

# 20 teaching ideas to challenge students

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1

**Concept map integration.** Students in pairs, draw up a concept map for a topic. Different pairs do different topics. Then they join with another pair and see how much their maps can be integrated together.

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2

**Fantasy Science Festival.** Working in groups, students describe/design 3-4 fantastical, hands-on, interactive exhibits which they would like to see at the Fantasy Science Festival. Their exhibits should demonstrate a scientific principle, phenomenon or prototype and they should unleash their imaginations!

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3

**Time travel.** What scientific discovery would you erase from history and why? What knock-on effects would this have?

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**Left field.** Students make notes about an issue, concept or topic. A random, apparently unrelated noun is displayed and used to stimulate new ideas and thinking.

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**Hold a scientific writing competition.** This could be organised across a year group with prizes. Categories could include essay, article, report, poetry.

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6

**QWC questions.** Give out 2-3 six-mark questions, 2 answers and the mark scheme. Students use these to decide the criteria which must be met in order to write a good 6 mark question.

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**QWC questions 2.** Students create their own 6 mark question and mark scheme using the criteria drawn up in the previous activity. This leads on to students writing answers to each-other's questions, marking them and identifying weak points in the question or mark scheme.

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**The big question!** Students collaborate to answer questions such as; what is science? Do we need all species of plants and animals? Is an understanding of the Universe important? They can answer in whatever form they choose: TED Talk, play, cartoon, debate, radio interview.

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**Recommend a book.** Suggest a reading list to your class. How about...*A short history of nearly everything*, Bill Bryson; *Bad Science*, Ben Goldacre; *Eating the sun: How plants power the planet*, Oliver Morton etc. Students could write a review of a chapter or the whole book.

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10

**How might..?** Pose a question at the end of a lesson e.g. how might what we have learnt today affect political policy, jobs, relationships, health etc? Or, How might our understanding of....change in the future?

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11

**Maths throw-in.** Drop a small mathematical task into the lesson without warning. The task could involve converting units e.g. grams into kilograms; standard form; decimal places and significant figures; ratio and/or proportion; decimals, fractions and percentages.

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**Condense into symbols.** Students design and use symbols to summarise a lesson, concept, key idea. Or, do their investigation results show a pattern and can they summarise this pattern using algebra?

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13

**Show a graph.** Students list links between the graph shown and their scientific knowledge. They go on to suggest what the information revealed by the graph means to them, their community, society as a whole. Graphs could be the price of crude oil over time; public perception of science etc.

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**Deduction.** Students choose an object, equation, or idea and describe it fluently without saying what, or what type of item it is. Each sentence must provide more evidence. How long can they talk before their partner (team) identifies the item?

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**Pupil plenary power.** Challenge individual students to design and lead a plenary. Give them time to plan and discuss their ideas with you.

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16

**Up and down the pyramid.** Take a key word or idea e.g. 'friction'. Climbing down the pyramid towards the foundations, students decide what wider (and wider) categories this is an example of. Climbing the pyramid involves students stating examples of the keyword.

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17

**Additional application.** Give out an idea, e.g. sound travels in waves. What else can students apply this to? i.e. energy, light, water, earthquakes, types of waves etc.

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18

**Investigation learning.** Students design an experiment to test what the class has learnt from a previous lesson. Can the results be expressed quantitatively? What difficulties arise with this type of investigation?

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**What's the difference?** Students explain the differences between two key words such as, moment and momentum, selection and speciation, precision and accuracy.

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**Lecture.** Students work in pairs or small groups. They research and present a lecture about science. Here are some ideas: What is the importance of science to society? Does science have a method? Are there patterns in science? What are the limitations of science?