**Debating the Ethics of Animal Use in Research: Exploring Model Organisms**

Approximate timing: 1 hour

Required resources: PowerPoint presentation, animal model cards, cost vs. benefit sheets, fact sheet

This lesson will introduce students to the use of animals in research, which models are used and how such research is regulated. It will give them a chance to justify their own opinions and to learn to respect those of other people.

**The lesson supports:**

**Key stage 3**

*Science - Applications and implications of science*

Examining the ethical and moral implications of using and applying science. The way scientific developments are achieved can raise ethical and moral issues, for example experiments on animals to produce drugs that may prolong human life.

*Citizenship - Rights and responsibilities*

a) Exploring different kinds of rights and obligations and how these affect both individuals and communities.

b) Understanding that individuals, organisations and governments have responsibilities to ensure that rights are balanced, supported and protected.

c) Investigating ways in which rights can compete and conflict, and understanding that hard decisions have to be made to try to balance these.

There are different kinds of rights, obligations and responsibilities - political, legal, human, social, civic and moral. Pupils should explore contested areas surrounding rights.

*Religious Education - Values and commitments*

Evaluating their own and others' values in order to make informed, rational and imaginative choices.

*PSHE: Personal wellbeing - Critical reflection*

Pupils should be able to reflect critically on their own and others' value

*English - Critical understanding*

a) Engaging with ideas and texts, understanding and responding to the main issues.

b) Assessing the validity and significance of information and ideas from different sources.

c) Exploring others' ideas and developing their own.

d) Analysing and evaluating spoken and written language to appreciate how meaning is shaped

**Key stage 4**

*How Science Works: Applications and implications of science*

Pupils should be taught to consider how and why decisions about science and technology are made, including those that raise ethical issues, and about the social, economic and environmental effects of such decisions

All pupils should develop their ability to relate their understanding of science to their own and others' decisions about lifestyles, and to scientific and technological developments in society.

*Citizenship*

Critical thinking and enquiry

Students should be able to:

1. question and reflect on different ideas, opinions, assumptions, beliefs and values when exploring topical and controversial issues and problems
2. research, plan and undertake enquiries into issues and problems, using a range of information, sources and methods
3. interpret and analyse critically sources used, identifying different values, ideas and viewpoints and recognising bias
4. evaluate different viewpoints, exploring connections and relationships between viewpoints and actions in different contexts (from local to global).

*Religious Education*

Values and commitments

Evaluating their own and others' values in order to make informed, rational and imaginative choices.

*PSHE: Personal wellbeing*

Critical reflection

Pupils should be able to reflect critically on their own and others' values

*English*

Critical understanding

a) Engaging with the details of ideas and texts.

b) Connecting ideas, themes and issues, drawing on a range of texts.

c) Forming independent views and challenging what is heard or read on the grounds of logic, evidence or argument.

d) Analysing and evaluating spoken and written language to explore their impact on the audience

Links to Babraham Institute information:

<https://www.babraham.ac.uk/our-research/animal-research>

<https://www.babraham.ac.uk/our-research/healthy-ageing>

<https://www.babraham.ac.uk/science-services/biological-support-unit>

External links:

<http://www.understandinganimalresearch.org.uk/>

<https://www.ipsos.com/en-uk/public-attitudes-animal-research-2018>

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| **Learning outcomes** | |
| All students will: | Give examples of how animals have been used in scientific research |
| Most students will: | Describe the 3R’s of animal research |
| Some students will: | Compare the advantages and disadvantages of different model organisms |
| Key words: | Cell culture; model organism; reduction, replacement and refinement; transgenic |

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| **Teaching notes** | **Student learning activities** |
| **Starter or ice-breaker activity** (10 minutes)  Discuss student opinions on the use of animals in research, reminding them to respect each other’s opinions throughout.  Explain activity – students show their opinion on two questions by standing on a line across the classroom from ‘Strongly Agree’ to ‘Strongly Disagree’.  Ask students at each end or in the middle to explain their answer – involve different students for each question. | Slides 3 & 4  Activity – students show their opinion on two questions by standing on a line across the classroom from ‘Strongly Agree’ to ‘Strongly Disagree’ and should be ready to explain their answer.  N.B. data is from <https://www.ipsos.com/en-uk/public-attitudes-animal-research-2018> |
| **Development** (10 minutes)  Ask students to discuss which medical advances have been made using research involving animals and when they think that research took place. | Slide 5  Students discuss in groups and then compare ideas |
| **Principal Activity** (15 minutes)  Explain that, while people are the best research model, animals are the next best because at the cellular level many animals are alike. Within mammals the likenesses are found also in many aspects of the anatomy and physiology.  Ask students which model organisms are used.  Hand out sets of 8 animal cards to student groups. Students should arrange the cards (a) by similarity to humans, (b) by ease of extrapolation to humans and (c) by how much they think welfare is an issue.  Explain why some model organisms are better than others. Generally, the simpler the organism, the easier it is to use and the less significant the welfare concerns, but the less we can use the results to extrapolate to humans. | Slide 6  Students should suggest model organisms (animals) that are used in research    Slide 7  Students should arrange the cards and explain their answers  Slide 8 |
| **Development** (5 minutes)  Introduce the 3R’s and, before showing text, ask students to suggest what they might be (Replacement, Refinement, Reduction) as well as how they could be fulfilled. Discuss answers. | Slide 9  Supplementary data can be obtained from <https://www.nc3rs.org.uk/the-3rs> |
| **Secondary activity** (10 minutes)  Use 3Rs sheet to allow students to identify examples of each. Discuss answers. | Slide 10 |
| **Plenary** (10 minutes)  Ask students to comment on the lesson.  Ask if opinions have changed from start of lesson.  Summarise key points from slide. | Slides 11 & 12 |
| **Extension activities**  Animals in Research (Model Organisms) Web Quest on the Babraham Institute website.  Animals in Research Workshop 2 – Legislation. | **Animals in Research (Model Organisms) Web Quest**  Start at: <https://www.babraham.ac.uk/our-research/animal-research> and follow links to research pages, science services and other content on our website to inform your answers. For each question, keep a record of the web pages you have visited.  1. Name three species that are used in research at the Babraham Institute.  2. What are the advantages and disadvantages of each species?  3. Which of the discoveries made using animal research at the Babraham Institute do you think is the most important? Explain your reasons.  4. Which alternative models used do you think are the most important? Explain your reasons. |