

Going Public

2. Workshop activities for 5 - 12 year olds



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Microbiology can be introduced to a young audience through a mixture of simple, safe "experiments" and arts based activities. This information sheet provides ideas for activities, based on the experience of the SGM External Relations Office. All of the activities described below have been thoroughly tried and evaluated during 1999 by SGM staff in a variety of situations.

The event and its venue

Most science promotion events for young children take place outside of the laboratory environment in locations such as church or community halls and school classrooms. Facilities are often limited - hot and cold running water can be quite a luxury and space may be at a premium. This need not be a problem, all that is necessary for some exciting workshops is a few tables and chairs for the children, space to store your equipment and perhaps access to a sink and running water.

Preparation of learning aids

- ◇ A set of good clear micrographs of interesting microorganisms is essential to capture the attention of young children. In primary schools, microbiology teaching concentrates on the theme of "good and bad microbes", this is an excellent route to follow and many examples can be taken from everyday life. Liberal use of the **yuck factor** will appeal to small children's lavatorial humour.

- *Staphylococcus* (snot)
- *Streptococcus* (sore throat)
- *Penicillium* (mouldy bread)
- *Vorticella*, *Paramecium* (sludge busters/poo eaters)
- organisms involved in dental plaque formation

However, this should be tempered by reference to some of the "**good guys**"

- diatoms (silica in toothpastes)
- *Penicillium* (blue cheeses and medicines)
- bacteria involved in manufacture of yoghurt, cheese and other food products)
- "good gut bacteria" (that do battle with the bad guys).

Finding high impact pictures can be difficult, but Dennis Kunkel's website in Hawaii has some fantastic colour images that can be downloaded and printed. He is generally happy to give permission for the images to be used for educational purposes. (www.pbrc.hawaii.edu/~kunkel)

- ◇ Clear, simple diagrams that illustrate different shapes and structures of microorganisms are also useful. Good use of colour is recommended.

Presentation structure

- ◇ Small children are fascinated by microbes and love to hear about these amazing tiny creatures. It thrills them to know that microbes are all around us even though we can not see them. A brief introduction in this vein using good images and descriptive, simple language will keep their attention for 5 - 10 minutes. If you let the children select images from a "gallery" of micrographs, they really feel involved.
- ◇ After the introduction the fun can begin! We have found that a combination of "**experiments**" and **creative art work** provides the children with most enjoyment. Allow about 15 - 20 minutes for each type of activity, although different groups can work much more slowly or quickly.
- ◇ **Simple safe experiments** are a good introduction to science and make the children feel quite important! All activities suggested below are safe for use outside the laboratory if carried out with appropriate care and equipment (i.e. no glassware).

- Dough races - find out about yeast and why it makes dough rise. Look at different flours (strong white/brown, S.R. white/brown) to see if they make a difference. If facilities are available, you can explore the effect of temperature on the yeast.
- Look at blue cheeses, mouldy bread and open gilled mushrooms under a 10x hand lens. All the samples should be sealed in Petri dishes beforehand so that the children do not come into contact with spores. Any mouldy bread cultures should be autoclaved before disposal.
- Pond water viewed under a microscope can be fascinating. (you will need to borrow some decent microscopes from the laboratory). It is possible to buy cultures of fresh water protozoa and algae (see below) if you want to guarantee that there will be life under the lens!

- ◇ **Arts and crafts activities** are an ideal way of exploring shapes and diversity of microbial life. There are two approaches which work well with children in this age group. To explore **diversity**, children make models/pictures/collages based on good quality micrographs of interesting microbes. **Suitable activities** include:

- Salt dough modelling (with different colour doughs)
- Drawing on cotton hankies (or cotton squares) with fabric pens, painting on glass jars, acetates or white tiles
- Collages (using dried pulses and pasta shapes)
- Making microbe flags (with pea-sticks and paper with coloured drawings using felt-tip pens)

Children at the older end of the age group can relate to the **difference between yeasts and bacteria** if it is put to them in simple terms. (cytoplasm is a jelly, plasma membrane is a bag, DNA can be kept in or out of a bag, presence/absence of an outer cell wall, organelles). This can be illustrated with simple diagrams. The different **shapes** of bacteria are also good to explore. **Suitable activities** include:

- salt dough modelling (with pulses and pasta as cytoplasmic inclusions, DNA , organelles etc)
- collages of bacterial rods, cocci, chains, clusters on filter paper in Petri dishes (using pulses & pasta shapes)

- similar collages on cardboard badges, sheets of paper or on discs of coloured card to make simple mobiles
- microbe flags.

- ◇ A brief summary at the end of the workshop will remind the participants what they have discovered about microbes. It is also a good opportunity to make sure that they have retained a sense of proportion and will not be going home full of lurid tales about nasty microbes!

Presentation style

- ◇ For the introductory section, try to adopt a story teller style which provokes fascination with the secret world of microbes. Once you have the children's attention their natural curiosity should take over and you will have a rapt audience.
- ◇ Try to answer individual questions on a one to one basis while the children are working.

Other handy hints

- ◇ Some children need more guidance than others when it comes to making models and drawing. It might help to have "one I made earlier" as a sample. They can be enormously self critical, so much praise is required and some extra materials in case of disaster.
- ◇ If there is no access to water for hand washing, a plentiful supply of baby wipes is essential because small children hate having sticky hands.
- ◇ We have found that a group of eight children can be comfortably managed by two people (while one talks, the other can be setting up the next activity, to allow a fast turn around - this age group does not wait patiently!)

Sources of further information and resources

BBSRC and MRC web sites have details of their publications on linking with primary & secondary schools (www.bbsrc.ac.uk, www.mrc.ac.uk)

The Association of Science Education website lists science resources for teachers (www.ase.org.uk)

SGM Education Department can give advice and also provide copies of guidelines for microbiology activities in schools. Some of this material is available on the SGM website (www.socgenmicrobiol.org.uk)

E-mail: education@socgenmicrobiol.org.uk or telephone 0118 9881835.

Pure and mixed cultures of algae and protozoa can be obtained from Sciento (61 Bury Old Road, Whitefield, Manchester, M45 6TB)