

Going Public

3. Talks and presentations to GCSE and post 16 students



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For people who work in universities, the 14 - 18 age group often seems the ideal target for science promotion activities; they seem similar in interests and outlook to the 18 - 21 year olds that populate our lecture theatres. It is true that one can explain more “real science” to a 6th form audience, and they will listen better to “standard” lectures. BUT a PUS activity, for these age groups, will only succeed if you really understand the perspective of the audience and the pressures on their teachers. More 6th form PUS events are poorly attended, or have to be cancelled, than for any other target audience. This information sheet offers a check list of handy hints, based on the personal experience of Liz Sockett (SGM Education Officer), for any scientist thinking of promoting microbiology to this age group.

The event and its venue

If teachers invite you to their school to speak, it is worth checking if they have specific aims in mind so that you can meet their expectations. If you decide to organise an event and invite schools to attend, you should check how the subject of your presentation corresponds to the specific aims of the science syllabus. Teachers will only bring GCSE and A-level pupils out of school to an event that is directly relevant to their teaching. Your talk should supplement the text books, perhaps giving simplified explanations of new research. It is essential to advertise your talk and emphasise its relevance to the appropriate sections of the syllabuses. The National Curriculum is available online (www.nc.uk.net). GCSE and A - level syllabuses are available from examining boards such as Edexcel (see below).

Preparation of learning aids

- ◇ As with all presentations, good, clear slides are essential and should include an introductory section and a concise summary. Avoid the use of research data slides. If you have a few beautiful molecular models, or micrographs do show them, but point out the scale of the images.
- ◇ Students of this age will be able to look at data and spot trends on simplified graphs if well annotated and carefully explained.
- ◇ If you make a computer-based presentation showing web-based DNA databases or protein structures, make sure it will all run from a lap-top. Do not rely on a school's internet access, it may not be available or reliable.
- ◇ Real data from sequencing runs will interest A-level groups, particularly if you can take enough colour photocopies to give out. You can think of mutation hunting for them to do.

Presentation structure

- ◇ If you're invited to lecture at a school then restrict your talk to 30mins, (40mins maximum for a group of post-16 students). If you are speaking within a lesson, you should allow plenty of setting up time and know how much time there will be for questions. If you overrun, you risk losing your audience when the bell rings!
- ◇ If you're planning to put on an event rather than responding to an invitation, think about what type of school or schools you're going to target. Some public schools have better lab equipment and seminar programmes than some universities and they may be used to inviting scientists on to the premises. Their audiences are well behaved and attentive (usually). This can be a good starting point for the PUS novice to try out a presentation. However, if you decide to target schools which are not so well endowed, you might be offering them a rarer

opportunity to meet a scientist. It is true that sometimes crowd control may be a worry, but the benefits outweigh the problems every time.

- ◇ You are unlikely to get many volunteers leaping at the opportunity to help with demonstrations (unlike the madly keen 5-12 year olds). Take a presentation that you can do single-handed if necessary.
- ◇ If you decide to do a practical demonstration in a school you should ensure that it is safe and manageable within your time slot. It is also worth checking that the students have not previously done the activity. A high percentage of pupils have isolated DNA from fruit and vegetables, thanks to the work of the NCBE (National Centre for Biotechnology Education), so they might not be thrilled by doing it again with you.
- ◇ A talk with teachers before the event will highlight any areas that the students particularly like. If they are very interested in Dolly the sheep, you can make links to any genetic engineering topic from that.
- ◇ Students of this age are often very sophisticated and they will be interested to hear about the machinery that you use in the lab as well as the biology. Remember to include some information about these gadgets and take some photos if you can. They also love to hear how many thousands of pounds the equipment costs or how few parts per million it can detect etc.

Presentation style

- ◇ Many complex biological processes are simplified at the GCSE and A-level stages. Students may think that ATP has high energy bonds or that eukaryotic DNA can be cloned directly into bacteria and expressed. They may never have heard of promoters, PCR, cDNA, exons or introns but will enjoy hearing more about these topics if you introduce them in a way that doesn't undermine what they have learned in class.
- ◇ Try to get their attention with some scientific anecdotes that might relate to their lives, but make the tone positive (i.e. don't go on about how they're damaging their health by smoking and drinking alcohol). **Good examples** of bacteria to mention to this age group include:

- Bacteria that infect body piercing sites or contact lenses
- Bacteria that sense and metabolise drugs
- Bacteria that cause sexually transmitted diseases

Steer clear of acne anecdotes, HIV and meningitis (these can be sensitive subjects)

- ◇ Avoid using any acronyms such as FRS, BBSRC, MRC. They are not relevant to school students

Question sessions

- ◇ Leave time for questions and answers at the end of your talk and make it clear to the teachers how long you wish to allow for this session.
- ◇ Students in this age group often feel it is "uncool" to be interested in science. Unlike a younger audience who may ask a mass of questions, you may get very few. To prepare for this you could think of some "ethical" issues where you can seek opinions by a show of hands.
- ◇ Try to be fair and check that you're taking questions from all areas of the room.
- ◇ If you are prepared to answer written queries after your talk, take some A4 SAEs with you since many teachers appreciate new "expert" contacts!
- ◇ If possible, build in some "lingering time" for students who prefer to ask questions in relative privacy.

Safety issues

- ◇ If you take cultures or equipment into schools, it is essential that you consider the safety implications and carry out a risk assessment. Guidelines for practising microbiology in schools are available from the organisations listed below.

Other handy hints

- ◇ You may wish to assess the event by a simple questionnaire that you give to each teacher. Give them an SAE to return it. Stress that if you get feedback from them then you'll be more likely to say yes to another invitation.
- ◇ Recruit some helpers (your researchers or teachers at the venue) to protect any demonstrations from pilfering or breakage as the students leave (and you're occupied answering questions). This happens at the most august venues, and you need to protect any models you have made!
- ◇ See if you can take a few "freebies" from your friendly Research Council or Learned Society! High school pupils are sometimes too "cool" to clamour for such freebies but they appreciate give-aways with real pictures of bacteria on them or with website information. Pens can be a very successful method of advertising websites (if you have a large enough budget).
- ◇ Teachers appreciate materials that they can use for display or classroom work and they may not know what is available. Often organisations produce quite useful material that you can link to your talk (a list is available from the SGM). Do check what the material says first though in case it contradicts your message! The SGM has a range of material for use in schools (see below)
- ◇ If you have time to prepare a very brief "reading list" of web sites and popular journal articles (e.g. *New Scientist/Scientific American*) for the teachers, they will find it useful.
- ◇ A list of (checked) web sites where students can look for further information will be gratefully received.
- ◇ A-level teachers will be on the lookout for new ideas for A-level projects and your input, based on your own research interests, may be very helpful. However, school laboratories can be ill-equipped so you may be asked to host a student in your laboratory. This can be very time consuming for you and your researchers; be honest, you may not be able to commit yourself to this level of help. If you do decide to host a post - 16 student in your laboratory you should consider the safety implications carefully.
- ◇ The 15 -18 year old audience will be interested in you from the careers perspective as well as for the science. Ask the teacher in advance if you should include some careers information. Bear in mind that many 14 - 16 year olds study single or double award science (not the traditional single subjects). The SGM has produced a new careers poster and leaflet for 15 - 18 year olds which is available for distribution in schools.
- ◇ If you are going to talk a bit about careers and you come from a university, then check up on the entry grades currently for microbiological, medical and biological courses. Take some prospectuses. They'll expect that you'll know all about all disciplines!
- ◇ Finally think whether you feel able to be a contact point for future enquiries by the teachers or pupils. If so then offer the teachers your contact details. Contacts such as these can be a very big help to teachers in finding reliable information.

Sources of further information and resources

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

The Wellcome Trust information service maintains a library of resources (infoserv@wellcome.ac.uk)

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

The National Association for Managers of Student Services in Colleges maintains a website with links to all examination boards with syllabus details (www.namss.org.uk/curric.htm#Exam)

The SGM Education Department can give advice and also provide copies of guidelines for microbiology activities in schools. (E-mail: education@socgenmicrobiol.org.uk or telephone 0118 9881835). Some of this material is available on the SGM website (www.socgenmicrobiol.org.uk).

Information on microbiological safety in schools and colleges is available from the SGM website and in publications such as *Topics in Safety* published by ASE and *Safety in Science Education* published by the DfEE (details on the SGM website).