

Comparison of AC v8.4 to v9.0

Year 9: Science

| Key | same/refined | removed | new | moved |
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Note that v8.4 content descriptions may have been reordered to align with v9.0 content descriptions.

| Version 8.4 | | | Version 9.0 | | |
|---|--|---|--|--------------------------|------------------------------|
| Achievement standard | | | 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>By the end of Year 9 students explain how body systems provide a coordinated response to stimuli. They describe how the processes of sexual and asexual reproduction enable survival of the species. They explain how interactions within and between Earth's spheres affect the carbon cycle. They analyse energy conservation in simple systems and apply wave and particle models to describe energy transfer. They explain observable chemical processes in terms of changes in atomic structure, atomic rearrangement and mass. Students explain the role of publication and peer review in the development of scientific knowledge and explain the relationship between science, technologies and engineering. They analyse the different ways in which science and society are interconnected.</p> <p>Students plan and conduct safe, reproducible investigations to test or identify relationships and models. They describe how they have addressed any ethical and intercultural considerations when generating or using primary and secondary data. They select and use equipment to generate and record replicable data with precision. They select and construct appropriate representations to organise, process and summarise data and information. They analyse and connect data and information to identify and explain patterns, trends, relationships and anomalies. They analyse the impact of assumptions and sources of error in methods and evaluate the validity of conclusions and claims. They construct logical arguments based on evidence to support conclusions and evaluate claims. They select and use content, language and text features effectively to achieve their purpose when communicating their ideas, findings and arguments to specific audiences.</p> | | |
| Strands | Sub-strands | Content descriptions | Content descriptions | Sub-strands | Strands |
| Science understanding | Biological sciences | <p>multi-cellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment ACSSU175</p> <p>ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems ACSSU176 Moved to Year 7</p> | <p>compare the role of body systems in regulating and coordinating the body's response to a stimulus, and describe the <u>operation of a negative feedback mechanism</u> AC9S9U01</p> <p><u>describe the form and function of reproductive cells and organs in animals and plants, and analyse how the processes of sexual and asexual reproduction enable survival of the species</u> AC9S9U02</p> | Biological sciences | Science understanding |
| | Earth and space sciences | <p>the theory of plate tectonics explains global patterns of geological activity and continental movement ACSSU180 Moved to Year 8</p> | <p>represent the carbon cycle and examine how key processes including combustion, photosynthesis and respiration rely on interactions between Earth's spheres (the geosphere, biosphere, hydrosphere and atmosphere) AC9S9U03 Moved from Year 10</p> | Earth and space sciences | |
| | Physical sciences | <p>energy transfer through different mediums can be explained using wave and particle models ACSSU182</p> | <p>use wave and particle models to describe energy transfer through different mediums and <u>examine the usefulness of each model for explaining phenomena</u> AC9S9U04</p> <p>apply the law of conservation of energy to <u>analyse system efficiency</u> in terms of energy inputs, outputs, transfers and transformations AC9S9U05 Moved from Year 10</p> | Physical sciences | |
| | Chemical sciences | <p>all matter is made of atoms that are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms ACSSU177</p> <p>chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed ACSSU178</p> <p>chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer ACSSU179 Moved to Year 8</p> | <p><u>explain how the model of the atom changed following the discovery of electrons, protons and neutrons</u> and describe how natural radioactive decay results in stable atoms AC9S9U06</p> <p>model the rearrangement of atoms in chemical reactions using a <u>range of representations, including word and simple balanced chemical equations</u>, and use these to demonstrate the law of conservation of mass AC9S9U07</p> | Chemical sciences | |
| Science as a human endeavour | <p>scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community ACSHE157</p> <p>advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries ACSHE158</p> | | <p>explain how scientific knowledge is validated and refined, including the role of publication and peer review AC9S9H01</p> <p>investigate how advances in technologies enable advances in science, and how science has contributed to developments in technologies and engineering AC9S9H02</p> | | Science as a human endeavour |
| | <p>people use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including <u>generating new career opportunities</u> ACSHE160</p> <p>values and needs of contemporary society can influence the focus of scientific research ACSHE228</p> | | <p><u>analyse the key factors that contribute to science knowledge and practices being adopted more broadly by society</u> AC9S10H03</p> <p>examine how the values and needs of society influence the focus of scientific research AC9S9H04</p> | | |

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Note that v8.4 content descriptions may have been reordered to align with v9.0 content descriptions.

| | Version 8.4 | Version 9.0 | |
|------------------------|---|---|-----------------|
| Science inquiry skills | formulate questions or hypotheses that can be investigated scientifically ACSIS164 | develop investigable questions, reasoned predictions and hypotheses to test relationships and develop explanatory models AC9S9I01 | Science inquiry |
| | 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 ACSIS165 select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately ACSIS2166 | plan and conduct valid, reproducible investigations to answer questions and test hypotheses , including identifying and controlling for possible sources of error and, as appropriate, developing and following risk assessments, considering ethical issues, and addressing key considerations regarding heritage sites and artefacts on Country/Place AC9S9I02 select and use equipment to generate and record data with precision to obtain useful sample sizes and replicable data , using digital tools as appropriate AC9S9I03 | |
| | analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies ACSIS169 use knowledge of scientific concepts to draw conclusions that are consistent with evidence ACSIS170 | select and construct appropriate representations, including tables, graphs, descriptive statistics, models and mathematical relationships , to organise and process data and information AC9S9I04 analyse and connect a variety of data and information to identify and explain patterns, trends, relationships and anomalies AC9S9I05 | |
| | evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data ACSIS171 critically analyse the validity of information in primary and secondary sources and evaluate the approaches used to solve problems ACSIS172 | assess the validity and reproducibility of methods and evaluate the validity of conclusions and claims, including by identifying assumptions, conflicting evidence and areas of uncertainty AC9S9I06 construct arguments based on analysis of a variety of evidence to support conclusions or evaluate claims, and consider any ethical issues and cultural protocols associated with accessing, using or citing secondary data or information AC9S9I07 | |
| | communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations ACSIS174 | write and create texts to communicate ideas, findings and arguments effectively for identified purposes and audiences , including selection of appropriate content, language and text features, using digital tools as appropriate AC9S9I08 | |

Considerations for planning for Year 9, in the first year of implementation

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| Key | assumed prior knowledge | duplicated content |
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In the initial year of implementing the Australian Curriculum v9.0: Science, teachers need to consider the implications of content changes as they transition from v8.4.

The table below:

- identifies changes between v8.4 and v9.0 that may influence the sequence of students' learning
- outlines considerations for planning teaching and learning programs for the first year of implementation
- recognises that content in both SHE and SI are taught in two-year bands from Year 1.

| | Year 8 content in v8.4 | Year 9 content in v9.0 | Considerations |
|-----------------------|--|--|---|
| Science understanding | Year 8 cells are the basic units of living things; they have specialised structures and functions ACSSU149 multi-cellular organisms contain systems of organs carrying out specialised functions that enable them to survive and reproduce ACSSU150 | Year 9 compare the role of body systems in regulating and coordinating the body's response to a stimulus, and describe the operation of a negative feedback mechanism AC9S9U01 describe the form and function of reproductive cells and organs in animals and plants, and analyse how the processes of sexual and asexual reproduction enable survival of the species AC9S9U02 | <ul style="list-style-type: none"> Consider focussing on <ul style="list-style-type: none"> form and function at cellular and organ level of both plants and animals role of sexual reproduction compared with asexual reproduction. |
| | sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales ACSSU153 | represent the carbon cycle and examine how key processes including combustion, photosynthesis and respiration rely on interactions between Earth's spheres (the geosphere, biosphere, hydrosphere and atmosphere) AC9S9U03 | <ul style="list-style-type: none"> Students in Year 9 during the first year of implementation will miss content relating to tectonic plates, as it appears in Year 9 in v8.4 and Year 8 in v9.0 <ul style="list-style-type: none"> investigate tectonic activity including the formation of geological features at divergent, convergent and transform plate boundaries and describe the scientific evidence for the theory of plate tectonics AC9S8U03. Therefore, consider including a brief overview when introducing the geosphere. Students in Year 9 during implementation will miss content relating to matter and energy flow in ecosystems, as it appears in Year 9 in v8.4 and Year 7 in v9.0 <ul style="list-style-type: none"> use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations AC9S7U02. Therefore, consider including content on energy and matter flow in ecosystems when introducing interactions between Earth's spheres for implementation year plus one further year. |

| | Year 8 content in v8.4 | Year 9 content in v9.0 | Considerations |
|------------------------------|---|--|---|
| | <p>properties of the different states of matter can be explained in terms of the motion and arrangement of particles ACSSU151</p> <p>differences between elements, compounds and mixtures can be described at a particle level ACSSU152</p> <p>chemical change involves substances reacting to form new substances ACSSU225</p> | <p>explain how the model of the atom changed following the discovery of electrons, protons and neutrons and describe how natural radioactive decay results in stable atoms AC9S9U06</p> <p>model the rearrangement of atoms in chemical reactions using a range of representations, including word and simple balanced chemical equations, and use these to demonstrate the law of conservation of mass AC9S9U07</p> | <p>Consider focussing on conservation of mass and representations of chemical reactions.</p> |
| Science as a human endeavour | <p>Years 7–8</p> <p>People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity ACSHE136</p> | <p>Years 9–10</p> <p>examine how the values and needs of society influence the focus of scientific research AC9S9H04</p> | <ul style="list-style-type: none"> Students in Year 9 during the first year of implementation need to be provided opportunities to explore the role of science communication, as this content appears in Year 7 in v9.0 <ul style="list-style-type: none"> explore the role of science communication in informing individual viewpoints and community policies and regulations AC9S7H04. |
| Science inquiry | <p>Years 7–8</p> <p>Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed ACSIS140</p> | <p>Years 9–10</p> <p>plan and conduct reproducible investigations to answer questions and test hypotheses, including identifying variables and assumptions and, as appropriate, recognising and managing risks, considering ethical issues and recognising key considerations regarding heritage sites and artefacts on Country/Place AC9S9I02</p> | <ul style="list-style-type: none"> Students in Year 9 during the first year of implementation will miss content relating to repeatable investigations and identifying required permissions to conduct investigations on Country/Place as it appears in Year 6 v9.0 <ul style="list-style-type: none"> plan and conduct repeatable investigations to answer questions, including, as appropriate, deciding the variables to be changed, measured and controlled in fair tests; describing potential risks; planning for the safe use of equipment and materials; and identifying required permissions to conduct investigations on Country/Place AC9S6I02. <p>Therefore, opportunities need to be provided to</p> <ul style="list-style-type: none"> understand the difference between repeatable and reproducible investigations identify required permissions to conduct investigations on Country/Place. |
| | <p>Communicate ideas, findings and evidence-based solutions to problems using scientific language, and representations, using digital technologies as appropriate ACSIS148</p> | <p>write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, including selection of appropriate language and text features, using digital tools as appropriate AC9S9I08</p> | <ul style="list-style-type: none"> Students in Year 9 during the first year of implementation need to be introduced to the language of communication including purpose, audience and text features as they appear in Year 6 in v9.0 <ul style="list-style-type: none"> write and create texts to communicate ideas and findings for specific purposes and audiences, including selection of language features, using digital tools as appropriate AC9S6I08. <p>Therefore, opportunities to write and create texts for specific purposes and audiences including selecting language features need to be provided.</p> |

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