Alignment with the Australian Curriculum: Science

This *Earthquake explorers* unit embeds all three strands of the Australian Curriculum: Science. The table below lists sub-strands and their content for Year 6. This unit is designed to be taught in conjunction with other Year 6 units to cover the full range of the Australian Curriculum: Science content for Year 6.

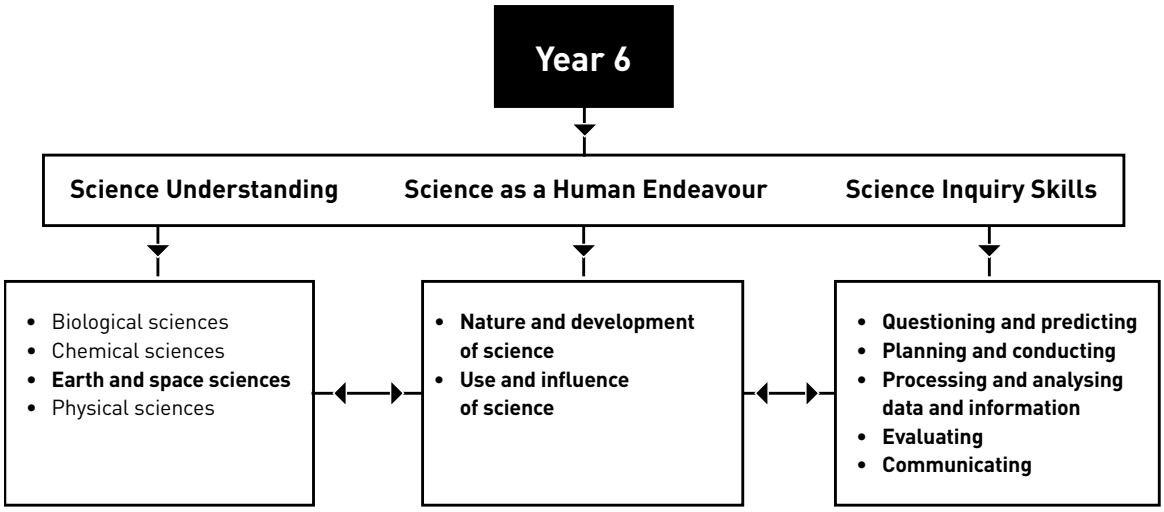
For ease of assessment the table below outlines the sub-strands and their aligned lessons.

Strand	Sub-strand	Code	Year 6 content descriptions	Lessons
Science Understanding	**Earth and space sciences**	ACSSU096	Sudden geological changes or extreme weather conditions can affect Earth's surface	1–7
Science as a Human Endeavour	**Nature and development of science**	ACSHE098	Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena	2, 3, 4, 5, 7
		ACSHE099	Important contributions to the advancement of science have been made by people from a range of cultures	5
	Use and influence of science	ACSHE100	Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives	1, 2, 5, 7
		ACSHE220	Scientific knowledge is used to inform personal and community decisions	5, 7
Science Inquiry Skills	**Questioning and predicting**	ACSIS232	With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be	3, 5
	Planning and conducting	ACSIS103	With guidance, plan appropriate investigation methods to answer questions or solve problems	3, 6
		ACSIS104	Decide which variable should be changed and measured in fair tests and accurately observe, measure and record data, using digital technologies as appropriate	3, 6
		ACSIS105	Use equipment and materials safely, identifying potential risks	3, 6
	Processing and analysing data and information	ACSIS107	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	2, 4, 5
		ACSIS221	Compare data with predictions and use as evidence in developing explanations	5
	Evaluating	ACSIS108	Suggest improvements to the methods used to investigate a question or solve a problem	6
	Communicating	ACSIS110	Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts	1–7

AC All the material in the first four columns of this table is sourced from the Australian Curriculum.

Interrelationship of the science strands

The interrelationship between the three strands—Science Understanding, Science as a Human Endeavour and Science Inquiry Skills—and their sub-strands is shown below. Sub-strands covered in this unit are in bold.



AC All the terms in this diagram are sourced from the Australian Curriculum.

Relationship to overarching ideas

In the Australian Curriculum: Science, six overarching ideas support the coherence and developmental sequence of science knowledge within and across year levels. In *Earthquake explorers*, these overarching ideas are represented by:

Overarching idea	Incorporation in *Earthquake explorers*
Patterns, order and organisation	Students interpret secondary data and organise it in order to recognise patterns in the distribution of earthquakes in the world. They relate these patterns to data on tectonic plates to infer relationships between tectonic plate movement and earthquake activity.
Form and function	Through modelling, students investigate the relationship between the form of the earth's crust and the function of tectonic plates in causing earthquakes and their effects on the Earth's surface.
Stability and change	Students identify that gradual change on a global scale during periods of seeming stability can cause sudden, dramatic changes in a localised area. Students identify that earthquakes are not predictable, but that areas which are more likely to experience earthquakes can be predicted.
Scale and measurement	Students investigate the measurement of earthquake magnitude according to the modified Mercalli and Richter scales and explore how to use a seismometer to measure earthquake activity. They explore how changes to the Earth's surface can be measured by the effect on humans as well as by mathematical models. Students explore processes that occur over geological time and different timescales. They relate these slow processes to events that happen on timescales of days.
Matter and energy	Students explore how the movement energy of the Earth's tectonic plates can cause changes at the Earth's surface; the friction between plates sliding past each other can cause earthquakes and the collision of plates can raise mountains.
Systems	Students relate localised earthquake events to the global system of tectonic plates. They identify some common interactions between the plates, investigating the forces at work and the inputs and outputs of the system.

Curriculum focus

The Australian Curriculum: Science, is described by year level, but provides advice across four year groupings on the nature of learners. Each year grouping has a relevant curriculum focus.

Curriculum focus Years 6	Incorporation in *Earthquake explorers*
Recognising questions that can be investigated scientifically and investigating them	Students create and test models and analyse secondary data about earthquakes to form evidence-based claims about the processes that cause changes to the Earth's surface. Through modelling they explore methods of investigating natural phenomena that cannot be manipulated directly.

Achievement standards

The achievement standards of the Australian Curriculum: Science, indicates the quality of learning that students typically demonstrate by a particular point in their schooling, for example at the end of a year level. These standards will be reviewed regularly by ACARA and are available from the ACARA website.

By the end of the unit, teachers will be able to make evidence-based judgments on whether the students are achieving below, at or above the Australian Curriculum: Science Year 6 achievement standard.

General capabilities

The skills, behaviours and attributes that students need to succeed in life and work in the 21st century have been identified in the Australian Curriculum as general capabilities. There are seven general capabilities and they are embedded throughout the units. For further information see: www.australiancurriculum.edu.au

For examples of our unit-specific general capabilities information see the next page.

Earthquake explorers—Australian Curriculum General capabilities

General capabilities	Australian Curriculum description	*Earthquake explorers* examples
Literacy	Literacy knowledge specific to the study of science develops along with scientific understanding and skills. Primary**Connections** learning activities explicitly introduce literacy focuses and provide students with the opportunity to use them as they think about, reason and represent their understanding of science.	In *Earthquake explorers* the literacy focuses are: • science journals • storyboards • oral presentations • TWLH charts • glossaries • word walls • factual recounts • cutaway diagrams (optional) • factual texts • timelines • graphs.
Numeracy	Elements of numeracy are particularly evident in Science Inquiry Skills. These include practical measurement and the collection, representation and interpretation of data.	Students: • represent and interpret data in graphs • identify trends and patterns from numerical data.
Information and communication technology (ICT) competence	ICT competence is particularly evident in Science Inquiry Skills. Students use digital technologies to investigate, create, communicate, and share ideas and results.	Students are given optional opportunities to: • use interactive resource technology to view, record and analyse information • use a digital camera to record results • use ICT to create multimedia presentations.
Critical and creative thinking	Students develop critical and creative thinking as they speculate and solve problems through investigations, make evidence-based decisions, and analyse and evaluate information sources to draw conclusions. They develop creative questions and suggest novel solutions.	Students: • ask questions on a TWLH chart and answer them based on investigations • analyse and evaluate secondary sources of information to formulate conclusions • make evidence-based claims about regions that have relatively more earthquake activity.
Ethical behaviour	Students develop ethical behaviour as they explore ethical principles and guidelines in gathering evidence and consider the ethical implications of their investigations on others and the environment.	Students: • ask questions that respect each other's point of view • make reasoned judgments about social, environmental and personal effects of earthquakes.
Personal and social competence	Students develop personal and social competence as they learn to work effectively in teams, develop collaborative methods of inquiry, work safely, and use their scientific knowledge to make informed choices.	Students: • work collaboratively in teams • listen to and follow instructions to safely complete investigations • participate in discussions • consider the application of science to meet a range of personal and social needs.
Intercultural understanding	Intercultural understanding is particularly evident in Science as a Human Endeavour. Students learn about the influence of people from a variety of cultures on the development of scientific understanding.	• 'Cultural perspectives' opportunities are highlighted where relevant • Important contributions made to science by people from a range of cultures are highlighted where relevant.

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Cross-curriculum priorities

There are three cross-curriculum priorities identified by the Australian Curriculum:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia's engagement with Asia
- Sustainability.

For further information see: www.australiancurriculum.edu.au

Aboriginal and Torres Strait Islander histories and cultures

The PrimaryConnections Indigenous perspectives framework supports teachers' implementation of Aboriginal and Torres Strait Islander histories and cultures in science. The framework can be accessed at: www.science.org.au/primaryconnections

Earthquake explorers focuses on the Western science way of analysing secondary data and trends in order to make evidence-based claims about the causes of earthquakes. Students explore the tectonic plates model of the Earth and resultant explanations for observed changes at the Earth's surface.

Aboriginal and Torres Strait Islander Peoples might have other explanations for the observed phenomenon of earthquakes, or the formation of geological landforms, often referring to Dreamtime. For example, the Awabakal Indigenous people who live in the Newcastle region have a story about a kangaroo which makes the ground shake. Dreamtime stories can be specific to particular people or communities, or can be shared across different groups.

PrimaryConnections recommends working with Aboriginal and Torres Strait Islander community members to access local and relevant cultural perspectives. Protocols for engaging with Aboriginal and Torres Strait Islander community members are provided in state and territory education guidelines. Links to these are provided on the PrimaryConnections website.

Asia and Australia's engagement with Asia

The *Earthquake explorers* unit provides opportunities for students to compare magnitudes of earthquakes in Australia to those of neighbouring Asian countries. Students develop an understanding about why some Asian countries are more prone to higher magnitude earthquakes and appreciate the serious dangers and effects this can have on the people and their environment.

Sustainability

In *Earthquake explorers*, students explore how natural movements of Earth's tectonic plates can result in dramatic effects on people and the environment. Suggested curriculum links provide opportunities for students to develop understanding of how individual and community decisions about materials and building structures can mitigate or contribute to the effects of a natural disaster. This can assist them to develop knowledge, skills and values for making decisions about individual and community actions that contribute to sustainable developments in earthquake-prone regions.

Alignment with the Australian Curriculum: English and Mathematics

Strand	Sub-strand	Code	Year 6 content descriptions	Lessons
English–Language	**Language for interaction**	ACELA1517	Understand the uses of objective and subjective language and bias	1–7
	Expressing and developing ideas	ACELA1524	Identify and explain how analytical images like figures, tables, diagrams, maps and graphs contribute to our understanding of verbal information in factual and persuasive texts	1, 2, 4, 5
		ACELA1526	Understand how to use banks of known words, word origins, base words, suffixes and prefixes, morphemes, spelling patterns and generalisations to learn and spell new words, for example technical words and words adopted from other languages	1–7
English–Literacy	**Interacting with others**	ACELY1709	Participate in and contribute to discussions, clarifying and interrogating ideas, developing and supporting arguments, sharing and evaluating information, experiences and opinions	1–7
		ACELY1816	Use interaction skills, varying conventions of spoken interactions such as voice volume, tone, pitch and pace, according to group size, formality of interaction and needs and expertise of the audience	1–7
		ACELY1710	Plan, rehearse and deliver presentations, selecting and sequencing appropriate content and multimodal elements for defined audiences and purposes, making appropriate choices for modality and emphasis	1–7
	Interpreting, analysing, evaluating	ACELY1711	Analyse how text structures and language features work together to meet the purpose of a text	1, 2
		ACELY1712	Select, navigate and read texts for a range of purposes, applying appropriate text processing strategies and interpreting structural features, for example table of contents, glossary, chapters, headings and subheadings	5
		ACELY1713	Use comprehension strategies to interpret and analyse information and ideas, comparing content from a variety of textual sources including media and digital texts	1, 2, 4, 5
	Creating texts	ACELY1714	Plan, draft and publish imaginative, informative and persuasive texts, choosing and experimenting with text structures, language features, images and digital resources appropriate to purpose and audience	7
Mathematics–Statistics and Probability	**Data representation and interpretation**	ACMSP147	Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables	2, 5, 6
		ACMSP148	Interpret secondary data presented in digital media and elsewhere	2, 5

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Other links are highlighted at the end of lessons where possible. These links will be revised and updated on the website (www.science.org.au/primaryconnections)