Suggested teaching program

**Chapter 6: Interactions between organisms**

Time allocation: 4 weeks

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| **Context and overview** |
| In year 7, students use and develop models such as food chains and food webs to represent and analyse the flow of energy and matter through ecosystems and explore the impact of changing components within these systems. 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** |
| • Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactionsACSSU112  • Scientific knowledge has changed peoples’ understanding of the world and is refined as new evidence becomes available ACSHE119  • 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  • 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 predict the effect of environmental changes on feeding relationships. Students describe situations where scientific knowledge from different science disciplines has been used to solve a real-world problem. They explain how ecosystems are 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** |
| **6.1 All organisms are interdependent**  **(pages 102–103)** | *Science Understanding*  ACSSU112  *Science Inquiry Skills*  ACSIS125  ACSIS130  ACSIS133 | By the end of this unit, students should be able to:  • define producer, consumer, food chain and food web  • describe the key features of a food web  • provide examples of producers and consumer  • explain the difference between a food chain and food web.  • relate the classification of an organism in a food web with its trophic position in that web. | **Challenge 6.1**  *Studying food webs*  Students investigate their local ecosystem for food webs and classify producers and consumers as well as examining food web pyramids.  **Trophic levels**  Students can extend their understanding of food webs by learning about trophic levels in food webs by completing the various games available on the NeoK12 Ecosystems for Kids website. | **Oxford Science 7 WA resources**  • Check your learning, page 103  • Challenge 6.1, page 198 |
| **Additional resources**  NeoK12 has a broad range of ecosystem activities for students of all abilities.  <http://www.neok12.com/Ecosystems.htm> |
| **6.2 All organisms have a role in an ecosystem**  **(pages 104–105)** | *Science Understanding*  ACSSU112  *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 herbivore, carnivore, omnivore and decomposer  • describe the role of decomposers in ecosystems  • provide examples of herbivores, carnivores, omnivores and decomposers  • explain how pollination is a result of food web interactions  • relate healthy ecosystems with clean water. | **Challenge 6.2**  *Exploring leaf litter*  Students look for invertebrates and other leaf litter organisms. The emphasis is on identifying possible detritivores.  **Experiment 6.2**  *What if water were filtered through a pot with native grasses?*  Students investigate how natural systems can filter water. As an extension to this concept, students could research lagoon systems as natural water filters.  **Parasite cleaning stations**  Students can watch the ABC Catalyst video about cleaner fish and discuss where cleaner fish fit in a food web and how they should be classified. | **Oxford Science 7 WA resources**  • Check your learning, page 105  • Experiment 6.2, page 199  • Challenge 6.2, page 199 |
| **Additional resources**  The Science Kids website has some good games and activities to consolidate understanding of food chains.  <http://www.sciencekids.co.nz/gamesactivities/foodchains.html>  The ABC Catalyst video about cleaner fish demonstrates how different species interact in food webs.  <http://www.abc.net.au/catalyst/stories/2929830.htm> |

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| **6.3 Food webs can be disrupted**  **(pages 106–107)** | *Science Understanding*  ACSSU112  *Science as a Human Endeavour*  ACSHE121  *Science Inquiry Skills*  ACSIS124  ACSIS125  ACSIS126  ACSIS129  ACSIS130  ACSIS131  ACSIS132  ACSIS133 | By the end of this unit, students should be able to:  • define biosphere  • describe how a food chain relies on a delicate balance between all its components  • provide examples of endangered or threatened Australian plants and animals  • explain how the loss of one species from a food web can affect every other organism in the web. | **Experiment 6.3**  *What if the effectiveness of pollinators were reduced?*  Students investigate factors that affect the pollination of fruit plants and look at the influences pollinators on the successful pollination of plants.  **Introduced organisms**  Students can extend their understanding of the balanced nature of food webs by learning about the detrimental affects of introduced organisms such as the Cane Toad. | **Oxford Science 7 WA resources**  • Check your learning, page 107  • Experiment 6.3, page 200 |
| **Additional resources**  National Geographic video about Cane Toads in Australia.  <http://nationalgeographic.org/media/cane-toads/> |
| **6.4 Human activity can affect local habitats**  **(pages 108–109)** | *Science Understanding*  ACSSU112  *Science as a Human Endeavour*  ACSHE119  ACSHE121  *Science Inquiry Skills*  ACSIS125  ACSIS129  ACSIS130  ACSIS133 | By the end of this unit, students should be able to:  • define deforestation, urban sprawl, land degradation and habitat.  • describe how deforestation affects ecosystems  • provide examples of how land can be degraded  • relate deforestation to urban sprawl. | **Challenge 6.4**  *Calculating your ecological footprint*  Students calculate their carbon footprint based on their current behaviours. As an extension, students could set goals for changing their behaviours, then retest at the end of the topic.  **Environmental hot topics**  Students can extend their learning by completing Nova tutorials like ‘Climate change and coral bleaching’, ‘Population and environment: a global challenge’ and ‘Getting the buzz on the value of bees’. | **Oxford Science 7 WA resources**  • Check your learning, page 109  • Challenge 6.4, page 201 |
| **Additional resources**  The World Wildlife Fund website is only one of many ecological footprint calculators:  <http://www.wwf.org.au/get-involved/change-the-way-you-live/ecological-footprint-calculator>  The Nova website has a number of articles supported by animations and videos that explain aspects of ecosystems.  <http://www.nova.org.au/category/earth-environment> |

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| **6.5 Isolated populations can be used as case studies**  **(pages 110–111)** | *Science Understanding*  ACSSU112  *Science as a Human Endeavour*  ACSHE119  ACSHE121  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:  • describe what happened to the natural ecosystem of Easter Island over time  • explain how human behaviour changed the ecosystem of Easter Island  • relate the changes to the ecosystem on Easter Island to changes in Australian ecosystems today. | **Investigating Easter Island**  Students can investigate further in the history of Easter Island and the implication it may have for today’s environments. The BBC clip from *The State of the Planet* and the History website a great places to start. | **Oxford Science 7 WA resources**  • Extend your understanding, page 111 |
| **Additional resources**  This 4 minute BBC clip shows David Attenborough discussing the implications of the history of Easter Island.  <http://www.bbc.co.uk/programmes/p004hsk7>  The History website contains detailed information about Easter Island.  <http://www.history.com/topics/easter-island> |
| **6.6 Environments can be responsibility managed**  **(pages 112–113)** | *Science Understanding*  ACSSU112  *Science as a Human Endeavour*  ACSHE119  ACSHE223  ACSHE120  ACSHE121  *Science Inquiry Skills*  ACSIS125  ACSIS131  ACSIS133 | By the end of this unit, students should be able to:  • define green corridor, conservation and biodiversity  • describe how green wedges, corridors and backyard stepping stones can help conserve biodiversity  • explain the importance of biodiversity to an ecosystem. | **Challenge 6.6**  *Making a biosphere*  Students design and construct a sustainable aquatic biosphere in a 1 L bottle. Alternative to this activity, or design of the biosphere can be found at the Annenberg Learner website. | **Oxford Science 7 WA resources**  • Extend your understanding, page 113  • Challenge 6.6, page 201 |
| **Additional resources**  Annenberg Learner website contains a variety of teaching resources including lesson plans and instruction for building an EcoColumn.  <http://www.learner.org/courses/essential/life/bottlebio/ecocol/index.html> |
| **6.7 Modern land managers use traditional techniques**  **(pages 114–115)** | *Science Understanding*  ACSSU112  *Science as a Human Endeavour*  ACSHE223  ACSHE121  *Science Inquiry Skills*  ACSIS125  ACSIS130  ACSIS132  ACSIS133 | By the end of this unit, students should be able to:  • describe some traditional methods of ecosystem management  • explain the importance of combining traditional management methods with modern scientific understanding. | **Challenge 6.7**  *Looking at Eucalypt adaptations*  Students investigate the characteristics of eucalypt nuts, leaves and bark that make it suitable for a semi-arid climate.  **Natural disaster management**  Students can play the *Stop Disasters!* game to get an idea of how natural disasters may be managed in the real world. | **Oxford Science 7 WA resources**  • Extend your understanding, page 115  • Challenge 6.7, page 202 |
| **Additional resources**  The UN/ISDR stimulator demonstrates how some natural disasters may be managed. However, the instruction may need to be simplified form some students.  <http://www.stopdisastersgame.org/en/playgame.html> |
| **6 Review**  **(pages 116–118)** | *Science Understanding*  ACSSU112  *Science Inquiry Skills*  ACSIS133 | By the end of this unit, students should be able to:  • define all Key Words listed on page 118  • use food chains and food webs to represent how matter and energy cycles through ecosystems  • predict the effect of environmental changes to feeding relationships  • 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 116–117  • Research topics, page 117  • Key Words list, page 118 |