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|  | Year 8 standard elaborations — Australian Curriculum: Science REVISED DRAFT |

The Australian Curriculum achievement standards are an expectation of the depth of understanding, the extent of knowledge and the sophistication of skills that students should typically demonstrate at the end of a teaching and learning year. In Queensland, the Year 8 Australian Curriculum achievement standard represents a C standard — a sound level of knowledge and understanding of the content, and application of skills.

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| Year 8 Australian Curriculum: Science achievement standard |
| By the end of Year 8, students [compare](http://www.australiancurriculum.edu.au/Glossary?a=&t=Compare) physical and chemical changes and use the particle model to [explain](http://www.australiancurriculum.edu.au/Glossary?a=&t=Explain) and predict the properties and behaviours of substances. They [identify](http://www.australiancurriculum.edu.au/Glossary?a=&t=Identify) different forms of energy and [describe](http://www.australiancurriculum.edu.au/Glossary?a=&t=Describe) how energy transfers and transformations cause change in simple systems. They [compare](http://www.australiancurriculum.edu.au/Glossary?a=&t=Compare) processes of rock formation, including the time scales involved. They [analyse](http://www.australiancurriculum.edu.au/Glossary?a=&t=Analyse) the relationship between structure and function at cell, organ and body system levels. Students examine the different science knowledge used in occupations. They [explain](http://www.australiancurriculum.edu.au/Glossary?a=&t=Explain) how evidence has led to an improved understanding of a scientific idea and [describe](http://www.australiancurriculum.edu.au/Glossary?a=&t=Describe) situations in which scientists collaborated to generate solutions to contemporary problems.Students [identify](http://www.australiancurriculum.edu.au/Glossary?a=&t=Identify) and construct questions and problems that they can [investigate](http://www.australiancurriculum.edu.au/Glossary?a=&t=Investigate) scientifically. They consider safety and ethics when planning investigations, including designing field or experimental methods. They [identify](http://www.australiancurriculum.edu.au/Glossary?a=&t=Identify) variables to be changed, measured and controlled. Students construct representations of their data to reveal and [analyse](http://www.australiancurriculum.edu.au/Glossary?a=&t=Analyse) patterns and trends, and use these when justifying their conclusions. They [explain](http://www.australiancurriculum.edu.au/Glossary?a=&t=Explain) how modifications to methods could improve the quality of their data and [apply](http://www.australiancurriculum.edu.au/Glossary?a=&t=Apply) their own scientific knowledge and investigation findings to [evaluate](http://www.australiancurriculum.edu.au/Glossary?a=&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 v6.0 Science for Foundation–10*, [www.australiancurriculum.edu.au/Science/Curriculum/F-10](http://www.australiancurriculum.edu.au/Science/Curriculum/F-10) |

The standards elaborations (SEs) should be used in conjunction with the Australian Curriculum achievement standard and content descriptions for the relevant year level. They provide additional clarity about using the Australian Curriculum achievement standard to make judgments on a five-point scale.

The SEs for Science have been developed using the Australian Curriculum content descriptions and the achievement standard.
They promote and support:

* aligning curriculum, assessment and reporting, connecting curriculum and evidence in assessment, so that what is assessed relates directly to what students have had the opportunity to learn
* continuing skill development from one year of schooling to another
* making judgments on a five-point scale based on evidence of learning in a folio of student work
* planning an assessment program and individual assessments
* developing task-specific standards and grading guides.

## Year 8 Science standard elaborations REVISED DRAFT

|  | A | B | C | D | E |
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|  | The folio of student work has the following characteristics: |
| Understanding dimension | Science Understanding | * Integration of analysis, explanation, description, identification and comparison of phenomena, with science knowledge
* Application of science knowledge to generate justified solutions and justified predictions in simple and complex situations
 | * Linking of analysis, explanation, description, identification and comparison of phenomena, with science knowledge
* Application of science knowledge to generate informed solutions and plausible predictions and solutions in simple situations with progress towards some that are complex
 | * Analysis, explanation, description, identification and comparison of phenomena
* Application of science knowledge to generate solutions and predictions in simple situations
 | * Partial explanations, description, identification, definition and recall of science knowledge
* Application of science knowledge to generate partial solutions and predictions in simple situations
 | Recall of science facts |
|  | Refer to the Year 8 Australian Curriculum achievement standard for the depth of conceptual understanding for each of the sub-strands: *Biological sciences, Chemical sciences, Earth and space sciences* and *Physical sciences*. |
| **Understanding dimension** | Science as a Human Endeavour | * Examination and explanation of how and why different science knowledge is used in occupations
* Thorough explanation of how evidence has improved understanding of scientific ideas and informed the collaboration of scientists to generate solutions to contemporary problems
 | * Examination and explanation of how different science knowledge is used in occupations
* Explanation of how evidence has improved understanding of scientific ideas and informed the collaboration of scientists to generate solutions to contemporary problems
 | * Examination of the different science knowledge used in occupations
* Explanation of how evidence has improved understanding of scientific ideas
* Description of situations in which scientists collaborated to generate solutions to contemporary problems
 | Statements about:* science knowledge used in occupations
* use of evidence to understand scientific ideas
* scientists collaborating to generate solutions to contemporary problems
 | Statements about:* science used in occupations
* scientific ideas
* scientists collaborating
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| Skills dimension | Questioning and predicting | Identification and construction of questions and problems that can be investigated scientifically and the making of justified predictions  | Identification and construction of questions and problems that can be investigated scientifically and the making of plausible predictions  | Identification and construction of questions and problems that can be investigated scientifically | Guided identification and construction of questions  | Use of given investigation questions |
| **Skills dimension** | Planning and conducting (including designing field or experimental methods) | * Description of how to manage safety and ethical considerations when planning investigations
* Identification of how variables are changed, controlled and accurately measured to comprehensively collect reliable data
 | * Description of the implications of safety and ethical considerations when planning investigations
* Identification of how variables are changed, controlled and measured to collect reliable data
 | * Consideration of safety and ethics when planning investigations
* Identification of variables to be changed, controlled and measured
 | * Selection of, or partial planning of investigations that consider safety and ethics
* Partial identification of variables to be changed, measured and controlled
 | Use of given investigations methods  |
| Processing and analysing data and information | Following of conventions to systematically construct accurate representations of data to analyse patterns and trends, and use of these when explaining relationships and justifying conclusions | Following of conventions to systematically construct representations of data to analyse patterns and trends, and use of these when describing relationships and justifying conclusions | Construction of representations of data to reveal and analyse patterns and trends, and use these when justifying conclusions | * Partial construction of representations of data to reveal patterns and trends
* Partial development of conclusions
 | * Use of given representations
* Restatement of data
 |
| Skills dimension | Evaluating | * Reflection on the method used and evaluation of the quality of data to thoroughly explain how effective modifications to methods will improve the quality of data
* Use of relevant scientific knowledge and investigation findings to evaluate with justification claims made by others
 | * Reflection on the method used and evaluation of the quality of data to explain how effective modifications to methods could improve the quality of data
* Use of relevant scientific knowledge and investigation findings when evaluating claims made by others
 | * Explanation of how modifications to methods could improve the quality of data
* Application of scientific knowledge and investigation findings to evaluate claims made by others
 | Statements about:* modifications to methods
* claims made by others
 | Statements about: modifications and claims |
| Communicating | Concise and coherent use of appropriate scientific language and representations to communicate science ideas, methods and findings in a range of text types | Coherent use of appropriate scientific language and representations to communicate science ideas, methods and findings in a range of text types | Use of appropriate language and representations to communicate science ideas, methods and findings in a range of text types | Use of everyday language and representations to communicate science ideas, methods and findings  | Fragmented use of language and representations |

**Note:** Colour highlights have been used in the table to emphasise the qualities that discriminate between the standards.

## Notes

The SEs describe the qualities of achievement in the two dimensions common to all Australian Curriculum learning area achievement standards:

* understanding
* skills.

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| Dimension[[1]](#footnote-1) | Description |
| Understanding\* | The concepts underpinning and connecting knowledge in a learning area, related to a student’s ability to appropriately select and apply knowledge to solve problems in that learning area |
| Skills\* | The specific techniques, strategies and processes in a learning area |

The following terms and key words are used in the Year 8 Science SEs. They help to clarify the descriptors and should be used in conjunction with the ACARA Australian Curriculum Science glossary [www.australiancurriculum.edu.au/Science/Glossary](http://www.australiancurriculum.edu.au/Science/Glossary)

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| Term1  | Description |
| Accuracy; Accurate | Consistent with a standard, rule, convention or known factIn the context of Science:* accurate measurements are close to the accepted value
* accurate representations are a true representation of observations or collected data.
 |
| Analysis; Analyse\* | Consider in detail for the purpose of finding meaning or relationships, and identifying patterns, similarities and differences |
| Coherent | Rational; well-structured and makes sense |
| Communicating (sub-strand)\* | Conveying information or ideas to others through appropriate representations, text types and modes |
| Comparison; Compare | Estimate, measure or note how things are similar or dissimilar |
| Complexity; Complex | Involving a number of elements, components or steps  |
| Comprehensive | Detailed and thorough, including all that is relevant |
| Concise | Brief and to the point; without repetition of information, loss of clarity or loss of argument, logic or solution |
| Conventions\* (tables and graphs) | Agreed methods of representing concepts, information and behavioursIn the context of constructing tables and graphs in science, the following conventions apply:**Tables**Any table used in an investigation should include:* the independent variable goes in the left hand column, the dependent variables in the column/s to the right
* column headings that have all the information needed to define the table's meaning and should identify units (if applicable)
* a title that summarises what the table is showing.

**Graphs**Any graph used to report findings should include:* labelling the dependent variable on the horizontal (x) axis and the independent on the vertical (y) axis, accompanied by the units of measurement
* an appropriate scale in ascending amounts with equal intervals (if applicable)
* a title that summarises what the graph is showing.
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| Definition; Define | To state the meaning of |
| Description; Descriptive; Describe\* | Give an account of characteristics or features |
| Effectively; Effective | Meeting the assigned purpose; in a way that produces a desired or intended result |
| Evaluation; Evaluate\* | Examine and judge the merit or significance of something |
| Evaluating (sub-strand)\* | Considering the quality of available evidence and the merit or significance of a claim, proposition or conclusion with reference to that evidenceIn Year 8, this includes:* reflecting on the method used to investigate a question or solve a problem
* evaluating the quality of the data collected
* identifying improvements to the method
* evaluating claims.
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| Examination; Examine | To study or analyse |
| Explanation; Explanatory; Explain\* | Provide additional information that demonstrates understanding of reasoning and/or application |
| Fragmented | Disjointed, incomplete or isolated |
| Given | Known or provided |
| Guided | Visual and/or verbal prompts to facilitate or support independent action |
| How vs why | ‘How’ is used to know the manner in which something has happened. ‘Why’ is asked to find out the reasons behind something. |
| Identification; Identify\* | Establish or indicate who or what someone or something is |
| Informed | Having relevant knowledge; being conversant with the topicIn the context of Science, informed means referring to scientific background knowledge and/or empirical observations. |
| Integration; Integrate | To make into a whole by bringing all parts together |
| Justification; Justify\* | Show how an argument or conclusion is right or reasonable |
| Link | To connect with |
| Partial | Incomplete, half-done, unfinished |
| Planning and conducting (sub-strand)\* | Making decisions regarding how to investigate or solve a problem and carrying out an investigation, including the collection of data. In Year 8, this includes:* planning and conducting a range of investigation types
* ensuring safety and ethical guidelines are followed
* measuring and controlling variables in fair tests
* selecting equipment to collect data with accuracy.
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| Plausibility; Plausible | Credible and possibleIn the context of science, a plausible prediction is based on scientific knowledge. |
| Processing and analysing data and information (sub-strand)\* | Representing data in meaningful and useful ways; identifying trends, patterns and relationships in data, and using this evidence to justify conclusionsIn Year 8, this includes:* constructing and using a range of representations
* analysing patterns or relationships.
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| Questioning and predicting (sub-strand)\* | Identifying and constructing questions, proposing hypotheses and suggesting possible outcomes |
| Questions (that can be investigated scientifically) | A question that is connected to scientific concepts and methods and is able to be investigated through the systematic observation and interpretation of data. There are three types of investigable questions:1. **Descriptive questions**: produce a qualitative or quantitative description of an object, material, organism or event
2. **Relational questions:** identify associations between the characteristics of different phenomena
3. **Cause-effect questions**: determine whether one or more variables cause or affect one or more outcome variables

Sharkawy, A 2010. ‘A Quest to Improve: Helping students learn how to pose investigable questions’, *Science and Children*, vol. 48, no. 4, pp. 32–35. |
| Recall\* | Remember information, ideas or experiences |
| Reflection; Reflect\* | Think carefully about, such as past experiences, activities or events |
| Relevant | Connected to the matter in hand |
| Reliability; Reliable | Constant and dependable or consistent and repeatable. In the context of collecting data from:* first-hand investigations, reliability refers to the consistency of the data collected. A consistent pattern of results is established through repetition
* secondary sources, reliability refers to information and data from secondary sources that is consistent with information and data from a number of reputable sources.

Note: reliability and validity are terms that can easily be confused by students. In the context of collecting data from:* first-hand investigations, validity refers to whether the measurements collected are caused by the phenomena being tested i.e. if the procedure is testing the hypothesis
* secondary sources, validity refers to the degree to which evidence supports the assertion or claim being evaluated

McCloughan, G 2001, ‘Reliability and validity – what do they mean?’ *Curriculum Support for teaching in Science in 7–12*, vol. 6, no. 3, pp. 14–15. |
| Restatement; Restate | Repeat known information |
| Science knowledge\* | Science knowledge refers to facts, concepts, principles, laws, theories and models that have been established by scientists over time. 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. For year level specific information, refer to the Year 8 Level description and content descriptions [www.australiancurriculum.edu.au/science/Curriculum/F-10#level8](http://www.australiancurriculum.edu.au/science/Curriculum/F-10#level8)  |
| Science understanding\* | Science understanding is evident when a person selects and integrates appropriate science knowledge to explain and predict phenomena, and applies that knowledge to new situations. The Year 8 Australian Curriculum achievement standard outlines the depth of conceptual understanding for each of the Science understanding sub-strands:*Biological sciences* * Analysis of the relationship between structure and function at cell, organ and body system levels

*Chemical sciences** Comparison of physical and chemical changes
* Use of the particle model to explain and predict the properties and behaviours of substances

*Earth and space sciences* * Comparison of processes of rock formation, including the time scales involved

*Physical sciences** Identification of different forms of energy
* Description of how energy transfers and transformations cause change in simple systems.
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| Selection; Select\* | Choose in preference to another or others |
| Simple  | Involving few elements, components or steps; obvious data or outcomes |
| Solutions | Answers to problems or questions |
| Statement; State | A sentence or assertion |
| Systematic | Methodical, organised and logical |
| Thorough | Demonstrating depth and breadth, inclusive of relevant detail |

1. The asterisk (\*) denotes dimensions and terms described by ACARA. Unmarked terms are described by QCAA. [↑](#footnote-ref-1)