Suggested teaching program

**Chapter 7: Surviving**

Time allocation: 5 weeks

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| **Context and overview** |
| In year 8, analyse the relationship between structure and function at cell, organ and body system levels. Students use experimentation to isolate relationships between components in systems and explain these relationships through increasingly complex representations. They make predictions and propose explanations, drawing on evidence to support their views. |
| **Syllabus outcomes addressed** |
| • Multi-cellular organisms contain systems of organs carrying out specialised functions that enable them to survive and reproduce ACSSU150  • Scientific knowledge has changed peoples’ understanding of the world and is refined as new [evidence](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/evidence) becomes available ACSHE134  • Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures ACSHE226  • Solutions to contemporary issues that are found using science and [technology](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/technology), may impact on other areas of society and may involve ethical considerations ACSHE135  • Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge ACSIS139  • Collaboratively and individually plan and conduct a range of [investigation](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/investigation) types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed ACSIS140  • Measure and control variables, select equipment appropriate to the task and collect [data](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/data) with accuracy ACSIS141  • Construct and use a range of representations, including graphs, keys and models to represent and [analyse](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/analyse) patterns or relationships in [data](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/data) using [digital technologies](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/digital-technologies) as appropriate ACSIS144  • Summarise [data](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/data), from students’ own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on [evidence](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/evidence) ACSIS145  • Reflect on scientific investigations including evaluating the quality of the [data](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/data) collected, and identifying improvements ACSIS146  • Use scientific knowledge and findings from investigations to [evaluate](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/evaluate) claims based on [evidence](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/evidence) ACSIS234  • Communicate ideas, findings and [evidence](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/evidence) based solutions to problems using [scientific language](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/scientific-language), and representations, using [digital technologies](http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/science-v9/overview/glossary/digital-technologies) as appropriate ACSIS148 |
| **Achievement standards** |
| Students analyse the relationship between structure and function at cell, organ and body system levels. Students examine the different science knowledge used in occupations. They explain how evidence has led to an improved understanding of a scientific idea and describe situations in which scientists collaborated to generate solutions to contemporary problems.  Students identify and construct questions and problems that they can investigate scientifically. They consider safety and ethics when planning investigations, including designing field or experimental methods. They identify variables to be changed, measured and controlled. Students construct representations of their data to reveal and analyse patterns and trends, and use these when justifying their conclusions. They explain how modifications to methods could improve the quality of their data and apply their own scientific knowledge and investigation findings to evaluate claims made by others. They use appropriate language and representations to communicate science ideas, methods and findings in a range of text types. |

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| **Student book section** | **WA Syllabus links** | **Suggested indicators of learning and understanding** | **Suggested teaching and learning activities** | **Resources** |
| **7.1 The human body is divided into systems**  **(pages 116–117)** | *Science Understanding*  ACSSU150  *Science as a Human Endeavour*  ACSHE134  ACSHE226  *Science Inquiry Skills*  ACSIS144  ACSIS148 | By the end of this unit, students should be able to:  • define tissue, organ, body system and anatomy  • describe the relationship between cells, tissues, organs and body systems  • provide examples of body systems and the main organs they involve. | **What if?**  Students investigate the responses of their own body to exercise.  **Challenge 7.1**  *Brown paper body brainstorm*  Students draw all the organs they can think of inside a human body outline and develop a colour coding system to indicate organs systems. | **Oxford Science 8 Western Australian Curriculum resources**  • What if? Page 115  • Check your learning, page 117  • Challenge 7.1, page 203 |
| **7.2 The digestive system is made up of organs**  **(pages 118–119)** | *Science Understanding*  ACSSU150  *Science Inquiry Skills*  ACSIS139  ACSIS140  ACSIS141  ACSIS144  ACSIS145  ACSIS146  ACSIS234  ACSIS148 | By the end of this unit, students should be able to:  • define digestion, peristalsis, chyme and villi  • describe the differences between chemical and physical digestion  • list the main organs of the digestive system  • explain the function of the digestive system  • relate the structure of villi to their function. | **Experiment 7.2A**  *Digesting protein*  Students investigate the function of pepsin as a digestive enzyme and determine the optimal conditions for its action.  **Experiment 7.2B**  *What if an enzyme was boiled?*  Students investigate the effect of boiling and other treatments on the action of enzymes using pineapple to dissolve jelly.  **Digestive system in action**  Students can consolidate their understanding of the structure and function of the digestive system using the John Kitses animated digestive system. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 119  • Experiment 7.2A, page 204  • Experiment 7.2B, page 205 |
| **Additional resources**  John Kitses interactive, animated digestive system:  <http://kitses.com/animation/digestion.html> |
| **7.3 The digestive system varies between animals**  **(pages 120–121)** | *Science Understanding*  ACSSU150  *Science Inquiry Skills*  ACSIS148 | By the end of this unit, students should be able to:  • define caecum, rumen, reticulum, omasum and abomasum  • describe why there are differences in the digestive systems of different animals  • relate the structure of teeth to their function  • relate the structure of organs in the digestive system to their function. | **Comparative digestion**  Students can investigate the differences between herbivore and carnivore digestive system by reading the information on the VetSci website. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 121 |
| **Additional resources**  VetSci Comparative digestion:  <http://vetsci.co.uk/2010/05/14/comparative-digestion/> |
| **7.4 Things sometimes go wrong in the digestive system**  **(pages 122–123)** | *Science Understanding*  ACSSU150  *Science as a Human Endeavour*  ACSHE134  ACSHE226  *Science Inquiry Skills*  ACSIS148 | By the end of this unit, students should be able to:  • define ulcers, gallstones, gluten intolerance, constipation, diarrhoea and ultrasound  • describe some common malfunctions of the digestive system and the diseases or conditions they lead to. | **Investigating digestive problems**  Students can choose one of the problems associated with digestion from this section, or another to investigate. In pairs or small groups, they can present their information as a poster, verbal presentation or another form. | **Oxford Science 8 Western Australian Curriculum resources**  • Extend your understanding, page 123 |

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| **7.5 The respiratory system exchanges gases**  **(pages 124–125)** | *Science Understanding*  ACSSU150  *Science as a Human Endeavour*  ACSHE134  ACSHE226  *Science Inquiry Skills*  ACSIS139  ACSIS140  ACSIS141  ACSIS145  ACSIS148 | By the end of this unit, students should be able to:  • define cellular respiration  • identify the key organs and structure of the respiratory system including: trachea, bronchi, lungs, pharynx, epiglottis, alveoli and diaphragm  • describe the role of the respiratory system  • relate the structure and function of the alveoli  • explain the difference between respiration and breathing  • demonstrate controlled dissection skills. | **Challenge 7.5A**  *Measure your lung capacity*  Students determine their own lung capacity through displacing water in a container.  **Challenge 7.5B**  *Fish dissection*  Students develop their dissecting skills and investigate the organ systems of a fish.  **Virtual salmon dissection**  Students may prefer to carry out the virtual dissection of a fish at the Langley School website.  **Bitesize respiratory system**  Student can consolidate their understanding of the structure and function of the human respiratory system through completing the Bitesize tutorial. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 125  • Challenge 7.5A, page 206  • Challenge 7.5B, page 206 |
| **Additional resources**  BBC Bitesize Respiratory System tutorial:  <http://www.bbc.co.uk/education/guides/z6h4jxs/revision/2>  Langley Schools virtual salmon dissection:  <http://www2.sd35.bc.ca/uconnect/salmon/DissectionGame.html> |
| **7.6 Things sometimes go wrong in the respiratory system**  **(pages 126–127)** | *Science Understanding*  ACSSU150  *Science as a Human Endeavour*  ACSHE136  *Science Inquiry Skills*  ACSIS148 | By the end of this unit, students should be able to:  • describe the symptoms of asthma, emphysema and pneumonia  • provide examples of diseases of the human respiratory system  • explain how ventolin relieves the symptoms of asthma. | **The physical changes involved in asthma**  Students can learn more about the effects of asthma by watching the narrated animation from the NHS website. | **Oxford Science 8 Western Australian Curriculum resources**  • Extend your understanding, page 127 |
| **Additional resources**  NHS website has an animation of the processes involved in asthma:  <http://www.nhs.uk/video/pages/asthmaanimation.aspx> |

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| **7.7 the circulatory system carries substances around the body**  **(pages 128–129)** | *Science Understanding*  ACSSU150  *Science as a Human Endeavour*  ACSHE134  ACSHE226  *Science Inquiry Skills*  ACSIS139  ACSIS140  ACSIS141  ACSIS144  ACSIS148 | By the end of this unit, students should be able to:  • list key organs and structures of the circulatory system including: heart, atria, ventricles, blood vessels, arteries, arterioles, capillaries and veins  • describe the components of blood and their functions, including: red blood cells, plasma, white blood cells and platelets  • identify and describe the functions of the main structures of the heart  • relate the presence of muscular walls and valves in arteries and veins to the relative blood pressure  • demonstrate controlled dissection skills. | **Experiment 7.7**  *Heart dissection*  Students develop their dissection skills and investigate the structure and function of a mammalian heart.  **Bitesize circulatory system**  Student can consolidate their understanding of the structure and function of the human circulatory system through completing the Bitesize tutorial, activity and quiz. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 129  • Experiment 7.7, page 207 |
| **Additional resources**  BBC Bitesize Circulatory System tutorial:  <http://www.bbc.co.uk/education/guides/zhnk7ty/revision> |
| **7.8 Things sometimes go wrong in the circulatory system**  **(pages 130–131)** | *Science Understanding*  ACSSU150  *Science as a Human Endeavour*  ACSHE134  ACSHE226  *Science Inquiry Skills*  ACSIS139  ACSIS140  ACSIS141  ACSIS144  ACSIS145  ACSIS146  ACSIS234  ACSIS148 | By the end of this unit, students should be able to:  • provide examples of diseases of the circulatory system  • describe the main symptoms and causes of some circulatory diseases including coronary heart disease. | **Challenge 7.8**  *Modelling blood flow*  Students investigate the flow of blood around the body by modelling the different diameters of arteries and capillaries. | **Oxford Science 8 Western Australian Curriculum resources**  • Extend your understanding, page 131  • Challenge 7.8, page 208 |

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| **7.9 The excretory system removes wastes**  **(pages 132–133)** | *Science Understanding*  ACSSU150  *Science Inquiry Skills*  ACSIS139  ACSIS140  ACSIS141  ACSIS144  ACSIS145  ACSIS148 | By the end of this unit, students should be able to:  • define excretion, amino acids, ammonia, urea and metabolism  • describe the key organs of the excretory system including kidneys, skin, bladder and liver  • describe the structure and function of kidneys, liver and skin  • explain the process of excretion of amino acids  • relate the structure and function of a nephron  • demonstrate controlled dissection skills. | **Experiment 7.9**  *Kidney dissection*  Students develop their dissection skills and investigate the structure and function of a mammalian kidney.  **Bitesize excretion tutorial**  Student can consolidate their understanding of the structure and function of the human excretory system and learn about exertion in plants through completing the Bitesize tutorial and quiz. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 133  • Experiment 7.9, page 208 |
| **Additional resources**  BBC Bitesize excretion tutorial:  <http://www.bbc.co.uk/education/guides/zj7v4wx/revision> |

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| **7.10 Plants have tissues and organs**  **(pages 134–135)** | *Science Understanding*  ACSSU150  *Science Inquiry Skills*  ACSIS139  ACSIS140  ACSIS141  ACSIS144  ACSIS145  ACSIS146  ACSIS234  ACSIS148 | By the end of this unit, students should be able to:  • define osmosis, transpiration and chlorophyll  • list and describe the structure and function of major plant tissues including: stems, leaves, roots, xylem and phloem  • explain the function of stomata in transpiration and photosynthesis  • relate the structure and function of root hairs. | **Challenge 7.10A**  *Locating the stoma of a leaf*  Students use their microscope skills to investigate the structure, function and location of stomata on leaves.  **Challenge 7.10B**  *Locating the xylem and phloem in a stem*  Students investigate the location and function of xylem and phloem in celery stalks and compare to the human circulatory system.  **Challenge 7.10C**  *Modelling root cells*  Students investigate osmosis and its role in the function of root hairs.  **Experiment 7.10**  *Factors that affect transpiration*  Students design an experiment to investigate a factor that may affect transpiration, after establishing a baseline rate of transpiration.  **Osmosis**  Students can learn more about the process of osmosis and how if differs from diffusion by watching the BBC Bitesize animation. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 135  • Experiment 7.10, page 210  • Challenge 7.10A, page 209  • Challenge 7.10B, page 209  • Challenge 7.10C, page 210 |
| **Additional resources**  BBC Bitesize osmosis animation:  <http://www.bbc.co.uk/schools/gcsebitesize/science/add_gateway_pre_2011/greenworld/waterrev1.shtml> |
| **7 Review**  **(pages 136–138)** | *Science Understanding*  ACSSU150  *Science Inquiry Skills*  ACSIS148 | By the end of this unit, students should be able to:  • define all Key Words listed on page 138  • explain how the multicellular organisms survive through the specialised functions of organ systems  • 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 8 Western Australian Curriculum resources**  • Review questions, pages 136–137  • Research topics, page 137  • Key Words list, page 138 |