Victorian Curriculum: Mathematics - Measurement and Geometry (SUB-STRANDS WITH ELABORATIONS)

PROGRESSION IS HIGHLIGHTED IN THE FOLLOWING DOCUMENT VIA **BOLDED TEXT**.

Based on Australian Curriculum, Assessment and Reporting Authority (ACARA) materials

Year Level Indicators	Level descriptions	Sub-strands							
		Units of measurement		Shape		Geometric reasoning		Location and transformation	
		Content descriptions	Elaborations	Content descriptions	Elaborations	Content descriptions	Elaborations	Content descriptions	Elaborations
Foundation	'In Foundation level, students play with objects and draw pictures to develop links between their immediate environment, everyday language and mathematical activity...,' ',...Students compare common objects with respect to length, mass and capacity, and order events and compare their duration. They make rough estimates and simple measurements with respect to informal units. Students name, sort and describe familiar everyday shapes and objects, and describe position and movement in their immediate environment...','	Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language **(VCMMG078)**	* Comparing objects directly, by placing one object against another to determine which is longer or by pouring from one container into the other to see which one holds more * Using suitable language associated with measurement attributes, such as 'tall' and 'taller', 'heavy' and 'heavier',	Sort, describe and name familiar two-dimensional shapes and three-dimensional objects in the environment **(VCMMG081)**	* Sorting and describing squares, circles, triangles, rectangles, spheres and cubes	N/A	N/A	Describe position and movement **(VCMMG082)**	* Interpreting the everyday language of location and direction, such as 'between', 'near', 'next to', 'forwards', 'towards' * Following and giving simple directions to guide a friend around an obstacle path and vice versa
		Compare and order the duration of events using the everyday language of time **(VCMMG079)**	* Knowing and identifying the days of the week and linking specific days to familiar events * Sequencing familiar events in time order						
		Connect days of the week to familiar events and actions **(VCMMG080)**	* Choosing events and actions that make connections with students' everyday family routines						
Foundation Level Achievement Standard	NOTE: The standards are not divided into sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	Students identify measurement attributes in practical situations and compare lengths, masses and capacities of familiar objects.		Students **identify simple** shapes in their environment and sort shapes by their **common and distinctive** features.		N/A	N/A	They use **simple statements and gestures** to describe **location**.	
		They order events, **explain** their duration, and **match** days of the week to familiar events.							
Level 1	'In Level 1, students **use mathematical symbols and language as well as materials** and drawings in their mathematical **explorations of daily life**...,' ',...Students use **uniform** informal units to measure and compare length and capacity. They tell time to the **half-hour** and use time and calendar terms such as hours, days, weeks and **months** to describe duration. Students use terms such as **corner, edge and face** to **classify** familiar shapes and objects, and are able to **give and follow directions to** familiar locations...,'	**Measure** and compare the lengths**,** **masses** and capacities of pairs of objects using **uniform informal units** **(VCMMG095)**	* Understanding that in order to compare objects, the unit of measurement must be the same size * Lifting to compare the mass of objects using words, for example, heavier, lighter, same * Measuring the capacity of containers using uniform material, for example cups or bucket	Recognise and **classify** familiar two-dimensional shapes and three-dimensional objects **using obvious features** **(VCMMG098)**	* Focusing on geometric features and describing shapes and objects using everyday words such as 'corners', 'edges' and 'faces'	N/A	N/A	**Give and follow directions to familiar** locations**.** **(VCMMG099)**	* Understanding that people need to give and follow directions to and from a place, and that this involves turns, direction and distance * Understanding the meaning and importance of words such as 'clockwise', 'anticlockwise', 'forward' and 'under' when giving and following directions * Interpreting and following directions around familiar locations
		Tell time to the **half-hour** **(VCMMG096)**	* Reading time on analogue and digital clocks and observing the characteristics of half-hour times						
		Describe duration using **months, weeks, days and hours** **(VCMMG097)**	* Describing the duration of familiar situations such as 'how long is it until we next come to school?'						
Level 1 Achievement Standard	NOTE: The standards are not divided into sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	Students use informal units to of measurement to **order** objects based on length and capacity.		Students **describe** two-dimensional shapes and three-dimensional objects.		N/A	N/A	They use the language of direction **to move from place to place**.	
		They tell time to the half hour and **explain** time durations.							

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Level 2	'...,Students compare and order sets of shapes and objects based on length, **area**, **volume** and capacity using uniform informal units. They compare **masses** using **balance scales**, tell the time to the **quarter hour**, and use months and **seasons** to describe sequences of events **over a longer time frame**. Students describe sets of shapes and objects defined in terms of properties, and **draw** examples of these **with and without the use of technology**. They **use simple maps** and identify **relative** locations, and investigate the effect of simple transformations of **slides, flips, half and quarter turns, both by hand and using technology**...,'	Compare and **order several shapes** and objects based on length, **area, volume** and capacity using **appropriate** uniform informal units **(VCMMG115 - Using Units of Measurement)**			* Comparing lengths using finger length, hand span or a piece of string * Comparing areas using the palm of the hand or a stone * Comparing capacities using a range of containers	N/A	N/A	**Interpret simple maps** of familiar locations and **identify the relative positions of key features** **(VCMMG122)**	* Understanding that we use representations of objects and their positions, such as on maps, to allow us to receive and give directions and to describe place * Constructing arrangements of objects from a set of directions
		Compare **masses** of objects using **balance scales** **(VCMMG116)**	* Using balance scales to determine whether the mass of different objects is more, less or about the same	Describe and **draw** two-dimensional shapes, **with and without digital technologies** **(VCMMG120)**	* Identifying key features of squares, rectangles, triangles, kites, rhombuses and circles, such as straight lines or curved lines, and counting the edges and corners			**Investigate the effect of one-step slides and flips with and without digital technologies** **(VCMMG123)**	* Understanding that objects can be moved but changing position does not alter an object's size or features
		Tell time to the **quarter-hour, using the language of 'past' and 'to'** **(VCMMG117)**	* Describing the characteristics of quarter past times on an analogue clock, and identifying that the small hand is pointing just past the number and the big hand is pointing to the three	Describe **the features** of three-dimensional objects **(VCMMG121)**	* Identifying geometric features such as the number of faces, corners or edges			Identify and describe **half and quarter turns** **(VCMMG124)**	* Predicting and reproducing a pattern based around half and quarter turns of a shape and sketching the next element in the pattern
		Name and **order** months and **seasons** **(VCMMG118)**	* Investigating the seasons used by Aboriginal people, comparing them to those used in Western society and recognising the connection to weather patterns.						
		Use a calendar to identify the **date and determine the number of days in each month** **(VCMMG119)**	* Using calendars to locate specific information, such as finding a given date on a calendar and saying what day it is, and identifying personally or culturally specific days						
Level 2 Achievement Standard	NOTE: The standards are not divided into sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	They tell time to the quarter hour...		Students draw two-dimensional shapes, **specify** their features…		N/A	N/A	...and **explain** the effects of one-step transformations.	
		...and use a calendar to identify the date, days, weeks, months included in seasons and **other events**.		They **recognise** the features of three-dimensional objects.				They interpret simple maps of familiar locations.	
		Students order shapes and objects using informal units **for a range of measures**.							
Level 3	'In Level 3, students **increasingly** use mathematical terms and symbols to describe computations, measurements and characteristics of objects...,' ',...Students use **metric units** of length, mass and capacity to **measure**, order and compare objects. They **associate angle with measure of turn and compare angles in everyday situation**s. They tell the time in **minutes** and **convert between units of time**. They use **simple grids** in maps and identify **symmetry**...,'	Measure, order and compare objects using **familiar metric units** of length, **area**, mass and capacity **(VCMMG140)**	* Recognising the importance of using common units of measurement * Recognising and using centimetres and metres, square centimetres, grams and kilograms, and millilitres and litres * Measuring the area of rectangles (including squares) by counting the number of square centimetres	**Make models of three-dimensional objects** and **describe key** features **(VCMMG142)**	* Exploring the creation of three-dimensional objects, including prisms and pyramids, using origami	**Identify angles as measures of turn and compare angle sizes in everyday situations** **(VCMMG146)**	* Opening doors partially and fully and comparing the size of the angles created * Recognising that analogue clocks use the turning of arms to indicate time, and comparing the size of angles between the arms for familiar times	Create and interpret simple **grid** maps **to show position and pathways** **(VCMMG143)**	* Creating a map of the classroom or playground
		Tell time to **the minute** and investigate the relationship between **units of time** **(VCMMG141)**	* Recognising there are 60 minutes in an hour and 60 seconds in a minute					Identify **symmetry in the environment** **(VCMMG144)**	* Identifying symmetry in Aboriginal rock carvings or art * Identifying symmetry in the natural and built environment
								Identify and describe slides and turns **found in the natural and built environment** **(VCMMG145)**	* Recognising and representing slides and turn used in brickwork around the school * Recognising and representing slides and turn used in sporting activities
Level 3 Achievement Standard		Students use metric units for length, area, mass and capacity.		...and make models of three-dimensional objects.		They use angle size as a measure of turn in **real** situations…		Students **match** positions on maps **with given information** and create simple maps.	
		They tell time to the **nearest** minute.						Students identify symmetry in the natural and constructed environments.	

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Level 4	'In Level 4, students,... ,... **broaden** their use of measures and scales…,' ',...Students use **scaled instruments** with metric units to measure and compare length, mass, capacity and **temperature**. They compare shapes and objects using familiar metric units for area and **volume**, and compare angles **with respect to a right angle**. Students use **'am' and 'pm' notations, and solve simple time problems**, including **conversions between** units of time. They construct **new** shapes **by combining or splitting** common shapes, and **create** symmetric patterns, pictures and shapes **with and without the use of technology**. They interpret and use basic maps with simple **scales**, directions and **legends**...,'	Use **scaled** instruments to measure and compare lengths, masses, capacities and **temperatures** **(VCMMG165)**	* Reading and interpreting, to the nearest graduation, the graduated scales on a range of measuring instruments	Compare **the areas of regular and irregular shapes by informal means** **(VCMMG169)**	* Comparing areas using metric units, such as counting the number of square centimetres required to cover two areas by overlaying the areas with a grid of centimetre squares	Compare angle**s** and **classify them as equal to, greater than or less than a right angle** **(VCMMG174)**	* Creating angles and comparing them to a right angle using digital technologies	Use simple **scales, legends** and directions **to interpret information contained in basic maps** **(VCMMG172)**	* Identifying the scale used on maps of cities and rural areas in Australia and a city in Indonesia and describing the difference * Using directions to find features on a map
		Compare objects using familiar metric units of area and **volume** **(VCMMG166)**	* Comparing areas using grid paper * Comparing volume using centicubes * Recognising that metric units are not the only units used throughout the world, for example measuring the area of floor space using tatami mats (Japan), using squares for room and house area (Australia)	Compare and describe two dimensional shapes **that result from combining and splitting common shapes, with and without the use of digital technologies** **(VCMMG170)**	* Identifying common two-dimensional shapes that are part of a composite shape by recreating it from these shapes * Creating a two-dimensional shapes from verbal or written instructions			**Create** symmetrical **patterns, pictures and shapes with and without digital technologies** **(VCMMG173)**	* Using stimulus materials such as the motifs in Central Asian textiles, Tibetan artefacts, Indian lotus designs and symmetry in Yolngu or Central and Western Desert art
		Convert between units of time **(VCMMG167)**	* Identifying and using the correct operation for converting units of time						
		Use **am and pm notation and solve simple time problems** **(VCMMG168)**	* Calculating the time spent at school during a normal school day * Calculating the time required to travel between two locations * Determining arrival time given departure time	**Explain and compare the geometric properties** of two-dimensional shapes and three-dimensional objects **(VCMMG171)**	* Describing the similarities and differences between two-dimensional shapes and three-dimensional objects * Recognising two-dimensional shapes that are the faces for three-dimensional objects such as prisms, pyramids and platonic solids (including tetrahedrons, cubes and dodecahedrons)				
Level 4 Achievement Standard	NOTE: The standards are not divided into sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	Students use scaled instruments to measure length, **angle**, area, mass, capacity and temperature of **shapes** and objects.				They classify angles in relation to a right angle.		Students interpret information contained in maps.	
		They solve problems involving time **duration**.		Students compare areas of regular and irregular shapes **using informal units**.				Students create symmetrical simple and composite shapes and patterns, with and without digital technology.	
		They convert between units of time.							

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Level 5	....Students choose and use **suitable** metric and other units for measurement of length, angle, area, volume, capacity and mass. They **calculate** the **perimeter** and area of rectangles, and construct **specified angles using protractors and other relevant technologies**. Students use **12 and 24 hour time systems, with measurements** and conversions **to seconds**. They use grid **reference systems** to describe location and **connect** three-dimension objects with two-dimensional **representations**. They **translate, reflect** and rotate shapes with and without the use of technology, and identify **point and line** symmetries. They explore similarity of familiar shapes through **enlargement**...,'	Choose **appropriate** units of measurement for length, area, volume, capacity and mass **(VCMMG195)**	* Investigating alternative measures of scale to demonstrate that these vary between countries and change over time. For example, temperature measurement in Australia, Indonesia, Japan and USA * Recognising that some units of measurement are better suited for some tasks than others, for example kilometres rather than metres to measure the distance between two towns	**Connect** three-dimensional objects **with their nets and other two-dimensional representations** **(VCMMG198)**	* Identifying the shape and relative position of each face of a solid to determine the net of the solid, including that of prisms and pyramids * Representing two-dimensional shapes such as photographs, sketches and images created by digital technologies	**Estimate, measure** and compare angles **using degrees.** **Construct angles using a protractor** **(VCMMG202)**	* Measuring and constructing angles using both 180° and 360° protractors * Recognising that angles have arms and a vertex, and that size is the amount of turn required for one arm to coincide with the other	Use a grid **reference system** to describe locations. Describe routes using **landmarks** and directional language **(VCMMG199)**	* Comparing aerial views of Country, desert paintings and maps with grid references * Creating a grid reference system for the classroom and using it to locate objects and describe routes from one object to another
		Calculate the **perimeter** and area of rectangles **using familiar metric units** **(VCMMG196)**	* Exploring efficient ways of calculating the perimeters of rectangles such as adding the length and width together and doubling the result * Exploring efficient ways of finding the areas of rectangles * Measuring volume and capacity by counting the number of cubes (cubic centimetres) * Exploring efficient ways of finding the volume and capacity of rectangular prisms and cubes					Describe **translations, reflections** and rotations of two-dimensional shapes. Identify **line and rotational** symmetries **(VCMMG200)**	* Identifying and describing the line and rotational symmetry of a range of two-dimensional shapes, by manually cutting, folding and turning shapes and by using digital technologies * Identifying the effects of transformations by manually flipping, sliding and turning two-dimensional shapes and by using digital technologies
		Compare **12- and 24-hour time systems and convert between them** **(VCMMG197)**	* Investigating the ways time was and is measured in different Aboriginal Country, such as using tidal change * Using units hours, minutes and seconds					Apply the **enlargement transformation** to familiar two dimensional shapes and **explore the properties of the resulting image compared with the original** **(VCMMG201)**	* Using digital technologies to enlarge shapes * Using a grid system to enlarge a favourite image or cartoon
Level 5 Achievement Standard	NOTE: The standards are not divided into sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	They convert between 12 and 24-hour time. Students use appropriate units of measurement for length, area, volume, capacity and mass, and calculate perimeter and area of rectangles and volume, and capacity of rectangular prisms.		Students connect three-dimensional objects with their two-dimensional representations.		They estimate angles, and use protractors and **digital technology** to construct and measure different angles.		Students use a grid reference system to locate landmarks. They describe transformations of two-dimensional shapes and identify line and rotational symmetry.	

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Level 6	'....Students **use decimals for** metric measurement, convert between **units, recognise the prefixes used in** metric measurements, and **relate** and compare measures and units, including **capacity and volume**. They develop and use **timetables**. Students investigate **combinations of** transformations with and without technology, and use **the Cartesian coordinate system to** describe location **in the plane**. They investigate the **sum of angles at a point on a line and vertically opposite angles**...,'	**Connect decimal representations to the metric system** **(VCMMG222)**	* Recognising the equivalence of measurements such as 1.25 metres and 125 centimetres	Construct **simple prisms and pyramids** **(VCMMG228)**	* Considering the history and significance of pyramids from a range of cultural perspectives including those structures found in China, Korea and Indonesia * Constructing prisms and pyramids from nets, and skeletal models	**Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles.** **Use results to find unknown angles** **(VCMMG231)**	* Identifying the size of a right angle as 90° and defining acute, obtuse, straight and reflex angles * Measuring, estimating and comparing angles in degrees and classifying angles according to their sizes * Investigating the use of rotation and symmetry in the diagrammatic representations of kinship relationships of Central and Western Desert people * Recognising and using the two alternate conventions for naming angles	Investigate **the effect of combinations** of transformations **on** simple and composite shapes, **including creating tessellations, with and without the use of digital technologies** **(VCMMG229)**	* Understanding which attributes of a shape remain the same or change under the effects of transformations such as size, shape or orientation * Creating tessellations with simple shapes or simple composite shapes
		Convert between common metric units of length, mass and capacity **(VCMMG223)**	* Identifying and using the correct operations when converting units including millimetres, centimetres, metres, kilometres, milligrams, grams, kilograms, tonnes, millilitres, litres, kilolitres and megalitres * Recognising the significance of the prefixes in units of measurement						
		Solve problems involving the comparison of lengths and areas using appropriate units **(VCMMG224)**	* Recognising and investigating familiar objects using concrete materials and digital technologies						
		Connect volume and capacity and their units of measurement **(VCMMG225)**	*Recognising that 1ml is equivalent to $1cm^3$					**Introduce the Cartesian coordinate system using all four quadrants** **(VCMMG230)**	* Understanding that the Cartesian plane provides a graphical or visual way of describing location
		Interpret and use timetables **(VCMMG226)**	* Planning a trip involving one or more modes of public transport * Developing a timetable of daily activities						
		Measure, calculate and compare **elapsed** time **(VCMMG227)**	* Recognising that some units of time are better suited for some tasks than others, for example, seconds rather than minutes to measure the duration of a short event * Using a stopwatch to measure and compare the duration of a series of events, for example, how long does it take to jump a skipping rope 100 times * Using the starting and finishing times to calculate and compare elapsed time, for example, the time taken to walk to school compared to the time taken to ride to school						
Level 6 Achievement Standard	NOTE: The standards are not divided into sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	Students relate decimals to the metric system and **choose appropriate units of measurement to perform a calculation.**		Students construct simple prisms and pyramids.		They solve problems using the properties of angles…		FROM NUMBER AND ALGEBRA They use **ordered pairs of integers to represent** coordinates of points and locate **a point in any one of the** four quadrants on the Cartesian plane.	
		They solve problems involving time, length and area, make connections between capacity and volume.						...and investigate combinations of transformations in the plane, with and without the use of digital technology.	
		Students interpret a variety of everyday timetables.							

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Level 7	',...Students use formulas for calculating areas of **triangles**, rectangles and **related shapes**, and volumes **of cubes and rectangular prisms**. They form two-dimensional representations of **prisms, buildings and other structures**. They use simple combinations of transformations, with and without technology, to create **geometric** patterns and identify line and point symmetry, **apply parallel line and transversal angle properties**, angles sums **in triangles and quadrilaterals, classify** triangles and **quadrilaterals**, and construct them **using compass and straight edge and dynamic geometry technology**...,'	**Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving** **(VCMMG258)**	* Building on the understanding of the area of rectangles to develop formulas for the area of triangles * Establishing that the area of a triangle is half the area of an appropriate rectangle * Using area formulas for rectangles and triangles to solve problems involving areas of surfaces	Draw different **views of prisms and solids formed from combinations of prisms** **(VCMMG260)**	* Using aerial views of buildings and other 3D structures to visualise the structure of the building or prism	**Classify triangles according to their side and angle properties and describe quadrilaterals** **(VCMMG262)**	* Identifying side and angle properties of scalene, isosceles, right-angled and obtuse- angled triangles * Describing squares, rectangles, rhombuses, parallelograms, kites and trapeziums	Describe translations, reflections **in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates.** Identify line and rotational symmetries **(VCMMG261)**	* Describing patterns and investigating different ways to produce the same transformation such as using two successive reflections to provide the same result as a translation * Experimenting with, creating and recreating patterns using combinations of reflections and rotations using digital technologies
		Calculate volumes of rectangular prisms **(VCMMG259)**	* Investigating volumes of cubes and rectangular prisms and establishing and using the formula V = l × b × h * Understanding and using cubic units when interpreting and finding volumes of cubes and rectangular prisms			**Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral** **(VCMMG263)**	* Using concrete materials and digital technologies to investigate the angle sum of a triangle and quadrilateral		
						Identify **corresponding, alternate and cointerior angles when two straight lines are crossed by a transversal** **(VCMMG264)**	* Defining and classifying pairs of angles as complementary, supplementary, adjacent and vertically opposite		
						Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning **(VCMMG265)**	* Constructing parallel and perpendicular lines using their properties, a pair of compasses and a ruler, and dynamic geometry software * Defining and identifying the relationships between altenate, corresponding and cointerior angles for a pair of parallel lines cut by a transversal		
Level 7 Achievement Standard	NOTE: The standards are not divided into sub-strands in the Victorian Curriculum documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.			They describe different views of three-dimensional objects, **and use models, sketches and digital technology to represent** these views.		Students name the types of angles formed by a transversal crossing parallel lines and solve simple numerical problems involving these lines and angles.		From NUMBER & ALGEBRA They **assign ordered pairs to** given points on the Cartesian plane…	
				Students use formulas for the area and perimeter of rectangles.					
				Students calculate volumes of rectangular prisms.					
				They classify triangles and quadrilaterals and **represent** transformations of these shapes in the Cartesian plane, with and without digital technology.					