Unit title	Contemporary Issues in Science
Guided learning hours	120
Number of lessons	60
Duration of lessons	2 hours (unless otherwise stated)

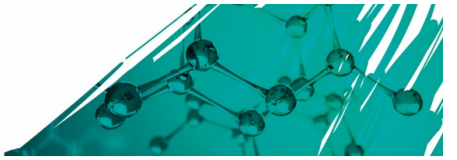
Links to other units

- 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.

Key to learning opportunities			
AW	Assignment writing	**IS**	Independent study
GS	Guest speaker	**V**	Visit
GW	Group work		

Lesson	Topic	Lesson type	Suggested activities	Classroom resources
1	**Introduction to the unit**	GW	• **Tutor presentation:** give out the unit specification to discuss the learning outcomes, assessment criteria and mode of assessment. • **Tutor presentation:** on relevant sources of information. Cover identification and location of sources, how to extract information from sources, and how to reference the information and assess the reliability of sources. • **Small group activity/class discussion:** ask learners to collaborate in small groups to identify and explain examples of contemporary scientific issues in the following topic areas: energy sources, medical treatments, pharmaceuticals, chemicals, nanotechnology, food technology or a suggestion of their own. Give learners access to networked PCs or other media to find out more on their chosen topic. Gather learners to feed back to the rest of the group on their topic and facilitate a discussion. **Please note that the suggested activities in the following lessons in the learning and delivery phase should not directly target the contemporary scientific issue theme in the Pearson Set Assignment for the assessment of this unit.**	• Tutor presentation and notes • Small dry wipe boards for group activity



Learning aim A: Understand contemporary scientific issues in terms of ethical, social, economic, and environmental impact and future developments				
2–3	**Energy sources** • Renewable and non-renewable • Use of fossil fuels in transportation • Carbon capture systems	IS GS V	For each topic, one of the examples of a contemporary scientific issue can give the focus for the lesson. Alternatively, you or learners may have a relevant area of interest to explore. Some suggested approaches include: • **Tutor presentation:** on the contemporary scientific issue and nature of its study, which learners can take notes from. Suitable content could include: the historical and contemporary context to the issue, the science and studies involved in the issue, and problems and future developments involved with the issue. Include examples of titles of the reported contemporary issue across a number of different types of media or case studies, so that learners can undertake further reading around the topic after the presentation. • **Guest speaker:** ask a guest speaker to give a talk on a particular aspect of the contemporary scientific issue. Suitable individuals could include scientific researchers or environmentalists. Learners should make notes. Encourage them to prepare and ask questions for the guest speaker. • **Visit:** arrange a visit to a relevant scientific workplace or environment which has a connection to the scientific issue, such as a pharmaceutical company, an oil refinery, a medical research centre or a conservation area. Learners should take notes, collect information leaflets and ask questions to guides. • **Tutor-led discussion:** lead the discussion on the contemporary scientific issue with the learners, focussing upon key scientific	• Tutor presentation and notes • Examples of contemporary issues • Whiteboard, YouTube clips and media reports • PCs or laptops with internet connection for review of sources of information
4–5	**Medical treatments** • Proton beam therapy • Prosthetics • Stem cell therapy • Cloning techniques • Genetic engineering			
6–7	**Pharmaceuticals** • Resistance to antimicrobials • Performance-enhancing drugs in sport			
8–9	**Chemicals** • Insecticides			

	• Plastic waste in oceans • Acidification of oceans		aspects. Learners to make notes from the discussion about the different aspects and drawing any conclusions. • **Paired activity:** give each pair of learners a different scientific issue which may have been studied previously. Take them with producing a pamphlet or information guide summarising the science behind the issue and the problem it solves or causes.	
10–11	**Nanotechnology** • Uses in cosmetics • Health effects of using diesel fuel • Space exploration			
12–13	**Food technology** • GM crops • Food composition (fat, salt and sugar content) • Preservatives			
14–15	**Learner research and presentation of a contemporary scientific issue**	IS	• **Individual research activity:** ask learners to carry out their own literature search and review of sources of information with regard to a contemporary scientific issue of their own choice for the duration of one lesson. • **Individual research and presentation activity:** based on their research, learners then produce and present their research of their chosen issue back to the rest of the class in the following lesson.	• PCs or laptops with internet connection for internet search • Whiteboard

16	**Economic implications**	GW IS	• **Tutor-led presentation:** on the implications of contemporary scientific or technological issues (from lessons 2–15). Focus on the benefits and disadvantages that are, or would be, experienced in the implication category. There should be an emphasis on exploring the consequences within a category (such as the political, religious and cultural viewpoints as social implications) and between categories (for example, the economic impact a scientific advance would have on society as a social implication, or a scientific issue facing a society that could have social and ethical implications). Give learners examples set within topics that they have previously studied, and case studies to assess and draw out the main implications. • **Paired activity:** give learners a flipchart and pens to mind map implications arising from a contemporary scientific issue. Give each pair of learners a different scientific issue which may have been studied previously. Learners could present their mind map back to the rest of the class. • **Independent learning activity:** give learners a case study or article on a scientific issue to analyse. Ask them to draw up a list of economic, social, ethical or environmental issues that are referred to within the article, ensuring that they can reference evidence to support their identification. They could also identify issues which are implicit or could be inferred, giving a justification for their conclusions.	• Tutor presentation and notes • Examples of contemporary issues • Whiteboard, YouTube clips and media reports • PCs or laptops with internet connection for review of sources of information
17	**Social implications**			
18	**Ethical implications**			
19	**Environmental implications**			

20	**Learner discussion of the implications of a contemporary scientific issue**	GW	• **Tutor-led discussion:** select a contemporary issue and discuss with the learners relevant economic, social, ethical or environmental implications. Facilitate the discussion so that links between the implication categories can be drawn. Have learners make notes from the discussion about different aspects and draw any conclusions. Repeat the discussion with a different contemporary issue.	• Examples of contemporary issues • Whiteboard
21	**Research and development of a scientific issue**	IS GW	• **Tutor presentation:** explore how scientific theories are conceived or discovered, then researched and developed to solve a problem or question. This should focus on key principles of scientific research involving observation, hypothesis, experimentation, corroboration and acceptance of a theory or discovery. A link could be made to content from *Unit 4: Investigative Project Skills*. The presentation should include examples based on topics covered in lessons 2–15 and the provision of exercises for learners to consider steps to research the problem further or to develop a solution. • **Paired activity:** give learners a flipchart and pens to mind map either possible solutions to a contemporary scientific issue or the development of an existing technology. Give each pair of learners a different scientific issue which may have been studied previously. Learners could present their mind map back to the rest of the class.	• Tutor presentation and notes • Examples of contemporary issues • Whiteboard, YouTube clips and media reports
22	**Research and development of a scientific issue – proposals from learners**	IS	• **Individual activity:** ask learners to carry out their own literature search of a contemporary scientific issue which is either a problem that needs to be solved, or is an existing technology or theory which needs to be developed. Learners could then come up with their own set of proposals to tackle the further research needed or the development of a solution to present to the class. They should present a brief overview of the scientific issue and several research/development proposals, with justification and details of	• PCs, laptops or library for review of sources of information • Whiteboard

			how this will be achieved. They should conclude with a recommendation of the order in which the research or development proposals should be prioritised, and be prepared to answer questions from the rest of the class.	
23–26	**Mock assessment for learning aim A**	AW	• **Practice assignment:** give learners a practice assignment on a contemporary scientific issue with regard to the economic, environmental, ethical and social impact, and further research and development. Please see the Pearson BTEC International subject website 'Course materials' tab for Sample Assessment Material that could be used for this purpose. **The assignment and its theme for this activity must not be the same as the Pearson Set Assignment for the academic year.** Learners will be required to source suitable articles and sources as part of the assignment so will need some allocation of lesson time to do this. The writing of their assignment could be done under assessment conditions to prepare learners for actual assessment.	• Sample assignment • PCs, laptops or library for review of sources of information • Articles and research (learner-sourced)

Learning aim B: Understand the influence of different organisations and individuals on scientific issues				
27	**Governmental organisations** e.g. World Health Organization (WHO), European Union (EU), United Nations (UN), environmental agencies, food standards agencies	IS GS V	For each major type of organisation or individual, give a broad range of examples so that learners can become familiar with similarities and differences in purpose and objective. In particular, learners will need to be able to recognise the extent of an organisation or individual's influence within a scientific issue. Some suggested activities that could be used include: • **Tutor presentation:** on the examples of a type of organisation and individuals that influence scientific and technological contemporary issues. Learners should make notes from the presentation about the way in which the organisations and individuals influence the issues identified, how widely and who they influence and if their influence may increase or decrease over time. Include profiles, case studies or website links so that learners can undertake further reading around the topic after the presentation. • **Individual research activity:** have learners carry out a literature search and review of sources of information with regard to the work and influence of a governmental, non-governmental, private and voluntary organisation, to build up a profile. Profiles of key individuals could also be researched and assembled. Ask learners to work in pairs to produce and present their research of their chosen	• Tutor presentation and notes • Examples of contemporary issues • Whiteboard, YouTube clips and media reports • PCs or laptops with internet connection for review of sources of information
28	**Non-governmental organisations** e.g. International Science Council (ICS) and its member unions, Médecins Sans Frontières			
29	**Private and commercial organisations** e.g. oil companies, pharmaceutical companies, fair trade organisations			

30	**Pressure, voluntary and charitable groups** e.g. charities, trusts, World Wildlife Fund (WWF), Greenpeace, Friends of the Earth		profiles back to the rest of the class. • **Tutor-led discussion:** lead a discussion on how the organisations, groups or individuals influence an identified contemporary science or technological issue that has been studied. Have learners make notes from the presentation about the way in which the organisations and individuals influence the scientific and technological issues identified, how widely and who they influence and how their influence may increase or decrease over time. • **Guest speaker:** ask a guest speaker to give an overview of the work and influence of a specific organisation or group that they represent, or as an individual. Learners should make notes; encourage them to prepare, and ask, questions for the guest speaker. • **Visit:** arrange a visit to a relevant organisation with a connection to a scientific issue (see lessons 2–15). Learners should take notes, collect information leaflets, and ask questions to any representatives that they meet during the visit.	
31	**Universities, research groups and professional bodies**			
32	**Individuals and the public** e.g. scientists, engineers, medical professionals, politicians, entrepreneurs, campaigners, journalists, members of the public			
33	**Influence of organisations and individuals** • area of influence • type of influence • sphere of influence	IS GW	• **Class discussion:** give the class a case study on a specific contemporary scientific issue to read in preparation for a group debate (for example, 'Should the use of diesel be banned?'). Cast selected learners (or pairs of learners) in relevant roles for the debate of the issue, such as a governmental representative, a multinational company, a pressure group campaigner, a scientific research group, etc. Give each learner or pair a short profile of their organisation or individual and their role's objective regarding the issue. They will have some time to prepare their position and argument on the issue before the debate. You could chair and	• Case studies of contemporary issues • Whiteboard

			moderate the debate, posing questions from the remainder of the class. The same questions could be posed to all roles, with similar and opposing arguments presented to influence the debate and a class vote on the issue taken at the end.	
34	**Mock assessment for learning aim B**	AW	• **Practice assignment:** give learners a practice assignment on a contemporary scientific issue with regard to the influence of different organisations and individuals. It would be desirable to set the same contemporary scientific issue as for learning aim A, so that learners can make use of the research that they have already done. Please see the Pearson BTEC International subject website 'Course materials' tab for Sample Assessment Material that could be used for this purpose. **The assignment and its theme for this activity must not be the same as the Pearson Set Assignment for the academic year.**	• Sample assignment • Articles and research (learner-sourced)
Learning aim C: Understand how to interpret, analyse and evaluate scientific information				
35–36	**Interpretation and analysis of scientific information**	IS	You will need to teach learners how to interpret and analyse scientific articles objectively and to practise this skill. Some suggested approaches that could be used include: • **Tutor presentation:** explain the different ways in which evidence, data and information can be collected, presented, interpreted and analysed. Consider qualitative and quantitative evidence, different ways to process and present data correctly and accurately (such as tabulation and graphically), how the type of presentation allows for interpretation, its limitations and statistical analysis techniques. This presentation could be linked to teaching and delivery of *Unit 4: Investigative Project Skills*, learning aim C (Safely undertake the project, collecting, analysing and presenting the results). The presentation should include examples for learners and the provision of exercises for them to apply their learning, such as	• Tutor presentation and notes • Examples of professional scientific articles on a contemporary issue • PCs or laptops with internet connection for review of sources of information

			giving data to present, interpret and analyse. Alternatively, generate data from a tutor-led practical demonstration as part of the presentation, and task learners with the presentation, interpretation and analysis. • **Individual activity:** have learners bring in a selection of their practical work containing quantitative data from other units (for example, their investigative project for Unit 4). Learners could critique their presentation, choice of display, interpretation and statistical analysis (if carried out). They could take the opportunity to select and try out different forms of presentation for their data, and reassess their original interpretation of the results. • **Individual research activity:** ask learners to research and source professional and scientific articles on a specific contemporary scientific issue – this would ideally be a different issue to that used for previous learning aims so that learners get a broader understanding of this unit in a different context. Each learner should have a different issue to explore; direct them towards published scientific articles from a professionally recognised organisation or institute. The articles sourced can be examined with regard to how evidence has been presented, interpreted and analysed, so will need to contain qualitative and quantitative data; include visual data such as tables, charts, graphs, calculations or statements referring to data or statistics. Learners can make notes on similarities and differences, if there are particular strengths or weaknesses in the presentation, and if they agree with the interpretation or can offer their own. • **Individual activity:** have learners deliver a short presentation that critiques the presentation, interpretation and analysis of data in a professional scientific article that they have read (or one of their own experiments). As part of the presentation, learners should	• Equipment for practical work (tutor-demonstrated) • Practical reports (learner-sourced)

			reflect on what they have learned and how they will strengthen interpretative and analytical skills as a result. Questions and suggestions of alternative approaches from you and other learners would allow for collaboration and sharing of ideas.	
37–38	**Evaluation of scientific information (validity, reliability and authenticity of evidence)**	IS GW	You will need to teach learners how to evaluate scientific articles objectively in terms of their validity, reliability and authenticity, and to practise this skill. • **Tutor presentation:** give guidance to learners on how to evaluate scientific information and data. This should inform learners about the meanings of the terms 'reliability', 'validity', 'authenticity' and 'accuracy', placing this in the context of information, data and their source. Inform learners about how to apply these principles and recognise indications of these when evaluating articles. Some key factors that should be raised include sample size, references to other publications, use and misuse of data, bias, errors, inaccuracies, visual presentations and authenticity of data. This presentation could be linked to the teaching and delivery of *Unit 4: Investigative Project Skills*, learning aim D (Communicate and evaluate the findings of the project). The presentation should include examples of articles for learners to apply their learning. • **Paired activity:** have learners bring in a selection of their practical work containing quantitative data from other units (for example, their investigative project for Unit 4). Learners could swap with others and critique the validity and reliability of the data, conclusions, the references, and any limitations or strengths of the work. This activity could be linked with the previous lessons for re-interpretation and analysis of the learners' practical work. • **Individual research activity:** have learners carry out their own literature search for a specific contemporary scientific issue and review the sources of information with regard to the validity,	• Tutor presentation and notes • Examples of professional scientific articles on a contemporary issue • PCs or laptops with internet connection for review of sources of information • Practical reports (learner-sourced)

			reliability and authenticity of data. Learners can make notes comparing different sources about the same scientific and technological issue, and evaluate the merits and shortcomings of each. Have learners propose how each article's validity, reliability and authenticity could be strengthened. Link this research activity with the previous lessons which sourced articles to interpret and analyse. • **Individual activity:** ask learners to deliver a short presentation that evaluates a professional scientific article that they have read in terms of its validity, reliability and authenticity. As part of the presentation, learners should reflect on what they have learned and how they will strengthen their evaluative skills as a result. The opportunity for questions and suggestions of alternative approaches from you and other learners would allow for collaboration and sharing of ideas.	
39	**Interpretation and evaluation of a scientific article**	IS		• Article(s) on a contemporary scientific issue • Whiteboard
40–41	**Mock assessment for learning aim C**	AW	• **Practice assignment:** give learners a practice assignment on a contemporary scientific issue with regard to interpreting, analysing and evaluating scientific information within three scientific articles. Please see the Pearson BTEC International subject website 'Course materials' tab for Sample Assessment Material that could be used for this purpose. It would be desirable to set the same contemporary scientific issue as for learning aims A/B, so that learners can make use of the research that they have already done. **The assignment and its theme for this activity must not be the same as the Pearson Set Assignment for the academic year.**	• Sample assignment • Articles and research (learner-sourced)

Learning aim D: Understand how science is reported and presented in different media and for different audiences				
42–43	**Reporting media and target audiences**	IS	Give a broad range of different media types so that learners can become familiar with similarities and differences in purpose and objective. In particular, learners will need to be able to recognise who the content of the reporting is intended for. Some suggested activities that could be used include: **Tutor presentation:** a presentation about where learners will encounter the reporting of contemporary scientific issues. Give a general survey of the different ways that this may be communicated. Learners will already have examined articles from professional publications and journals, and the survey of reporting should be expanded to include other forms of media, such as television and radio, newspapers and magazines, social media and websites, campaign leaflets and pamphlets, etc. The source and background of the author(s) should be considered and there is an opportunity to link this with prior learning in learning aims B and C. The presentation should also focus on who the target audience is for the scientific issue; this could include the scientific or medical community, political representatives, pressure group campaigners and the general public. The presentation should include examples for learners to read or view to apply their learning. • **Individual research activity:** have learners carry out a literature search and review of sources of information with regard to the reporting medium and its target audience – this research would ideally be on a different contemporary scientific issue to that used for previous learning aims, so that learners get a broader understanding of this unit in a different context. The research should include other forms of media, such as digital, social and	• Tutor presentation and notes • Examples of different media reporting on a contemporary scientific issue • PCs or laptops with internet connection for review of sources of information

			television, besides print media. Learners should prepare a document that makes a comparison of how the different media sources report the scientific or technological issues, and draw conclusions about their purpose and target audience. This could be linked with the following lesson and extended to consider and compare the style, tone, accuracy, bias, etc.	
44–45	**Presentation of science reporting**	IS V	**Tutor presentation:** a presentation about how different media have reported contemporary issues. This will take a more specific and detailed look at the content of the reporting. It should specifically consider the detail and accuracy of the reporting, the level of language and terminology used, writing or presenting style and tone, visual representations, the quantity and quality of the scientific information, and biased viewpoints. This should look at examples which are on the same scientific issue and reflect different viewpoints and presentation styles in the reporting – there is an opportunity to link this with the previous lesson or to prior learning in learning aims B and C. The presentation should include examples for learners to read or view to apply their learning. • **Tutor-led discussion:** give the class three or more different media reports on the same contemporary scientific issue to read or watch, making notes and then participating in a tutor-led group discussion. The discussion will focus on the advantages and disadvantages of the different reporting media, the likely target audience, and draw conclusions about accuracy, level of language, tense, use of terminology, referencing, technical language, any bias, use of well-known people, use of visuals, and the quantity and quality of scientific reporting. • **Visit:** take learners on a pre-arranged visit to a television broadcaster, newspaper office or professional institute to find out how a report is assembled and edited for publishing or broadcast –	• Tutor presentation and notes • Examples of different media reporting on a contemporary scientific issue • PCs or laptops with internet connection for review of sources of information

			a scientific report would be a desirable context but the principles of accuracy and presentation in reporting would be transferable to other sectors. Alternatively, a virtual visit or guest speaker, using Skype or similar platform, could be arranged if an on-site visit is not possible. A further option would be to visit a museum which specialises in science presentation and displays; this would give learners a wider experience of how scientific information is communicated. At any visit, learners should take notes and ask questions to guides or representatives.	
46	**Reporting on a scientific issue by learners**	GW	• **Small group activity:** give each group of learners a different scientific issue which may have been studied previously to make a video on. Task them with producing a television programme, radio broadcast or social media video to inform the general public (or another target group) about the science behind the issue and the problem it solves or causes. They should consider the depth, tone and visuals that are to be used. The programme/video could be recorded or storyboarded.	• PCs or laptops with internet connection for sources of information • Whiteboard • Video camera/ recording equipment
47–49	**Mock assessment on learning aim D**	AW	• **Practice assignment:** give learners a practice assignment on a contemporary scientific issue with regard to how it has been presented in different media for different audiences. Learners should produce two different reports, for a general and professional audience. Please see the Pearson BTEC International subject website 'Course materials' tab for Sample Assessment Material that could be used for this purpose. It would be desirable to set the same contemporary scientific issue as for learning aims A-C so that learners can make use of the research that they have already done. **The assignment and its theme for this activity must not be the same as the Pearson Set Assignment for the academic year.**	• Sample assignment • Articles and research (learner-sourced)

50	**Summary of the unit**	GW	• **Preparation for assessment:** this session should be used to ensure learners are fully prepared for the actual assessment, and that they understand the assessment rules. Recap the key themes (i.e. establishing a scientific issue, its implications and future development, how organisations and individuals influence the issue, the validity and reliability of scientific information, and the presentation and communication of scientific information to different groups) and give general guidance on assessment, such as following the command verbs and assessment guidance for learning aims.	• Tutor presentation and notes
51–60	**Pearson Set Assignment (summative assessment)**	AW	• **20 hours under controlled conditions is advised for assessment.** • Use the first (and possibly second) of the two-hour lessons to allow learners to source appropriate articles and media for their source material.	• Pearson set assignment • Articles and research (learner-sourced)

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.