Year 8 Mathematics
Curriculum and assessment plan

Example

Level description	Context and cohort considerations
In Year 8, learning in Mathematics builds on each student's prior learning and experiences. Students engage in a range of approaches to learning and doing mathematics that develop their understanding of and fluency with concepts, procedures and processes by making connections, reasoning, problem-solving and practice. Proficiency in mathematics enables students to respond to familiar and unfamiliar situations by employing mathematical strategies to make informed decisions and solve problems efficiently. Students further develop proficiency and positive dispositions towards mathematics and its use as they: • extend computation with combinations of the 4 operations with integers and positive rational numbers, recognise the relationship between fractions and their terminating or infinite recurring decimal expansions; they convert between fraction and decimal forms of rational numbers and locate them on the real number line • extend the exponent laws to numerical calculations involving positive and zero exponents, and solve a broad range of practical problems, using mental methods, written algorithms and digital tools • use mathematical modelling to solve problems in a broad range of contexts that involve ratios with 2 or more terms, percentage increase and decrease, proportions with decimal values, and rates in measurement contexts, and apply proportional reasoning • manipulate linear and other algebraic expressions, recognise and model situations using linear relations and solve related equations using tables, graphs and algebra • interpret and explain demonstrations and proofs of Pythagoras' theorem and investigate irrational numbers, their infinite non-recurring decimal expansion and their approximate location on the real number line • select metric measurement units fit for purpose, convert between units, recognising the effects of different levels of measurement accuracy on the results of computations, and relate these to interval estimates for measurements in various contexts • apply knowledge of the relationships between π and the features of circles to solve problems involving circumference and area and establish sets of congruency and similarity conditions for common shapes in the plane and create algorithms to test for these conditions, discuss examples and counterexamples • construct and locate objects with reference to three-dimensional coordinates using digital tools • consider a variety of situations involving complementary and mutually exclusive events, combinations of 2 events; represent these using tables and diagrams, conducting simulations and calculating corresponding probabilities • examine experimental and observational data and identify populations and samples with respect to context; investigate variation in summary statistics across samples of varying size and discuss their findings.	The Year 8 cohort participates in regular mathematics lessons. This plan has considered: • summative and formative data from Year 7 showing the need to support and extend on their rational numbers and exponent understandings • timing of the fundraising event as this context is incorporated into Unit 4 • exploration and use of digital tools, e.g. virtual material, electronic devices, simulation programs and dynamic geometric software, in relevant contexts that support the learning and doing of mathematics.

Unit 1 — The positive and negatives of being irrational and random	Unit 2 — Laws, properties and functions	Unit 3 — Why triangles?	Unit 4 — Making connections
Duration: 10 weeks	**Duration: 10 weeks**	**Duration: 10 weeks**	**Duration: 10 weeks**
Our number system comprises of real numbers including rational and irrational numbers. These numbers, when used in statistics and probability, help us to make decisions and predictions about everyday events. In the first phase of this unit, students engage in number stories, choosing and using efficient strategies to solve problems when using all four operations with integers and positive rational numbers. Through the study of architecture and garden design, e.g. the use of the golden ratio in design features, students extend their knowledge of real numbers to include recognising irrational numbers, including terminating, and recurring decimals. Students demonstrate their knowledge and skills of this unit in an end-of-semester examination at the end of Term 2. The second phase of this unit focuses on a combined statistics and probability investigation conducted throughout the term. Through the exploration of statistical investigations and data gathering exercises, e.g. census, sampling, experiment and observation, students build their ethical understanding about appropriateness of data collection methods and the impact bias can have on decision-making. Through the use of critical and creative thinking skills students compare variations in data samples obtained from the same population and make connections to analyse and report the distribution of data. Students connect their statistical investigations to probability concepts where they recognise and explore the probability of complementary events. Students explore how the relationships of these events are used to determine all possible combinations for two events, e.g. using two way tables, tree diagrams and Venn diagrams. They run basic simulations to test a series of conjectures to determine if the random selection process aligns to theoretical predictions. Students present their statistical and probability findings in an investigation journal completed throughout the term.	Number properties, rules and associated patterns are the building blocks upon which mathematics is constructed. In this unit, students expand their number and algebra knowledge to understand how number properties can be used to develop rules, allowing for quantification, calculation, analysis and problem-solving in real-world applications. In the first phase of this unit students build on their exponent knowledge from Year 7 to establish and apply exponent laws to positive integers and zero-exponents. Using manipulatives, e.g. beads, petri dishes and play money, they build understanding through concrete experiences in financial and scientific scenarios, e.g. savings and bacteria growth. Through collaborative learning experiences, students use real-world travel scenarios to investigate problems of 12- and 24-hour time duration across multiple time zones. In the second phase of this unit students use manipulatives, e.g. algebra tiles and area models, to develop an understanding of the associative, commutative, identity, distributive and inverse properties and apply them to create, expand, factorise, rearrange and simplify linear expressions. Students graph linear relationships on the Cartesian plane using digital tools, e.g. graphing software. They solve linear equations and one-variable inequalities using graphical and algebraic techniques. Students develop critical thinking skills as they use their knowledge and skills of linear relations in a problem-solving mathematical modelling task to find a solution for a construction company who is looking for a simplified quoting system. Students present their solution in a multimodal presentation. At the completion of the mathematical modelling task, students revise Unit 1 and 2 number and algebra concepts and complete an end-of-semester examination.	Triangles are mathematically significant. Studying the unique geometric properties of triangles is fundamental to understanding how we build our physical and virtual environments. Triangles are also central to learning how to form sound logical arguments and visualising what must be proven. In the first phase of this unit, students are introduced to and explore the foundational concepts of Pythagoras' theorem through physical and visual representations, e.g. manipulatives and diagrams to connect to real-world contexts in the school environment. Students apply algebraic properties from Unit 2 to use and manipulate Pythagoras' theorem formulas to solve measurement problems involving the unknown lengths of right-angled triangles. Students expand their knowledge of triangles to establish sets of conditions for finding the congruency and similarity of triangles. In a written project, students use computational thinking skills to create flow charts (algorithms) that test for these conditions and establish if two triangles are either congruent or similar. In the second phase of this unit, students participate in practical engineering activities to extend their understanding that plotting of co-ordinates (x,y) on the two-dimensional Cartesian plane can be extended to a three-dimensional coordinate system (x,y,z). Using digital tools or with paper, students draw three-dimensional axes to describe the position and location of points and objects, e.g. drawing a cube to describe and locate points on the axes. Students demonstrate their knowledge and skills of this unit in an end-of-semester examination at the end of Term 4.	Learning in Mathematics is cumulative and recursive. In this unit, students draw upon different concepts they have learnt previously. Through deep learning experiences, students are able to transfer their learning to make connections across their mathematical knowledge and skills. The first phase of this unit focuses on revising ratio and percentages from Year 7, Unit 2, to develop an understanding of rates in real-world contexts, e.g. transport fares, savings account growth. Through the use of shopping stimulus materials students develop their understanding and fluency of how ratios and percentages are connected to the world in which they live. Students demonstrate their understanding and skills in a routine mathematical modelling problem-solving task in the end-of-semester examination. In the second phase of this unit, students apply their knowledge of triangle geometric properties from Unit 3 and angle properties from Year 7 to investigate the properties of quadrilaterals. Through the use of manipulative and collaborative game-based activities students develop their critical and creative skills to provide reasons for choices made about properties of given quadrilaterals. Students then apply their knowledge of irrational numbers, terminating and recurring decimals from Unit 1, and the knowledge of the features of a circle (radius, diameter and π) from Year 7, to develop and use formulas to solve problems involving the circumference and area of circles. Students explore the connection between visual representations of circles and formula calculations by creating visual representations, e.g. rulers, compass, chalk, string and digital tools, to test and prove their formula calculations in problem-solving scenarios. Then, students use a range of prisms sourced from their environment to continue to build on their measurement knowledge from Year 7 when solving problems involving the volume and capacity of right prisms using appropriate units. This unit concludes with an examination, including understanding, fluency and reasoning skills from Units 3 and 4.

Where there is one assessment item within a unit, the corresponding achievement standard aspect/s is indicated in blue.
Where there is a second assessment item within a unit, the corresponding achievement standard aspect/s is indicated in yellow.
Where there is an assessment item that is assessed across units, e.g. end-of-semester examination, the corresponding achievement standard aspect/s is indicated in green.

	Unit 1 — The positive and negatives of being irrational and random		Unit 2 — Laws, properties and functions		Unit 3 — Why triangles?		Unit 4 — Making connections	
	Assessment 1 — Project: Statistical investigation and probability experiment and simulations	**Term/ week**	**Assessment 2 — Project: Mathematical modelling**	**Term/ week**	**Assessment 4 — Project: Computational thinking**	**Term/ week**	**Assessment 5 — Examination**	**Term/ week**
Assessment	**Description:** Part A: Students plan and conduct a statistical investigation gathering population/census data about the Year 8 cohort, e.g. gender identity, hair colour, eye colour, height, siblings, pets, mode of transport to school. Students choose two particular features, e.g. hair colour and pets, and use random and non-random sampling techniques to analyse and describe the distribution of data and compare the variation in distributions against the whole cohort population. Students record their investigation data, results and reasoning in an investigation journal. Part B: Students use their sample data to represent and determine a number of related possibilities of two events occurring, e.g. If I picked a student at random from the class, what is the chance that the person will have blue eyes and a dog as a pet? Students showcase their knowledge, understanding and reasoning skills in their investigation journal. **Technique:** Project **Mode:** Written **Conditions:** • issued in week 4 and completed over multiple lessons by the end of week 9 • written responses up to 600 words	Term 1 Week 9	**Description:** Students apply mathematical modelling skills to algebraic equations and graphs to simplify a system for quotes for a construction company. Students apply algebraic properties and graph linear relations to solve linear equations, and they make and test conjectures involving linear relations and rates using digital tools. Students present their quoting system in a multimodal presentation. **Technique:** Project **Mode:** Multimodal **Conditions:** • issued in week 4 and completed by end of week 5 (including 3 hours of class time) • spoken/signed response 3–4 minutes	Term 2 Week 5	**Description:** Students use computational thinking skills to create a flow chart (algorithm) that can be used to identify if two triangles are congruent or similar using the conditions shown in shapes. Students apply Pythagoras' theorem to find the side measurements of right-angled triangles before proving congruency or similarity. Through peer review, students test the design of the algorithm. **Technique:** Project **Mode:** Written **Conditions:** • issued in week 7 and completed by end of week 8 (including 3 hours of class time)	Term 3 Week 8	**Description:** Students undertake a 2-part end-of-semester examination covering topics from Units 3 and 4. **Part A: Short response** Students respond to short response questions using their knowledge and skills from Unit 3 and Unit 4 focusing on: • using Pythagoras' theorem to solve measurement problems involving unknown lengths of right-angled triangles • using three dimensions to locate and describe position • using appropriate metric units when solving measurement problems involving the perimeter and area of composite shapes, and volume of right prisms • using formulas to solve problems involving the area and circumference of circles • applying the properties of quadrilaterals to solve problems, providing reasons for solutions made. **Part B: Extended response** Students use stimulus to respond to a routine mathematical modelling problem-solving scenario with a financial and measurement context, e.g. road trip cost and distance travelled to: • formulate a response to the problem, choosing efficient calculation strategies • solve practical problems involving ratios, percentages and rates • interpret and communicate solutions, reviewing the appropriateness of their response. **Technique:** Examination **Mode:** Written **Conditions:** • Part A and Part B each up to 70 minutes, plus 5 minutes perusal, under supervised conditions • calculator allowed	Term 4 Week 8
			Assessment 3 — Examination **Description:** Students respond to short response questions using their knowledge and skills from Unit 1 and Unit 2 focusing on: • recognising irrational numbers and terminating or recurring decimals • solving problems involving the four operations with integers and positive rational numbers • applying the exponent laws to calculations with numbers involving positive integer exponents • applying algebraic properties to rearrange, expand and factorise linear expressions • solving problems of duration involving 12- and 24-hour cycles across multiple time zones. **Technique:** Examination **Mode:** Written **Conditions:** • up to 70 minutes, plus 5 minutes perusal, under supervised conditions • calculator allowed	**Term/ week** Term 2 Week 8				

	Unit 1 — The positive and negatives of being irrational and random	Unit 2 — Laws, properties and functions	Unit 3 — Why triangles?	Unit 4 — Making connections
Achievement standard	By the end of Year 8, students recognise irrational numbers and terminating or recurring decimals. They apply the exponent laws to calculations with numbers involving positive integer exponents. Students solve problems involving the 4 operations with integers and positive rational numbers. They use mathematical modelling to solve practical problems involving ratios, percentages and rates in measurement and financial contexts. Students apply algebraic properties to rearrange, expand and factorise linear expressions. They graph linear relations and solve linear equations with rational solutions and one-variable inequalities, graphically and algebraically. Students use mathematical modelling to solve problems using linear relations, interpreting and reviewing the model in context. They make and test conjectures involving linear relations using digital tools. Students use appropriate metric units when solving measurement problems involving the perimeter and area of composite shapes, and volume of right prisms. They use Pythagoras' theorem to solve measurement problems involving unknown lengths of right-angle triangles. Students use formulas to solve problems involving the area and circumference of circles. They solve problems of duration involving 12- and 24-hour cycles across multiple time zones. Students use 3 dimensions to locate and describe position. They identify conditions for congruency and similarity in shapes and create and test algorithms designed to test for congruency and similarity. Students apply the properties of quadrilaterals to solve problems. They conduct statistical investigations and explain the implications of obtaining data through sampling. Students analyse and describe the distribution of data. They compare the variation in distributions of random samples of the same and different size from a given population with respect to shape, measures of central tendency and range. Students represent the possible combinations of 2 events with tables and diagrams, and determine related probabilities to solve practical problems. They conduct experiments and simulations using digital tools to determine related probabilities of compound events.	By the end of Year 8, students recognise irrational numbers and terminating or recurring decimals. They apply the exponent laws to calculations with numbers involving positive integer exponents. Students solve problems involving the 4 operations with integers and positive rational numbers. They use mathematical modelling to solve practical problems involving ratios, percentages and rates in measurement and financial contexts. Students apply algebraic properties to rearrange, expand and factorise linear expressions. They graph linear relations and solve linear equations with rational solutions and one-variable inequalities, graphically and algebraically. Students use mathematical modelling to solve problems using linear relations, interpreting and reviewing the model in context. They make and test conjectures involving linear relations using digital tools. Students use appropriate metric units when solving measurement problems involving the perimeter and area of composite shapes, and volume of right prisms. They use Pythagoras' theorem to solve measurement problems involving unknown lengths of right-angle triangles. Students use formulas to solve problems involving the area and circumference of circles. They solve problems of duration involving 12- and 24-hour cycles across multiple time zones. Students use 3 dimensions to locate and describe position. They identify conditions for congruency and similarity in shapes and create and test algorithms designed to test for congruency and similarity. Students apply the properties of quadrilaterals to solve problems. They conduct statistical investigations and explain the implications of obtaining data through sampling. Students analyse and describe the distribution of data. They compare the variation in distributions of random samples of the same and different size from a given population with respect to shape, measures of central tendency and range. Students represent the possible combinations of 2 events with tables and diagrams, and determine related probabilities to solve practical problems. They conduct experiments and simulations using digital tools to determine related probabilities of compound events.	By the end of Year 8, students recognise irrational numbers and terminating or recurring decimals. They apply the exponent laws to calculations with numbers involving positive integer exponents. Students solve problems involving the 4 operations with integers and positive rational numbers. They use mathematical modelling to solve practical problems involving ratios, percentages and rates in measurement and financial contexts. Students apply algebraic properties to rearrange, expand and factorise linear expressions. They graph linear relations and solve linear equations with rational solutions and one-variable inequalities, graphically and algebraically. Students use mathematical modelling to solve problems using linear relations, interpreting and reviewing the model in context. They make and test conjectures involving linear relations using digital tools. Students use appropriate metric units when solving measurement problems involving the perimeter and area of composite shapes, and volume of right prisms. They use Pythagoras' theorem to solve measurement problems involving unknown lengths of right-angle triangles. Students use 3 dimensions to locate and describe position. They identify conditions for congruency and similarity in shapes and create and test algorithms designed to test for congruency and similarity. Students apply the properties of quadrilaterals to solve problems. They conduct statistical investigations and explain the implications of obtaining data through sampling. Students analyse and describe the distribution of data. They compare the variation in distributions of random samples of the same and different size from a given population with respect to shape, measures of central tendency and range. Students represent the possible combinations of 2 events with tables and diagrams, and determine related probabilities to solve practical problems. They conduct experiments and simulations using digital tools to determine related probabilities of compound events.	By the end of Year 8, students recognise irrational numbers and terminating or recurring decimals. They apply the exponent laws to calculations with numbers involving positive integer exponents. Students solve problems involving the 4 operations with integers and positive rational numbers. They use mathematical modelling to solve practical problems involving ratios, percentages and rates in measurement and financial contexts. Students apply algebraic properties to rearrange, expand and factorise linear expressions. They graph linear relations and solve linear equations with rational solutions and one-variable inequalities, graphically and algebraically. Students use mathematical modelling to solve problems using linear relations, interpreting and reviewing the model in context. They make and test conjectures involving linear relations using digital tools. Students use appropriate metric units when solving measurement problems involving the perimeter and area of composite shapes, and volume of right prisms. They use Pythagoras' theorem to solve measurement problems involving unknown lengths of right-angle triangles. Students use formulas to solve problems involving the area and circumference of circles. They solve problems of duration involving 12- and 24-hour cycles across multiple time zones. Students use 3 dimensions to locate and describe position. They identify conditions for congruency and similarity in shapes and create and test algorithms designed to test for congruency and similarity. Students apply the properties of quadrilaterals to solve problems. They conduct statistical investigations and explain the implications of obtaining data through sampling. Students analyse and describe the distribution of data. They compare the variation in distributions of random samples of the same and different size from a given population with respect to shape, measures of central tendency and range. Students represent the possible combinations of 2 events with tables and diagrams, and determine related probabilities to solve practical problems. They conduct experiments and simulations using digital tools to determine related probabilities of compound events.
Moderation	**Calibration:** Refer to QCAA moderation advice on the QCAA website under the Assessment tab in the learning area.	**Expert:** Refer to QCAA moderation advice on the QCAA website under the Assessment tab in the learning area.	**Consensus:** Refer to QCAA moderation advice on the QCAA website under the Assessment tab in the learning area.	**Calibration:** Refer to QCAA moderation advice on the QCAA website under the Assessment tab in the learning area.

Content descriptions	Units				Content descriptions	Units				Content descriptions	Units			
Number	**1**	**2**	**3**	**4**	**Algebra**	**1**	**2**	**3**	**4**	**Measurement**	**1**	**2**	**3**	**4**
recognise irrational numbers in applied contexts, including square roots and π AC9M8N01	☑	☐	☐	☐	create, expand, factorise, rearrange and simplify linear expressions, applying the associative, commutative, identity, distributive and inverse properties AC9M8A01	☐	☑	☐	☐	experiment with linear functions and relations using digital tools, making and testing conjectures and generalising emerging patterns AC9M8M01	☐	☐	☑	☐
establish and apply the exponent laws with positive integer exponents and the zero-exponent, using exponent notation with numbers AC9M8N02	☐	☑	☐	☐	graph linear relations on the Cartesian plane using digital tools where appropriate; solve linear equations and one-variable inequalities using graphical and algebraic techniques; verify solutions by substitution AC9M8A02	☐	☑	☐	☐	solve problems involving the volume and capacity of right prisms using appropriate units AC9M8M02	☐	☐	☐	☑
recognise terminating and recurring decimals, using digital tools as appropriate AC9M8N03	☑	☐	☐	☐	use mathematical modelling to solve applied problems involving linear relations, including financial contexts; formulate problems with linear functions, choosing a representation; interpret and communicate solutions in terms of the situation, reviewing the appropriateness of the model AC9M8A03	☐	☑	☐	☐	solve problems involving the circumference and area of a circle using formulas and appropriate unit AC9M8M03	☐	☐	☐	☑
use the 4 operations with integers and with rational numbers, choosing and using efficient strategies and digital tools where appropriate AC9M8N04	☑	☐	☐	☐	experiment with linear functions and relations using digital tools, making and testing conjectures and generalising emerging patterns AC9M8A04	☐	☑	☐	☐	solve problems involving duration, including using 12- and 24-hour time across multiple time zones AC9M8M04	☐	☑	☐	☐
use mathematical modelling to solve practical problems involving rational numbers and percentages, including financial contexts; formulate problems, choosing efficient calculation strategies and using digital tools where appropriate; interpret and communicate solutions in terms of the situation, reviewing the appropriateness of the model AC9M7N05	☐	☐	☐	☑						recognise and use rates to solve problems involving the comparison of 2 related quantities of different units of measure AC9M8M05	☐	☐	☐	☑
										use Pythagoras' theorem to solve problems involving the side lengths of right-angled triangles AC9M8M06	☐	☐	☑	☐
										use mathematical modelling to solve practical problems involving ratios and rates, including financial contexts; formulate problems; interpret and communicate solutions in terms of the situation, reviewing the appropriateness of the model AC9M8M07	☐	☐	☐	☑

Content descriptions	Units				Content descriptions	Units				Content descriptions	Units			
Space	**1**	**2**	**3**	**4**	**Statistics**	**1**	**2**	**3**	**4**	**Probability**	**1**	**2**	**3**	**4**
identify the conditions for congruence and similarity of triangles and explain the conditions for other sets of common shapes to be congruent or similar, including those formed by transformations AC9M8SP01	☐	☐	☑	☐	investigate techniques for data collection including census, sampling, experiment and observation, and explain the practicalities and implications of obtaining data through these techniques AC9M8ST01	☑	☐	☐	☐	recognise that complementary events have a combined probability of one; use this relationship to calculate probabilities in applied contexts AC9M8P01	☑	☐	☐	☐
establish properties of quadrilaterals using congruent triangles and angle properties, and solve related problems explaining reasoning AC9M8SP02	☐	☐	☐	☑	analyse and report on the distribution of data from primary and secondary sources using random and non-random sampling techniques to select and study samples AC9M8ST02	☑	☐	☐	☐	determine all possible combinations for 2 events, using two-way tables, tree diagrams and Venn diagrams, and use these to determine probabilities of specific outcomes in practical situations AC9M8P02	☑	☐	☐	☐
describe the position and location of objects in 3 dimensions in different ways, including using a three-dimensional coordinate system with the use of dynamic geometric software and other digital tools AC9M8SP03	☐	☐	☑	☐	compare variations in distributions and proportions obtained from random samples of the same size drawn from a population and recognise the effect of sample size on this variation AC9M8ST03	☑	☐	☐	☐	conduct repeated chance experiments and simulations, using digital tools to determine probabilities for compound events, and describe results AC9M8P03	☑	☐	☐	☐
design, create and test algorithms involving a sequence of steps and decisions that identify congruency or similarity of shapes, and describe how the algorithm works AC9M8SP04	☐	☐	☑	☐	plan and conduct statistical investigations involving samples of a population; use ethical and fair methods to make inferences about the population and report findings, acknowledging uncertainty AC9M8ST04	☑	☐	☐	☐					

General capabilities	Units			
	1	**2**	**3**	**4**
Critical and creative thinking	☑	☑	☑	☑
Digital literacy	☑	☑	☑	☑
Ethical understanding	☑	☐	☐	☐
Intercultural understanding	☐	☐	☐	☐
Literacy	☐	☐	☐	☐
Numeracy	☑	☑	☑	☑
Personal and social capability	☐	☐	☐	☐

Cross-curriculum priorities	Units			
	1	**2**	**3**	**4**
Aboriginal and Torres Strait Islander histories and cultures	☐	☐	☐	☐
Asia and Australia's engagement with Asia	☐	☐	☐	☐
Sustainability	☐	☐	☐	☐