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## Under the microscope

Using a microscope in school to look at microbes can be very rewarding but is not as difficult as it seems if you follow **John Grainger's** handy hints.



▲ Young schoolgirl using a microscope. Richard Bailey / Science Photo Library

The setting up of a microscope is a basic skill that is rarely mastered in schools. Only when it is done properly can the smaller end of the diversity of life be fully appreciated and microscopy be put to many other uses, such as aiding identification, measuring growth and checking for contamination. The magnifying power of a microscope is important but, particularly when looking at microbes, remember that the amount of detail seen is determined by its resolving power. The sub-stage condenser plays a crucial role in achieving good resolution.

### Hints

Adjust the iris diaphragm to achieve optimum balance between definition and glare. Do not control light intensity by moving the sub-stage condenser, the position of which should be to focus the light on the specimen. Re-adjust the iris diaphragm for each objective lens.

For looking at wet mounts of living specimens of protozoa, algae,

moulds and even yeasts, the low power objective lens (x10) is often adequate, but also necessary for locating and centering on an area of interest before turning to the high power objective lens (x40). Without altering the focus, turn to the high power lens and then finely re-focus.

Use the oil immersion objective lens for examining stained preparations of bacteria. Put one drop of immersion oil onto the preparation; a coverslip is not required. Remove the slide and wipe the oil immersion lens clean after use.

More detailed information on microscopy, including observing and preparing mounts for observing different types of micro-organisms, making smears and staining procedures is available in *Basic Practical Microbiology: A Manual* (email [education@sgm.ac.uk](mailto:education@sgm.ac.uk) to obtain a copy).

**John Grainger** is Chairman of the Microbiology in Schools Advisory Committee (MISAC) and co-delivers SGM's basic practical microbiology courses for teachers and technicians. He can be contacted via SGM HQ.

SGM aims to promote microbiology education in its broadest sense.

National Science Week (NSW) provides an ideal opportunity to raise the profile of our subject. **Joy Perkins** describes some events that were supported by a grant from the Society's PUS Fund.

### Shedding light on the amazing secret world of soil microbes

Professor Ken Killham delivered the NSW lecture on this topic at Aberdeen University on 16 March 2006. He provided a fascinating insight into the tiny organisms that live underground. The event was attended by Higher and Advanced Higher Biology pupils from local schools. It also featured a competition with GIANT Microbes™ as prizes. These are educational cuddly toys modelled on viruses and bacteria.

Ken explored *The Good, The Bad & The Ugly* of soil microbes. *The Good* focused on a range of beneficial plant-microbial associations such as mycorrhizal systems for nutrient capture and the use of microbes to clean up persistent organic pollutants in soil. *The Bad* investigated the deadly stomach bug *E. coli* O157:H7 and its presence in Scottish cattle, as well as *the very bad* endospores of the soil bioterrorism bug *Bacillus anthracis*. *The Ugly* covered devastating plant pathogens, including winter wheat root rot. At the end of the talk the audience was reminded that the soil sustains the planet – providing our food and fibre, regulating our water and air quality, supporting trees for timber and fuel, and cleaning up most of our pollution. The lecture was also peppered with interesting facts, for example, in a single hectare of land the biomass of microbes equates to 30 sheep! Professor Killham's enthusiasm was infectious and the event was a huge success with visiting pupils.

The three Ps – Perkins, Porter and Pennington – also helped to raise the profile of microbiology at the NSW Science Discovery Day. The excellent venue for this event was Satrosphere, Aberdeen's hands-on science centre, and it was organized by the Aberdeen Branch of the British Association for the Advancement of Science (BA). The event was only made possible by the generosity of BP who covered admissions charges for 800+ visitors.

At this family-orientated day I delivered a workshop called *Trees, plants and microbes – getting to the root of the issue*. Visitors found out about soil microbes through a range of hands-on activities. They discovered how tiny organisms in soil help trees and plants grow and investigated beneficial root-microbe interactions. Examples of friendly mycorrhizal fungi from the roots of orchids and a pine tree were also on display. Drag and drop computer exercises were very popular with visitors of all ages. Pete Jeffels from the Learning Technology Unit at the University used Flash Macromedia software to design mushroom-based activities.

In the Satrosphere café, Professors Andy Porter and Hugh Pennington contributed to the *Real Live Science* programme. As visitors relaxed and enjoyed a bite to eat, scientists gave short presentations. Andy described the human immune system and how it fights diseases. Hugh, using the memorable title *Bird 'flu! MRSA! We're all doomed!?*, provided a lively account of Sir Alexander Ogston, a famous

## National Science Week in Aberdeen



graduate from Aberdeen University. In the 1880s Ogston discovered and worked on *Staph. aureus* and researched the cause of hospital infections.

Many thanks to SGM for funding both events and Aberdeen University staff (too many to mention individually) for their support in raising the profile of microbiology during NSW 2006.

### Joy Perkins

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*If you are going out into the community to promote microbiology, a grant from the SGM's PUS Fund can provide up to £1,000. See [www.sgm.ac.uk/grants](http://www.sgm.ac.uk/grants) for further details of the scheme. We can also supply ideas for activities and provide goodies to give away, as well as tell you what is safe to do! Contact [education@sgm.ac.uk](mailto:education@sgm.ac.uk)*

▲ Professor Hugh Pennington at the 'Real Live Science' initiative.

## What's new?

### Science in School – [www.scienceinschool.org](http://www.scienceinschool.org)

This is a new European journal to promote inspiring science teaching. It covers the whole range of science, highlighting the best in teaching and cutting edge research. It is available in print in English and online in several different European languages.

To receive an alert when an issue is published, send an email with the subject *Subscribe to Science in School* to [scienceinschool@embl.de](mailto:scienceinschool@embl.de)

### Where do medicines come from?

ABPI has put together this new resource for primary schools, designed to be used with interactive white boards and computers. It is in three parts:

where do medicines come from? – Powerpoint presentation of stories for KS1 and KS2 with follow-up activities

how do we get medicines in our bodies? – a series of animations posters – A2 size to be used at different points in the primary curriculum.

See [www.abpischools.org.uk](http://www.abpischools.org.uk) for details and to download web versions.

## 2006 MISAC Competition MRSA today

SGM sponsored the 18th MISAC competition for secondary schools. This year's topic was chosen because of the serious problems caused in hospitals by MRSA (methicillin-resistant *Staphylococcus aureus*) and their extensive coverage by the media. Therefore, it was no surprise that the competition to write a newspaper feature on a hospital outbreak of MRSA proved to be very popular. It generated nearly 700 entries and involved more than 800 students from 105 schools and colleges drawn from England, Wales, Scotland and Northern Ireland. Pleasingly, this year there were more entries than usual from the GCSE Group, with numbers still holding up well in the 11–14 age range.

The judges looked particularly for attention to the guidance given to entrants on the writing of a news story, including preparing the headline to catch the reader's attention, structuring the story to maintain interest while conveying essential information, and the appropriate use of pictures, diagrams and scientific terms. Other important features were evidence of scientific merit, the use of entrants' own words rather than text downloaded from the web, and an appreciation of the importance of bringing out human and local interest.

Sue Assinder and Janet Hurst, representing SGM, joined the Chairman and other members of MISAC for the judging at Marlborough House. This year the judging panel also benefited from the expertise of Alexandra Blair, Education Correspondent on *The Times* newspaper. Many entries impressed the judges with their high quality, but unfortunately a notable proportion were excluded from consideration because they did not adhere to the competition rules, particularly by using the format of a factsheet instead of that of a newspaper article.

The winner of the 11–14 age group was Eleanor Tayler of the Abbey School, Reading; Emma Pascall of Durham High School came first in the GCSE group. Further details of the winners are available on the web ([www.microbiologyonline.org.uk/misac](http://www.microbiologyonline.org.uk/misac)) and a selection of the entries will be on display on the SGM stand at the ASE annual meeting at the University of Birmingham (4–6 January 2007).

Each school entering the competition received a pack of microbiology teaching resources and every student was sent a certificate of entry.

Next year's competition on *Salmonella: from farm to fork*, will be sponsored by the Society for Applied Microbiology and an entry form will be downloadable from the MISAC website (see above) in September. MISAC is grateful to all its sponsors for enabling the competition to take place each year.



◀ The MISAC judging panel at SGM HQ in April 2006. From left to right: Peter Fry, John Tranter, Sue Assinder, Janet Hurst, John Grainger and Alexandra Blair.