Unit 8: Contemporary Issues in Science

Delivery guidance

This unit has four learning aims that deal with contemporary scientific issues: impacts and developments in scientific issues; the influence of organisations and individuals on scientific issues; the interpretation, analysis and evaluation of scientific information; and the reporting and presentation of scientific issues in different media for different audiences.

Learners will look at contemporary scientific issues covering energy sources, medical treatments, pharmaceuticals, chemicals, nanotechnology and food technology, but there is also an opportunity to explore other contemporary issues in science where they have a personal interest. Learners will need access to an array of articles and reports on different scientific issues, which should offer a variety in style and format. In addition to applying their scientific knowledge to real-life scenarios, there is scope for learners to develop strong research and analytical skills, and exercise critical thinking either for or against a viewpoint, as well as reporting and presenting science for different audiences in different ways.

Approaching the unit

Learners may bring knowledge of contemporary issues through their own experiences, such as at home, previous studies, current affairs and through the media and charities. You could give initial introductory input for your learners about a number of current contemporary issues and start a discussion on their thoughts and views on these issues. Learners should be encouraged to research and learn about contemporary issues through various forms of media and through discussion with peers, friends and family. Universities and industries welcome learners that have good knowledge, understanding and the employability skills developed when studying contemporary issues.

To complete this unit, your learners will need access to the internet, newspapers, journals, magazines and books. Some delivery methods appropriate for this unit are:

- discussions – class and small group discussions on case studies and new contemporary issues
- visiting/guest speakers from a variety of sources, such as charities, pressure groups, energy suppliers, manufacturers, local media and local government
- tutor presentation/guidance – briefing and monitoring learners about individual research and valid, appropriate websites and references
- group and individual learner activity – where learners can research relevant materials and case studies
- mock assessment sessions
- video and YouTube clips – where learners can learn and reinforce their knowledge and understanding of contemporary issues.

For **learning aim A**, introduce the unit by informing the learners about its different sections, how it fits within the qualification and how it relates to other units. Inform the learners about the resources available within your centre with regard to contemporary issues. Ask learners to work in small groups to discuss the definition of a contemporary issue and then discuss the definition

with the learners; this could be supported by sharing previous experiences of contemporary issues to engage and motivate learners. Follow this by discussing a particular contemporary issue and any ethical, social, economic and environmental aspects/impacts. Ask learners if they have any ideas about potential areas for further research or development with regard to the contemporary issue. Then ask learners to carry out research on a contemporary issue.

Ask a guest speaker from a relevant organisation to talk about a particular contemporary issue; learners would need to take notes and ask questions with regard to any ethical, social, economic and environmental impacts, and further research or development in the science. This could lead to a class discussion about any drawbacks, benefits, risks, misuses, solutions and conclusions about a contemporary issue. Engage the learners by asking them to research the other contemporary issues in the content in a systematic manner, and review and evaluate their findings with regard to patterns, similarities, benefits, drawbacks, risks, misuses, solutions and conclusions.

You could then set learners a practice assignment task based upon some articles for them to consider the social, ethical, environmental and economic impacts, or the potential research and development, for a contemporary scientific issue.

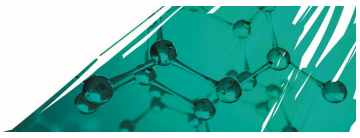
For **learning aim B**, give a presentation on the influence of different organisations and individuals on scientific and technological contemporary issues, with support from some current case studies that are in the reporting mediums. It would be useful to lead a discussion with learners about the influence of governments and their departments on some of the contemporary issues that you have covered, such as the influence of an environmental agency on a local ecological issue. You could support this learning aim by asking a guest speaker from a government organisation to discuss their influence on a contemporary issue.

Learners could then carry out some individual research on global organisations and give feedback on their findings about their influence, such as any bias, policy issues, laws, drawbacks, benefits, risks, misuses and solutions.

Learners could repeat this sequence to draw conclusions about how other organisations and individuals influence contemporary issues. Next, ask learners to review and evaluate their findings with regard to patterns, similarities, benefits, drawbacks, risks, misuses, solutions and conclusions. Then set learners a practice assignment task based on some articles for them to consider the influence of different organisations and individuals on contemporary scientific issues.

For **learning aim C**, it would be useful to ask learners about their experience of the importance of interpretation and analysis of scientific information with regard to practical, experimental work in science. Discuss with the learners how they could apply this skill to contemporary issues, and the different sources of information and data involved. Ask learners to carry out some research on a contemporary issue with regard to collecting any qualitative or quantitative data from more than one source, and to include any charts, tables, calculations, graphs, histograms and so on. Follow this with a class discussion on the findings, any variation of interpretation and methods of analysis of the data, and conclusions drawn. You could then give a presentation about the evaluation of scientific information, including the reliability, validity and accuracy of sources of information and data. Learners could carry out some research with regard to reliability and validity, and make comparisons from different sources.

Introduce factors about sample size, references to further publications, bias, errors, inaccuracies, use and misuse of data, visual presentations and authenticity of data. Your learners, as



individuals or in groups, could then review and evaluate their overall findings with regard to patterns, similarities, benefits, drawbacks, risks and misuses.

Then set learners a practice assignment task based on some articles which would involve interpretation, analysis and evaluation of scientific information with regard to a contemporary scientific issue.

For **learning aim D**, give an introductory presentation on the different types of reporting medium and how contemporary scientific issues for different audiences are reported differently. Your learners will need to gain an understanding of the fact that different types of reporting media have a rationale for the way they report contemporary issues. Ask learners to carry out a literature search and review of the reporting of a contemporary issue, and to make comparisons of how these have been reported. Then ask learners to review and evaluate their findings with regard to patterns, similarities, differences and conclusions.

Your learners need to be familiar with the level of science used in different types of reporting medium. They need to be able to differentiate the level and technicality of the language used, the use of terminology, accuracy, the types of referencing used, any bias, use of visuals, the quality of the scientific reporting and conclusions drawn. It is also essential for learners to be able to differentiate between reporting mediums and to be able to take an article and write it for a different type of audience. Follow this up by giving a presentation using one type of reporting medium, and ask learners for their thoughts on the reporting medium and its target audience. Learners could then plan a video or programme for a specific target audience on a scientific issue.

Then set learners a practice assignment task in regard to the different types of reporting media and their target audiences, with reference to a contemporary scientific issue.

Assessment model

Learning aim	Key content areas	Recommended assessment approach
A Understand scientific issues in terms of the economic, environmental, ethical and social impact and future developments	**A1** Contemporary scientific issues **A2** Implications of scientific issues **A3** Research and development of a scientific issue	This unit is assessed through a Pearson Set Assignment.
B Understand the influence of different organisations and individuals on scientific issues	**B1** Organisations and individuals **B2** Scope of influence	
C Understand how to interpret, analyse and evaluate scientific information	**C1** Interpretation and analysis of scientific information **C2** Evaluation of scientific information	
D Understand how science is reported and presented in different media and for different audiences	**D1** Reporting media and target audiences **D2** Presentation of science reporting	

Assessment guidance

The unit is assessed by a Pearson Set Assignment.

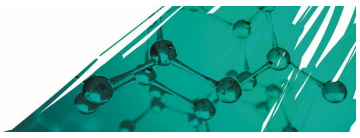
The assessment is set by Pearson and will need to be taken under controlled conditions before it is marked by tutors.

Set assignment units are subject to external standards verification processes common to all BTEC units. By setting an assignment for some units, we can ensure that all learners take the same assessment for a specific unit.

Learners are permitted to re-sit set assignment units during their programme.

Set assignments are available from September each year and are valid for one year only.

Delivery must cover all the unit content and prepare learners to produce evidence to meet the assessment criteria and assessment guidance in preparation for taking the Pearson Set Assignment.



Getting started

This gives you a starting place for one way of delivering the unit, based around the recommended assessment approach in the specification.

Unit 8: Contemporary Issues in Science

Introduction

Begin by introducing the unit to learners through a presentation, discussing the unit introduction, topics and summary of assessment. Then explain how the unit fits within the qualification.

Brief learners about how this unit will develop their skills and help them when studying other units within the qualification, and support them in preparation for the workplace or university.

At this stage, discuss with the learners what contemporary issues there are, and ask them to share their own experiences. Follow this by explaining the big picture and getting them to draw a mind map of how all the aspects of contemporary issues fit together. The learners could also discuss contemporary issues with, for example, their friends and family to help them in their discussions while studying the unit.

Learning aim A: Understand scientific issues in terms of the economic, environmental, ethical and social impact and future developments

- Brief learners about contemporary scientific issues, aspects of ethical, social, economic and environmental impacts, and further research and development within scientific areas.
- Take one contemporary issue, such as energy sources, and discuss what learners know about the subject.
- Brief the learners on the resources that will be available to them to carry out investigations into contemporary issues.
- Ask learners to carry out research into energy sources from a number of media sources and write up their findings.
- Discuss with the learners their findings and conclusions, for example about any drawbacks, benefits, risks, misuses, problems to solve and solutions.
- Invite a guest speaker from a scientific workplace to come in and discuss a contemporary issue and any new developments taking place in finding solutions/conclusions.
- Arrange a visit for your learners to a workplace connected with a contemporary scientific issue.
- Give a presentation to learners about the science and context behind other contemporary issues shown in the unit content.
- Have learners carry out research into an example in each of the other contemporary issues in the content. This can have a particular focus on the impact of any ethical, social, economic and environmental aspects, or on the potential research and development of the science and technology involved.
- Ensure learners discuss their findings in small groups, and present their findings in a whole-class discussion.
- Follow this up by summarising the impact of any ethical, social, economic and

environmental aspects with regard to any patterns, similarities, benefits, drawbacks, risks, problems, misuses and solutions. Alternatively, if the discussion has focused on the potential research and development of science or technology, then this could be turned into a set of proposals and recommendations.

- Ask learners to present their findings using a scientific poster, a leaflet or by use of PowerPoint slides.
- Give learners a practice assignment on scientific and technological issues in terms of economic, environmental, ethical and social impact, and future research and development. Please see the Pearson BTEC International subject website 'Course materials' tab for Sample Assessment Material for this purpose (https://qualifications.pearson.com/en/qualifications/btec-international-level-3/applied-science.coursematerials.html).

Learning aim B: Understand the influence of different organisations and individuals on scientific issues

- Give a presentation to learners about the influence of different organisations and individuals on scientific and technological issues. This should include governments and their departments, global organisations, non-governmental organisations, professional bodies, universities, research groups, multinational companies, pressure groups, voluntary organisations, scientists, journalists, etc.
- Take one organisation, such as the government or a global organisation, and discuss its influence on a scientific and technological issue (e.g. the World Health Organization and its role in the eradication of smallpox).
- Learners can research how the government or global organisation influences a scientific and technological issue.
- Discuss with the learners their findings and the conclusions about their influence, including for example any bias, policy issues, laws, drawbacks, benefits, risks, misuses, problems to solve and solutions recommended.
- Invite a guest speaker from a government department or a conservation group to discuss their influence on a contemporary issue(s), enabling learners to ask questions and discuss with them any new developments taking place.
- Arrange a visit for your learners to an organisation connected with a contemporary scientific issue.
- Give a presentation to learners about other organisations and individuals who influence scientific and technological issues shown in the unit content.
- Ask learners to carry out research into an example in each of the other organisations or individuals in the content, and make notes about their influence on contemporary issues.
- Enable learners to discuss in small groups what their findings were and present their findings in a whole-class discussion.
- Follow this up by summarising the influence of organisations and individuals on scientific and technological issues, such as any patterns, similarities, benefits, drawbacks, risks, problems, misuses and proposed solutions.
- Use a debate forum on a contemporary scientific issue where learners assume the role of

representatives from a pressure group, government, a research group, a multinational company, etc.

- Give learners a practice assignment on scientific and technological issues in terms of the influence of different organisations and individuals. Please see the Pearson BTEC International subject website 'Course materials tab' for Sample Assessment Material for this purpose (https://qualifications.pearson.com/en/qualifications/btec-international-level-3/applied-science.coursematerials.html).

Learning aim C: Understand how to interpret, analyse and evaluate scientific information

- Give an introductory presentation to the learners about the importance of information and data, its interpretation, analysis and evaluation. Discuss how the media may interpret the information and data to influence the outcomes they want.
- Discuss with learners how this topic overlaps and links with the interpretation, analysis and evaluation of data and information in other relevant units of the qualification.
- Ask learners to bring in some of their results and reports of their own practical work to consider the presentation, interpretation and analysis, or to allow another learner to evaluate its validity and reliability.
- Ask learners to investigate a contemporary issue with regard to collecting qualitative and quantitative data from more than one source, including any visual data such as tables, charts, graphs, calculations or statements using data.
- Lead a discussion with your learners about their findings. Have learners draw conclusions from the use of information and data and any variations of interpretation and analysis of data.
- Give a presentation to learners about the importance of evaluating information and data, and how it can be represented correctly or incorrectly in the media. Include reliability, accuracy and validity of sources of information and data.
- Ask learners to investigate a contemporary issue using different sources of information and data with regard to its sample size, authenticity, use and misuse, validity, reliability and accuracy.
- Learners can then discuss in small groups what their findings were. Ask them to present their findings in a whole-class discussion.
- Learners should follow this up by summarising their findings on sample size, with references to further publications, bias, errors, inaccuracies, use and misuse of data, visual presentations and authenticity of data.
- Give learners a practice assignment on a contemporary scientific issue within three scientific articles to interpret, analyse and evaluate the scientific information. Please see the Pearson BTEC International subject website 'Course materials' tab for Sample Assessment Material for this purpose (https://qualifications.pearson.com/en/qualifications/btec-international-level-3/applied-science.coursematerials.html).

Learning aim D: Understand how science is reported and presented in different media and for different audiences

- Brief learners about how different types of reporting mediums target different types of audience with regard to contemporary scientific issues.
- Using three different articles relating to the same contemporary issue, discuss with the learners how the issue is reported to target different audiences.
- Ask learners to carry out research into a contemporary issue from three different media sources. Have them review their findings with regard to patterns, similarities, differences and conclusions.
- Hold a class discussion to summarise their findings and draw conclusions about the differences with reference to the target audience.
- Arrange a visit for your learners to a publisher or broadcaster to find out how a report is assembled, or a visit to a museum that specialises in science to see how information and exhibits are presented for visitors.
- Discuss with learners how scientific and technological contemporary issues are reported and the relationship with the reporting medium, the target audience, the level and technicality of the language used, use of terminology, their accuracy, types of referencing, any bias, use of visuals, use of individuals and organisations.
- Using the above variables, ask learners to carry out an investigation into the contemporary issue from different sources.
- Discuss with learners what their findings were. Ask them to present their findings in a whole-class discussion, summarising their findings and drawing conclusions.
- Learners can present their findings of different reporting mediums using, for example, a scientific poster, a leaflet or by use of PowerPoint slides.
- Learners can produce their own video or programme on a scientific issue for a specific target audience.
- Give learners a practice assignment on a contemporary scientific issue with regard to how it has been presented in different media for different audiences, and producing two different reports themselves for a general and professional audience. Please see the Pearson BTEC International subject website 'Course materials' tab for Sample Assessment Material for this purpose (https://qualifications.pearson.com/en/qualifications/btec-international-level-3/applied-science.coursematerials.html).

Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

This unit links to:

- Unit 1: Principles and Applications of Biology I
- Unit 2: Principles and Applications of Chemistry I
- Unit 3: Principles and Applications of Physics I
- Unit 4: Investigative Project Skills
- Unit 5: Principles and Applications of Biology II
- Unit 6: Principles and Applications of Chemistry II
- Unit 7: Principles and Applications of Physics II.

This unit also links to a wide range of optional units available across the qualification.

Resources

In addition to the resources listed below, publishers are likely to produce Pearson-endorsed textbooks that support this unit of the BTEC International L3 Qualifications in Applied Science.

Check the Pearson website for BTEC International Level 3 Applied Science (https://qualifications.pearson.com/en/qualifications/btec-international-level-3/applied-science.html) for more information as titles achieve endorsement.

The use of different reporting mediums, such as tabloid and broadsheet newspapers and scientific articles, is essential for this unit.

Textbooks

Hartley, J, Annets, F, Meunier, C, Llewellyn, R, Hocking, S, Peers, A and Parmar, C – *Pearson BTEC National Applied Science: Student Book 1* (Pearson, 2016) ISBN 9781292134093. This book is a useful general reference and contains chapters on contemporary scientific issues impacts and developments of scientific issues, interpretation, analysis and evaluation of scientific information, and science reporting.

Annets, F, Hartley, J, Hocking, S, Llewellyn, R and Meunier, C – *Pearson BTEC National Applied Science: Student Book 2* (Pearson, 2016) ISBN 9781292134130. This book is a useful general reference and contains a chapter on contemporary issues in science.

Curtis, C, Fullick, A, Lees, K, Meunier, C and Usher C – *Revise BTEC National Applied Science: Revision Workbook* (Pearson, 2018) ISBN 9781292258171. This book is a useful source of case studies and exercises for contemporary issues in science.

Journals

ACS Nano
American Chemical Society

Biologist
Royal Society of Biology

Chemistry News and *Chemistry World*
Royal Society of Chemistry

Chemical Reviews
American Chemical Society

Energy & Environmental Science
Royal Society of Chemistry

International Journal of Pharmaceutics
Elsevier

Journal of Environmental Science
International Scientific Journal

Journal of Food Science
Institute of Food Technologists

Journal of Medical and Biological Sciences
International Scientific Journal

Nature
An international journal covering research spanning all areas of science

New Scientist
Covering the latest news and articles about science and technology

Public Library of Science (PLOS)
An international journal covering research spanning all areas of science

Physics World
Institute of Physics

Science
An international journal covering research spanning all areas of science

Scientific American
Latest science stories, articles and news

Videos

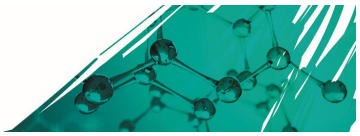
YouTube videos:

- Bioethics: Contemporary Issues in Science
- Contemporary issues in Physical Science
- Global Issues in Science and Technology

TED talks: short talks on Technology, Entertainment and Design (TED) covering a wide range of topics, including technology, science, health, nature and the environment

Websites

Visit the Pearson BTEC International Applied Science web page – this contains course materials (UK) and past exam paper resources on contemporary issues in science that could be used as a source of articles, under the 'sample assessments' and 'external assessment' tabs.



Visit the Association for Science Education website – science resources for tutors, journals, textbooks, useful links.

Visit the International Institute of Physics website – resources about theoretical and practical physics, publications, training and events, other useful links.

Visit the International Life Science Institute website – resources about theoretical and practical life sciences, publications, training and events, other useful links.

Visit the Institute of Physics website – resources about theoretical and practical physics, journals, textbooks, useful links.

Visit the International Union of Pure and Applied Chemistry website – resources about theoretical and practical chemistry, publications, training and events, other useful links.

Visit the National Aeronautics and Space Administration, USA website. This website gives information on research in nanotechnology and space exploration.

Visit the website for Nature magazine – scientific journals on all science-related topics.

Visit the Royal Society of Biology website – resources about theoretical and practical biology, journals, textbooks, useful links.

Visit the Royal Society of Chemistry website – resources about theoretical and practical chemistry, journals, textbooks, useful links.

Visit the website of the United Nations, giving updated information on current concerns and processes.

Visit the official World Health Organization website.

Visit the World Wildlife Fund pressure group information website.

Pearson is not responsible for the content of any external internet sites. It is essential for tutors to preview each website before using it in class so as to ensure that the URL is still accurate, relevant and appropriate. We suggest that tutors bookmark useful websites and consider enabling learners to access them through the school/college intranet.