



Science Outreach for schools

Climatica

www.climatica.org.uk

Kathryn Adamson, Tim Lane, Richard Selwyn Jones

Contents

- 1 Why visit schools?**
 - The role of outreach in schools
 - Where to find a school
 - Deciding what to present

- 2 Key consideration for preparing your session**
 - Questions to consider when planning
 - Teaching from a national curriculum

- 3 During and after the event**
 - What to remember during the event
 - After the event is finished

- 4 References and useful links**



1 Why visit schools?

This guide focuses on the place of science outreach in schools. It covers the reasons for undertaking such outreach, the best ways to become involved with schools, and advice on presentation technique and style.

The role of outreach in schools

Though all forms of communication with the public are important, there are few opportunities which allow for such direct contact with the public. Some analysis has suggested that science blogs and other websites often only reach a small portion of the public, and that often the recipients are already science enthusiasts (Kouper, 2010).

Interacting directly with schools allows an unbroken line of contact with young people who may not have yet been introduced to your field of science. As school students represent such a large, important part of the public, it is vital that scientists engage with them in an appealing manner.

Climate science is one of the most important issues that current and future populations will face, and it is vital that young people understand the science behind it. Schools outreach is therefore an opportunity for scientists to convey these important messages.

Where to find a school

If in a university, speak to your university or department's widening participation office. They often have a list of local schools that are open to scientists coming in to teach, and have experience of supporting academics to do this. If they do not have such a list already in place, ask them to compile one!

Visit your city's council and ask them for a list of local schools.

National scientific bodies and their mailing lists often have events for school, or receive specific teaching requests from schools, which are then sent to members. Sign up to these mailing lists and keep an eye out for any events close to your location.

Deciding what to present

Once you've found a school to work with, you need to decide what you will talk about.

You may be very passionate about your specific field of study, but school students may not be (yet!). You need to remember that the aim of schools outreach is to both educate *and* inspire.

Students should leave your session with increased knowledge which should be useful for their school work. As school students are future scientists, they should also be inspired to become scientists in the future.

The material you present therefore needs to be wide in scope. You can then focus in on a few aspect of the topic, using specific examples from your own work. It's useful to use these examples to show, practically, how your research is done. This will help to break down any barriers with the audience, and teach them *how* science is carried out.

2 Key considerations for preparing your session

Once you have established the theme of your session, you need to ask a number of questions to ensure you deliver valuable science:

- What is the aim of the session you are running? Sometimes teachers will want you to teach material that is aligned with their curriculum. In other instances, they may be open for you to present on a broader range of topics that is not directly related to their work.
- Who is your target audience, which age-group are the students? It is easier to deliver multiple sessions to different age groups. This way the content can be easily tailored for different students.
- How much time will you have? If you are asked to (and can fit it into your schedule), then running multiple sessions over the course of a day will be beneficial to both the school and you.
- How many students will be attending - will the session be compulsory or voluntary?

Once you have a clear idea of the purpose and audience for your session(s), you can plan the style and content.

Start by asking the teachers what has been done during previous lessons. This will help you to gauge the standard of the students, and ensure minimal overlap with their previous classes.

Make the title of the talk/workshop snappy and catchy to make sure the students are excited to come.

Aim to do things which the school cannot do or provide. Bring in props or other scientific equipment that you use. If you work in the field, you could bring in samples that you do not mind being passed round the students.

Tailor sessions to the correct age group. Not only do different student age groups need different content, the style of teaching is also different. So if you can split into multiple sessions for different age groups then do so.

Make the sessions as fun and memorable as you can; use videos, photos, props, and personal stories from your research.

Include lots of specific examples from your own research, and other case studies. These help to make the science more personal, relatable, and are likely to be the parts of the subject you are most comfortable and enthusiastic when presenting.

Keep in contact with the school prior to the event to ensure that you manage expectations for both parties.

If you are required to teach from a national curriculum there are a number of extra recommended steps:

- Check with the teacher exactly what they want to be covered. Ask for (or check yourself) the curriculum so you can see where your work could fit in.
- When you plan your talk or workshop, use the vocabulary from the curriculum in order to promote continuity and more successful information recall between what *you* tell the class and what the teacher discusses with them afterwards.
- Write out a series of Learning Objectives for your session. It is helpful for everyone: you – as it reminds you what you actually need to be telling the students; and the students – in case they become confused by the material.
- Check the curriculums for a number of subjects. Some of what you teach may be related to: Geography, Physics, Chemistry, Biology, Mathematics, or others. If it does, you can highlight this to the students, and to the teachers, so that they know they are getting extra value from your talk.

3 During and after the event

What to remember during the event

Be flexible with the timing and content of the event, as things may change during the day. It's always useful to have a number of time fillers on hand in case they're needed. These could include a short quiz or a number of longer videos you may not have time for during the session.

To gauge the knowledge level of the class, you could start your session by quizzing the students on their knowledge. Ask them progressively more challenging questions so you can assess the level of their understanding.

It can be difficult to keep students, especially secondary school students, entertained throughout the session. It's good to employ a number of different techniques to keep them interested, and ensure they come away with a positive impression of science, and the subject you've been teaching:

- Make sure your session includes as many different forms of media as you can. Bring in props or specimens (as mentioned above), use videos, photos, and personal stories and experiences.
- If you have time and the space, get the students up and moving. They will probably be having a day of lessons in classrooms and introducing fun activities will make the event, and the science, more memorable.
- Ask a lot of questions of the audience to keep them involved. Make as many questions as you can open-ended, and encourage all answers, even if they're not 100% correct.
- Finish your session(s) with a bang. Deliver your take home messages with something fun, exciting, and memorable. This will ensure your key points are remembered by the students.

After the event

Thank the member of staff who hosted or organised the event. This is important to continue a good relationship with the school, especially if you wish to organise events in the future.

Ask for some feedback once you've finished the event. This can either be done informally, in person, or after the event by email. If you feel comfortable with it, you can also ask the teacher to ask the students for their (anonymous) feedback. This can be very beneficial to your outreach work, and can help to improve the content and style of your delivery.

If you have any, provide some resources for the teacher and/or students. These can be used by the teacher during follow-up work, or to stretch the knowledge of the students. Relevant resources might take the form of hand-outs, presentation slides, websites, or videos that you think might be useful for students.

4 References and useful links

American Geophysical Union

http://education.agu.org/files/2012/06/EPOMetaResource_EPOGuides.pdf

Climatica

www.climatica.org.uk

European Geosciences Union

<http://www.egu.eu/outreach/>

www.egu.eu/young-scientists/resources/?filterby=5&limit=50

National Science Teachers' Association

<http://www.nsta.org/climate/>

School Science

<http://www.schoolscience.co.uk/>

Science Museum, London

http://www.sciencemuseum.org.uk/about_us/~media/2D9E879670494F3882944D311D368F06.ash

[x](#)

United States Geological Survey

<http://education.usgs.gov/>

Kouper, I., 2010. Science blogs and public engagement with science: practices, challenges and opportunities. *Journal of Science Communication* 9, 1-10

[http://jcom.sissa.it/archive/09/01/Jcom0901\(2010\)A02](http://jcom.sissa.it/archive/09/01/Jcom0901(2010)A02)