





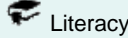
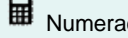
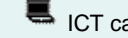
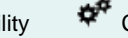
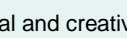
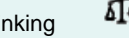
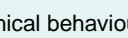

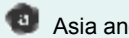
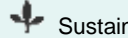


Year 9 Work Program — Australian Curriculum:

Science

Identify curriculum	Year level description (highlighted aspects indicate differences from the previous year level)	<p>The <i>Science Inquiry Skills</i> and the <i>Science as a Human Endeavour</i> strands are described across a two-year band. In their planning, schools and teachers refer to the expectations outlined in the Achievement Standards and also to the content of the <i>Science Understanding</i> strand for the relevant year level to ensure that these two strands are addressed over the two-year period. The three strands of the curriculum are interrelated and their content is taught in an integrated way.</p> <p>The order and detail in which the content descriptions are organised into teaching/learning programs are decisions to be made by the teacher.</p> <p>Over Years 7 to 10, students develop their understanding of microscopic and atomic structures, how systems at a range of scales are shaped by flows of energy and matter and interactions due to forces, and develop the ability to quantify changes and relative amounts.</p> <p>In Year 9, students consider the operation of systems at a range of scales. They explore ways in which the human body as a system responds to its external environment and the interdependencies between biotic and abiotic components of ecosystems. They are introduced to the notion of the atom as a system of protons, electrons and neutrons, and how this system can change through nuclear decay. They learn that matter can be rearranged through chemical change and that these changes play an important role in many systems. They are introduced to the concept of the conservation of matter and begin to develop a more sophisticated view of energy transfer. They begin to apply their understanding of energy and forces to global systems such as continental movement.</p>
	Achievement standard	<p>By the end of Year 9, students explain chemical processes and natural radioactivity in terms of atoms and energy transfers and describe examples of important chemical reactions. They describe models of energy transfer and apply these to explain phenomena. They explain global features and events in terms of geological processes and timescales. They analyse how biological systems function and respond to external changes with reference to interdependencies, energy transfers and flows of matter. They describe social and technological factors that have influenced scientific developments and predict how future applications of science and technology may affect people's lives.</p> <p>Students design questions that can be investigated using a range of inquiry skills. They design methods that include the control and accurate measurement of variables and systematic collection of data and describe how they considered ethics and safety. They analyse trends in data, identify relationships between variables and reveal inconsistencies in results. They analyse their methods and the quality of their data, and explain specific actions to improve the quality of their evidence. They evaluate others' methods and explanations from a scientific perspective and use appropriate language and representations when communicating their findings and ideas to specific audiences.</p> <p>Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), <i>Australian Curriculum v3.0: Science for Foundation–10</i>, <www.australiancurriculum.edu.au/Science/Curriculum/F-10>.</p>

Teaching and learning	Term overview	Term 1	Term 2	Term 3	Term 4
		<p>Waves and particles</p> <p>During this term students examine aspects of the chemical and physical sciences through atomic and wave models. Their understanding of these models is developed and reinforced through targeted activities.</p> <p>Students will:</p> <ul style="list-style-type: none"> describe the models of sound and light work collaboratively to design and communicate the results of a scientific inquiry understand the limitations of physical models used to explain light and matter. For example, radiation energy does not require a medium and electron movement is not similar to planetary motion conduct experiments to develop an understanding of the features of the wave model used to describe the behaviour of sound and light understand that models and theories are refined over time through questioning and experimentation appreciate that evidence provides the basis of explanations used by scientists to form models and theories explain how models for the structure of the atom and the nature of light have been developed over considerable time and have been refined in the light of new evidence and explanations. Investigate energy transformations including light, sound and electrical energy. 	<p>The changing Earth</p> <p>During this term students explore the development of the theory of plate tectonics.</p> <p>Students will:</p> <ul style="list-style-type: none"> construct a physical model of the atom describe the evidence that underpinned the different historical models for the structure of the atom make predictions and conduct fair and safe investigations to explore the conservation of mass in chemical reactions discuss how the conservation of mass is represented in chemical equations. learn that continental drift theory was initially only based on circumstantial evidence, such as the shapes of the continents appearing to “fit” together, and was generally not accepted investigate the evidence that helped establish plate tectonics as the current paradigm of Earth Science, such as mantle convection and variable magnetic fields in rocks of different ages conduct practical investigations to model the role of heat energy and convection currents in the movement of tectonic plates investigate technical advances associated with Earth Science, such as ultrasound, laser, sonar, satellites and seismometers, and their use in government and industry consider the effect of natural disasters on Earth and the environment relate the occurrence of earthquakes, tsunamis and volcanic activity to constructive and destructive plate boundaries describe the history of Earth over time and explore the age and stability of the Australian continent. 	<p>Life in the balance</p> <p>During this term students explore the overarching ideas of stability and change through the investigation of body systems and ecosystems.</p> <p>Students will:</p> <ul style="list-style-type: none"> investigate the balance or equilibrium of factors in a system that is in a steady state investigate inputs, outputs and boundaries of systems and the role of the components that make up subsystems learn how the coordination of the respiratory, circulatory, digestive and excretory systems provides the requirements of life in complex organisms use their new knowledge to test, challenge or debate health-based claims made in advertising construct evidence-based arguments using appropriate scientific language, conventions and representations investigate the chemical processes of respiration and photosynthesis and their role in the energy flow in an ecosystem compare how a disease affects the equilibrium of a body system and model how a change in the environment affects the equilibrium of an ecosystem 	<p>The patterns of chemistry</p> <p>During this term students examine how chemical reactions are used to describe the patterns of change observed in systems in which matter transforms.</p> <p>Students will:</p> <ul style="list-style-type: none"> identify reactants and products in chemical reactions model a chemical reaction based on the rearrangement of atoms describe observed reactions using word equations and introduce simple symbolic equations consider types and patterns of chemical reactions, such as combustion, acids with metals, bases, and carbonates explore where combustion, acid with metal, bases and carbonates reactions occur in their everyday lives conduct investigations to identify reactions as endothermic or exothermic investigate the real-life use of endothermic and exothermic reactions, for example in MREs (Meal, Ready-to-Eat) and hot and cold packs design an investigation to evaluate the nutritional content claims of MREs accurately collect and record data from investigations explore the interdependencies of biotic and abiotic components of ecosystems <ul style="list-style-type: none"> explore the interactions of organisms such as predator/prey, parasites, competitors and pollinators
	Aboriginal and Torres Strait Islander perspectives	<p>Science provides opportunities for students to strengthen their appreciation and understanding of Aboriginal peoples and Torres Strait Islander peoples and their living cultures. Specific content and skills within relevant sections of the curriculum can be drawn upon to encourage engagement with:</p> <ul style="list-style-type: none"> Aboriginal and Torres Strait Islander frameworks of knowing and ways of learning Indigenous contexts in which Aboriginal and Torres Strait Islander peoples live Aboriginal peoples’ and Torres Strait Islander peoples’ contributions to Australian society and cultures. <p>Science provides opportunities to explore aspects of Australian Indigenous knowing with connection to, and guidance from, the communities who own them. Using a respectful inquiry approach, students have the opportunity to explore non-Indigenous science interpretations of Aboriginal and Torres Strait Islander lifestyles including knowledge of natural phenomena; native flora and fauna; and land, water and waste management. Using an inquiry approach enables students to learn science in contexts that are valued by Aboriginal and Torres Strait Islander students, their peers and communities, acknowledging their values and approaches to learning.</p>			

	General capabilities and cross-curriculum priorities	Opportunities to engage with: 	Opportunities to engage with: 	Opportunities to engage with: 	Opportunities to engage with: 	
	Key to general capabilities and cross-curriculum priorities	 Literacy  Numeracy  ICT capability  Critical and creative thinking  Ethical behaviour  Personal and social capability  Intercultural understanding  Aboriginal and Torres Strait Islander histories and cultures  Asia and Australia's engagement with Asia  Sustainability				
Develop assessment	Assessment For advice and guidelines on assessment, see www.qsa.qld.edu.au	A folio is a targeted selection of evidence of student learning and includes a range of responses to a variety of assessment techniques. A folio is used to make an overall on-balance judgment about student achievement and progress at appropriate points and informs the reporting process.				
		Term 1	Term 2	Term 3	Term 4	
		Week	Week	Week	Week	
		Assessment instrument	Assessment instrument	Assessment instrument	Assessment instrument	
		2–6 <ul style="list-style-type: none"> On Demand Written Task – Designing houses for QLD climate 8 Supervised assessment: Short and extended responses (Written)	2-5 <ul style="list-style-type: none"> On Demand Written Task – Nanomaterials Or EEI (Extended Experimental Investigation). 8 Supervised assessment: Short and extended responses (Written)	2–5 EEI (Written) or QCAT – How much water should I drink? 8 Supervised assessment: Short and extended responses (Written)	2–5 <ul style="list-style-type: none"> ERT (Extended Response Task) – Ready to eat meals 6 Supervised assessment: Short and extended responses (Written)	
		QCATs: Identify the curriculum targeted by the QCAT and schedule its implementation appropriate to the sequence of learning.				
Make judgments and use feedback	Moderation	Teachers develop tasks and plan units. Teachers co-mark tasks to ensure consistency of judgments.	Teachers develop tasks and plan units. Teachers select representative folios and meet to ensure consistency of judgments before marking tasks.	Teachers develop tasks and plan units. Teachers select representative folios and meet to ensure consistency of judgments before marking tasks. Teachers choose a selection of the QCATs to calibrate. They moderate to ensure consistency of judgments.	Teachers develop tasks and plan units. Teachers co-mark tasks to ensure consistency of judgments.	

Year 9 Science: review for balance and coverage of content descriptions

Science Understanding	1	2	3	4
Biological sciences				
Multi-cellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment (ACSSU175)			✓	
Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176)			✓	✓
Chemical sciences				
All matter is made of atoms which are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms (ACSSU177)		✓		✓
Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed (ACSSU178)				✓
Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer (ACSSU179)				✓
Earth and space sciences				
The theory of plate tectonics explains global patterns of geological activity and continental movement (ACSSU180)		✓		
Physical sciences				
Energy transfer through different mediums can be explained using wave and particle models (ACSSU182)	✓			

Science as a Human Endeavour	1	2	3	4
Nature and development of science				
Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community (ACSHE157)	✓			
Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries (ACSHE158)		✓		
Use and influence of science				
People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions (ACSHE160)		✓	✓	
Advances in science and emerging sciences and technologies can significantly affect people's lives, including generating new career opportunities (ACSHE161)		✓		✓
The values and needs of contemporary society can influence the focus of scientific research (ACSHE228)	✓	✓		

Science Inquiry Skills	1	2	3	4
Questioning and predicting				
Formulate questions or hypotheses that can be investigated scientifically (AC SIS164)	✓	✓	✓	✓
Planning and conducting				
Plan, select and use appropriate investigation methods, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods (AC SIS165)	✓	✓	✓	✓
Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data (AC SIS166)	✓	✓	✓	✓
Processing and analysing data and information				
Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies (AC SIS169)	✓	✓	✓	✓
Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (AC SIS170)	✓	✓	✓	✓
Evaluating				
Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data (AC SIS171)	✓	✓	✓	✓
Critically analyse the validity of information in secondary sources and evaluate the approaches used to solve problems (AC SIS172)	✓	✓	✓	✓
Communicating				
Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (AC SIS174)	✓	✓	✓	✓

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