

# Upfront Curriculum Reference

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## Australian National Benchmarks Number Sense

Benchmark	Upfront title	Number Sense Outcomes
<b>Year 3</b>	Lower Primary	<ul style="list-style-type: none"> <li>• Read and write whole numbers up to 999</li> <li>• Demonstrate their knowledge of place value</li> <li>• Recognise and show one-half of a group of objects</li> <li>• Count forwards to and backwards from 99</li> <li>• Identify and continue simple patterns involving numbers up to 99 (e.g. counting patterns)</li> <li>• Remember or work out basic addition facts to <math>10+10</math>, the matching subtraction facts, and extensions of those facts.</li> <li>• Add and subtract whole numbers to 99 by using mental methods</li> </ul>
<b>Year 5</b>	Middle Primary	<ul style="list-style-type: none"> <li>• Read, write and use whole numbers up to 9999</li> <li>• Demonstrate knowledge of place value and recognise different forms of the same number</li> <li>• Show understanding of simple fractions</li> <li>• Show understanding and use of decimals in familiar contexts</li> <li>• Count forwards to and backwards from 1000 (by 10s and 100s)</li> <li>• Identify simple patterns involving numbers (eg extensions of addition or subtraction facts)</li> <li>• Work out the answers to addition and subtraction problems that involve 3-digit whole numbers</li> <li>• Know or work out multiplication facts to <math>10 \times 10</math> and use these to work out extensions of those facts</li> <li>• Perform simple multiplications and divisions with whole numbers such as <math>34 \times 6</math> and <math>36 \div 3</math> using mental methods</li> </ul>
<b>Year 7</b>	Upper Primary	<ul style="list-style-type: none"> <li>• Read, write, compare and order whole numbers to seven digits and numbers with decimal fractions to 2 decimal places</li> <li>• Read, name, write and compare simple common fractions and recognise simple equivalent fractions, decimals and percentages written in different forms</li> <li>• Calculate with addition, subtraction, multiplication and division, using a variety of strategies</li> </ul>

## Measurement and Data

Benchmark	Upfront title	Measurement and Data Sense Outcomes
<b>Year 3</b>	Lower Primary	<ul style="list-style-type: none"> <li>• Use language such as <i>shorter than</i>, <i>holds more than</i>, <i>heavier than</i> and <i>later than</i> to describe or compare objects and events</li> <li>• Decide whether to focus on length, capacity or mass (weight) when comparing two objects or quantities</li> <li>• Choose a uniform unit such as straws to estimate, measure and compare lengths</li> <li>• Tell the time in hours and minutes on digital clocks, and hours and half-hours on analogue clocks</li> <li>• Sequence regular activities during a day; say the days of the week and months of the year in order; and find dates on calendars</li> <li>• Collect and organise information, display it in simple bar graphs or picture graphs, and comment on the information</li> </ul>
<b>Year 5</b>	Middle Primary	<ul style="list-style-type: none"> <li>• Know that a group of objects can be ordered differently depending on whether the objects are arranged according to length (or height or width), capacity or mass (weight)</li> <li>• Estimate, measure and compare lengths using metres and centimetres</li> <li>• Estimate, measure and compare areas by counting squares on a grid</li> <li>• Estimate, measure and compare capacity using litres (and have some awareness of millilitres)</li> <li>• Estimate, measure and compare mass (weight) using kilograms (and have some awareness of grams)</li> <li>• Interpret measures expressed in decimal form</li> <li>• Tell the time in hours and minutes on analogue and digital clocks</li> <li>• Sequence times in a day, and interpret simple timetables and calendars to find information</li> <li>• Organise and summarise information into straightforward lists, tables, horizontal and vertical bar graphs and pictographs using many-to-one correspondence</li> <li>• Interpret information contained in column and bar graphs and make meaningful comments about that information</li> </ul>
<b>Year 7</b>	Upper Primary	<ul style="list-style-type: none"> <li>• Make reasonable estimates of different measurements – length, capacity, mass (weight), temperature and time – and of area by comparison with a square metre</li> <li>• Read scales to the nearest graduation</li> <li>• Use standard units to measure length (mm, cm, m and km), capacity (mL and L), mass (g and kg) and time (seconds, minutes and hours)</li> <li>• Measure area by counting squares and part-squares, and volume by counting cubes</li> <li>• Recognise the relative likelihood of events occurring on the basis of simple quantitative data</li> <li>• Read and interpret data presented in a variety of ways (eg tables, charts, pictographs, bar, column, line, circle graphs)</li> </ul>

## Spatial Sense

Benchmark	Upfront title	Spatial Sense Outcomes
<b>Year 3</b>	Lower Primary	<ul style="list-style-type: none"> <li>• Recognise and name familiar 2D and 3D shapes and objects (ie triangle, square, rectangle, circle, cube and pyramid)</li> <li>• Identify where those 2D and 3D shapes and objects occur or are used in everyday life</li> <li>• Use everyday language such as <i>flat</i>, <i>round</i>, <i>side</i>, <i>corner</i> and <i>curved</i> to describe common shapes and objects and their properties</li> <li>• Recognise and continue simple patterns based on repetitions of common shapes</li> <li>• Use language which shows they understand position and direction when using a simple grid, map or plan</li> </ul>
<b>Year 5</b>	Middle Primary	<ul style="list-style-type: none"> <li>• Recognise and name 2D shapes (ie pentagon and hexagon) given descriptions and drawings of them</li> <li>• Recognise and name common 3D shapes and objects (ie rectangular prism, cylinder, cone and sphere) given descriptions or realistic drawings of them</li> <li>• Describe and compare 2D and 3D shapes and objects according to their important features (eg say why a shape would be a cone rather than a cylinder)</li> <li>• Use conventional terms such as <i>angle</i>, <i>face</i>, <i>edge</i> and <i>base</i> to name parts of these 2D and 3D shapes</li> <li>• Recognise 2D shapes that have an obvious line of symmetry</li> <li>• Recognise and continue spatial patterns that use repetitions of 2D shapes</li> <li>• Place an object accurately on a simple map or plan and follow or give directions to find a particular place on a map or plan</li> </ul>
<b>Year 7</b>	Upper Primary	<ul style="list-style-type: none"> <li>• Recognise, describe and name common 2D shapes (ie right-angles and equilateral triangles, quadrilateral, parallelogram and octagon) and 3D shapes and objects (ie rectangular, triangular and hexagonal prisms, tetrahedron and square-based pyramid) and representations of these</li> <li>• Use geometric language (ie <i>2D (two-dimensional)</i>, <i>3D (three-dimensional)</i>, <i>diagonal</i>, <i>right angle</i>, <i>parallel</i>, <i>perimeter</i>, <i>circumference</i> and <i>degrees</i>) to describe, classify and compare shapes and objects</li> <li>• Recognise basic angles (ie 90°, 360°) and describe them as corner of shapes or rotations</li> <li>• Identify symmetrical 2D shapes and recognise line symmetry in 2D shapes</li> <li>• Describe single movements of 2D shapes (ie flip (reflection), slide (translation) and turn (rotation)), and use combinations for these to create patterns</li> <li>• Identify and describe locations and routes using simple coordinate maps and major compass points (N, S, E, W)</li> </ul>

## NSW/ACT Number Strand

Substrand	Early Stage 1	Stage 1	Stage 2	Stage 3	Stage 4
	Upfront P-K	Lower Primary	Middle Primary	Upper Primary	Lower Secondary
<p><b>Whole Numbers</b> Students develop a sense of the relative size of whole numbers and the role of place value in their representation.</p>	<p><b>NES1.1</b> Counts to 30, and orders, reads and represents numbers in the range 0 – 20.</p>	<p><b>NS1.1 – Unit 1 (two-digit numbers)</b> Counts, orders, reads and represents 2- and 3-digit numbers. <b>NS1.1 – Unit 2 (three-digit numbers)</b> Counts, orders, reads and represents two- and three-digit numbers.</p>	<p><b>NS2.1</b> Counts, orders, reads and record numbers up to 4 digits.</p>	<p><b>NS3.1</b> Orders, reads and writes numbers of any size.</p>	
<p><b>Operations with Whole Numbers</b> Students recognise the properties of special groups of whole numbers and apply a range of strategies to aid computation.</p>					<p><b>NS4.1</b> Recognises the properties of special groups of whole numbers and applies a range of strategies to aid computation.</p>
<p><b>Integers</b> Students compare, order and calculate with integers.</p>					<p><b>NS4.2</b> Compares, orders and calculates with integers.</p>
<p><b>Addition &amp; Subtraction</b> Students develop facility with number facts and computation with progressively larger numbers in addition and subtraction and an appreciation of the relationship between those facts.</p>	<p><b>NES1.2</b> Combines, separates and compares collections of objects</p>	<p><b>NS1.2</b> Uses a range of mental strategies for addition and subtraction involving 1- and 2-digit numbers.</p>	<p><b>NS2.2</b> Uses mental strategies for addition and subtraction involving 2, 3- and 4-digit numbers.</p>	<p><b>NS3.2</b> Applies appropriate strategies for addition and subtraction with counting numbers of any size.</p>	

<p><b>Multiplication &amp; Division</b> Students develop facility with number facts and computation with progressively larger numbers in multiplication and division and an appreciation of the relationship between those facts.</p>	<p><b>NES1.3</b> Groups, shares and counts collections of objects.</p>	<p><b>NS1.3</b> Uses a range of mental strategies and concrete materials for multiplication and division.</p>	<p><b>NS2.3 – Unit 1 (multiplication and division facts)</b> Uses mental and informal written strategies for multiplication and division. <b>NS2.3 – Unit 2</b> Uses mental and informal written strategies for multiplication and division.</p>	<p><b>NS3.3</b> Selects and applies appropriate strategies for multiplication and division.</p>	
<p><b>Fractions, Decimals &amp; Percentages</b> Students develop an understanding of the parts of a whole, and the relationships between the different representations of fractions. Students operate with fractions, decimals and percentages.</p>	<p><b>NES1.4</b> Describes halves, encountered in everyday contexts, as two equal parts of an object.</p>	<p><b>NS1.4</b> Describes and models halves and quarters, of objects and collections, occurring in everyday situations.</p>	<p><b>NS2.4 – Unit 1</b> Compares and represents commonly used fractions and decimals, adds and subtracts decimals to 2 decimal places, and interprets everyday percentages. <b>NS2.4 – Unit 2</b> Compares and represents commonly used fractions and decimals, adds and subtracts decimals to 2 decimal places, and interprets everyday percentages.</p>	<p><b>NS3.4 – Unit 1</b> Compares, orders and calculates with decimals, simple fractions and simple percentages. <b>NS3.4 – Unit 2</b> Compares, orders and calculates with decimals, simple fractions and simple percentages.</p>	<p><b>NS4.3</b> Operates with fractions, decimals, percentages, ratios and rates.</p>
<p><b>Chance</b></p>		<p><b>NS1.5</b> Recognises and describes the element of chance in everyday events.</p>	<p><b>NS2.5</b> Describes and compares chance events in social and experimental contexts.</p>	<p><b>NS3.5</b> Orders the likelihood of simple events on a number line from zero to one.</p>	
<p><b>Probability</b></p>					<p><b>NS4.4</b> Solves probability problems involving simple events.</p>

## Patterns & Algebra

Substrand	Early Stage 1	Stage 1	Stage 2	Stage 3	Stage 4
	Upfront P-K	Lower Primary	Middle Primary	Upper Primary	Lower Secondary
<b>Patterns and Algebra</b>	<p><b>PAES1.1</b></p> <p>Recognises, describes and continues repeating patterns and number patterns that increase or decrease.</p>	<p><b>PAS1.1</b></p> <p>Represents and continues a variety of number patterns, supplies missing elements in a pattern and builds number relationships.</p>	<p><b>PAS2.1</b></p> <p>Describes and records number patterns using a variety of strategies and completes simple number sentences by calculating missing values.</p>	<p><b>PAS3.1a</b></p> <p>Records, analyses and describes geometric and number patterns that involve one operation using tables and words.</p> <p><b>PAS3.1b</b></p> <p>Constructs, verifies and completes number sentences involving the four operations with a variety of numbers.</p>	
<b>Algebraic Techniques</b>					<p><b>PAS4.1</b></p> <p>Uses letters to represent numbers and translates between words and algebraic symbols.</p> <p><b>PAS4.3</b></p> <p>Uses the algebraic symbol system to simplify, expand and factorise expressions.</p> <p><b>PAS4.4</b></p> <p>Uses algebraic techniques to solve linear equations and simple inequalities.</p>
<b>Number Patterns</b>					<p><b>PAS4.2</b></p> <p>Creates, records,</p>



					analyses and generalises number patterns using words and algebraic symbols in a variety of ways.
<b>Linear Relationships</b>					<b>PAS4.5</b> Interprets linear relationships on the number plane.

## Data

Substrand	Early Stage 1	Stage 1	Stage 2	Stage 3	Stage 4
	Upfront P-K	Lower Primary	Middle Primary	Upper Primary	Lower Secondary
Data	<b>DES1.1</b> Represents and interprets data display made from objects and pictures.	<b>DS1.1</b> Organises data, displays data using column and picture graphs, and interprets the results.	<b>DS2.1</b> Organises data, displays data using tables and graphs, and interprets the results.	<b>DS3.1</b> Displays and interprets data in graphs with scales of many-to-one correspondence.	<b>DS4.1</b> Reads and interprets graphs, tables, charts and statistical information.
Data Analysis and Evaluation					<b>DS4.2</b> Analyses data using measures of location and range.

## Measurement

Substrand	Early Stage 1	Stage 1	Stage 2	Stage 3	Stage 4
	Upfront P-K	Lower Primary	Middle Primary	Upper Primary	Lower Secondary
<b>Length</b>	<b>MES1.1</b> Describes length and distance using everyday language and compares lengths using direct comparison.	<b>MS1.1</b> Estimates, compares and records lengths and distances using informal units, metres and centimetres.	<b>MS2.1</b> Estimates, compares and records lengths, distances and perimeters in metres, centimetres and millimetres.	<b>MS3.1</b> Selects and uses the appropriate unit and device to measure lengths, distances and perimeters.	
<b>Area</b>	<b>MES1.2</b> Describes area using everyday language and compares areas using direct comparison.	<b>MS1.2</b> Estimates and compares areas using informal units.	<b>MS2.2</b> Estimates and compares the areas of surfaces in square centimetres and square metres.	<b>MS3.2</b> Selects and uses the appropriate unit to calculate area, including the area of squares, rectangles and triangles.	
<b>Perimeter and Area</b>					<b>MS4.1</b> Uses formulae and Pythagoras' theorem in calculating perimeter and area of circles and figures composed of rectangles and triangles.
<b>Volume and Capacity</b>	<b>MES1.3</b> Compares the capacities of containers and the volumes of objects or substances using direct comparison.	<b>MS1.3</b> Estimates and compares volumes and capacities using informal units.	<b>MS2.3 – Unit 1 (litres and cubic centimetres)</b> Estimates and compares volumes and capacities using litres, millilitres and cubic centimetres. <b>MS2.3 – Unit 2 (millilitres and displacement)</b> Estimates and compares volumes and capacities	<b>MS3.3</b> Selects and uses the appropriate unit to estimate and measure volume and capacity, including the volume of rectangular prisms.	

			using litres, millilitres and cubic centimetres.		
<b>Surface Area and Volume</b>					<b>MS4.2</b> Calculates surface area of rectangular and triangular prisms and volume of right prisms and cylinders.
<b>Mass</b>	<b>MES1.4</b> Compares the masses of two objects and describes mass using everyday language.	<b>MS1.4</b> Estimates and compares the masses of two or more objects using informal units.	<b>MS2.4</b> Estimates and compares masses using kilograms and grams.	<b>MS3.4</b> Selects and uses the appropriate unit and measuring device to find the mass of objects.	
<b>Time</b>	<b>MES1.5</b> Sequences events and uses everyday language to describe the duration of activities.	<b>MS1.5</b> Compares the duration of events using informal methods and reads clocks on the half-hour.	<b>MS2.5</b> Reads and records time in one-minute intervals and makes comparisons between the units.	<b>MS3.5</b> Uses twenty-four hour time and am and pm notation in real-life situations and constructs timelines.	<b>MS4.3</b> Performs calculations of time that involve mixed units.

## Space and Geometry

Substrand	Early Stage 1 Upfront P-K	Stage 1 Lower Primary	Stage 2 Middle Primary	Stage 3 Upper Primary	Stage 4 Lower Secondary
<b>Three-dimensional Space</b>	<b>SGES1.1</b> Sorts three-dimensional objects and describes them using everyday language.	<b>SGS1.1</b> Sorts three-dimensional objects including cones, cubes, cylinders, spheres and prisms, and recognises them in pictures and the environment.	<b>SGS2.1</b> Compares, describes and names three-dimensional objects including pyramids.	<b>SGS3.1</b> Identifies three-dimensional objects, including particular prisms and pyramids, on the basis of their properties, and visualises them given drawings of different views.	
<b>Properties and Solids</b>					<b>SGS4.1</b> Describes three-dimensional solids including polyhedra, and classifies them in terms of their properties.
<b>Two-dimensional Space</b>	<b>SGES1.2</b> Sorts representations of two-dimensional shapes using everyday language.	<b>SGS1.2</b> Sorts, represents, describes and explores various two-dimensional shapes.	<b>SGS2.2a</b> Compares and names two-dimensional shapes and describes their features. <b>SGS2.2b</b> Identifies, compares and describes angles in practical situations.	<b>SGS3.2a</b> Classifies two-dimensional shapes and describes side and angle properties. <b>SGS3.2b</b> Measures and classifies angles.	
<b>Angles</b>					<b>SGS4.2</b> Identifies and names angles formed by the intersection of

					straight lines, including those related to transversals on sets of parallel lines, and makes use of the relationships between them.
<b>Properties of Geometrical Figures</b>					<p><b>SGS4.3</b> Classifies and determines the properties of triangles and quadrilaterals.</p> <p><b>SGS4.4</b> Identifies congruent and similar two-dimensional figures stating the relevant conditions.</p>
<b>Position</b>	<p><b>SGES1.3</b> Uses everyday language to describe position and follow simple directions.</p>	<p><b>SGS1.3</b> Describes the position of objects using everyday language.</p>	<p><b>SGS2.3</b> Uses simple maps and grids to represent position and follow routes.</p>	<p><b>SGS3.3</b> Uses a variety of mapping skills.</p>	

## Northern Territory

### Number Strand

<b>Strand Statement</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 6</b>
<b>Upfront</b>	<b>P-K</b>	<b>P-K &amp; Lower Primary1</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<p><b>The Number strand focuses on number concepts and notation, number patterns and number skills. In addition, the strand is about the development of number and computation in various cultures, the significance of the <i>idea</i> of number and the significance of the development of number notations. In this strand, students also learn successively more efficient computing strategies.</b></p>	<p>Students count and use number to order things. When listening to stories they add and subtract small numbers as they occur. They understand the concept of money and receiving change. They use a variety of strategies to mentally solve questions from stories and songs.</p>	<p>Students count numbers with at least two digits and estimate collections up to a size of 20. They understand the everyday fractions of 1. They understand addition and subtraction. They subtract two digit numbers using a variety of methods. They have a basic understanding of multiplication and division. They recognise the value of Australian coins and correctly exchange money for goods.</p>	<p>Students work with large whole numbers and extend number patterns. They apply fractional and decimal quantities, choosing the appropriate operation when dealing with everyday situations. They remember and apply mentally, basic addition facts up to <math>10 + 10</math>. They remember many basic multiplication facts and can use mental methods. They link multiplication and division.</p>	<p>Students use common fractions and order decimals with equal numbers of places. They investigate number patterns and solve simple number puzzles. They understand multiplication. They recall and apply all four operations with whole numbers mentally. They add and subtract numbers with equal decimal places and multiply and divide whole numbers and decimals by single digit numbers.</p>	<p>Students move easily between various ways of representing number and quantities. They order decimals with unequal numbers of places and read scales involving decimals. They understand multiplication and division. They use a range of mental and written strategies for operations on whole numbers and common and decimal fractions. They use estimation skills when appropriate.</p>	<p>Students interpret whole powers, roots and scientific notation. They use negative numbers and ratios to describe the relationship between quantities. They apply number patterns and the relationships between numbers. They use common fractions and percentages to make estimates. They know common equivalence and can use these to calculate or estimate percentages mentally.</p>

## Space Strand

<b>Strand Statement</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 6</b>
<b>Upfront</b>	<b>P-K</b>	<b>P-K &amp; Lower Primary1</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<p><b>The mathematical study of space, or geometry, is about the shape and structure of objects, how objects can be transformed and how symmetry can be used. The study of space is also concerned with location and arrangement.</b></p>	<p>Students match shapes despite their orientation. They recognise pictures which have symmetry. They use everyday language to give simple directions, describe position, locate things, and describe how shapes are alike or different. They relate shape with use.</p>	<p>Students describe objects according to their shape. They identify and recall the names of some common shapes. They construct objects from their parts. They make patterns by repeating and moving shapes according to specified rules. They locate objects and describe paths on simple grids.</p>	<p>Students identify drawings of 3D objects with the objects themselves.. They select a suitable paper net to make common 3D shapes. They recognise and name everyday 3D solids and identify their cross-sections. They use knowledge of shape and structure in everyday learning contexts. They correctly interpret maps and give clear directions.</p>	<p>Students identify nets of shapes and make predictions about folding. They use geometrical language to describe figures and to predict whether shapes will tile. They use maps employing the ideas of scale and co-ordinates. They give clear and simple instructions for finding things in 3D space.</p>	<p>Students interpret drawings of 3D shapes. They identify nets. They describe the geometric features of a collection of shapes and make abstract generalisations about them. They follow instructions for moving or sketching things and make figures and objects with specified spatial characteristics. They read everyday network maps and diagrams.</p>	<p>Students understand basic properties of triangles and rectangles and the conditions for congruent triangles. They make and check generalisations about shapes, visualise the effect of transformations and describe the basic properties of these transformations. They visualise paths and regions, given a set of rules.</p>



## Measurement Strand

Strand Statement	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Upfront	P-K	P-K & Lower Primary1	Lower Primary	Middle Primary	Upper Primary	Lower Secondary
<p><b>Through studies involving measurement, students should understand measurement techniques and tools, become proficient in measuring and calculating length, area, volume, capacity, mass, weight, angle, time and temperature in everyday situations. It focuses on developing confidence in using standard formulae and known ratios, rates and scales; understanding the significance of making allowances for errors and developing confidence and skills in estimation.</b></p>	<p>Students compare the size of two things and describe them using everyday language. They informally measure length and capacity by repeating units and estimate to make mathematical judgements involving their own body. They describe time and the passing of time and can place things in sequence.</p>	<p>Students compare things using measurement. They make estimates based on units they can see or handle, and measure carefully using some formal (metric) and informal units. They acknowledge the idea of time passage and can order familiar events into typical sequences according to the time of the day or year. They can use calendars for everyday purposes and can tell the time on a clock.</p>	<p>Students recognise the need for a common unit to compare two things and are able to choose an appropriate unit for the items to be measured. They measure length, capacity, angle, area and mass. They make sensible measurement estimates of things they can see and handle. They can read clocks, calendars and simple timetables and they can distinguish between actual time and duration of time.</p>	<p>Students display a knowledge of the size of a common standard unit. They use the size of common things to help in estimation. They choose their unit of measurement based on the accuracy of the measurement required. They read simple scales and measure accurately. They identify relationships between measurements for some common shapes through exploration. They understand the difference between time and duration and make reasonable estimates of time.</p>	<p>Students are practical in their choice of units and measuring equipment. They use a variety of graduated scales. They estimate, measure and calculate time and duration of time, and interpret complex timetable and schedules. They relate dimensions to areas and volumes of common two and three dimensional shapes.</p>	<p>Students solve measurement problems independently. They estimate, reject unreasonable estimates and decide the level of accuracy required. They extract measurements from published materials, and choose and use a wide range of formulae to calculate areas and volumes, substituting correctly and expressing in appropriate units. They work with similarity and Pythagoras' theorem.</p>

## Chance and Data Strand

Strand Statement	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Upfront	P-K	P-K & Lower Primary <sup>1</sup>	Lower Primary	Middle Primary	Upper Primary	Lower Secondary
<p><b>The Chance and Data strand is about chance events and how they are described. It focuses on data-handling processes and their appropriateness and it is also about making predictions from data and judging the reasonableness of those predictions.</b></p>	<p>With guidance, students ask questions and suggest answers about collections and objects. They classify and sequence objects or pictures. They display data with objects and pictures and describe this information in words and numbers.</p>	<p>Students use a variety of ways to summarise and display data collections in speech and writing.</p>	<p>Students collect, organise and display data based on the context of the investigation. They interpret a range of data presentation.</p>	<p>Students experiment with organising data in a form that helps answer questions. They calculate simple summary statistics. They group data and interpret diagrams, tables and bar graphs. They investigate a wide range of practical problems not obviously mathematical.</p>	<p>Students understand that probability statements give a measure of how likely something is to happen and express probability using fractions and decimals. They interpret data organised into diagrams and tables.</p>	<p>Students use systematic strategies to work out probabilities. They use data to assign probabilities for one and two stage events. They use appropriate graphs and summary statistics to represent data. They interpret and draw conclusions from data.</p>

## Algebra Strand

<b>Strand Statement</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 6</b>
<b>Upfront</b>	<b>P-K</b>	<b>P-K &amp; Lower Primary1</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<p><b>The Algebra strand begins with a study of patterns and focuses on ways of representing generality and variability whilst at the same time reducing complexity. The strand extends this notion to develop the ideas of functions and equations essential to a study of more sophisticated mathematics in the senior years.</b></p>	<p>Algebra outcomes are not reported on at this level although important 'pre-algebra' skills and concepts are developed and reported on in the Number strand.</p>	<p>Algebra outcomes are not reported on at this level although important 'pre-algebra' skills and concepts are developed and reported on in the Number strand.</p>	<p>Algebra outcomes are not reported on at this level although important 'pre-algebra' skills and concepts are developed and reported on in the Number strand.</p>	<p>Algebra outcomes are not reported on at this level although important 'pre-algebra' skills and concepts are developed and reported on in the Number strand.</p>	<p>Students produce and apply rules describing how two quantities are related and express them in a simple language and begin to use shortened forms of the rule. They find a number or numbers that satisfy constraints expressed in natural language and interpret and draw sketch graphs relating two quantities.</p>	<p>Students apply the basic conventions of algebra to summarise rules, to manipulate linear expressions and to write symbolic equations. They generate graphs of algebraic relationships. They distinguish linear from square relationships, recognising these and other types of relationships between variables in tables, symbolic expressions and graphs. Students use analytical methods to solve linear and more complex equations and iterate to solve other types.</p>

## Queensland Number

<b>Foundation Level</b> Upfront P-K	<b>Level 1</b> Upfront P-K	<b>Level 2</b> Lower Primary	<b>Level 3</b> Middle Primary	<b>Level 4</b> Upper Primary	<b>Level 5</b> Lower Secondary
<p>Level Statement</p> <p><i>Students are developing a notion of counting and an awareness of number and money. Number names becoming more meaningful.</i></p>	<p>Level Statement</p> <p><i>Students are developing a sense of number by knowing number names and counting in sequence. They recognise, compare, order and represent small whole numbers and use concrete materials to explore the concept of parts of a whole. They are developing an awareness of the cost of goods and recognise notes and coins. Students identify and distinguish between situations that require them to add or subtract, to share equally or to create equal groups.</i></p>	<p>Level Statement</p> <p><i>Students demonstrate their developing number sense by comparing, ordering and representing whole numbers to 999 and understanding that the value of a digit in a number determines its place value. They understand that a whole can be made up of equal parts and use concrete materials to represent halves and quarters. Students are beginning to recall or work out some addition, subtraction and multiplication number facts. They use a range of computation methods including mental, written and calculator to solve problems.</i></p>	<p>Level Statement</p> <p><i>Students compare, order and represent whole numbers to 9999, decimal fractions and common fractions and recognise the value of each digit. They recognise appropriate amounts of money for cash transactions. Students recall or work out all addition, subtraction and multiplication number facts and some division facts. They use a range of computation methods, including mental, written and calculator, to solve problems that involve whole numbers and decimal fractions in context.</i></p>	<p>Level Statement</p> <p><i>Students compare and order any whole numbers and decimal fractions. They identify fractions expressed in different ways and make connections between common fractions, decimal fractions and percentages. Students recall all addition, subtraction, multiplication and division number facts. They use a range of computation methods to solve problems that involve whole numbers, decimal and common fractions, percentages and rates.</i></p>	<p>Level Statement</p> <p><i>Students compare and order positive and negative integers and explain and record index notation. They interpret and use conventions for expressing rates and ratios.. Students use a range of computation methods to solve problems that involve positive rational numbers, rates, ratios and direct proportions.</i></p>

Upfront P-K	Upfront P-K	Lower Primary	Middle Primary	Upper Primary	Lower Secondary
<b>Number Concepts NF.1</b> Students rote count to a specified number. Students recognise numerals in their lives and environments.	<b>Number Concepts N1.1</b> Students identify, compare and order small whole numbers, make and match representations of these numbers.	<b>Number Concepts N2.1</b> Students compare and order whole numbers to 999, match different representations and combinations of whole numbers and identify simple fractions of objects and collections.	<b>Number Concepts N3.1</b> Students compare, order and represent whole numbers to 9999 and common and decimal fractions.	<b>Number Concepts N4.1</b> Students compare and order whole numbers and common and decimal fractions of any size, make connections between key percentages and fractions.	<b>Number Concepts N5.1</b> Students compare and order integers, and use and interpret index notation, rates and ratios.
<b>Addition and Subtraction NF.2</b> Students show an awareness of <i>more</i> , <i>less</i> and <i>same</i> in life situations.	<b>Addition and Subtraction N1.2</b> Students identify and solve addition and subtraction problems involving small whole numbers.	<b>Addition and Subtraction N2.2</b> Students identify and solve addition and subtraction problems involving whole numbers.	<b>Addition and Subtraction N3.2</b> Students identify and solve addition and subtraction problems involving whole numbers and decimal fractions.	<b>Addition and Subtraction N4.2</b> Students identify and solve addition and subtraction problems involving any whole numbers and decimal fractions.	<b>Addition and Subtraction N5.2</b> Students identify and solve addition and subtraction problems involving positive rational numbers.
<b>Multiplication and Division NF.3</b> Students share a quantity of everyday objects among their peers.	<b>Multiplication and Division N1.3</b> Students identify and describe equal groupings and equal sharing within everyday situations.	<b>Multiplication and Division N2.3</b> Students identify and solve multiplication and division problems, selecting from a range of computation methods, strategies and known number facts.	<b>Multiplication and Division N3.3</b> Students identify and solve multiplication and division problems involving whole numbers and decimal fractions, selecting from a range of computation methods, strategies and known number facts.	<b>Multiplication and Division N4.3</b> Students identify and solve multiplication and division problems involving whole numbers, decimal fractions, common fractions and percentages selecting from a range of computation methods, strategies and known number facts.	<b>Multiplication and Division N5.3</b> Students identify and solve multiplication and division problems involving positive rational numbers, rates, ratios and direct proportions using a range of computational methods and strategies.

## Patterns and Algebra

<b>Foundation Level</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>
<b>Upfront P-K</b>	<b>Upfront P-K</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<p>Level Statement  <i>Students investigate patterns and are developing an awareness of 'same' when matching.</i></p>	<p>Level Statement  <i>Students identify patterns. They continue patterns. They represent the same pattern in different ways. They describe patterns or change in terms of a simple rule. Students describe the number value of a group of objects as 'equal to', 'different from' or 'the same as'. They know that the number value of a group of objects stays the same when rearranged or represented in different combinations.</i></p>	<p>Level Statement  <i>Students use rules to create and describe number patterns based on addition and subtraction. They identify number sequences that are not patterns. They complete missing parts of, or continue, a number pattern when given the rule. They know the inverse relationship between addition and subtraction and use this to apply and then reverse simple rules. Students represent addition and subtraction situations using equations. They recognise and describe the equivalence or non-equivalence of two sides of an addition or subtraction equation (number sentence) and determine an unknown using a variety of self-generated and learned strategies.</i></p>	<p>Level Statement  <i>Students describe relationships between sets of numbers in terms of functions or rules. They draw tables and graphs to display these relationships. They know the inverse relationship between multiplication and division and use this to reverse the effect of a rule or change. Students identify equivalence in situations that involve measures and money. They determine the missing part of an equation (number sentence) that requires either addition and subtraction, or multiplication and division.</i></p>	<p>Level Statement  <i>Students identify representations of patterns and functions and use their knowledge of functions and inverses to determine unknowns within equations or any position in a pattern. They apply combinations of the four operations, observing the order of operations and the presence of brackets. Students manipulate and solve simple equations using strategies that maintain balance. They identify relationships between sets of data.</i></p>	<p>Level Statement  <i>Students identify when relationships exist between two sets of everyday data and use functions expressed in words or symbols, or represented in tables and graphs to describe these relationships. They identify relationships that are linear and express these using equations. Students use algebraic reasoning and conventions, including graphical representations, to solve problems and justify their solutions.</i></p>

Upfront P-K	Upfront P-K	Lower Primary	Middle Primary	Upper Primary	Lower Secondary
<p><b>Patterns and functions</b> <b>PAF.1</b> Students copy a given pattern by choosing items from a limited selection.</p>	<p><b>Patterns and functions</b> <b>PA1.1</b> Students identify and describe patterns and change based on simple rules</p>	<p><b>Patterns and functions</b> <b>PA2.1</b> Students explain patterns, identify and describe relationships using rules and use backtracking to reverse the effects of rules involving addition and subtraction.</p>	<p><b>Patterns and functions</b> <b>PA3.1</b> Students continue number patterns, identify, describe and represent relationships between two quantities and use backtracking to reverse any one of the four operations.</p>	<p><b>Patterns and functions</b> <b>PA4.1</b> Students identify representations of patterns and functions and apply backtracking to solve simple equations that involve combinations of the four operations.</p>	<p><b>Patterns and functions</b> <b>PA5.1</b> Students interpret and compare different representations of linear and simple non-linear functions and solve the related problems.</p>
<p><b>Equivalence and equations</b> <b>PAF.2</b> Students show an awareness of 'same' in relation to people, objects, places or small collections.</p>	<p><b>Equivalence and equations</b> <b>PA1.2</b> Students compare and describe arrangements of objects and combinations of numbers to 10 using the language of equivalence.</p>	<p><b>Equivalence and equations</b> <b>PA2.2</b> Students represent and describe equivalence in equations that involve addition and subtraction.</p>	<p><b>Equivalence and equations</b> <b>PA3.2</b> Students represent and describe equivalence in equations that involve combinations of multiplication and division or addition and subtraction.</p>	<p><b>Equivalence and equations</b> <b>PA4.2</b> Students create and interpret equations containing unknowns and understand the effect of order of operations.</p>	<p><b>Equivalence and equations</b> <b>PA5.2</b> Students interpret and solve linear equations related to realistic problems using algebraic and graphical methods.</p>

## Measurement

<b>Foundation Level</b> <b>Upfront P-K</b>	<b>Level 1</b> <b>Upfront P-K</b>	<b>Level 2</b> <b>Lower Primary</b>	<b>Level 3</b> <b>Middle Primary</b>	<b>Level 4</b> <b>Upper Primary</b>	<b>Level 5</b> <b>Lower Secondary</b>
<p>Level Statement</p> <p><i>Students are responding to and developing some everyday language associated with time, length, mass, area and volume.</i></p>	<p>Level Statement</p> <p><i>Students identify and distinguish between the attributes of length, mass, area and volume. They select an attribute to make comparisons between objects. They describe these comparisons using appropriate language. They use non-standard units when they estimate and measure length, mass, area and volume. Students are developing an awareness of time and its relevance to their everyday lives. They sequence familiar events and relate specific events to days of the week and months of the year. They use comparative language to describe the duration of events or activities.</i></p>	<p>Level Statement</p> <p><i>Students use non-standard and some standard units to estimate, measure and order length, mass, area and volume. Students measure and compare durations of events and link these to familiar activities. They read time on analogue clock in five-minute increments and any time on digital displays. They use calendars to locate and sequence events over a year.</i></p>	<p>Level Statement</p> <p><i>Students use equivalent forms of standard units to compare, order and measure. They select appropriate standard units to estimate and measure length, mass, area and volume. Students interpret and use calendars and simple timetables to plan and record events. They know and use conventions related to reading and recording time. They calculate the duration of events.</i></p>	<p>Level Statement</p> <p><i>Students investigate ways to determine areas, volume, and lengths of boundaries and describe the relationships between the dimensions in general terms. They select and use the appropriate standard unit when estimating and measuring. Students use diaries, calendars and timetables to plan and organise events or activities. They use 24 hour and 12 hour time.</i></p>	<p>Level Statement</p> <p><i>Students identify and describe links between their own generalised methods and formulae used to calculate areas, volumes and lengths of boundaries. Students plan, monitor and manage their use of time. They understand and consider the impact of different time zones within Australia.</i></p>



<b>Upfront P-K</b>	<b>Upfront P-K</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<p><b>Length, mass, area and volume</b> <b>MF.1</b> Students show an awareness of everyday language related to measurement.</p>	<p><b>Length, mass, area and volume</b> <b>M1.1</b> Students select the appropriate attribute to compare and order the size of objects and measure with non-standard units.</p>	<p><b>Length, mass, area and volume</b> <b>M2.1</b> Students use non-standard and standard units to estimate, measure and order the size of objects.</p>	<p><b>Length, mass, area and volume</b> <b>M3.1</b> Students identify and use equivalent forms of standard units when measuring, comparing and ordering.</p>	<p><b>Length, mass, area and volume</b> <b>M4.1</b> Students choose appropriate units when estimating and measuring and explain the relationships between dimensions when investigating areas, volumes and lengths of boundaries of rectangles and prisms.</p>	<p><b>Length, mass, area and volume</b> <b>M5.1</b> Students develop formulae for areas, volumes and lengths of boundaries where the relationships between dimensions are known and investigate the relationships between dimensions.</p>
<p><b>Time</b> <b>MF.2</b> Students associate common words with familiar times of the day or week.</p>	<p><b>Time</b> <b>M1.2</b> Students sequence familiar events related to days and weeks, and directly compare the duration of events.</p>	<p><b>Time</b> <b>M2.2</b> Students use a calendar to locate and sequence events, read and interpret key times on 12-hour displays and measure and compare durations of time.</p>	<p><b>Time</b> <b>M3.2</b> Students read, record and calculate with 12-hour time, and interpret calendars and simple timetables related to daily activities.</p>	<p><b>Time</b> <b>M4.2</b> Students read, record and calculate with 24-hour time and develop timetables and calendars to plan and organise events of activities.</p>	<p><b>Time</b> <b>M5.2</b> Students interpret and solve realistic problems related to time management and time zones within Australia.</p>

## Chance and Data

<b>Foundation Level</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>
-	<b>Upfront P-K</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
-	Level Statement <i>Students organise and classify data in response to particular situations and display information using simple conventional displays.</i>	Level Statement <i>Students collect and organise data, create and interpret a range of data displays and identify significant elements of the displays. They suggest and distinguish between some sources of variation in data and explain the effects of these variations.</i>	Level Statement <i>Students describe all possible outcomes from a single situation and order these from most like to least like to occur. They identify situations where every outcome has an equal chance of occurring. Students organise data. They make statements regarding the results of surveys using quantitative and comparative language.</i>	Level Statement <i>Students interpret frequency tables. They judge the likelihood of particular events using probability values. Students select data displays that best represent the collected data type and use appropriate measures of location when commenting on data displays.</i>	Level Statement <i>Students determine theoretical probabilities where outcomes can be shown to be equally likely. Students use histograms and stem and leaf plots to determine features of data such as location, spread and range.</i>
<b>Chance CDF.1</b> -	<b>Chance CD1.1</b> -	<b>Chance CD2.1</b> -	<b>Chance CD3.1</b> Students identify all possible outcomes of familiar situations or action and, for these sample spaces, order the likelihood of occurrence of the identified outcomes using experimental data.	<b>Chance CD4.1</b> Students compare the likelihood of different outcomes.	<b>Chance CD5.1</b> Students model and determine probabilities for single events to justify statements and decisions.

<p><b>Data CDF.2</b></p> <p>-</p>	<p><b>Data CD1.2</b></p> <p>Students interpret simple data displays.</p>	<p><b>Data CD2.2</b></p> <p>Students organise data and interpret a variety of displays to investigate questions, and identify elements of the displays.</p>	<p><b>Data CD3.2</b></p> <p>Students use existing sources of data to investigate questions, organise data and identify and interpret elements of the displays.</p>	<p><b>Data CD4.2</b></p> <p>Students make comparisons about various data based on the displays and measures of location.</p>	<p><b>Data CD5.2</b></p> <p>Students compare data displays involving discrete and continuous data, including grouping, and comparing measures of location.</p>
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## Space

<b>Foundation Level</b> <b>Upfront P-K</b>	<b>Level 1</b> <b>Upfront P-K</b>	<b>Level 2</b> <b>Lower Primary</b>	<b>Level 3</b> <b>Middle Primary</b>	<b>Level 4</b> <b>Upper Primary</b>	<b>Level 5</b> <b>Lower Secondary</b>
<p>Level Statement</p> <p><i>Students are developing notions of shape, location and movement.</i></p>	<p>Level Statement</p> <p><i>Students identify some obvious properties that distinguish 3D shapes and objects and 2D shapes, and understand that these properties are constant. They describe properties using simple geometric terms and pay attention to the number of side or corners and the shapes of faces.</i></p> <p><i>Students identify and describe the positions of objects relative to their environment. They give directions, follow directions and identify alternative pathways between locations.</i></p>	<p>Level Statement</p> <p><i>Students sort 3D shapes and objects by identifying common properties including those that distinguish them from 2D shapes. They identify and match drawings, pictures and other representations of 3D shapes and objects from different viewpoints. They investigate nets of some shapes.</i></p> <p><i>Students recognise that maps and plans are representations of environments and use these to follow or give directions related to pathways and the location of objects. They interpret and use alphanumeric grids to describe locations. They recognise the relative size and proximity of objects and locations.</i></p>	<p>Level Statement</p> <p><i>Students identify the geometric properties that define and distinguish families of prisms, cylinders, spheres, cones and pyramids. They recognise the properties that distinguish trapeziums and rhombuses from other quadrilaterals, as well as the properties that distinguish different groups of triangles. They describe the properties of shapes using terms such as parallel, congruent, symmetrical and other terms related to angles. Students describe locations and directions with reference to the four compass points and grid references displayed on simple authentic maps and plans. They interpret the symbols used on</i></p>	<p>Level Statement</p> <p><i>Students analyse the geometric properties that define and distinguish families of polygons and their sub-groups. They analyse and describe groups of 3D shapes, such as the Platonic solids. They use the properties of prisms and pyramids to identify other shapes belonging to those groups. They analyse and classify shapes according to criteria including rotational symmetry and perpendicular lines or faces.</i></p> <p><i>They refer to the eighth compass points or angles of turn when giving directions. They use simple linear scales to estimate distance on maps and plans..</i></p>	<p>Level Statement</p> <p><i>Students investigate the properties of shapes, including congruence and similarity and identify shapes embedded within irregular shapes to assist with the calculation of areas. They interpret plans and elevations with attention to suitable scales, depth and perspective, They calculate distance on maps and dimensions on plans by referring to scales expressed as simple ratios. They give or follow directions expressed as compass bearings and distance to move around a local environment.</i></p>

			<i>maps by referring to the keys and legends and know that most maps are orientated to the north.</i>		
<b>Shape and line NF.1</b> Students recognise familiar objects from different viewpoints. Students recognise common objects.	<b>Shape and line N1.1</b> Students identify everyday shapes and objects using geometric names and identify simple representations of them.	<b>Shape and line N2.1</b> Students identify and sort 3D shapes and objects and 2D shapes according to geometric properties and identify shapes and objects from different viewpoints or orientations.	<b>Shape and line N3.1</b> Students identify the defining geometric properties of families of 3D shapes, identify nets of 3D shapes, and identify and describe the properties of specific families of 2D shapes.	<b>Shape and line N4.1</b> Students analyse the geometric properties of a range of 2D and 3D shapes to classify shapes into subgroups of families.	<b>Shape and line N5.1</b> Students analyse the relationships between the properties of shapes, lines and angles to explain similarity and congruence.
<b>Location, direction and movement NF.2</b> Students position or locate objects in response to directions. Students use an awareness of locations to follow the directions.	<b>Location, direction and movement N1.2</b> Students follow simple directions to move through, and locate and place objects.	<b>Location, direction and movement N2.2</b> Students interpret simple maps, plans and grids to follow and give directions, and to locate or arrange places or objects.	<b>Location, direction and movement N3.2</b> Students interpret maps and plans using a range of conventions, describe location and give directions using major compass points, angles and grids.	<b>Location, direction and movement N4.2</b> Students interpret maps and plans with reference to conventions.	<b>Location, direction and movement N5.2</b> Students interpret maps, interpret and describe plans that use scale and describe movements using compass bearings and distance.

**South Australia  
Number Strand**

Standard	Key Ideas	Outcomes	Upfront title
<p><b>Standard 1</b></p>	<p>Children construct their concepts of counting numbers, simple fractions and the base 10 numbering system using symbols and collections from everyday life. In their daily activities children construct meaning from their operations with numbers. They explore ways of deconstructing and combining numbers that represent collections of objects, units of comparison and amounts of money. Children generate and explore a variety of computational strategies to use numbers in daily activities when they need to estimate and quantify.</p>	<p><b>1.6</b> Uses the base 10 number system and fractions to represent numbers.</p> <p><b>1.7</b> Uses a variety of counting strategies and the four number operations to estimate and quantify collections of objects and units of comparison.</p> <p><b>1.8</b> Uses counting strategies to answer questions about situations that involve number operations and informal and standard algorithms.</p>	<p><b>P-K and Lower Primary</b></p>

<p><b>Standard 2</b></p>	<p>Students develop their number sense through exploring and analysing how numbers are used and represented in their daily activities. They continue to refine their understanding of relationships between numbers, place value and proportion.</p> <p>Students develop their understanding of the four operations (+-x÷) and the relationship between them. They use mathematical terminology, symbols and conventions to communicate their understanding to others.</p> <p>Students use their number sense to refine their ability to estimate, calculate and present using spreadsheets, measurements and amounts of money in their personal, family and community activities, and in their experiences in other Learning Areas.</p>	<p><b>2.6</b> Represents and compares rational numbers in a variety of ways, describing relationships among them.</p> <p><b>2.7</b> Applies operations with whole numbers.</p> <p><b>2.8</b> Uses a variety of estimating and calculating strategies, including memorising addition and subtraction facts with whole numbers, and with money represented as decimals.</p>	<p><b>Middle Primary</b></p>
<p><b>Standard 3</b></p>	<p>Students recognise relationships within different number concepts in order to make sense of, and represent numerically, a range of community activities and social processes encountered in their lives. Students understand the meaning of operations and how they relate to each other.</p> <p>Students use computational tools and strategies.</p>	<p><b>3.6</b> Represents and analyses relationships amongst number concepts.</p> <p><b>3.7</b> Describes, represents and analyses operations with rational numbers and relationships between them.</p> <p><b>3.8</b> Uses a variety of estimating and calculating strategies with whole numbers, including memorising multiplication and division facts, fractions and decimals.</p>	<p><b>Upper Primary</b></p>

<p><b>Standard 4</b></p>	<p>Students recognise relationships within different number concepts in order to make sense of, and represent numerically, a range of community activities and social processes encountered in their lives. Students understand the meaning of operations and how they relate to each other.</p> <p>Students use computational tools and strategies.</p>	<p><b>4.6</b> Represents and analyses relationships amongst integers and rational numbers.</p> <p><b>4.7</b> Communicates understanding of the meaning of operations with integers and rational numbers and how they relate to each other.</p> <p><b>4.8</b> Applies appropriate computational tools and strategies to situations involving integers and rational numbers.</p>	<p><b>Lower Secondary</b></p>
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## Exploring, Analysing and Modelling Data

Standard	Key Ideas	Outcomes	Upfront title
<b>Standard 1</b>	<p>Children generate data about the world around them. They develop strategies, including using technology, to collect, organise and represent data, and use it to describe situations and to make decision and personal plans.</p> <p>Children explore ways of using comparative language and number to describe and represent data and to communicate responses about their questions. They make predictions about similar situations based upon the conclusions drawn from data they collect and digitalise.</p> <p>Children construct an understanding of chance and randomness through exploring the variety of possibilities presented both by their daily activities and the phenomena in their environments.</p>	<p><b>1.1</b> Organises data.</p> <p><b>1.2</b> Uses everyday comparative language and number to describe data in parts and as a whole.</p> <p><b>1.3</b></p>	<b>P-K and Lower Primary</b>
<b>Standard 2</b>	<p>Students generate and analyse data from a diverse range of sources (including online) and perspectives to investigate situations drawn from their personal lives and the world around them. They use this data to explore patterns and relationships, and to inform their choices and actions.</p> <p>Students draw conclusions from data they collect from diverse sources and perspectives using descriptions of the spread of data and of relationships within it. They make predictions and informal inferences for larger populations or similar situations, and communicate their conclusions and predictions to a variety of audiences.</p> <p>Students refine their understanding of chance and randomness by using data from their daily activities to describe possible outcomes and their likelihood. They analyse trends and relationships and make predictions about possibilities in the future.</p>	<p><b>2.1</b> Explores patterns and uses data presented by others.</p> <p><b>2.2</b> Describes key features of data and draws conclusions from similar data from different groups. They make general predictions based on results.</p> <p><b>2.3</b></p>	<b>Middle Primary</b>

<p><b>Standard 3</b></p>	<p>Students engage with data by formulating and answering questions, and collecting, organising and representing data in order to investigate and understand the world around them. Students use statistical methods to reduce, analyse and interpret data, while critically evaluating the cultural and social inclusivity of the samples used.</p> <p>Students engage with data to understand, analyse and apply notions of chance and probability in the social and natural worlds.</p>	<p><b>3.1</b> <b>3.2</b> Summarises and draws conclusions about data. <b>3.3</b> Analyses data to search for patterns in events where the range of outcomes is generated by situations where chance plays a role.</p>	<p><b>Upper Primary</b></p>
<p><b>Standard 4</b></p>	<p>Students engage with data by formulating and answering questions, and collecting, organising and representing data in order to investigate and understand the world around them. Students use statistical methods to reduce, analyse and interpret data, while critically evaluating the cultural and social inclusivity of the samples used.</p> <p>Students engage with data to understand, analyse and apply notions of chance and probability in the social and natural worlds.</p>	<p><b>4.1</b> Classifies, sequences, collapses, tabulates and represents data. <b>4.2</b> Reads and describes information in given tables, diagrams, line and bar graphs. Makes predictions based on the information, understanding the limitations of data interpretation and the possible social consequences of these limitations. <b>4.3</b> Interprets data and makes numerical statements about probability, models situations, using data to validate their theories about the fairness of everyday situations including hypothetical situations.</p>	<p><b>Lower Secondary</b></p>

## Measurement

Standard	Key Ideas	Outcomes	Upfront title
<b>Standard 1</b>	<p>Children construct concepts of size and measurable attributes by comparing a wide variety of familiar figures, objects and events drawn from the world around them.</p> <p>Children develop strategies that directly compare and quantify measurable attributes of a wide variety of figures, objects and events drawn from the world around them.</p>	<p><b>1.4</b> Compares and orders the measurable attributes of distance, surface, space, mass, turn/angle and time to describe the size of familiar figures, objects and events.</p> <p><b>1.5</b> Uses a variety of strategies to measure the size of a wide variety of figures, objects and events drawn from the world around them.</p>	<p><b>P-K and Lower Primary</b></p>
<b>Standard 2</b>	<p>Students refine their concepts of measurable attributes and units of comparison, they choose the most appropriate attributes and units to quantify 2-D figures, 3-D solids and time for a wide variety of purposes and are able to justify their choices to others.</p> <p>Students use direct measurement strategies and relationships between particular attributes to quantify the size of 2-D figures, 3-D solids and time. They identify, plan and act to address measurement problems.</p>	<p><b>2.4</b> Estimates and uses metric units to measure attributes of figures and objects; orders events or cycles of events; estimates the duration and time of events; uses measuring tools.</p> <p><b>2.5</b> Performs simple operations on measures.</p>	<p><b>Middle Primary</b></p>

<p><b>Standard 3</b></p>	<p>Students understand attributes, units and systems of measurement. They research and report on how measurement is used in the home, community and paid workforce, and recognise transferability between these and other contexts. Students recognise and develop and report on connections between mathematical ideas and representations. They employ logical strategies to solve problems in measurement situations, and reflect on the reasonableness of their answers.</p>	<p><b>3.4</b> Selects appropriate attributes and systems to measure for a variety of purposes. <b>3.5</b> Uses a range of standard tools to measure relationships between distances and other measurable attributes to calculate size.</p>	<p><b>Upper Primary</b></p>
<p><b>Standard 4</b></p>	<p>Students understand attributes, units and systems of measurement. They research and report on how measurement is used in the home, community and paid workforce, and recognise transferability between these and other contexts. Students recognise and develop and report on connections between mathematical ideas and representations. They employ logical strategies to solve problems in measurement situations, and reflect on the reasonableness of their answers.</p>	<p><b>4.4</b> Selects appropriate measurements units and scale. <b>4.5</b> Applies a variety of techniques and tools, and uses a range of measurement formulae to solve problems.</p>	<p><b>Lower Secondary</b></p>

## Pattern and Algebraic Reasoning

Standard	Key Ideas	Outcomes	Upfront title
<b>Standard 1</b>	<p>Children recognise, describe, predict, represent and communicate patterns.</p> <p>Children make predictions and informal generalisations about their daily activities, aspects of their natural world and environments using patterns they general or identify.</p> <p>Children use mathematics to explore and describe change based on their personal experiences and interactions with their environments, they use these predictions to make connection between past, present and future.</p>	<p><b>1.9</b> Recognises and constructs spatial and numerical patterns with concrete materials, continues these patterns and predicts what comes next.</p> <p><b>1.10</b> Represents and communicates spatial and numerical patterns.</p> <p><b>1.11</b></p>	<p><b>P-K and Lower Primary</b></p>
<b>Standard 2</b>	<p>Students identify, describe, construct, represent and predict patterns and relationships when working with data, measuring and calculating. They relate these patterns and relationships to their everyday lives.</p> <p>Students employ everyday language and mathematical symbols to represent and communicate their generalisations about mathematical situations and structures.</p> <p>Students collect and analyse information in understanding that the social and physical world is constantly changing, and that such change can be represented in symbols and mathematical models.</p>	<p><b>2.9</b> Represents and analyses different forms of spatial and numerical patterns.</p> <p><b>2.10</b> Represents and communicates patterns with everyday and mathematical language, including symbols, number lines and graphs.</p> <p><b>2.11</b></p>	<p><b>Middle Primary</b></p>

<p><b>Standard 3</b></p>	<p>Students demonstrate, record and report on logical and critical thought processes by searching for and abstracting generational algebraic representations from patterns. Students analyse mathematical structures and use algebraic formulae to represent situations. They further develop the capacity to express themselves, and to solve problems involving linear relationships. Students use mathematical modals to make connections and analyse how things might change in both real and abstract contexts. They extract information from tables of data and graphs, making comparisons between varying rates of change, and predicting future events.</p>	<p><b>3.9</b> Describes and generalises relationships between measurable attributes as patterns and explains the impact of varying one aspect of the relationship. <b>3.10</b> Analyses and generalises numerical and spatial patterns and solves problems with such patterns.  <b>3.11</b> Uses mathematical representations to make connections and analyse change.</p>	<p><b>Upper Primary</b></p>
<p><b>Standard 4</b></p>	<p>Students demonstrate, record and report on logical and critical thought processes by searching for and abstracting generational algebraic representations from patterns. Students analyse mathematical structures and use algebraic formulae to represent situations. They further develop the capacity to express themselves, and to solve problems involving linear relationships. Students use mathematical modals to make connections and analyse how things might change in both real and abstract contexts. They extract information from tables of data and graphs, making comparisons between varying rates of change, and predicting future events.</p>	<p><b>4.9</b> Analyses and generalises numeric and visual patterns to solve problems in a range of situations.  <b>4.10</b> Uses symbolic algebra to represent situations and manipulate the symbolic representations to solve problems involving linear equations and inequations; gives simple algebraic proofs. <b>4.11</b></p>	<p><b>Lower Secondary</b></p>

## Spatial Sense and Geometric Reasoning

Standard	Key Ideas	Outcomes	Upfront title
<b>Standard 1</b>	<p>Children explore their social and natural environments, identifying and mathematically describing key features of shapes and objects around them. In the process they learn more about themselves and their integral relationship with the environments.</p> <p>Children explore and experiment with simple transformations to predict and change the orientation and position of figures and objects in the daily lives.</p> <p>Children explain ways of representing themselves and familiar locations in spatial terms, and begin to think in geometric ways.</p>	<p><b>1.12</b> Uses key spatial features to describe and represent 2-D and 3-D shapes.</p> <p><b>1.13</b> Uses simple transformations to orientate and move familiar objects.</p> <p><b>1.14</b> Uses everyday and positional language to represent their location and familiar places.</p>	<p><b>P-K and Lower Primary</b></p>
<b>Standard 2</b>	<p>Students understand and appreciate the extent to which shape and structure help them to make sense of their world.</p> <p>Students explore and communicate the ideas and language of geometric change and transformation. They use combinations of mathematical transformations.</p> <p>Students develop their capacity to think about and describe geometrical form, using a variety of spatial attributes, in more abstract and precise formulations.</p>	<p><b>2.12</b> Compares and analyses relationships between and within 2-D and 3-D shapes and objects to represent their world.</p> <p><b>2.13</b> Predicts the result of using combinations of reflections (flips), translations (slides) and rotations when arranging shapes.</p> <p><b>2.14</b> Uses positional language and measurements to formally map location and arrangements.</p>	<p><b>Middle Primary</b></p>

<p><b>Standard 3</b></p>	<p>Students explore and analyse features in their immediate and extended environment in geometric terms. They compare perspectives of spatial sense and geometric reasoning in order to understand different human interactions with their environment.</p> <p>Students analyse and understand the uses and purposes of flips (reflection), slides (translation), rotations and dilations to explore geometric relationships and alternative preferred possibilities in the physical world.</p> <p>Students develop and extend their capacity to solve problems in multilayered and abstract ways in order to produce accurate maps, graphs and models.</p>	<p><b>3.12</b> Describes and generalises spatial relationships within and between groups of 2-D and 3-D shapes and objects.</p> <p><b>3.13</b> Analyses the result of a series of flips, slides, rotations and reflections and translations.</p> <p><b>3.14</b> Uses scaled maps and plans and envisages alternative possibilities.</p>	<p><b>Upper Primary</b></p>
<p><b>Standard 4</b></p>	<p>Students explore and analyse features in their immediate and extended environment in geometric terms. They compare perspectives of spatial sense and geometric reasoning in order to understand different human interactions with their environment.</p> <p>Students analyse and understand the uses and purposes of flips (reflection), slides (translation), rotations and dilations to explore geometric relationships and alternative preferred possibilities in the physical world.</p> <p>Students develop and extend their capacity to solve problems in multilayered and abstract ways in order to produce accurate maps, graphs and models.</p>	<p><b>4.12</b> Identifies characteristics and properties of 2-D and 3-D shapes.</p> <p><b>4.13</b> Identifies, represents and justifies one and two step geometrical transformations.</p> <p><b>4.14</b> Represents and uses location maps, pathways diagrams and network diagrams to describe current and possible future characteristics of the physical world.</p>	<p><b>Lower Secondary</b></p>



## Tasmania - Essential Learnings – Being Numerate

**KEY ELEMENT OUTCOME:** Understands and has the confidence and disposition to use the mathematical concepts and skills required to meet the demands of life.

Performance Guidelines

***Being numerate means using mathematical concepts and skills involving number, measurement, space and data whenever they are needed in life. It includes having the confidence and disposition to use mathematical understandings whenever appropriate.***

***Students who are numerate:***

- ***Understand how to think, act and communicate mathematically by: ...applying mathematics in a variety of contexts [and] ...connecting new understandings to old.***
- ***Understand number by: counting, counting; ordering; estimating; calculating; and relating whole or part quantities.***
- ***Understand measurements by: comparing; estimating, measuring, choosing and using units and relationships.***
- ***Understand space by: visualising; drawing; viewing; making models; scaling; rotating; reflecting; translating.***
- ***Understand data by: collecting, classifying, organising, representing, interpreting, predicting.***

STANDARD 1	STANDARD 2	STANDARD 3	STANDARD 4	STANDARD 5
Upfront P-K	Lower Primary	Lower - Middle Primary	Middle - Upper Primary	Upper Prim/Lower Secondary
<p>Understands that mathematical language and ideas can be used to describe situations.</p> <p>Students demonstrate aspects of this learning when they:</p> <ul style="list-style-type: none"> <li>• Use informal mathematical language.</li> <li>• Sort items in informal ways.</li> <li>• Engage in and enjoy</li> </ul>	<p>Understands how to purposefully use informal ways of thinking mathematically in familiar situations.</p> <p>Students demonstrate aspects of this learning when they:</p> <ul style="list-style-type: none"> <li>• Make and extend patterns, and conjecture in simple situations.</li> <li>• Use number concepts and counting strategies (e.g. count on, count</li> </ul>	<p>Understands how to explore, refine and communicate more effective ways of thinking and acting mathematically in familiar situations.</p> <p>Students demonstrate aspects of this learning when they:</p> <ul style="list-style-type: none"> <li>• Explore strategies for posing and solving problems with an increased range of approaches.</li> <li>• Recognise patterns in</li> </ul>	<p>Understands how to consistently select effective mathematical strategies and choose the most effective strategy for solving problems in a variety of situations.</p> <p>Students demonstrate aspects of this learning when they:</p> <ul style="list-style-type: none"> <li>• Pose and answer mathematical questions by drawing on and refining an extended repertoire of strategies.</li> <li>• Recall relevant number</li> </ul>	<p>Understands how and when to use mathematical ideas effectively and critically when interpreting and communicating information and solving problems.</p> <p>Students demonstrate aspects of this learning when they:</p> <ul style="list-style-type: none"> <li>• Use mathematical understanding in practical applications and explore, describe and communicate quantitative relationships</li> </ul>

<p>number games, song and rhymes.</p> <ul style="list-style-type: none"> <li>• Do approximate counting of collections.</li> <li>• Notice numbers in their environment.</li> <li>• Use measurement ideas in appropriate contexts.</li> <li>• Explore spatial ideas with puzzles, building blocks, etc.</li> <li>• Distinguish between objects, for example by colour or likes and dislikes.</li> </ul>	<p>back) to solve number problems.</p> <ul style="list-style-type: none"> <li>• Use informal measures to describe or compare objects and answer questions such as 'How long?' 'How tall?'</li> <li>• Recognise, group and name common shapes.</li> </ul>	<p>number sequences and explore relationships.</p> <ul style="list-style-type: none"> <li>• Commit some number relations to memory, based on understanding of mental strategies, and use a range of mental and written processes for calculating, as well as ideas of place value.</li> <li>• Use some standard units of measure to answer questions.</li> <li>• Explain the distinguishing features of some 2D and 3D shapes, and recognise them in the environment.</li> <li>• Use surveys purposefully and interpret data in simple graphs, maps and tables.</li> </ul>	<p>relations and choose personally effective techniques for calculations, be they mental, written or technologically assisted, with whole or part quantities.</p> <ul style="list-style-type: none"> <li>• Use standard units of measure to draw conclusions, summarise patterns in data and explore relationships.</li> <li>• Visualise and use shapes (2D and 3D), locations and directions to solve problems.</li> <li>• Interpret and draw inferences from data (including likelihood of chance events) when presented in different formats.</li> </ul>	<p>in words, symbols and graphs.</p> <ul style="list-style-type: none"> <li>• Use personally effective techniques for estimating and dealing with whole numbers, fractions, decimals, percentages, ratios and rates.</li> <li>• Estimate, measure and use measurement relationships effectively in meaningful contexts.</li> <li>• Visualise and use shapes in different orientations and scales.</li> <li>• Use simple statistical strategies to extract, analyse and critically interpret data presented in different forms, and determine the likelihood of chance events.</li> </ul>
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## Victoria Number

Level	Sub-strand	Learning Outcomes	Upfront title
1	-	<p><b>1.1</b> Count, compare and order collections of at least 20 objects.</p> <p><b>1.2</b> Model numbers up to at least 10 and use strategies to find and verbalise relationships between small numbers.</p> <p><b>1.3</b> Recognise and write numerals from 1 to 10 and use them to record simple addition and subtraction facts and doubles.</p> <p><b>1.4</b> Use knowledge of numbers, counting and addition and subtraction relationships to explore and describe simple, everyday numerical situations including the use of money.</p> <p><b>1.5</b> Use materials to recognise, generate and represent simple number patterns.</p>	P-K and Lower Primary
2	<b>Numbers, Counting and Numeration</b>	<p><b>2.1</b> Count forwards and backwards to and from 1000 and skip-count to 100.</p> <p><b>2.2</b> Model, represent and understand numbers up to 999.</p> <p><b>2.3</b> Use informal fraction language in relation to objects and collection of objects.</p>	Lower/Middle Primary
	<b>Mental Computation and Estimation</b>	<p><b>2.1</b> Calculate mentally with numbers up to approximately 20.</p> <p><b>2.2</b> Use estimation strategies to assist counting and computations when dealing with numbers greater than 20.</p>	Lower Primary

	<b>Computation and Applying Number</b>	<p><b>2.1</b> Model addition and subtraction operations and use informal written methods based on place-value to solve these problems.</p> <p><b>2.2</b> Create and solve number sentences arising from number stories and situations which involve a single operation of addition, subtraction, multiplication or division.</p> <p><b>2.3</b> Read, write and interpret symbolic number sentences involving one operation.</p> <p><b>2.4</b> Read money amounts and deal with simple change situations.</p>	<b>Lower Primary</b>
	<b>Number Patterns and Relationships</b>	<p><b>2.1</b> Recognise patterns in the whole number system.</p> <p><b>2.2</b> Represent, identify and extend whole number patterns.</p> <p><b>2.3</b> Construct and complete simple statements of equality (equations).</p>	
<b>3</b>	<b>Numbers, Counting and Numeration</b>	<p><b>3.1</b> Recognise the structure of whole numbers up to 5 digits, including place value.</p> <p><b>3.2</b> Skip-count by numbers of increasing size.</p> <p><b>3.3</b> Represent, find, compare and order fractional parts of objects and collections of objects.</p> <p><b>3.4</b> Use decimal notation to represent and compare simple decimal fractions.</p>	<b>Middle Primary</b>
	<b>Mental Computation and Estimation</b>	<p><b>3.1</b> Recall or mentally determine basic multiplication and division facts.</p> <p><b>3.2</b> Use place-value ideas and the properties of numbers and operations to assist mental computation.</p> <p><b>3.3</b> Make estimates to check the reasonableness of the results of written computation and calculator use.</p>	

	<b>Computation and Applying Number</b>	<p><b>3.1</b> Use knowledge of place-value to solve and record solutions to addition, subtraction, multiplication and division problems.</p> <p><b>3.2</b> Select the appropriate operations and computation methods to solve problems involving whole numbers and money.</p> <p><b>3.3</b> State equivalence statements and addition and subtraction facts involving simple common fractions and carry out calculations involving tenths and hundredths.</p>	<b>Middle/ Upper Primary</b>
	<b>Number Patterns and Relationships</b>	<p><b>3.1</b> Use rules involving addition, subtraction and multiplication to describe, extend and test number patterns.</p> <p><b>3.2</b> Detect similarities and differences in the nature of the operations of addition, subtraction and multiplication.</p> <p><b>3.3</b> Construct and complete simple statements of equality involving whole numbers and fractions.</p>	
<b>4</b>	<b>Numbers, Counting and Numeration</b>	<p><b>4.1</b> Use place-value knowledge to read, write and order negative whole numbers and decimal numbers from thousandths to millions.</p> <p><b>4.2</b> Compare and order common fractions.</p> <p><b>4.3</b> Rename common fractions as decimals and percentages.</p>	<b>Upper Primary/ Lower Secondary</b>
	<b>Mental Computation and Estimation</b>	<p><b>4.1</b> Recall automatically basic multiplication and division facts, simple common fraction facts and frequently used common fraction, decimal and percentage equivalences.</p> <p><b>4.2</b> Use knowledge of place-value and number properties to increase the range of computations which can be carried out mentally.</p> <p><b>4.3</b> Use estimation strategies to check the results of written or calculator computations.</p>	
	<b>Computation and Applying Number</b>	<p><b>4.4</b> Analyse a problem situation which may involve several different operations, decimal numbers, negative whole numbers and common fractions; express the problem symbolically and choose appropriate computational methods to solve it.</p>	

	<b>Number Patterns and Relationships</b>	<p><b>4.1</b> Investigate number sequences which may involve fractions, decimals and combinations of operations, using a calculator where appropriate.</p> <p><b>4.2</b> Specify multiples and factors of whole numbers.</p> <p><b>4.3</b> Construct, verify and complete number sentences involving the four operations, brackets, decimal numbers and fractions.</p>	<b>Upper Primary/ Lower Secondary</b>
5	<b>Numbers, Counting and Numeration</b>	<p><b>5.1</b> Compare and order common and decimal fractions, percentages and ratios.</p> <p><b>5.2</b> Find prime factors and understand the use of whole-number powers and the square root sign.</p> <p><b>5.3</b> Compare and order negative numbers.</p>	
	<b>Mental Computation and Estimation</b>	<p><b>5.1</b> Extend the use of basic number facts to mentally compute operations on fractions and decimals, and square roots.</p> <p><b>5.2</b> Use properties of numbers to carry out mental computations involving whole numbers, decimals and common fractions.</p> <p><b>5.3</b> Use estimation strategies to check computations with fractions and decimals.</p>	
	<b>Computation and Applying Number</b>	<p><b>5.3</b> Carry out the four operations in cases where both positive and negative integers are involved.</p> <p><b>5.4</b> Select and use an appropriate sequence of operations and appropriate computation methods to solve problems.</p>	
6	<b>Numbers, Counting and Numeration</b>	<p><b>6.1</b> Move freely between the fraction, percentage and decimal forms of rational numbers.</p> <p><b>6.3</b> Interpret and use numbers written with integer powers.</p>	

	<b>Mental Computation and Estimation</b>	<p><b>6.1</b> Use automatic recall of decimal and percentage equivalents of common fractions and properties of numbers to mentally compute percentages of quantities.</p> <p><b>6.2</b> Use place-value and index notation to mentally compute powers of multiples of 10, roots and multiples of 100 and check the results of calculator computations.</p>	<b>Lower Secondary</b>
	<b>Computation and Applying Number</b>	<p><b>6.1</b> Use appropriate methods of computation to carry out the four operations on, and evaluate powers and roots of, common and decimal fractions and numbers expressed in index notation.</p> <p><b>6.2</b> Solve problems involving rates, ratios and percentages.</p>	

## Space

Level	Sub-strand	Learning Outcomes	Upfront title
1	Shape and space	<p><b>1.1</b> Recognise and name some simple shapes and objects and use everyday language to describe shape and function.</p> <p><b>1.4</b> Use shape and orientation to fit several simple shapes together by copying or by matching lines.</p> <p><b>1.5</b> Use and understand simple everyday location words to follow and give an oral direction.</p> <p><b>1.6</b> Follow short paths on simple drawings and modals.</p>	P-K and Lower Primary
2	Shape and space	<p><b>2.1</b> Identify, name and use common terms to describe features of simple shapes and objects.</p> <p><b>2.2</b> Compare and classify shapes and objects using simple spatial criteria.</p> <p><b>2.5</b> Describe and explain the effect of simple flips, slides and turns on shapes.</p> <p><b>2.6</b> Use shape, orientation and symmetry to complete simple pictures or patterns.</p>	
	Location	<p><b>2.1</b> Use and understand everyday location words to follow directions.</p> <p><b>2.2</b> Use <i>left</i> and <i>right</i> to describe the position of objects in relation to self.</p> <p><b>2.3</b> Locate and follow paths on simple maps, models and mazes.</p> <p><b>2.4</b> Locate key features when interpreting simple maps or models.</p>	
3	Shape and Space	<p><b>3.1</b> Recognise straight, curved, diagonal, horizontal and vertical lines, and angles as rotations of lines.</p> <p><b>3.2</b> Use simple conventional spatial language when describing shapes, parts of shapes, objects, parts of objects and simple cross-sections.</p>	Middle Primary



		<p><b>3.3</b> Compare the spatial properties of shapes and objects.</p> <p><b>3.4</b> Visualise and identify some of 'what is not seen' of simple objects.</p> <p><b>3.5</b> Interpret, recognise and name three-dimensional objects from drawings.</p> <p><b>3.6</b> Look at simple patterns involving translating, rotating and reflecting multiple copies of a shape and informally describe the transformations used.</p> <p><b>3.7</b> Identify symmetry in regular two-dimensional shapes.</p>	<b>Middle Primary</b>
	<b>Location</b>	<p><b>3.1</b> Use and understand conventional location language to follow and give directions and describe position.</p> <p><b>3.2</b> Visualise, find and compare alternative paths on simple maps, grids and mazes.</p> <p><b>3.3</b> Interpret and describe location and direction using grid references and cardinal compass points.</p> <p><b>3.4</b> Interpret and identify features when reading and making formal maps and plans.</p>	<b>Middle Primary</b>
<b>4</b>	<b>Shape and Space</b>	<p><b>4.1</b> Recognise parallel, perpendicular, horizontal and vertical lines, right angles, and angles greater than or less than 90 degrees (multiples of 45 degrees).</p> <p><b>4.2</b> Analyse and compare the spatial properties of lines, angles, polygons, polyhedra and cross-sections using conventional spatial terms.</p> <p><b>4.5</b> Visualise 'what is not seen' of an object.</p> <p><b>4.6</b> Visualise and describe transformations of shapes.</p>	<b>Upper Primary</b>

	<b>Location</b>	<p><b>4.1</b> Use and understand conventional location language including distance and direction.</p> <p><b>4.2</b> Use informal coordinate systems (positive numbers only) and intermediate compass points to specify location or give directions.</p> <p><b>4.3</b> Visualise and find paths to satisfy specifications on maps, grids and mazes.</p> <p><b>4.4</b> Interpret formal maps.</p> <p><b>4.5</b> Use a simple scale (for example, 1 centimetre for each metre) when interpreting and using maps and plans.</p>	<b>Upper Primary</b>
5	<b>Shape and Space</b>	<p><b>5.6</b> Use angle relations involving transversals and pairs of parallel lines to solve problems, giving a reason for the solution.</p> <p><b>5.7</b> Investigate and apply properties of regular and irregular polygons and circles.</p>	
	<b>Location</b>	<p><b>5.2</b> Use coordinates in 4 quadrants, grids and bearings to specify location of points.</p> <p><b>5.3</b> Use information on a map to specify and obtain distances, heights and directions.</p>	<b>Lower Secondary</b>
6	<b>Shape and Space</b>	<p><b>6.3</b> Analyse properties of selected polyhedra.</p> <p><b>6.5</b> Use congruence and similarity conditions for triangles to solve mathematical and practical problems.</p> <p><b>6.6</b> Establish and use the relationship between the number of sides and the sum of the interior angles of polygons, including regular polygons.</p> <p><b>6.7</b> Identify and use geometric terms and features relating to circles, such as diameter, radius, chord, tangent, arc, sector, segment.</p>	
	<b>Location</b>	<p><b>6.1</b> Visualise and describe paths of points that move subject to definite constraints.</p> <p><b>6.2</b> Investigate and describe the locus, that is the path of an object moving in two-dimensional and three-dimensional space.</p>	

## Measurement

Level	Sub-strand	Learning Outcomes	Upfront title
1		<p><b>1.1</b> Identify attributes of objects and describe those attributes in the everyday language of measurement.</p> <p><b>1.2</b> Estimate, measure and compare the size of objects using informal methods.</p> <p><b>1.3</b> Relate time to, and describe time in terms of, familiar recurring phenomena within own life.</p> <p><b>1.4</b> Relate the function of clocks to the telling of time.</p>	P-K and Lower Primary
2	<b>Measurement and Estimating</b>	<p><b>2.1</b> Choose and use the appropriate attribute when responding to measurement questions and select units of measure which relate well to the attribute.</p> <p><b>2.2</b> Use everyday language to describe and compare distances, mass, capacity and area.</p> <p><b>2.3</b> Make comparisons of the relative size of two or more objects.</p> <p><b>2.4</b> Use uniform informal units to estimate, measure, compare and order the sizes of objects.</p> <p><b>2.5</b> Measure objects by comparing to formal units and standard units of measurement.</p>	Lower Primary
	<b>Time</b>	<p><b>2.1</b> Order and sequence events with respect to the time of day or time of the year they usually occur.</p> <p><b>2.2</b> Tell the time using analogue and digital clocks and describe time elapsed (duration) in everyday language and common units of time.</p>	
	<b>Using Relationships</b>	<p><b>2.1</b> Describe and represent different attributes of objects and distinguish between these in measurement contexts.</p>	
3	<b>Measurement and Estimating</b>	<p><b>3.2</b> Measure and compare using appropriate informal units.</p> <p><b>3.4</b> Demonstrate understanding of the concept of angle.</p>	Middle Primary

	<b>Time</b>	<b>3.1</b> Estimate short and long periods of time, describe duration of time, and make and use timetables, schedules and calendars. <b>3.2</b> Tell the time using digital and analogue clocks.	<b>Middle Primary</b>
	<b>Using Relationships</b>	<b>3.1</b> Describe the relationship between attributes.	
<b>4</b>	<b>Measuring and Estimating</b>	<b>4.1</b> Choose attributes and standard units appropriate to the task. <b>4.2</b> Make judgements about the relative size of objects based on comparison to known benchmarks or standard units. <b>4.4</b> Read simple scales and measuring accurately to the nearest marked gradation, taking into account the degree of exactness required.	<b>Middle/ Upper Primary</b>
	<b>Time</b>	<b>4.1</b> Use timetables and analyse calendars. <b>4.2</b> Calculate time elapsed (duration). <b>4.3</b> Tell the time exactly using analogue clocks and digital clocks.	<b>Upper Primary</b>
	<b>Using Relationships</b>	<b>4.1</b> Compare the perimeter and area of regular and irregular polygons. <b>4.2</b> Investigate the relationship between area and perimeter and calculate the area of a polygon. <b>4.3</b> Investigate and compare the volume and mass of objects.	
<b>5</b>	<b>Measuring and Estimating</b>	<b>5.1</b> Recognise and select appropriate metric units and levels of accuracy for measuring quantities and rates.	
	<b>Time</b>	<b>5.1</b> Calculate time and duration of time.	<b>Upper Primary/ Lower Secondary</b>
	<b>Using Relationships</b>	<b>5.1</b> Obtain areas by counting squares in order to develop new rules for the area of regular shapes. <b>5.2</b>	<b>Upper Primary</b>

		Use rules to calculate perimeters of polygons and circles, areas of shapes based on triangles, rectangles and circles, and volumes and surface areas of rectangular prisms. <b>5.3</b> Calculate and use rates.	<b>Upper Primary/ Lower Secondary</b>
<b>6</b>	<b>Measuring and Estimating</b>	<b>6.1</b> Choose units, measurements and levels of accuracy appropriate to a measurement situation. <b>6.2</b> Use estimates where appropriate and judge the reasonableness of these estimates.	<b>Lower Secondary</b>
	<b>Time</b>	<b>6.1</b> Calculate time intervals.	
	<b>Using Relationships</b>	<b>6.1</b> Calculate using rates and interpret graphs involving rates. <b>6.2</b> Use length, area and volume relationships involving triangles, quadrilaterals, circles, prisms and pyramids. <b>6.3</b> Use similarity relationships and scale factors in and between figures. <b>6.4</b> Use trigonometry and Pythagoras' theorem.	

## Chance and Data

Level	Sub-strand	Learning Outcomes	Upfront title
1			
2			
	<b>Data (from measurement and data)</b>	<b>2.4</b> Describe and interpret data in lists and simple graphs.	<b>Lower/ Middle Primary</b>
3	<b>Interpreting Data</b>	<b>3.1</b> Extract specific information from data summarised in diagrams and tables. <b>3.2</b> Describe and interpret data displayed in simple scaled graphs.	<b>Middle Primary</b>
4	<b>Chance</b>	<b>4.1</b> Examine the outcomes from simple chance experiments and data on familiar events to order outcomes and events from least to most likely. <b>4.2</b> Use and interpret numerical statements which quantify chance.	<b>Upper Primary/ Lower Secondary</b>
	<b>Summarising and Presenting Data</b>	<b>4.3</b> Compare, order and summarise data sets using simple numerical methods.	<b>Lower Secondary</b>
	<b>Interpreting Data</b>	<b>4.1</b> Extract and interpret numerical information contained in tables, data displays and databases. <b>4.2</b> Interpret and compare data displays, including how well they communicate information.	
5	<b>Chance</b>	<b>5.1</b> Analyse experiments to determine the theoretical probability of events.	
	<b>Interpreting Data</b>	<b>5.1</b> Interpret and evaluate information contained in tables, visual displays and databases and report on methods of data collection. <b>5.2</b> Interpret simple measures of location and spread and then use them in comparisons. <b>5.3</b> Draw inferences from published data. <b>5.4</b> Make predictions on the basis of samples.	

6	<b>Chance</b>	<p><b>6.1</b> Estimate probabilities and proportions using published data and simulations.</p> <p><b>6.2</b> Analyse situations involving mutually exclusive, complementary and compound events and assign probabilities to those events.</p> <p><b>6.3</b> Assign and use odds and subjective probability.</p>	<b>Lower Secondary</b>
	<b>Interpreting Data</b>	<p><b>6.1</b> Interpret and evaluate information collected from published data.</p> <p><b>6.2</b> Evaluate procedures used in data collection.</p> <p><b>6.3</b> Make comparisons between two sets of data.</p>	

## Algebra

Level	Sub-strand	Learning Outcomes	Upfront title
1	-	-	
2	-	-	
3	-	-	
4	-	-	
5	<b>Expressing Generality</b>	<b>5.1</b> Develop, interpret and simplify mathematical expressions which describe rules for relationships and mensuration formulas. <b>5.2</b> Identify the equivalence or difference between simple algebraic expressions. <b>5.3</b> Construct and interpret rules for simple relationships between variables and between successive terms in sequences.	<b>Lower Secondary</b>
	<b>Equations and Inequalities</b>	<b>5.1</b> Develop linear and other simple equations and inequalities from information provided in a given context. <b>5.2</b> Make judgments about, and verify truth values for prepositions expressed as linear equalities and inequalities.	
	<b>Function</b>	<b>5.1</b> Use ordered pairs to locate and describe the positions of points on a Cartesian coordinate grid. <b>5.2</b> Interpret graphs of linear and other simple relationships. <b>5.3</b> Plot graphs of linear and other simple functions.	
6	<b>Expressing Generality</b>	<b>6.1</b> Use methods of algebraic manipulation to rearrange and simplify mathematical expressions and change the subject of a formula. <b>6.2</b> Use algebraic manipulation to demonstrate the equivalence (identity) or difference between various mathematical expressions over a specified domain.	



		<b>6.3</b> Construct and interpret rules for linear and simple quadratic relationships.	
	<b>Equations and Inequalities</b>	<b>6.2</b> Use algebraic and graphical techniques to find the solutions for linear and quadratic equations.	
	<b>Function</b>	<b>6.2</b> Interpret graphs of linear, quadratic and other simple functions.	

## Reasoning and Strategies

Level	Sub-strand	Learning Outcomes	Upfront title
1	-	<p><b>1.1</b> Recognise what is correct or incorrect and consistent or inconsistent in mathematical situations involving materials, objects, dialogue and, as appropriate, calculators, and correct any inconsistencies encountered.</p> <p><b>1.2</b> Make judgements based on simple criteria.</p> <p><b>1.3</b> Choose an appropriate activity to respond to mathematical question or represent a situation generated by adults and fellow students.</p>	P-K and Lower Primary
2	<b>Mathematical Reasoning</b>	<p><b>2.2</b> Make judgements based on simple criteria.</p>	
	<b>Strategies for Investigation</b>	<p><b>2.1</b> Ask and respond to questions which clarify the essential nature of a story, task or problem and identify key information in familiar situations.</p> <p><b>2.2</b> Use simple strategies to explore tasks and solve problems.</p>	
3	<b>Mathematical Reasoning</b>	<p><b>3.1</b> Make and test simple conjectures.</p> <p><b>3.2</b> Make judgements about the accuracy of reasoning and results.</p>	Middle Primary
	<b>Strategies for Investigation</b>	<p><b>3.1</b> Generate mathematical questions from presented data and from familiar contexts.</p> <p><b>3.2</b> Clarify the essential nature of a task or problem and identify key information in familiar situations.</p> <p><b>3.3</b> Use familiar representations, processes and concepts to explore unfamiliar tasks and problems.</p> <p><b>3.4</b> Uses the guess-check-improve process in appropriate contexts.</p>	
4	<b>Mathematical Reasoning</b>	<p><b>4.1</b> Make and test simple conjectures in each mathematics strand.</p> <p><b>4.2</b></p>	Upper Primary

		<p>Make judgements about the accuracy of reasoning and results and modify working accordingly.</p> <p><b>4.3</b> Use and interpret simple mathematical models.</p>	
	<b>Strategies for Investigation</b>	<p><b>4.1</b> Generate mathematical questions from presented data and from familiar contexts.</p> <p><b>4.2</b> Clarify the essential nature of a task or problem and identify key information in the context under consideration.</p> <p><b>4.3</b> Use a range of strategies for inquiry when responding to tasks and problems.</p> <p><b>4.4</b> Communicate own responses to tasks and problems appropriate for this level to others.</p>	<b>Upper Primary/ Lower Secondary</b>
<b>5</b>	<b>Mathematical Reasoning</b>	<p><b>5.1</b> Make, test and modify conjectures.</p> <p><b>5.2</b> Make judgments about the quality of the reasoning in a mathematical argument expressed verbally or in symbolic form.</p> <p><b>5.3</b> Use and interpret simple mathematical models and make judgments about the accuracy and suitability of the results obtained by using mathematical models.</p>	
	<b>Strategies for Investigation</b>	<p><b>5.1</b> Generate mathematical questions for inquiry from presented data, familiar contexts and the experience gained from inquiries in relation to previous tasks and problems.</p> <p><b>5.2</b> Clarify the essential nature of a task or problem and identify key information in familiar and unfamiliar situations.</p> <p><b>5.3</b> Apply a range of strategies for inquiry to complete tasks and solve problems.</p> <p><b>5.4</b> Communicates own responses to tasks and problems appropriate for this level to others.</p>	<b>Lower Secondary</b>
<b>6</b>	<b>Mathematical Reasoning</b>	<p><b>6.1</b> Formulate and test conjectures and generalisations.</p> <p><b>6.2</b> Interpret and make judgments about the quality of the reasoning in a mathematical argument expressed verbally or in symbolic form.</p>	

		<b>6.3</b> Make judgments about the accuracy and suitability of the result obtained by using a mathematical model.	
	<b>Strategies for Investigation</b>	<b>6.1</b> Choose and use a range of strategies for inquiry when responding to tasks and problems. <b>6.2</b> Communicate own responses to tasks and problems appropriate for this level to others.	<b>Lower Secondary</b>

## Western Australia Number Strand

	Upfronttitle	Understand Numbers		Understand Operations	Calculate	Reason About Number Patterns
<b>Level 1</b>	P-K	Reads and writes small whole numbers, using them to say how many things there are, makes collections of a given size, and describes order.		Visualises partitions of small number.	Uses counting and other strategies to mentally solve questions from stories involving small numbers.	Copies and continues repeating and counting patterns and uses numbers to represent these patterns.
<b>Level 2</b>	Lower Primary	(a) Reads, writes and counts with whole numbers to beyond 100, using them to compare collection sizes and describe order.	(b) Understands the meaning of <i>half</i> and <i>quarter</i> , splitting quantities into <i>fair</i> shares and partitioning quantities repeatedly into halves.	Understands the meaning and connections between counting, number partitions, addition and subtraction and uses this understanding to represent situations involving all four basic operations.	Counts, partitions and regroups in order to add and subtract 1- and 2-digit numbers, drawing mostly on mental strategies for 1-digit numbers and a calculator for numbers beyond their present scope.	Recognises, continues and represents patterns involving counting, grouping and constant addition or subtraction of whole numbers.
<b>Level 3</b>	Middle Primary	(a) Reads, writes and counts with and compares whole numbers into the thousands, money and familiar measurements.	(b) Reads and understands the meaning of unit fractions, flexibly partitioning and rearranging quantities to show equal parts.	Understands the meaning, use and connections between the four operations on whole numbers, and uses this understanding to choose appropriate operations and construct and complete simple equivalent statements.	Adds and subtracts whole numbers and amounts of money and multiplies and divides by 1-digit whole numbers, drawing mostly on mental strategies for doubling, halving, adding to 100, and additions and subtractions readily derived from basic facts.	Recognises, identifies and uses patterns involving operation on whole numbers, and follows and identifies rules for how terms in a sequence can be linked by multiplication or an addition- or subtraction-based strategy.

<b>Level</b>  <b>4</b>	<b>Upper Primary</b>	(a) Reads, writes and counts with and compares whole numbers into the millions and decimals (equal number of places).	(b) Reads, writes and understands the meaning of fractions and for readily visualised fractions, shows equivalence between them.	Understands the meaning, use and connections between the four operations on whole and decimal numbers, and uses this understanding to choose appropriate operations (whole multipliers and divisors) and constructs and completes equivalent statements.	Calculates with whole numbers, money and measures (at least multipliers and divisors to 10), drawing mostly on mental strategies to add and subtract 2-digit numbers and for multiplications and divisions related to basic facts.	Recognises, identifies and uses patterns involving operations on whole and fractional numbers, and follows and identifies rules for how successive terms in a sequence or paired quantities can be linked by a single operation.
<b>Level</b>  <b>5</b>	<b>Lower Secondary</b>	(a) Reads, writes, says and understands the meaning, order and relative magnitude of whole and decimal numbers and negative integers.	(b) Reads, writes and understands the meaning, order and relative magnitude of any fractions, straightforward ratios and percentages, and knows the more common equivalences between them.	Understands the meaning, use and connections between the four operations on whole, decimal and fractional numbers, and uses this understanding to choose appropriate operations, including where fractional multipliers and divisors are required.	Calculates with whole numbers, decimals and fractions (well-known equivalences, whole number multipliers and divisors), drawing mostly on mental strategies for whole numbers, money and readily visualised fractions.	Recognises, identifies and uses number patterns involving one or two operations, and follows, compares rules for linking successive terms in a sequence or paired quantities using one or two operations.
<b>Level</b>  <b>6</b>		Reads, writes, says and understands the meaning and relative magnitude of positive and negative rational numbers and numbers expressed with integer powers.	Uses ratios and rates to describe the relationship between two quantities and finds one quantity from another in situations where familiarity with the context helps understand the ration or rate.	Calculates with positive and negative numbers, decimals, fractions and integer powers, using mostly mental strategies including for frequently used fractions and percentages of amounts.	Identifies number patterns which are linear, square or involve a power of a whole number.	

## Algebra

	Upfront title	Understand Symbols	Understand Graphs	Represent Variation	Solve Equations and Inequalities
Level 1		-	-	-	-
Level 2		-	-	-	-
Level 3		-	-	-	-

<b>Level</b> <b>4</b>		-	-	-	-
<b>Level</b> <b>5</b>	<b>Lower Secondary</b>	Uses a letter to represent a variable quantity in a written expression involving one or two operations.	Plots data in first-quadrant coordinate graphs, describing patterns in the resulting scatter of points.	Interprets graphs which describe the relationship between two quantities in everyday situations.	Generates number pairs which satisfy a single constraint which is stated in natural language.
<b>Level</b> <b>6</b>		Uses and interprets basic algebraic conventions for representing situations involving a variable quantity.	Plots and interprets graphs, considering points, interval lengths, increases and decreases over an interval, and slope.	Recognises at least linear and square relationships in tables, symbols and graphs.	Sets up equations to represent one constraint in a situation, solves equations of the form: $ax^2 + b = c$ and solves linear equations.



## Chance and Data

	Upfront title	Understand Chance	Collect and Organise Data	Summarise and Represent Data	Interpret Data
<b>Level 1</b>	Lower Primary		Participates in classifying and sequencing objects and pictures.	Displays objects and pictures and describes data in words and numbers.	Attention should be directed toward Level 2.
<b>Level 2</b>	Lower Primary			Displays and summarises data based on one-to-one correspondences between data and representation.	Describes what displays of data show.
<b>Level 3</b>	Middle Primary		Classifies, sequences and tabulates data in order to answer questions.	Summarises data using frequencies, measurements and many-to-one correspondences between data and representation.	Reads and makes sensible statements about the information provided in tallies and in simple tables, diagrams, pictographs and bar graphs.

<b>Level</b>  <b>4</b>	<b>Upper Primary</b>		Classifies, sequences and tabulates data in order to answer questions.	Summarises data with simple fractions, highest, lowest and middle scores; and means.	Reads and makes sensible statements about the information provided in tables, diagrams, line and bar graphs, fraction and means.
<b>Level</b>  <b>5</b>	<b>Lower Secondary</b>	Interprets and makes numerical statements of probability based on lists of equally likely outcomes and using fractions and percentages.	Classifies, sequences and tabulates data in order to answer questions.	Summarises data with fractions, percentages, means and medians.	Reads and makes sensible statements about trends and patterns in the data in tables, diagrams, plots, graphs and summary statistics.
<b>Level</b>  <b>6</b>		Estimates probabilities and proportions based on primary or secondary data collection and assigns probabilities for one- and two-stage events by reasoning about equally likely outcomes.	Classifies, sequences and tabulates data in order to answer questions.	Summarises data to show location and variability (including when some grouping of data is required) in order to compare data sets and to show relationships in one data set.	Interprets, makes comparisons and describes relationships in collected and published data from tables, diagrams, plots and graphs.

## Measurement

	Upfront title	Understand Units	Direct Measure	Estimate	Indirect Measure
<b>Level 1</b>	<b>P-K</b>	Understands everyday comparative language associated with length, mass, capacity and time.	Directly compares and orders 'straight' lengths and events in time and counts informal units of length, capacity, area, mass and time to decide 'how many fit or match'.	Makes non-numerical estimates of size involving everyday movements and actions.	Attention should be directed toward Level 3.
<b>Level 2</b>	<b>Lower Primary</b>	Distinguishes the attributes of length, area, capacity and mass when comparing things and chooses things which relate well to the attribute of interest to use as units.	Directly compares and orders things by length, area, capacity, mass and time; indirectly compares lengths and capacities; and uses uniform units carefully to measure lengths.	Estimates the order of things by length, area, mass and capacity and makes numerical estimates of length using a unit that can be seen or handled.	Attention should be directed toward Level 3.
<b>Level 3</b>	<b>Middle Primary</b>	Realises that using a uniform unit repeatedly to match an object gives a measure of the size of the object, and chooses suitable and uniform things to use as units and a common unit to compare two things.	Directly and indirectly compares and orders things by length, area, capacity, mass, time and angle, measures them by counting uniform units and uses standard scales to measure length and time.	Makes sensible numerical estimates using units that can be seen or handled and uses language such as 'between' to describe estimates.	(a) Understands perimeter and uses straightforward arithmetic to determine perimeters, elapsed time and other measurements which cannot be obtained directly.

<b>Level</b>  <b>4</b>	<b>Upper Primary</b>	Selects appropriate attributes, distinguishes perimeter from area and time from elapsed time, and chooses unit of a sensible size for the descriptions and comparisons to be made.	Measures area by counting uniform units including where part-units are required, and measures length, mass, capacity, time and angle, reading whole number scales.		(a) Understands relationships involving the perimeter of polygons, the area of regions based on squares and the volume of prisms based on cubes, and uses these for practical purposes.	
<b>Level</b>  <b>5</b>	<b>Lower Secondary</b>	Takes purpose and practicality into account when selecting attributes, units and instruments for measuring things and uses the relationship between metric prefixes to move between units.	Uses a range of whole number and decimal scales for measuring, including making measurements that are more accurate than the available scales allow.	Makes sensible estimates of length, area, mass, capacity and time in standard units and identifies unreasonable estimates of things.	(a) Understands and applies directly length, area and volume relationships for shapes based on rectangles and rectangular prisms.	(b) Understands and uses scale factors and the effect of scaling linear dimensions on length, areas and volumes of figures and objects produced on grids and with cubes.
<b>Level</b>  <b>6</b>		Decides what measurements are needed in order to complete a practical task and ensures that units used are consistent with each other and any formula used.		Estimates in situations in which it is sensible to do so (including where direct measurement is impossible or impractical), and judges whether estimates and measurements are reasonable.	(a) Understands and applies directly length, area and volume relationships for polygons and circles, prisms and pyramids.	(b) Understands and uses similarity and Pythagoras' theorem to solve problems involving triangles and scale drawing.

## Space

	Upfront title	Represent Location	Represent Shape	Represent Transformations	Reason Geometrically
<b>Level 1</b>	P-K	Uses and interprets familiar everyday language for the position of things, their movements, and paths between them.			
<b>Level 2</b>	Lower Primary	Attends to order and betweenness on informal maps and in descriptions of locations and paths.			Sorts things according to everyday spatial criteria.
<b>Level 3</b>	Middle Primary	Understands a map or plan as a 'bird's-eye view' and uses order proximity and directional language associated with quarter and half turns on maps and in descriptions of locations and paths.	Attends to the shape and placement of parts when matching things, including matching 3D models which can be seen and handled with conventional drawings of them and with their nets.	Recognises repetitions of the same shape within arrangements and patterns.	Interprets common spatial language and uses it to describe and compare features of things.

<b>Level</b>  <b>4</b>	<b>Upper Primary</b>	Uses distance, direction and grids on maps and plans and in descriptions of locations and paths.		Attends to the shape, size and placement of parts when matching, things, including identifying nets of 3D models.	Recognises rotations, reflections and translations in arrangements and patterns.	Selects and compares figures and objects on the basis of spatial features, using conventional geometric criteria.
<b>Level</b>  <b>5</b>	<b>Lower Secondary</b>	(a) Uses coordinates, bearings and scale on maps and plans and in descriptions of locations and paths.	(b) Identifies the essential features of a location.		Visualises the effect of straightforward translations, reflections and rotations of figures and objects.	Analyses, identifies and applies distinguishing features of common classes of mathematical figures and objects, including using the concepts of parallelism and perpendicularity.
<b>Level</b>  <b>6</b>		(a) Visualises, and describes paths and regions which satisfy provided conditions.			Visualises the effect of straightforward translations, reflections and rotations of figures and objects.	Analyses, identifies and applies properties of, and relationships between, the classes of figures which can be reasoned about in terms of the properties of triangles and parallel and intersecting lines.

## New Zealand Number Strand

	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>
<b>Upfront title</b>	<b>P-K</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<b>Exploring  number</b>	<p>Students should be:</p> <ul style="list-style-type: none"> <li>Developing numeral recognition.</li> <li>Counting, ordering, and comparing numbers up to 5 (and later up to 9), and then up to 20).</li> <li>Making and talking about sets up to 5 (and later up to 9, and then up to 20).</li> <li>Exploring the number system from zero to 99 and beyond.</li> <li>Rote counting to 99 and counting forwards and backwards to and from 99 in 1s, 2s, 5s, and 10s.</li> <li>Exploring the idea of place value through comparing number patterns in 10s.</li> <li>Exploring the</li> </ul>	<p>Students should be:</p> <ul style="list-style-type: none"> <li>Counting, recording, ordering, and comparing numbers.</li> <li>Investigating number patterns with and without the aid of a calculator.</li> <li>Exploring the number system from 0 to 1000 and beyond.</li> <li>Exploring place value.</li> <li>Investigating odd and even numbers.</li> <li>Investigating ways to rename numbers. Eg <math>167 = 100 + 60 + 7</math></li> <li>Exploring number patterns showing multiples.</li> <li>Exploring fractions (halves, quarters, thirds, fifths).</li> </ul>	<p>Students should be:</p> <ul style="list-style-type: none"> <li>Extending their understanding of the number system.</li> <li>Exploring the use of fractions and decimals in society.</li> <li>Developing meaning for decimal place values.</li> <li>Saying decimals.</li> <li>Writing decimals in words and symbols.</li> <li>Comparing and ordering decimals.</li> <li>Exploring number patterns which involve both whole number and decimals.</li> <li>Investigating possible ways of renaming numbers using decimals.</li> </ul>	<p>Students should be:</p> <ul style="list-style-type: none"> <li>Extending their understanding of the number system.</li> <li>Exploring factors of numbers by investigating rectangular (composite) numbers and line (prime) numbers.</li> <li>Exploring equivalent fractions.</li> <li>Exploring a variety of number patterns, including powers and roots.</li> <li>Relating fractions to decimals.</li> <li>Talking about the use of percentage in everyday contexts.</li> <li>Saying decimals as percentages.</li> <li>Investigating contexts for negative numbers.</li> <li>Investigating the results of multiplying</li> </ul>	<p>Students should be:</p> <ul style="list-style-type: none"> <li>Expressing numbers in index form.</li> <li>Exploring the use of standard form in practical contexts.</li> <li>Converting numbers from ordinary form to standard form, and vice versa.</li> <li>Exploring the use of ratio in everyday contexts.</li> <li>Developing meaning for ratio by comparing two like quantities.</li> <li>Investigating equivalent ratios.</li> <li>Recording ratios as a/b and a:b.</li> </ul>

	<p>meaning of digits in any 2-digit whole number.</p> <p>Exploring the idea of a fraction.</p> <p>Finding halves and quarters of everyday objects, common shapes, and sets of objects, using practical methods.</p>			<p>and dividing decimals by powers of 10</p>	
<p><b>Exploring computation</b></p>	<p>Students should be:</p> <p>Developing number sense by exploring estimation and computation.</p> <p>Joining 2 or more sets with a combined total of up to 9, and later 20.</p> <p>Separating a set of up to 9 objects (later up to 20 objects) into two or more parts.</p> <p>Recording number stories about objects and sequence pictures.</p> <p>Developing mental strategies for adding numbers of objects up to a total of 9 and later 20.</p> <p>Developing mental strategies for subtracting numbers</p>	<p>Students should be:</p> <p>Exploring estimation and computation.</p> <p>Working with numbers 0 to 1000 and beyond.</p> <p>Performing additions and subtractions.</p> <p>Investigating the special properties of 0, under addition and subtraction, and of 1, under multiplication and division.</p> <p>Devising strategies to help the memorising of the addition, subtraction, multiplication, and division facts.</p> <p>Developing instant recall of basic addition and subtraction facts through a programme of regular maintenance.</p> <p>Devising and refining strategies for estimating and checking the</p>	<p>Students should be:</p> <p>Developing a number and computation sense by exploring estimation and computation.</p> <p>Maintaining addition and subtraction facts.</p> <p>Demonstrating the instant recall of basic multiplication facts.</p> <p>Working with whole numbers and decimals.</p> <p>Using a calculator and mental methods to add or subtract numbers.</p> <p>Making sensible estimates.</p> <p>Solving story problems involving one or more of the four arithmetic operations.</p> <p>Using calculators, concrete materials, and mental methods to find fractions of whole numbers and decimal amounts</p>	<p>Students should be:</p> <p>Developing their number and computation sense by exploring estimation and computation.</p> <p>Maintaining basic facts.</p> <p>Using money and measurements to explore sensible rounding techniques.</p> <p>Exploring the outcomes of multiplication and division, using decimals.</p> <p>Devising and using strategies for estimating the results of computations involving decimals.</p> <p>Solving problems involving the multiplication and</p>	<p>Students should be:</p> <p>Developing their number and computation sense by exploring estimation and computation.</p> <p>Making sensible estimates.</p> <p>Exploring and using rounding techniques, including significant figure and decimal place rounding.</p> <p>Developing mental strategies for adding, subtracting, multiplying, and dividing positive and negative numbers.</p> <p>Solving problems involving positive and negative numbers.</p> <p>Finding percentages of quantities, and one quantity as a percentage of another.</p> <p>Increasing and</p>



	<p>of objects from up to 20. Making sensible estimates.</p>	<p>reasonableness of addition, subtraction, multiplication, and division calculations. Devising and extending mental strategies for addition, subtraction, multiplication, and division. Solving comparison problems (how many more than or less than) in a story context. Adding and subtracting money or measurements. Exploring division as sharing. Using concrete materials to develop the meaning of multiplication as repeated addition, and division as repeated subtraction. Developing recall of multiplication facts through a programme of regular maintenance. Writing and solving story problems (including those involving money and measurements) which involve combinations of the 4 operations. Recognising that taking a fraction of a set is a sharing (dividing) operation.</p>	<p>(including money and measurements).</p>	<p>division of decimals. Finding percentages of quantities. Exploring and establishing conventions for order of operations.</p>	<p>decreasing quantities by given percentages. Investigating profit and loss related to cost price and selling price. Sharing quantities in given ratios. Developing and using strategies for adding and subtracting fractions.</p>
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## Measurement Strand

	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>
<b>Upfront title</b>	<b>P-K</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<b>Estimating and measuring</b>	<p>Students should be: Exploring how measurements are made in a variety of cultural situations, and experiencing situations where values are put on measured quantities. Investigating length, mass, volume, temperature, and money, and making comparisons, using appropriate language. Estimating and measuring with non-standard units to find length, area, mass, and volume. Using a variety of measures in everyday situations.</p>	<p>Students should be: Learning about a variety of measuring devices and units by talking with others. Investigating the uses of measurement. Exploring the representation of qualitative data, such as feelings and opinions, on a simple scale. Comparing the representation of qualitative data, such as feelings and opinions, on a simple scale. Solving measurement problems involving length, mass, and volume (capacity), in context, by estimating measurements, and counting with non-standard units and metric units (metre, centimetre, kilogram, gram, litre, and millilitre). Solving measurement problems involving length, mass, and volume (capacity), in context, by estimating measurements, and counting with non-</p>	<p>Students should be: Comparing the uses of measurement in different families, cultures, societies, and eras. Exploring timetables and charts, and discussing the use of electronic measuring devices. Measuring qualitative data using a simple scale. Developing an understanding of measurement and solving measurement problems. Estimating measurements and using units of length, mass, and volume and checking by reading scales. Developing an understanding of length, mass, and volume for everyday situations.</p>	<p>Students should be: Exploring the uses of measurement in work, sport, at home, and in leisure, and discussing the need for measurement in our world. Developing an understanding of measurement and solving measurement problems in context. Exploring the approximate nature of measurement, and the need for rounding to give sensible results. Estimating and selecting appropriate units for measurement tasks involving length, mass, volume, time, area, and temperature. Exploring the relationship between perimeter and area for figures such as rectangles, and exploring the</p>	<p>Students should be: Investigating measurement within areas of interest and exploring the use of a range of measuring devices and scales. Exploring the use of 2-dimensional scales to measure qualitative data such as attitudes, feelings, opinions, and behaviours, and discussing the limitations of this form of measurement. Developing the understanding needed to be able to solve measurement problems in context. Consolidating the concepts of area, volume, and mass. Further exploring the equivalence of units. Solving problems in practical contexts involving irregular and composite areas and</p>

		<p>standard units and metric units (metre, centimetre, kilogram, gram, litre, and millilitre).</p> <p>Solving measurement problems involving area and volume, in context, by estimating and counting with non-standard units (regular and irregular shapes).</p> <p>Developing an understanding of the size of a metre, kilogram, and litre by working with these measurements in a variety of contexts.</p> <p>Reading scales</p> <p>Solving problems in context, and naming upper and lower values for estimates.</p> <p>Investigating shopping problems and prices, including giving change in shopping.</p>	<p>Exploring, estimating, and checking units for area and temperature.</p> <p>Using calculations in practical tasks, including mixing and interchanging units.</p> <p>Describing the result of a measurement task as coming between a lower and an upper value.</p>	<p>relationship between the circumference and the diameter of a circle.</p> <p>Consolidating an understanding of the concepts of area and volume, and using hectare and cubic metre.</p> <p>Investigating the areas of squares, leading to squaring and finding square roots.</p> <p>Understanding equivalence of units.</p> <p>Recording measurements and making conversions between units within the metric system, using decimals and calculators where appropriate.</p> <p>Constructing and using timetables and charts, and exploring the use of measuring devices which use newer technologies.</p> <p>Interpreting diagrams involving the reading of scales, maps, plans, and so on.</p> <p>Measuring qualitative data, and discussing the limitations of this form of</p>	<p>volumes, and using appropriate models and naming upper and lower limits for the results.</p> <p>Using investigation to develop formulae for perimeters and areas and volumes.</p> <p>Finding <math>\pi</math> as the ratio of the circumference to the diameter of a circle; and discovering that shapes with a given perimeter do not necessarily enclose the same area, and vice versa.</p> <p>Designing and using scale representations of everyday situations.</p>
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<p><b>Developing concepts of time, rate, and change</b></p>	<p>Students should be: Exploring time, eg using a calendar, and using the language of time, growth, change, and speed.</p>	<p>Students should be: Making and using unconventional instruments to measure time. Estimating time intervals and working with units of time, including telling time on digital and analogue clocks. Exploring ideas of growth, speed, and change.</p>	<p>Students should be: Using analogue and digital clocks to measure time, converting between analogue and digital expressions of time, and using seconds in practical contexts. Exploring and comparing change.</p>	<p>measurement. Students should be: Reading and interpreting a 24-hour clock, and discussing the differences between 12-hour and 24-hour time and the reasons for using 24-hour time. Exploring concepts of change, including the use of units.</p>	<p>Students should be: Using techniques such as graphing and averaging to explore rates of change.</p>
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## Geometry Strand

	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>
<b>Upfront title</b>	<b>P-K</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<b>Exploring shape and space</b>	<p>Students should be: Exploring a variety of shapes and objects by touching, observing, and talking about them. Sorting, classifying and comparing shapes and objects, using words such as: curved/straight, smooth/rough, etc, and colour names. Making objects from everyday junk materials and then talking about the shapes used in the construction. Exploring objects which stack, pack, and roll. Locating objects and people in space, using words like on, beside, underneath, etc. Exploring the construction of simple everyday packages. Describing the changing appearances</p>	<p>Students should be: Making, talking about, and classifying shapes and objects from their own and other cultures. Exploring tangrams. Exploring common cardboard boxes and packages and the nets used to make them. Describing the features of objects which have been felt but not seen. Describing the changing appearances of objects when viewed from different places. Describing the shape of the cross-section when objects are sliced. Giving and following directions</p>	<p>Students should be: Making simple shapes and objects found in their environment. Making models of objects and scenes represented in photographs and drawings. Drawing pictures of simple geometric objects. Talking about simple shapes and objects, using the language of geometry – sides, edges, faces, triangle, rectangle, right angle, parallel, radius. Exploring tangrams. Designing simple containers to hold sets of objects such as beans. Predicting and checking the shapes of different cross-sections through everyday objects. Giving and following</p>	<p>Students should be: Designing shapes comprising circles, rectangles, triangles, and other polygons, and talking about shapes they make using the language of geometry. Drawing solids viewed from different positions by first sketching, then using isometric paper, and later squared paper. Building solids from diagrams which show views from the top, front, back, and side. Investigating the construction and use of packaging and containers in the commercial world (tessellating end faces). Estimating, measuring, and drawing angles, including vertically opposite angles, adjacent angles on a straight line, and angles at a point, using a</p>	<p>Students should be: Exploring the relationships between geometry and a range of art forms. Exploring paper folding and the use of drawing instruments to construct parallel and perpendicular lines, tangents to a circle, using the radius to the point of contact, angle bisectors, mediators, specified angles, and finding centres of circles. Exploring, talking about, and making the shapes around them. Investigating, and applying in practical contexts, Pythagoras' Theorem, and the angle-in-the-semicircle property. Exploring the properties of polygons, including the relationships between the number of sides of regular and irregular polygons and the sum of the interior and exterior angles. Exploring the relationships between angles when two or</p>

	of shapes and objects when viewed from different places.	using “clockwise”, “anticlockwise”, “left”, and “right”. Drawing and reading maps by making use of the four points of the compass. Describing paths found in the environment, eg the flight path of balls thrown in the air.	instructions to follow shortest/longest paths between positions. Drawing and interpreting simple scale maps. Exploring the idea of locus.	protractor and Logo. Constructing polygons to given specifications. Using a compass to indicate directions (orienteeing, weather directions). Exploring and using a variety of 2-dimensional grids to specify location. Investigating different pathways, including the shortest path between two locations on a map. Drawing loci, including the flight path of balls, the locus of points which are fixed distance from a given point (circle), a given straight line (a parallel line), and a circle (a concentric circle).	more parallel lines are cut by another line. Further exploring the concept of “locus”. Making skeleton models of 3-dimensiional objects in order to identify the internal right-angled triangles. Drawing 3-dimensional objects, using isometric or squared paper.
<b>Exploring symmetry and transformations</b>	Students should be: Experiencing and exploring rolling, spinning, twisting, and turning (quarter and half turns). Designing and talking about patterns which involve transformations: reflecting, rotating, translating, and enlarging. Exploring ways of	Students should be: Exploring and recording the results of reflecting and rotating (clockwise and anticlockwise). Exploring and creating geometrical patterns involving translation, reflection, and rotational symmetry. Exploring ways of covering surfaces	Students should be: Using mirrors and cutting out shapes defined by creases in folded paper to explore reflection and rotational symmetry. Designing patterns which involve translation, reflection, or rotation. Tessellating quadrilaterals, triangles and regular polygons.	Students should be: Describing the symmetry (reflection and rotational) in patterns, objects, and designs. Exploring the three regular, and the eight semi-regular, tessellation constructed from regular polygons. Investigating the geometry of distortion, using a variety of grids. Investigating properties	Students should be: Finding, in practical contexts, the scale factors for similar objects in 2 dimensions and 3 dimensions, and calculating unknown measurements. Enlarging and reducing simple shapes, given the centre of enlargement and scale factor in 2 and 3 dimensions, and exploring the relationship between the scale factors for length, area, and volume.

	<p>fitting shapes together to cover surfaces (tessellating).          Making and talking about pairs of objects, where one is an enlargement of the other.</p>	<p>with regular shapes (tessellating).          Exploring enlargement of shapes and objects using the overhead projector and by making models.</p>	<p>Enlarging or reducing shapes on grid paper, and objects made from cubes, to a specified scale.</p>	<p>of shapes and objects that are not changed by enlargement.</p>	<p>Investigating applications of rotation.          Investigating mathematical descriptions of transformations.          Identifying all the properties of a figure that do and do not change under standard transformations.          Exploring transformations of shapes on non-square grids.</p>
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## Algebra

	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>
<b>Upfront title</b>	<b>P-K</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<b>Exploring patterns and relationships</b>	<p>Students should be: Exploring repeating and sequential patterns by making and discussing them, using calculators to generate them, looking at how they continue, and predicting new terms. Illustrating and talking about relationships, using pictures, arrows, and other methods.</p>	<p>Students should be: Exploring, creating, describing and continuing spatial and numerical sequential patterns, using calculators where appropriate, and developing the idea that some patterns continue without end. Using a variety of diagrams to show relationships, drawn from familiar situations. Talking about and acting out ideas represented in their own and other graphs.</p>	<p>Students should be: Investigating, creating, and continuing number and spatial sequential patterns, including figurate numbers, and expressing in words the rules which describe such patterns, using a calculator where appropriate. Developing an understanding of relations and representing and interpreting them. Using diagrams to show relationships. Describing the rule for one- and two-stage “guess my rule” games, and graphing input and output pairs on a number plane, using a calculator where appropriate. Sketching, interpreting, and writing stories about graphs of familiar situations.</p>	<p>Students should be: Finding, and continuing, linear number patterns from practical contexts and finding and justifying the rules which describe them. Developing an understanding of relations and representing and interpreting them. Sketching graphs which represent familiar situations. Interpreting a relationship illustrated by points on a graph. Representing a relationship by a point on a graph. Writing stories and talking about graphs representing familiar situations. Generating and graphing sequences</p>	<p>Students should be: Developing an understanding of relations, and representing and interpreting them. Interpreting relationships illustrated by points on a graph and representing such relationships in other ways. Sketching and interpreting graphs which represent everyday situations. Using rules given in words, symbols, flow charts, or graphs. Generating, in practical contexts, linear, quadratic, and other patterns, and finding and justifying the graphs and rules which describe them. Generating sequences from rules expressed in words and algebraically. Investigating practical</p>



				from rules expressed in a variety of ways. Developing strategies for finding rules for linear patterns arising in practical contexts, and using symbols to express these rules.	situations that are approximated by linear functions, and investigating the interpretation of the slope and intercept of lines drawn from practical contexts.
<b>Exploring equations and expressions</b>	Students should be: Exploring the different ways to show the same number. Telling number stories involving equals, less than, and greater than; writing and explaining number sentences using =, <, >; and using calculators and concrete material to make statements involving = and the operations.	Students should be: Writing and talking about number sentences using =, <, >. Using calculators and concrete materials to make statements involving = and the 4 operations, and emphasising that these are alternative ways of expressing the same number. Exploring the special properties of zero in the context of addition, and 1 in the context of multiplication.	Students should be: Finding, and explaining in words, simple formulae that can be used to solve a practical problem. Creating and using rules for “think of a number” games, and solving number sentences. Distinguishing between finite and infinite.	Students should be: Using, creating, and describing formulae derived from practical contexts, using words and symbols. Solving number puzzles with whole number solutions which can be represented by simple linear equations.	Students should be: Talking about the different ways rules can be expressed. Using algebraic expressions to generalise from numerical instances arising in a practical context and expressing it in algebraic terms. Developing an ability to solve equations in a problem context. Developing confidence in re-arranging and simplifying algebraic expression.

## Statistics

	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>
<b>Upfront title</b>	<b>P-K</b>	<b>Lower Primary</b>	<b>Middle Primary</b>	<b>Upper Primary</b>	<b>Lower Secondary</b>
<b>Statistical investigations</b>	Students should be: Working with category variables.	Students should be: Working with objects or whole number variables. Using conventional displays such as pictographs, block graphs, bar graphs, stem-and-leaf graphs, and tally charts.	Students should be: Using data presented in a variety of ways, including strip graphs, dot plots, bar graphs, stem-and-leaf graphs, and tally charts. Considering the features of displays of number data, including the overall shape of the data distribution, clusters, middle, and spread. Organising measurement data to the nearest whole number, using informal approaches and displaying such data.	Students should be: Using discrete data in a variety of ways and presenting data displays which compare data. Organising measurement data into classes.	Students should be: Classifying data, including using published data. Matching appropriate displays to data type. Using data presented in a variety of appropriate ways, including picture graphs, dot plots, bar graphs, stem-and-leaf graphs, strip graphs, pie graphs, tall charts, frequency tables, and histograms. Analysing and interpreting data, finding and using measures of central tendency and spread.
<b>Interpreting Statistical Reports</b>	-		Students should be: Considering data displays, and making sensible statements about the significant features of the display, and making informal inferences based on them. Evaluating statements and assertions about a situation represented in a data display.	Students should be: Considering features of data displays, and identifying the mode, estimating mean and median.	Students should be: Making statements about and exploring the ways in which two data sets are different and similar, from consideration of data displays that compare them.

			Developing an awareness of the ways in which statistical information can be presented.		
<b>Exploring probability</b>			<p>Students should be:</p> <ul style="list-style-type: none"> <li>Using language associated with chance.</li> <li>Considering frequency tables, drawing informal inferences about the populations.</li> <li>Finding all possible outcomes of an event, using systematic approaches including tree diagrams.</li> </ul>	<p>Students should be:</p> <ul style="list-style-type: none"> <li>Displaying and describing sets of possible outcomes using tree diagrams.</li> </ul>	<p>Students should be:</p> <ul style="list-style-type: none"> <li>Calculating probabilities, including consideration of some simple games of chance involving dice, coins, or cards, and using tree diagrams to explore situations involving two or more events.</li> </ul>