



The Big Bang

UK Young Scientists & Engineers Fair

Secondary pre-Fair lesson

Lesson 1 of 2

Learning objective

- Students to understand the range and diversity of exciting careers available in STEM.
- Students to understand how science, technology, engineering and maths are integral to how we live today.

Resources

- Tomorrow's Engineers resource pack available to download from www.tomorrowsengineers.org.uk/careers
- Big Bang Challenge fold-out card included in teaching pack. All students will be provided with a copy at The Fair to complete.
- A teachers' resource pack will also be available at The Fair.

Did you know?

This pre-Fair lesson ties in with most of the 8 Gatsby benchmarks, specifically 'linking curriculum learning to careers' and 'encounters with employees'. Whilst at The Fair, students will also have the opportunity to have personal careers guidance and encounters with further and higher education.

Starter

- Begin a discussion that reminds students of their upcoming trip to The Big Bang Fair.

Teaching input and lesson overview

- This lesson consists of two in-class discussions and an optional 'on the way to The Fair' activity.
- The discussions can be extended or shortened by the teacher depending on how much time is available.
- The discussions can be led by the teacher, or alternatively students can be divided into groups to discuss independently.
- There are many related resources that are aimed at students for future reference available at www.tomorrowsengineers.org.uk/careers
- At the end of the lesson students should understand the reach of science and engineering in the world around us and how there are multiple ways of working in these roles.
- The lesson should end with a summary that students can continue and explore these topics at The Fair and that there is the opportunity to complete the Big Bang Challenge at The Fair which will be discussed in a post-Fair lesson.
- As an optional activity, there is a KWL chart included in the resource pack for students to fill out what they know already, what they want to know and what they learnt.

Not enough time for this lesson?

If you don't have time to dedicate a whole lesson to this discussion, you could always do it with your class while travelling to The Fair.

Assessment questions

- Do you feel you have a better understanding of what scientists and engineers do?



Lesson in detail

1. A discussion of examples of jobs in STEM:

Begin by going through what science, technology, engineering and maths is. This can then lead to a discussion of examples of jobs in STEM. As students suggest various jobs, compile a list on a large sheet of paper or write them on the board. Ideally the list will become quite long and varied to show the variety of jobs. If students are in need for some prompts, the '100 jobs in STEM' poster (download from www.tomorrowsengineers.org.uk/stemjobsposter) could be quite useful.

2. A discussion about how integral STEM subjects are to all aspects of our lives today, and in the future:

Begin by asking for some suggestions of the most pressing challenges facing the world today, and in the next decade. Compile a list of 4-6 challenges. Split the class into smaller groups and ask each group to address one of the challenges they have come up with.

Each group should:

- Come up with some creative solutions to these challenges.
- Name some skills scientists and engineers could contribute to help tackle these global challenges.
- Consider how STEM is a cross collaborative area to work in, what other sectors could help to contribute to the solutions? e.g. engineers and chefs working together to create 3D printed food.
- Prepare a 2-minute feedback presentation to the class which can be discussed in the round.

The above activity will highlight that students can have multiple interests and combine them with STEM, while demonstrating that science and engineering are diverse disciplines that require people from different backgrounds with different skillsets to collaborate to successfully complete a project.

Some possible prompts to discuss are included below, however, students should feel free to bring other issues to the foreground and be as creative as possible:

- Responding to and safeguarding against natural disasters.
- The uses of artificial intelligence and robots, and whether they can cause more harm than good. Examples are electric and driverless cars, drones and smart technology.
- Extra-terrestrial travel and exploring other planets.
- Making the planet more sustainable.
 - Lower plastic use and creating a biodegradable alternative.
 - How to tackle climate change.
 - Conserving biodiversity and wildlife.
 - Dealing with congestion in cities.
- Food supply and housing for a growing population (e.g. eating insects, lab grown meat, 3D printed food, agri-tech, transport).



Printable discussion cards

Creative answers welcome!

What are some ways to detect, respond to and safeguard against natural disasters?

What can artificial intelligence and robots be used for?

Can they potentially be used for more harm than good?

In what ways can we explore other planets?
Why would we do this?

What challenges would be involved moving the human population to another planet?

Are there any creative solutions to dealing with congestion in cities?

How can we live more sustainably? How could we get rid of pollution and make everything biodegradable?

E.g. a biodegradable alternative to plastic?

How can we ensure a food supply and houses for the worlds growing population?

Is eating insects or growing meat in laboratories the answer?

Is there a way to reverse climate change?

How can we prevent plants and animals going extinct?