**Peer Review: How scientists get their homework marked KS2**

Approximate timing: 60 minutes

Required resources: PowerPoint presentation, factsheet, publication, protocol and data

Originally developed and delivered by (then) Babraham Institute PhD students Cassandra Hogan, Helen Craig and Hakim Yadi, this lesson will introduce students to the concept of the peer review process and how it can help to detect false claims and to establish a consensus about which claims should be regarded as valid.

**The lesson supports:**

*AQA GCSE Biology*
Working scientifically 1.6: Recognise the importance of peer review of results and of communicating results to a range of audiences.

4.3.1.9: Discovery and development of drugs

*EDEXCEL GCSE Biology*
1: Development of scientific thinking (f) Recognise the importance of peer review of results and of communicating results to a range of audiences.

*OCR GCSE Biology*
IaS3: How are scientific explanations developed?

*OCR A Level Biology*
 5c: How science works (11) Evaluate the role of the scientific community in validating new knowledge and ensuring integrity

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| **Learning outcomes** |
| All students will: | Measure/record experimental data and draw a conclusion from a drawn graph |
| Most students will: | Be able to explain the concept of peer review |
| Some students will: | Explain why reports of scientific developments in the popular media are not subject to peer review and may be oversimplified, inaccurate or biased. |
| Key words | Peer, publication, journal, hypothesis |

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| **Teaching notes** | **Student learning activities**  |
| **Slide 3****How does science make it into a text book?**Explain how science works - defining a problem, making a hypothesis, doing experiments to prove this. Then you write it up as a paper in a journal. Lots of people around the world will be working on the same thing, and lots of papers will get published about slightly different aspects of the problem – they won’t all agree with each other. Over time the evidence builds up and we get a better picture of what is going on.Eventually the picture is clear enough for the science to be put in a text book, though there may still be unanswered questions. | Ask students to suggest answers |
| **Slide 4****How do we write up an experiment?**Point out the similarities and differences | Ask the students to come up with their workflow and compare it to oursTry and get them to ask how research can be ‘marked’ if it’s completely new… |
| **Slide 5****What is the difference?**Ask the class what they would do if they had to get their homework right but there was no teacher to check it? **Slide 6****What is peer review?**Talk through the bullet points and ask the students (in groups) to come up with their ideas on what a reviewer might look for. | Bring them round to the idea that they could ask each other, which is peer review. |
| **Slide 7****Your turn**Give the publication out to the class and get them to look at it in groups.  | Ask students to read the intro and methods and make sure everyone in their group understands. Ask the groups to look for any errors/problems with the paper and ask them to think of comments on the paper as a whole.Discuss the results |
| **Some questions**These are optional open-ended extension activities for group and/or class discussions. | Challenge the students to come up with other ethical/moral issues |
| **So what have we learned?**Summarise using the bullet points |  |
| **Supporting material**The protocol and data presentation is a set of diagrams showing the effect of the drugs on bacteria.  | The diagrams could be used by a lower ability class as an exercise in measurement and recording/graphing data. |