

Overview

A scientific problem may be approached by generating scientific theories, which may then be tested by experiment. Ethical problems cannot be approached in the same way, since there are no 'theories of morality' that correspond to theories in the sciences. However, this does not mean that all possible answers to ethical problems have the same merit or that ethical problems cannot be the subject of rigorous analysis.

In this unit the ethical questions arise from the conflicts between concern for animal welfare and the need to use them in some way. The aim is to introduce the idea that the discussion of controversial issues relating to the conduct and application of science involves making decisions. In any situation, there is usually more than one choice available. Often, a course of action may seem like a good solution, but it may also have some undesirable outcomes.

The approach in the activity could be used for other topics, for example IVF or genetic testing.

The activities

There is one activity in this unit. For other units about ethical issues see the units 'Difficult decisions' and 'Transport problem'. Research on the use of animals could be set as homework prior to the lesson. The activity would be suitable after students have completed work on the body, drugs or diseases.

In the activity students consider whether animals should be used for research by carrying out an analysis of the advantages and disadvantages (costs/benefits). During the discussion students are encouraged to decide whether the views expressed are based on evidence or opinion.

Curriculum links (for students aged 14–16)

How Science Works (from POS KS4 for England)

Communication skills

3a recall, analyse, interpret, apply and question scientific information or ideas

3b use both qualitative and quantitative approaches

3c present information, develop an argument and draw a conclusion, using scientific, technical and mathematical language, conventions and symbols and ICT tools

Applications and implications of science

4a about the use of contemporary scientific and technological developments and their benefits, drawbacks and risks

4b to consider how and why decisions about science and technology are made including those which raise ethical issues, and about social, economic and environmental effects of such decisions

GCSE or equivalent 14–16 specifications

England (GCSE)

AQA Science A 4461

Biology 1a: Human Biology 11.3 How do we use/abuse medical and recreational drugs?

AQA Science B 4462

Biology Unit 1: 11.3 How do we use/abuse medical and recreational drugs?

AQA Biology 4411

Unit Biology 1: 11.3 How do we use/abuse medical and recreational drugs?

AQA Applied Science (Double Award) 4861

Science for the Needs of Society Unit 2: 11.2 Health and Medicine – The Body at Risk

Edexcel 360 Science 2101

Biology B1 a: Topic 1 – Environment; Topic 4 – Use, Misuse and Abuse

Edexcel 360 Additional Science 2103

Biology B2: Topic 2 – Divide and Develop

Chemistry C2: Topic 5 – Synthesis

OCR Science A (21C science) J630

Module B2: Keeping Healthy

OCR Biology A (21C) J633

Module B2: Keeping Healthy

OCR Additional Applied Science (21C science)

AP4 Harnessing Chemicals: 4.4 – Formulations and effectiveness

OCR Science B (Gateway Science) J640

Module B1: Understanding ourselves; Item B1c: Keeping Healthy; Item B1e: Drugs and You

OCR Biology B (Gateway Science) J643

Module B1: Understanding ourselves: Item B1c: Keeping Healthy; Item B1e: Drugs and You

Scotland (SCE standard grade)

No direct links

Wales (WJEC GCSE)

Science

Biology B1: 8. Health

Applied Science (Double Award)

Science & Society Unit 2: (a) The Human Body and Health; 26

NI (CCEA GCSE)

Science (Single Award)

Module 2: Human Activity and Health – Disease and Body Defences

Learning objectives

This unit introduces students to the idea that discussion of controversial issues related to science involves making decisions about what should be done and the consequences of different choices.

By working through the unit, students come to understand that:

- decisions about controversial issues involving science require scientific information to decide what is possible
- science alone does not provide a method for making decisions about controversial issues
- the discipline of ethics provides ways of making decisions about controversial issues involving notions of right and wrong
- in any given situation, there is usually more than one choice available
- a course of action may seem like a good solution, but it may also have some undesirable consequences.

Teaching and learning approaches

- Discussing ideas in a small group ✓ (LSS2)
- Devising 'visual' ways of expressing and communicating ideas (including maps, diagrams, charts) ✓ (LSS3) (LSS6)
- Argumentation ✓

For further information about Learning Skills for Science (LSS) click here.

Downloads

- PowerPoint presentation
 - slide 1 – stimulus image and question
 - slide 2 – making decisions
 - slide 3 – number of animals used per person per year
 - slide 4 – medical advances derived from animal research
 - slide 5 – types of animal research
 - slide 6 – toxicity testing
 - slide 7 – % of animals used for different types of research
 - slide 8 – % of types of different animals used in research
 - slide 9 – alternatives to animal research
- Activity sheet A – Animal research – right or wrong? (statements)
- Activity sheet B – Animal research – right or wrong? (statements with tick boxes)
- Activity sheet – Animal research – right or wrong? Role cards

Acknowledgements

This unit was written by Silvia Newton and is based on the original SATIS unit 1010; it also draws on 'Difficult decisions' in *New SATIS 14–16* published in *The World of Science* in 1997 and SATIS 16–19 unit 5, 'Animal rights and animal wrongs'. The unit has been influenced by ideas related to ethics in science education in Patrick Fullick, Mary Ratcliffe (eds.), *Teaching Ethical Aspects of Science*, Bassett Press (1996) and those on the websites of BEEP (BioEthics in Education Project), PEEP (Physics Ethics in Education Project), New Economics Foundation – DEMOCS and Nuffield Foundation Science for Public Understanding. Sarah Jones, Association of the British Pharmaceutical Industry (ABPI) and Kay Roberts, GlaxoSmithKline gave comments on the unit.