

Unit 20 What's in the public interest?

About the unit

Schools need to decide which opportunities to develop as explicit citizenship provision. This unit provides a template for studying a public issue that has a science dimension and is both contemporary and controversial. It could be taught within citizenship and/or science. It may be helpful to liaise with the school science department when planning this unit. The unit meets some of the teaching requirements of the national curriculum programmes of study for both citizenship and science at key stage 3. Aspects of the unit that are specific to science are identified in **this typeface**.

The structure and activities suggested are designed so that they might be applied to any contemporary science-related issue, typically on a national scale. Immunisation is used throughout the unit purely as an example. Other issues, *eg food safety, organ donation and transplants, forensic science*, could provide an alternative focus. Pupils consider a range of points of view. They explore the conflicting rights and responsibilities involved, such as those of individuals and the interests of the wider public. They learn that views may conflict and that expert opinion cannot always arbitrate between them. They find out who is involved in making public policy decisions, and learn that these are sometimes taken in the absence of scientific certainty or where there is contradictory scientific evidence.

Pupils also learn about the different ways the media covers topical issues, problems and events, and the effect this can have on our understanding and opinion of them. They analyse information from a range of sources to identify key issues and events. They appreciate diversity and see matters from other people's points of view.

Pupils build on their scientific knowledge and understanding. They use scientific ideas and models to explain phenomena and events, and to understand a range of applications of science. They think about the positive and negative effects of scientific and technological developments on the environment and in other contexts. They take account of others' views and understand why opinions may differ. They evaluate the strength of the evidence that they and others have collected. They select and use a wide range of reference sources. They learn how scientists work together on present-day scientific developments and about the importance of experimental evidence in supporting scientific ideas. They begin to appreciate the power and the limitations of scientific methodology.

When choosing an issue (or issues), it is important to bear in mind the interests and cultural experiences of pupils. The *Teacher's guide* has helpful information on dealing with sensitive and controversial issues (appendix 9) and on how to plan for enquiry in citizenship (appendix 8).

Where the unit fits in

This unit addresses the following aspects of the key stage 3 citizenship programme of study:

Knowledge and understanding about becoming informed citizens

Pupils should be taught about:

- 1a the legal and human rights and responsibilities underpinning society, basic aspects of the criminal justice system, and how both relate to young people
- 1c central and local government, the public services they offer and how they are financed, and the opportunities to contribute
- 1f the work of community-based, national and international voluntary groups
- 1g the importance of resolving conflict fairly
- 1h the significance of the media in society

Developing skills of enquiry and communication

Pupils should be taught to:

- 2a think about topical political, spiritual, moral, social and cultural issues, problems and events by analysing information and its sources, including ICT-based sources
- 2b justify orally and in writing a personal opinion about such issues, problems or events
- 2c contribute to group and exploratory class discussions, and take part in debates

Developing skills of participation and responsible action

Pupils should be taught to:

- 3a use their imagination to consider other people's experiences and be able to think about, express and explain views that are not their own

This unit builds on the following units in the key stage 3 science scheme of work: unit 7A 'Cells', unit 8A 'Food and digestion', unit 8B 'Respiration', unit 8C 'Microbes and disease', unit 9B 'Fit and healthy'.

Expectations

At the end of this unit

most pupils: know about a topical science-related issue and the key events relating to it. They recognise its social, political and/or economic implications. They evaluate how media sources both inform and affect our understanding of the issue, and appreciate that differing viewpoints can lead to conflicting demands for action. They recognise the need to consider the balance of the competing rights and responsibilities involved. They consider other people's experiences and explain views that are not necessarily their own. They appreciate that knowledge of scientific ideas helps people to understand the issue. They understand the decision-making process that creates public policy in this case. They know of the work of relevant community-based, national and/or international public services and voluntary groups.

some pupils have not made so much progress and: show limited understanding of a topical science-related issue, including its political dimension. They use some media sources to find out about a contemporary issue, problem or event. They understand that other people have different points of view. They make some links between relevant science and the issue.

some pupils have progressed further and: show detailed knowledge of a topical science-related issue, including its social, political and economic dimensions. They demonstrate the ability to evaluate and use a wide range of media sources, and recognise how media presentation affects our understanding and opinions of the issue. They express a range of views that are not necessarily their own, and understand how decisions about relevant public policy are taken. They appreciate the need to consider the balance of the competing rights and responsibilities involved. They make correct, detailed links between scientific insights and the issue. They show a detailed understanding of several relevant organisations, their limitations, and the opportunities they themselves have for influencing public debate.

Expectations in science appropriate to the issues explored can be taken from the key stage 3 science scheme of work.

Resources

Resources include:

- press and TV news coverage
- the British Organ Donor Society's booklets and video related to tissue and organ transplantation
- Solomon, J, *SATIS 16–19: How does society decide?* ASE, 1992
- John Stringer (ed), *SATIS 8–14*, ASE, 1992: 2.8, Unit 2 'Reporting science' (an activity about science in the popular press); 3.8, Unit 1 'Gift of life' (sensitively introduces the concept of organ donation and transplantation)
- The Charis Project, *Charis Science Units A1–A9*, 2000 (teacher resources promoting moral and spiritual development through the school curriculum. Available through the Association for Science Education website – see www.standards.dfes.gov.uk/schemes)
- *Citizenship education: the global dimension* (a booklet available in pdf from the Citizenship education: the global dimension website)
- Ted Huddleston and Don Rowe, *Good thinking: education for citizenship and moral responsibility*, Volume 1: KS3, Citizenship Foundation, 2001
- Mary Ratcliffe (ed), *ASE Guide to Secondary Science Education*, 1998 (contains a number of relevant articles: those on understanding evidence, the nature of science, environmental education and social and ethical applications of science)
- Association for Science Education (ASE) Science Year CD-ROM

Many groups and organisations produce online resources that are relevant to citizenship. QCA has not printed these website addresses as it recognises that they can and do change, often at short notice. So that we can monitor and maintain a reliable and useful resource, the website addresses of the following organisations can be accessed through the key stage 3 citizenship scheme of work site at www.standards.dfes.gov.uk/schemes

- *New Scientist* (for their 'hot topics')
- British Organ Donor Society
- Guardian learning, science lesson packs
- Guardian learning, topical lessons (gives access to a library of lessons, free to schools for a period of 30 days before a subscription fee becomes payable)
- The Why Files (US website based on topical science news stories and the science behind the news, designed for use in education)
- St Louis Community College, Highlights in the History of Microbiology (excellent, detailed site featuring Pasteur, Jenner, Koch, etc)
- Association for Science Education (ASE)

Literacy and language

References to the Key Stage 3 National Strategy *Framework for teaching English, Years 7, 8 and 9* (NSE) are given in brackets and are indicated in appropriate sections of this unit.

Through the activities in this unit pupils will be able to understand, use and spell correctly words relating to:

- citizenship, *eg rights, responsibilities, fact, opinion, media*

Speaking and listening – through the activities pupils learn to:

- use talk to hypothesise, speculate and evaluate conflicting evidence (year 7, S&L12, year 8 S&L10, year 9 S&L9)

Reading – through the activities pupils learn to:

- use appropriate reading strategies to gather and synthesise information (year 7 R2, year 8 R2, year 9R2)

Links with other subjects

History: unit 20 'Twentieth-century medicine', unit 21 'Scientific discoveries' in the scheme of work

Design and technology: unit 9E(i) 'Ensuring quality production (food)' in the scheme of work
ICT: 3b, 3c, 4a, 5a in the programme of study

Pupils should learn:

Pupils:

What is the issue we are addressing?

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| <ul style="list-style-type: none"> • about a topical issue, problem or event • to explore the chosen issue and to share ideas and information • about the significance of the media in society • about the different ways in which the media covers situations, and the effect this can have on our understanding and opinion of events • to identify key issues and events | <ul style="list-style-type: none"> • Use a text extract, pictures, a cartoon or perhaps an oral report to start a discussion about a current issue or recent news story (immunisation examples include: vaccination against foot and mouth disease, the MMR [measles/mumps/rubella] vaccine, annual vaccination against flu for the elderly, biological weapons). A directed reading activity based on a newspaper article might prepare pupils for a better discussion. • Ask the pupils about their own experiences of and opinions about the current topic, noting (or adding) differing viewpoints. For example, pupils are likely to have had DPT [diphtheria/polio/tetanus] and whooping cough vaccinations, a BCG and perhaps some other vaccination(s) in preparation for a trip abroad. They may need to be prompted to think about the purpose of vaccination. • If the pupils are not sufficiently well informed to express opinions on the chosen issue, begin with a sorting exercise. Give them six statements that sum up the major positions in the debate, and ask them to sort these statements into two categories: 'I agree with' and 'I disagree with'. • From this introduction, make a list of key words: both citizenship words, <i>eg fact, opinion, objective, subjective, controversial</i>, and relevant science words, <i>eg micro-organism (microbe), public health, infectious disease, epidemic, quarantine, immune, host (carrier)</i>. | <ul style="list-style-type: none"> • decide on a contemporary issue to investigate that involves both citizenship and science • identify features of media reporting, <i>eg incomplete information</i>, and learn to distinguish between opinion and fact • discuss the media coverage of a contemporary issue and summarise their views of a media report • know that viruses, bacteria and fungi are all micro-organisms | <ul style="list-style-type: none"> • Copying text extracts or pictures may involve copyright issues. Articles can be downloaded from newspaper websites. • If possible, arrange the physical layout of the room to promote dialogue and discussion. • Remind pupils of the agreed ground rules for discussion (see the introductory unit 1 'Citizenship – what's it all about?'). |
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Learning objectives

Pupils should learn:

Possible teaching activities**Learning outcomes**

Pupils:

Points to note

What points of view are there about the issue, and why?

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| <ul style="list-style-type: none"> • to identify appropriate questions and possible sources of information • that understanding contemporary events requires some knowledge of their political, social and economic context • to appreciate diversity and see events from other people's points of view • about the different rights and responsibilities involved in the issues and the importance of resolving conflict fairly • about the importance of the media in society • to use appropriate reading strategies to gather and synthesise information (NSE) | <ul style="list-style-type: none"> • Ask the class collectively to list the parties affected by the issue, <i>eg for foot and mouth disease: farmers, the food industry, the rural tourism industry, the government, expert veterinary advisers, consumers.</i> • In small groups, pupils explore a few websites, with tasks such as the following: <ul style="list-style-type: none"> – Work out the viewpoint of each of the affected parties and write it down. For example, are people's lives or employment directly affected? How? – Does the issue have political, social and/or economic dimensions? – How has the issue been portrayed in the press and on TV? Has this influenced public opinion and political response, <i>eg the images of pyres of burning carcasses for foot and mouth disease?</i> – Develop the ethical dimension: encourage pupils to consider both individual and community points of view, and what they consider as right and wrong actions in this case – Ask pupils to identify rights and responsibilities, <i>eg the right to individual choice as against the responsibility not to endanger the health of others</i> • Debrief using feedback from the tasks, reviewing the main points first. Then ask the class whether the differing viewpoints might be reconciled and, if so, how. | <ul style="list-style-type: none"> • know and describe the key points of the issue they are investigating • analyse key points and pose relevant questions • understand the need to balance the competing rights and responsibilities of those affected to resolve conflict fairly • recognise the role of the media and its effect on public opinion | <ul style="list-style-type: none"> • Websites are likely to provide the most up-to-date information about a topical issue, but be careful that they do not draw pupils' attention away from citizenship issues. • An alternative approach at this stage would be to organise a role-play. Several pupils could each be briefed about a viewpoint and its associated technical knowledge. There would still be a need for debriefing afterwards. • Another alternative would be to invite a visitor, <i>eg a local councillor, a representative from a voluntary agency or a local health education unit</i>, to speak briefly about the issue and answer pupil questions. This will need careful preparation with the visitor. • This section links with unit 9 'The significance of the media in society'. It may be sufficient to work from a selection of media headlines, or from information leaflets published by parties to the debate. • Link with NSE: year 7 R2, year 8 R2, year 9 R2. |
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Learning objectives

Pupils should learn:

Possible teaching activities**Learning outcomes**

Pupils:

Points to note

What is the relevant science? (How can animals be protected against infectious diseases?)

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| <ul style="list-style-type: none"> • about distinguishing fact from opinion • about the interplay between empirical questions, evidence and scientific explanations • about the ways in which scientists work today and how they worked in the past, including the roles of experimentation, evidence and creative thought in the development of scientific ideas • to use talk to hypothesise, speculate and evaluate, conflicting evidence (NSE) | <ul style="list-style-type: none"> • Ask pupils to recall relevant scientific ideas, <i>eg for immunisation: What are the symptoms of the disease? Can the disease be treated? How does the microbe spread? Is the host contagious before it shows symptoms? Is there a test available to identify hosts during the incubation period? How does the immune system respond with and without immunisation? What does 'vaccination' mean? Are there other ways to prevent the spread of the disease?</i> • Introducing one or more historical case studies is one way of undertaking revision and at the same time developing understanding of citizenship concepts. Key events have sometimes led to public acceptance of new policies, <i>eg cholera outbreaks in 19th century London created a notion of public health and enabled statutory protective measures to be introduced.</i> To develop scientific understanding, a science teacher might prefer to undertake relevant practical work, afterwards inviting pupils to explain what was done and then discussing what it showed. • In small groups, pupils think critically about the information they have considered. Which parts of the information from interested parties are factual, and which are opinion? One way of doing this would be to ask pupils to sort statements into three categories: 'fact', 'opinion' and 'uncertain'. Choose statements carefully to ensure that all categories are represented. Follow-up discussion is essential, so that pupils are trained to be critical of 'fact'. For instance, it is a 'fact' that vaccinations can have unwanted side effects, but causal links are often difficult to establish, <i>eg a suggested link between MMR vaccination and autism is by no means proven; the science here is uncertain.</i> Crime statistics, because they arise in part through enforcement policy itself, are not straightforward facts. | <ul style="list-style-type: none"> • identify and understand the key aspects of the chosen science-related issue • distinguish fact from opinion and know the importance of being critical of how 'facts' are presented • describe a range of mechanisms by which microbes enter the body • describe antibody action • recall that vaccines contain microbial material, eg weakened strains, dead micro-organisms, extracts of micro-organisms, that cannot cause infections | <ul style="list-style-type: none"> • Public health campaign materials may provide relevant facts and arguments. • A case study could take the form of a video, printed material or information on a website. • Suggestions and resources for teaching the relevant science topic are given in the schemes of work, <i>eg for immunisation, refer to unit 8C 'Microbes and disease' in the key stage 3 science scheme.</i> • Appropriate historical case studies might include: Edward Jenner and the smallpox vaccine; Louis Pasteur (either development of germ theory of disease or his vaccine for rabies); Robert Koch and his identification of the bacilli responsible for TB and cholera. • Extension activity: an exercise modelling the spread of an infectious disease could be undertaken. • Link with NSE: year 7 S&L12, year 8 S&L10, year 9 S&L9. |
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Learning objectives

Pupils should learn:

Possible teaching activities**Learning outcomes**

Pupils:

Points to note

What should be done? How can we take responsible action and have a say?

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| <ul style="list-style-type: none"> • how to use their scientific knowledge and understanding to explain and interpret observations, measurements/ other data and conclusions • about public policy decisions that are sometimes made in the absence of certainty | <ul style="list-style-type: none"> • Return to a structured class discussion of the issue with which you began, by asking for specific reports from different groups. Each group should consider and agree on how they wish to communicate their findings to the audience. Encourage pupils to: <ul style="list-style-type: none"> – consider the evidence gathered (from media reports or elsewhere) by discussing questions such as: How have scientists gathered the evidence? Why might there be conflicting views among scientists? Why aren't scientists certain about the issue? Ask pupils whether the case requires further scientific evidence and whether this is obtainable – appreciate that, in a democracy, public policy should represent the interests of a majority of people, but this does not mean that everyone gets what they want – appreciate that public policy needs to be developed even when the scientific case is uncertain, and that this requires political argument and sometimes compromise • Finally, ask pupils to consider whether they could influence the debate or take action in some way. How? You might ask pupils to write a press release, or to design a campaign poster. • Extension activity: With more able groups you may want to introduce epidemiological data, carefully explaining the value and meaning of statistical evidence. Help pupils to distinguish between correlational evidence (often what's available) and cause and effect (more difficult to establish). | <ul style="list-style-type: none"> • develop their own views and opinions and express and justify their own viewpoints • recognise the strengths and limitations of existing scientific evidence • identify some of the processes by which scientific evidence is collected and evaluated • appreciate that public policy relies on factors other than scientific evidence • communicate their views to a chosen audience, having agreed on an appropriate method of presentation | <ul style="list-style-type: none"> • For information and discussion relating to the processes and practices of science, see Driver, R, Leach, J, Millar, R and Scott, P, <i>Young people's images of science</i>, Open University Press, Buckingham, 1996. • Additional activities could include: pupils participate in discussions by internet or e-mail as well as in their local communities; pupils make a collage from magazine pictures and headlines that represent their own view. |
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Review – what have we learnt?

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| <ul style="list-style-type: none"> • to assess and reflect on their own progress | <ul style="list-style-type: none"> • Ask pupils to review and reflect on what they have learnt during their investigation. What were the different points of view they considered? Pupils describe their own views and conclusions, based on what they have found out. • Pupils can keep a record of their work, and/or their assessment of it, in their citizenship portfolio. | <ul style="list-style-type: none"> • reflect on their activities, identifying what went well, what went wrong, and why | <ul style="list-style-type: none"> • Refer to the <i>Teacher's guide</i> and review unit 19 'Assessing progress and recognising achievement at the end of key stage 3' for suggestions about assessing progress in citizenship. |
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