Raybox with Accessories

The raybox can be used in a single-ray mode without using the plano-convex lens. However, with the lens inserted and using the two-slit, three-slit or broad-slit masks, the emergent light can be made to be divergent, convergent or parallel by adjusting the position of the light source in relation to the lens. The raybox can be used in a wide range of optical experiments with transparent flatbased blocks, prisms and mirrors. The coloured filters can be used to produce beams of coloured light, but external light levels have to be reduced for maximum effectiveness. Base measurements: 180 x 65 x 75mm. The light source is mounted under an adjustable lid, designed so that minimum light emerges in unwanted directions. Power requirement: 12V (AC or DC) connected to two 4mm sockets on the raybox. Light source: 12V, 10W line-filament bulb, length 43mm. Accessories: Plano-convex lens of focal length 75mm; 2 plastic masks with, respectively, one and two thin slits, three thin slits and one broad slit; 7 coloured filters and 1 tri-colour filter, mounted in 50 x 50mm plastic frames; 1 spare 12V 10W bulb.



## EDU1208 Optical Bench Kit

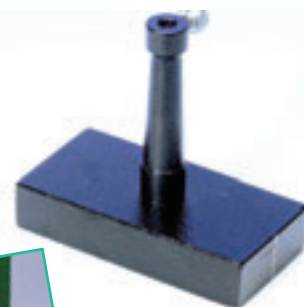
For use in a wide range of optics experiments including focal length of lenses, curvature or mirrors and lens combinations etc.

**Comprises:** Non-twisting aluminium alloy bench (1,200mm) with easy to read scale divided into cm and mm; light source with mounting rod, bulb (12V, 24W), 2m of flex and 2 x 4mm plugs; 3 x universal holders on sliders; 50 x 50mm slides; triangular gauze object with image return screen, 2 x pin objects, diffuser/screen and scale object; magnification accessory with concentric circles 10mm and 20mm dia.; 100 x 100mm double sided scaled screen on slider; 50 x 50mm plane mirror.



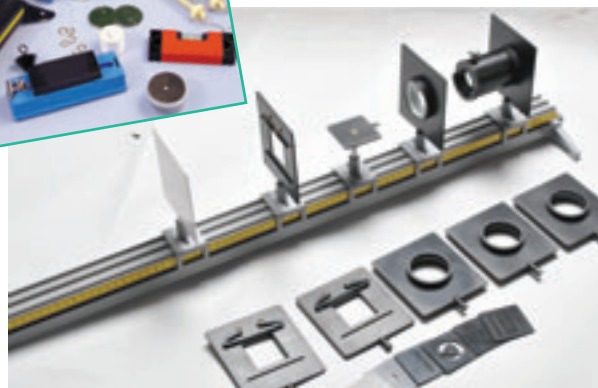
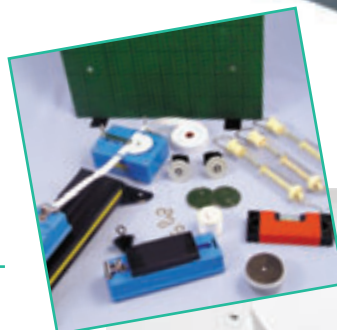
## PH0702A Optical Bench Accessories Stand

Consists of a metal pillar with a hole and lock screw mounted on a heavy base. An index line is engraved on one side of the base.



## EDU810 Optical Bench Kit with Force, Motion & Dynamics Kit - Complete System

A comprehensive kit combining an optical bench kit with the Force, Motion and Dynamics kit (code: EDU801) for a wide range of investigations into many aspects of optics and dynamics.



## PH0666 Optical Bench Kit, 12V, 24W

Wooden optical bench with accessories. 1.5 metres long with millimetre divisions. Mounted accessories: Lamp housing with white lamp; white metal object screen of 75mm dia.; lens holder for 38mm diameter lenses; object needle mounted on 6mm metal rod; plane mirror in metal frame, 100x75mm; white metal receiving screen with slot for squared paper.



## EDU949 Diffraction Demonstration Slide

For demonstrating the principle of the diffraction grating and the way in which its properties are dependent upon the number of lines per unit length. Comprises a card mount 90 x 40mm with three 16 x 9mm apertures containing diffraction grating replicas of 100, 300 and 600 lines/mm, resp.



## EDU946 Diffraction Grating, 80 lines / mm

## EDU947 Diffraction Grating, 300 lines / mm

## EDU948 Diffraction Grating, 600 lines / mm

Overall Size 50 x 50mm. Aperture Size 36 x 24mm. Mounted between two glass protecting plates



## Lens, Mirrors & Prisms

### EDU144 Lens Set, pk of 4

#### Consisting of:

- Biconcave, 50mm. Focal length: 100mm
- Biconcave, 50mm. Focal length: 150mm
- Biconvex, 50mm. Focal length: 100mm
- Biconvex, 50mm. Focal length: 150mm



### Lenses, pks of 20

High quality precision finished lenses for a variety of light and optics experiments. Individually pouched and supplied in neat presentation cases. Packs of 20.

- LBVS050** Biconcave 38mm Focal: 50mm
- LBVS100** Biconcave 38mm Focal: 100mm
- LBVS150** Biconcave 38mm Focal: 150mm
- LBVS200** Biconcave 38mm Focal: 200mm
- LBVS250** Biconcave 38mm Focal: 250mm
- LBVS300** Biconcave 38mm Focal: 300mm
- LBVS500** Biconcave 38mm Focal: 500mm



- LBVL050** Biconcave 50mm Focal: 50mm
- LBVL100** Biconcave 50mm Focal: 100mm
- LBVL150** Biconcave 50mm Focal: 150mm
- LBVL200** Biconcave 50mm Focal: 200mm
- LBVL250** Biconcave 50mm Focal: 250mm
- LBVL300** Biconcave 50mm Focal: 300mm
- LBVL500** Biconcave 50mm Focal: 500mm



- LBXS050** Biconvex 38mm Focal: 50mm
- LBXS100** Biconvex 38mm Focal: 100mm
- LBXS150** Biconvex 38mm Focal: 150mm
- LBXS200** Biconvex 38mm Focal: 200mm
- LBXS250** Biconvex 38mm Focal: 250mm
- LBXS300** Biconvex 38mm Focal: 300mm
- LBXS500** Biconvex 38mm Focal: 500mm



- LBXL050** Biconvex 50mm Focal: 50mm
- LBXL100** Biconvex 50mm Focal: 100mm
- LBXL150** Biconvex 50mm Focal: 150mm
- LBXL200** Biconvex 50mm Focal: 200mm
- LBXL250** Biconvex 50mm Focal: 250mm
- LBXL300** Biconvex 50mm Focal: 300mm
- LBXL500** Biconvex 50mm Focal: 500mm

## Cylindrical Glass Lenses

**CYLEN01** Biconvex, 50mm (H) x 45mm (W)  
Focal: 75mm

**CYLEN05** Biconcave, 50mm (H) x 45mm (W)  
Focal: 75mm

**CYLEN10** Planoconvex, 50mm (H) x 45mm (W)  
Focal: 75mm

High quality precision finished lens for a variety of light and optics experiments. Individually pouched and supplied in a neat presentation case.



## Meniscus Lenses

**LEME11D** 50mm dia +11D

**LEME25D** 50mm dia +2.5D

**LEME3D** 50mm dia +3D

**LEME55D** 50mm dia +5.5D

**LEME8D** 50mm dia +8D

High quality precision finished lens for a variety of light and optics experiments. Individually pouched and supplied in a neat presentation case.



## P550/F Wooden Lens Holder

A wooden holder to take lenses or mirrors up to 76mm dia. Comprising an upright 100mm high with V-shape slot to hold a convex or concave lens, mounted on a rectangular base 100 x 50mm. An index mark is engraved on each end of the base.

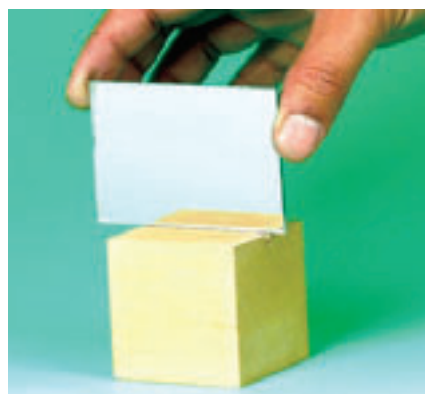


## EDU734 Lens Holder, Slide Support, pk of 5

Plastic lens holder suitable to house lenses up to 50mm. Mounted on base. Used in conjunction with Light & Optics experiments. Simple locking ring holds lens firmly in position.

## PH0516 Mirror Support Block, 50 x 50 x 50mm, pk of 10

A slotted wooden lock for supporting mirrors



## Mirrors, pks of 10

Optically worked glass. Silver backed with protective coating. Unmounted, Glass Plane Mirrors.

EDU909	Plane Glass, 50mm x 50mm
PH0514A	Plane Glass, 75mm x 25mm
PH0514B	Plane Glass, 75mm x 50mm
PH0514C	Plane Glass, 100mm x 75mm
PH0514D	Plane Glass, 150mm x 25mm
PH0514E	Plane Glass, 150mm x 50mm
EDU908	Plane Glass, 50mm x 100mm

PH0520B	Concave, 50mm dia, Focal: 75mm
PH0520C	Concave, 50mm dia, Focal: 100mm
PH0520D	Concave, 50mm dia, Focal: 150mm
PH0520E	Concave, 50mm dia, Focal: 200mm
PH0520F	Concave, 50mm dia, Focal: 300mm

PH0520L	Concave, 75mm dia, Focal: 300mm
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PH0526B	Convex, 50mm dia, Focal: 75mm
PH0526C	Convex, 50mm dia, Focal: 100mm
PH0526D	Convex, 50mm dia, Focal: 150mm
PH0526E	Convex, 50mm dia, Focal: 200mm
PH0526F	Convex, 50mm dia, Focal: 300mm

PH0526L	Convex, 75mm dia, Focal: 300mm
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## Acrylic Prisms

Clear polished acrylic prisms for optics experiments.

GACB1	Giant Equilateral Triangle 190 x 190 x 190mm X 25mm thick
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GACB2	Giant Isosceles Triangle 185 x 135 x 135mm X 25mm thick
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GACB3	Giant Rectangular 190 x 120mm X 25mm thick
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ACB010	Rectangular, 75 x 50mm
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PH0568B	Rectangular, 100 x 65 x 18mm
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PH0560A	Equilateral Triangle, 38mm sides
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PH0562A	Right-angled Triangle, 35 x 25mm
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PH0564	Isosceles Triangle, 15 x 60 x 20mm
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ACB011	Biconvex, 75 x 115mm
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ACB012	Biconcave, 75 x 115mm
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ACB014	Equilateral Triangle, 60 x 60 x 60mm
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ACB015	Isosceles Triangle, 90 x 45 x 45mm
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ACB016	Right-angled Triangle, 90 x 60 x 30mm
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ACB013	Semi-circular, 75mm dia.
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PH0570A	Semi-circular, 90 x 16mm thick
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PH0570B	Semi-circular, 90 x 25mm thick
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## ACB017 Acrylic Prism Set

Consists of 7 blocks in well presented storage tray. All faces fully polished. Rectangle 75 x 50mm; Semi-circular 75mm dia.; Triangle 60 x 60 x 60° with 58mm side; Triangle 90 x 45 x 45° with 75mm hypotenuse; Triangle 90 x 60 x 30° with 75mm hypotenuse; Bi-convex, 75mm long curved faces, 100mm radius; Bi-concave, 75mm long curved faces, 100mm radius, 25mm thick.



## Glass Prisms

High quality glass with optically worked surfaces. All angles accurately worked. The edges are slightly bevelled and the glass completely bubble-free.

- PH0566A Rectangular, 75 x 50 x 12mm
- PH0566B Rectangular, 75 x 50 x 18mm
- PH0566C Rectangular, 100 x 60 x 18mm
- GBREC Rectangular, 115 x 65 x 18mm
- PRISM Triangle, 90 x 60 x 30°
- PRIG38 Right-angled Triangle, 38 x 38mm
- PRIG50 Right-angled Triangle, 50 x 50mm
- PRMEQ38 Equilateral Triangle, 38 x 38 x 38mm
- PREMQ50 Equilateral Triangle, 50 x 50 x 50mm
- PH0556A Equilateral Triangle, 25 x 25 x 25mm
- PH0558A Right-angled Triangle, 25 x 25mm
- PH0570C Semi-circular, 90 x 16mm thick



- PH0583A Borosilicate Crown Glass  
Refractive Index: 1.51
- PH0583B Dense Flint Glass  
Refractive Index: 1.62
- PH0583C Extra Dense Flint Glass  
Refractive Index: 1.65
- PH0583D Double Extra Dense Flint Glass  
Refractive Index: 1.71-1.74



Optically worked prisms for use with Spectrometer. Equilateral triangle, two faces polished. 32 x 32mm.

## PH0584 Newton's Ring Apparatus

Pair of 60mm diameter optically polished glass plates, one plane and the other plano-convex, mounted together in a metal frame. The pressure between the plates is adjustable by three brass, nickel-plated screws.



## PH0607 Pinhole Camera Kit

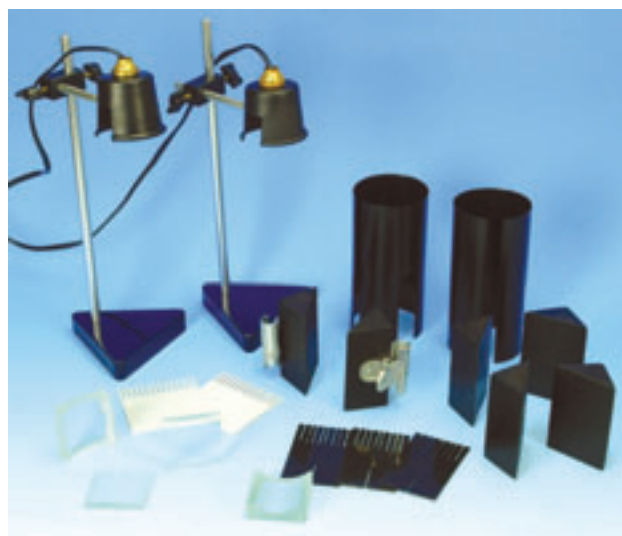
The kit consists of 8 cardboard boxes 150 x 100 x 100mm with hole, screen and lid; filament lamp; 50 sheets of black paper 200 x 250mm; one 60W lamp; one mounted lamp holder with flex; one packet of pins. Uses a basic pinhole camera to show the principles of image formation.



## PH0606A Ray Optics Kit

A versatile kit of components for ray optics experiments. Suitable for investigations in linear propagation of light rays, focussing of rays by cylindrical lenses, focussing of multiple rays showing aberration, law of reflection, refraction in water and prisms etc. Kit consists of:

- 2 lamps with stands (12V, 24V)
- 1 pair of housing shields
- 2 combined single and triple slit plates
- 2 multiple slit combs
- 2 holders for combs and slit plates
- 4 wooden light barriers
- 4 plano cylindrical lenses + 7D
- 2 plano cylindrical lenses +10D
- 2 plano cylindrical lenses + 17D
- 2 plano cylindrical lenses -17D



## P594 Direct Vision Spectroscope

For the rapid examination of spectral composition of white light sources. This instrument gives a brilliant spectrum with a dispersion of approx.  $11^\circ$ . The slit is of variable width and adjusted by rotating the end piece. Supplied in a wooden case. 80 lines per mm.



## PH0619 Standard Spectrometer

An economically priced instrument which is capable of useful quantitative work. The main structural parts, including the collimator and telescope bodies are high quality castings. All metal parts are well coated with high quality finishes.

**SCALE:** 170mm diameter, divided 0 to  $360^\circ \times 1^\circ$ , independently rotates with locking screw. A spring loaded Vernier scale attached to the telescopic mount provides readings to  $0.1^\circ$ .

**COLLIMATOR:** Mounted on fixed pillar with axis adjustment. Objective lens has 150mm focal length, aperture of 212mm and is carried in spiral focussing system. Unilaterally adjustable slit 6mm long.

**TELESCOPE:** Mounted on movable pillar with adjustment by a locking screw and axis adjustment. Objective lens has 170mm focal length, 21mm aperture and is carried in a spiral focussing system. Ramsden eyepiece with cross wires and locking ring focus adjustment.

**PRISM TABLE:** The table is provided with three levelling screws and has lines marked to assist placement of prism.

**STANDARD ACCESSORIES:** Includes 1 prism clamp for prisms up to 40mm high, 1 diffraction grating holder, aperture 25 x 25mm, 1 small screwdriver, 1 tommy bar for axis adjustment. Full instructions.



## PH0620 Advanced Spectrometer

This instrument is specifically designed for advanced work but is sufficiently robust for individual student use. It is capable of high performance. The main structure is of heavy cast metal with bright plated fittings. The instrument is mounted on a baseboard which fits into a polished hardwood case.

**SCALE:** 177mm diameter circle is fixed. The table and telescopic movements are completely independent of each other. Both movements can be read to 30sec. of arc by means of double ended verniers. Both rotations have fine adjustment screws. Release of a clamping screw enables coarse adjustment to be made manually.

**COLLIMATOR:** Mounted on a fixed pillar and fitted with 178mm focus achromatic objective with 32mm clear aperture.

**TELESCOPE:** Mounted on a movable pillar and fitted with 178mm focus achromatic objective with a 32mm clear aperture. Also fitted is x15 Ramsden eyepiece and a glass cross line graticule.

**PRISM TABLE:** The table is marked with lines to assist placing the prism with respect to the levelling screws and has interchangeable clamping units for the prism and grating.



## 241-004 Spectral Lamp Power Supply with Lamp Holder

Spectral lamps produce monochromatic light at high intensity. Edu-Lab's spectral lamps have a glass tube with an inner discharge column. The discharge column contains the gas.

**Please enquire for spectral lamp required.**



## PH1197A Spectrum Tube Stand with Power Supply

Specially designed box holds the tube firmly and prevents the student from touching the electrodes. A black panel behind the tube eliminates distracting ambient light and protects the tube from breakage. Operates on 220V A/C at 50Hz and is suitable for 20/26 cm tubes.



### Spectrum Tubes, 260mm

- PH1196B1 Oxygen
- PH1196B2 Neon
- PH1196B3 Helium
- PH1196B4 Air
- PH1196B5 Nitrogen
- PH1196B6 Argon
- PH1196B7 Carbon Dioxide
- PH1196B8 Iodine Vapour
- PH1196B9 Hydrogen
- PH1196B10 Sulphur Water Vapour
- PH1196B11 Krypton
- PH1196B12 Xenon

Spectrum tube, straight form, 260mm length with 50mm long fine capillary tube. Recommended for use with the Spectrum Tube Holder with Power Supply (code: PH1197A).



## WB005 Light Guide Demonstrator

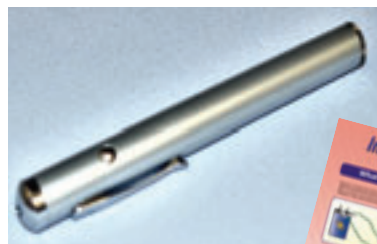
An 'S' shaped acrylic bar 220 x 20 x 20mm which can be used with the Raybox (code: EDU528) to demonstrate total internal reflection. It helps students to understand the principles of optical communications. The bottom of the bar is painted white to aid visibility.



## 712-004 Laser Pen

This inexpensive and lightweight laser pen is useful for ray optics demonstrations and simple diffraction work. In addition to this you can make your point on overhead images with this useful presentation tool.

**Caution:** Laser Light. Do not stare into the beam or view directly with optical instruments.



## 44-35-1126 Magnetism Poster - 890 x 584mm

A graphical summary of this key topic! Provide your students with a visual summary which provides insight into what is magnetism; the type of magnets that exist; the concept of attraction-repulsion; magnetic fields; Earth's natural magnetism, and much more.



## 221-001 Magnetic Activity Kit, pk of 10

Consists of 5 anisotropic ferrite magnets, a rod, screw-on caps and washers. Easy to use kit demonstrates N & S pole, levitation by repulsion, strength and distance, how to make a stronger magnetic field, magnetic field through liquids, solids and gases. Instructions included.



## 4006 Magnetics Kit

Help students understand the force of magnetism with these exciting experiments including classifying magnetic and non-magnetic materials, what attracts and repels, magnetic force through solids, how compasses react to a magnetic field and more. Includes Teacher's Guide and material for five students.



## R-4000900 Investigating Magnetism Kit

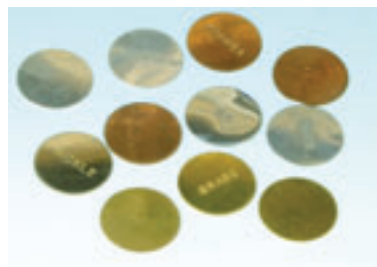
By creating electromagnets and conducting ten other activities, students learn the principles of magnetism and magnetic fields. Teacher's Guide and two student workbooks provide all the necessary background and instructions. All necessary materials are in the kit.



**EDU149 Metal Discs, set of 8**  
25mm dia

**EDU150 Metal Discs, set of 16**  
8 stamped & 8 unstamped, 25mm dia

Set of 8 metal discs each stamped with the metal name. Consists of: brass, copper, bronze, nickel, mild steel, stainless steel, zinc and aluminium. 25mm diameter.



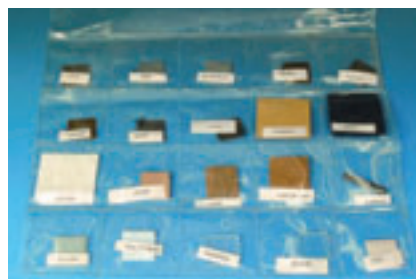
**EDU889 Metal Strips, set of 12**

A set of twelve metal strips for magnetism experiments. Each strip is stamped with a key letter for easy identification. The set contains magnetic and non-magnetic metals.



**221-003 Materials Collection for Magnetism Studies**

A collection of twenty various magnetic and non-magnetic materials for teaching the principles of magnetism.



### Magnetic Needles

**MGND50** 50mm, with Jewel Bearing

**MGND75** 75mm, with Jewel Bearing

**MGND100** 100mm, with Jewel Bearing

**P816A** 50mm, with Brass Cup Bearing

**P816B** 75mm, with Brass Cup Bearing

**P816C** 100mm, with Brass Cup Bearing

Carbon steel needle with jewel or brass cup bearing for pivoting.



**P818 Magnetic Needle Stand, Metal**

Non-magnetic metal pillar with carbon steel point, on stable base, of overall height 110mm. (needle not included).



**P818A Magnetic Needle Stand, Plastic**

Non-magnetic metal pillar with carbon steel point, on stable base, of overall height 110mm. (needle not included).



## PH0820A Plotting Compass, Economy

16mm dia., pk of 10

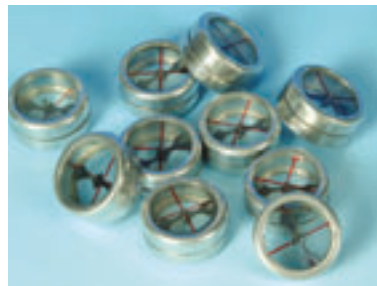
Dial marked with principal points of the compass, one glass face only in aluminium case. 16mm diameter.



## PH0822 Plotting Compass, 2 glass faces

20mm dia., pk of 10

With two glass faces 20mm diameter. Provided with a durable plastic case for storage.



## PH786A Magnet Bar & Keeper

37x12x5mm (Pair)

## PH786E Magnet Bar & Keeper

150x12x5mm (Pair)

Chrome steel bar magnets packed in pairs with keepers. Coloured half red, half blue.



## Magnets - Alnico Bars & Keepers

PH0787A 37 x 13 x 10mm (Pair)

PH0787B 50 x 13 x 10mm (Pair)

PH0787C 75 x 13 x 10mm (Pair)

PH0787D 100 x 13 x 10mm (Pair)

PH0787E 150 x 13 x 10mm (Pair)

PH0788A 37 x 15 x 10mm (Pair)

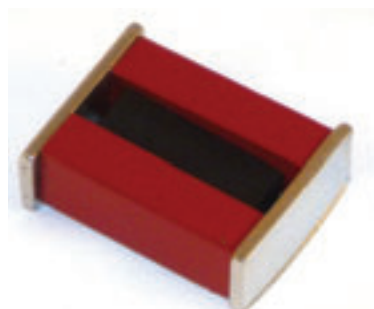
PH0788B 50 x 15 x 10mm (Pair)

PH0788C 75 x 15 x 10mm (Pair)

PH0788D 100 x 15 x 10mm (Pair)

PH0788E 150 x 15 x 10mm (Pair)

ALNICO magnets. Dimensions are nominal. Boxed in pairs with keepers.



## PH0804 Magnetising & Demagnetising Coil

A solenoid wound with insulated copper wire and mounted on a base, complete with switch and 4mm socket terminals. Low voltage, suitable for magnetising and demagnetising ordinary magnets, iron bars, strips etc.



## 221-800 Re-magnetiser

Re-magnetiser for bar and horseshoe magnets. No electricity required.



## 260-719 Parallel Foil Bar

A neat and effective way of supporting foil strips when demonstrating the attraction and repulsion of current-carrying conductors.



## PH0797 Floating Magnets, Blue PH0797A Floating Magnets, Coloured

A set of 5 ceramic magnets, of 32mm external diameter, mounted on a 150mm high wooden pole. Illustrates magnetic repulsion forces.



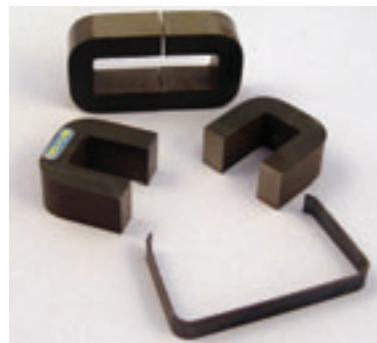
## 100-170 F=BIL Coil

A heavy-duty printed circuit coil measuring 110 x 85mm on an aluminium handle gives 5 or 10 turns. It can be placed between the poles of a permanent magnet on the top pan of a chemical balance so that when a current is passed through the coil a force is exerted on the magnet due to the magnetic effect of the current. Quantitative measurements can be taken to investigate the formula  $F = BIL$ .



## CCORE2 C' Cores with Clip, set of 2

Double 'C' core and holding clip. A laminated, rounded-rectangle core with square cross-section, which has been cut across the middle to produce two equal C's with square, bare-metal meeting faces. A spring steel clip is provided to hold them together.



## EDU143 Magnetic Field Apparatus, set of 3

A set of 3 perspex-mounted wire arrangements designed to demonstrate the electromagnetic fields generated by a current passing through a conductor.

### A) Single conductor type:

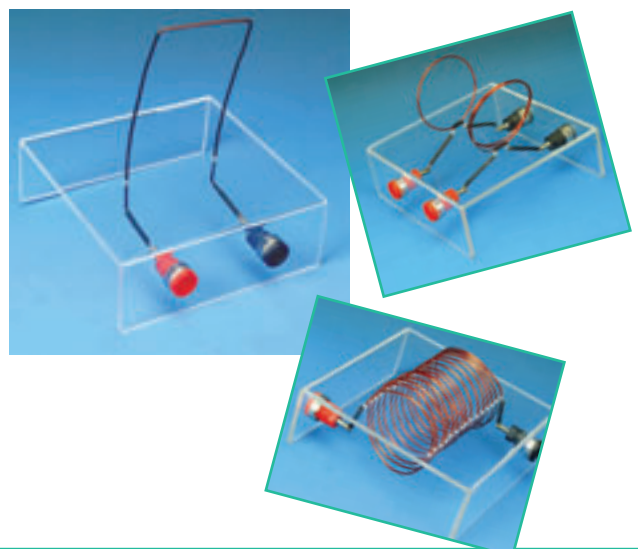
A rectangular loop of wire 1.5mm diameter capable of carrying a maximum 8A current. Either sprinkled iron filings or a plotting compass is placed around the vertical wire to show the magnetic field emitted around a current carrying wire.

### B) Single and 5 turn flat coil:

Both coils have a 62mm diameter of 1.5mm copper wire. The single turn will take 8A and the 5 turn is restricted to 5A.

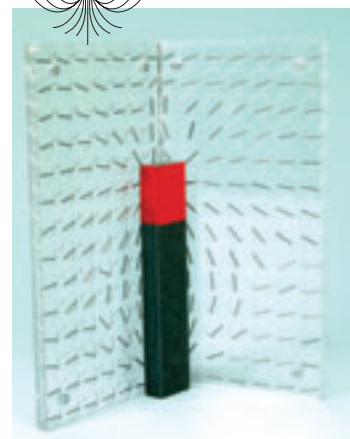
### C) Open Helix Coil:

Consists of 14 turns of 1.5mm diameter copper wire open wound on a clear base. Coil 51mm diameter x 92mm length.



## PH0803 Magnetic Field Demonstrator

Ever tried removing iron filings from a magnet? This is the perfect solution for previously-messy magnetic field line demonstrations, clearly revealing the field lines in 1, 2 or 3 dimensions without the need for loose iron filings. Equally suited for demonstration purposes and students' experiments.



## 20-1053 Measurement in the Laboratory

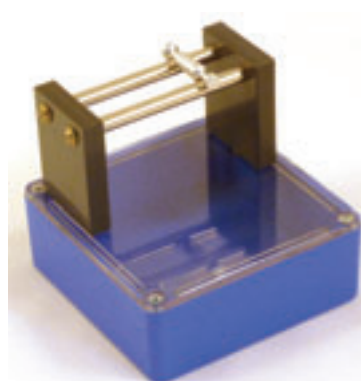
### Lab Investigation

Study key measuring methods & techniques. Expand the foundational science skills of your class, making them familiar with the basic units of measurement. Your students will master the common measurement skills used in the introductory science laboratory through skill-oriented explorations. Using comprehensive, curriculum-based investigations, they learn about the metric system, mass, volume, density, gravity, temperature and pH. Through these activities, the class gains a thorough understanding of how to gather information, graph and analyze data, and interpret scientific diagrams. Class size - 40 students. Suitable for KS3.



## FLM Fleming Apparatus

Fleming's apparatus for supplies up to 6V 3A D.C.



## PH303A Scale Pan, Brass

## PH303B Scale Pan, Bakelite

75mm diameter with suspension cords and hook.



## Forcemeters

ATSP0250 250g/2.5N Blue

ATSP0500 500g/5N Green

ATSP1000 1kg/10N Beige

ATSP2000 2kg/20N Red

ATSP3000 3kg/30N White

ATSP5000 5kg/50N Yellow

EDU100 Boxed set of 6

High quality tubular spring balances which are colour coded and scaled in both Newtons and grams. The stainless steel spring mechanism is clearly visible and zero adjustment is incorporated.



## Spring Balances

PH0022A	50g, 1g graduation
PH0022B	100g, 1g graduation
PH0022C	250g, 5g graduation
PH0022D	500g, 5g graduation
PH0022E	1000g, 10g graduation
PH0022F	1000g, 20g graduation
PH0022G	2000g, 40g graduation

Polystyrene body with large, easy-to-read anodised metal scale and adjustable 'zero'.

## Spring Balances

PH0028A	1.5kg, 25g graduation
PH0028B	3kg, 50g graduation
PH0028C	6kg, 100g graduation
PH0028D	10kg, 250g graduation

An inexpensive, pocket-sized spring balance with the added benefit of a double scale/index system. This allows the scale to be read from either side. The casing is moulded in tough ABS plastic. Length: 85mm. Width: 25mm.

## Spring Balances

PH0026A	Dual Scale - 100g/1N
PH0026B	Dual Scale - 250g/2.5N
PH0026C	Dual Scale - 500g/5N
PH0026D	Dual Scale - 1000g/10N
PH0026E	Dual Scale - 2000g/20N
PH0026F	Dual Scale - 5000g/50N
PH0026G	Dual Scale - 10,000g/100N

Metal cased, flat form, dual scale spring balance.

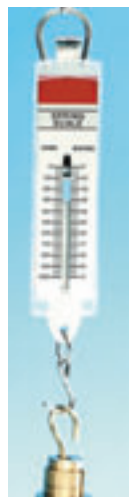
## Two Way Forcemeters

SBPP25	2.5N/250g - Blue
SBPP5	5N/500g - Green
SBPP10	10N/1kg - Beige
SBPP20	20N/2kg - Red
SBPP30	30N/3kg - White
SBPP50	50N/5kg - Yellow
SBPP100	Set of 6

A series of tubular meters used to investigate measurement of force involving either a push or a pull action. Calibrated in grams and Newtons. The extended rod has a clear flat surface to mark own scales of measurement using a dry wipe marker. The range of six balances is colour coded for easy reference.

## DYNA Dynamometer, Push-Pull

Consists of a steel compression spring mounted on a graduated chrome-plated rod. Unit is housed in a metal tube fitted with T-shaped handle. The instruments are direct reading, fitted with a scale calibrated in Kg and Newtons and a cursor registering the push/pull reading. 100N maximum. Overall length: 350mm.



## Mass Sets

### Masses

MB001	Brass 1g
MB002	Brass 2g
MB005	Brass 5g
MB010	Brass 10g
MB020	Brass 20g
MB050	Brass 50g
MB100	Brass 100g

Small form slotted masses.

### Hangers only

MHB010G	Brass 10g
MHB020G	Brass 20g
MHB050G	Brass 50g
MHB100G	Brass 100g

Small form slotted mass hangers.

### Brass Sets

EDU087	100g (10g hanger, 9 x 10g Masses)
P260	100g (20g Hanger, 4x20g Masses)
P262	250g (50g Hanger, 9x20g, 1x10g, 2x5g Masses)
EDU088	500g (50g Hanger, 9x50g Masses)
EDU089	1000g(100g Hanger, 9x100g Masses)
EDU1025	438g (50g Hanger, 1 of each 200g, 100g, 50g, 20g, 10g, 5g, 2g, 1g)

Small form slotted mass & hanger sets.

### Cast Alloy Masses

EDU877	Mass, 10g, pk of 3
EDU878	Mass, 20g, pk of 3
EDU879	Mass, 50g, pk of 3
EDU903	Mass, 100g, pk of 5

Slotted masses. Flat, with large central hole and small slot to prevent masses sliding off hanger. Manufactured from cast alloy, accuracy 1%.

### Cast Alloy Hangers

EDU880	Hanger, 50g, pk of 3
EDU902A	Hangers, 100g, pk of 5

Mass hangers for slotted masses. Circular section central column with flattened section near top to slide the small-slotted masses on or off. Manufactured from cast alloy, accuracy 1%.

### Cast Alloy Sets

EDU904	100g (9x10g Mass, 1x10g Hanger)
EDU905	1000g(9x100g Mass, 1x100g Hanger)

Small format cast alloy mass & hanger set.



## Cast Masses & Hangers

EDU771	Mass, 100g
EDU772	Mass, 200g
EDU773	Mass, 500g
EDU774	Mass, 1,000g
EDU775	Mass, 2,000g
EDU776	Mass, 5,000g
EDU777	Mass, 10,000g
EDU778	Hanger only, 500g
EDU779	Hanger only, 1,000g

Large format slotted masses and hangers.

## Hexagonal Masses with Rings

HEX50	Mass, 50g
HEX100	Mass, 100g
HEX200	Mass, 200g
HEX500	Mass, 500g
HEX1000	Mass, 1,000g
HEX2000	Mass, 2,000g
HEX5000	Mass, 5,000g
HEX10000	Mass, 10,000g

Hexagonal iron mass with lifting ring.  
Within international tolerance.



## EDU769 Weighing Set on Tray

A combined set of accurate steel and brass weights that are housed in a sturdy blue moulded tray. Provides for weighing objects from 10g to 1990g in 10g increments. 3 steel weights and 6 brass weights. Contents: 1 each of - 1kg, 500g, 200g, 50g, 20g; 2 each of - 100g & 10g; 1 Moulded Tray.



## PH0258A-NTN Newton Masses, 1N set

9 x 0.1N slotted brass masses with 1 x 0.1N hanger.

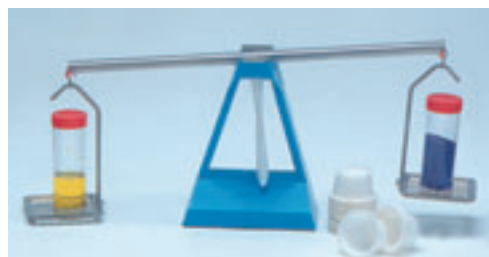
## PH0258D-NTN Newton Masses, 10N set

9 x 1N slotted brass masses with 1 x 1N hanger.



## 3802 Equal Arm Beam Balance Kit

An educational standard, this balance features a durable one-piece base, moulded of high impact styrene with three-point suspension for self-levelling. The beam is aluminium for light-weight sensitivity and pivots from self-aligning genuine agate bearings. Two sliding weights provide for fine adjustment. With a load of 50 grams per pan, the balance has an ultimate sensitivity of 10mg.



**P78 Vernier Calliper Gauge**  
- plated steel, dual scale 0-12cm

Plated steel, Columbus type callipers enabling the user to read either inside, outside or depth measurements. With dual scale, 0-12.5cm x 0.1mm. Imperial scale graduated to  $5 \times \frac{1}{128}''$ . Provided with thumb wheel for easy motion of jaws.



**P80 Vernier Calliper Gauge**  
- plated steel, dual scale 0-15cm, in case

IME type, improved design, plated steel with dual scale, 0-15cm x 0.1mm and  $6 \times \frac{1}{128}''$ . Provided with thumb movement for easy motion of jaws. Supplied in plastic case.



**PH0082 In-Out Calipers**

Steel calipers for external and internal measurement.



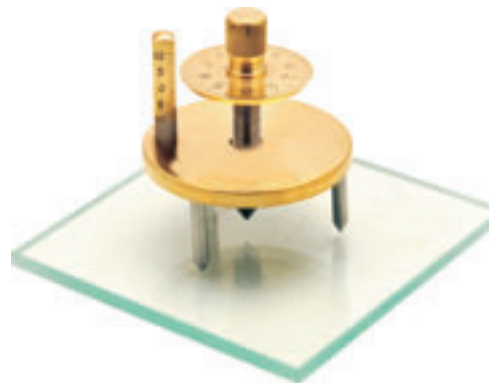
**P86 Micrometer Screw Gauge**

Made of nickel-plated brass with ratchet top. Accurately machined stainless steel rod with range 0-25 x 0.01mm. Lock type. For outside measurements up to 25mm. Supplied in plastic case. Precision: 1/100mm.



**PH0092 Spherometer**

Spherometer for the accurate measurement of the radius of curvature of spherical lenses. Made of brass with a vertical scale of 10-0-10mm and a micrometer scale with 100 divisions.



**PH0094 Opisometer**

For measuring the length of curved lines. Consists of a knurled wheel which runs on a transversely mounted threaded spindle.



**RU06 Ruler, 1 metre**  
**RU06/10 Ruler, 1 metre, pk of 10**

Well finished hardwood ruler graduated on both edges in centimetres and millimetres. One edge labelled 0-100cm left to right, the other edge in reverse.



**RU08 Ruler, 0.5 metre**

Well finished hardwood ruler graduated on both edges in centimetres and millimetres. One edge labelled 0-50cm left to right, the other edge in reverse.

**PH0334 Inclined Plane with Angle Measure**

A board with a well-finished metal base 450 x 150mm hinged at one end supporting a scaled, plane board. The planed section can be inclined and fixed at any angle from 0 to 45° to the horizontal. The end of the inclined board features an adjustable pulley wheel from which masses can be suspended. Supplied without weights.



**PH0337 Inclined Plane with Friction Board**

For investigating sliding friction. Consisting of a plane board hinged at the base at one end, with a pulley for the force cord at the other end. The inclination of the plane is variable and is locked into position by means of a screw clamp with pointer. Clear increments reflect the selected angle on the attached angle measuring plate. Complete with scale pan and two slides and a 75 x 25mm metal roller. Dimensions 600x75mm.



**STPCLCK Stop Clock**

A general purpose stop clock with large start and reset triggers for operation. Housed in a black powder-coated metal case with 100mm dial. Packed in sturdy case with protective foam insert.



**EDU1022 Digital Electronic Countdown Timer**

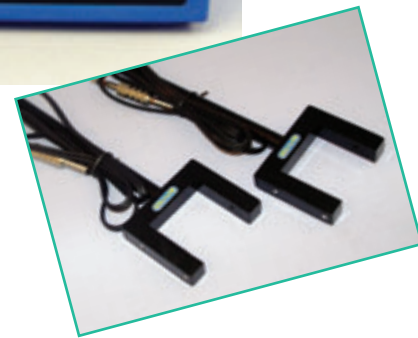
Large digital countdown timer with range up to 99 minutes and 59 seconds, with resolution of 1 second. Countdown only. Comes with stand, clip and magnetic fixing. Size: 80 x 70 x 20mm. LCD size: 64 x 38mm.



**EDU096 Laboratory Timer**  
**EDU097 Laboratory Timer + Timing Gates**

This is a precision digital timer used to measure the time interval between any two events with high accuracy. The timer standard accuracy has been achieved using the 10MHz Quartz Crystal Oscillator. The timer has four operating modes: Manual, Freefall mode, Timing Gates mode and any other triggering start and stop. The timer has a built-in power source for the Edu-Lab Timing Gates (code: EDU096A) and the G by Freefall Apparatus (code: GFF). Display: 14mm LED.

The pair of timing gates is housed in tough moulded cases giving excellent durability. The lamps operate on 6 volts. A special built-in circuit prevents lamps from damage in case higher voltage is accidentally applied. The timing gates can be connected by 4mm sockets to a timer and power supply.



**Ticker Tape Timers**

These devices use an electromagnet which activates a striker, producing dots via a carbon disk on the ticker tape. The dots are produced at a rate of 50 - 60Hz depending on the mains frequency. With 4mm terminal sockets. The Ticker Tape Timers are used in the measurement of velocity, acceleration and general timing. **There are 6V & 12v units available - please check your unit rating before connecting the unit to a PSU.**

**EDU035 12V Model, without Accessories**

The Edu-Lab Ticker Tape Timer has a frequency of 50 to 60Hz, equivalent to that of the mains power supply. It will give good results if operated from a 12V AC power supply unit. Higher voltage causes the tape to be subject to a greater drag.



**EDU042 6V Model, with Accessories**

The Edu-Lab Ticker Tape Timer has a frequency of 50 to 60Hz, equivalent to that of the mains power supply, and is supplied with one roll of ticker tape and a pack of 100 Carbon Discs (code: EDU037). It will give good results if operated from a 6V AC power supply unit. Higher voltage causes the tape to be subject to a greater drag.



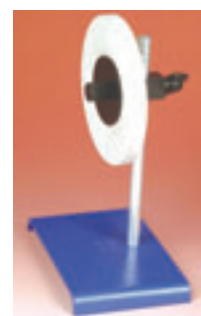
**EDU036 Spare Ticker Tape Rolls, pk of 5  
30m x 15mm**



**EDU037 Spare Carbon Discs, box of 100  
50mm dia. with 4mm hole**

**EDU1089 Timer, 12V, without Accessories**

12V AC, 50Hz: 50Vib/Sec, 60Hz: 60Vib/Sec.  
With 4mm terminal sockets.



**PH0353D Ticker Tape Holder**

A specially designed stand to hold our ticker tape rolls, makes an excellent accessory.

## 614-008 Picoammeter

The Picoammeter is designed to measure very small currents and has 10 ranges, selected by a rotary switch, from 100pA to 3μA. The instrument has a large moving coil meter. It can be auto-zeroed by a membrane switch. Input is by way of a UHF socket for shield leads, alternatively 4mm plugs can be plugged into the UHF socket and associated 4mm socket. Input impedance 10MΩ will not be damaged by voltages up to 5KV. Suggested uses include measurement of current for Planck's constant experiments, ionization currents, reverse current of silicon diode, resistivities of wood and paper, capacitor leakage current, etc. Comes complete with a UHF male to 4mm plug shield lead. UHF socket for shielded lead.

### Specification:

- Measurement: 10 ranges, from 100pA to 3μA
- Input voltage: up to 5KV
- Input impedance: 10MΩ
- Input: UHF sockets, complemented by a 4mm socket for negative input.
- Power: PP3 9V battery
- Dimensions: 208 x 155 x 115mm (W x H x D).  
Height including handle is 187mm.



## 614-009 Microvoltmeter

The Microvoltmeter is an effective and robust replacement for a spot galvanometer with nine ranges from 100μV to 3μV. The input resistance is 10MO /V and is 1K on the 100V range which is considerably better than a spot galvanometer. The instrument has a large moving coil meter which can be auto-zeroed by a membrane button switch. Input is by way of 4mm sockets or, for very low voltages where a shielded lead is preferred, UHF socket. Suggested uses include measurement of e.m.f.'s from thermocouples, strain gauges and hall effect devices, electromagnetic induction measurements, etc.

### Specification:

- Measurement: 9 ranges, from 100μV to 3μV
- Input impedance: 10MΩ per volt, maximum 30MΩ
- Input: 4mm socket or UHF socket, complemented by a 4mm socket for negative input
- Power: PP3 9V battery
- Dimensions: 208 x 155 x 115mm (W x H x D)  
Height including handle is 187mm.



## AMTER1A Ammeter, 0-1A Single Range

## AMTER2A Ammeter, 0-2A Single Range

## AMTER5A Ammeter, 0-5A Single Range

## PH1074B Ammeter, 0-1/ 0-5A Dual Range

## EDU199 Digital Multimeter

- Display: 1999 counts, digit is 15mm high
- DC voltage: 200m/2/20/200V±0.5%, 600V±0.8%
- AC voltage: 200/600V±1.2%
- DC current: 2m/20mA±1.0%, 200mA±1.5%, 10A±3.0%
- Resistance: 200/2k/20k/200k/2MΩ±1.0%



## Voltmeters

PH1080A	Single Range, 0-1
PH1080AA	Single Range, 0-1.5
PH1080AB	Single Range, 0-3.0
PH1080AC	Single Range, 0-5.0
PH1080AD	Single Range, 0-10.0
PH1080AE	Single Range, 0-15.0
PH1080AF	Single Range, 0-30.0
PH1080AG	Single Range, 0-50.0
PH1080B	Dual Range, 0-1V / 5V
PH1080BA	Dual Range, 0-5V / 10V
PH1080BB	Dual Range, 0-5V / 15V



Moving Coil, DC only with 4mm socket terminals.

## Galvanometers, DC

PH1084A	1-0-1mA
PH1084B	35-0-35mA
PH1084C	3.5-0-3.5mA
PH1084D	Graduated 30-0-30 with 200 $\mu$ A sensitivity

High quality moving coil meters. Colour coded with 4mm socket terminals for ease of connection. 6mA FSD



## PH1084 Galvanometer 50-0-50mA

Galvanometer, moving coil, DC only. 50-0-50mA. With 4mm socket terminals.

## PH1106B Ohmmeter, Series, 0-100 $\Omega$

Designed for measuring resistance in electric circuits. Housed in unbreakable case with clear front cover. Series, 0-100 $\Omega$ .



## PH1116 Interscale Demonstration Meter

Housed in an ABS plastic case 300 x 150 x 300mm with glass front and rear. Moving coil type with accuracy of  $\pm 2.5\%$ . Basic sensitivity of meter is 5mA, 100mV f.s.d. The meter can be used to demonstrate the working principle of AC or DC ammeters or voltmeters with interchangeable plastic scales.

Designed for use with the various interchangeable scale dials (code: PH1118), depending on the range being measured.



## Demonstration Meter Dials

PH1118A1	2.5-0-2.5mA DC
PH1118A2	0-1V DC
PH1118A3	0-10mA AC
PH1118A4	0-5V AC
PH1118A5	0-100mV
PH1118B1	10-0-10mA DC
PH1118B2	0-5V DC
PH1118B3	0-50mA AC
PH1118B4	0-10V AC
PH1118B5	0-500mV
PH1118C1	0-10mA DC
PH1118C2	0-10V DC
PH1118C3	0-10mA AC
PH1118C4	0-15V AC
PH1118D1	0-50mA DC
PH1118D2	0-15V DC
PH1118D3	0-500mA AC
PH1118D4	0-50V AC
PH1118E1	0-100mA DC
PH1118E2	0-300V DC
PH1118E3	0-1A AC
PH1118E4	0-300V AC



PH1118F1	0-500mA DC
PH1118F2	5-0-5V DC
PH1118F3	0-5A AC
PH1118G1	0-1A DC
PH1118G2	10-0-10V DC
PH1118H	0-5A DC
PH1118I	0-10A DC

For use with PH1116 (pictured is the PH1116 housing containing one of the interchangeable dials). Each dial comprises a laminated plastic panel (315 x 115mm), with a sealed moulded box at one end which contains the shunt

## PH1118J Galvanometer, Spot Reflecting

Suitable for industrial Kelvin Double Bridge and Senior Kelvin Double Bridge. Galvanometer resistance 125 $\Omega$  nominal, Sensitivity 15mm, Scale division per micro amp, time period 2 seconds, critical damping resistance 1000 $\Omega$  and working voltage is 230 volts AC 50Hz.



## PH0466A Joule Meter, mounted on stand

A domestic electricity meter adapted to operate on single phase 50Hz, 12V AC up to a maximum current of 8.33A RMS. The meter is mounted on a robust bench stand with 4mm input and output socket terminals. The aluminium disc rotates once for every 100 joules. Larger readings are indicated by three digits calibrated at 100, 1000 and 10,000 joules per division, respectively.



## PH0466B Joule Meter, single phase

A single phase energy meter mounted on a support in a transparent case to enable students to observe the movement of the meter. A bulb holder and power cord are supplied in order to observe the working of the meter when power is switched on.



## 211-001 Digital Joulemeter/Wattmeter

The Edu-Lab Joulemeter/Wattmeter is light, compact, and designed for class demonstration or student use. The unit can measure energy taken up by a load, either by AC power or DC power, and from 1J to 999,999J or 1mJ to 999,999mJ and can also measure power level of 200mW to 200W. One pair of 4mm sockets is also provided to indicate the instantaneous power. Depending on mW / mJ or W / J range, 1V full scale deflection represents 100mW or 100W respectively.

### Specifications:

- Design: single chip microprocessor with dedicated precision analogue multiplier for power measurement.
- Input Voltage: 0 to 15V AC, (0 to 21V DC), absolute maximum 35V DC, 24V AC.
- Maximum current: 10A AC / DC
- Input Frequency: 0 to 500Hz Maximum
- Accuracy: 5%, typically better than 3% at full scale.
- Energy / Power Indications: 6 digits
- Built-in timing function
- Power Supply: 220V A.C. 50/60Hz
- Dimensions: 208x155x115mm



## 614-007 Mains Joulemeter

The mains joulemeter / Wattmeter is accurate, light and compact. It is designed for class demonstration and also for student use. The meter measures the energy or power delivered to a mains appliance. Current transformers and sampling voltage transformer isolate the unit from the mains. Determines the energy consumed by domestic appliance. Compare the efficiency of different types of lamp bulbs. Compare power consumption for lamp bulbs at different voltages (variable mains transformer unit required) Analogue outputs for datalogger or oscilloscope. Built in timing function.

### Specifications:

- Measurement range: 200W and 2KW full-scale reading for power measurement. 0 to 999,999 J or 0 to 999,999kJ for energy measurement.
- Resolution: 0.5J/ 0.5W on the 200W range and 0.005kJ/ 0.005KW on the kW range.
- Maximum current: 10A, protected by 10A fast blow fuse
- Input impedance: 1M $\Omega$
- 1V full-scale instantaneous power indication by a pair of 4mm meter output sockets
- Energy Indication by six 7-segment LEDs
- Accuracy: 3% and typically better than 1%
- Linearity: 2% and typically better than 1%
- Mains supply: 230V  $\pm$ 5%, 50Hz
- Internal Fuse: 315mA (L)
- External fuse: 10A fast blow (in IEC socket)
- Dimensions: 208 x 155 x 115mm (W x H x D)
- Height including handle is 187mm.



## 605-014 Student Digital Joulemeter

The Edu-Lab Student Joulemeter is designed specifically for student use. The unit can measure energy from 1 joule to 999,999 joules, with accuracy of 3%, but 1% accuracy is typical. Power is by means of a 9V DC mains adaptor (not included).

### Specification:

Input voltage: 0V to 15V AC, or 0V to 21V DC (maximum).

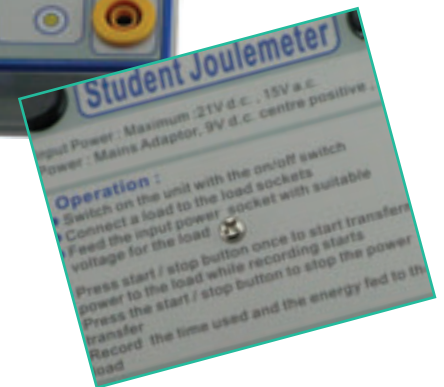
Maximum load current : 10A AC/DC

Circuitry : Microprocessor, combined with precision voltage multiplier.

Built-in timing function, the start button starts timer and joulemeter together and at the same time starts powering up the load. The stop button stops the timer and joulemeter, and disconnects the input power from the load.

Dimensions: 90 x 90 x 33mm

Display: 2 x 16 character LCD



## 614-006 Electrometer, DC Amplifier

Used for measurement of small current, small charge or time constant for RC experiments. Rotary switch of extremely high insulation resistance (>500GΩ) is employed to select resistors or capacitors, to discharge the capacitor or leave them open. Typical half times for this unit, for the built in 1nF, 100GΩ or 100nF, 1GΩ RC pairs, are from 67 to 71 seconds against theoretical values of 69.3 seconds. Complete with a UHF male to 4mm plugs lead.

Professional electrometer IC; input leakage current for amplifier guaranteed less than 25fA. Built in moving coil meter, analogue outputs available for dataloggers or external meter. Input resistance over 1TΩ. Selection of 1nF 1% or 100nF 2% capacitors. Selection of 10MΩ 1%, 1GΩ 1% or 100GΩ 1% resistors. x1 and x10 gain switch provides the decades between the built-in resistors. Charge or current tabulated on a table on front panel for easy reference, measurement range from 1pA to 100nA, 0.1nC to 100nC.

### Specification:

Input: UHF socket, supplemented by a 4mm socket for negative input.

Input resistors: 10MΩ 1%, 1GΩ 1%, 100GΩ 1%

Input impedance: Over 1TΩ

Measurement ranges: 1pA to 100nA , 0.1nC to 100nC

Power supply: 9V PP3 Battery, alkaline battery recommended

Dimensions: 208 x 155 x 115mm (W x H x D).

Height including handle is 187mm

Gain selection: x1 or x10 - selected by toggle switch

1V auxiliary output is provided for data-loggers.



## 605-006 EHT Power Supply

The adjustable 5KV output is fully isolated and the output is monitored by a digital display. Output current is electronically limited to 2mA and the outputs are also current limited by 100K resistors to avoid larger transient currents. In addition to the 0-5KV outputs, there are further outputs linked by 25M $\Omega$  resistors. This provides EHT outputs appropriate for electrostatic experiments with a short circuit current of 60 $\mu$ A.

The switching transformer is specially wound so the output maintains a stable voltage with time, as opposed to most other commercial brands where the voltage will drop with time. An auxiliary output is provided to drive cathode heaters etc. An Independent earth terminal is available for earthing of any one of the five output sockets.

EHT power supply suitable for driving Teltron tubes and electrostatic experiments. Continuously variable, 0-2.5KV or 0-5KV at a maximum current of 2mA. Two secondary outputs with 25M $\Omega$  resistors (total 50M for 5KV range). Auxiliary output, 6.3V a.c. at 1A, protected by resettable fuse. Bright 12.5mm green LED display indicating EHT output. Shrouded sockets suitable for standard 4mm plugs or shrouded plugs.

### Specifications:

- Input: 220V-240V, 50/60 Hz
- Output: 0 to 5KV DC, 2mA or 2.5KV DC, 2 mA
- Mains supply: 230V 5% , 50Hz
- Fuse: 315mA (L)
- Dimensions: 208 x 155 x 115mm (W x H x D). Height including handle is 187mm
- Secondary outputs with 25M $\Omega$  safety resistors.
- Auxiliary output of 6.3V AC, 1A for cathode heaters, protected by resettable fuse
- Independent Earth Terminal for earthing of any one of the five output sockets.



## 605-007 High Tension Power Supply

The Edu-Lab High Tension Power supply is designed specifically for thermionic experiments, such as the Teltron double fine beam tube. It can also be used for experiments requiring a high tension supply such as ionization current etc. It provides two independent outputs of 0-35V and 0-350V, 100mA maximum, with continuously adjustable voltages. Two auxiliary cathode heater outputs are also provided. All outputs are fully isolated from earth. Bright 12.5mm green LED display indicating HT output. Shrouded sockets suitable for standard 4mm plugs or shrouded plugs.

### Specifications:

- Input: 220V-240V, 50/60 Hz
- Outputs: 0-35 and 0-350V, fully regulated and maximum current is 100mA
- Mains supply: 230V  $\pm$ 5%, 50Hz
- Fuse: 1A (L)
- Dimensions: 208 x 155 x 115mm (W x H x D). Height including handle is 187mm.
- Primary is protected by slow-blow fuse and thermal trips.
- Two auxiliary outputs of 6.3V AC, 1A for cathode heaters, protected by resettable fuse.
- Independent Earth Terminal is provided.



## 605-010 Dual $\pm 15V$ Power Supply

The Edu-Lab dual rail  $\pm 15V$  power supply is a very robust power supply for use with operational amplifier circuitry. It provides ample current of 1A and is short-circuit proofed. Each power unit is individually trimmed to precisely  $\pm 15V$ . Independent earth connection. Shrouded output sockets for standard 4mm plugs or shrouded plugs.

### Specification:

- Input: 230V  $\pm 10\%$ , 50Hz/60Hz
- Output: Dual Rail  $\pm 15V$ , continuously rated at maximum of 1A
- Dimensions: 208 x 155 x 115mm (W x H x D).
- Height including handle is 187mm
- Slow-blow fuse protection for primary
- Thermal trip for transformer
- Short-circuit proofed, regulators with thermal shut down facilities.



## 605-001 Power Supply

AC/DC power supply with cooling fan and built in micro-processor overloading protection.

- Input : 230VAC 50Hz
- Output : 2-12v AC/DC in 6 steps

## 605-002 Power Supply

This unit is the same as 605-001 but is specially smoothed for electronics applications.

- Input : 230V AC 50Hz
- Output : 2-12v AC/DC in 6 steps



## 605-013 Variable Power Supply, 0-25V, 8.5A

A popular, advanced, continuously-variable power supply unit with LED digital display, the Edu-Lab College Power Supply Unit is ideal for demonstration purposes and for use by students in advanced level courses. It provides a fine and smooth, continuously-variable AC or DC voltage at a combined maximum current of 8.5A. The DC is smoothed by an internal 2200 $\mu F$  capacitor. AC or DC voltage reading is selected by a toggle switch and indicated by a bright green, easy-to-read 12.5mm LED display. Microprocessor tripping circuitry will differentiate between a real short-circuit or a temporary current surge.

### Specification:

- Output Voltage continuously variable by rotary knob from 0 to 25V
- Continuously rated combined current of 8.5A, AC or DC
- Heavy-duty 40A Schottky barrier diodes employed for rectification, together with high performance toroidal transformer, reduce the weight of the power supply and power waste - thus eliminating the need for a noisy and troublesome cooling fan.
- Digital display for voltage for AC or DC, selected by toggle switch
- Fully protected secondary by high speed, resettable microprocessor-controlled trip.
- Slow-blow fuse protection for primary
- Thermal fuse protection for transformer
- Dimensions: 300 x 115 x 155mm (W x D x H)
- Weight: 5.5kg



## 605-003 Laboratory Bench Power Supply 0-13V

Output voltage selected by up/down push switches in 1V steps, up to 13V. Long switch lifetime. Voltage can be switched safely at full load without serious contact wear. Output protection is handled by a 30A heavy duty relay. The outputs are opened momentarily, controlled by  $\mu P$ , between switching times. Fully protected secondary by high speed, micro-processor controlled and resettable electronic trip. Over current is measured and timed for cases of serious overload and slight overload to decide tripping time, so as to avoid oversensitive tripping in cases of initial heavy current surge, for example lamp bulbs. Slow-blow fuse protection for transformer primary. Shock barrier diodes are employed for rectification with less voltage drop and power waste thus eliminating the need for a noisy internal cooling fan.

### Specifications:

Size: 205 x 150 x 115mm (W x H x D).

Input voltage: 240V, 50 Hz.

Output voltage: 0-13V a.c. at no load. Slightly smoothed d.c. gives practical r.m.s values of 0-13V at no load.



## 605-009 Smoothing Unit

A smoothing unit for reducing ripple from non-regulated power supplies. Maintains a ripple-free output when high currents are drawn. The unit comprises a lightweight and efficient toroidal 0.1H inductor with a network of 2,200 $\mu F$  capacitors and diodes. With a supply of 12V at 3A, 1% ripple would be typical. Will work without suffering damage even at reverse polarity. Up to 8A at 35V, absolute maximum 40V DC (DC rectified from 28V AC). Shrouded sockets accept standard 4mm plugs and shrouded plugs.

### Specifications:

Input Voltage: 0 to 35V, absolute maximum 40V

Current rating: 8A maximum

Dimensions: 208 x 155 x 115mm (W x H x D).  
Height including handle is 187mm.



## 281-006 Scaler-Timer

General purpose scaler-timer, suitable for radioactivity counting utilising a GM tube and as a general purpose millisecond digital timing device with manual or electronic triggering. 6-digit, bright green LED display. Manual or timed counting of 1, 10 or 100 seconds. Press-to-read switch to read the accurate applied voltage to the GM tube. Auto ranging on timing modes. Built in loudspeaker and switch on the back of the machine allows audible indication of counts when required

### Specifications:

Operation: Timer / Scaler

Capacity: 999,999 counts or seconds

Input power: 230V  $\pm 5\%$ , 50Hz

Timing inputs: Manually switched start/stop; light gate(s) operated start/stop

GM tube Voltage: 300V to 500V

Fuse: 315mA (L) slow-blow

Dimensions: 208 x 155 x 115mm (W x H x D).  
Height including handle is 187mm.



## 281-013 GM Tube Holder

Geiger-Müller Tube Holder, for use with Edu-Lab Scaler Timer (code: 281-006). An aluminum box 58 x 33mm (diameter x depth) which houses the G.M. tube socket. Connection is through a 1m long co-axial connecting lead, terminated in a standard P.E.T. connector. A  $2.2M\Omega$  stabilizing resistor is internally wired in series with the anode connection. G.M. tubes available on request.



## 920-102 Half-Life Analogue

A container of 500, 10mm cubes is used to investigate the topic of half-life. Each cube has one face identified and the class is actively involved in 'throwing' the cubes, which represent atomic nuclei, to see how many 'decay' during each throw. Decayed nuclei are removed prior to the next throw. Very good results for an exponential decay curve are obtained without the hazards of using radioactive material and the investigation involves everyone rather than another Teacher demonstration. Supplied with full instructions.



## Resistance Coils

- PH1143A Resistance Coil -  $1\Omega$
- PH1143B Resistance Coil -  $2\Omega$
- PH1143C Resistance Coil -  $5\Omega$
- PH1143D Resistance Coil -  $10\Omega$
- PH1143E Resistance Coil -  $20\Omega$
- PH1143F Resistance Coil -  $50\Omega$
- PH1143G Resistance Coil -  $100\Omega$
- PH1143H Resistance Coil -  $200\Omega$

Resistance units to add to any circuit for basic electrical experiments. Instead of using simple resistances these blocks provide convenient connections to a resistance by means of 4mm sockets.



## P1162 Jockey - 100mm with insulated handle

For Wheatstone Bridge and Potentiometer work. Insulated handle with plated brass contact and 4mm plug terminal. Overall length: 100mm.



## PH1156A Wheatstone Bridge - 2 gap PH1156B Wheatstone Bridge - 4 gap

This Wheatstone bridge has broad, heavily plated brass strips mounted on a polished hardwood base. Terminals with 4mm sockets are provided. The 24 SWG constantan wire is stretched along the top of a metre scale in mm and cm. Supplied with jockey. Dimensions: 1130 x 80 x 50mm.



## PH1160A Potentiometer, single wire

New design with protective cover. Wound upon a tube with heavily oxidised resistance wire. Fitted with 4mm safety socket terminals. Resistance  $\pm 10\%$  compared to nominal value.



## Decade Resistance Box

**DRBOX3** 3 Decade ranges

**DRBOX4** 4 Decade ranges

**DRBOX5** 5 Decade ranges

This decade resistance substitution boxes provide 3, 4 or 5 decade ranges from 0 to 11,110 $\Omega$  with a resolution of 1 $\Omega$ . Each decade is selected by a rotary switch. Tapping points are provided across each range to allow the unit to be used as an accurate potential divider. All resistance values are  $\pm\%$  with a rating of 0.25W maximum per range.



## PH0425 Platinum Resistance Thermometer

Platinum resistance thermometer for showing the principles of platinum resistance thermometry and accurate temperature measurement. Suitable for temperatures below 150 $^{\circ}\text{C}$ . Fine platinum wire of 2 $\Omega$  resistance wound non-inductively on a mica frame and soldered to copper leads. Base has 4mm socket terminals.



## Rheostats

**ORH0002** 2.5 $\Omega$ , 9.0A

**ORH0004** 4.5 $\Omega$ , 9.0A

**ORH0008** 8.5 $\Omega$ , 5.0A

**ORH0016** 16 $\Omega$ , 4.0A

**ORH0020** 20 $\Omega$ , 4.5A

**ORH0037** 37 $\Omega$ , 3.2A

**ORH0055** 55 $\Omega$ , 2.3A

**ORH0125** 125 $\Omega$ , 1.8A

**ORH0135** 135 $\Omega$ , 1.4A

**ORH0280** 280 $\Omega$ , 1.3A

**ORH0300** 300 $\Omega$ , 0.9A

**ORH0600** 600 $\Omega$ , 0.6A

**ORH1325** 1325 $\Omega$ , 0.5A

**ORH1600** 1600 $\Omega$  0.3A

A high quality rheostat offering excellent value for money. Wound with heavily oxidised resistance wire on a vitreous enamel steel tube with the winding, which is supported on robust diecast end stands. The heavy duty sliding contact is of multi-leaf phosphor bronze, nickel plated for corrosion resistance. 4mm terminal posts are fitted, facilitating external connection with a conventional 4mm plug.



## PH1144D-20 Rheostat - 20 $\Omega$ , 4.2A

Open type rheostat with metal/bakelite supports.  
Resistance: 20 $\Omega$ . Current: 4.2A. Length: 300mm.

## PH1144D-16 Rheostat - 16 $\Omega$ , 4.2A

Open type rheostat with metal/bakelite supports.  
Resistance: 16 $\Omega$ . Current: 4.2A. Length: 250mm.

## Bare Wire

PH1058A Copper, 2.00mm dia.  
(14 nearest swg) - 500g reel

PH1058B Copper, 1.60mm dia.  
(16 nearest swg) - 500g reel

PH1058C Copper, 1.25mm dia.  
(18 nearest swg) - 250g reel

PH1058D Copper, 0.90mm dia.  
(20 nearest swg) - 250g reel

PH1058E Copper, 0.71mm dia.  
(22 nearest swg) - 250g reel

PH1058F Copper, 0.56mm dia.  
(24 nearest swg) - 250g reel

PH1058G Copper, 0.45mm dia.  
(26 nearest swg) - 250g reel

PH1058H Copper, 0.40mm dia.  
(28 nearest swg) - 250g reel

PH1058I Copper, 0.31mm dia.  
(30 nearest swg) - 250g reel

PH1058J Copper, 0.28mm dia.  
(32 nearest swg) - 250g reel

PH1066A Eureka/Constantan, 1.60mm dia.  
(16 nearest swg) - 125g reel

PH1066B Eureka/Constantan, 1.25mm dia.  
(18 nearest swg) - 125g reel

PH1066C Eureka/Constantan, 0.90mm dia.  
(20 nearest swg) - 125g reel

PH1066D Eureka/Constantan, 0.70mm dia.  
(22 nearest swg) - 125g reel

PH1066E Eureka/Constantan, 0.55mm dia.  
(24 nearest swg) - 125g reel

PH1066F Eureka/Constantan, 0.45mm dia.  
(26 nearest swg) - 125g reel

PH1066G Eureka/Constantan, 0.40mm dia.  
(28 nearest swg) - 125g reel

PH1066H Eureka/Constantan, 0.31mm dia.  
(30 nearest swg) - 125g reel

PH1066I Eureka/Constantan, 0.28mm dia.  
(32 nearest swg) - 125g reel

PH1066J Eureka/Constantan, 0.25mm dia.  
(34 nearest swg) - 125g reel

PH1064A Nichrome, 1.25mm dia.  
(18 nearest swg) - 125g reel

PH1064B Nichrome, 0.90mm dia.  
(20 nearest swg) - 125g reel

PH1064C Nichrome, 0.70mm dia.  
(22 nearest swg) - 125g reel

PH1064E Nichrome, 0.45mm dia.  
(26 nearest swg) - 125g reel



## 44-35-1116 Sound Poster

- 890 x 584mm

A graphic illustration of sound's sources; how it is produced and heard; how sound travels; the role of sound waves; the Doppler Effect; the applications of sound; and more!

## 1630 Sound OHP Transparencies

- set of 6

Investigate the cause of sound with this set of six transparencies. Includes 8 overlays.

## 4101 Sound Spectrum Chart

- 850 x 610mm

Did you know that a vibrating guitar string moves the air and produces sound? This unique chart presents ingredients of sound including pitch, tone, pressure and vibration. An activity guide provides ideas for experimentation.

## 3983 Sound Energy Kit

Students investigate the physics behind sound energy in this kit. These activities include sound wave theory, reflection of sound, force of sound waves and transmission, and many more. Teachers Guide included.

## 230-105 Mini Speaker

A miniature loudspeaker, fully enclosed in a white plastic enclosure, suitable for connection to a tone generator for demonstration of the production of sound waves from electrical signals. Size 100 x 75 x 40mm.

## 241-003 Bell in Vacuum Jar

A versatile unit for demonstrating the properties of a vacuum. Comprises a sturdy baseplate with tap, glass bell jar and detachable battery operated bell. Use with hand pump (code: 251-001) or ideally with electric vacuum pump (code: 612-001).

## 241-507 Bell in Acrylic Vacuum Jar

To demonstrate part of the nature of sound waves by showing that sound does not exist in a vacuum. Bell housed in acrylic jar for safety. Dimensions: 250 x 140mm.



## P164C Vacuum Plate with Integral Hand Pump, 250mm dia.

For use with bell jars, for example, to create a vacuum environment for experiments.



## PH1030A Electric Bell

Simple dome, double-gong bell with detachable cover. Threaded metal terminals are provided for easy connection. Diameter approximately 75mm.



## Pump Plates

- P156A 175mm dia
- P156B 200mm dia
- P156C 250mm dia

Robust free-standing pump plate available in three sizes. Supplied with tube for connection to pump and with a stop-cock for air regulation on the central pillar. Tripod style base. Suitable for vacuum physics experiments



## 241-022 Digital Signal Generator

For use as a power amplifier:

When the instrument is to be used as a power amplifier, press the waveform selection button until the 'aux' option is chosen. The instrument now acts as a power amplifier with the signal input fed through the pair of 4 mm sockets labeled 'AUX'.

**Note :** The earth provided is connected to the physical earth through the power cord; the signal generator output is floating with respect to ground.

**Maintenance:** The Signal generator is a robust instrument and can withstand prolonged short circuit for the output. Should the unit cease to work properly, return it to your supplier for servicing. **Do not open the instrument.**

### Specifications:

- Frequency Range: 0.1 Hz to 99.9 KHz in six decades, read on digital display.
- Frequency Accuracy: 0.01% (100 ppm) in all ranges
- Output waveform: Sine, Rectangular and Triangular
- High Impedance Output: Maximum 17V peak to peak from internal source impedance of 600Ω
- Low Impedance output: 6V R.M.S. at 4Ω (about 8.8V peak for all waveforms)
- Maximum Power output of 4.5W available over the entire frequency range for all waveforms.
- Maximum Power Transfer occurs when the load is 4Ω, giving  $62/(4+4) = 4.5W$
- Amplitude Control: Variable from zero to maximum output in 256 increments, amplitude is displayed by a 10 segment bar graph
- Attenuation: x1, x 0.1, x0.01, ±1%, operating only on the 600Ω output.
- Amplifier voltage gain: 100
- Frequency Response: DC to 100KHz, -3 dB, output power 4.5W into 4Ω load
- Controls : All control settings except amplitude are stored and updated upon any changes.
- Electric Supply: 220V~240V, 50Hz
- Dimensions: approx. 210 x 155 x 118mm L X W x D
- Weight: Approx. 2.05Kg, without power cord
- Internal fuse: T315mA L



## 290-131 Ultrasonic System

This apparatus consists of a self-contained transmitter and receiver operating in the 40kHz region. The transmitted wave is modulated at a variable frequency of about 2kHz and this is detected by the receiver which amplifies the signal and drives a miniature integral loudspeaker. Both transmitter and receiver are contained in separate plastic enclosures measuring 60 x 100 x 25mm which contain all the electronics and the 9V batteries. The receiver has front-panel 4mm sockets so that the output can be monitored on an oscilloscope for more quantitative measurements. A special feature is the second output transducer on the transmitter which can be switched on when required. This then becomes a twin coherent source, and by moving the receiver interference patterns can be dramatically demonstrated. The system is ideal for demonstrating sound waves above the hearing threshold and reflection properties associated with sonar etc. Complete with batteries and full instructions.



## 50-360 Doppler Ball

A 90mm hollow plastic ball with a PP3 battery powered tone generator and speaker inside. The ball can be whirled round in a large horizontal circle by means of the attached cord to demonstrate the Doppler effect. Good output volume and variable pitch provide all that is required for a dramatic demonstration of the Doppler shift associated with a moving source.



## PH0738A Steel Tuning Forks

- boxed set of 8

Best quality steel, plain shank, with frequency marked on each one. Boxed set of 8. Consists of one each of:

- C (256); D (288); E (320); F (341);
- G (384); A (426); B (480); C (512).



## PH0740A Steel Tuning Forks

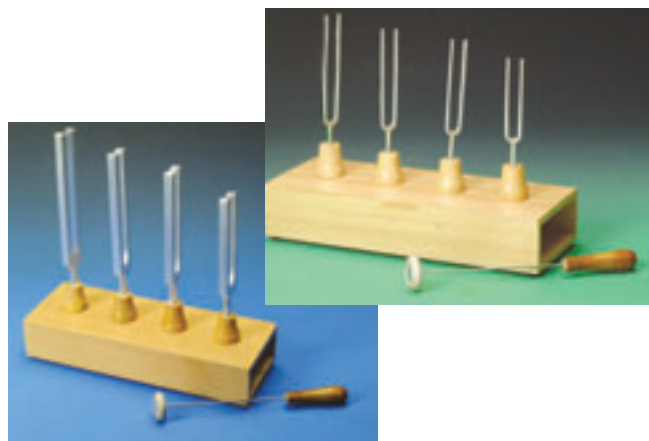
on Resonance Box, set of 4

## PH0740B Aluminium Tuning Forks

on Resonance Box, set of 4

For demonstrating the formation of basic major chords. Consists of four forks mounted on a wooden box and having frequency of:

- C (256); E (320); G (384); C (512).



## PH0742A Steel Tuning Forks on Resonance Box, pair

## PH0742B Aluminium Tuning Forks on Resonance Box, pair

A pair of tuning forks for demonstrating the beat frequencies mounted on individual boxes. One fork is provided with an adjustable mass by means of which frequency may be shifted from the nominal 426.6Hz. When both forks are sounded a clearly audible 'beat' is produced, its rate depending upon the difference in frequency between the forks.



## Aluminium Tuning Forks

TNFRK1	256hz
TNFRK2	288hz
TNFRK3	320hz
TNFRK4	341hz
TNFRK5	384hz
TNFRK6	426hz
TNFRK7	480hz
TNFRK8	512hz

Manufactured from high quality aluminium with plain shanks. Frequency marked on each one.



## TNFRKIR8 Aluminium Tuning Forks - boxed set of 8

High quality aluminium plain shank tuning forks with frequency marked on each one. Boxed set of 8. Consists of one each of:

- C (256); D (288); E (320); F (341);
- G (384); A (426); B (480); C (512).



## 720-001 Adjustable Tuning Fork, 210mm

Aluminium tuning fork, adjustable to deliver 7 frequencies (C, D, E, F, G, A, B).



## PH0718B Resonance Apparatus, Brass Tubes

This apparatus is used for resonance investigations in air columns and consists of two metal tubes telescoping into each other. The column of air within the tubes may be altered in length from 300mm up to 530mm by moving the outer tube. Fitted on a removable wooden base.



## PH0726 Sonometer

A wooden resonance box 1140mm long, 125mm wide and 100mm high. At one end of the base are two 50N spring balances with hooks and at the other end are two corresponding wrest pins. Also included are three bridges; one large (to span wires) and two small (for the individual wires). Supplied with two steel wires, 30 swg, 1 metre long.



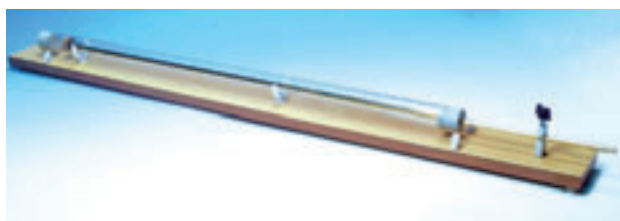
## PH0730 Sonometer, 3-Wire Pattern

A hollow, wooden, resonance box 1290 x 130 x 110mm, with scales divided in millimetres between fixed bridges over which the wires are stretched. A spring balance reading 100N x 5N is fitted to one end and the tension exerted and measured can be finely adjusted by a wing nut. Another wire passes over a pulley and can be loaded as desired.



## PH0722 Kundt's Tube, Unmounted

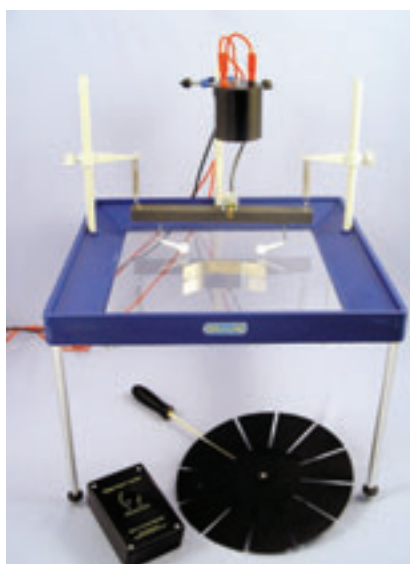
Show the wavelength of vibrations in air in a closed tube by depositing lycopodium powder at the nodes. Comprising a glass tube approximately 80cm in length and 32mm in dia. At one end is a tightly fitting but adjustable cork piston fitted to a metal rod 100cm long. At the other end a loose fitting piston attached to a sounding rod, 100cm in length and 8mm dia. Closed length: 1890mm.



## EDU044 Ripple Tank Kit

This economy Ripple Tank System comes as a ready-to-use unit with no external power source required. Comprised of a tough, moulded frame with a large transparent viewing surface. The Ripple Tank light source is a 6V halogen lamp which gives excellent illumination. The tank has sloping sides which minimise noise. This Ripple Tank System comes complete with:

- Ripple tank
- 4 Push-fit legs
- Ripple motor, eccentric cam mounted on ripple bar
- 3 Support pillars for supporting the light source and rippler bar
- 2 Motor support springs
- Lamp unit with adjustable arm
- 2 Rippler bar hanging hooks
- Power source for ripple tank
- Hand stroboscope
- Concave perspex plate
- Rectangular perspex plate
- Curved reflector
- 2 Barriers
- Roller Bar
- Neatly compartmentalized box



## 241-400 Ripple Tank

This excellent quality Ripple Tank provides a comprehensive demonstration of the general properties of waves. Wave Propagation Phenomena are projected onto a screen.

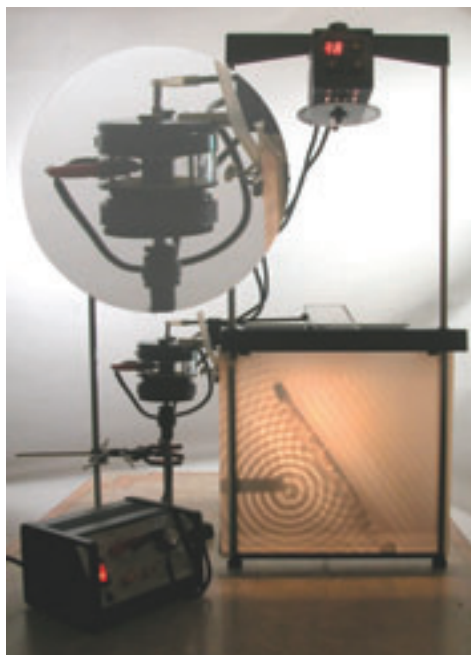
### Topics to explore:

Reflection & Refraction - parallel waves can be produced and by using appropriate barriers reflection and refraction are produced.

Interference Phenomena - occurs when two point source dippers generate circular waves. These can be regulated. Plus many more experiments.

### Kit consists of:

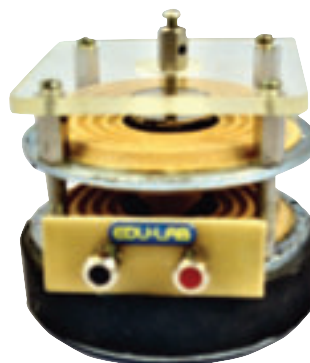
Variable Vibrator, Ripple Tank, Wave dampers, Electronic Stroboscope with halogen lamp, projection mirror, screen, wave dippers, and accessories. Requires a 12V, 5A DC Power supply. The Ripple Tank and accessories are all housed in a high quality, aluminium case. Teacher's notes and experiments are provided in a superb manual.



## 241-403 Vibration Generator

- with Accessory Set

Gives mechanical oscillations when fed by oscillator- AF amplifier. Frequency response for whole of audio spectrum and beyond. Frequency range 30 to 10,000Hz. Coil impedance:  $3\Omega$ . Amplitude Output: 4mm Maximum. Electrical Input: 5W. Weight: 1Kg. Dimensions: 100 x 100 x 90mm. Accessories included.

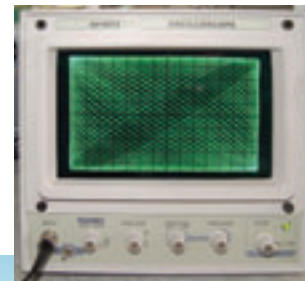


## Oscilloscope - Large Screen

614-001 Model A, 10KHz, Dual channel

614-002 Model B, 10KHz, Single channel

This large screen Oscilloscope is an excellent laboratory resource for educating students in practical science. This new generation instrument has a 225mm kinescope screen which can be easily read from a distance. Features include: vertical deflection, a sweep system, horizontal deflection and a calibration signal. (Detailed Technical Data available on request).



241-501 Slinky, Helical Spring, 150mm

SPHL1000 Slinky, Helical Spring, 100mm

SPHL50 Slinky, Helical Spring, 50mm

Ideal for demonstrating different types of waves. Helical steel coil diameter 75mm.



## PH0706 Helix Wave Form

Steel wire close-wound helix 20mm diameter. Closed length 3 metre extending to approx. 9 metre. Looped ends.



## PH0712 Wave Motion Apparatus

For demonstrating the movement of progressive transverse waves.



## 241-024 Microwave Transmitter/Receiver

Apparatus for the investigation of transverse waves.

Convenient wavelength for the investigation of transverse waves

Plane polarised wave for the transmitter, internally modulated with 1KHz tone, or music, or no modulation

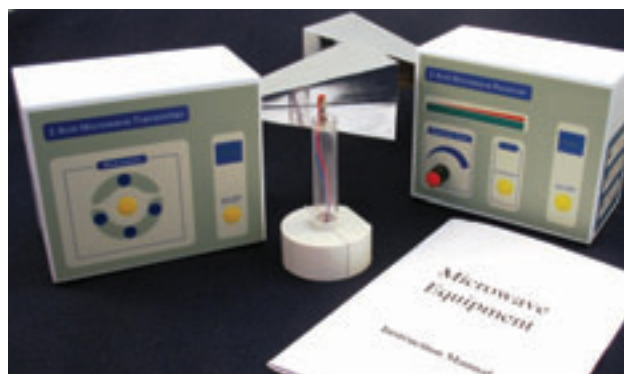
Built in gain control for the receiver, with 30 bar graphs to indicate signal strength, external outputs to data-loggers and external meters

Built in loudspeaker for the receiver, with on /off control

Detail instruction booklet illustrating various microwave experiments, covering topics of wave reflection, refraction, polarization, interference etc.

Auxilliary input for external simple tones to transmit through microwaves

Probe Detector for non-directional reception of the microwaves



## A Revolutionary Way of Logging Data!

### EDU-LOGGER® Datalogging System

The EDU-LOGGER® system is rather different to almost all other educational dataloggers in that its sensors incorporate their own individually programmable micro-processors and have memory. Hence each sensor can be viewed as a datalogger in its own right, recording and storing data independently of any other. Such sensors can be referred to as Logger Sensors but within this guide they will just be called sensors.

The variety of sensors currently available will cover most of the needs of secondary science education (11-18 years) and others are to be added. To program the sensors they need to be connected to either a PC or to EDU-LOGGER's Monitor Display Unit (MDU). They can be connected singly or in chains. Depending on their use, sensors can be powered directly from a PC or from the MDU. However, they can also be powered individually or in chains from a Battery Unit. The addition of RF Communication modules in both the sensor chain and plugged into the USB Bridge at the PC, or into the MDU, allows remote connection over up to 30m (in open space). In this way it is possible to set up lots of individually programmed sensors or chains of programmed sensors. The order of connection of the sensors does not matter and they can be added or removed from the chain without affecting the others.

10 bit resolution is provided for most sensors and sampling rates vary from 10,000 per second to 1 per hour, depending on the sensor concerned. The rates available for each sensor match well to their likely use. Experiment durations are from 25ms to 31 days, dependent on the sensor and the sampling rate. A Trigger setting with Pre-trigger is available through which to start sampling and display data from just before the Trigger operated.

The EDU-LOGGER® system has four modes of operation: **On-line experiment: Continuous** and **Single step** modes and **Off-line experiment: (A)** and **(B)**.

**On-line experiment: Continuous** mode is where the sensors are connected to a PC or the MDU, programmed, and remain connected as the data is fed back in real-time. All sensors would gather data at the same rate, would be triggered together (a choice has to be made of which sensor to trigger from) and would run for the same time.

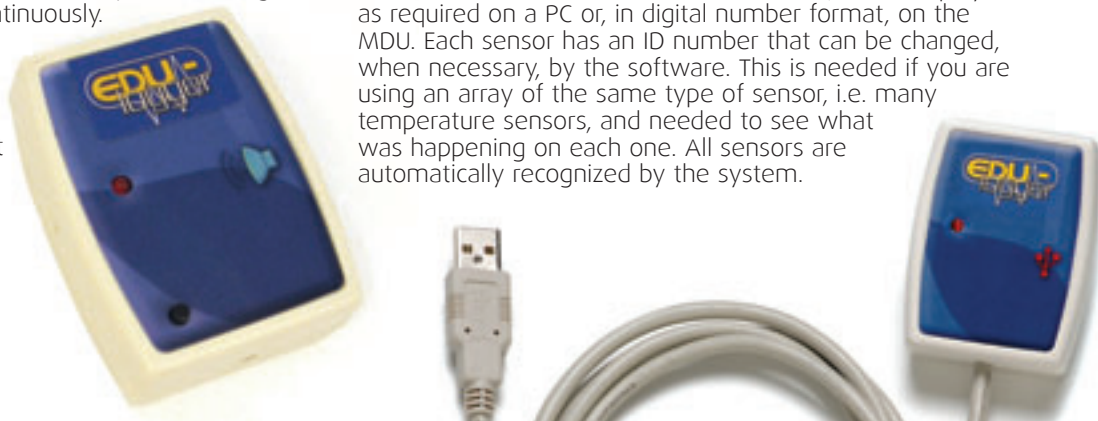
**On-line experiment: Single-step** mode (sometimes known as 'snapshot') enables collection of data at particular stages of the experiment instead of continuously. This mode could be used when obtaining Voltage and Current data for a resistor, light bulb or light emitting diode when the variation in applied voltage is not continually variable (e.g. when provided by discrete cells giving 0V,  $\pm 1.5V$ ,  $\pm 3V$ ,  $\pm 4.5V$  and  $\pm 6V$ ).

The two sets of data can first be viewed plotted against Time and then against each other in an XY plot. This mode would also be appropriate when investigating how the pressure of a fixed mass of gas in a syringe changes as its volume is reduced from say 60ml, to 50ml, to 40ml, to 30ml and finally to 20ml. The Pressure values would be recorded, but the Volumes would just be indicated by the numbers 1, 2, 3, 4 and 5. If the data file is then saved and exported into a spreadsheet, the actual values of the Volumes can then be input by hand, further manipulation of the data brought about e.g.

generating a column of data of 1/Volume, before a graph of Pressure against 1/Volume is plotted. Although the spreadsheet icon indicates Microsoft Excel®, you can export into any that accept CSV (Comma Separated Values) such as Lotus 123®, Softmaker Planmaker® and OpenOffice®.

**Off-line experiment mode (A)** is where the sensors have been programmed by connection to a PC or the MDU with different Sampling rates and Experiment durations. The sensors are then disconnected from the PC or MDU and put into battery-powered chains (or singly) to collect their data on the pressing of the sensors' Start/stop buttons. However, in this mode, each sensor can be programmed independently to be triggered to record data as well as having their Start/stop buttons pressed at different times. Reconnection of the sensors to a PC or the MDU is required to upload the data and analyse it. However, all graphs would be overlaid on the longest Time axis with  $t=0s$  being where each sensor appears to have been triggered. Hence it does not take account of the time differences between the pressing of any sensors' Start/stop buttons and their independent triggering.

**Off-line experiment mode (B)** is where the sensors have been programmed by connection to a PC or the MDU and remain connected. As in Mode A the sensors can be programmed with different Sampling rates and Experiment durations. Each sensor can be programmed independently to be triggered to record data. Starting is enabled via clicking an icon (Run sensors) on the PC or the Run button on the MDU, and stopping can be done by clicking on another icon (Stop measurement) on the PC or the Stop button on the MDU, or automatically when the Experiment duration has been completed. Data is then uploaded in order to display and analyse it. However, all graphs (on the PC) would be overlaid on the longest Time axis with  $t=0s$  being where each sensor appears to have been triggered. Collected data is stored in the sensors' internal memories, to be displayed as required on a PC or, in digital number format, on the MDU. Each sensor has an ID number that can be changed, when necessary, by the software. This is needed if you are using an array of the same type of sensor, i.e. many temperature sensors, and needed to see what was happening on each one. All sensors are automatically recognized by the system.



**Note: Additional features will be incorporated in later versions of EDU-LOGGER® and more sensors will be developed.**

**Revised versions of the software will be provided free to download as they become available.**



The computer display of data can be in the form of a graph or a table, or both, plus a digital display of each sensor's current value e.g. 20°C, 8.95V, 20.9%. The default graph display is of what the sensor measures (Y-axis) plotted against Time (X-axis) but it is possible to plot XY graphs in which one sensor's data is plotted against another. Graphs can have their axis scales pre-selected, can be Zoomed to maximize their display in the Y-axis direction, or indeed have small areas selected and Zoomed to allow examination in more detail. The graphs of each sensor can be overlaid and their Y-axes moved to convenient positions on the screen. A best-fit line/curve facility is provided to overlay the graphs. Areas under graphs can be easily calculated for use in determining such a quantity as Impulse from a Force-time graph. Graph plotting can be in 'points only' or in 'a joined up line' and a set of grid-lines can optionally be added.

A number of mathematical functions [ $\log(A)$ ,  $\ln(A)$ ,  $\sqrt{A}$ ,  $A^2$ ,  $1/A^2$ ,  $(A+B)$ ,  $(A \cdot B)$ ,  $(A/B)$ ,  $(A \cdot K)$ ,  $(10A)$  and  $(A/K)$ ] are available with which to convert data, where A and B are the variables and K a constant. The function  $A/B$  would be useful in generating data (and a graph) of the Resistance of a filament light bulb, where A is the Voltage across the bulb and B the Current flowing through it. Whilst these will allow one to deal with most things the data can also be exported into a spreadsheet for further manipulation and processing.

Triggering is available to start datalogging when a particular sensor's measured value falls or rises below or above a set level. When triggering has been selected, a Pre-trigger display is made available on the graphs and in the tables so that sensor values just before the triggering took place can also be seen. This is particularly useful when looking at how the voltage across a coil changes when a magnet falls through it.

A video with play-back facility is provided via a webcam so that data can be collected synchronized with a video of the process. These can be saved for future use.

Worksheets, incorporating setup details, photographs and diagrams, can be developed, displayed and saved with or without a setup configuration.

## EDU-LOGGER® Key Features:

Sensors have memory and so retain last set of data.

Capacity, in Off-line mode, to operate sensors at differing Sampling rates and Experiment durations. In On-line mode (connected to PC) the sensors run for the same time and at the same rate as each other. However, there is a special Off-line mode (though still connected to the PC) that allows sensors to be setup and run independently of each other.

Experiment durations from 25ms to 31 days dependent on both sensor and sampling rate.

Sampling rates up to 10000 per second (and as long as 1 per hour) are available dependent on both sensor and experiment duration.

Useful area under graph, gradient, statistical analysis and Math functions (eg. ability to convert data to Log X or take Voltage data and divide it by Current data to give Resistance and plot this as a new graph against Time).

Capacity to export data to a spreadsheet for further analysis, manipulation, and display of graphs.

Sections of graphs can be zoomed in on.

Capacity to plot not just the usual Y against Time graphs but also XY graphs.

Graphs from all sensors (not just two) can be overlaid with their separate Y-axes being movable.

Graphs can be 'locked' on screen to be overlaid by others for comparison.

There is a Single-step mode (often known as 'Snapshot') in which data from the sensors can be captured only as and when required.

Easy to set up Trigger facility.

Videoring of experiments can be conducted with a webcam and the data collected and graphed synchronised with it for playback.

Notes (including photographs and diagrams) for the conduction of experiments can be incorporated with or without setup configurations. Those with setup configurations can be run instantly as all the setting up procedures have been saved in advance.

Programming of sensors, and display of data (not in graphical form) can also be done from a hand-held battery-powered Monitor Display Unit, though not incorporating trigger settings and, with the photogate, limited to recording only Time.

Sensors can be programmed complete with trigger settings, disconnected from a PC, connected to a Battery Unit, and operate via their onboard start/stop buttons.

Remote connection is extremely easy to set up and requires no built-in Wi-Fi or Bluetooth facility.



## Dataloggers - Fixed Sensors

### 900-101 Voltage Sensor

Measurement Ranges	Resolution
± 20V	0.01V

### 900-106 pH Sensor

Measurement Ranges	Resolution
0 - 14	0.1pH

### 900-103 Temperature Sensor

Measurement Ranges	Resolution
-35°C - 150°C	0.1°C
-31°F - 238°F	0.1°F

### 900-105 Oxygen Sensor

Measurement Ranges	Resolution
0 - 25% (air)	0.1%
0 - 100% (dissolve)	0.1%
0 - 12.5mg/L (dissolve)	0.1mg/L

### 900-111 Force Sensor

Measurement Ranges	Resolution
±10N	0.01N
±50N	0.01N

### 900-102 Current Sensor

Measurement Ranges	Resolution
± 2500mA	10mA

### 900-109 Light Gate Sensor

Measurement Ranges	Resolution
0/1 Duration pulse	+/- 100µs
Speed	+/- 100µs
Acceleration	+/- 100µs

### 900-108 Heart Rate & Pulse Sensor

Measurement Ranges	Resolution
30 - 240BPM	1BPM
0 - 1024	Arbitrary units (for viewing signal shape)

900-101



900-106



900-103



900-105



900-111



900-109



900-108



900-102



## Dataloggers - Monitors & Kits

EDU-LOGGER® technology is based on autonomous modular sensors that can be combined in a long "chain". Each sensor samples and records the information in its own memory, working independently from all of the other sensors.

EDU-LOGGER® sensors can be connected in any order to a PC or to a monitor display unit. The unique design of the sensors allows for any combination of modules, regardless of the connection order. Sensors can be added or removed without effecting the rest of the chain.

Once the EDU-LOGGER® sensors are connected in a manner appropriate for the experiment, they can be operated in three different modes:

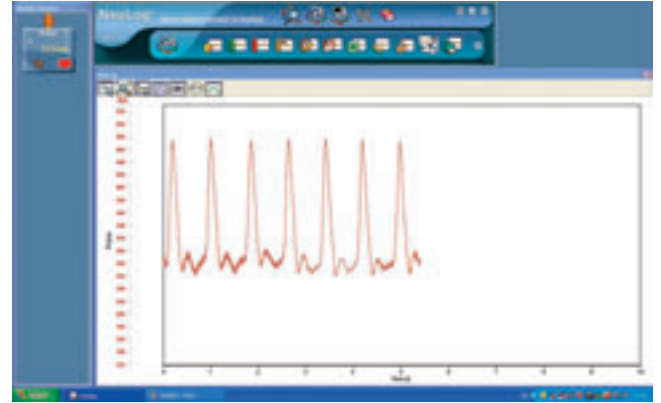
**PC:** The sensors can be connected via a USB port, and the researcher can control data acquisition and analyze results using the EDU-LOGGER® software.

**Monitor display unit:** The unit comes equipped with an LCD screen and keyboard and can be used easily outdoors.

**Independent Sensor:** Each sensor contains its own memory and processor. It can be programmed via the PC or the monitor display unit and will then carry out measurements as a stand-alone unit.

### Features:

- ▶ Flexible modular system.
- ▶ All sensors can operate individually and in combination.
- ▶ Fast and easy connection to a USB port.
- ▶ Automatic recognition of sensors.
- ▶ Digital range can be defined via the included software.
- ▶ Programmable sample rate (20/H to 20,000/sec).
- ▶ Extensive memory capabilities (64,000 samples per sensor).
- ▶ Variable duration of samples (3.2 sec to 133 days).
- ▶ Powered via USB or batteries. No mains supply is required.
- ▶ For elementary school, high school & university level work.



900-100



900-114



900-115



900-113

**900-100 EDU-LOGGER Kit with Case**

**900-114 Monitor Display Unit**

**900-115 Battery Module**

**900-117 Carry-Case for EDU-LOGGER Kit**

**900-116 RF Module** (not shown)

**900-118 USB Cable - 30cm** (not shown)

**900-113 USB Bridge - FOR DATA TRANSFER**

A USB Bridge is **NECESSARY** for sensors to talk to a PC, so is at the 'heart of the system' unleashing the full potential of Edu-Logger. In 'online mode' it bridges the PC-Sensor Network gap, provides power to the sensors and 'manages' the data traffic in the network of connected sensors. This allows easy data collection and programming of the sensors, so they can function independently while 'offline'. **NB only one USB Bridge required - regardless of the number of sensors in use.**





**IMPORTANT NOTE**

A USB Bridge is **NECESSARY** with all these sensors to be able to communicate with a PC. Order on Page 267.



**Individual Logger Sensors are clearly differentiated by unique pictograms...**

## Dataloggers - Detachable Sensors

Code	Description	Ranges	Resolution
900-104	Light	0 - 1,000lux 0 - 6,000lux 0 - 150,000lux	1lux 6lux 150lux
900-107	Humidity	0 - 95%	0.1%
900-110	Pressure	0 - 7atm 0 - 100PSI 0 - 700kPa 0 - 7Bar	0.01atm 0.1PSI 0.1KPA 0.01Bar
900-112	Sound	40 - 110dB 0 - 1024	0.1dB Arbitrary units (for fast measurements)
900-123	Motion	0.25 - 6m	2mm
900-124	Magnetic Field	± 10 mT	0.001mT
900-125	Conductivity	0-20000µs/cm 0-18000mg/L 0-18000ppm	0-2000µs/cm - 0.1µs/cm Over 2000 - 1µs/cm 0-1000mg/L - 0.1mg/L Over 1000 - 1 mg/L 0-1000ppm - 0.1ppm Over 1000 - 1ppm
900-126	Spirometer	± 10 L/s	0.02L
900-127	GSR	0-65279 0-10µS	Arbitrary units 10nS
900-128	EKG	0-3mV	
900-129	Colorimeter	R.G.B.	0.01%





# EDU-logger



900-122



900-107



900-112

## Dataloggers - Detachable Sensors

Code	Description	Ranges	Resolution
------	-------------	--------	------------

900-130	Carbon Dioxide	350 - 8,000ppm	1ppm
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900-131	Barometer	80 - 106KPa	0.1KPa
		0.80 - 1.00atm	0.01atm
		23.60 - 31.30in/Hg	0.01in/Hg
		-380 - 1950m	0.1m

900-132	Blood Pressure	0-250 mm/Hg	0.25mm/Hg
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900-133	Drop Counter	0-25000counts	
		0-1000mL	

900-134	Flow Rate	0-3.5m/s	0.0001m/s
---------	-----------	----------	-----------

900-135	Force Plate	-800 - (+3500)N	0.3N
---------	-------------	-----------------	------

900-136	Rotary Motion	0 - 30 rev/s	1°
		Below 7.5 rev/s	0.25°

900-137	Acceleration	Acc-x -80 - 80m/s <sup>2</sup>	0.2m/s <sup>2</sup>
		Acc-y -80 - 80m/s <sup>2</sup>	0.2m/s <sup>2</sup>
		Acc-z -80 - 80m/s <sup>2</sup>	0.2m/s <sup>2</sup>

900-139	Soil Moisture	0-45% volumetric content of water in soil	0.05%
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900-140	UVB	230-320mW/m <sup>2</sup>	0.3 mW/m <sup>2</sup>
---------	-----	--------------------------	-----------------------

900-141	Turbidity	0-200NTU	0.13NTU
---------	-----------	----------	---------

900-138	Salinity	<b>COMING SOON</b>
900-142	UVA	<b>COMING SOON</b>
900-143	Surface Temperature	<b>COMING SOON</b>
900-144	Wide-Range Temperature	<b>COMING SOON</b>
900-145	Infrared Thermometer	<b>COMING SOON</b>
900-146	Respiration	<b>COMING SOON</b>
900-147	Hand Dynamometer	<b>COMING SOON</b>



# MATH

## GRADE 5

any times to its base, by itself. and an form.

base  $\rightarrow 5^3 = 5 \times 5 \times 5 = 125$  exponent

Exponential Form	Word Form	Operation	Value
$10^1$	10 to the 1st power	10	10
$10^2$	10 to the 2nd power	$10 \times 10$	100
$10^3$	10 to the 3rd power	$10 \times 10 \times 10$	1000

# NUMERACY + maths

# Maths

Skills games and activities

Curriculum Mastery Flip Charts Combine Essential Math Skills with Hands-on Activities

Similar figures are in shape, but not in size.

Flips, Slides & Turns has been transformed by transformations are:

Mathematics LEVEL G

NEWPATH LEARNING

Symmetry

A figure has line of symmetry if it can be reflected into two congruent parts on top of each other. The fold line or line of reflection is called the line of symmetry.

ANSWER C  $53^\circ$

Since the triangles are similar, the angles are equal.  $\angle DFE$  is similar to  $\angle BAC$  which is  $53^\circ$  because  $180 - 95 - 32 = 53$ .

The triangles shown are similar. What is the measure of  $\angle DFE$ ?

A  $27^\circ$   
 B  $42^\circ$   
 C  $53^\circ$   
 D  $95^\circ$

270

## Clever Catch® Balls

### About the Clever Catch® range:

These colourful 600mm inflatable vinyl balls provide an excellent way for children to build maths skills.

The Maths Clever Catch® balls feature various problems, facts and illustrations to reinforce that maths can be fun!

Play involves two or more players who toss the ball to each other and answer the question found on the ball under their left thumb. Directions and answers are included.



### SR-1467 Clever Catch® Probability & Statistics

Statistics have never been this fun! Includes 87 challenging questions with a complete answer sheet.



### SR-1568 Clever Catch® Trigonometry

Trigonometry is a subject that all students need extra review with. Sides and angles of planes or spherical triangles and the calculation based on them, are covered in the questions.



### SR-1382 Clever Catch® Algebra

The **NEW** Algebra 1 Clever Catch® encourages students to solve algebraic equations quickly and easily while having fun. The 83 color coded questions include Properties, Simplifying Equations, Basic Functions, Inequalities and Absolute Value. Clever Catch® Algebra helps build an excellent foundation for comprehension of algebra.

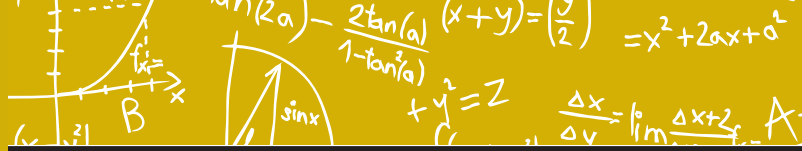


### SR-1468ND Clever Catch® Blank

This is a very adaptable teaching aid. You make the questions and design the ball as needed for whatever topics your students need help with most. Use a wet erase marker to write the problems or questions. We recommend not using a Blue wet erase marker as it may leave a stain on the ball. Suitable for all ages.



**MORE**  
Clever Catch Balls covering other educational subjects are available on many pages throughout the catalogue



## Maths Flipchart Sets (Key Stage 3)

### About the Maths Flipchart range:

10 set series presents levelled review of Grades 1 - 8 (ages 5-14years) maths standards.

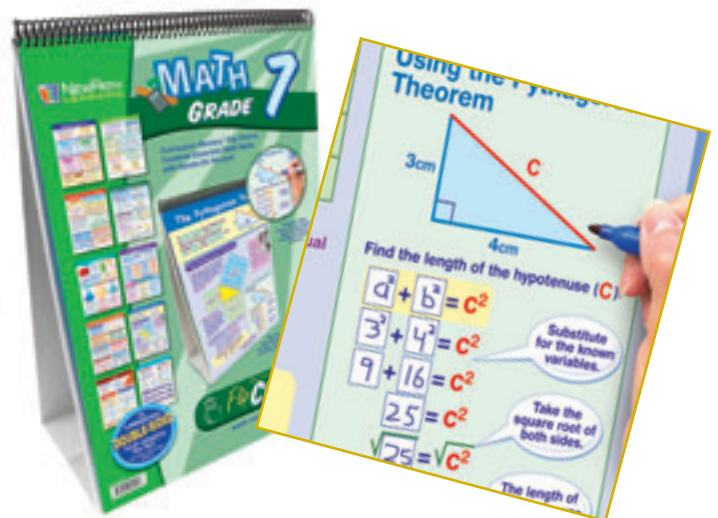
### Each Curriculum Mastery Flip Chart Set features:

- 10 Double-sided, laminated charts.
- Full-sized, 30 x 45cm charts.
- Activity Guide featuring black-line copy-masters of the charts along with review questions, vocabulary terms, suggested activities and more.
- Sturdy easel for years of classroom application.
- Side 1 features a colourful, graphic overview of the topic.
- Side 2 serves as a 'write-on/wipe-off' activity chart featuring questions, labeling exercises, vocabulary review & more!



### 101-131 Grade 6 Maths Flipchart Set

Commutative & Associative Properties; Decimal Operations; Graphing Ordered Pairs; Integers & Rational Numbers; Adding & Subtracting Integers; Multiplying & Dividing Integers; Writing Expressions; Solving Equations; Area of Triangles; Area & Circumference of Circles.

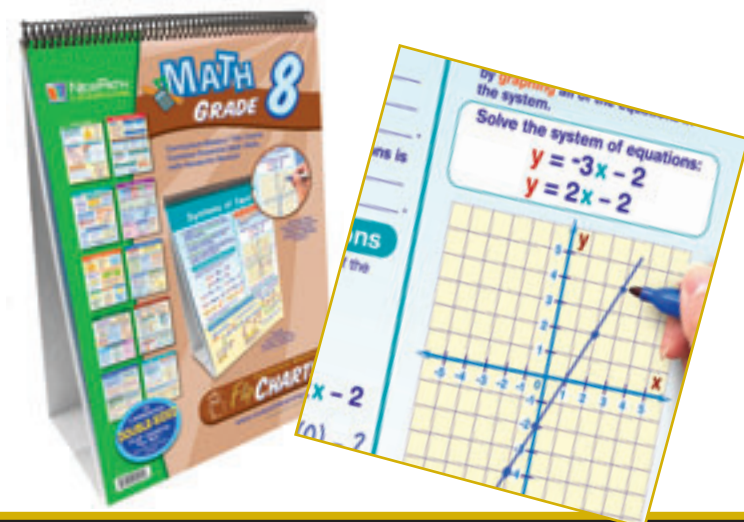


### 101-132 Grade 7 Maths Flipchart Set

Analyzing & Displaying Data; Equations & Inequalities; Exponents, Factors & Fractions; Geometric Proportions; Finding Volume; Applying Percents; Lines & Angles; The Pythagorean Theorem; Introduction to Functions; Nonlinear Functions & Set Theory.

### 101-133 Grade 8 Maths Flipchart Set

Integer Operations; Rational Numbers & Operations; Real Numbers; Numbers & Percents; Polynomials & Exponents; Patterns in Geometry; 3-D Geometry; Solving Linear Equations; Ratios, Proportions & Percent; and Mathematical Processes.



## Maths Skills Games (Key Stage 3)

### About the Maths Skills Games range:

Comprehensive coverage of the Current NCTM Standards for Grades 1 - 8 (ages 5-14years)

### Each set features:

- ▶ 25 Sets of 30 standards-based review cards - a total of 750 review cards.
- ▶ Each set is focused on a specific curriculum topic and levelled by content & readability.
- ▶ 12 Double-sided, laminated game boards.
- ▶ Comprehensive Teacher Planning & Resource Guide
- ▶ Presentation CD featuring interactive review questions for use on a PC, Mac or projection unit.
- ▶ Free introductory online subscription to access interactive content, activities and assessments.



### 101-150 Grade 6 Maths Skills Game

Whole Numbers to Trillions; Commutative/Associative Properties; Distributive Property; Proportions/Equivalent Fractions; Percents; Ordering Fractions; Add/Subtract Fractions; Multiply/Divide Fractions; Mixed Numbers; Rational Numbers; Percent, Rate, Base; Order of Operations; Repeated Multiplication; Exponents; Evaluate Exponents; One & Two Step Functions; Evaluate Formulas; Simple Proportions; Area of Triangles & Quadrilaterals; Area and Circumference of Circles; Plotting Points; Area of Coordinate Polygons; Measurement Conversion; Statistics; Graphs.



### 101-151 Grade 7 Maths Skills Game

Organizing Data; Analyzing, Graphing & Displaying Data; Introduction to Algebra; Equations & Inequalities; Using Integers; Rational & Irrational Numbers; Decimal Operations; Exponents, Factors & Fractions; Fraction Operations; Numerical Proportions; Geometric Proportions; Introduction to Percent; Applying Percents; Plane Figures: Lines & Angles; Plane Figures: Closed Figure Relationships; Measurement, Perimeter & Circumference; Exploring Area & Surface Area; The Pythagorean Theorem; Finding Volume; Introduction to Probability; Using Probability; Algebraic Equations; Algebraic Inequalities; Introduction to Functions; Nonlinear Functions & Set Theory.





 **labware**

# Labware A - Z

Laboratory equipment and resources  
arranged alphabetically.

Microscopes

balances

labware

### Absorption Tubes

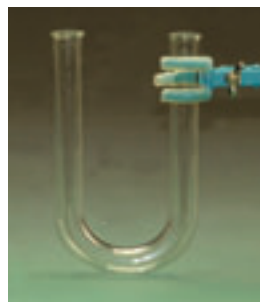
- ABS125** 125 x 15mm (H x O.D.), pk of 2  
**ABS150** 150 x 20mm (H x O.D.), pk of 2

Heavy walled borosilicate glass, U-form.

### Absorption Tubes with Connector Tubes

- AST125** 125 x 15mm (H x O.D.), pk of 2  
**AST150** 150 x 20mm (H x O.D.), pk of 2

Heavy walled borosilicate glass, U-form, with connector tubes of approximately 6mm diameter.



## Autoclaves

### 612-013 Autoclave, Omega Media 121°C, 22 minute cycle

The Omega autoclave from Prestige Medical is a compact and fully portable electronic autoclave with a comprehensive range of features: For sterilising petri dishes, media, ampoules or instruments. Omega autoclaves come complete with the following standard contents: certificate of compliance - vessel (BS3970:Part 4:1990); performance test certificate; warranty registration card; instruction manual; electrical cord set and one box of 50 sterilising strips.



- 10 year pressure vessel guarantee
- CE marked to the MDD
- Lifetime heating element guarantee
- Large instrument basket and 'V' support included
- Integral pressure and temperature gauges
- Capacity: 10 litres
- Dimensions: 420 x 350mm (W x H)
- Max load: 4 Kg
- Sterilising cycle: 121°C for 22 minutes
- Design pressure: 1.3 bar

### 612-006 Autoclave, 14 litre Aluminium for Gas Cookers/Burners, Portable

Suitable for instruments, glassware, media and waste.

- Internal dimensions: 280 x 230mm (diameter x depth)
- Design pressure: 1.3 bar
- Max working temp: 121°C
- Minimal maintenance
- Can be heated using a domestic or bottled gas flame
- No plumbing required



### 612-004 Autoclave, 14 litre Aluminium

Suitable for instruments, glassware, media and waste. Electrically powered with thermostat.

- Internal dimensions: 280 x 230mm (diameter x depth)
- Minimal maintenance
- Design pressure: 1.3 bar
- Max working temp: 121°C
- Electrically safe to BS3456
- Electrical power 220 - 240 volt, 2.0kW
- No plumbing required





## 612-005 Autoclave, 14 litre Aluminium with VARIO Remote Control

Suitable for instruments, glassware, media and waste. Electrically powered with thermostat. The VARIO remote control unit gives variable cycle temperatures and times, four preset cycles, stores cycles in memory and has many more useful features.

- Internal dimensions: 280 x 230mm (diameter x depth)
- Minimal maintenance
- Electrically safe to BS3456
- Electrical power 220 - 240 volt, 2.0kW
- Design pressure: 1.3 bar
- Max working temp: 121°C
- No plumbing required



## 612-009 Autoclave, 22 litre Stainless Steel for Gas Cookers/Burners

Suitable for instruments, glassware, media and waste.

- Internal dimensions: 280 x 355mm (diameter x depth)
- Max working temperature: 121°C
- Design pressure: 1.3 bar
- Minimal maintenance
- Can be heated using a domestic or bottled gas flame
- No plumbing required



## 612-007 Autoclave, 22 litre Stainless Steel

Suitable for instruments, glassware, media and waste. Electrically powered with thermostat.

- Internal dimensions: 280 x 355mm (diameter x depth)
- Minimal maintenance
- Max working temperature: 121°C
- Design pressure: 1.3 bar
- Electrically safe to BS3456
- Electrical power 220 - 240 volt, 2.0kW
- No plumbing required



## 612-008 Autoclave, 22 litre Stainless Steel with VARIO Remote Control

Suitable for instruments, glassware, media and waste. Electrically powered with thermostat. The VARIO remote control unit gives variable cycle temperatures and times, four preset cycles, stores cycles in memory and has many more useful features.

- Internal dimensions: 280 x 355mm (diameter x depth)
- Minimal maintenance
- Max working temperature: 121°C
- Design pressure: 1.3 bar
- Electrically safe to BS3456
- Electrical power 220 - 240 volt, 2.0kW
- No plumbing required



### 612-012 Autoclave, 30 litre Stainless Steel for Gas Cookers/Burners

Suitable for instruments, glassware, media and waste.  
 Internal dimensions: 280 x 490mm (diameter x depth)  
 Max working temperature: 121°C  
 Design pressure: 1.3 bar  
 Minimal maintenance  
 Can be heated using a domestic or bottled gas flame  
 No plumbing required

### 612-010 Autoclave, 30 litre Stainless Steel

Suitable for instruments, glassware, media and waste.  
 Electrically powered with thermostat.  
 Internal dimensions: 280 x 490mm (diameter x depth)  
 Minimal maintenance  
 Max working temperature: 121°C  
 Design pressure: 1.3 bar  
 Electrically safe to BS3456  
 Electrical power 220 - 240 volt, 2.0kW  
 No plumbing required

### 612-011 Autoclave, 30 litre Stainless Steel with VARIO Remote Control

Suitable for instruments, glassware, media and waste.  
 Electrically powered with thermostat. The VARIO remote control unit gives variable cycle temperatures and times, four preset cycles, stores cycles in memory and has many more useful features.  
 Internal dimensions: 280 x 490mm (diameter x depth)  
 Minimal maintenance  
 Max working temperature: 121°C  
 Design pressure: 1.3 bar  
 Electrically safe to BS3456  
 Electrical power 220 - 240 volt, 2.0kW  
 No plumbing required

### Autoclave Bags

- 700-002 310 x 660 mm, pk of 200
- 700-003 400 x 700 mm, pk of 200
- 700-004 600 x 780 mm, pk of 200

High temperature autoclave bags, manufactured from heavy-gauge polypropylene, suitable for autoclaving up to a temperature of 136°C. Clear with blue biohazard labelling and a write-on panel for further labelling purposes.

### 700-001 Autoclave Tape, 50m x 25mm





## Balances

**PH0020A** Balance, Compression, 500g

**PH0020D** Balance, Compression, 5kg

Useful for weighing chemicals and general purposes. The body is plastic and has a wide view dial and easy to read scale. Highly durable, with zero adjustment knob.



**P15** Lever Arm Balance, Single Range  
250 x 1g

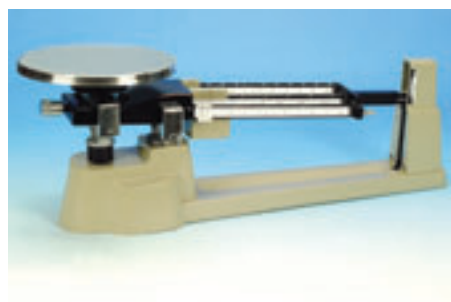
**P16** Lever Arm Balance, Dual Range  
250 x 1g & 1000 x 5g

A direct reading, single pan balance with its scale in the form of a quadrant, graduated in the ranges of 0-250 x 1g or 0-1000 x 5g (dual model only) which can be set using the weight arm provided. Cast aluminium frame with chrome plated steel parts. Levelling screw for zero adjustment.



**CH0024A** Single Pan, Triple Beam, 610g

This single pan, triple beam balance (with 200g capacity uncalibrated tare beam) has been specially designed to handle weighing solids and powder. The balance has three notched and tiered beams with centre readings and sliding indicator masses. The three beams are calibrated 500 x 100g, 100 x 10g and 10 x 0.1g - providing sensitivity of 0.1g up to a total of 610g. The capacity can be increased up to 2,610g by using supplementary masses. Spring loaded zero adjust compensator and magnetic damping are provided for fast setting and reading.



**CH0027** Single Pan, Quad Beam, 311g

Single pan balance with four beams, each with a non-removable slider, and graduated 200 x 100g, 100 x 10g, 10 x 1g and 10 x 0.01g - providing sensitivity of 0.01g up to a total of 311g. Additional masses are not required. With zero adjustment and a stainless steel pan of 90mm diameter with two pouring spouts and a handle. Height of stirrup: 175mm. Magnetically dampened beam movement ensures rapid weighing. A platform housed in the base can be used for density determination.



**602-040** Dune Compact, 200 x 0.1g

**602-041** Dune Compact, 2000 x 1g

**602-042** Dune Compact, 5000 x 2g

The Dune series offers all the necessary features for quick and easy weighing. Equipped with an AC adapter, auto calibration through the keypad, low battery indicator, and overload indicator. With its alternate battery operation, splash-proof keypad, and sturdy plastic construction throughout, Dune balances deliver accurate readings in field, classroom, workplace or lab. Platform size 145 x 145mm. Weighing units g, oz, lbs.



### Core Balances

- 602-043 Compact, Portable, 200 x 0.01g
- 602-044 Compact, Portable, 250 x 0.1g
- 602-045 Compact, Portable, 600 x 0.1g
- 602-046 Compact, Portable, 1500 x 0.1g
- 602-048\* Compact, Portable, 2000 x 1g
- 602-047\* Compact, Portable, 2600 x 0.1g
- 602-049\* Compact, Portable, 5000 x 1g

### Specification:

- Platform size: 120mm dia. or \* 145mm dia.
- Stainless steel pan
- Auto power off
- Low battery indication
- ShockProtect™ overload three-point protection
- Can be stacked for storage
- Lock down mounting slot for Kensington™ type lock and cable
- Dual tare keys, colour-coded for easy recognition
- Removable draught shield
- Below balance weighing, with hanger
- Backlit LCD display.
- Mains adapter supplied as standard
- please specify 110/230V when ordering



### OHAUS CS Series Balances

- 602-001 CS Series Compact, 200 x 0.1g
- 602-002 CS Series Compact, 2000 x 0.1g
- 602-003 CS Series Compact, 5000 x 0.1g

The OHAUS CS Compact Scale is a lightweight, portable scale perfectly suited for use in laboratory, industrial, education and home use applications. Applications can include forensic testing, quality control, formulation, soil sampling, postal weighing and dietary needs.

### Specification:

- Repeatability (Std. dev.) (g): 0.1
- Linearity (g): ±0.1
- Weighing Units: g, lb:oz, Newton, oz
- Zero Range: To capacity by subtraction
- Stabilization Time: 3 seconds
- Optimum Operating Temperature: 65°-77°F / 18°-25°C at 10% to 80% relative humidity, non-condensing
- Power Requirements: 3 x AA alkaline batteries (included) or AC adapter (included)
- Calibration: User calibration from keypad
- Auto Shut-Off: 5 minutes no activity (battery operation only)
- Display (in/mm): LCD (0.4 / 11)
- Pan size L x W (in/cm): 5.75 x 5.25 / 14.5 x 13.3
- Scale Dimensions L x W x H (in/cm): 8.0 x 5.5 x 1.5 / 20.3 x 14.0 x 3.8
- Box Dimensions (L x W x H (in/cm): 12 x 6.75 x 2 / 30 x 17 x 5.5
- Net Weight (lb/kg): 0.91 / 0.47
- Shipping Weight: (lb/kg) 1.8 / 0.8



### CS Series Standard Features:

**Superior RF Protection** - The CS is designed with superior RF protection to deliver accurate and stable results when used in production areas or near cell phones. Approvals for electrical and emissions include CE listed and FCC Class B Part 15 operation.

**Large Stainless Steel Weighing Platform** - The CS is designed with a large weighing platform and can adequately handle large samples including oversized letters. In addition, the standard stainless steel platform is removable for easy cleaning.

**Compact Design** - The CS has a low profile design and is truly portable when powered by three "AA" batteries (included). A standard AC adapter can also be used to power the CS, when used in a more permanent location.



## OHAUS Traveler™ Balances

- 602-017 Traveler™ Portable, 150g x 0.01g
- 602-018 Traveler™ Portable, 300g x 0.01g
- 602-019 Traveler™ Portable, 300g x 0.1g
- 602-020 Traveler™ Portable, 500g x 0.1g
- 602-021\* Traveler™ Portable, 1500g x 0.1g
- 602-022\* Traveler™ Portable, 3000g x 0.1g
- 602-023\* Traveler™ Portable, 5000g x 1g

Designed for basic but accurate weighing in educational applications, the OHAUS Traveler™ Series was designed with a unique draughtshield that offers weigh-thru capability while being used and 'stackability' when being stored. With the right combination of performance and features, the Traveler™ is great value for your basic weighing applications.

### Specification:

- Weighing Units: Gram, Newton
- Tare Range: To capacity by subtraction
- Linearity: ± 1 d
- Stabilization Time (sec): < 3
- Display Size W x H (mm): 84 x 17
- Operating Temperature Range: 50° - 104°F / 10° - 40°C
- Power Requirements: AC Adapter (included) or 4 AA Batteries (not included)
- Dimensions (mm): 149x73x224 WxHxD (to top of draughtshield)
- Operating Humidity Range: 30%-90%
- Pan Size (mm): 120 dia. or \* 125 x 135 mm.



### Traveler™ Standard Features:

- Weigh-Thru Draughtshield** - Traveler's unique draughtshield was designed with an easy to remove center section that provides protection from rough environments while maintaining weighing speed.
- Stackable Draughtshield** - Designed with storage in mind it allows the balances to be stacked away when not in use. The draughtshield's centre piece can also be removed and converts into a weigh boat when turned upside down!
- USB or RS232 Connectivity** - Easy-to-install interface options, which provide weight output to an OHAUS printer or PC.

## OHAUS Scout® Pro Balances with Auxiliary Displays

- 602-067 Scout® Pro, 120g x 0.001g
- 602-068 Scout® Pro, 200g x 0.01g
- 602-069 Scout® Pro, 400g x 0.01g
- 602-071 Scout® Pro, 400g x 0.1g
- 602-072 Scout® Pro, 600g x 0.1g
- 602-073 Scout® Pro, 2000g x 0.1g
- 602-074 Scout® Pro, 4000g x 0.1g
- 602-076 Scout® Pro, 6000g x 1g

Ohaus Scout Pro Balance coupled with a TAD7 Secondary Display for demonstrations and easier viewing. Use this auxiliary display to make reading your scale's results even easier. This display kit comes complete with mounting brackets that allow you to mount the display on a table or wall.

### Specification:

See code: 602-004 on the next page for the full description and specification of Scout Pro Balances.



### TAD7 Display Unit Specification:

- ABS plastic housing
- Colour: white
- Base has four non-slip rubber pads
- Clear lens placed over LCD allows universal housing to accommodate various LCD sizes
- Housing size: 156mm (W) x 68mm (L) x 29mm (H)
- The bottom housing has two keyhole slots for direct wall /surface mounting
- Table/Wall Mount design. Two moulded plastic brackets are included that fit into the keyholes slot on the bottom of housing. The brackets can be installed in two directions to provide two different viewing angles in relation to a table or wall surface.
- The power connection is provided through the RS232 connector 3.3V DC, 30mA

### OHAUS Scout® Pro Balances

602-004	Scout® Pro, 120g x 0.001g
602-005	Scout® Pro, 200g x 0.01g
602-006	Scout® Pro, 400g x 0.01g
602-007	Scout® Pro, 400g x 0.1g
602-008	Scout® Pro, 600g x 0.1g
602-009	Scout® Pro, 2000g x 0.1g
602-010	Scout® Pro, 4000g x 0.1g
602-011	Scout® Pro, 6000g x 1g

The Ohaus Scout Pro is designed for use in laboratory, industrial or education applications and continues the tradition set by the Ohaus Scout and Scout II balances. Featuring easy-to-use two-button operation, a high-contrast LCD display, multiple weighing units, four application modes and the option of either RS232 or USB connectivity. Scout Pro balances are available with an auxiliary LCD for demonstration purposes (codes: 602-067 to 602-076).

#### Standard Scout Pro Specification:

- Tare Range: To Capacity By Subtraction
- Over Range Capacity: Capacity +90d
- Stabilization Time: 3 seconds
- Operating Temp. Range: 10° to 40°C
- Power Requirements: AC Adapter or 4 AA Batteries (not included)
- Display: High Contrast LCD with 6 digits 15mm high
- Calibration Type: Digital Calibration from Keypad
- Shipping Dimensions W x H x D: 25.4 x 10.2 x 30.5cm
- Shipping Weight (kg): 1.8

#### Individual Model Specifications:

Model:	004	005	006
Capacity (g):	120	200	400
Readability (g):	0.001	0.01	0.01
Repeatability-SD (g):	0.003	0.01	0.01
Linearity (g):	±0.003	±0.01	±0.01
Pan Size (cm):	9dia.	12dia.	12dia.
Net Weight (kg):	0.7	0.7	0.8
Weighing Units:	g, oz, ozt, dwt		

Model:	007	008	009
Capacity (g):	400	600	2000
Readability (g):	0.1	0.1	0.1
Repeatability-SD (g):	0.1	0.1	0.1
Linearity (g):	±0.1	±0.1	±0.1
Pan Size (cm):	12dia.	16.5x14.2	16.5x14.2
Net Weight (kg):	0.8	0.8	0.8
Weighing Units:	g, kg, oz, lb, lb:oz, ozt, dwt		

Model:	010	011
Capacity (g):	4000	6000
Readability (g):	0.1	1
Repeatability-SD (g):	0.1	1
Linearity (g):	±0.1	±1
Pan Size (cm):	16.5x14.2	16.5x14.2
Net Weight (kg):	0.8	0.8
Weighing Units:	g, kg, oz, lb, lb:oz, ozt, dwt	



#### Scout® Pro Standard Features:

- Multiple Application Modes** - Including enhanced parts counting, percentage weighing, totalisation and display hold.
- Easy to Use** - The high-contrast LCD display combined with two key operation makes the ScoutPro easy to operate.
- USB or RS232 Connectivity** - Quickly-installed option with integral cable allows data connection to PC or printer.
- Easy to Clean** - Removable stainless steel weighing platform, sealed front panel and moulded spill ring.
- Battery or AC Power** - Uses 4 AA batteries with auto shut-off feature for 40 hours of operation, or the Scout Pro can be run on the included AC adapter.
- Multiple Weighing Units** - Including grams, kilograms, pounds, ounces, a combined pound:ounce display, troy ounces and pennyweights.
- Integral Weigh-Below Hook** - Critical for density or specific gravity determination.

#### Scout® Pro Built-in Application Modes:

- Parts Counting** - Designed for counting parts for inventory control, parts bagging, receiving, dispensing and ticket counting:
  - Select from a sample size of 5, 10, 20 or 50 pieces while in counting mode with a quick button press.
  - User-enabled automatic recalculation of the average piece weight).
  - Can be configured for just the counting feature.
- Percentage Weighing** - Compare samples for compounding, formulation or quick weight checking. Place your reference weight on the platform, enter the weight into memory and the display will show the percentage sample weight compared to the reference weight.
- Totalisation** - Use the memory function to repeatedly sum the weight on the platform for compounding and formulation. Allows totalisation up to the limit of the display.
- Display Hold** - Allows you to retain the weight of an over-sized package on the display. Great for postal and shipping applications.
- User-Configurable** - Allows you to select active weighing units and modes using the two-button keypad. Can be quickly configured using an on-display menu system. A built-in lockswitch prevents reconfiguration during use.



## Highland Portable Precision Balances

- 602-059 Highland Portable, 120g x 0.001g
- 602-060 Highland Portable, 150g x 0.005g
- 602-061 Highland Portable, 300g x 0.01g
- 602-063 Highland Portable, 600g x 0.01g
- 602-062 Highland Portable, 600g x 0.02g
- 602-065 Highland Portable, 1000g x 0.01g
- 602-064 Highland Portable, 1500g x 0.05g

### Features and Specification:

- RS232 and USB Interface both included
- Can be stacked for storage
- ShockProtect™ overload three-point protection
- Handical™ manual internal calibration with built-in mass
- Lock down mounting slot for Kensington™ type lock
- Dual tare keys, color-coded for easy recognition
- Capacity tracker
- Removable draught shield
- Stainless steel pan
- Auto power off
- Low battery indication
- Adjustable levelling feet
- Rechargeable battery / mains adapter supplied as standard
- Below balance weighing with hanger
- Backlit LCD display
- Weighing
- Percentage weighing
- Parts counting
- Weight accumulation.
- Capacity: varies with model as listed
- Readability: varies with model as listed
- Platform size: 120mm Ø.
- Units of measurement: Gram (g), Carat (ct), Pound (lb), Dram (d), Grain (GN), Troy Ounce (Ozt), Pennyweight (dWt), Momme (MM), Tals T. (TL.T), Tals S. (TL.S), Tals T. (TL.T), Newton (N), Gram (g2)



## PGW Precision Balance

- 602-024 1500g x 0.01g
- 602-025 2500g x 0.01g
- 602-026 3500g x 0.01g
- 602-027 4500g x 0.01g

Designed to meet the needs of Laboratories, Schools, Industry and Commercial users.

### Features:

- Metal casing
- Security Locking Point
- External calibration
- Full range tare
- Platform size: 192 x 192mm
- 18+ Weighing units (including one custom unit)
- RS-232 bi-directional interface



### PGL Precision Balances

602-050	PGL Precision,	200g x 0.001g
602-051	PGL Precision,	300g x 0.001g
602-052*	PGL Precision,	2000g x 0.01g
602-053*	PGL Precision,	3000g x 0.01g
602-054*	PGL Precision,	40000g x 0.1g
602-055*	PGL Precision,	6000g x 0.1g
602-056*	PGL Precision,	8000g x 0.1g
602-057**	PGL Precision,	10kg x 0.1g
602-058**	PGL Precision,	20kg x 0.1g

#### Features and Specification:

- RS-232 bi-directional interface
- External calibration
- GLP print outs
- Date and time
- Colour coded keys
- Backlit LCD with dual display
- Capacity tracker
- Security locking station
- Metal casing
- Below balance weighing with hanger
- AC or rechargeable battery operation
- Weighing
- Parts counting
- Percentage weighing
- Check weighing
- Density determination.
- Capacity: varies with model as listed
- Readability: varies with model as listed.
- Platform sizes: 145 x 125mm or \*192 x 192mm or \*400 x 300mm
- Units of measurement: Gram (g), Milligram (mg), Carat (ct), Grain (GN), Newton (N), Troy Ounce (Ozt), Pennyweight (dWt), Ounce (Oz), Custom unit.



### OHAUS Pioneer Balances

602-037	Pioneer,	65g x 0.1mg
602-077	Pioneer,	110g x 0.1mg
602-078	Pioneer,	210g x 0.1mg
602-079*	Pioneer,	210g x 1mg
602-080*	Pioneer,	410g x 1mg
602-081**	Pioneer,	510g x 0.01g
602-082**	Pioneer,	2100g x 0.01g
602-083**	Pioneer,	4100g x 0.01g
602-084**	Pioneer,	4100g x 0.1g

Analytical balance. Draughtshield with removable panels.

- Capacity: varies with model as listed
- Readability: varies with model as listed
- Platform sizes: 90mm dia. or \*120mm dia. or \*\*180mm dia
- Weighing units: mg, g, ct, oz, dwt, tical, tola, mommes, baht, grain, mesghal, Newton, ozt, teals, custom.





**602-038 Bench Scales, 8000g x 0.1g**

**602-039 Bench Scales, 32kg x 1g**

Bench scale

Capacity: varies with model as listed.

Platform size: 225 x 275mm.

Units of measurement: g and kg.



### Weighing Mass Sets

**PH0034A Weighing Set, 1mg to 100g**

**PH0034B Weighing Set, 1mg to 200g**

**PH0034C Weighing Set, 1mg to 500g**

**PH0034D Weighing Set, 1mg to 1000g**

**PH0034E Weighing Set, 1mg to 2000g**

Polished brass weights in hardwood case with hinged lid and divided compartments. Nickel-silver and aluminium fractions. Supplied with chrome-plated brass forceps.



**723-001 Weighing Boat, 5ml**  
- 55 x 35mm, pk of 1000

**723-002 Weighing Boat, 30ml**  
- 80 x 60mm, pk of 500

**723-003 Weighing Boat, 100ml**  
- 120 x 100mm, pk of 250

Diamond shaped. Colour: White.



**716-001 Evaporating Basins, 40ml, each**

**EVAP80 Evaporating Basins, 80ml, pk of 20**

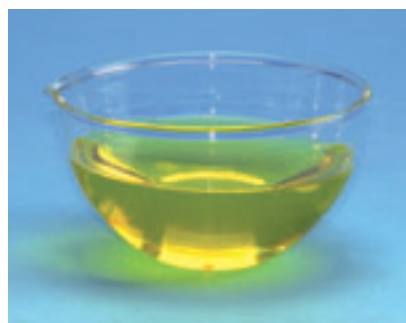
**C72G Evaporating Basins, 100ml, pk of 20**

Porcelain evaporating basin with spout, round bottom, glazed inside and outside except underside of base.



**ED0503 Glass Evaporating Basins, 100ml**  
pk of 10

Glass evaporating basin with spout & round bottom.



## Beakers

BK0104	Glass Beaker,	50ml
BK0105	Glass Beaker,	100ml
BK0107	Glass Beaker,	250ml
BK0108	Glass Beaker,	400ml
BK0110	Glass Beaker,	600ml
BK0112	Glass Beaker,	1000ml

Borosilicate glass, low form with spout. Graduated by 50ml increments. These beakers are equivalent to leading brands in quality, durability and heat resistance.



702-011	Tripour Beaker,	50ml
702-007	Tripour Beaker,	100ml
702-009	Tripour Beaker,	250ml
702-010	Tripour Beaker,	400ml
702-012	Tripour Beaker,	900ml

Beaker with three pouring spouts, made of ultra clear polypropylene with moulded-in graduations. Autoclavable up to 121 °C.



## Polypropylene Beakers

BEAK0050	50ml,	pk of 10
BEAK0100	100ml,	pk of 10
BEAK0250	250ml,	pk of 10
BEAK0500	500ml,	pk of 5
BEAK1000	1000ml,	pk of 5
BEAK2000	2000ml,	pk of 5

A range of polypropylene beakers having excellent clarity and very good chemical resistance. The products are autoclavable up to 130°C, have raised graduations on the outer surface and an excellent easy-pour tapered spout.

## Polypropylene Beaker Sets

EDU915	10, 25, 50, 100 & 250ml,	set of 5
EDU1203	50, 100, 250 & 500ml,	set of 4
EDU881	50, 100, 250, 500 & 1000ml,	set of 5
TBEAK	5 x 100ml & 5 x 250ml,	set of 10
EDU906	500, 1000 & 2000ml,	set of 3

A range of polypropylene beakers having excellent clarity and very good chemical resistance. The products are autoclavable up to 130°C, have raised graduations on the outer surface and an excellent easy-pour tapered spout.





## Bottles

### EDU651 Specimen Bottles, pk of 10

Polypropylene with screw cap. 30ml volume, wide mouth with lid design that is easy to seal or remove.



### Dropper Bottles

EDU677A Clear Glass, 30ml, pk of 6

EDU677B Clear Glass, 60ml, pk of 6

EDU679A Clear Glass, 125ml, pk of 6

EDU680A Amber Glass, 30ml, pk of 6

EDU681B Amber Glass, 60ml, pk of 6

EDU682A Amber Glass, 125ml, pk of 6

Borosilicate glass pipette dropping bottle with glass dropper, high density polythene stopper with dust-proof head and vinyl teat. Both stopper and teat are resistant to acids and alkalis.



### 704-0001 Dropper Bottle Tray

Plastic tray with divider for dropper bottle storage. Holds 10 x 60ml dropper bottles. Removable divider. Size: 208 x 85 x 35mm (L x W x D).



CH0180A Wash Bottles, 125ml, pk of 5

CH0180B Wash Bottles, 250ml, pk of 5

CH0180C Wash Bottles, 500ml, pk of 5

CH0180D Wash Bottles, 1000ml, pk of 5

Resilient, translucent polyethylene narrow-mouth wash bottles. Material thickness designed for easy handling when squeezing. The cap is fitted with a flexible polyethylene delivery tube with nozzle, which can be aimed wherever required, and the nozzle has a removable cap.



## Brushes

CH0214A Beaker Brushes, Bristle, pk of 10

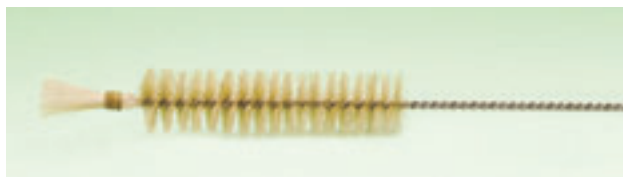
CH0214B Beaker Brushes, Nylon, pk of 10

Bristles on 40cm long wooden handle. Head size: 65 x 45 x 150mm.



### Burette Brushes

- CH0217A Bristle, for 25ml Burette, pk of 10
- CH0217B Bristle, for 50ml Burette, pk of 10
- CH0217C Bristle, for 100ml Burette, pk of 10
- CH0217D Nylon, for 25ml Burette, pk of 10
- CH0217E Nylon, for 50ml Burette, pk of 10
- CH0217F Nylon, for 100ml Burette, pk of 10

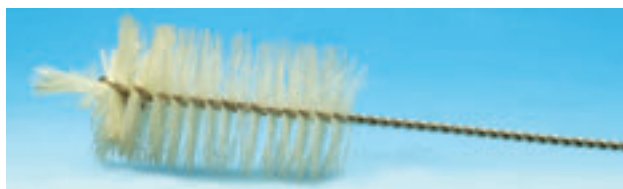


Burette brush on galvanised steel wire handle. High quality materials used for durability.

#### Brush Dimensions:

Burette Capacity (ml)	Head dia. (mm)	Total Length (mm)
25	16	610
50	19	760
100	25	915

- CH0220A Bristle Cylinder Brushes, pk of 10
- CH0220B Nylon Cylinder Brushes, pk of 10



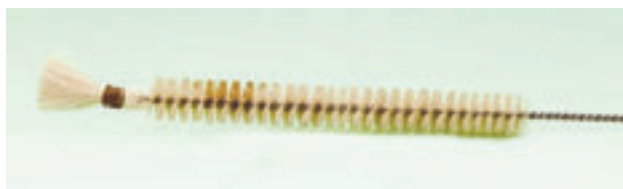
Brush head widens towards the end, with a slightly fanned tip. On galvanised wire handle. Diameter 50-100mm. Suitable for Erlenmeyer flasks, cylinders and beakers.

- CH0216A Bristle Flask Brushes, pk of 10
- CH0216B Nylon Flask Brushes, pk of 10



For round bottom flasks up to 100mm dia. On galvanised wire handle. Overall length: 480mm.

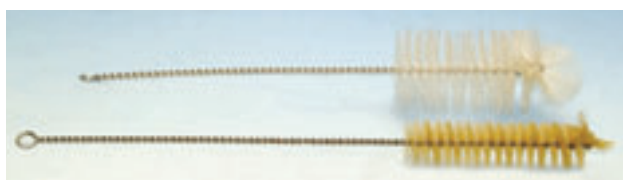
- CH0218A Bristle Pipette Brushes, pk of 10
- CH0218B Nylon Pipette Brushes, pk of 10



Pipette brush. Head size 125 x 10mm. Overall length 700mm. For pipettes and tubes from 8-12 mm diameter.

### Test Tube Brushes

- CH0204A Bristle, 11mm dia., pk of 10
- CH0204B Bristle, 29mm dia., pk of 10
- CH0204C Nylon, 11mm dia., pk of 10
- CH0204D Nylon, 29mm dia., pk of 10
- CH0210A Bristle, 50 x 19mm Head, pk of 10
- CH0210B Nylon, 50 x 19mm Head, pk of 10
- CH0206A\* Bristle, Tapered, 24-13mm, pk of 10
- CH0206B\* Bristle, Tapered, 35-25mm, pk of 10
- CH0206C\* Nylon, Tapered, 24-13mm, pk of 10
- CH0206D\* Nylon, Tapered, 35-25mm, pk of 10



Test tube brush on galvanised steel wire handle.

\* with fluffed cotton yarn tip



- 702-002 Burette, Glass Stopcock**  
10 x 0.1ml Class B Single Bore
- 702-003 Burette, Glass Stopcock**  
25 x 0.1ml Class B Single Bore

Burette with single bore. Accuracy  $\pm 0.1$ ml. Glass Stopcock. Class B.



- 13234A Burette, Glass Stopcock**  
50ml x 0.1ml Class B

Burette with single straight bore. Interchangeable glass key stopcock with blue ceramic graduations. Accuracy  $\pm 0.1$ ml. Glass Stopcock. Class B.



- 702-004 Burette, PTFE Key Stopcock**  
25ml x 0.1ml Class B

- 11780A Burette, PTFE Stopcock**  
50ml x 0.1ml Class B

Burette with straight bore interchangeable PTFE key stopcock and blue ceramic graduations. Accuracy  $\pm 0.1$ ml. This unit requires no lubrication and is sealed with a simple nut and 'O' ring mechanism. Class B. PTFE Stopcock.



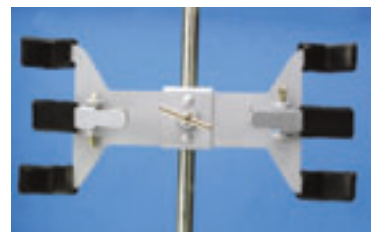
- CH0262A Polypropylene Burette Clamp**  
Single Clamp
- CH0262B Polypropylene Burette Clamp**  
Double Clamp

Fisher clamps for burettes.



- EDU732 Burette Clamps, Single, pk of 10**
- EDU733 Burette Clamps, Double, pk of 10**

Die-cast retort clamp with built-in boss head. Spring loaded jaws furnished with rubber grips for quick and stable clamping. High quality finish to metal surfaces.



- C264 Hardwood Burette Stand, Single**
- C264B Hardwood Burette Stand, Double**

Seasoned hardwood, polished stand with clamp. Rods are approx. 460 x 16mm. Base (single) 200 x 100mm; (double) 290 x 110mm.



**C532 Spirit Burner with Wick**

Glass spirit lamp with metal wick holder and spare wick. Complete with plastic cap. 80ml capacity.



**CH0535B Spirit Burner, Stainless Steel**

Stainless steel spirit lamp with woven wick in holder and screw-on cap.



**CH0535C Spirit Burner, Brass**

High quality brass spirit lamp with woven wick in holder and screw-on cap.



**Bunsen Burners**

**EDU1080** LPG, 11mm dia., 125mm ht.

**EDU101** LPG, 13mm dia., 145mm ht.

**EDU1081** Natural Gas, 11mm dia., 125mm ht.

**EDU078** Natural Gas, 13mm dia., 145mm ht.

Nickel-plated burner tube with rotatable air regulator, mounted on an enamelled pressed-steel base with a cylindrical rifflled connector. Base diameter 80mm, 8mm inlet. Packed in a sturdy presentation case for storage and shipping. Metal surfaces well finished. Conforms to safety standards.



**CH0096 Teclu, Natural Gas, 13mm dia.**

Natural gas burner with conical mixing section, screwed air regulator and gas control needle. It gives a very hot flame suitable for glasswork and soldering. Burner tube height x diameter (125 x 13mm). Connector diameter 9mm. Base diameter 80mm.



**CH0099 Semi Micro, Nat. Gas/Air, 5.5mm dia.**

Suitable for natural gas with air regulator. Burner tube height x diameter (100 x 5.5 mm). Connector diameter 9mm (OD).



**Bunsen Burner Tube**

**EDU993A** 500mm, pk of 10

**EDU993B** 600mm, pk of 10

**EDU993C** 750mm, pk of 10

**EDU993D** 900mm, pk of 10

Nitrile rubber with reinforced ends. Internal diameter 5mm.



## 612-014 Becelec 2 Electric Burner

The new Becelec 2 Electric Burner offers a unique replacement option to conventional gas bunsen burners. The high power heater combined with a reflective internal stainless steel bowl produces a concentrated stream of heat comparable with that of existing gas-powered bunsen burners. The wire safety guard included adds to the safety aspect of this burner.

### Technical Specification:

- Dimensions: 310 x 200 x 110mm ( L x W xH)
- Power: 500 watt.
- Temperature range: 37 to 920° C
- Weight: 1.7 Kg.
- Diameter of heating area: 130mm



## 15E481 SpinGene Microcentrifuge

Personal Interchangeable Microcentrifuge.

SpinGene is ideal for DNA extraction and concentration, quick spin downs, microfiltration and cell separation. SpinGene is ergonomically designed with interchangeable rotors, non-slip base and transparent cover.

### SpinGene is designed to be:

- Personal and affordable
- Lightweight and compact
- Quiet and quick to set up

### SpinGene is supplied with:

- Two interchangeable rotors for 8 x 0.5ml & 1.5ml tubes or 16 x 0.2ml tubes (2 strips of 8)
- Operation to 6500rpm providing 2000g RCF
- 12 months warranty
- 230V AC, 50-60Hz
- CE mark



## 604-003 Targa Centrifuge 4 x 15ml Swing Out Rotor

The Targa centrifuge is designed specifically for the education market being a low cost, low energy product. Constructed with a durable steel body for safety, with four-place swing out rotor and removable buckets.

### Specification:

- Maximum speed: 2800rpm.
- Rotor type: swing out.
- Tube capacity: 15ml.
- Maximum number of tubes: 2.
- Tube dimensions (diameter x length): 17 x 100mm, 13 x 75mm (with green adaptors), 10 x 75mm (with grey adaptors).
- Max radius: 130mm.
- Max RCF: 1100g.
- Rating: 100W.
- External dimensions: 361 x 400 x 320mm (W x D x H with lid closed)
- Warranty period: 3 Years
- Safety class: 1
- Voltage: 230V AC, 50-60Hz
- Packed weight: 10.9kg
- Operation: Rotor activated push button.



### Features and Operation:

- Maintaining finger pressure on the push button operates the centrifuge and locks the lid in position
- The rotor can only be energised when the lid is correctly closed and locked
- A viewing window in the lid enables the rotation to be observed
- Releasing finger pressure de-energises the rotor
- Rotor energised warning indicator
- Wipe-clean bowl with no crevices and removable rotor, for easy cleaning.

### 604-005 Interlock Centrifuge with Timer 4 x 15ml Swing Out Rotor

This Interlocked Centrifuge is constructed with a steel body with four-place swing out rotor complete with removable aluminium buckets. The safety interlock prevents the lid being opened until the rotor is at rest, and the timer can be used for automatic timed operation for up to a 30 minutes.

#### Features and Operation:

In the case of power failure the lid remains in the locked position.

The product can only be operated if the lid is correctly closed and locked in position.

Control panel has a series of indicator lamps - for rotor on, lid locked and rotor run down.

Viewing window in lid for observing rotor.

Maintaining finger pressure on the push button operates the centrifuge and locks the lid in position.

Releasing finger pressure de-energies the rotor, but the lid remains locked until the rotor is at rest.

Operation making it suitable for quick spin cycles.

Four-place swing out rotor.

Timer allows automatic timed operation up to 30 minutes.

Push button activates timer, illuminated, and lid remains locked until the rotor is at rest.

Four buckets fitted on rotor suitable for tubes up to maximum of 17mm diameter.



#### Specification:

Fixed speed, maximum: 2800rpm

Maximum radius: 135mm

Maximum RCF: 1200g

External Dimensions: 361 x 400 x 320mm (W x D x H lid closed), 361 x 415 x 720mm (W x D x H with lid open).

Tube dimensions (dia. x length): 17 x 100mm, 13 x 75mm (with green adaptors), 10 x 75mm (with grey adaptors).

Warranty Period: 3 Years

Safety Class: 1

Voltage: 230V or 120V models available

Packed Weight: 11.9 kg



### 604-004 Interlock Centrifuge 4 x 15ml Swing Out Rotor

Same specification, features and operation as 604-005 above but **without timer**.

### 15E681 Neon Centrifuge

Compact and noise-free design, with a small footprint that conserves valuable bench space. Designed to operate at 10,000 rpm it is ideal for quick spin-downs of sample from tube walls or caps. Capable of exerting 5,590g RCF on up to eight 1.5ml samples. Unique see-through design with attractive neon lighting. 220V, 50Hz.





**610-007 Drying/Warming Cabinet, 125 litre**

**610-008 Drying/Warming Cabinet, 250 litre**

The GENLAB Drying/Warming Cabinets are suitable for drying a range of items such as glassware and instruments, and for any general purpose warming applications.

**Features and Specification:**

- Maximum temperature: 50°C above ambient
- Easy-clean powder coated body
- Thermostat control for set temperature
- Toughened glass doors, sliding
- Full two-year warranty.
- Capacities: 125L & 250L
- Three shelves
- Internal dimensions: 430 x 720 x 400mm (125L); 520 x 980 x 480mm (250L)



**Insulated Cabinets**

**610-009 Drying/Warming Cabinet, 100 litre**

**610-010 Drying/Warming Cabinet, 200 litre**

The GENLAB Drying/Warming Cabinets are suitable for drying a range of items such as glassware and instruments, and for any general purpose warming applications. This insulated unit gives far greater temperature control, allowing greater accuracy during the drying and warming process. The resulting reduction in energy requirements gives a performance saving of over 30% compared to the non-insulated unit.

**Features and Specification:**

- Maximum temperature: 50°C above ambient
- Easy-clean powder coated body
- Thermostat control for set temperature
- Toughened glass doors, sliding
- Full two-year warranty.
- Capacities: 100L & 200L
- Three shelves
- Internal dimensions: 400 x 670 x 370mm (100L); 490 x 930 x 450mm (200L)



**EDU870 'G' Clamp, 75mm**

**EDU885 'G' Clamp, 100mm**

Drop-forged clamp finished with resistant coating.



**C74A Crucible with Lid, 15ml**

**C74B Crucible with Lid, 25ml**

Porcelain crucibles with lid, glazed inside and outside except base.



## Measuring Cylinders

CY0401	Glass, 5ml x 0.1ml graduation
CY0402	Glass, 10ml x 0.2ml graduation
CY0403	Glass, 25ml x 0.5ml graduation
CY0404	Glass, 50ml x 1ml graduation
CY0405	Glass, 100ml x 1ml graduation
CY0406	Glass, 250ml x 2ml graduation
CY0407	Glass, 500ml x 5ml graduation
CY0408	Glass, 1000ml x 10ml graduation
CY0409	Glass, 2000ml x 20ml graduation

Graduated borosilicate glass cylinder with spout, tall form with rounded base. Blue graduations. Class B.



MCYL0010	Polypropylene, 10ml x 0.2ml, pk of 10
MCYL0025	Polypropylene, 25ml x 0.5ml, pk of 10
MCYL0050	Polypropylene, 50ml x 1ml, pk of 10
MCYL0100	Polypropylene, 100ml x 1ml, pk of 5
MCYL0250	Polypropylene, 250ml x 2ml, pk of 5
MCYL0500	Polypropylene, 500ml x 5ml, pk of 5
MCYL1000	Polypropylene, 1000ml x 10ml, pk of 5
MCYL2000	Polypropylene, 2000ml x 20ml, pk of 2

Polypropylene measuring cylinders having excellent clarity and good chemical resistance. Autoclavable up to 130°C. These cylinders have raised graduations on the outer surface with an excellent easy-pour tapered spout.



## Measuring Cylinder Sets

EDU1039	Polypropylene, set of 5 10, 25, 50, 100, 250ml
EDU1031	Polypropylene, set of 6 10, 25, 50, 100, 250, 500ml
EDU1078	Polypropylene, set of 4 10, 50, 100, 1000ml
EDU1033	Polypropylene, set of 6 25, 50, 100, 250, 500, 1000ml
EDU866	Polypropylene, set of 5 50, 100, 250, 500, 1000ml

A range of polypropylene measuring cylinders having excellent clarity and good chemical resistance. The products are autoclavable up to 130°C. These cylinders have raised graduations on the outer surface with an excellent easy-pour tapered spout.





## DFSPNA Deflagrating Spoons and Caps

pk of 20

Steel cup and rod held in a dished aluminium cap. Length: 350mm; Cap: 90mm; Cup: 18mm.



## CH0417 Flask Stand

Polypropylene, stackable stand can be steam autoclaved. Will hold round bottom flask up to 10 litre capacity.



## CH0382 Fractional Distillation Column

Made from borosilicate glass with removable centre rod with discs, fitting inside a smooth bore tube with entry tube on side. Number of discs: 20. Overall Length: 480mm.

## Premium Grade Filter Papers

FLP090 90mm dia., pk of 100

FLP110 110mm dia., pk of 100

FLP125 125mm dia., pk of 100

FLP150 150mm dia., pk of 100

A good quality paper for general purpose use with medium retention and flowrate. 100 Circles/pack.



## Flasks

FL0702 Conical Flask, 50ml

FL0703 Conical Flask, 100ml

FL0705 Conical Flask, 250ml

FL0707 Conical Flask, 500ml

FL0708 Conical Flask, 1000ml

Conical, borosilicate glass Erlenmeyer flask with a narrow neck. Class B.



FL2604 Volumetric Flask, with Stopper, 50ml

FL2605 Volumetric Flask, with Stopper, 100ml

FL2606 Volumetric Flask, with Stopper, 200ml

FL2607 Volumetric Flask, with Stopper, 250ml

FL2608 Volumetric Flask, with Stopper, 500ml

FL2609 Volumetric Flask, with Stopper, 1000ml

FL2610 Volumetric Flask, with Stopper, 2000ml

Volumetric, Borosilicate Glass with blue graduation. Fitted with chemical resistance stopper as per DIN standard 12664 and ISO1042. Class B.



## Funnels

- 726-001 Glass Funnel, 55mm, pk of 10  
 FN2204 Glass Funnel, 75mm, pk of 10  
 FN2206 Glass Funnel, 100mm, each

Borosilicate glass funnel, with typical long-stem construction. Unaffected by acids, alkalis etc.

### CH0488B Thistle Funnel, 25mm dia.

Thistle funnel, neutral glass, stout walled. 250mm length.

### Funnels and Funnel sets

- EDU212 Polypropylene, 55mm dia., pk of 10  
 EDU742 Polypropylene, 65mm dia., pk of 10  
 EDU175 Polypropylene, 75mm dia., pk of 10  
 EDU743 Polypropylene, 95mm dia., pk of 10  
 C454SET Polypropylene, set of 3  
 50, 75, 100mm  
 EDU874 Polypropylene, set of 10  
 5 x 75mm + 5 x 95mm

Polypropylene, filter type, plain with long stem, unaffected by acids and alkali etc.

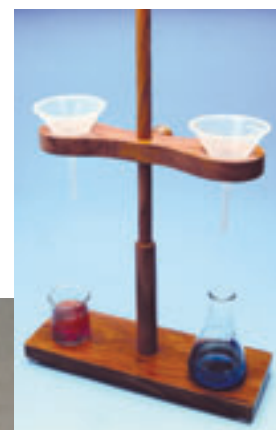
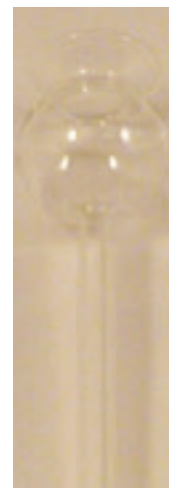
- CH0689A Funnel Stand, Single  
 CH0689B Funnel Stand, Double

Polished wood base with clamping screws. Rods are approx. 460mm x 16mm dia.

### Buchner Funnels

- CH0462A Buchner Funnel, 35mm dia.  
 CH0462B Buchner Funnel, 50mm dia.  
 CH0462C Buchner Funnel, 60mm dia.  
 CH0462D Buchner Funnel, 75mm dia.  
 CH0462E Buchner Funnel, 100mm dia.  
 CH0462F Buchner Funnel, 125mm dia.  
 CH0462G Buchner Funnel, 150mm dia.  
 CH0462H Buchner Funnel, 200mm dia.  
 CH0462I Buchner Funnel, 250mm dia.  
 CH0462J Buchner Funnel, 300mm dia.

Porcelain with straight sides above the perforated plate. For individual specifications please refer to the table opposite.



Top Dia. (mm)	Height (mm)	Filter Paper (mm dia.)	Capacity (approx. ml)
35	100	27	15
50	100	40	35
60	108	50	60
75	120	70	100
100	170	90	325
125	200	110	575
150	200	130	850
200	245	175	1950
250	260	230	4000
300	305	260	5200



## Gas Jars

- C494A 150 x 50mm (h x dia.), pk of 10
- C494B 200 x 50mm (h x dia.), pk of 10
- C494C 250 x 50mm (h x dia.), pk of 10
- C494D 300 x 50mm (h x dia.), pk of 10
- C494E 200 x 75mm (h x dia.), pk of 10
- C494F 300 x 75mm (h x dia.), pk of 10
- C494G 200 x 100mm (h x dia.), pk of 10
- C494H 250 x 100mm (h x dia.), pk of 10

Cylindrical, clear glass, ground flange and heavy foot.  
Supplied without covers.



## Gas Jars Covers

- CH0496A 50mm dia., pk of 10
- CH0496B 65mm dia., pk of 10
- CH0496C 75mm dia., pk of 10
- CH0496D 90mm dia., pk of 10
- CH0496E 100mm dia., pk of 10

Circular sheet glass, ground one side.



- BHSHL07 Beehive Shelf, 75mm dia.
- BHSHL10 Beehive Shelf, 100mm dia.

Made of porcelain, glazed both inside and out. For use in pneumatic troughs for gas collection.

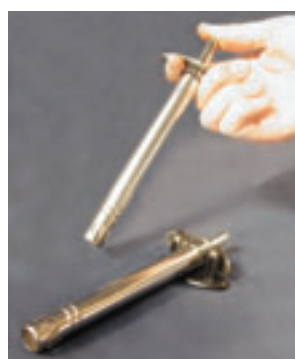


## EDU740 Wooden Splints, approx. 1000

For lighting burners or testing for oxygen etc. Supplied in bundles of approximately 1,000 splints.

## EDU080 Gas Lighter

Suitable for igniting the common fuel gases. Sparks produced by squeezing the handle. No battery required.



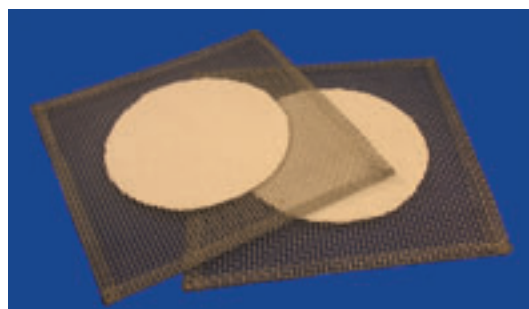
## Wire Gauzes

- GUZPL125 Plain, 125 x 125mm, pk of 10
- GUZPL150 Plain, 150 x 150mm, pk of 10

Plain gauze wire squares without ceramic centres.

- GUZCR125 125 x 125mm, pk of 10
- GUZCR150 150 x 150mm, pk of 10

Square, with flat circular ceramic centre. Extra strong quality, well finished edges for safety. Packed in neat shelf cartons with inner protection and drying agent.



## Thermostatic Hotplates, Analogue

607-004 - Small

607-005 - medium

These analogue hotplates feature a generous working area, thermostatically controlled, with an illuminated on/off switch and heater and a warning light to show when the hob is still hot. The hob surface overlaps the body to prevent spillages from entering the controls. The hob is solid aluminium, 12mm thick, for excellent thermal properties and uniform heat distribution over its working area. The painted surfaces and control panel have an antibacterial finish and are also all chemical resistant, wipe-clean surfaces. Hob temperature is adjusted using the analogue control dial.

### Features and Specification:

- Clearly visible bright status indicators; Hot Warning Light (>60°C)
- Analogue temperature control dial
- Body made from powder-coated galvanised steel to resist corrosion
- Wipe-clean antibacterial paint finish
- Hotplate fitted with non-slip rubber feet for safety
- Thermostatic temperature range: ambient +10°C - 350°C
- Sensitivity/temperature stability @ 45°C air temp: ±10°C @ 150°C
- Warranty period: 3 Years
- Safety class: 0
- Carries the CE mark
- Voltage: 230V AC
- Hob dimensions:
- SMALL - (W x D): 305 x 240mm
- MEDIUM - (W x D): 457 x 305mm
- Unit dimensions:
- SMALL - (W x D x H): 305 x 240 x 200mm
- MEDIUM - (W x D x H): 457 x 305 x 200mm
- Heater Power: SMALL - 1000W ; MEDIUM - 2000W
- Power consumption: SMALL - 1000W ; MEDIUM - 2000W



## Polypropylene Measuring Jugs

JUG0250 250ml, pk of 10

JUG0500 500ml, pk of 10

JUG1000 1000ml, pk of 5

JUG2000 2000ml, pk of 5

EDU781 Set of 3 - 250,500,1000ml

EDU1202 Set of 4 - 250,500,1000,2000ml

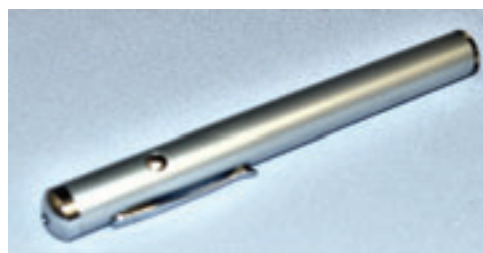
Polypropylene measuring jugs having excellent clarity and good chemical resistance. The products are autoclavable up to 130°C. The jugs have raised graduations on the outer surface and an excellent easy-pour tapered spout.



## 712-004 Laser Pen

This inexpensive and lightweight laser pen is useful for ray optics demonstrations and simple diffraction work. In addition to this you can make your point on overhead images with this useful presentation tool.

**Caution: Laser Light. Do not stare into the beam or view directly with optical instruments.**





## Incubators

610-011	18 litre
610-012	18 litre with Visibility Door
610-013	30 litre
610-014	30 litre with Visibility Door
610-015	40 litre
610-016	40 litre with Visibility Door
610-017	50 litre
610-018	50 litre with Visibility Door
610-019	75 litre
610-020	75 litre with Visibility Door

The GENLAB General Purpose Incubators offer a range of highly efficient, reliable, cost effective units to suit most biological analysis, research and general laboratory applications.

### Features and Specification:

- Easy clean powder-coated body
- Direct reading thermostat
- Safety overheat thermostat
- Aluminium coated mild steel chamber
- Full two year warranty
- Temp. range:
  - with solid door - ambient +5°C to 100°C
  - with visibility door - ambient +5°C to 60°C
- Temp. Fluctuation:  $\pm 0.25^{\circ}\text{C}$  @ 37°C
- Capacities: 18L, 30L, 40L 50L & 75L
- Two shelves
- Visibility door: (see listing)
- Internal dimensions:
  - 18L - 260 x 260 x 270mm ; 30L - 260 x 360 x 350mm
  - 40L - 320 x 360 x 350mm ; 50L - 330 x 490 x 330mm
  - 75L - 330 x 490 x 450mm



## Masses

MB001	Brass, 1g
MB002	Brass, 2g
MB005	Brass, 5g
MB010	Brass, 10g
MB020	Brass, 20g
MB050	Brass, 50g
MB100	Brass, 100g

Small form slotted mass.

MHB010G	Brass Hanger only, 10g
MHB020G	Brass Hanger only, 20g
MHB050G	Brass Hanger only, 50g
MHB100G	Brass Hanger only, 100g

Small form slotted mass hanger.



**Masses**

- EDU087** Brass Slotted Set, 100g  
10g Hanger and 9 x 10g Masses
- EDU088** Brass Slotted Set, 500g  
50g Hanger and 9 x 50g Masses
- EDU089** Brass Slotted Set, 1000g  
100g Hanger and 9 x 100g Masses
- P260** Brass Slotted Set, 100g  
20g Hanger and 4 x 20g Masses
- P262** Brass Slotted Set, 250g  
50g Hanger, 9 x 20g, 1 x 10g, 2 x 5g Masses
- EDU1025** Brass Slotted Set, 438g  
50g Hanger, 1 of each 200g, 100g, 50g,  
20g, 10g, 5g, 2g and 1g

Small form slotted mass & hanger set.



- EDU877** Cast Alloy, 10g, pk of 3
- EDU878** Cast Alloy, 20g, pk of 3
- EDU879** Cast Alloy, 50g, pk of 3
- EDU903** Cast Alloy, 100g, pk of 5

Slotted masses. Flat, with large central hole and small slot to prevent masses sliding off hanger. Manufactured from cast alloy, accuracy 1%.

- EDU880** Cast Alloy Hangers, 50g, pk of 3
- EDU902A** Cast Alloy Hangers, 100g, pk of 5

Mass hangers for slotted masses. Circular section central column with flattened section near top to slide the small-slotted masses on or off. Manufactured from cast alloy, accuracy 1%.



- EDU904** Cast Alloy Set, 100g  
9x10g Mass, 1x10g Hanger
- EDU905** Cast Alloy Set, 1000g  
9x100g Mass, 1x100g Hanger

Small format cast alloy mass & hanger set.

- EDU771** Cast Mass, 100g
- EDU772** Cast Mass, 200g
- EDU773** Cast Mass, 500g
- EDU774** Cast Mass, 1000g
- EDU775** Cast Mass, 2000g
- EDU776** Cast Mass, 5000g
- EDU777** Cast Mass, 10,000g

Large format slotted mass.

- EDU778** Cast Hanger only, 500g
- EDU779** Cast Hanger only, 1000g

Large format slotted hanger.





## Iron Masses

<b>HEX50</b>	Hexagonal with Ring, 50g
<b>HEX100</b>	Hexagonal with Ring, 100g
<b>HEX200</b>	Hexagonal with Ring, 200g
<b>HEX500</b>	Hexagonal with Ring, 500g
<b>HEX1000</b>	Hexagonal with Ring, 1000g
<b>HEX2000</b>	Hexagonal with Ring, 2000g
<b>HEX5000</b>	Hexagonal with Ring, 5000g
<b>HEX10000</b>	Hexagonal with Ring, 10,000g

Hexagonal iron mass with lifting ring.



## EDU769 Weighing Set on Tray

A combined set of accurate steel and brass weights that are housed in a sturdy blue moulded tray. Provides for weighing objects from 10g to 1990g in 10g increments. 3 steel weights and 6 brass weights.

**Contents:** 1 each of 1kg, 500g, 200g, 50g and 20g;  
2 each of 100g & 10g; 1 Moulded Tray.



## EDU990T Melting Point Apparatus, Simple

Basic equipment for determining melting point of substances. Consists of an aluminium block with hole for thermometer (not supplied). Ideal for individual student use.



## MELTP Melting Point Apparatus

This ergonomic apparatus has been designed with safety and ease of operation in mind, making it ideal for use in education and industry alike. A single control knob on the front panel incorporates the mains ON/OFF switch with arbitrary scale of 0 to 10. A rapid heat switch allows higher temperatures to be obtained quickly. Sample tubes are illuminated from behind and magnified through a lens. A selector at the rear of the instrument allows a light or dark background. Ceramic insulation around the aluminium heating block minimises heat transfer to the casing. Thermometer, capillary tubes and cooling plug available as accessories. Supplied with instructions.

Electrical supply: 230V AC, 50/60Hz

Weight: 1.5kg

Temperature range: Ambient to + 350°C



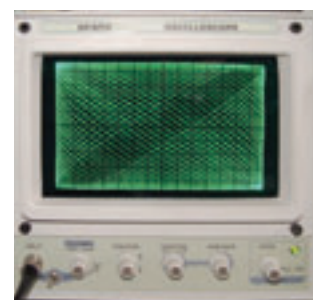
**614-001 Large Screen Oscilloscope**

Model A, Dual channel

**614-002 Large Screen Oscilloscope**

Model B, Single channel

This large screen Oscilloscope is an excellent laboratory resource for educating students in practical science. A new generation instrument with a 225mm kinescope screen which can be easily read from a distance. Features include: vertical deflection, a sweep system, horizontal deflection and a calibration signal. (Detailed technical data available on request).



**610-001 Oven, 6 litre**

**610-003 Oven, 18 litre**

**610-004 Oven, 30 litre**

**610-005 Oven, 40 litre**

**610-002 Oven, 50 litre**

**610-006 Oven, 75 litre**

The GENLAB General Purpose Ovens are highly efficient, reliable, cost effective units to suit most drying, warming and general laboratory applications.

**Features and Specification:**

Temperature range: 40 to 250°C

Fluctuation  $\pm 0.75^\circ\text{C}$

Easy clean powder-coated body

Aluminium coated mild steel chamber

Direct reading thermostat

Safety overheat thermostat

Full two year warranty

One shelf

Capacities: 6L, 18L, 30L, 40L, 50L & 75L

Interior dimensions:

6L - 150 x 230 x 190mm; 18L - 260 x 260 x 270mm

30L - 240 x 360 x 350mm; 40L - 320 x 360 x 350mm

50L - 330 x 490 x 330mm; 75L - 330 x 490 x 450mm



**CH0625G Test Paper, Cobalt Chloride**

**C622A Test Paper, Litmus Red**

**C622B Test Paper, Litmus Blue**

**C622C Test Paper, Litmus Neutral**

**C627 Test Paper, Universal Ind., pH 1-11**

Plastic Case of 10 books each with 20 leaves.



**CH0627A pH Indicator Dispenser, pH 1-11**

**CH0627B pH Indicator Dispenser, pH 1-14**

**EDU893 Test Paper, Universal Ind., pH 1-14**

Indicator paper supplied in plastic dispenser containing 5 metres of 8mm wide test strip. A colour chart is provided on the side of the dispenser.



**GLU101 Glucose Test Strips, pk of 50**



## EDU1032 pH Meter, Digital

A robust, inexpensive, hand held pocket LCD pH meter with 0.01 resolution and standard combination electrode with screw fit. Ideal for laboratory use or where a quick and easy reading is required.

- Range: 0 to 14 pH
- Resolution: 0.01 pH
- Accuracy:  $\pm 0.2$  pH
- Calibration: Manual two point
- Operating temp.: 0 to 50°C
- Dimensions: (incl. electrode) 180 x 50 x 25mm



## CH0892 pH Tester, Pocket

A lightweight, splash proof, pocket size tester. Ideal for pH spot reading precise to 0.1 pH with large easy to read LCD display. Supplied in case with 3 x 1.5V alkaline batteries. Battery life 700 hours approx.

- Range: 0.0 to 14.0 pH
- Resolution: 0.01pH
- Environment: 0 to 50°C
- Accuracy:  $\pm 0.1$  pH
- Mass: 85g
- Dimensions: 150 x 30 x 24mm



## 614-013 pH Turtle

with Electrode & Software

The Hanna pH Turtle is a sophisticated yet easy-to-use transmitter that turns any PC into a pH meter. Simply plug it to your PC's serial port and go! Within moments you can view pH measurements on the large screen of your laptop or desktop PC. Hanna's user-friendly software allows continuous real-time data logging right from the desktop. This software can be operated in eight different languages: Dutch, English, French, German, Italian, Norwegian, Portuguese, and Spanish. The main window of this powerful software contains a virtual pH meter display, a continuously updating table of logged data and even a real-time graph with an advanced zoom feature. Manual temperature compensation, log on demand, logging interval and even high & low alarm settings are easily programmed with your keyboard. The pH Turtle is also supplied with a double-junction, refillable pH electrode to ensure a long life, even in varied and unclean samples. In addition, its rugged plastic body provides higher resistance to accidental shocks and falls. The pH Turtle does not require a serial box interface to turn your PC into a pH meter. You simply hook it up to your PC serial (RS-232) port and the unit is powered up, drawing power through the port with no need for an external adapter. pH Turtle can be easily, automatically calibrated on 1, 2 or 3 points through your PC keyboard. The meter automatically recognizes pH 4, 7 and 10 buffers. User can set high and low alarms which can be visually displayed in graph and table windows. The software can also provide an audible 'beep' whenever the value is outside the desired interval. The pH Turtle is supplied complete with Windows® Compatible Software, 1m Cable with RS-232 Connector, pH Electrode and instructions.



### Specification:

Accuracy of pH at 20°C/68°F	$\pm 0.2$
Dimensions (OD x H)	3.6 x 1.6in / 88 x 40mm
Environment (RH)	95%
Environment (°C)	0° to 50°
Environment (°F)	32° to 122°
Temperature Compensation (°C)	Manual 0° to 100°
Temperature Compensation (°F)	Manual 32° to 212°
Typical EMC Deviation of pH	$\pm 0.2$
Weight	8.8oz / 250 g
pH Calibration	Automatic 1, 2 or 3 points through keyboard
pH Range	0.0 to 14.0
pH Resolution	0.1

### 614-010 pH Meter Hand Held

A rugged, portable pH meter with simple-to-use rotary dial and manual two-point calibration. Temperature compensation can be set manually to improve pH accuracy. Supplied with a double junction pH electrode with 1m cable.

#### Specification:

- Range: 0.0 -14.0 pH
- Battery life: 100 hours approx.
- Dimensions: 185 x 82 x 53mm
- Weight: 265g



### 614-011 Compact pH/C Meter with pH Electrode

### 614-012 Compact pH/C Meter with Magnetic Stirrer & Electrode

pH meter designed for use where space is at a premium. Featuring the main requirements of a laboratory pH meter: auto temperature compensation/calibration;  $\pm 0.02$  pH accuracy; can be run on mains or battery power. Because of its small footprint, built-in beaker and electrode stand the meter can be used practically anywhere. A large dual-level LCD display reads both pH and temperature simultaneously. Supplied with combination pH/C probe, plastic beaker, electrode holder, calibration solutions, mains power cable and battery.

#### Features and Specification:

- pH electrode with temperature sensor
- Built-in beaker holder and beaker-top electrode holder
- Small desk top footprint - 190 x 105mm
- Reads pH and temperature
- Large LCD screen
- Easy one-button calibration
- Mains or battery operated
- Built-in 500rpm magnetic stirrer (614-012 only)
- pH range:  $-2.00$  to  $16.00$
- pH resolution:  $0.1$  ; pH accuracy:  $\pm 0.02$
- Temp. range:  $-5.0$  to  $105^{\circ}\text{C}$  ; Temp. resolution:  $0.1^{\circ}\text{C}$
- Temperature accuracy:  $\pm 0.5^{\circ}\text{C}$  up to  $60^{\circ}\text{C}$ ;  $\pm 1^{\circ}$  up to  $105^{\circ}\text{C}$  or  $\pm 1^{\circ}\text{F}$  up to  $140^{\circ}$ ;  $\pm 2^{\circ}\text{F}$  up to  $221^{\circ}\text{F}$
- pH calibration: Auto at 1 or 2 points
- Power supply: 230V AC Mains to 12V DC, or 9V battery
- Dimensions (W x D x H): 190 x 105 x 50mm
- Weight: 450g



### Pestle and Mortar

- PM80 50ml, 80mm dia.
- PM90 150ml, 90mm dia.
- PM100 175ml, 100mm dia.
- PM130 300ml, 130mm dia.
- PM150 500ml, 150mm dia.

Porcelain with unglazed grinding surface.





## 101VR20 Petri Dishes, 90mm dia., pk of 20

Dishes are produced from cytotoxicity tested, FDA approved virgin polystyrene with Triple Vent. High optical quality.



## 760-001 Petri Dishes, 90mm dia., pk of 10

Borosilicate Glass 90mm.



## CH0376 Petri Dish Rack

Clear acrylic with white polycarbonate posts. This handy rack will hold 60 Petri dishes of 90mm diameter. Useful during inoculation, incubation and storage.



## diji Liquid Handling System

EDU1000 10ml system, Grade B

EDU1001 25ml system, Grade B

EDU1000/5 10ml system, Grade B, pk of 5

EDU1001/5 25ml system, Grade B, pk of 5

712-008 10ml system, A Grade

712-018 25ml system, A Grade

**diji** is the unique new instrument for handling laboratory liquids. **diji** combines the positive displacement features of a syringe with the traditional graduations of a pipette, making it simple and easy to use - in the laboratory or in the field.

**Half syringe + half pipette = half the effort**

**diji** liquid handling equipment leads the field in several areas:

**Accuracy; Safety; Reliability; Ease of use; Precision; Durability**

Liquids are dispensed or aspirated by nestling the handpiece in the palm of the hand and stroking the piston rod, with the thumb, in a very relaxed and natural way. The operator can not suck liquid into the wrong places therefore contamination is eliminated and cleaning is easier. **diji** is autoclavable when assembled or dismantled.

**diji** consists of simple parts and is easily repairable:

- A simple PTFE (Teflon®) seal assembly
- A piston rod assembly
- A borosilicate glass Syrette
- A handgrip



- CH0556A One Mark Pipette, 2ml
- CH0556B One Mark Pipette, 5ml
- CH0556C One Mark Pipette, 10ml
- CH0556D One Mark Pipette, 15ml
- CH0556E One Mark Pipette, 20ml
- CH0556F One Mark Pipette, 25ml
- CH0556G One Mark Pipette, 50ml

Neutral glass, bulb form, single graduation on upper stem.  
Class B.

- CH0558A One Mark Pipette, Blue, 1ml
- CH0558B One Mark Pipette, Orange, 2ml
- CH0558C One Mark Pipette, White, 5ml
- CH0558D One Mark Pipette, Red, 10ml
- CH0558E One Mark Pipette, Green, 15ml
- CH0558F One Mark Pipette, Yellow, 20ml
- CH0558G One Mark Pipette, Blue, 25ml
- CH0558H One Mark Pipette, Red, 50ml

Borosilicate glass, bulb form, single graduation on upper stem  
and colour coded.

#### CH0564E Graduated Pipette, 25ml

Pipette, straight form, graduated, neutral glass. 25ml capacity,  
0.2ml graduations.

#### EDU163 Glass Dropping Pipette, pk of 20

125mm glass body pipette with rubber teat. Useful for  
dispensing liquid from test tubes.

#### CH0232A Rubber Teats, 50ml, pk of 20

Rubber bulb teats for use with dropper pipettes.

#### CH0232B Rubber Teats, 1ml, pk of 20

Heavy weight rubber bulb, for pipettes & medicine droppers.  
Diameter 5 to 6mm.

#### C232 Rubber Teats, 2ml, pk of 10

For use with dropper pipettes etc.

#### CH0232C Latex Teats, 2ml, pk of 20

Latex bulb fits diameter 6 to 8 mm.

#### CH0230A Rubber Teats, 5ml, pk of 20

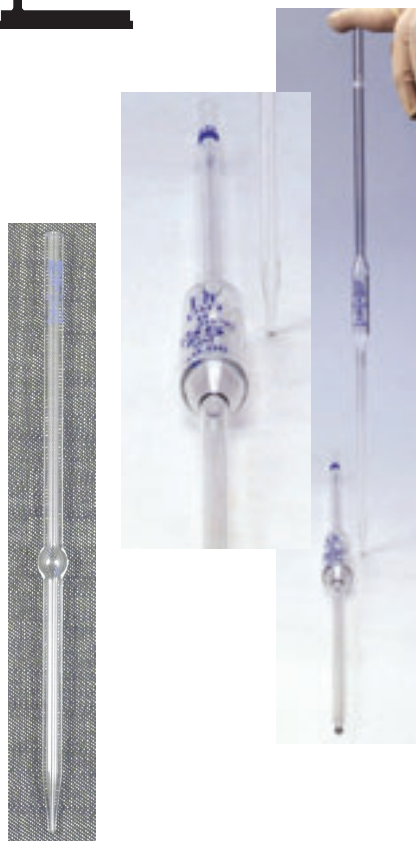
#### CH0230B Rubber Teats, 10ml, pk of 20

#### CH0230C Rubber Teats, 15ml, pk of 20

#### CH0230D Rubber Teats, 25ml, pk of 20

#### CH0230E Rubber Teats, 50ml, pk of 20

Rubber, pear-shaped teats for use with pipettes etc.





## Graduated Pipettes

**EDU655** Disposable, 3 x 0.5ml, pk of 40

**EDU655A** Disposable, 3 x 0.5ml, pk of 500

Translucent pipettes with precise graduation and good chemical resistance. Length: 155mm.



## Pipette Fillers

**C6586A** Bulb Type, Red, pk of 10

**C6586B** Bulb Type, Black, pk of 10

Bulb-type, rubber pipette filler for pipetting noxious solutions, microbial suspensions and other harmful and unpleasant solutions. Consists of a bulb and three pinch valves controlling influx and efflux of the pipette contents. Bulb Dia. 54mm.



**PIPUMP2** Pipette Filler, PI Pump, 2ml

**PIPUMP10** Pipette Filler, PI Pump, 10ml

**PIPUMP25** Pipette Filler, PI Pump, 25ml

Fast-release pipetting device for precise pipetting or zip-quick emptying. The thumb wheel can be rotated to precisely draw up or dispense liquids, or alternatively the releaser may be pushed in for virtually instant emptying. The moulded chuck has a silicone rubber collar inside to hold various pipettes of standard sizes. It resists acids and alkalis and can be easily disassembled for thorough cleaning.



**C589** Pipette Stand, 12 horizontal

Polished wooden stand, two sided.  
Height: 230mm Width: 260mm Depth: 120mm.



**C592** Pipette Stand, 12 horizontal

This autoclavable stand is two sided, with two ends joined to each other with three metal rods, all coated with polypropylene, to hold the pipettes.



**C588** Pipette Stand, 12 vertical

**C590** Pipette Stand, 24 vertical

A polished, wooden stand, with four rubber feet, which holds 12 or 24 pipettes vertically.  
Height: 41 cm. Width: 36cm. Depth: 11cm.



**CH0594** Pipette Stand, 28 vertical

Stable, high-density polypropylene stand.

### Pipettors

- CH0586D Micropipettor Pipette, 5 $\mu$ l
- CH0586E Micropipettor Pipette, 10 $\mu$ l
- CH0586F Micropipettor Pipette, 20 $\mu$ l
- CH0586G Micropipettor Pipette, 25 $\mu$ l
- CH0586H Micropipettor Pipette, 50 $\mu$ l
- CH0586I Micropipettor Pipette, 100 $\mu$ l
- CH0586J Micropipettor Pipette, 200 $\mu$ l
- CH0586K Micropipettor Pipette, 250 $\mu$ l
- CH0586L Micropipettor Pipette, 400 $\mu$ l
- CH0586M Micropipettor Pipette, 500 $\mu$ l
- CH0586N Micropipettor Pipette, 1000 $\mu$ l



Very high accuracy fixed volume micropipettors. Ideal for clinical diagnostics, routine tests and control analysis.

- CH0582A Variable Volume Pipette  
0.5-10 $\mu$ l, 0.1 $\mu$ l increments
- CH0582B Variable Volume Pipette  
2-20 $\mu$ l, 0.1 $\mu$ l increments
- CH0582C Variable Volume Pipette  
5-50 $\mu$ l, 1 $\mu$ l increments
- CH0582D Variable Volume Pipette  
10-100 $\mu$ l, 1 $\mu$ l increments
- CH0582E Variable Volume Pipette  
20-200 $\mu$ l, 1 $\mu$ l increments
- CH0582F Variable Volume Pipette  
100-1000 $\mu$ l, 10 $\mu$ l increments

A new range of user friendly micropipettes with variable digital volume deliveries. The pipettes are adjustable, air displacement units manufactured to the highest standards.



- CH0584A High Volume, Range 1-5ml
- CH0584B High Volume, Range 2-10ml

Specially designed for safe day-to-day laboratory pipetting and dilution work. Eradicates use of glass pipettes and dangerous mouth pipetting. With an increment of 0.1 ml., they provide high accuracy not achievable with conventional glass pipetting in reagent preparations, dilutions, colorimetric tests and cell cultures. Calibration and specification conform to DIN 12650.

- CH0583A Micropipette, Vari-Fix, 5-25 $\mu$ l
- CH0583B Micropipette, Vari-Fix, 10-50 $\mu$ l
- CH0583C Micropipette, Vari-Fix, 100-500 $\mu$ l

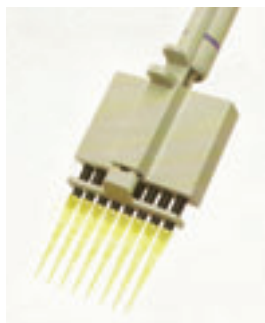
Designed for critical low volume pipetting for application in molecular biology, biotechnology, DNA amplification, DNA sequencing, restriction enzyme and immuno assays. With specially designed position, it handles volume down to 0.5 microlitre with outstanding accuracy and reproducibility. Measuring increments: 10/20/30/40/50microlitre





- CH0585A** Micropipette, Multichannel  
5-50µl, 1µl accuracy, CV <0.5
- CH0585B** Micropipette, Multichannel  
20-100µl, 1µl accuracy, CV <0.3
- CH0585C** Micropipette, Multichannel  
40-300µl, 0.7µl accuracy, CV <0.25

High accuracy and precision for 96-well microlitre plates. Comfortable and lightweight with soft plunger movement. Separate tip ejector allows easy tip ejection. Recommended for ELISA, molecular screening, kinetic studies and DNA amplification.



- CH0587A** Micropipette Tips, 10µl, pk of 100
- CH0587B** Micropipette Tips, 200µl, pk of 100
- CH0587C** Micropipette Tips, 1000µl, pk of 100
- CH0587D** Micropipette Tips, 5000µl, pk of 100
- CH0587E** Micropipette Tips, 10,000µl, pk of 100

Pack of 100 micropipette tips for use with fixed and variable volume micropipettes



### 605-001 Power Supply

AC/DC power supply with cooling fan and built in micro-processor overloading protection.  
Input: 230V AC, 50H; Output: 2-12V AC/DC in 6 steps.



### 605-002 Power Supply

This unit is the same as 605-001 but is specially smoothed for electronics applications.  
Input: 230V AC, 50H; Output: 2-12V AC/DC in 6 steps.



### 605-010 Dual ±15V Power Supply

The Edu-Lab dual rail ±15V power supply is a very robust power supply for use with operational amplifier circuitry. It provides ample current of 1A and is short-circuit proofed. Each power unit is individually trimmed to precisely ±15V. Independent earth connection. Shrouded output sockets for standard 4mm plugs or shrouded plugs.

#### Specification:

- Input: 230V ±10%, 50Hz/60Hz
- Output: Dual Rail ±15V , continuously rated at maximum of 1A
- Dimensions: 208 x 155 x 115mm (W x H x D).  
Height including handle is 187mm
- Slow-blow fuse protection for primary.
- Thermal trip for transformer.
- Short-circuit proofed, regulators with thermal shut down facilities.



### 605-007 High Tension Power Supply

The Edu-Lab High Tension Power Supply is designed specifically for thermionic experiments, such as the Teltron double fine beam tube. It can also be used for experiments such as ionization current etc. It provides two independent outputs of 0-35V and 0-350V, 100mA max., with continuously adjustable voltages. Two auxiliary cathode heater outputs are also provided. All outputs are fully isolated from earth. Bright 12.5mm green LED display indicating HT output. Shrouded sockets suitable for standard 4mm plugs or shrouded plugs.

#### Specification:

- Input: 220V-240V, 50/60 Hz
- Outputs: 0-35 & 0-350V, fully regulated & max current is 100mA
- Mains supply: 230V  $\pm$ 5%, 50Hz
- Fuse: 1A (L)
- Dimensions: 208 x 155 x 115mm (W x H x D). Height including handle is 187mm.
- Primary is protected by slow-blow fuse and thermal trips.
- Two auxiliary output of 6.3V a.c. 1A for cathode heaters, protected by resettable fuse.
- Independent Earth Terminal is provided



### 605-003 Laboratory Bench Power Supply

Output voltage selected by up/down push switches in 1V steps, up to 13V. Long switch lifetime. Voltage can be switched safely at full load without serious contact wear. Output protection is handled by a 30A heavy duty relay. The outputs are opened momentarily, controlled by  $\mu$ P, between switching times. Fully protected secondary by high speed, micro-processor controlled and resettable electronic trip. Over current is measured and timed for cases of serious overload and slight overload to decide tripping time, so as to avoid oversensitive tripping in cases of initial heavy current surge. Slow-blow fuse protection for transformer primary. Shocktity barrier diodes for rectification with less voltage drop and power waste thus eliminating the need for a noisy internal cooling fan.

#### Specification:

- Size: 205 x 150 x 115mm (W x H x D).
- Input voltage: 240V, 50Hz.
- Output voltage: 0-13V a.c. at no load. Slightly smoothed d.c gives practical r.m.s values of 0-13V at no load.



### 605-009 Smoothing Unit

A smoothing unit for reducing ripple from non-regulated power supplies. Maintains a ripple-free output when high currents are drawn. The unit comprises a lightweight and efficient toroidal 0.1H inductor with a network of 2,200 $\mu$ F capacitors and diodes. With a supply of 12V at 3A, 1% ripple would be typical. Will work without suffering damage even at reverse polarity. Up to 8A at 35V, absolute maximum 40V d.c. (d.c. rectified from 28V a.c). Shrouded sockets accept standard 4mm plugs and shrouded plugs.

#### Specification:

- Input Voltage: 0 to 35V, absolute maximum 40V
- Current rating: 8A maximum
- Dimensions: 208 x 155 x 115mm (W x H x D). Height including handle is 187mm.





## 605-008 Electromagnetic Power Supply

Low Voltage, high current power supply for uses with Westminster electromagnetic kits, Fleming's apparatus, etc. 1-0-1V nominal a.c., allow students access to a.c. of 1V or 2V d.c output is furnished by rectification of 2V a.c (unsmoothed) Short-circuit current is 10A. Tolerates short circuit. Transformer is protected by thermal fuses and slow-blow fuse 40A Shottky barrier diode for robust and efficient rectification

### Specification:

- Input voltage : 230V  $\pm$ 10% 50Hz
- Outputs: 1-0-1V a.c., 2V d.c nominal
- Dimensions: 208 x 155 x 115mm (W x H x D).
- Height including handle is 187mm.



## 605-013 Variable Power Supply, 0-25V, 8.5A

A popular, advanced, continuously-variable power supply unit with LED digital display, the Edu-Lab College Power Supply Unit is ideal for demonstration purposes and for use by students in advanced level courses. It provides a fine and smooth, continuously-variable AC or DC voltage at a combined maximum current of 8.5A. The DC is smoothed by an internal 2200 $\mu$ F capacitor. AC or DC voltage reading is selected by a toggle switch and indicated by a bright green, easy-to-read 12.5mm LED display. Microprocessor tripping circuitry will differentiate between a real short-circuit or a temporary current surge.

### Specification:

- Output Voltage continuously variable by rotary knob from 0 to 25V
- Continuously rated combined current of 8.5A, AC or DC
- Heavy-duty 40A Schottky barrier diodes employed for rectification, together with high performance toroidal transformer, reduce the weight of the power supply and power waste - thus eliminating the need for a noisy and troublesome cooling fan.
- Digital display for voltage for AC or DC, selected by toggle switch
- Fully protected secondary by high speed, resettable microprocessor-controlled trip.
- Slow-blow fuse for primary
- Thermal fuse protection for transformer
- Dimensions: 300 x 115 x 155mm (W x D x H)
- Weight: 5.5kg



## 251-001 Vacuum Pump, Hand

A lightweight, hand-operated vacuum pump drawing 15cm<sup>3</sup> per stroke, up to a maximum vacuum of 50mmHg. It can be used to produce positive gauge pressures up to 2 atm.

## 612-001 Vacuum Pump, Electric

Being very quiet and with low energy consumption, this rotary vacuum pump is ideal for all general laboratory applications requiring vacuum.

- Displacement: 1 litre per second.
- Vacuum Limit: 0.01.
- ATM Rotational speed: 1300 rpm.
- Pumping Speed: 1 litre per second.



## 241-022 Signal Generator and Amplifier

### Specification:

- Frequency Range: 0.1 Hz to 99.9 KHz in six decades, read on digital display
- Frequency Accuracy: 0.01% (100 ppm) in all ranges
- Output waveform: Sine, Rectangular and Triangular
- High Impedance Output: Maximum 17V peak to peak from internal source impedance of 600Ω
- Low Impedance output: 6V R.M.S. at 4Ω (about 8.8V peak for all waveforms)
- Maximum Power output of 4.5W available over the entire frequency range for all waveforms
- Maximum Power Transfer occurs when the load is 4Ω, giving  $62/(4+4) = 4.5W$
- Amplitude Control: Variable from zero to maximum output in 256 increments, amplitude is displayed by a 10 segment bar graph
- Attenuation: x1, x 0.1, x0.01, ±1%, operating on the 600Ω output
- Amplifier voltage gain: 100
- Frequency Response: DC to 100KHz, -3 dB, output power 4.5W into 4Ω load
- Controls: All control settings except amplitude are stored and updated upon any changes
- Electric Supply: 220V~240V, 50Hz
- Dimensions: approx. 210 x155 x 118mm (L X W x D)
- Weight: Approx. 2.05kg, without power cord
- The instrument is CE marked , internal fuse is T315mA L



When the instrument is to be used as a power amplifier, press the waveform selection button until the 'aux' option is chosen. The instrument now acts as a power amplifier with the signal input fed through the pair of 4 mm sockets labeled 'AUX'.

**Note :** The earth provided is connected to the physical earth through the power cord; the signal generator output is floating with respect to ground.

### Maintenance:

The Signal generator is a robust instrument and can withstand prolonged short circuit for the output.

Should the unit cease to work properly, return it to your supplier for servicing .

Do not open the instrument.

## 712-002 Safety Aprons, pk of 100

Soft polyethylene disposable aprons.



## POLYM Safety Gloves, Polythene Medium, pk of 100

Non-sterile, disposable polythene.



## ECVS Safety Gloves, Vinyl Small, pk of 100

## ECVM Safety Gloves, Vinyl Medium, pk of 100

Non-sterile, disposable vinyl.



## 712-003 Safety Glove, Silicone

Silicone rubber with inserts for fingers and thumb. Fits any size. Protects between -30°C and 260°C.



## Safety Lab Coats

712-001A Small

Chest: 113cm, Arm: 55cm, Length: 90cm

712-001B Medium

Chest: 116cm, Arm: 58cm, Length: 96cm

712-001C Large

Chest: 122cm, Arm: 59cm, Length: 99cm

712-001D Extra Large

Chest: 126cm, Arm: 61cm, Length: 103cm

White polyester/cotton mix, with one breast pocket and two side pockets.



## EDU1005 Safety Goggles

Polycarbonate safety goggles with adjustable strap.



## EDU652 Safety Spectacles

Comfortable and lightweight polycarbonate safety spectacles.

## 613-005 Eyewash Pack, pk of 24

Pack of 24 sterile eyewashes



## 613-006 Eyewash Station

### 613-023 Replenishment Solution, 500ml

The double eyewash station includes 2 x 500ml eyewash solution and eyepads and comes in a wall mountable carry case

## FA25 Emergency First Aid Kit

10 person first aid kit includes: 20 assorted plasters; 2 sterile eyepads; 4 triangular bandages; 6 medium dressings; 2 large dressings; 1 pair of disposable gloves; 6 safety pins; 10 anti-septic wipes; a wall bracket; and some first aid guidance notes.



## FSEPR Fire Blanket

Wall-mountable, 1 metre square.

### 613-003 Acid Spill Clean Up Kit

Kit contains: Instruction sheet/MSDS; 2 vinyl exam gloves; 4 empty 225 x 400mm polybags; 4 twist ties; 4 blank shipping tags; 1 dustpan and brush; 1 bag vermiculite absorbant; 1 bag neutralising mixture (Calcium Hydroxide, Sodium Carbonate, Calcium Carbonate & Litmus Powder).



### 613-002 Caustic Spill Clean Up Kit

Kit contains: Instruction sheet/MSDS; 2 vinyl exam gloves; 4 empty 225 x 400mm polybags; 4 twist ties; 4 blank shipping tags; 1 dustpan and brush; 1 bag vermiculite absorbant; 1 bag neutralising mixture (Citric Acid, Anhydrous & Litmus Powder).

### 613-001 Solvent Spill Clean Up Kit

Kit contains: Instruction sheet/MSDS; 2 vinyl exam gloves; 2 empty 225 x 400mm polybags; 2 twist ties; 2 blank shipping tags; 1 dust pan and brush; 1100g diatomaceous earth in 225 x 400mm polybag.

### EDU1008 Bench Mats, 150 x 150mm, pk of 10

### EDU1009 Bench Mats, 230 x 230mm, pk of 10

### EDU1010 Bench Mats, 300 x 300mm, pk of 10

Calcium silicate, asbestos-free bench mats with well-finished edges. Packed in sturdy cartons.



### 613-004 Sinksafe Glassware Protection Mats pk of 20

Sinksafe is composed of 50mm square modular units which can be connected together to form a platform to cover the base of any sink. It provides a firm cushion to break the fall of glassware and thus prevent loss of equipment. The mesh design allows the unhindered passage of liquids, and the small contact area of the legs prevents retention by capillarity of chemical solutions. The polypropylene construction is suitably chemical-resistant.

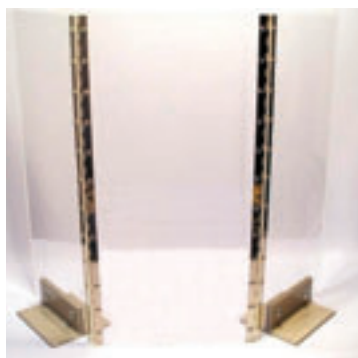
When used in school laboratories not only is there a cost saving on every occasion a breakage is prevented, but there are also the important safety benefits of avoiding broken glass in the sink or mercury spillage from thermometers.



*Free trial packs of Sinksafe are available for a limited period only. If your educational establishment would like to receive one of these packs - please contact us.*

### EDU994 Safety Screen

Transparent polycarbonate safety screen comprising central panel and two side panels connected with hinges. Overall height is 610mm. Section widths are 225, 300 and 225mm. 4mm thick.





## Hazardous Storage Cabinets

- 613-010** Vertical, One-Doored
- 613-011** Horizontal, Two-Doored
- 613-012** Large Horizontal, Two-Doored
- 613-013** Vertical, Two-Doored

Designed to meet the requirements of COSHH regulations for safe storage of flammable liquids and chemicals. Bright yellow with warning signs. 0.9mm thick steel. Adjustable, perforated galvanised shelf. Removable galvanised sump.

All cabinets have one shelf, except **613-013**, which has three. Sizes (H x W x D):

- 613-010** - 915 x 455 x 455mm.
- 613-011** - 710 x 915 x 455mm
- 613-012** - 915 x 915 x 455mm
- 613-013** - 1830 x 915 x 455mm



## 613-014 Hazardous Storage Chest

Designed to meet the requirements of COSHH regulations for safe storage of flammable liquids and chemicals; this sloping-topped chest is bright yellow with warning signs and is constructed from 1.6mm steel with a liquid-tight base and a hasp and staple for padlocking.

Size (H x W x D): 610 x 915 x 455mm.



## 613-020 Hazardous Storage Cabinet Stand

Stand for horizontal hazardous storage cabinet or chest.

Suitable for **613-011**, **613-012** and **613-014**.

Size (H x W x D): 455 x 915 x 455mm



## Fume Cupboards

### 613-017 Airone 1000R Filtration

Fixed, filtered fume cupboard for classrooms or small prep-rooms.

#### Features and Specification:

- Tested & certified to BS:7989:2001
- Epoxy-coated mild steel construction (RAL 7035)
- Counterweighted sliding glass sash front
- Laminated safety glass side windows
- Automatic face velocity adjustment (VAV)
- Digital control system
- 365mm high front opening, set by stops
- Filtrete electrostatic particle filter
- Solid grade laminate back baffle
- Built-in fluorescent lights
- External dimensions (W x D x H): 1000 x 760 x 1300mm

#### Includes:

- Polypropylene worktop with vulcathene drip cup
- Remote water service
- Remote gas service
- Single electrical socket
- Plain stand (Adds 900mm to height)
- 22kg CMS carbon filter, size RS



### 613-021 Airone 1000RS Mobile Filtration

School spec, mobile filtration fume cupboard.

#### Features and Specification:

- Tested & certified to BS:7989:2001
- Complies with Building Bulletin 88
- Approved by CLEAPSS
- Epoxy-coated mild steel construction (RAL 7035)
- Counterweighted sliding glass sash front
- Laminated safety glass side and rear windows
- 360 degree visibility
- Fully mobile with front lockable castors
- 2-Speed fan control
- 365mm high front opening, set by stops
- Filtrete electrostatic particle filter
- Storage area under cupboard
- External dimensions (W x D x H): 1000 x 700 x 1850mm

#### Includes:

- Polypropylene worktop with vulcathene drip cup
- Remote water service
- Remote gas service
- Single electrical socket
- Plain stand (Adds 900mm to height)
- 22kg CMS carbon filter, size RS



### 613-018 Airone 1200R Filtration

Fixed, filtered prep-room fume cupboard.

#### Features and Specification:

- Tested & certified to BS:7989:2001
- Epoxy-coated mild steel construction (RAL 7035)
- Counterweighted sliding glass sash front
- Laminated safety glass side windows
- Automatic face velocity adjustment (VAV)
- Digital control system
- 365mm high front opening, set by stops
- Filtrete electrostatic particle filter
- Solid grade laminate back baffle
- Built-in fluorescent lights
- External dimensions (W x D x H): 1200 x 760 x 1300mm

#### Includes:

- Polypropylene worktop with Sink
- Remote water service
- Remote gas service
- Double electrical socket
- Plain stand (Adds 900mm to height)
- Two 15kg CMS carbon filters, size B





## 613-019 Airone 1200X Ducted

Fixed, ducted prep-room fume cupboard.

### Features and Specification:

- Tested & certified to BS:7989:2001
- Complies with Building Bulletin 88
- Epoxy-coated mild steel construction (RAL 7035)
- Counterweighted sliding glass sash front
- Laminated safety glass side and rear windows
- Bypass system to ensure constant airflow
- 400mm front opening set by stops
- Built-in fluorescent lights
- Low airflow alarm
- Solid grade laminate back baffle
- External dimensions (W x D x H): 1200 x 760 x 1300mm

### Includes:

- Polypropylene worktop with vulcathene drip cup
- Remote water service
- Remote gas service
- Double electrical socket
- Plain stand (Adds 900mm to height)



## 613-015 Docking Station for Airone Airone 1000RS/DS

### Features and Specification:

- Epoxy-coated mild steel construction
- Specifically designed for use with Airone 1000RS and Airone 1000DS
- Lockable, sturdy construction to securely lock away water, waste and gas when not in use
- Quick-release connections to water, waste and gas
- Externally accessible 13A electrical socket
- Easily sited and recess or flush fitted
- Fume cupboard tether point to prevent damage to service connections



## 613-016 Filter Saturation Alarm for Airone R Range

### Features and Specification:

- Integrates into Airone R control system for convenience and ease of use
- Sensor discreetly situated to allow exposure to exhaust air
- Detects low concentrations of hydrocarbons and some gases and organic acids
- Alarms at contaminants in exhaust air
- Alarm mute function
- Detects filter breach (i.e. by leak/saturation) prior to laboratory becoming unduly contaminated



## Spatulas

**SPCHT150/PK10 150mm Chattaway**, pk of 10

**SPCHT200/PK10 200mm Chattaway**, pk of 10

Chattaway type; one end flat and the other end canted up. Polished finish.

**EDU084/PK10 150mm Spoon End**, pk of 10

**EDU085/PK10 200mm Spoon End**, pk of 10

**EDU085A 300mm Spoon End**, pk of 10

Well finished and polished stainless steel spatula, with one end flat and the other end spoon form.



**SPNUF140/PK10 140mm Nuffield**, pk of 10

Nuffield pattern spatula.



**SPTRUL175 175mm Trulla**, pk of 10

Trulla spatula, stainless steel, double ended with trowel-shaped scoops for handling large quantities of material. Width: 15mm.



**CH0631A 150mm Polypropylene**, pk of 20

**CH0631B 200mm Polypropylene**, pk of 20

Polypropylene spatula with a spoon on one end and a flat, knife-edged face on the other end.



**CH0640 155mm Palette Knife**

Flexible blade & parallel sides set in wooden handle.



**EDU009 Ceramic Spotting Tiles, Plain**

pk of 5



**EDU770 Polypropylene Spotting Tiles**

pk of 10

High quality polypropylene tile with 12 cavities. Autoclavable.





**BASE160T Retort Stand Base, 160 x 100mm**

**BASE200T Retort Stand Base, 200 x 125mm**

**BASE250T Retort Stand Base, 250 x 160mm**

A sturdy cast-iron base, finished in blue/black, with a tapped hole to accept a rod with 10 x 1.5mm metric thread.



**EDU729 Retort Base, 'A' Shaped**

Cast-iron, finished in blue coating with tapped hole 10 x 1.5mm metric thread. Length of side 200mm.



**EDU730 Retort Base, 'H' Shaped**

Accepts rods 8-12mm dia. Size: 200 x 200mm. Weight: 3kg. Plastic ends.

**RDMS0500 Retort Rod, Mild Steel**

500mm Long

**RDMS0600 Retort Rod, Mild Steel**

600mm Long

**RDMS0750 Retort Rod, Mild Steel**

750mm Long

**RDAL0500 Retort Rod, Aluminium Alloy**

500mm Long

**RDAL0600 Retort Rod, Aluminium Alloy**

600mm Long

**RDAL0750 Retort Rod, Aluminium Alloy**

750mm Long

**RDAL1000 Retort Rod, Aluminium Alloy**

1000mm Long



With 10 x 1.5mm metric thread.

**BOSS1 Bosshead, Doublehead, Chrome Plated**

**BOSS2 Bosshead, Doublehead, Anodised Black**

Doublehead, die-cast bossheads to hold rods of 5-20mm. Plastic clamping screws for tightness.



**CH0663B Bossheads, pk of 20**

For use with retort stand rods. Die-cast alloy accepts rods up to 16.5mm diameter at right angles to each other. Finished in high-quality blue coating. Metal edges finished for safe use.



**CH0666 Swivel Bossheads, pk of 5**

Zinc, die-cast, to hold rods up to 16mm. Two rods can be fitted at any angle.



**CLMPCRK Retort Clamp with Cork Jaws**

Four prong, cork jaw clamp finished in high quality blue coating. The clamp accepts articles from 2 - 90mm dia. Rod length 145mm. The design of the jaw ensures a firm grip at all angles of opening. The cork liners are well secured to the jaws of the clamp. Overall length: 245mm.



**CH0687 Retort Clamp Combined, Cork Jaws**

Diecast alloy clamp retort with cork-lined jaws and bosshead which accommodates rods up to 15mm dia.



**CLMP3P Retort Clamp, Rubber Jaws**

Made with rubber lined, diecast jaws. Clamping rod operates through swivels mounted neatly in the jaws. Mounted on a 135mm rod of 8mm diameter. Jaw capacity 90mm and overall length 250mm.



**CH0688 Retort Clamp Combined, Rubber Jaws**

Diecast alloy clamp retort with rubber-lined jaws and bosshead which accommodates rods up to 15mm dia.



- CH0668A Retort Ring, 50mm i.d.**
- CH0668B Retort Ring, 70mm i.d.**
- CH0668C Retort Ring, 100mm i.d.**
- CH0668D Retort Ring, 150mm i.d.**

Mild steel, plated retort ring with 8mm dia. stem. Stem Length: 140mm.



- CH0672A Retort Ring with Bosshead  
50mm i.d. - 90mm Stem**
- CH0672B Retort Ring with Bosshead  
75mm i.d. - 95mm Stem**

Strong circular mild steel ring with 8mm diameter stem. Open boss fitted with thumb screw to accept rods from 8mm to 12.5mm dia.



**C653 Channel Base**

Slotted base, finished in acid resistant coating with 40mm high jaws and fitted thumb screw. Designed for holding flat objects (e.g. manometers, boards, etc.), up to 34mm thick, in the vertical position. Width: 95mm. Length: 75mm. Height: 60mm. Weight: 1475g.



**CH0643 Tripod, Circular**

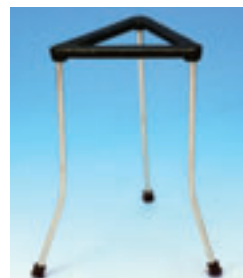
Black circular tripod stand with 95mm diameter and height 70mm. Used with spirit lamps. Supplied without lamp.





**TRSTD200 Tripod, Triangular, pk of 10**

200mm height x 125mm side-length stainless steel triangular tripod with rubber feet.



**C645A Tripod, 125mm, 200mm Height**

**C645B Tripod, 150mm, 200mm Height**

200mm height cast-iron triangular top with splayed steel legs and rubber feet.

**C530B Clay Pipe Triangles**

50mm pipe length, pk of 10

**C530C Clay Pipe Triangles**

60mm pipe length, pk of 10

**C530D Clay Pipe Triangles**

75mm pipe length, pk of 10

Clay pipe tubes on thick iron wire.



**CH0642 Laboratory Jack**

Screw operated, scissor-action mechanism. Strong, stable support for laboratory equipment. Minimum height: 60mm. Maximum elevation: 250mm. Top plate: 150 x 135mm. Maximum load: 25kg.



**607-017 Magnetic Stirrer Bar**

25 x 6mm, pk of 10

**607-018 Magnetic Stirrer Bar**

50 x 8mm, pk of 10



**CH0755A Stirring Rod, Glass, 150mm**

**CH0755B Stirring Rod, Glass, 300mm**

**772-003 Stirring Rod, Polypropylene, 250mm**



**607-015 Magnetic Stirrer**  
**Plastic Bodied, Mains Powered**

This magnetic stirrer offers superior stirrer capabilities without a high price tag. Measuring a compact 120 x 120mm, it takes up the minimum of bench top space (or fume cupboard space), whilst providing reliable and consistent stirring of liquid samples. This version is supplied complete with mains cable and plug. The unit includes a Speedafe® optical speed control feedback circuit which maintains a constant stirrer speed and limits the maximum speed to 1000rpm, even if the load is suddenly removed, thus preventing motor wear and providing a longer operational life.

**Specification:**

- Min speed: 100rpm; Max speed: 1000rpm
- Dimensions: 120 x 120 x 45mm
- Weight: 640g
- Power supply: Mains, 230V AC, 50-60Hz



- 607-006 Mini Magnetic Stirrer**  
Round Base, Yellow
- 607-007 Mini Magnetic Stirrer**  
Round Base, Light Green
- 607-008 Mini Magnetic Stirrer**  
Round Base, Light Blue
- 607-009 Mini Magnetic Stirrer**  
Round Base, Olive
- 607-010 Mini Magnetic Stirrer**  
Round Base, Green
- 607-011 Mini Magnetic Stirrer**  
Round Base, Blue
- 607-012 Mini Magnetic Stirrer**  
Round Base, Red
- 607-013 Mini Magnetic Stirrer**  
Round Base, Grey
- 607-014 Mini Magnetic Stirrer**  
Round Base, Ivory

This series of magnetic stirrers are compact, lightweight and low-cost, yet include our Speedsafe® technology for greater control of stirring speed and motor protection. Measuring just 137mm diameter they are available in a range of colours to suit your mood, match your laboratory colour scheme or to differentiate between samples being stirred. The high specification includes an optical speed control feedback circuit which maintains a constant stirrer speed and limits the maximum speed to 1000rpm, even if the load is suddenly removed, thus preventing motor wear and providing a longer operational life. Comes complete with 25 x 7mm Stirrer Bar.

**Specification:**

- Max stirring capacity: 1 Litre
- Min speed: 100rpm; Max speed: 1000rpm
- Dimensions (Diameter x H): 137 x 51mm
- Weight: 640g
- Power supply: Mains, 230V AC, 50-60Hz





## Rubber Stoppers

Constructed from high-quality, chemical resistant rubber. Stated dimensions are Dia.min x Dia.max x L, respectively.

CH0314A	<b>Solid Rubber Stoppers</b> 9 x 11.5 x 20mm, pk of 10
CH0314B	<b>Solid Rubber Stoppers</b> 11 x 14 x 24mm, pk of 10
C314-13	<b>Solid Rubber Stoppers</b> 13 x 16 x 24mm, pk of 10
C314-15	<b>Solid Rubber Stoppers</b> 15 x 18 x 24mm, pk of 10
CH0314E	<b>Solid Rubber Stoppers</b> 17 x 20 x 26mm, pk of 10
CH0314F	<b>Solid Rubber Stoppers</b> 18 x 21 x 26mm, pk of 10
C314-19	<b>Solid Rubber Stoppers</b> 19 x 22.5 x 28mm, pk of 10
C314-21	<b>Solid Rubber Stoppers</b> 21 x 24.5 x 28mm, pk of 10
CH0314I	<b>Solid Rubber Stoppers</b> 23 x 24.5 x 28mm, pk of 10



CH0314J	<b>Solid Rubber Stoppers</b> 25 x 28.5 x 28mm, pk of 10
CH0314K	<b>Solid Rubber Stoppers</b> 27 x 31 x 32mm, pk of 10
CH0314L	<b>Solid Rubber Stoppers</b> 29 x 33 x 32mm, pk of 10
C314-31	<b>Solid Rubber Stoppers</b> 31 x 36 x 35mm, pk of 10
CH0314N	<b>Solid Rubber Stoppers</b> 33 x 38.5 x 38.5mm, pk of 10

CH0314A/1H	<b>Rubber Stoppers, 1 Hole</b> 9 x 11.5 x 20mm, pk of 10
CH0314B/1H	<b>Rubber Stoppers, 1 Hole</b> 11 x 14 x 24mm, pk of 10
RS13	<b>Rubber Stoppers, 1 Hole</b> 13 x 16 x 24mm, pk of 10
RS15	<b>Rubber Stoppers, 1 Hole</b> 15 x 18 x 24mm, pk of 10
CH0314E/1H	<b>Rubber Stoppers, 1 Hole</b> 17 x 20 x 26mm, pk of 10
CH0314F/1H	<b>Rubber Stoppers, 1 Hole</b> 18 x 21 x 26mm, pk of 10
RS19	<b>Rubber Stoppers, 1 Hole</b> 19 x 22.5 x 28mm, pk of 10
RS21	<b>Rubber Stoppers, 1 Hole</b> 21 x 24.5 x 28mm, pk of 10
RS23	<b>Rubber Stoppers, 1 Hole</b> 23 x 24.5 x 28mm, pk of 10
CH0314J/1H	<b>Rubber Stoppers, 1 Hole</b> 25 x 28.5 x 28mm, pk of 10
CH0314K/1H	<b>Rubber Stoppers, 1 Hole</b> 27 x 31 x 32mm, pk of 10



RS28	<b>Rubber Stoppers, 1 Hole</b> 28 x 33 x 32mm, pk of 10
CH0314L/1H	<b>Rubber Stoppers, 1 Hole</b> 29 x 33 x 32mm, pk of 10
RS31	<b>Rubber Stoppers, 1 Hole</b> 31 x 36 x 35mm, pk of 10
CH0314N/1H	<b>Rubber Stoppers, 1 Hole</b> 33 x 38.5 x 38.5mm, pk of 10

- CH0314C/2H Rubber Stoppers, 2 Holes**  
13 x 16 x 24mm, pk of 10
- CH0314F/2H Rubber Stoppers, 2 Holes**  
18 x 21 x 26mm, pk of 10
- CH0314H/2H Rubber Stoppers, 2 Holes**  
21 x 24.5 x 28mm, pk of 10
- CH0314I/2H Rubber Stoppers, 2 Holes**  
23 x 24.5 x 28mm, pk of 10
- CH0314J/2H Rubber Stoppers, 2 Holes**  
25 x 28.5 x 28mm, pk of 10
- CH0314K/2H Rubber Stoppers, 2 Holes**  
27 x 31 x 32mm, pk of 10
- CH0314L/2H Rubber Stoppers, 2 Holes**  
29 x 33 x 32mm, pk of 10
- CH0314M/2H Rubber Stoppers, 2 Holes**  
31 x 36 x 35mm, pk of 10
- CH0314N/2H Rubber Stoppers, 2 Holes**  
33 x 38.5 x 38.5mm, pk of 10



#### Assorted Stopper Packs

- CH0315 Rubber Stoppers**  
pk of 50 assorted sizes
- CH0316 Rubber Stoppers, 1 Hole**  
pk of 50 assorted sizes
- CH0317 Rubber Stoppers, 2 Holes**  
pk of 50 assorted sizes
- EDU921 Rubber Stoppers, Mixed**  
pk of 67 assorted holes/sizes



- C322A Cork Borers, 4-10mm, set of 6**
- C322B Cork Borers, 4-18mm, set of 12**
- C322C Cork Borers, 4-27mm, set of 18**

Nickel plated brass. Variety of sizes, each with a cutting edge at bottom and handle at top. Complete with cleaning rod. Grip is good for easy use. Pipes are of a thick gauge material.



#### C324 Cork Borer Sharpener

Plated metal cone with polished wooden handle. Hinged cutter blade slotted to accept cutting blades. The edge is cut to the correct angle by depressing blade using thumb pressure. Borer diameter range: 4-27mm.



- EDU884/A Plastic Syringes, 5ml, pk of 100**
- EDU869 Plastic Syringes, 10ml, pk of 100**
- EDU869A Plastic Syringes, 20ml, pk of 100**
- EDU869D Plastic Syringes, 60ml, pk of 100**

Disposable plastic syringes, graduated in 1ml increments





## 251-402 Gas Syringe, Ground Glass, 100ml

Ground glass, volume graduated to 100ml in 5ml increments.

## 719-001 Syringe Clamp

Holder for 100ml gas syringe (code: 251-402).

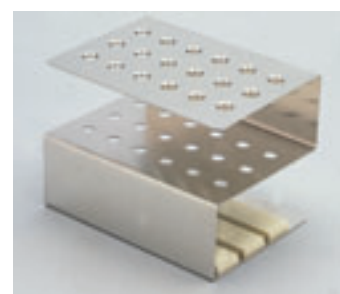
Dimensions: 320 x 50 x 153mm.

## 776-010 Tally Counter

Hand operated, counts up to to 9999, with reset button.

## 772-002 Thermometer Stand

Aluminium stand, holds 18 thermometers.



## Thermometers

### Brannan™ LO-tox™ Thermometers

776-018 305mm, -10 to 50 x 0.5°C, Blue Fill

776-019 305mm, -20 to 110 x 1°C, Blue Fill

776-020 305mm, -20 to 150 x 1°C, Blue Fill

776-021 405mm, -10 to 150 x 1°C, Blue Fill

776-022 305mm, -10 to 330 x 2°C, Brown Fill

These new Brannan™ laboratory thermometers utilise LO-tox™, an organic filling specifically chosen to achieve a wide temperature span and provide the lowest practical levels of hazard. The quality and legibility make these an ideal substitute for mercury thermometers. These thermometers are fitted with Brannan™ anti-roll end caps with a ring to allow the thermometer to be suspended.

### Features and Specification:

- Low-toxic blue or brown filling is easy to read
- Accurately calibrated against traceable standards
- 76mm immersion
- Blue anti-roll top and safety suspension ring
- Clear permanent markings

### Brannan™ Thermometers

776-023 300mm, -10 to 50 x 0.5°C, Green Fill

776-024 300mm, -10 to 110 x 1.0°C, Green Fill

776-025 300mm, -10 to 150 x 1.0°C, Green Fill

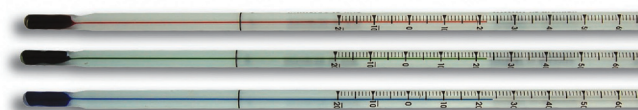
776-026 150mm, -10 to 110 x 1.0°C, Red Fill

776-027 300mm, -10 to 110 x 1.0°C, Red Fill

776-028 150mm, -10 to 110 x 1.0°C, Blue Fill

776-029 300mm, -10 to 110 x 1.0°C, Blue Fill

Brannan™ laboratory thermometer, made in the UK to exacting standards. 300mm versions are 76mm immersion and 150mm versions are total immersion.



**776-030 'Breaksafe' Thermometer**  
200mm, -10 to 110 x 1.0°C

The Brannan™ 'Breaksafe' Safety Thermometer is encapsulated in PVC to contain any glass or filling material in the event of breakage. Green filled, 76mm immersion.



**776-031 Uncalibrated Thermometer**  
300mm, -10 to 110°C

These Brannan™ Uncalibrated Thermometers are made in the UK and designed for student calibration. An anti-roll device is moulded into the glass to prevent breakage, and the thermometers are supplied individually packed in sealed trays. Green filled, 76mm immersion.



**776-032 Electronic Test Thermometer**

Waterproof Electronic Test Thermometer with max/min memory function and 120mm stainless steel probe. Switchable between centigrade and fahrenheit. Supplied complete with battery, pocket case and clip.



Temperature Range: -50 to +150°C

Divisions: 0.1°C

Weight: 33g

Dimensions: 200 x 20 x 15mm

Accuracy:

-50 to -20°C: ±2°C

-21 to +120°C: ±1°C

+121 to +150°C: ±2°C

**EDU1020 Electronic Thermometer**

Versatile max/min electronic thermometer with memory. Instant and accurate reading for a wide range of applications.

Temperature range: (indoor) 0° to 50°C; (outdoor) -50° to 70°C

Resolution: 0.1°C

Freeze alert function

Large, clear digital display

Complete with stand and hanging slot

Size: 100 x 75 x 18mm.

2 x 1.5V batteries supplied.



**EDU1023 Infra-Red Thermometer**

A hand held mini infrared thermometer with timekeeping function. Providing easy and safe non-contact measurement. LCD display has a resolution of 0.5°C and an accuracy ± 2.5°C. Complete with 1.5V battery. Range: -22° to +110°C.



## Crucible Tongs - packs of 10

TBMS150	Mild Steel, 150mm Bowed
TBMS200	Mild Steel, 200mm Bowed
TSMS150	Mild Steel, 150mm Straight
TSMS200	Mild Steel, 200mm Straight
TBSS150	Stainless Steel, 150mm Bowed
TBSS200	Stainless Steel, 150mm Bowed
TSSS150	Stainless Steel, 150mm Straight
TSSS200	Stainless Steel, 200mm Straight

General purpose tongs with corrugated jaws, used for the handling of hot apparatus.



## CH0738B Beaker Tongs

Stainless steel, silicone-covered jaws can hold any beaker from 250ml to 1500ml. 360mm in length with a jaw width of 70mm.



## CH0739 Flask Safety Tongs

Stainless steel, with cork lined rectangular jaws giving an extremely firm grip on flasks of any size from 100 to 2000ml.



## Gratnell Trays

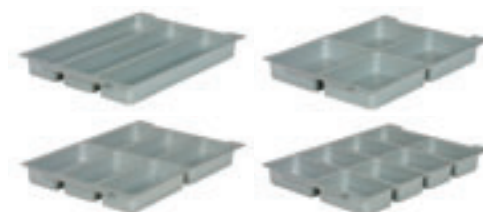
F/1B	Shallow, Blue, 427 x 312 x 75mm
F/1G	Shallow, Green, 427 x 312 x 75mm
F/1R	Shallow, Red, 427 x 312 x 75mm
F/1Y	Shallow, Yellow, 427 x 312 x 75mm
F/2B	Deep, Blue, 427 x 312 x 150mm
F/2G	Deep, Green, 427 x 312 x 150mm
F/2R	Deep, Red, 427 x 312 x 150mm
F/2Y	Deep, Yellow, 427 x 312 x 150mm
F/3B	Jumbo, Blue, 427 x 312 x 300mm
F/3G	Jumbo, Green, 427 x 312 x 300mm
F/3R	Jumbo, Red, 427 x 312 x 300mm
F/3Y	Jumbo, Yellow, 427 x 312 x 300mm



## Gratnell Tray Inserts

INS3	3 compartment, pk of 6
INS4	4 compartment, pk of 6
INS6	6 compartment, pk of 6
INS8	8 compartment, pk of 6

Inserts for Shallow Gratnell Trays.



## LF1 Lid for Gratnell Trays

Translucent clip-on lid to fit all sizes of Gratnell Tray.



## 2025Q Gratnell Tray Trolley

Trolley for Gratnell Trays. Fitted with heavy duty 75mm castors fitted into solid steel blocks for extra strength. The recessed top is removable, with open corners for easy cleaning. Dimensions: 710 x 420 x 850mm. Capacity: 12 shallow Gratnell trays. Other size trolleys available - please enquire for full details. (trays not included)



## G3 Runners for Gratnell Trolley (Pair)

Pair of plastic runners to fit Gratnell storage trolley



## 612-002 Laboratory Trolley

Heavy duty trolley with heavy duty metal castors, rubber tyre wheels and foot release brakes. Three adjustable shelves with spill protection lip. Supplied flat packed. No nuts or bolts - slots together.

Assembled dimensions: H 113cm x L 104cm x W 43cm.  
Shelf dimensions: 99cm L x 42cm W.



## EDU1014 Test Tubes, 125 x 16mm, pk of 100

## EDU1015 Test Tubes, 150 x 24mm, pk of 100

## EDU1016 Test Tubes, 150 x 24mm, pk of 50

Borosilicate glass with rim.. Standard wall thickness except EDU1016 which has extra thick walls (1.2mm).



## 704-002 Draining Rack

For drying test tubes, PVC coated.

## CH0727 Test Tube Holders, pk of 10

Aluminium test tube holder with sliding collar and wooden handle. Accepts tubes 15-25mm diameter.



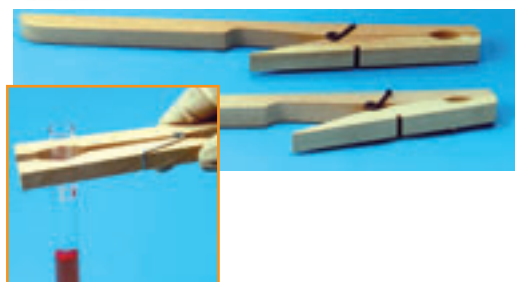
## CH0730 Test Tube Holders, pk of 10

Plated, sprung steel wire test tube holder with finger grips. The jaws will accept tubes up to 40mm dia. and their alignment is maintained by a steel wire collar. Overall length: 16cm.



## CH0726A Test Tube Holders, pk of 10

Peg-type holder with spring for closing jaws. 180mm length, accepts tubes 11-19mm diameter.





## **TTFR Test Tube Holders, pk of 10**

Test tube holder with strong spring clip with a strip of metal in wooden handle. To accept tubes 15 - 25mm diameter.



## **EDU762 Test Tube Stand, Wooden**

6-hole, pk of 10

## **EDU763 Test Tube Stand, Wooden**

12-hole, pk of 10

Polished wood stand with drilled holes of 20mm diameter each and clip-on polypropylene ends. Length: 12-hole 400mm ; 6-hole 230mm.



## **CH0702/PK10 Test Tube Stand, Wooden**

6-hole, pk of 10

Constructed from wooden shelves which slot together with polypropylene ends. Six holes in the top section accept two 30mm diameter tubes and four 20mm diameter tubes. Height: 110mm.



## **CH0696 Test Tube Stand, Polythene**

12-hole

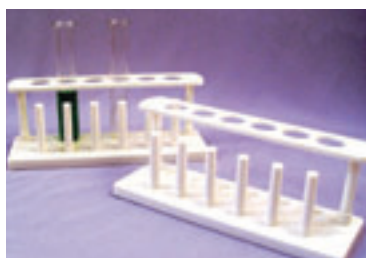
Polythene, autoclavable, with two parallel rows of holes along its length - 6 holes of 30mm dia. and 6 holes of 15mm dia.



## **CH0694B Test Tube Stand, Polypropylene**

6-hole, pk of 10

White polypropylene autoclavable rack with six 25mm dia. holes. Rack ends supported by columns. Designed with six vertical pins for drying test tubes. Length: 235mm. Height: 90mm



## **EDU160 Test Tube Stand, Z-shaped**

pk of 10

Z shape made from 18-gauge aluminium sheet, anodised, with three tiers. Has an overall height of 75mm and length of 200mm. This stand has 5 holes of 28mm, 6 holes of 20mm and 8 holes of 13mm diameter.



## **776-016 Test Tube Stand, Coated Wire**

12 x 16mm holes

## **776-015 Test Tube Stand, Coated Wire**

12 x 25mm holes



### CH0884 Thiele Melting Point Tube

Borosilicate glass, for determining the melting point of organic compounds. Diameter of tube: 25mm. Length: 150mm.



### C750 Delivery Tubes, O. D. 6mm, set of 4

Set of 4 glass delivery tubes, comprising:

- 1 x Short, straight 70mm length
- 1 x Long, straight 170mm length
- 1 x 90° bend with arms of 60mm and 160mm length
- 1 x 90° bend with both arms 60mm long



### Rubber Tubing - 10m

- C758-4 4mm bore, 1mm wall thickness
- C758-5 5mm bore, 1.5mm wall thickness
- C758-6 6.5mm bore, 1.5mm wall thickness
- C758-7 7mm bore, 1.5mm wall thickness
- C758-8 8mm bore, 2mm wall thickness
- C758-10 10mm bore, 2mm wall thickness
- C758-12 12mm bore, 2mm wall thickness

Soft quality, resistant to acid and alkalis.



### CH0298B Hoffman Clip, 40mm, pk of 10

Nickel-plated brass clip with projecting plate to prevent damage to tubing by end of screw. With hinged bottom bar for direct fitting and removal without access to ends of tube.



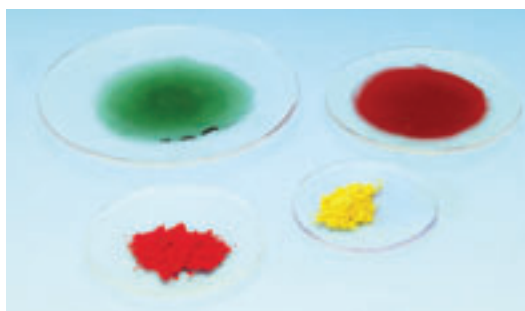
### CH0290B Mohr Clip, pk of 10

Good quality, nickel-plated brass clips.



- CH0554A Watch Glasses, 50mm, pk of 10
- CH0554B Watch Glasses, 60mm, pk of 10
- CH0554C Watch Glasses, 75mm, pk of 10
- CH0554 Watch Glasses, 80mm, pk of 10
- CH0554D Watch Glasses, 90mm, pk of 10
- CH0554E Watch Glasses, 100mm, pk of 10
- CH0554F Watch Glasses, 125mm, pk of 10
- CH0554G Watch Glasses, 150mm, pk of 10

Clear, polished glass with ground edge.





## Digital Water Baths - Stirred

- 603-010** Stirred Digital Bath, 8 Litre with Stainless Steel Tank
- 603-011** Stirred Digital Bath, 14 Litre with Stainless Steel Tank
- 603-012** Stirred Digital Bath, 22 Litre with Stainless Steel Tank
- 603-013** Stirred Digital Bath, 28 Litre with Stainless Steel Tank

Stirred Clifton water baths are designed for immersion of flasks/bottles/racks/etc., in a highly stable and accurate temperature environment throughout the water bath, featuring digital PID temperature control with Smart Technology for Adaptive or Optimized temperature modes.

### Features:

#### Thermostirrer

Durable stainless steel construction, painted surfaces are powder coated with an Anti-bacterial finish with good chemical resistance. Controls are easy to wipe clean and have an anti-bacterial finish. Immersed components are corrosion resistant. Quiet running in use with excellent water movement in bath.

#### Control options

Temperature control only  
Temperature and time

#### Temperature control - accurately controlled and set values reproducible every time using advanced PID control.

Time or temperature display.  
Temperature control features constant running 'Adaptive tuning' and the 'Clifton Optimization Control' mode to further refine PID values in unstable conditions.  
Features menu-driven data entry.  
Clearly visible LED display suiting all lighting conditions.  
Digital LED display to 0.1°C resolution.  
Actual water bath liquid temperature always displayed for complete assurance.  
Settings retained in memory.

#### Timer function

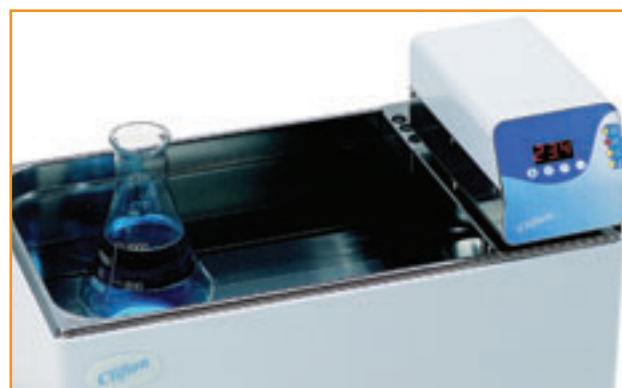
Display resolution: 1 minute  
Setting variable 0-999 minutes  
Time cycle - activated @ set point 2  
Cycle end with audible buzzer and 'end' message

#### Clearly visible bright status indicators

Heating, over temperature alarm, timer and set points.

#### Safety

When a low liquid level is detected in the bath a 'FIL' message automatically appears, with an audible buzzer and warning indicator, heating is then suspended. Once refilled, heating is restored and temperature control resumes automatically.  
Over temperature alarm automatically set at +4°C above set temperature point, with heater cut-off.  
Under temperature alarm automatically set at -4°C below set temperature point.



#### Water bath

Features a stainless steel 304 spec tank, corrosion resistant and crevice-free, contained within a sturdy body, powder-coat painted with an anti-bacterial finish with good chemical resistance.  
Supplied with removable stainless steel false base designed for good water circulation and water temperature stability.

#### Specification:

Carries the CE mark meeting Low Voltage and EMC Directives.  
Tank, immersed components: Immersed components are corrosion resistant, water bath 304 spec (18/8) stainless steel, crevice-free.  
Power Supply: Mains 230V AC, 50-60Hz, 1300W  
Temperature Range: Ambient +5°C - 99°C (extendable to -20°C with cooling accessories).  
Sensitivity/temperature stability @ 45°C: ±0.1°C  
Uniformity @ 45°C: ±0.01°C  
Temperature setting/control: Splash-proof controls with antibacterial finish/Keypad setting/Digital LED display/PID temperature control  
Temperature display resolution: Real-time fast responding display of actual measured temperature in increments of 0.1°C.  
Internal Dimensions (W x D x H):  
8L - 129 x 300 x 150mm; 14L - 219 x 298 x 150mm;  
22L - 395 x 298 x 150mm; 28L - 395 x 298 x 200mm.  
External Dimensions (W x D x H):  
8L - 271 x 332 x 170mm; 14L - 361 x 332 x 170mm;  
22L - 537 x 332 x 170mm; 28L - 537 x 332 x 240mm.

## Digital Water Baths - Unstirred

- 603-001 Unstirred Digital Bath, 4 Litre**
- 603-002 Unstirred Digital Bath, 8 Litre**
- 603-003 Unstirred Digital Bath, 14 Litre**
- 603-004 Unstirred Digital Bath, 22 Litre**  
with drain outlet
- 603-005 Unstirred Digital Bath, 28 Litre**  
with drain outlet

These water baths provide a stable temperature environment ideal for meeting quality control requirements. Featuring digital PID temperature control with Smart Technology for adaptive control for accurate working temperatures. Also featuring auto alarm settings, illuminated on/off switch, heater and over and under temperature indicators. Every water bath undergoes a factory calibration check, each filled with water, then at two reference temperatures we validate the bath achieves these settings with reference to a UKAS calibrated measuring system - giving you total confidence in use.

### Features:

#### Temperature control - accurately controlled and set values reproducible every time using advanced PID control.

- Temperature control features continuous 'Adaptive Tuning', to constantly refine the control liquid temperature at a set value.
- Clear LED display to 0.1°C resolution suiting all lighting conditions.
- Over temperature alarm automatically set at +4°C above set temperature value, with heater cut-out.
- Actual water bath liquid temperature always displayed for complete assurance.
- Settings retained in memory.

#### Clearly visible bright status indicators

- Indication of heating and over temperature alarm.

#### Heating

- Heating element, safety cut-out and temperature sensors concealed underneath tank providing a totally clear 'clutter free' working area which is easy to clean.
- The heating footprint covers the base of the tank, its low mass providing rapid energy transfer, quicker heat-up times and a reduction in energy consumption, with improved temperature uniformity because heat is spread over a broad area.

#### Stainless steel perforated false base

- Stainless steel perforated removable base.
- Clifton 'Low Height' shelf maximizes working height in tank.

#### Construction

- Stainless steel 304 spec bath contained within a sturdy body.
- Body with powder-coated paint finish has good chemical and detergent resistance.
- Anti-bacterial paint finish that inhibits the growth of bacteria.
- Control panel has good detergent and chemical resistance and is easy to wipe clean



### Specification:

- Carries the CE mark, meeting Low Voltage and EMC Directives.
- Brimful Capacity: 6 litres
- Tank, immersed components: 304 spec (18/8) stainless steel, crevice-free.
- Power Supply: Mains 230V AC, 50-60Hz, 400W
- Warranty: 3 years
- Safety class: 1
- Temperature Range: Ambient +5°C - 99°C
- Sensitivity/temperature stability @ 45°C: ±0.2°C
- Temperature setting/control: Splash-proof controls/Keypad setting/Digital LED display/PID temperature control.
- Temperature display resolution: Real-time, fast responding display of actual measured temperature in increments of 0.1°C.
- Internal Dimensions (W x D x H):  
4L - 300 x 150 x 150mm; 8L - 300 x 240 x 150mm;  
14L - 325 x 300 x 150mm; 22L - 500 x 300 x 150mm;  
28L - 500 x 300 x 200mm.
- External Dimensions (W x D x H):  
4L - 332 x 185 x 290mm; 8L - 332 x 270 x 290mm;  
14L - 325 x 300 x 150mm; 22L - 538 x 332 x 290mm;  
28L - 538 x 332 x 290mm.



## Hinged Gable Lids

- 603-006 for 4 Litre Unstirred Baths
- 603-007 for 8 Litre Unstirred Baths
- 603-008 for 14 or 18 Litre Unstirred Baths
- 603-009 for 22 or 28 Litre Unstirred Baths

Hinged gable lid for use with unstirred water baths (codes 603-001 to 603-005).



## 612-015 Water Still, 4L

A budget still designed to meet educational requirements at a low cost. This still produces 4 litres per hour with a 3kW metal heating element. Thermostatic cut off.



## 612-016 Water Still, 4L, Silica Heater

An economy still, producing four litres of pyrogen-free distillate per hour with two 1.5kW silica heating elements. Thermostatic cut off and pressure switch.



## 612-017 Water Still, Vertical, 4L

A traditional vertical water still, producing 4 litres per hour with a 3kW metal heating element. Thermostatic cut off. A double spiral condenser mounted on a spherical boiling chamber with a flexible joint. Water flow is controlled by a constant level device. Supplied with a metal bracket for wall mounting or bench mounting.



## 612-018 Water Still, Vertical, 8L

A above, but producing 8 litres per hour with 2 x 3kW metal heating elements.



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