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| Year 9 Science curriculum and assessment plan  Example |

# Curriculum overview

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| Year level description | Cohort description |
| The science inquiry skills and science as a human endeavour strands are described across a two-year band. In their planning, schools and teachers refer to the expectations outlined in the achievement standard and also to the content of the science understanding 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. The order and detail in which the content descriptions are organised into teaching and learning programs are decisions to be made by the teacher.  **Incorporating the key ideas of science**  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.  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. | This year level plan has not been developed with a specific cohort in mind. It is provided as an example of the intent of the Australian Curriculum: Science, and reflective of QCAA advice and resources. |
| Course organisation |
| This year level plan is written with the consideration that all school scenarios for delivery of Science are unique. It is written to:   * offer units of work that could be adapted to suit multiple contexts as required by the school, including allocated time and resources * consider different types of assessment that are suitable for the Science learning area * provide examples for schools to adapt to their own contexts. |

# Unit overview

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| Term 1 | Term 2 | Term 3 | Term 4 |
| Unit 1 — How can we stay healthy? | Unit 2 — Is that safe? | Unit 3 — Is there enough for everybody? | |
| Inquiry question: Will taking care of the environment keep us healthy?  Students will focus on biological systems and explore the interdependence of organ systems within the body and the interdependence of organisms within an ecosystem. They will focus on how disruption to our environment impacts human health.  Students will also engage in discussions about how the values and needs of contemporary society can influence the focus of scientific research.  Topics include:   * The digestive and respiratory systems * Body system responses to environmental changes * Ecosystems * Ecosystem disruption and restoration. | Inquiry question: Can technology keep us safe?  Students will understand that energy can be transformed and transferred and that using models allows us to apply our knowledge to design technology that keeps us safe, e.g. noise-reducing headphones. The aspects of safety students will consider are sound and heat levels, and predicting earthquakes.  Students will also research how new technologies arise from both advances in scientific understanding and curiosity‑ driven problem solving.  Topics include:   * Energy transfer and transformation * Use of wave and particle models to explain heat and sound energy transfer * Energy-driven geological activity * Using technology to identify and manage harmful levels of energy. | Inquiry question: Could laboratory-made food be the answer to feeding the world?  Students will explore the law of conservation of matter in the context of finite amounts of matter and the creation and distribution of resources in the world. | |
| In Term 3, students will focus on science inquiry and how advances in scientific understanding often rely on technological advances. Students will also discover that scientific knowledge is used to accept or reject claims and predictions.  Topics include:   * Structure of atoms * Natural radioactivity and nuclear decay * Law of conservation of matter * Chemical reactions including combustion and acid reactions. | In Term 4, students will focus on how the values and needs of contemporary society influence the focus of scientific research. Students will also develop awareness that over time the models we use to explain abstract concepts are refined as our scientific knowledge grows. Topics include:   * Chemical reactions including photosynthesis and respiration * Biological chemicals and how to replicate them. |

# Assessment overview

|  | Term 1 | | Term 2 | | Term 3 | | Term 4 | |
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|  | Unit 1 — Can we stay healthy? | Week/s | Unit 2 — Is that safe? | Week/s | Unit 3 — Is there enough for everybody? Part 1 | Week/s | Unit 3 — Is there enough for everybody? Part 2 | Week/s |
| Assessment | Technique: Investigation  In this investigation, students will research the impact of pollution on the human respiratory or digestive systems.  Format: Written report  Conditions:   * 2 weeks * 600–800 words | 8–10 | Technique: Examination  In this examination, students will respond to questions derived from the Unit 2 content descriptions for Earth and space sciences and Physical sciences.  Format: Written   * Short response items including multiple choice * Extended response items   Conditions: 60 minutes, plus 5 minutes perusal | 10 | Technique: Experimental investigation  In this experimental investigation, students will use Unit 3 practical experience to design and conduct an investigation into the manipulation of the chemical reactions used to coagulate proteins from cow’s milk and soy milk.  Format: Written scientific report  Conditions:   * 2 weeks * 600–800 words | 8–10 | Technique: Examination  In this examination, students will respond to questions derived from the Unit 3 content descriptions for Chemical sciences.  Format: Written   * Short response items including multiple choice * Extended response items   Conditions: 60 minutes, plus 5 minutes perusal | 9 |
| Achievement standard | 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. 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. | | 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. 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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. | |
| Moderation | Individual teachers will choose a range of three student responses from their class and grade these using the task-specific standards. The HOD will facilitate year-level moderation, two days after the submission date. | | Individual teachers will choose a range of three student responses from their class and grade these using the task-specific standards. The HOD will facilitate year-level moderation, the day after the examination.  Year-level moderation of the semester's work will take place in Week 10. | | Individual teachers will choose a range of three student responses from their class and grade these using the task-specific standards. The HOD will facilitate year-level moderation, two days after the submission date. | | Individual teachers will choose a range of three student responses from their class and grade these using the task-specific standards. The HOD will facilitate year-level moderation, the day after the examination.  Year-level moderation of completed folios of work will take place in Week 10. | |

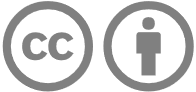
# Teaching and learning focus

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| Content descriptions | | | | | | | | | | | |
| Science understanding | Unit 1 | Unit 2 | Unit 3 | Science as a human endeavour | Unit 1 | Unit 2 | Unit 3 | Science inquiry | Unit 1 | Unit 2 | Unit 3 |
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| Biological sciences  Multi-cellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment | ✓ |  |  | Nature and development of science  Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community | ✓ | ✓ | ✓ | Questioning and predicting  Formulate questions or hypotheses that can be investigated scientifically |  | ✓ | ✓ |
| Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems | ✓ |  |  | Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries |  | ✓ | ✓ | Planning and conducting  Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods |  |  | ✓ |
| Chemical sciences  All matter is made of atoms that are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms |  |  | ✓ | Use and influence of science  People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people’s lives, including generating new career opportunities | ✓ |  | ✓ | Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately | ✓ | ✓ | ✓ |
| Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed |  |  | ✓ | Values and needs of contemporary society can influence the focus of scientific research |  | ✓ | ✓ | Processing and analysing data and information  Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies | ✓ | ✓ | ✓ |
| Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer |  |  | ✓ | Use knowledge of scientific concepts to draw conclusions that are consistent with evidence | ✓ | ✓ | ✓ |
| Earth and space sciences  The theory of plate tectonics explains global patterns of geological activity and continental movement |  | ✓ |  | Evaluating  Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data | ✓ | ✓ |  |
| Physical sciences  Energy transfer through different mediums can be explained using wave and particle models |  | ✓ |  | Critically analyse the validity of information in primary and secondary sources and evaluate the approaches used to solve problems | ✓ | ✓ | ✓ |
| Communicating  Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations | ✓ | ✓ | ✓ |

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| General capabilities | Year 9 | | |  | Cross-curriculum priorities | Year 9 | | |
| Unit | 1 | 2 | 3 |  | Unit | 1 | 2 | 3 |
| Literacy | ✓ | ✓ | ✓ |  | Aboriginal and Torres Strait Islander histories and culture | ✓ | ✓ |  |
| Numeracy | ✓ | ✓ | ✓ |  | Asia and Australia’s engagement with Asia |  | ✓ |  |
| Information and communication technology |  |  | ✓ |  | Sustainability | ✓ |  | ✓ |
| Critical and creative thinking | ✓ |  | ✓ |  |
| Personal and social capability |  | ✓ |  |  |
| Intercultural understanding | ✓ | ✓ | ✓ |  |
| Ethical understanding | ✓ | ✓ | ✓ |  |

# Planning considerations

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| Prior to implementation the teaching team will consider questions such as:   * Where has prior and future learning across the year level/band been reflected in the plan? * Are there adequate opportunities for students to develop depth of conceptual understanding and sophistication of skills across the year level/band? * Does the plan ensure adequate opportunities for students to demonstrate the achievement standard/s by the end of the year level/band? * Are the timing and demands of the planned assessment appropriate in relation to assessment of other learning areas and subjects taught in this year? * Are there any Indigenous cultural and intellectual property (ICIP) rights to consider? For guidance, see <https://smartcopying.edu.au/guidelines/copyright-basics/indigenous-cultural-and-intellectual-property-rights>. * Do the assessment techniques and conditions offer a range and balance across the year/band? What strategies for authentication are included? * What moderation processes will be used? When will assessment and moderation occur? * Is the planned teaching, learning and assessment sequence appropriate for reporting purposes? * Do strategies for differentiation and reasonable adjustments complement the teaching, learning and assessment sequence? * How will planned strategies for differentiation and reasonable adjustments impact other year level/band plans? |
| Following implementation, the teaching team will consider questions such as:   * Was the teaching, learning and assessment effective? * Are there opportunities to improve the effectiveness of the teaching, learning and assessment? If so, what? * Were there any common student misconceptions that need, or needed, to be clarified? * How do student outcomes in this year of learning impact on the planning of subsequent year level/band plans? |

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