



STEM Crew Big Questions

Teacher Notes

What are Big Questions?

A Big Question is a way of guiding pupils to make links between distinct subject areas and relate them to the world around them. Pupils are enabled to apply their knowledge across a number of subject areas in order to consider their response to the Big Question.

We have chosen 6 Big Questions and added the resources your pupils will need to be able to form a detailed and considered response.

The questions span a range of areas; human performance, design, the environment and technology.

The Big Question projects may be used in isolation for teaching in science or design technology, or as part of a larger cross curricular project across multiple subjects (including English and humanities).

How can they be used remotely?

Each question is supported by an information sheet for pupils with links to the resources they may need. Of course, pupils may do further reading and research in addition to the material provided.

Pupils are provided with a planning tool in the form of a sample mind map and a project log to keep a track of their progress.

There are also suggestions for presenting finished projects including links to apps or websites they may find useful.

Can I use the questions to cover subjects across the whole curriculum?

Yes! In the teacher notes we have included suggestions for further work in the arts and humanities. This makes our Big Questions truly cross curricular.

How do students present their work?

We love to promote creativity and innovation. Working alongside INEOS TEAM UK, we are surrounded by cutting-edge design and technology. Therefore, in these resources we have encouraged the use of a wide variety of media for students to present their work from logging to green screening.

They are a great opportunity to take advantage of the freedom provided by working outside the classroom to communicate knowledge in an innovative and creative way.

What will my students gain from completing a Big Question?

In addition to curriculum-linked learning in STEM subjects, independent learning across curriculum areas will enhance their skills in key areas. We believe **context**, **creativity**, **challenge** and **confidence** will all be born out of independent learning by using our resources in this way.



Notes on each Big Question:

How Have Advances in Materials Science Impacted on Yacht Design?

Teacher notes

This Big Question is designed to explore the many elements which come together to form a professional sports team. Students will need to gain a wide understanding of the roles, technology, people and places which form a prestigious sporting challenge.

Suggested wider curriculum activities

- English** Write a persuasive letter to your headteacher to encourage them to recycle
Write a newspaper report about carbon recycling
- Geography** How are raw materials extracted and sourced
- History** Investigate textiles used in Victorian times
Investigate who owned or funded the Americas Cup yachts from 1851 through to the current day, what business were they involved with and what does this tell you about society at that time?
- Art** Using recycled materials, produce a sculpture to represent past to present

What Does it Take to Become an Elite Athlete?

Teacher notes

This Big Question is designed to explore the many elements which come together to form a professional sports team. Students will need to gain a wide understanding of the roles, technology, people and places which form a prestigious sporting challenge.

Suggested wider curriculum activities

- English** Write a biography about a member of INEOS TEAM UK.
Write an explanation as to why nutrition is just as important as exercise.
- Geography** People and places; Write a postcard home from Auckland. Describe it's physical geography.
- History** Famous people in history. Choose a famous historical person you admire and produce a fact sheet about them.
- Art** Produce a pencil portrait of a famous person you admire.
- Music** Choose a piece from a musician you admire, past or present. Research the composer.

How Can We Design a Product to Minimise Impact on the Environment?

Teacher notes

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Suggested wider curriculum activities

- English** Write a persuasive letter to the Headteacher to persuade them to install solar panels on the school roof.
- Geography** Research forms of renewable energy and suggest which would be the best option for the UK to invest in and explain why.
- History** How did the industrial revolution impact on people's lives?
- Art** Using recycled materials, make a collage to represent our planet and its ecosystem.
- Music** Using a backing track of choice, write lyrics about the beauty of our planet.

How Do You Design a Winning America's Cup Yacht?

Teacher notes

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Suggested wider curriculum activities

- English** Write a chronological report about how America's Cup yacht design has changed since 1851.
- Geography** Formation of landforms- the Needles on the Isle of Wight, how physical processes change landscapes.
- History** Investigate who owned or funded the Americas Cup yachts from 1851 through to the current day, what business were they involved with and what does this tell you about society at that time? Investigate features of building design through the ages.
- Art** Create graphics for the hull of the boat that not only make it look good but also help disguise the hull shape to make it harder for other teams to see the exact shape of the hull.
- Design a logo for Britannia, the INEOS TEAM UK race boat

How has Technological Innovation Impacted on Sport?

Teacher notes

This Big Question is designed to explore the many elements which come together to form a professional sports team. Students will need to gain a wide understanding of the roles, technology, people and places which form a prestigious sporting challenge.

Suggested wider curriculum activities

- English** Write newspaper report about how INEOS TEAM UK use simulators to train.
- Geography** How is modelling used to predict weather?
- History** How did engineering play a part in the industrial revolution? Look at Ironbridge as an example.
- Art** Photography and vector art. Find examples of vector art. Produce your own vector art using a photograph you have taken with a marine environment theme.
- Music** Use music software to create a composition. Can the composition be reproduced using traditional instruments? Compare and contrast.



What Does it Take to Win the America's Cup?

Teacher notes

This Big Question is designed to explore the many elements which come together to form a professional sports team. Students will need to gain a wide understanding of the roles, technology, people and places which form a prestigious sporting challenge.

Suggested wider curriculum activities

- English** Write a biography about Sir Ben Ainslie.
Write a newspaper report about the British Challenge for the 36th America's Cup.
- Geography** People and places; study differences between America's Cup World Series venues. Weather and climate- why is Auckland a good venue for the 36th America's Cup?
- History** The Great Exhibition. How did the Victorians shape Britain's manufacturing industry?
- Art** Find examples of water portrayed in art. Using media of choice, produce a piece of artwork to represent protecting our oceans.
- Music** Listen to Handel's Water Music which was written in 1717 to be played from a barge as the King George I's party drifted down the River Thames. If you were to choose a piece of music to accompany INEOS TEAM UK as they undertake their first race, what would it be and why?