Suggested teaching program

**Chapter 3: Water**

Time allocation: 3 weeks

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| **Context and overview** |
| In year 7, students use and develop models such as the water cycle to represent and analyse the flow of matter through ecosystems and explore the impact of changing components within the water cycle. Students make accurate measurements and control variables to analyse relationships between system components and explore and explain these relationships through increasingly complex representations. |
| **Syllabus outcomes addressed** |
| • Water is an important resource that cycles through the environment ACSSU222  • Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures ACSHE223  • Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations ACSHE120  • 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  • Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements ACSIS131  • 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 sustainable use of resources depends on the way they are formed and cycle through Earth system. Students describe situation where scientific knowledge from different science disciplines had been used to solve a real-world problem They explain how water as a resource is viewed by, and impacted on, different groups in society. Students identify questions that can be investigated scientifically. They plan fair experimental methods, identifying variables to be changed and measured. They select equipment that improves fairness and accuracy and describe how they considered safety. Students draw on evidence to support their conclusions. They summarise data from different sources, describe trends and refer to the quality of their data when suggesting improvements to their methods. They communicate their ideas, methods and findings using scientific language and appropriate representations. |

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| **Student book section** | **WA Syllabus links** | **Suggested indicators of learning and understanding** | **Suggested teaching and learning activities** | **Resources** |
| **3.1 Water can change state**  **(pages 48–49)** | *Science Understanding*  ACSSU222  *Science Inquiry Skills*  ACSIS125  ACSIS130  ACSIS133 | By the end of this unit, students should be able to:  • identify the three states of matter  • describe the processes of changing between states of matter using the correct terminology  • relate the states of matter to states of water. | **Challenge 3.1A**  *Three states of water*  Students are challenged to create a situation where they have boiling water and ice in the same test tube.  **Challenge 3.1B**  *Ice cube necklace*  Students investigate the variables that can alter the freezing point of water.  **Investigating states of matter**  Students can carry out a variety of other investigations or activities about the states of matter. | **Oxford Science 7 WA resources**  • Check your learning, page 49  • Challenge 3.1A, page 184  • Challenge 3.1B, page 184 |
| **Additional resources**  This site provides instructions and downloadable worksheets for a number of investigations and activities based on the states of matter  <http://www.inquiryinaction.org/classroomactivities/activities_by_chapter.php?chapter=6&chapter_title=States%20of%20Matter> |
| **3.2 Water cycles through the environment**  **(pages 50–51)** | *Science Understanding*  ACSSU222  *Science as a Human Endeavour*  ACSHE121  *Science Inquiry Skills*  ACSIS124  ACSIS125  ACSIS126  ACSIS129  ACSIS130  ACSIS131  ACSIS133 | By the end of this unit, students should be able to:  • define evaporation, condensation, precipitation and transpiration  • describe the water cycle  • relate aspects of the water cycle to human behaviours. | **Experiment 3.2**  *What if the temperature were increased in the water cycle?*  Students design and make a model of the water cycle and investigate the effect of changing temperature on the cycle.  **Animated water cycles**  Students can watch the animated water cycle or complete the hydrological cycle tutorial and either critique the existing tutorials, write additional questions or create their own animation/tutorial. | **Oxford Science 7 WA resources**  • Check your learning, page 51  • Experiment 3.2, page 185 |
| **Additional resources**  A basic narrated and animated explanation of the water cycle.  <http://www3.epa.gov/safewater/kids/flash/flash_watercycle.html>  A more in-depth tutorial about the hydrological cycle, including quiz questions, can be found at: <http://www.sciencecourseware.com/eec/GlobalWarming/Tutorials/HydrologicalCycle/> |

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| **3.3 factors in nature affect the water cycle**  **(pages 52–53)** | *Science Understanding*  ACSSU222  *Science as a Human Endeavour*  ACSHE223  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:  • describe the characteristic conditions of El Nino and La Nina in Australia  • explain how El Nino and La Nina affect the water cycle in Australia  • explain how volcanic eruptions can affect the water cycle. | **Investigating El Nino**  Students can use real data in the form of various graphs and charts to investigate El Nino.  **El Nino and La Nina**  Students can watch a short documentary that provides more detail about these weather patterns. | **Oxford Science 7 WA resources**  • Check your learning, page 53 |
| **Additional resources**  The five data in the classroom activities use real data to investigate El Nino.  <http://dataintheclassroom.noaa.gov/SitePages/el-nino/index#.VhxPTBOqqkp>  National Geographic video about El Nino and La Nina  <http://education.nationalgeographic.com.au/activity/the-ocean-and-weather-el-nino-and-la-nina/> |
| **3.4 Human management affects the water cycle**  **(pages 54–55)** | *Science Understanding*  ACSSU222  *Science as a Human Endeavour*  ACSHE223  ACSHE120  ACSHE121  *Science Inquiry Skills*  ACSIS124  ACSIS125  ACSIS130  ACSIS131  ACSIS133 | By the end of this unit, students should be able to:  • define distillation  • describe how the water cycle is important to agricultural, industrial and domestic use of water  • provide examples of how agriculture, industry and domestic behaviour can alter the water cycle. | **Challenge 3.4**  *Can you reduce the evaporation of water in irrigation channels?*  Students investigate methods of reducing evaporation and apply their findings to calculate the costs of applying their ideas in a real life situation.  **Build a model desalination plant**  Students can use the information provided on the Teach Engineering website to build a functional model of a desalination plant. | **Oxford Science 7 WA resources**  • Check your learning, page 55  • Challenge 3.4, page 186 |
| **Additional resources**  Teach Engineering desalination model building.  <https://www.teachengineering.org/view_activity.php?url=collection/cub_/activities/cub_desal/cub_desal_lesson01_activity2.xml> |

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| **3.5 Water is a precious resource**  **(pages 56–57)** | *Science Understanding*  ACSSU222  *Science as a Human Endeavour*  ACSHE120  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:  • define sustainable  • provide examples of how water is used around the home  • explain how little drinking water is available to people. | **Promoting water saving**  Student can watch the water saving tips from the *savewater* website and either make their own videos to promote water saving around school, or develop their own water saving campaign. | **Oxford Science 7 WA resources**  • Extend your understanding, page 57 |
| **Additional resources**  Weblink for water saving tips around the home <http://www.melbournewater.com.au/getinvolved/saveandreusewater/pages/save-water-at-home.aspx> |
| **3 Review**  **(pages 58–60)** | *Science Understanding*  ACSSU222  *Science as a Human Endeavour*  ACSHE120  ACSHE121  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:  • define all key words listed on page 60  • explain how important water is to life on Earth and how it cycles 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 58–59  • Research topics, page 59  • Key words list, page 60 |