Year 8 plan — Australian Curriculum: Science

Implementation year: School name:

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| Identify curriculum | Year level description  (highlighted aspects indicate differences from the previous year level) | 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 *Science as a Human Endeavour* strand can provide relevant contexts in which science can be taught. The order and detail in which the content descriptions are organised into teaching/learning programs are decisions to be made by the teacher.  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 8, students are introduced to cells as microscopic structures that explain macroscopic properties of living systems. They link form and function at a cellular level and explore the organisation of body systems in terms of flows of matter between interdependent organs. Similarly, they explore changes in matter at a particle level, and distinguish between chemical and physical change. They begin to classify different forms of energy, and describe the role of energy in causing change in systems, including the role of heat and kinetic energy in the rock cycle. 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. | | | | | | | | |
| Achievement standard | By the end of Year 8, students compare physical and chemical changes and use the particle [model](http://www.australiancurriculum.edu.au/Glossary?a=S&t=model) to explain and predict the [properties](http://www.australiancurriculum.edu.au/Glossary?a=S&t=properties) and behaviours of substances. They identify different forms of energy and describe how energy transfers and transformations cause change in simple [systems](http://www.australiancurriculum.edu.au/Glossary?a=S&t=systems). They compare processes of rock formation, including the time scales involved. They [analyse](http://www.australiancurriculum.edu.au/Glossary?a=S&t=analyse) the [relationship](http://www.australiancurriculum.edu.au/Glossary?a=S&t=relationship) between structure and function at cell, organ and body [system](http://www.australiancurriculum.edu.au/Glossary?a=S&t=system) levels. Students examine the different science knowledge used in occupations. They explain how [evidence](http://www.australiancurriculum.edu.au/Glossary?a=S&t=evidence) has led to an improved understanding of a scientific idea and describe situations in which [scientists](http://www.australiancurriculum.edu.au/Glossary?a=S&t=scientists) collaborated to generate solutions to contemporary problems.  Students identify and construct questions and problems that they can investigate scientifically. They consider safety and ethics when planning [investigations](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigations), including [designing](http://www.australiancurriculum.edu.au/Glossary?a=S&t=designing) field or experimental methods. They identify [variables](http://www.australiancurriculum.edu.au/Glossary?a=S&t=variables) to be changed, measured and controlled. Students construct representations of their [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) to reveal and [analyse](http://www.australiancurriculum.edu.au/Glossary?a=S&t=analyse) [patterns](http://www.australiancurriculum.edu.au/Glossary?a=S&t=patterns) and [trends](http://www.australiancurriculum.edu.au/Glossary?a=S&t=trends), and use these when justifying their [conclusions](http://www.australiancurriculum.edu.au/Glossary?a=S&t=conclusions). They explain how modifications to methods could improve the quality of their [data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=data) and apply their own scientific knowledge and [investigation](http://www.australiancurriculum.edu.au/Glossary?a=S&t=investigation) findings to [evaluate](http://www.australiancurriculum.edu.au/Glossary?a=S&t=evaluate) claims made by others. They use appropriate language and representations to communicate science ideas, methods and findings in a range of text types. | | | | | | | | |
| Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), *Australian Curriculum v3.0: Science for Foundation–10*, <www.australiancurriculum.edu.au/Science/Curriculum/F-10>. | | | | | | | | |
| Teaching and learning | Term overview | Term 1 | | Term 2 | | Term 3 | | Term 4 | | |
| What’s the matter?  During this term students engage in a range of laboratory-based experiments and investigative learning experiences to explore changes in matter at a particle level and distinguish between chemical and physical changes. They appreciate that scientific knowledge changes as new evidence becomes available.  Students will:   * review the nature of scientific inquiry * continue to design student-generated investigations using inquiry methods * develop skills to safely use a range of laboratory techniques * present and evaluate scientific data using a science report genre * describe and model the states of matter, elements, compounds and mixtures at a particle level * research the history of the representation of matter * investigate the chemical differences that exist between elements, compounds and mixtures * investigate the relationship between the energy of particles and temperature * use symbols and formulas to represent elements and simple compounds | | We will rock you  During this term students investigate the dynamic nature of the rock cycle. They appreciate where and why rocks have been used in buildings and monuments in the local area.  Students will:   * explore how the forces of contraction, expansion and freezing of water can lead to the weathering of rocks * investigate the chemical weathering of rocks * create representations of the stages in the formation of igneous, metamorphic and sedimentary rocks * identify a range of common rock types using a key based on observable physical and chemical properties * recognise that rocks are a collection of different minerals * appreciate the timescales involved in rock formation and that the mode of formation determines texture and the minerals contained in the rock * investigate the relationship between rate of cooling and crystal formation size * research how rocks, minerals and ores, provide valuable resources and are used in aspects of everyday life | | Exemplar unit: Energy for my lifestyle  During this term students investigate how energy is generated and transformed in order to meet society’s energy requirements while taking into account sustainability and ethical considerations. They research sustainable and renewable energy technologies.  Students will:   * pose questions and collaboratively plan fair investigations about the different forms of energy, the effects they have, and the changes they cause in systems * conduct fair investigations to build an understanding of the different forms of energy * explore energy transfer and transformation * use flow diagrams to illustrate energy transfer and transformation * recognise that heat energy is often a by-product of energy transfer and transformation * collect data and analyse patterns and relationships to draw conclusions about energy transformations * appreciate the impact of society’s energy-dependent lifestyle * consider sustainability and ethical issues surrounding the sources of energy for society | | Multiplying by dividing  During this term students explore how organisms reproduce, starting at a cellular level. They focus on cell structure, function and reproduction, and investigate the history, use and ethics of reproductive technologies in mammals.  Students will:   * examine a variety of cells using a light microscope or digital technology * identify structures within plant and animal cells and describe their function * distinguish plant cells from animal cells and create representations of each cell type * discuss examples of cell specialisation * discuss how cells reproduce * research and explore the history, use and ethics of reproductive technologies in mammals * describe the structure of each organ in the human reproductive systems and relate their function to the overall function of the system * compare and contrast reproductive systems of organisms * distinguish between asexual and sexual reproduction * communicate ideas and finding using scientific language. | | |
| **Teaching and learning** |  | * revise the differences between chemical and physical changes * identify evidence that a chemical change has taken place * investigate simple reactions * collect data and analyse patterns and relationships to draw conclusions about chemical and physical changes. | | * engage with a geologist to learn about rocks, minerals and their existence and use in the local area * participate in field work or use Google Earth to investigate rocks and the use of rocks in the local area * communicate ideas and findings using scientific language. | | * appreciate the impact of an energy-dependent lifestyle. For example, its impact on industry, agriculture and/or marine and terrestrial resource management * communicate ideas, findings and solutions to problems in a variety of ways. | |  | | |
| Aboriginal and Torres Strait Islander perspectives | 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:   * 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.   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. | | | | | | | | |
| General capabilities and cross‑curriculum priorities | Opportunities to engage with:  Description: gc_literacy Description: gc_numeracy Description: gc_ict Description: gc_critical Description: gc_ethical Description: gc_personal_social  cc_sust | | Opportunities to engage with:  Description: gc_literacy Description: gc_numeracy Description: gc_ict Description: gc_critical Description: gc_ethical Description: gc_personal_social  cc_sust | | Opportunities to engage with:  Description: gc_literacy Description: gc_numeracy Description: gc_ict Description: gc_critical Description: gc_ethical Description: gc_personal_social  cc_asiacc_sust | | Opportunities to engage with:  Description: gc_literacy Description: gc_numeracy Description: gc_ict Description: gc_critical Description: gc_ethical Description: gc_personal_social  cc_sust | | |
| Key to general capabilities and cross-curriculum priorities | Description: Description: gc_literacy Literacy  Description: Description: gc_numeracy Numeracy  Description: Description: gc_ict ICT capability  Description: Description: gc_critical Critical and creative thinking  Description: Description: gc_ethical Ethical behaviour  Description: Description: gc_personal_social Personal and social capability  Description: Description: gc_intercultural Intercultural understanding   Aboriginal and Torres Strait Islander histories and cultures  Description: cc_asia Asia and Australia’s engagement with Asia  Description: cc_sust Sustainability | | | | | | | | |
| Develop assessment | Assessment  For advice and guidelines on assessment, see [www.qsa.qld.edu.au](http://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 | Assessment instrument | Week | Assessment instrument | Week | Assessment instrument | Week | Assessment instrument | |
| 1 | Supervised assessment: Short response (Written)  Identify current knowledge with a diagnostic tool at the beginning of the unit and use formatively to consolidate and build upon prior knowledge. | 5 | Research: Narrative (Written)  Write a narrative that describes the history of a rock — its description, formation, position in the rock cycle. Make predictions about its future as a rock. | 3–6 | Experimental investigation: Scientific report (Written)  Collaboratively design a fair investigation to examine the energy production of sustainable energy technologies. | 3 | | Research: Concept map (Multimodal)  Create a mind map (on paper or electronically) using a list of terms relating to the structure and function of plant and animal cells.  This assessment can be written, cut and paste or electronic. |
| 2–7 | Collection of work (Written)   * graphs and tables * labelled diagrams * written explanations * science journal entries * science reports. |
| 9 | Supervised assessment: Short response (Written)  Respond to questions focused on Science Understanding. | 7–10 | Collection of work: (Multimodal)  Investigate natural rock outcrops and the use of rocks in, for example buildings and monuments in the local area.  Present a set of guidelines or create a virtual tour outlining where the outcrops, buildings and monuments are located | 6–9 | Research: Report (Written)  Investigate sustainable energy technologies.  The assessment package *Energy test* in the QSA Assessment Bank could be used as assessment in this unit. | 4–9 | | Collection of work (Written)   * Supervised assessment with a focus on science understanding of reproduction * Science journal that records research notes and entries about reproductive technologies |
| **Develop assessment** |  |  |  |  | Justify the choice of rocks for a given purpose. |  |  |  | | * Response to stimulus scientific literacy that revisits new understandings and applies them in a context of reproductive technologies. |
| 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 choose A–E samples of the narrative and rock walk guidelines that link to the standards to calibrate before marking tasks. They moderate to ensure consistency of judgments. | | Teachers develop tasks and plan units.  Teachers choose A–E samples of student work that link to the standards to calibrate before marking tasks. They moderate to ensure consistency of judgments. | | Teachers develop tasks and plan units.  Teachers co-mark cell concept maps to ensure consistency of judgments.  Teachers choose A–E samples of the folios of work that link to the standards to calibrate before marking tasks. They moderate to ensure consistency of judgments. | | |

Year 8 Science: review for balance and coverage of content descriptions

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| Science Understanding | 1 | 2 | 3 | 4 |
| Biological sciences | | | | |
| Cells are the basic units of living things and have specialised structures and functions [(ACSSU149)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU149) |  |  |  | ✓ |
| Multi-cellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce [(ACSSU150)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU150) |  |  |  | ✓ |
| Chemical sciences | | | | |
| The properties of the different states of matter can be explained in terms of the motion and arrangement of particles [(ACSSU151)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU151) | ✓ |  |  |  |
| Differences between elements, compounds and mixtures can be described at a particle level [(ACSSU152)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU152) | ✓ |  |  |  |
| Chemical change involves substances reacting to form new substances [(ACSSU225)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU225) | ✓ |  |  |  |
| Earth and space sciences | | | | |
| Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales [(ACSSU153)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU153) |  | ✓ |  |  |
| Physical sciences | | | | |
| Energy appears in different forms including movement (kinetic energy), heat and potential energy, and causes change within systems [(ACSSU155)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSSU155) |  |  | ✓ |  |

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| Science as a Human Endeavour | 1 | 2 | 3 | 4 |
| Nature and development of science | | | | |
| Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people’s understanding of the world [(ACSHE134)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE134) | ✓ |  |  | ✓ |
| Science knowledge can develop through collaboration and connecting ideas across the disciplines of science [(ACSHE226)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE226) |  | ✓ |  |  |
| Use and influence of science | | | | |
| Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations [(ACSHE135)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE135) |  |  | ✓ | ✓ |
| Science understandings influence the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management [(ACSHE136)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE136) |  |  | ✓ |  |
| People use understanding and skills from across the disciplines of science in their occupations [(ACSHE227)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE227) |  | ✓ |  | ✓ |

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| Science Inquiry Skills | 1 | 2 | 3 | 4 |
| Questioning and predicting | | | | |
| Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge [(ACSIS139)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS139) | ✓ |  | ✓ |  |
| Planning and conducting | | | | |
| Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [(ACSIS140)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS140) | ✓ | ✓ | ✓ |  |
| In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task [(ACSIS141)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS141) | ✓ |  | ✓ |  |
| Processing and analysing data and information | | | | |
| Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate [(ACSIS144)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS144) | ✓ | ✓ | ✓ | ✓ |
| Summarise data, from students’ own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions [(ACSIS145)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS145) | ✓ | ✓ | ✓ | ✓ |
| Evaluating | | | | |
| Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [(ACSIS146)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS146) | ✓ |  | ✓ |  |
| Use scientific knowledge and findings from investigations to evaluate claims [(ACSIS234)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS234) | ✓ |  | ✓ |  |
| Communicating | | | | |
| Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate [(ACSIS148)](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS148) | ✓ | ✓ | ✓ | ✓ |

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