Year 10 standard elaborations — Australian Curriculum v9.0: Science

ACiQ | v9.0

Purpose

The standards elaborations (SEs) support teachers to connect curriculum to evidence in assessment so that students are assessed on what they have had the opportunity to learn. The SEs can be used to:

- make consistent and comparable judgments, on a five-point scale, about the evidence of learning in a folio of student work across a year/band
- develop task-specific standards (or marking guides) for individual assessment tasks
- quality assure planning documents to ensure coverage of the achievement standard across a year/band.

Structure

The SEs have been developed using the Australian Curriculum achievement standard. The achievement standard for Science describes what students are expected to know and be able to do at the end of each year. Teachers use the SEs during and at the end of a teaching period to make on-balance judgments about the qualities in student work that demonstrate the depth and breadth of their learning.

In Queensland, the achievement standard represents the C standard — a sound level of knowledge and understanding of the content, and application of skills. The SEs are presented in a matrix where the discernible differences and/or degrees of quality between each performance level are highlighted. Teachers match these discernible differences and/or degrees of quality to characteristics of student work to make judgments across a five-point scale.

Year 10 Australian Curriculum: Science achievement standard
By the end of Year 10 students explain the processes that underpin heredity and genetic diversity and describe the evidence supporting the theory of evolution by natural selection. They sequence key events in the origin and evolution of the universe and describe the supporting evidence for the big bang theory. They describe trends in patterns of global climate change and identify causal factors. They explain how Newton's laws describe motion and apply them to predict motion of objects in a system. They explain patterns and trends in the periodic table and predict the products of reactions and the effect of changing reactant and reaction conditions. Students analyse the importance of publication and peer review in the development of scientific knowledge and analyse the relationship between science, technologies and engineering. They analyse the key factors that influence interactions between science and society. Students plan and conduct safe, valid and reproducible investigations to test relationships or develop explanatory models. They explain how they have addressed any ethical and intercultural considerations when generating or using primary and secondary data. They select equipment and use it efficiently to generate and record appropriate sample sizes and replicable data with precision. They select and construct effective representations to organise, process and summarise data and information. They analyse and connect a variety of data and information to identify and explain patterns, trends, relationships and anomalies. They evaluate the validity and reproducibility of methods, and the validity of conclusions and claims. They construct logical arguments based on analysis of a variety of 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 diverse audiences.
Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), *Australian Curriculum Version 9.0 Science for Foundation–10* https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/science/year-10

Year 10 Science standard elaborations

		A	B	C	D	E
		The folio of student work contains evidence of the following:				
Science understanding	**Biological sciences**	• reasoned explanation of the processes that underpin heredity and genetic diversity • considered description of the evidence supporting the theory of evolution by natural selection	• plausible explanation of the processes that underpin heredity and genetic diversity • informed description of the evidence supporting the theory of evolution by natural selection	• explanation of the processes that underpin heredity and genetic diversity • description of the evidence supporting the theory of evolution by natural selection	• description of the processes that underpin heredity and genetic diversity • identification of evidence supporting the theory of evolution by natural selection	• description of the processes that underpin heredity • statement/s about the theory of evolution by natural selection

		A	B	C	D	E
	Earth and space sciences	sequenced key events in the origin and evolution of the universe and considered description of the supporting evidence for the big bang theory	sequenced key events in the origin and evolution of the universe and informed description of the supporting evidence for the big bang theory	sequenced key events in the origin and evolution of the universe and description of the supporting evidence for the big bang theory	description of the origin of the universe	statement/s about the origin of the universe
		• reasoned description of trends in patterns of global climate change • reasoned identification of causal factors	• plausible description of trends in patterns of global climate change • plausible identification of causal factors	• description of trends in patterns of global climate change • identification of causal factors	description of global climate change	statement/s about global climate change
	Physical sciences	• reasoned explanation of how Newton's laws describe motion • considered application of Newton's laws to predict motion of objects in a system	• informed explanation of how Newton's laws describe motion • plausible application of Newton's laws to predict motion of objects in a system	• explanation of how Newton's laws describe motion • application of Newton's laws to predict motion of objects in a system	• partial explanation of how Newton's laws describe motion • partial application of Newton's laws to predict motion of objects in a system	statement/s about laws of motion
	Chemical sciences	• reasoned explanation of patterns and trends in the periodic table • reasoned prediction of the products of reactions • reasoned prediction of the effect of changing reactant and reaction conditions	• plausible explanation of patterns and trends in the periodic table • plausible prediction of the products of reactions • plausible prediction of the effect of changing reactant and reaction conditions	• explanation of patterns and trends in the periodic table • prediction of the products of reactions • prediction of the effect of changing reactant and reaction conditions	• description of patterns or trends in the periodic table • guided prediction of the products of reactions • prediction of the effect of changing reactant or reaction conditions	• identification of a pattern or trend in the periodic table • statement/s about products of reactions • description of the effect of changing reactant or reaction conditions

		A	B	C	D	E
Science as a human endeavour	**Nature and development of science**	• thorough analysis of the importance of publication and peer review in the development of scientific knowledge • thorough analysis of the relationship between science, technologies and engineering	• detailed analysis of the importance of publication and peer review in the development of scientific knowledge • detailed analysis of the relationship between science, technologies and engineering	• analysis of the importance of publication and peer review in the development of scientific knowledge • analysis of the relationship between science, technologies and engineering	• description of the importance of publication and peer review in the development of scientific knowledge • description of the relationship between science, technologies and engineering	• statement/s about the importance of publication and peer review • statement/s about science, technologies and engineering
	Use and influence of science	thorough analysis of the key factors that influence interactions between science and society	detailed analysis of the key factors that influence interactions between science and society	analysis of the key factors that influence interactions between science and society	description of factors that influence interactions between science and society	identification of factors that influence interactions between science and society

		A	B	C	D	E
Science inquiry	Questioning and predicting	purposeful planning of investigations to test relationships or develop explanatory models	plausible planning of investigations to test relationships or develop explanatory models	planning of investigations to test relationships or develop explanatory models	planning of investigations to test relationships or develop explanatory models, with guidance	planning of investigations to test relationships or develop explanatory models, with direction
	Planning and conducting	thorough planning and conducting of safe, valid and reproducible investigations	detailed planning and conducting of safe, valid and reproducible investigations	planning and conducting of safe, valid and reproducible investigations	planning and conducting of safe, valid investigations	planning and conducting of safe investigations
		considered explanation of how they have addressed any ethical and intercultural considerations when generating or using primary and secondary data	informed explanation of how they have addressed any ethical and intercultural considerations when generating or using primary and secondary data	explanation of how they have addressed any ethical and intercultural considerations when generating or using primary and secondary data	description of ethical and intercultural considerations when generating or using primary and secondary data	identification of ethical and intercultural considerations when generating or using primary and secondary data
		selection and efficient use of equipment for the purposeful generation and recording of appropriate sample sizes and replicable data with precision	selection and efficient use of equipment for the effective generation and recording of appropriate sample sizes and replicable data with precision	selection and efficient use of equipment for the generation and recording of appropriate sample sizes and replicable data with precision	selection and use of equipment for the generation and recording of replicable data with precision	use of equipment for the generation and recording of replicable data with precision

		A	B	C	D	E
	Processing, modelling and analysing	selection and purposeful construction of effective representations to organise, process and summarise data and information	selection and plausible construction of effective representations to organise, process and summarise data and information	selection and construction of effective representations to organise, process and summarise data and information	construction of representations to organise, process and summarise data and information	construction of representations to organise and process data and information
		thorough analysis and connection of a variety of data and information to: • identify patterns, trends, relationships and anomalies • explain patterns, trends, relationships and anomalies	detailed analysis and connection of a variety of data and information to: • identify patterns, trends, relationships and anomalies • explain patterns, trends, relationships and anomalies	analysis and connection of a variety of data and information to: • identify patterns, trends, relationships and anomalies • explain patterns, trends, relationships and anomalies	analysis and connection of data and information to describe patterns, trends, relationships and anomalies	connection of data and information to identify patterns, trends, relationships or anomalies
	Evaluating	• considered evaluation of the validity and reproducibility of methods • thorough evaluation of the validity of conclusions and claims	• informed evaluation of the validity and reproducibility of methods • detailed evaluation of the validity of conclusions and claims	• evaluation of the validity and reproducibility of methods • evaluation of the validity of conclusions and claims	• partial evaluation of the validity and reproducibility of methods • partial evaluation of the validity of conclusions and claims	• description of the reproducibility of methods • description of the validity of conclusions or claims
		construction of logical purposeful arguments based on analysis of a variety of evidence to support conclusions and evaluate claims	construction of logical informed arguments based on analysis of a variety of evidence to support conclusions and evaluate claims	construction of logical arguments based on analysis of a variety of evidence to support conclusions and evaluate claims	construction of arguments based on a variety of evidence to support conclusions and evaluate claims	construction of arguments to support conclusions and evaluate claims

		A	B	C	D	E
	Communicating	selection and use of content, language and text features effectively to achieve their purpose of considered communication of their ideas, findings and arguments to diverse audiences.	selection and use of content, language and text features effectively to achieve their purpose of informed communication of their ideas, findings and arguments to diverse audiences.	selection and use of content, language and text features effectively to achieve their purpose when communicating their ideas, findings and arguments to diverse audiences.	selection and use of content, language and text features to achieve their purpose when communicating their ideas, findings and arguments to audiences.	use of content, language or text features when communicating their ideas, findings and arguments to audiences.

Key	shading emphasises the qualities that discriminate between the A–E descriptors