

# Year 4 unit overview — Australian Curriculum: Science

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), *Australian Curriculum v3.0: Science for Foundation–10*, <[www.australiancurriculum.edu.au/Science/Curriculum/F-10](http://www.australiancurriculum.edu.au/Science/Curriculum/F-10)>.








School name	Unit title	Duration of unit
Our School	Here today, gone tomorrow	One term


## Unit outline

Students engage with the idea that both natural processes and humans have an impact on Earth's surface. Science knowledge helps people understand the effects of their actions. This unit has local relevance to students as each year Queensland loses tonnes of soil to erosion. Students investigate human activities and the resulting effects on a local surface. They also identify changes to Earth's surface that have resulted from natural processes.

Questions that shape the inquiry include:

- What is a catchment? Where is our catchment?
- How has the surface of our local catchment changed naturally over time?
- What are the human activities that impact on the surface of our local catchment?
- What are the effects on the surface of our local catchment from these human activities and natural processes?
- What solutions could be offered to assist in minimising the effects caused by human activity and natural processes?
- How do scientists develop and model solutions?

Identify curriculum			
Content descriptions to be taught			General capabilities and cross-curriculum priorities
Science Understanding	Science as a Human Endeavour	Science Inquiry Skills	
<b>Earth and space sciences</b> <ul style="list-style-type: none"> <li>Earth's surface changes over time as a result of natural processes and human activity (<a href="#">ACSSU075</a>)</li> </ul>	<b>Nature and development of science</b> <ul style="list-style-type: none"> <li>Science involves making predictions and describing patterns and relationships (<a href="#">ACSHE061</a>)</li> </ul> <b>Use and influence of science</b> <ul style="list-style-type: none"> <li>Science knowledge helps people to understand the effect of their actions (<a href="#">ACSHE062</a>)</li> </ul>	<b>Questioning and predicting</b> <ul style="list-style-type: none"> <li>With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge (<a href="#">AC SIS064</a>)</li> </ul> <b>Planning and conducting</b> <ul style="list-style-type: none"> <li>Suggest ways to plan and conduct investigations to find answers to questions (<a href="#">AC SIS065</a>)</li> <li>Safely use appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate (<a href="#">AC SIS066</a>)</li> </ul> <b>Processing and analysing data and information</b> <ul style="list-style-type: none"> <li>Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends (<a href="#">AC SIS068</a>)</li> <li>Compare results with predictions, suggesting possible reasons for findings (<a href="#">AC SIS216</a>)</li> </ul> <b>Evaluating</b> <ul style="list-style-type: none"> <li>Reflect on the investigation; including whether a test was fair or not (<a href="#">AC SIS069</a>)</li> </ul>	 <b>Literacy</b> <ul style="list-style-type: none"> <li>Use appropriate scientific language specific to the topic.</li> </ul>  <b>Numeracy</b> <ul style="list-style-type: none"> <li>Create tables, charts and graphs to display information and find patterns.</li> </ul>  <b>ICT capability</b> <ul style="list-style-type: none"> <li>Use a range of digital technologies to assist with investigating the concepts.</li> </ul>  <b>Critical and creative thinking</b> <ul style="list-style-type: none"> <li>Use thinking skills to complete group activities and open-ended tasks.</li> </ul>  <b>Ethical behaviour</b> <ul style="list-style-type: none"> <li>Consider how the decisions of people impact on Earth's surface.</li> </ul>  <b>Aboriginal and Torres Strait Islander histories and cultures</b> <ul style="list-style-type: none"> <li>Demonstrate alternative ways of knowing and sharing.</li> </ul>  <b>Asia and Australia's engagement with Asia</b> <ul style="list-style-type: none"> <li>Consider the effect of events such</li> </ul>

		<b>Communicating</b> <ul style="list-style-type: none"> <li>Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports (<a href="#">AC SIS071</a>)</li> </ul>	as floods and extreme weather on the landscape, both in Australia and in the Asia region.  <b>Sustainability</b> <ul style="list-style-type: none"> <li>Discuss land clearing and the loss of habitat for animals.</li> </ul>
<b>Achievement standard</b>			
<p>By the end of Year 4, students apply the observable properties of materials to explain how objects and materials can be used. They use contact and non-contact forces to describe interactions between objects. They discuss how natural and human processes cause changes to the Earth's surface. They describe relationships that assist the survival of living things and sequence key stages in the life cycle of a plant or animal. They identify when science is used to ask questions and make predictions. They describe situations where science understanding can influence their own and others' actions.</p> <p>Students follow instructions to identify investigable questions about familiar contexts and predict likely outcomes from investigations. They discuss ways to conduct investigations and safely use equipment to make and record observations. They use provided tables and simple column graphs to organise their data and identify patterns in data. Students suggest explanations for observations and compare their findings with their predictions. They suggest reasons why their methods were fair or not. They complete simple reports to communicate their methods and findings.</p>			
<b>Relevant prior curriculum</b>		<b>Curriculum working towards</b>	
<b>In the Australian Curriculum: Science at Year 1</b> <b>Science Understanding</b> Earth and space sciences <ul style="list-style-type: none"> <li>Observable changes occur in the sky and landscape.</li> </ul> <b>In the Australian Curriculum: Science at Year 3</b> <b>Science as a Human Endeavour</b> <ul style="list-style-type: none"> <li>The content descriptions for Science as a Human Endeavour are the same for Year 3 and Year 4.</li> </ul> <b>Science Inquiry Skills</b> <ul style="list-style-type: none"> <li>The content descriptions for Science Inquiry Skills are the same for Year 3 and Year 4.</li> </ul>		<b>In the Australian Curriculum: Science at Year 6</b> <b>Science Understanding</b> Earth and space sciences <ul style="list-style-type: none"> <li>Sudden geological changes or extreme weather conditions can affect Earth's surface.</li> </ul> <b>In the Australian Curriculum: Science at Year 5</b> <b>Science as a Human Endeavour</b> Nature and development of science <ul style="list-style-type: none"> <li>Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena.</li> <li>Important contributions to the advancement of science have been made by people from a range of cultures.</li> </ul> Use and influence of science <ul style="list-style-type: none"> <li>Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives.</li> <li>Scientific knowledge is used to inform personal and community decisions.</li> </ul>	

	<p><b>Science Inquiry Skills</b></p> <p>Questioning and predicting</p> <ul style="list-style-type: none"> <li>• With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be.</li> </ul> <p><b>Planning and conducting</b></p> <ul style="list-style-type: none"> <li>• With guidance, plan appropriate investigation methods to answer questions or solve problems.</li> <li>• Decide which variable should be changed and measured in fair tests and accurately observe, measure and record data, using digital technologies as appropriate.</li> <li>• Use equipment and materials safely, identifying potential risks.</li> </ul> <p>Processing and analysing data and information</p> <ul style="list-style-type: none"> <li>• Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate.</li> <li>• Compare data with predictions and use as evidence in developing explanations.</li> </ul> <p>Evaluating</p> <ul style="list-style-type: none"> <li>• Suggest improvements to the methods used to investigate a question or solve a problem.</li> </ul> <p>Communicating</p> <ul style="list-style-type: none"> <li>• Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts.</li> </ul>
<p><b>Bridging content</b></p>	
<p>Both the <b>Australian Curriculum: Science at Year 4</b> and the <b>Year 5 Essential Learning: Earth and beyond</b> focus on changes to Earth's surface due to natural processes and human activity.</p>	
<p><b>Links to other learning areas</b></p>	
<p><b>In the Australian Curriculum: Mathematics at Year 4</b></p> <p>Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values.</p>	

Assessment		Make judgments
Describe the assessment	Assessment date	<p>Teachers gather evidence to make judgments about the following characteristics of student work:</p> <p><b>Understanding</b></p> <ul style="list-style-type: none"> <li>description and identification of scientific information and concepts</li> <li>use of science knowledge to generate solutions and explanations</li> <li>identification of the use of science</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>identification of questions for investigation, making plausible predictions</li> <li>safe use of materials, tools and equipment, following procedures to make observations</li> <li>identification of patterns and trends in data and observations, making comparisons with predictions</li> <li>communication and representation of ideas, methods, observations and findings</li> </ul> <p>For further advice and guidelines on constructing guides to making judgments refer to the Learning area standard descriptors: <a href="http://www.qsa.qld.edu.au">www.qsa.qld.edu.au</a></p>
<p>Students are given opportunities to demonstrate their knowledge, skills and understanding through both formative and summative assessment. The assessment is collated in student folios and allows for ongoing feedback to students on their learning.</p> <p>Year 4 teachers make decisions about the length of time required to complete the tasks and the conditions under which the assessment is to be conducted.</p> <p>The teaching and learning experiences throughout the term provide opportunities for students to develop the understandings and skills required to complete these assessments. As students engage with these learning experiences the teacher can provide feedback on specific skills.</p> <p><b>Experimental investigation: Model design and demonstration (Multimodal)</b></p> <p>Students identify a problem to be investigated in their local area by making an observation. They:</p> <ul style="list-style-type: none"> <li>pose a question to investigate the factors that affect Earth's surface in their local catchment</li> <li>plan, make predictions, conduct, evaluate and reflect on an investigation that answers this question</li> <li>recommend actions to minimise or solve the identified problem</li> <li>design and construct a model to collect data and present their demonstration to the class, explaining the results and sharing their recommendations.</li> </ul> <p>Observations could include:</p> <ul style="list-style-type: none"> <li>compacted soil at the local sporting field, BMX track or camp site</li> <li>erosion on local sand dunes where vegetation has been cleared</li> <li>clearing of all the trees and grass during the development of a new housing estate</li> <li>flooding of local farms after harvesting but before the establishment of the next crop.</li> </ul> <p>Suggested conditions:</p> <ul style="list-style-type: none"> <li>100–200 words</li> <li>open.</li> </ul>	Assessment will occur after the learning sequence	

Teaching and learning	Supportive learning environment	
Teaching strategies and learning experiences	Adjustments for needs of learners	Resources
<p>This unit overview has been developed using the 5E inquiry model for teaching and learning science. The 5E model follows a sequence of:</p> <ul style="list-style-type: none"> <li>Engage — begin with a lesson that captures students' interest through an activity or question.</li> <li>Explore — organise hands-on activities where students explore a concept or skill.</li> <li>Explain — guide students to develop explanations for the experience after they have explored a concept or skill.</li> <li>Elaborate — encourage students to apply what they have learnt to a new situation.</li> <li>Evaluate — provide an opportunity for students to review and reflect on their learning.</li> </ul> <p><b>Engage</b></p> <ul style="list-style-type: none"> <li>Set the context of the unit using images of erosion, turbid flood waters and dust storms that show how Earth's surface changes.</li> <li>Use before-and-after historical images that show changes to the local area, including the contour of the creek, local drains and flooding. Newspaper articles and documentaries could also be used.</li> <li>Invite an older member of the community to discuss their experiences and observations about changes to the area.</li> <li>Discuss what the students know about the surface of Earth and start a class word wall and question board.</li> </ul> <p><b>Explore</b></p> <ul style="list-style-type: none"> <li>Complete simple activities which introduce focus questions, such as: What is a catchment? Where is our catchment? What is our place in the catchment?</li> <li>Locate the local catchment on Google Earth.</li> <li>Conduct a field study of the local environment, identifying evidence of erosion and weathering on Earth's surface.</li> <li>Investigate the characteristics of the soil to answer the questions: What is the soil like in our catchment? Is the soil gritty? Sandy? Sticky? Silky smooth? Hard to squeeze? Soft? If possible, observe soil under a microscope.</li> <li>Record observations and data in the science journal by drawing a table to describe a variety of samples. Include answers to questions such as:</li> </ul>	<p>Section 6 of the <i>Disability Standards for Education</i> (The Standards for Curriculum Development, Accreditation and Delivery) states that education providers, including class teachers, must take reasonable steps to ensure a course/program is designed to allow any student to participate and experience success in learning.</p> <p>The <i>Disability Standards for Education 2005</i> (Cwlth) is available from: &lt;<a href="http://www.ag.gov.au">www.ag.gov.au</a>&gt; select Human rights and anti-discrimination &gt; Disability standards for education.</p>	<p><b>Web</b></p> <ul style="list-style-type: none"> <li>websites for videos on erosion, dust storms and floods</li> <li>free images</li> <li>Google Earth</li> <li>websites for factsheets, interactive worksheets: <a href="http://www.oresomeresources.com">www.oresomeresources.com</a></li> </ul> <p><b>Print</b></p> <ul style="list-style-type: none"> <li>State Library of Queensland photographs</li> <li>free images</li> <li>worksheets</li> <li>word wall</li> </ul> <p><b>Equipment</b></p> <ul style="list-style-type: none"> <li>assorted soil samples</li> <li>trays</li> <li>sand</li> <li>water, watering can</li> <li>sticks, plant matter</li> <li>jars</li> </ul> <p><b>Safety equipment</b></p> <ul style="list-style-type: none"> <li>completed risk assessment for activities that use electrical items and sharp objects</li> </ul>

Teaching and learning	Supportive learning environment	
Teaching strategies and learning experiences	Adjustments for needs of learners	Resources
<ul style="list-style-type: none"> <li>– What does it look like?</li> <li>– What is the texture of the soil?</li> <li>– What is the size and shape of the grains?</li> <li>– Is the soil moist?</li> <li>– Can you mould it?</li> <li>• Demonstrate three simulated environments using models in trays with a base of sand and a watering can to pour water on each to simulate rainfall. Students draw labelled diagrams to show the impact on each environment. Environments could include: <ul style="list-style-type: none"> <li>– a fully forested area using sticks, plant matter, shrubs</li> <li>– a semi-forested area using sticks, plant matter, shrubs</li> <li>– a cleared area.</li> </ul> </li> </ul> <p><b>Explain</b></p> <ul style="list-style-type: none"> <li>• Share ideas and negotiate an understanding of the focus questions raised in the “explore” phase.</li> <li>• Discuss what happened during the teacher demonstration, why and how it happened and identify ways it could be fixed.</li> <li>• Discuss the data that has been collected and what it infers about soil and erosion.</li> <li>• Consider the impact of the actions of people on the surface of the local catchment. Actions could include sport and recreation, mining, farming and housing. In groups, students research one of these impacts and share their findings with the class.</li> <li>• Explore the question: What are the consequences of human actions and natural processes on the surface of the local catchment?</li> </ul> <p><b>Elaborate</b></p> <ul style="list-style-type: none"> <li>• Work on the assessment task where students identify a problem to be investigated in their local area by making an observation.</li> </ul> <p><b>Evaluate</b></p> <ul style="list-style-type: none"> <li>• Select an area in the local environment which has undergone erosion or other change.</li> <li>• Create an action plan to manage and minimise the human and natural impact, e.g. planting native grasses and small shrubs, creating a wind break.</li> </ul>		

Use feedback	
<b>Ways to monitor learning and assessment</b>	Teachers collaboratively plan the teaching, learning and assessment to meet the needs of all learners. Before the model presentation, teachers discuss task-specific descriptors of the quality of student performance. Teachers individually mark all student responses, applying the shared understanding achieved through this calibration process.
<b>Feedback to students</b>	Teachers plan opportunities through the teaching strategies and learning experiences of the unit. Teachers provide ongoing feedback and encouragement to students on their strengths and areas for improvement. Through particular learning experiences students can reflect on and discuss with their teachers and peers what they are able to do well and what they need to do to improve.
<b>Reflection on the unit plan</b>	At the conclusion of the unit, all teachers who have been involved in planning, teaching, learning and assessment come together to reflect on the successes and challenges of the unit. They come with their personal reflections through answers to the following questions: <ul style="list-style-type: none"> <li>• What worked well in this unit?</li> <li>• What was a stumbling block?</li> <li>• How would you refine it?</li> <li>• What trends and gaps in learning have you identified?</li> <li>• How will you build on these learning experiences next term and beyond?</li> </ul>