Suggested teaching program

**Chapter 4: Resources**

Time allocation: 4 weeks

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| **Context and overview** |
| In year 7, students explore the notion of renewable and non-renewable resources and consider how this classification depends on the timescale considered. Students formulate hypotheses and analyse data to draw and analyse conclusions using primary and secondary sourced evidence. |
| **Syllabus outcomes addressed** |
| • Some of Earth’s resources are renewable but others are non-renewable ACSSU116  • People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity ACSHE121  • Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge ACSIS124  • Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed ACSIS125  • Measure and control variables, select equipment appropriate to the task and collect data with accuracy ACSIS126  • Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate ACSIS129  • Summarise data, from students’ own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence ACSIS130  • Use scientific knowledge and findings from investigations to evaluate claims based on evidence ACSIS132  • Communicate ideas, findings and evidence based solutions to problems using scientific language, and representations, using digital technologies as appropriate ACSIS133 |
| **Achievement standards** |
| Students analyse how the uses of resources depends on the way they are formed and cycle through Earth’s systems. Students describe social and technological factors that have influenced scientific developments and predict how future applications of science and technology may affect people’s lives.  Students design questions that can be investigated using a range of inquiry skills. They design methods that include the control and accurate measurement of variables and systematic collection of data and describe how they considered ethics and safety. They analyse trends in data, identify relationships between variables and reveal inconsistencies in results. They analyse their methods and the quality of their data, and explain specific actions to improve the quality of their evidence. They evaluate others’ methods and explanations from a scientific perspective and use appropriate language and representations when communicating their findings and ideas to specific audiences. |

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| **Student book section** | **WA Syllabus links** | **Suggested indicators of learning and understanding** | **Suggested teaching and learning activities** | **Resources** |
| **4.1 Resources on Earth are either renewable or non-renewable**  **(pages 62–63)** | *Science Understanding*  ACSSU116  *Science as a Human Endeavour*  ACSHE121  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:  • define resource  • explain the difference between renewable and non-renewable resources  • provide examples of renewable and non–renewable resources. | **Resource ID walk**  Using the activity provided on the Project Learning Tree website, students can take a short walk around the streets around the school and identify as many resources or evidence of resources as they can and classify them as either renewable or non-renewable. | **Oxford Science 7 WA resources**  • Check your learning, page 63 |
| **Additional resources**  Project Learning Tree activity about whether a resource is renewable or not.  <https://www.plt.org/family-activities-renewable-or-not> |
| **4.2 Renewable resources can be replaced quickly**  **(pages 64–65)** | *Science Understanding*  ACSSU116  *Science as a Human Endeavour*  ACSHE121  *Science Inquiry Skills*  ACSIS124  ACSIS125  ACSIS126  ACSIS129  ACSIS130  ACSIS133 | By the end of this unit, students should be able to:  • define turbine, generator and greenhouse emissions  • describe the ways in which electricity is generated in Australia in terms of renewable and non-renewable resources  • explain the characteristics of a renewable resource. | **Challenge 4.2**  *Can you increase the output of a power station?*  Students investigate the workings of a model power station and modify the design to improve efficiency. | **Oxford Science 7 WA resources**  • Check your learning, page 65  • Challenge 4.2, page 186 |

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| **4.3 Renewable resources can be harnessed to provide energy**  **(pages 66–67)** | *Science Understanding*  ACSSU116  *Science as a Human Endeavour*  ACSHE120  ACSHE121  *Science Inquiry Skills*  ACSIS124  ACSIS125  ACSIS126  ACSIS129  ACSIS130  ACSIS132  ACSIS133 | By the end of this unit, students should be able to:  • define solar, hydroelectrical and geothermal  • provide examples of renewable resources that can be used to generate electricity  • explain the similarities between all forms of renewable electricity generation. | **Challenge 4.3**  *Can you increase the power of solar cells?*  Students investigate the design of solar cells to improve their efficiency.  **Renewable and non-renewable energy sources**  Students can complete the interactive tutorial about different sources of energy. | **Oxford Science 7 WA resources**  • Check your learning, page 67  • Challenge 4.3, page 188 |
| **Additional resources**  Energy and the Environment interactive tutorial about renewable and non-renewable energy sources.  <http://www.childrensuniversity.manchester.ac.uk/interactives/science/energy/renewable/> |

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| **4.4 Non-renewable resources are limited**  **(pages 68–69)** | *Science Understanding*  ACSSU116  *Science as a Human Endeavour*  ACSHE119  ACSHE121  *Science Inquiry Skills*  ACSIS124  ACSIS125  ACSIS126  ACSIS130  ACSIS132  ACSIS133 | By the end of this unit, students should be able to:  • define fossil fuel, mineral and ores.  • describe how electricity can be generated from uranium  • provide examples of non–renewable sources of energy  • explain the key characteristic of a non–renewable resource. | **Experiment 4.4A**  *What if a muffin were mined in different ways?*  Students compare the effectiveness of different mining methods and their impact on the environment.  **Experiment 4.4B**  *What if a metal were obtained from a mineral?*  Students investigate electrolysis as a method of extracting copper from copper sulphate.  **Comparing energy resources**  Students can investigate the advantages and disadvantages of various energy sources using the information provided on the Energy Resources website and determine which source of energy is the best. Students will need to develop a list of criteria in order to evaluate the ‘best’ resource. | **Oxford Science 7 WA resources**  • Check your learning, page 69  • Experiment 4.4A, page 189  • Experiment 4.4B, page 190 |
| **Additional resources**  This Energy Resources website contains information, video clips, advantages, disadvantages, summaries and quizzes on all major energy types.  <http://www.darvill.clara.net/altenerg/index.htm> |

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| **4.5 Soil is one of our most valuable resources**  **(pages 70–71)** | *Science Understanding*  ACSSU116  *Science as a Human Endeavour*  ACSHE121  *Science Inquiry Skills*  ACSIS125  ACSIS126  ACSIS129  ACSIS130  ACSIS133 | By the end of this unit, students should be able to:  • define humus and land degradation  • provide examples of soil as a resource  • explain why soil is such an important resource  • identify soil as a renewable or non-renewable resource. | **Experiment 4.5**  *What if different soils were exposed to water?*  Students investigate the components of soils and how different soil components affects water absorption.  **Interactive soil**  Students can complete a number of online interactives from the Forces of Change website to learn more about the importance of soil as a resource. | **Oxford Science 7 WA resources**  • Check your learning, page 71  • Experiment 4.5, page 191 |
| **Additional resources**  The Forces of Change website provides a video tour of the ‘Dig it! The Secrets of Soil’ Smithsonian's National Museum of Natural History exhibition as well as a range of other activities.  <http://forces.si.edu/soils/> |

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| **4.6 our future depends on careful management of resources**  **(pages 72–73)** | *Science Understanding*  ACSSU116  *Science as a Human Endeavour*  ACSHE223  ACSHE120  ACSHE121  *Science Inquiry Skills*  ACSIS124  ACSIS125  ACSIS130  ACSIS132  ACSIS133 | By the end of this unit, students should be able to:  • define low-emission, hybrid vehicle, ethanol and efficiency  • explain why it is important to use resources sustainably  • provide examples of methods of conserving resources. | **Challenge 4.6**  *Resources for your future*  Students prepare and present a report about the use and depletion of one natural resource.  **Investigating biofuels as an alternative**  Students can use the Biofuels of Australia as a starting point for investigating biofuels as an alternative to burning fossil fuels in cars. Students may like to investigate electric and hybrid cars as well or instead. | **Oxford Science 7 WA resources**  • Check your learning, page 73  • Challenge 4.6, page 192 |
| **Additional resources**  Biofuels of Australia website contains lost of information about the development and use of biofuels in Australia. It also contains a list of mythbusters.  <http://biofuelsassociation.com.au/> |

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| **4.7 Green jobs will increase in the future**  **(pages 74–75)** | *Science Understanding*  ACSSU116  *Science as a Human Endeavour*  ACSHE223  ACSHE120  ACSHE121  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:  • describe what a ‘green job’ is  • provide examples of ‘green jobs’  • explain the importance of green jobs to the future of the planet  • relate developing scientific knowledge with the creation of new green jobs. | **Investigating green jobs**  Students can use the Green Career site to find ‘green jobs’ in their area and to find out more about what they might entail. | **Oxford Science 7 WA resources**  • Extend your learning, page 75 |
| **Additional resources**  Green Career is a job search site for sustainable, environmental and ‘green’ jobs in Australia and New Zealand.  <http://www.greencareer.net.au/> |
| **4 Review**  **(pages 76–78)** | *Science Understanding*  ACSSU116  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:  • define all Key Words listed on page 78  • explain the difference between renewable and non-renewable resources in terms of timescales and the ways in which they are formed and cycled through the environment  • identify areas of personal strengths and weaknesses in their knowledge and understanding of the topic. | **Revision activities**  • Students could play celebrity heads with the Key Words list.  • Students can make dominoes with Key Words on one end and definitions/diagrams/examples on the other end.  • Students can create mind maps, Venn diagrams or other graphic organisers to summarise the key concepts of this chapter.  • Peer teaching: students can work in groups to reteach the content of the unit to the class for the purpose of revision. Each group could be allocated a double-page to summarise. | **Oxford Science 7 WA resources**  • Review questions, pages 76–77  • Research topics, page 77  • Key Words list, page 78 |