Year 4 standard elaborations — Australian Curriculum v9.0: Mathematics

Purpose

The standards elaborations (SEs) have been designed to 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 Mathematics 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.

The Mathematics SEs have been organised using the Mathematical proficiencies. Performance across the five-point scale is frequently described in terms of complexity and familiarity of the standards descriptor being assessed. Across the standards elaborations in Year 3 to Year 6, this is described using: A — unfamiliar, B — complex familiar, C — simple familiar, D — some simple familiar, E — isolated and obvious.

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. Terms are described in the Notes section following the matrix.

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For all Queensland schools

Year 4 Australian Curriculum: Mathematics achievement standard

By the end of Year 4, students use their understanding of place value to represent tenths and hundredths in decimal form and to multiply natural numbers by multiples of 10. They use mathematical modelling to solve financial and other practical problems, formulating the problem using number sentences, solving the problem choosing efficient strategies and interpreting results in terms of the situation. Students use their proficiency with addition and multiplication facts to add and subtract, multiply and divide numbers efficiently. They choose rounding and estimation strategies to determine whether results of calculations are reasonable. Students use the properties of odd and even numbers. They recognise equivalent fractions and make connections between fraction and decimal notations. Students count and represent fractions on a number line. They find unknown values in numerical equations involving addition and subtraction. Students follow and create algorithms that generate sets of numbers and identify emerging patterns.

They use scaled instruments and appropriate units to measure length, mass, capacity and temperature. Students measure and approximate perimeters and areas. They convert between units of time when solving problems involving duration. Students compare angles relative to a right angle using angle names. They represent and approximate shapes and objects in the environment. Students create and interpret grid references. They identify line and rotational symmetry in plane shapes and create symmetrical patterns.

Students create many-to-one data displays, assess the suitability of displays for representing data and discuss the shape of distributions and variation in data. They use surveys and digital tools to generate categorical or discrete numerical data in statistical investigations and communicate their findings in context. Students order events or the outcomes of chance experiments in terms of likelihood and identify whether events are independent or dependent. They conduct repeated chance experiments and describe the variation in results.

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), *Australian Curriculum Version 9.0 Mathematics for Foundation–10*
https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/mathematics/year-4?view=quick&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&subjects-start-index=0

Note: The Mathematics SEs are organised by the Mathematical proficiencies. The proficiencies represent the actions students demonstrate when working mathematically. The proficiencies are embedded as verbs in the achievement standard and related content descriptions. For further information about the connections between the achievement standard aspects and the standard elaborations see Table 1 on page 4.

Year 4 Mathematics standard elaborations

		A	B	C	D	E
		The folio of student work contains evidence of the following:				
Mathematical proficiencies	**Understanding**	accurate and consistent identification, representation, description and connection of mathematical concepts and relationships in unfamiliar, complex familiar, and simple familiar situations	accurate identification, representation, description and connection of mathematical concepts and relationships in complex familiar and simple familiar situations	identification, representation, description and connection of mathematical concepts and relationships in simple familiar situations	partial identification, representation and description of mathematical concepts and relationships in some simple familiar situations	fragmented identification, representation and description of mathematical concepts and relationships in isolated and obvious situations
	Fluency	choice, use and application of comprehensive facts, definitions, and procedures to find solutions in unfamiliar, complex familiar, and simple familiar situations	choice, use and application of effective facts, definitions, and procedures to find solutions in complex familiar and simple familiar situations	choice, use and application of facts, definitions, and procedures to find solutions in simple familiar situations	choice and use of partial facts, definitions, and procedures to find solutions in some simple familiar situations	choice and use of fragmented facts, definitions and procedures to find solutions in isolated and obvious situations
	Reasoning	comprehensive explanation of mathematical thinking, strategies used, and conclusions reached in unfamiliar, complex familiar, and simple familiar situations	detailed explanation of mathematical thinking, strategies used, and conclusions reached in complex familiar and simple familiar situations	explanation of mathematical thinking, strategies used, and conclusions reached in simple familiar situations	partial explanation of mathematical thinking, strategies used, and conclusions reached in some simple familiar situations	fragmented explanation of mathematical thinking, strategies used, and conclusions reached in isolated and obvious situations
	Problem-solving	purposeful use of problem-solving approaches to find solutions to problems.	effective use of problem-solving approaches to find solutions to problems.	use of problem-solving approaches to find solutions to problems.	partial use of problem-solving approaches to make progress towards finding solutions to problems.	fragmented use of problem-solving approaches to make progress towards finding solutions to problems.

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

Notes

The SEs for Mathematics are organised using the Mathematical proficiencies. The Mathematical proficiencies include Understanding, Fluency, Reasoning and Problem-solving. The Mathematical proficiencies represent the valued features or assessable elements.

For a specific assessment task, the standard elaborations description (in the previous table) can be modified to include task-specific content. Task-specific content can be drawn from an aspect of the achievement standard and the related content description/s which are aligned to the Mathematical proficiencies being assessed. Table 1 provides examples of how content can be related to the standard elaborations valued features for task-specific marking guides at a C standard.

Table 2 helps clarify key terms from the standard descriptors in the Mathematics SEs and should be used in conjunction with the ACARA Australian Curriculum Mathematics glossary: https://v9.australiancurriculum.edu.au/content/dam/en/curriculum/ac-version-9/downloads/mathematics/mathematics-glossary-v9.docx

Table 1: Examples of how content can be related to the SE valued features for task-specific marking guides at a C standard

Aspect of the achievement standard	Related content description/s	SE valued features (Mathematical proficiencies)	Examples of how content can be related to the SE valued features
Students use their understanding of place value to represent tenths and hundredths in decimal form and to multiply natural numbers by multiples of 10.	**Number** • recognise and extend the application of place value to tenths and hundredths and use the conventions of decimal notation to name and represent decimals AC9M4N01 • solve problems involving multiplying or dividing natural numbers by multiples and powers of 10 without a calculator, using the multiplicative relationship between the place value of digits AC9M4N05	Understanding	• representing tenths and hundredths in decimal form using their understanding of place value
		Fluency	• multiplying natural numbers by multiples of 10 using their understanding of place value
They use mathematical modelling to solve financial and other practical problems, formulating the problem using number sentences, solving the problem choosing efficient strategies and interpreting results	**Number** • develop efficient strategies and use appropriate digital tools for solving problems involving addition and subtraction, and multiplication and division where there is no remainder AC9M4N06 • use mathematical modelling to solve practical problems involving additive and multiplicative situations including financial contexts; formulate the problems using	Understanding	• formulating financial and other practical problems using number sentences
		Fluency	• solving financial and other practical problems, choosing efficient strategies

Aspect of the achievement standard	Related content description/s	SE valued features (Mathematical proficiencies)	Examples of how content can be related to the SE valued features
in terms of the situation.	number sentences and choose efficient calculation strategies, using digital tools where appropriate; interpret and communicate solutions in terms of the situation AC9M4N08	Reasoning	• interpreting results related to mathematical modelling problems in terms of the situation
		Problem-solving	• using mathematical modelling to solve financial and other practical problems
Students use their proficiency with addition and multiplication facts to add and subtract, multiply and divide numbers efficiently.	**Number** • develop efficient strategies and use appropriate digital tools for solving problems involving addition and subtraction, and multiplication and division where there is no remainder AC9M4N06 • use mathematical modelling to solve practical problems involving additive and multiplicative situations including financial contexts; formulate the problems using number sentences and choose efficient calculation strategies, using digital tools where appropriate; interpret and communicate solutions in terms of the situation AC9M4N08 **Algebra** • recall and demonstrate proficiency with multiplication facts up to 10 x 10 and related division facts; extend and apply facts to develop efficient mental strategies for computation with larger numbers without a calculator AC9M4A02	Fluency	• using proficiency with addition facts to add and subtract numbers efficiently • using proficiency with multiplication facts to multiply and divide numbers efficiently

Aspect of the achievement standard	Related content description/s	SE valued features (Mathematical proficiencies)	Examples of how content can be related to the SE valued features
They choose rounding and estimation strategies to determine whether results of calculations are reasonable.	**Number** • choose and use estimation and rounding to check and explain the reasonableness of calculations including the results of financial transactions AC9M4N07	Reasoning	• determining whether results of calculations are reasonable, by choosing rounding and estimation strategies
Students use the properties of odd and even numbers.	**Number** • explain and use the properties of odd and even numbers AC9M4N02	Fluency	• using the properties of odd and even numbers
They recognise equivalent fractions and make connections between fraction and decimal notations.	**Number** • recognise and extend the application of place value to tenths and hundredths and use the conventions of decimal notation to name and represent decimals AC9M4N01 • find equivalent representations of fractions using related denominators and make connections between fractions and decimal notation AC9M4N03	Understanding	• recognising equivalent fractions • making connections between fraction and decimal notations
Students count and represent fractions on a number line.	**Number** • count by fractions including mixed numerals; locate and represent these fractions as numbers on number lines AC9M4N04	Understanding	• representing fractions on a number line
		Fluency	• counting fractions on a number line
They find unknown values in numerical equations involving addition and subtraction.	**Algebra** • find unknown values in numerical equations involving addition and subtraction, using the properties of numbers and operations AC9M4A01	Fluency	• finding unknown values in numerical equations involving addition and subtraction
Students follow and create algorithms that generate sets of numbers and identify emerging patterns.	**Number** • follow and create algorithms involving a sequence of steps and decisions that use addition or multiplication to generate sets of numbers; identify and describe any emerging patterns AC9M4N09	Understanding	• identifying emerging patterns from algorithms
		Fluency	• following algorithms that generate sets of numbers

Aspect of the achievement standard	Related content description/s	SE valued features (Mathematical proficiencies)	Examples of how content can be related to the SE valued features
		Problem-solving	• creating algorithms that generate sets of numbers

Students use scaled instruments and appropriate units to measure length, mass, capacity and temperature.	**Measurement**
	• interpret unmarked and partial units when measuring and comparing attributes of length, mass, capacity, duration and temperature, using scaled and digital instruments and appropriate units AC9M4M01
		Fluency	• using scaled instruments and appropriate units to measure
			  – length
			  – mass
			  – capacity
			  – temperature

Students measure and approximate perimeters and areas.	**Measurement**
	• recognise ways of measuring and approximating the perimeter and area of shapes and enclosed spaces, using appropriate formal and informal units AC9M4M02
		Fluency	• measuring and approximating
			  – perimeters
			  – areas

They convert between units of time when solving problems involving duration.	**Measurement** • solve problems involving the duration of time including situations involving "am" and "pm" and conversions between units of time AC9M4M03	Fluency	• converting between units of time when solving problems involving duration
Students compare angles relative to a right-angle using angle names.	**Measurement** • estimate and compare angles using angle names including acute, obtuse, straight angle, reflex and revolution, and recognise their relationship to a right angle AC9M4M04	Reasoning	• comparing angles relative to a right-angle using angle names
They represent and approximate shapes and objects in the environment.	**Space** • represent and approximate composite shapes and objects in the environment, using combinations of familiar shapes and objects AC9M4SP01	Understanding	• representing and approximating shapes and objects in the environment
Students create and interpret grid references.	**Space** • create and interpret grid reference systems using grid references and directions to locate and describe positions and pathways AC9M4SP02	Understanding	• creating grid references • interpreting grid references

Aspect of the achievement standard	Related content description/s	SE valued features (Mathematical proficiencies)	Examples of how content can be related to the SE valued features

They identify line and rotational symmetry in plane shapes and create symmetrical patterns.	**Space**
	• recognise line and rotational symmetry of shapes and create symmetrical patterns and pictures, using dynamic geometric software where appropriate AC9M4SP03
		Understanding	• identifying
			  – line symmetry
			  – rotational symmetry
			  in plane shapes
			• creating symmetrical patterns

Students create many-to-one data displays, assess the suitability of displays for representing data and discuss the shape of distributions and variation in data.	**Statistics** • acquire data for categorical and discrete numerical variables to address a question of interest or purpose, using digital tools; represent data using many-to-one pictographs, column graphs and other displays or visualisations; interpret and discuss the information that has been created AC9M4ST01 • analyse the effectiveness of different displays or visualisations in illustrating and comparing data distributions, then discuss the shape of distributions and the variation in the data AC9M4ST02	Understanding	• creating many-to-one data displays
		Reasoning	• assessing the suitability of displays for representing data • discussing the shape of distributions and variation in data
They use surveys and digital tools to generate categorical or discrete numerical data in statistical investigations and communicate their findings in context.	**Statistics** • acquire data for categorical and discrete numerical variables to address a question of interest or purpose, using digital tools; represent data using many-to-one pictographs, column graphs and other displays or visualisations; interpret and discuss the information that has been created AC9M4ST01 • conduct statistical investigations, collecting data through survey responses and other methods; record and display data using digital tools; interpret the data and communicate the results AC9M4ST03	Fluency	• using surveys and digital tools to generate categorical or discrete numerical data
		Reasoning	• communicating findings from statistical investigations in context
		Problem-solving	• generating categorical or discrete numerical data in statistical investigations

Aspect of the achievement standard	Related content description/s	SE valued features (Mathematical proficiencies)	Examples of how content can be related to the SE valued features
Students order events or the outcomes of chance experiments in terms of likelihood and identify whether events are independent or dependent.	**Probability** • describe possible everyday events and the possible outcomes of chance experiments and order outcomes or events based on their likelihood of occurring; identify independent or dependent events AC9M4P01	Understanding	• identifying whether events are independent or dependent
		Fluency	• ordering events or the outcomes of chance experiments in terms of likelihood
They conduct repeated chance experiments and describe the variation in results.	**Probability** • conduct repeated chance experiments to observe relationships between outcomes; identify and describe the variation in results AC9M4P02	Understanding	• describing the variation in results from repeated chance experiments
		Problem-solving	• conducting repeated chance experiments

Table 2: Key terms used in Mathematics SEs

Term	Description

Simple familiar	Problems of this degree of difficulty require students to demonstrate knowledge and understanding of the subject matter and application of skills in a situation where:
	• relationships and interactions are obvious and have few elements; and
	• all of the information to solve the problem is identifiable; that is
	  – the required procedure is clear from the way the problem is posed, or
	  – in a context that has been a focus of prior learning.
	Students are not required to interpret, clarify and analyse problems to develop responses.

Complex familiar	Problems of this degree of difficulty require students to demonstrate knowledge and understanding of the subject matter and application of skills in a situation where:
	• relationships and interactions have a number of elements, such that connections are made with subject matter within and/or across the strands of mathematics; and
	• all of the information to solve the problem is identifiable; that is
	  – the required procedure is clear from the way the problem is posed, or
	  – in a context that has been a focus of prior learning.
	Some interpretation, clarification and analysis will be required to develop responses.
	Creating complex familiar examples may consist in making changes to any of the following, including the:
	• number of steps required to solve the problem/situation
	• changes to increments, benchmarks or scale
	• number of attributes considered.

Unfamiliar	Problems of this degree of difficulty require students to demonstrate knowledge and understanding of the subject matter and application of skills in a situation where:
	• relationships and interactions have a number of elements, such that connections are made with subject matter within and/or across the strands of mathematics; and
	• all the information to solve the problem is not immediately identifiable; that is
	  – the required procedure is not clear from the way the problem is posed, and
	  – in a context in which students have had limited prior experience.
	Students interpret, clarify and analyse problems to develop responses.
	Creating unfamiliar examples may consist in making changes to any of the following, including the:
	• context for application, e.g. financial, measurement, spatial or statistical
	• type of representation, e.g. physical, visual or symbolic
	• orientation of representation, e.g. horizontal or vertical
	• merge of subject matter/concepts from across different strands.