British Science Week: why do we need science?

Session summary This session will help students understand the purpose of asking scientific questions, how they are relevant to the workplace and what careers are available to them within the scientific field. They will learn how to communicate scientific ideas to the public, and the importance of doing so effectively.	**Suggested volunteers:** A range of former students could contribute to this session, all working within a scientific field. This could include site engineers, science teachers, journalists, healthcare consultants, and much more.
Learning outcomes: • Students will learn about the variety of careers available within the scientific field. • Students will learn about the importance of scientific communication. • Students will understand how scientific ideas fit into wider society.	
Resources • Presentation • Student workbook (one per group) • A3 Paper (optional)	
Pre-session preparation • Speak to the volunteers over the phone and let them know what to expect from the session, as well as finding out which of the roles above they fit into and how they will tell their story. • **Ask volunteers to provide an example of a problem they face in the workplace, or more broadly what their company is aiming to do.** • Make sure an appropriate room has been allocated.	

Timings	Section content	Key objective and link to next section
0 – 5	**Welcome and introduction (slides 1 & 2)** - Introduce the objectives of the workshop. - Highlight the importance of thinking broadly about science and scientific ideas.	
5 - 25	**Meet the volunteers (slide 3):** - Volunteers introduce themselves, giving a name and clue (prop or verbally) to their job. - Volunteers each join a table (if there are more volunteers than tables, this can be done as a panel) and students guess their job. - Each table feeds back their volunteers job to the room, volunteer explains what they do day-to-day. - Rotate volunteers with further questions on the board for students to ask volunteers, including: where does science, or the scientific process, fit into your role? **Name the jobs (slide 4):** - Students brainstorm the variety of jobs available within 'science' – think broadly as types of engineers, journalists, etc. – think of as many jobs as they can within 2 minutes.	**Objective:** Increase knowledge of opportunities within the scientific field and the variety of careers available. **Link:** Now we'll move on to thinking a little more specifically about science, and what is really is.

25-30	**What is science? (slide 5)** - Students have 2 minutes to think of words and images they associate with 'science'. - Facilitator discusses the stereotypical depictions of science then introduces the true definition. - Facilitator turns to volunteers to ask them to explain what science actually is, particularly in relevance to their job.	**Objective:** students dispel myths about what science is, as a concept and within the workplace. **Link:** Great, it seems certain that science is really about asking the right questions and really pushing for answers – we're now going to think more specifically about how these questions arise in the workplace.
30-35	**Asking the right questions (slide 6)** - Introduce the idea of curiosity and the importance of science as a method of asking and answering questions. - Use the 4 examples on the board to show scientific and non-scientific questions (already arranged). - Students discuss in groups reasons why certain questions are/aren't scientific. - Introduce the idea that scientific questions are ones which can be proven/disproven with testing, thus the 'point' of science is in answering these questions.	**Objective:** students understand the difference between a scientific and non-scientific question. **Link:** Now we're going to link the industries and questions together. We've highlighted that science is all about asking the right questions and pushing to discover answers – what questions do our volunteers encounter in their workplace?
35-40	**Science communication: discussion (slide 8)** - Discussion statement: get students to move to either side of the room. - Points to highlight include: the public need to understand what new treatments to know how and whether they want to use them; understanding science will increase public knowledge; people need to understand the risks they are taking by not flying/vaccinating their children, etc. - Use controversial examples, e.g. contraceptive pill or genetic testing to help students understand the public need to make their own minds up about what they use, whilst receiving accurate scientific facts to help them.	**Objective:** students understand the importance of effective scientific communication in solving health crises, and moving science forwards. **Link:** You're going to get your thinking caps on again and think about how you would effectively communicate in the next example.
40-55	**Science communication: Ebola (slides 9-11)** - Go through each point on the board and explain the problem to students. - Students decide on an example of how they would communicate in this situation, noting ideas in their workbook. - Discuss infographics and how they were used to help ease the spread of disease.	**Objective:** Students think creatively about communication and tailoring it to difference audiences. **Link:** Thank you all for being here today, I hope you have gained some insight into scientific careers, working in science and how to communicate effectively. Before we go, I'll turn to our

		volunteers for a final piece of advice…'
55 - 60	**Final advice (slide 11)** - Alumni give a final piece of advice to students, something they would say to themselves at 16/17.	

Comments and adaptations

The session can be extended including a 'science at work' activity in which volunteers will present a 'scientific question' they ask at work and students will come up with a solution. They can then present their ideas more formally They can use the outline of the scientific process to show step-by-step how they would solve the given problem:

1. Make an observation
2. Ask questions about the observation and find information
3. Form a hypothesis (theory)
4. Test the theory with an experiment
5. Analyse the data and draw conclusions. Change the hypothesis depending on what you find.
6. Reproduce the experiment until the results are the same.
7. Ask more questions based on the results.

If the volunteer does not have a 'problem' which they can use at work, use general examples for each question:

- What is the best way of travelling from A to B?
- How are we different to chimpanzees?
- What is the quickest way of making 5000 tablecloths?
- What would happen if the Earth stopped moving around the Sun?
- Why do humans like listening to music?

The 'Science and Communication' section can also be extended by asking students to explain something they are currently doing in science, e.g. the importance of vaccinations, to a primary school student (Y3+).