Suggested teaching program

**Chapter 1: Science toolkit**

Time allocation: 3 weeks

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| **Context and overview** |
| In year 8, 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** |
| • 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  • 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 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** |
| **1.1 Science laboratories contain hazards**  **(pages 2–3)** | *Science Inquiry Skills*  ACSIS140  ACSIS148 | By the end of this unit, students should be able to:  • define hazard and corrosive  • describe the purpose of hazard symbols  • provide examples of some potential hazards in a science laboratory  • identify common hazard symbols  • demonstrate safe behaviour in the laboratory. | **What if?**  Students investigate their observation skills and relate their success to other variables.  **Learning and working in a laboratory**  Revisit basic safety procedures required for conducting experiments and activities in a science laboratory. See pages 156-158.  **Laboratory OH & S**  Students can investigate some of the hazard signs and safety behaviours expected in workplaces. The Safe Work Australia website will be a good place to start. | **Oxford Science 8 Western Australian Curriculum resources**  • What if? Page 1  • Check your learning, page 3 |
| **Additional resources**  The Safe Work Australia website has a list of standard hazard symbols and other health and safety information:  <http://www.safeworkaustralia.gov.au/sites/swa/whs-information/hazardous-chemicals/pages/hazardous-chemicals-other-substances> |
| **1.2 Dissection is an important science skill**  **(pages 4–7)** | *Science as a Human Endeavour*  ACSHE134  *Science Inquiry Skills*  ACSIS139  ACSIS140  ACSIS148 | By the end of this unit, students should be able to:  • define anatomy  • identify the key instruments required for a dissection  • describe the purpose of dissection  • list appropriate safety equipment required for a dissection  • demonstrate safe dissecting skills. | **Skills Lab 1.2**  *Dissecting a chicken wing*  Students develop their dissection and specimen drawing skills with this activity.  **Videos of dissections**  A quick Internet search for ‘Inside Nature’s Giants’ will locate a number of dissection videos, but footage of the dissection of a giant squid can be found on the Museum Victoria website.  **Ethics of dissections**  Students can discuss the pros and cons of dissections. A video explaining some of the ethical considerations behind ‘Inside Nature’s Giants’ can be found on the Channel 4 website. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 5  • Skills Lab 1.2, pages 6–7 |
| **Additional resources**  The Museum Victoria website hosts a video of a dissection of a giant squid:  <http://museumvictoria.com.au/learning-federation/video-temp/public-dissection-of-giant-squid-video/>  The Channel 4 website has many links to articles and clips about ‘Inside Nature’s Giants’, including ethical considerations:  <http://www.channel4.com/programmes/inside-natures-giants> |
| **1.3 Scientists design their own experiments**  **(pages 8–9)** | *Science Inquiry Skills*  ACSIS139  ACSIS140  ACSIS141  ACSIS144  ACSIS145  ACSIS148 | By the end of this unit, students should be able to:  • define fair test, variable, dependant variable, independent variable, controlled variables and hypothesis  • describe the key features of a fair test  • provide examples of dependant, independent and controlled variables from scenarios  • explain how to formulate a hypothesis  • demonstrate the ability to follow experimental methods  • demonstrate sound experimental design. | **Experiment 1.3A**  *Making a balloon rocket*  Students establish a baseline recording to start their investigation in Experiment 1.3B.  **Experiment 1.3B**  *Changing the independent variable*  Using the baseline established in Experiment 1.3A, students design their own experiment to test the effect of an independent variable. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 8  • Experiment 1.3A, page 9  • Experiment 1.3B, page 9 |
| **1.4 Scientists keep a logbook and write formal reports**  **(pages 10–11)** | *Science Inquiry Skills*  ACSIS139  ACSIS140  ACSIS141  ACSIS144  ACSIS145  ACSIS146  ACSIS234  ACSIS148 | By the end of this unit, students should be able to:  • list the main sections of an experimental report  • describe the information required in each section of an experimental report  • explain the purpose of a logbook. | **Experiment 1.4**  *Marshmallow slingshots*  Students determine the relationship between two variables – the distance of elastic extension and distance travelled by projectile. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 10  • Experiment 1.4, page 159 |
| **1.5 Tables and graphs are used to present scientific data**  **(pages 12–13)** | *Science Inquiry Skills*  ACSIS144  ACSIS145  ACSIS148 | By the end of this unit, students should be able to:  • describe a directly proportional relationship and inversely proportional relationship  • provide examples of a directly proportional relationship and inversely proportional relationship  • demonstrate the ability to extrapolate data. | **The right tool for the job**  Students can investigate which graph is most appropriate for displaying scientific data. They can make cue cards or posters displaying hints and tips for drawing appropriate graphs. | **Oxford Science 8 Western Australian Curriculum resources**  • Check your learning, page 13 |
| **1 Review**  **(pages 14–16)** | *Science Inquiry Skills*  ACSIS139  ACSIS144  ACSIS145  ACSIS148 | By the end of this unit, students should be able to:  • define all Key Words listed on page 16  • write a testable hypothesis  • conduct investigations safely  • measure and control variables  • construct and interpret graphs  • 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 14–15  • Research topics, page 15  • Key Words list, page 16 |