

Australian Curriculum Mathematics Alignment document_V8.1		Foundation
Content Descriptor	Elaboration	Math-U-See Location
<b>Number and Algebra</b>		
<i>Number and place value</i>		
Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point (ACMNA001)	<ul style="list-style-type: none"> <li>identifying the number words in sequence, backwards and forwards, and reasoning with the number sequences, establishing the language on which subsequent counting experiences can be built</li> <li>developing fluency with forwards and backwards counting in meaningful contexts, including stories and rhymes</li> <li>understanding that numbers are said in a particular order and there are patterns in the way we say them</li> </ul>	Primer lesson 1, 2, 3, 5, 7, 14, 18, Activity 4x, 12x -16x, 27x - 28x  Alpha lesson 2, 3 Activity 2x, 19x
Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond (ACMNA002)	<ul style="list-style-type: none"> <li>understanding that each object must be counted only once, that the arrangement of objects does not affect how many there are, and that the last number counted answers the 'how many' question</li> <li>using scenarios to help students recognise that other cultures count in a variety of ways, such as by placing one pebble in a bag to represent one object (for example to count the number of cattle).</li> </ul>	Primer lesson 1, 2, 3, 5, 7, 14, 18, Activity 1x – 5x, 7x, 16x  Alpha lesson 2, 3 Activity 3x
Subitise small collections of objects (ACMNA003)	<ul style="list-style-type: none"> <li>using subitising as the basis for ordering and comparing collections of numbers</li> </ul>	Primer lesson 23 Alpha lesson 3 Activity 3x
Compare, order and make correspondences between collections, initially to 20, and explain reasoning (ACMNA289)	<ul style="list-style-type: none"> <li>comparing and ordering items of like and unlike characteristics using the words 'more', 'less', 'same as' and 'not the same as' and giving reasons for these answers</li> <li>understanding and using terms such as 'first' and 'second' to indicate ordinal position in a sequence</li> <li>using objects which are personally and culturally relevant to students</li> </ul>	Primer lesson 2, 3, 5, 7, 8, 11, 13, 14, 15, 16 Activity 11x – 12x  Alpha lesson 3
Represent practical situations to model addition and sharing (ACMNA004)	<ul style="list-style-type: none"> <li>using a range of practical strategies for adding small groups of numbers, such as visual displays or concrete materials using Aboriginal and Torres Strait Islander methods of adding, including spatial patterns and reasoning</li> </ul>	Primer lesson 12, 13, 15, 16, 18 Alpha lesson 4,5, 7, 9, 10 Activity 4x – 5x, 7x – 8x, 10x – 11x, 14x, 17x
<i>Patterns and algebra</i>		
Sort and classify familiar objects and explain the basis for these classifications. Copy, continue and create patterns with objects and drawings (ACMNA005)	<ul style="list-style-type: none"> <li>observing natural patterns in the world around us</li> <li>creating and describing patterns using materials, sounds, movements or drawings</li> </ul>	Primer Activity 4x, 6x, 8x, 16x, 22x, 29x

Measurement and Geometry		
<i>Using units of measurement</i>		
Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language (ACMMG006)	<ul style="list-style-type: none"> <li>comparing objects directly, by placing one object against another to determine which is longer or by pouring from one container into the other to see which one holds more</li> <li>using suitable language associated with measurement attributes, such as 'tall' and 'taller', 'heavy' and 'heavier', 'holds more' and 'holds less'</li> </ul>	Activity 6x
Compare and order the duration of events using the everyday language of time (ACMMG007)	<ul style="list-style-type: none"> <li>knowing and identifying the days of the week and linking specific days to familiar events</li> <li>sequencing familiar events in time order</li> </ul>	
Connect days of the week to familiar events and actions (ACMMG008)	<ul style="list-style-type: none"> <li>choosing events and actions that make connections with students' everyday family routines</li> </ul>	
<i>Shape</i>		
Sort, describe and name familiar two dimensional shapes and three dimensional objects in the environment (ACMMG009)	<ul style="list-style-type: none"> <li>sorting and describing squares, circles, triangles, rectangles, spheres and cubes</li> </ul>	Primer lesson 4, 6, 16 Activity 4x, 8x Alpha lesson 11
<i>Location and transformation</i>		
Describe position and movement (ACMMG010)	<ul style="list-style-type: none"> <li>interpreting the everyday language of location and direction, such as 'between', 'near', 'next to', 'forwards', 'towards'</li> <li>following and giving simple directions to guide a friend around an obstacle path and vice versa</li> </ul>	
Statistics and Probability		
<i>Data representation and interpretation</i>		
Answer yes/no questions to collect information (ACMSP011)	<ul style="list-style-type: none"> <li>posing questions about themselves and familiar objects and events representing responses to questions using simple displays, including grouping students according to their answers</li> <li>using data displays to answer simple questions such as 'how many students answered "yes" to having brown hair?'</li> </ul>	

Curriculum gaps:

- days of the week
- ordering events
- language associated with direction
- collecting very basic information (yes/no) and displaying this data

Australian Curriculum Mathematics Alignment document_V8.1		Year 1
Content Descriptor	Elaboration	Math-U-See Location
<b>Number and Algebra</b>		
<i>Number and place value</i>		
Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by twos, fives and tens starting from zero (ACMNA012)	<ul style="list-style-type: none"> <li>• using the popular Korean counting game (sam-yuk-gu) for skip counting developing fluency with forwards and backwards counting in meaningful contexts such as circle games</li> </ul>	Primer lesson 17, 18, 19, 22, 23, 25, 26 Activity 17x-20x, 22x-26x  Alpha lesson 6, 11, 13 Activity 6x, 8x, 9x, 11x, 13x, 20x, 21x, 27x-30x
Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line (ACMNA013)	<ul style="list-style-type: none"> <li>• modelling numbers with a range of material and images</li> <li>• identifying numbers that are represented on a number line and placing numbers on a prepared number line</li> </ul>	Primer lesson 9, 18, 23, 26, 27 Activity 23x  Alpha lesson 1, 3, 6 Activity 6x, 12x, 23x
Count collections to 100 by partitioning numbers using place value (ACMNA014)	<ul style="list-style-type: none"> <li>• understanding partitioning of numbers and the importance of grouping in tens</li> <li>• understanding two-digit numbers as comprised of tens and ones/units</li> </ul>	Primer lesson 9, 18, 23  Alpha lesson 1, 6, 9, 10 Activity 6, 28
Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts (ACMNA015)	<ul style="list-style-type: none"> <li>• developing a range of mental strategies for addition and subtraction problems</li> </ul>	Primer lesson 17, 19, 22, 25, 29, 30 Activity 13x, 15x, 17x, 18x, 21x, 24x, 25x, 27x-30x  Alpha lesson 4, 5, 6-10, 12, 14-30 Activity 5x, 7x-12x, 14x-18x, 21x-30x
<i>Fractions and decimals</i>		
Recognise and describe one-half as one of two equal parts of a whole. (ACMNA016)	<ul style="list-style-type: none"> <li>• sharing a collection of readily available materials into two equal portions</li> <li>• splitting an object into two equal pieces and describing how the pieces are equal</li> </ul>	This learning is related to telling the time on the half hour. Refer to Primer lesson 29 and the Appendix of the Alpha level.
<i>Money and financial mathematics</i>		
Recognise, describe and order Australian coins according to their value (ACMNA017)	<ul style="list-style-type: none"> <li>• showing that coins are different in other countries by comparing Asian coins to Australian coins</li> <li>• understanding that the value of Australian coins is not related to size</li> <li>• describing the features of coins that make it possible to identify them</li> </ul>	Primer lesson 19
<i>Patterns and algebra</i>		
Investigate and describe number patterns formed by skip counting and patterns with objects (ACMNA018)	<ul style="list-style-type: none"> <li>• using place-value patterns beyond the teens to generalise the number sequence and predict the next number</li> <li>• investigating patterns in the number system, such as the occurrence of a particular digit in the numbers to 100</li> </ul>	Primer lesson 17, 18, 19, 22, 23, 25  Alpha lesson 6, 11, 13 Activity 13x

<b>Measurement and Geometry</b>		
<i>Using units of measurement</i>		
Measure and compare the lengths and capacities of pairs of objects using uniform informal units (ACMMG019)	<ul style="list-style-type: none"> <li>• understanding that in order to compare objects, the unit of measurement must be the same size</li> </ul>	
Tell time to the half-hour (ACMMG020)	<ul style="list-style-type: none"> <li>• reading time on analogue and digital clocks and observing the characteristics of half-hour times</li> </ul>	Primer lesson 29 Alpha Appendix
Describe duration using months, weeks, days and hours (ACMMG021)	<ul style="list-style-type: none"> <li>• describing the duration of familiar situations such as 'how long is it until we next come to school?'</li> </ul>	
<i>Shape</i>		
Recognise and classify familiar two dimensional shapes and three-dimensional objects using obvious features (ACMMG022)	<ul style="list-style-type: none"> <li>• focusing on geometric features and describing shapes and objects using everyday words such as 'corners', 'edges' and 'faces'</li> </ul>	Primer lesson 4, 6, 8, 16, 26 Alpha lesson 10, 12 Activity 13x, 14x
<i>Location and transformation</i>		
Give and follow directions to familiar locations (ACMMG023)	<ul style="list-style-type: none"> <li>• understanding that people need to give and follow directions to and from a place, and that this involves turns, direction and distance</li> <li>• understanding the meaning and importance of words such as 'clockwise', 'anticlockwise', 'forward' and 'under' when giving and following directions</li> <li>• interpreting and following directions around familiar locations</li> </ul>	
<b>Statistics and Probability</b>		
<i>Chance</i>		
Identify outcomes of familiar events involving chance and describe them using everyday language such as 'will happen', 'won't happen' or 'might happen' (ACMSP024)	<ul style="list-style-type: none"> <li>• justifying that some events are certain or impossible</li> </ul>	
<i>Data representation and interpretation</i>		
Choose simple questions and gather responses (ACMSP262)	<ul style="list-style-type: none"> <li>• determining which questions will gather appropriate responses for a simple investigation</li> </ul>	
Represent data with objects and drawings where one object or drawing represents one data value. Describe the displays (ACMSP263)	<ul style="list-style-type: none"> <li>• understanding one-to-one correspondence</li> <li>• describing displays by identifying categories with the greatest or least number of objects</li> </ul>	

Curriculum gaps:

Fractions and Decimals

Informal units of measure and duration of time

Location and transformation

Statistics and probability

# Australian Curriculum Mathematics Alignment Document\_V8.1

Year 2

Content Descriptors	Elaboration	Math-U-See linkage
<b>Number and Algebra</b>		
<b>Number and Place Value</b>		
Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and ten from any starting point, then moving to other sequences. (ACMNA026)	<ul style="list-style-type: none"> <li>Developing fluency and confidence with numbers and calculations by saying number sequences</li> <li>Recognising patterns in number sequences, such as adding 10 always results in the same final digit</li> </ul>	Alpha lesson 6, 11, 13 Alpha activity 6x, 9x, 11x, 13x, 20x, 27x  Beta lesson 6, 8, 21  Gamma lesson 3, 4, 5, 6
Recognise, model, represent and order numbers to at least 1000 (ACMNA027)	<ul style="list-style-type: none"> <li>Recognising there are different ways of representing numbers and identifying patterns going beyond 100</li> <li>Developing fluency with writing numbers in meaningful contexts</li> </ul>	Primer lesson 10  Alpha lesson 1  Beta lesson 1, 2
Group, partition and rearrange collections up to 1000 in hundreds, tens and ones to facilitate more efficient counting (ACMNA028)	<ul style="list-style-type: none"> <li>Using an abacus to model and represent numbers</li> <li>Understanding three-digit numbers as comprised of hundreds, tens and ones/units</li> <li>Demonstrating and using models such as linking blocks, sticks in bundles, place-value blocks and Aboriginal bead strings and explaining reasoning</li> </ul>	Primer lesson 10, 20  Alpha lesson 1, 9, 10, 13, 15  Beta lesson 1, 2, 5, 7, 13, 20, 23, 25
Explore the connection between addition and subtraction (ACMNA029)	<ul style="list-style-type: none"> <li>Becoming fluent with partitioning numbers to understand the connection between addition and subtraction</li> <li>Using counting on to identify the missing element in an additive problem</li> </ul>	Primer lesson 21, 29, 30  Alpha lesson 8, 18 – 30 Alpha test and activity booklet  Beta lesson 5, 7, 13, 20, 22, 24
Solve simple addition and subtraction problems using a range of efficient mental and written strategies (ACMNA030)	<ul style="list-style-type: none"> <li>Becoming fluent with a range of mental strategies for addition and subtraction problems, such as commutativity for addition, building to 10, doubles, 10 facts and adding 10</li> <li>Modelling and representing simple additive situations using materials such as 10 frames, 20 frames and empty number lines</li> </ul>	Primer lesson 20, 21, 24  Alpha lesson 5, 7, 8, 9, 10, 12, 14 – 30 Alpha test and activity booklet  Beta lesson 7, 13, 20, 22, 24
Recognise and represent multiplication as repeated addition, groups and arrays (ACMNA031)	<ul style="list-style-type: none"> <li>Becoming fluent with a range of mental strategies for addition and subtraction problems, such as commutativity for addition, building to 10, doubles, 10 facts and adding 10</li> </ul>	Gamma lesson 1, 2, 3, 4, 5, 6

	<ul style="list-style-type: none"> <li>Modelling and representing simple additive situations using materials such as 10 frames, 20 frames and empty number lines</li> </ul>	
Recognise and represent division as grouping into equal sets and solve simple problems using these representations (ACMNA032)	<ul style="list-style-type: none"> <li>Dividing the class or a collection of objects into equal-sized groups</li> <li>Identifying the difference between dividing a set of objects into three equal groups and dividing the same set of objects into groups of three</li> </ul>	Delta lesson 2, 3, 4
<b>Fractions and decimals</b>		
Recognise and interpret common uses of halves, quarters and eighths of shapes and collections (ACMNA033)	<ul style="list-style-type: none"> <li>Recognising that sets of objects can be partitioned in different ways to demonstrate fractions</li> <li>Relating the number of parts to the size of a fraction</li> </ul>	Delta lesson 29 Epsilon lesson 2
<b>Money and financial mathematics</b>		
Count and order small collections of Australian coins and notes according to their value (ACMNA034)	<ul style="list-style-type: none"> <li>Identifying equivalent values in collections of coins or notes, such as two five-cent coins having the same value as one 10-cent coin</li> <li>Counting collections of coins or notes to make up a particular value, such as that shown on a price tag</li> </ul>	Primer lesson 19, 22 Beta lesson 8, 13 Gamma lesson 5, 6, 26
<b>Patterns and algebra</b>		
Describe patterns with numbers and identify missing elements (ACMNA035)	<ul style="list-style-type: none"> <li>Describing a pattern created by skip counting and representing the pattern on a number line</li> <li>Investigating features of number patterns resulting from adding twos, fives or 10s</li> </ul>	Primer lesson 17, 19, 22, 25 Alpha lesson 6, 11, 13 Beta lesson 6 Gamma lesson 3, 5, 6
Solve problems by using number sentences for addition or subtraction (ACMNA036)	<ul style="list-style-type: none"> <li>Representing a word problem as a number sentence</li> <li>Writing a word problem to represent a number sentence</li> </ul>	Primer lesson 21 Alpha test and activity booklet Beta lesson 2

Measurement and Geometry		
Using units of measurement		
Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units (ACMMG037)	<ul style="list-style-type: none"> <li>Comparing lengths using finger length, hand span or a piece of string</li> <li>Comparing areas using the palm of the hand or a stone</li> <li>Comparing capacities using a range of containers</li> </ul>	
Compare masses of objects using balance scales (ACMMG038)	<ul style="list-style-type: none"> <li>Using balance scales to determine whether the mass of different objects is more, less or about the same, or to find out how many marbles are needed to balance a tub of margarine or a carton of milk</li> </ul>	
Tell time to the quarter-hour, using the language of 'past' and 'to' (ACMMG039)	<ul style="list-style-type: none"> <li>Describing the characteristics of quarter-past times on an analogue clock, and identifying that the small hand is pointing just past the number and the big hand is pointing to the three</li> </ul>	Beta lesson 24
Name and order months and seasons (ACMMG040)	<ul style="list-style-type: none"> <li>Investigating the seasons used by Aboriginal people, comparing them to those used in Western society and recognising the connection to weather patterns.</li> </ul>	Bets lesson 26
Use a calendar to identify the date and determine the number of days in each month(ACMMG041)	<ul style="list-style-type: none"> <li>Using calendars to locate specific information, such as finding a given date on a calendar and saying what day it is, and identifying personally or culturally specific days</li> </ul>	Beta lesson 26
Shape		
Describe and draw two-dimensional shapes, with and without digital technologies (ACMMG042)	<ul style="list-style-type: none"> <li>Identifying key features of squares, rectangles, triangles, kites, rhombuses and circles, such as straight lines or curved lines, and counting the edges and corners</li> </ul>	Gamma lesson 1
Describe the features of three-dimensional objects (ACMMG043)	<ul style="list-style-type: none"> <li>Identifying geometric features such as the number of faces, corners or edges</li> </ul>	
Location and transformation		
Interpret simple maps of familiar locations and identify the relative positions of key features (ACMMG044)	<ul style="list-style-type: none"> <li>Understanding that we use representations of objects and their positions, such as on maps, to allow us to receive and give directions and to describe place</li> <li>Constructing arrangements of objects from a set of directions</li> </ul>	
Investigate the effect of one-step slides and flips with and without digital technologies (ACMMG045)	<ul style="list-style-type: none"> <li>Understanding that objects can be moved but changing position does not alter an object's size or features</li> </ul>	
Identify and describe half and quarter turns (ACMMG046)	<ul style="list-style-type: none"> <li>Predicting and reproducing a pattern based around half and quarter turns of a shape and sketching the next element in the pattern</li> </ul>	



Statistics and Probability		
Chance		
Identify practical activities and everyday events that involve chance. Describe outcomes as 'likely' or 'unlikely' and identify some events as 'certain' or 'impossible' (ACMSP047)	<ul style="list-style-type: none"> <li>Classifying a list of everyday events according to how likely they are to happen, using the language of chance, and explaining reasoning</li> </ul>	
Data representation and interpretation		
Identify a question of interest based on one categorical variable. Gather data relevant to the question (ACMSP048)	<ul style="list-style-type: none"> <li>Determining the variety of birdlife in the playground and using a prepared table to record observations</li> </ul>	
Collect, check and classify data (ACMSP049)	<ul style="list-style-type: none"> <li>Recognising the usefulness of tally marks</li> <li>Identifying categories of data and using them to sort data</li> </ul>	Primer lesson 22  Beta lesson 26
Create displays of data using lists, table and picture graphs and interpret them (ACMSP050)	<ul style="list-style-type: none"> <li>Creating picture graphs to represent data using one-to-one correspondence</li> <li>Comparing the usefulness of different data displays</li> </ul>	

Curriculum gaps:

Using units of measure

Features of 3D objects

Location and transformation

Chance

Data displays

Australian Curriculum Mathematics Alignment Document_V8.1		Year 3
Content Descriptors	Elaborations	Math-U-See linkage
<b>Number and Algebra</b>		
<b>Number and Place Value</b>		
Investigate the conditions required for a number to be odd or even and identify odd and even numbers (ACMNA051)	<ul style="list-style-type: none"> <li>Identifying even numbers using skip counting by twos or by grouping even collections of objects in twos</li> <li>Explaining why all numbers that end in the digits 0, 2, 4, 6 and 8 are even and that numbers ending in 1, 3, 5, 7 and 9 are odd</li> </ul>	Alpha lesson 7  Beta lesson 6, 8, 9
Recognise, model, represent and order numbers to at least 10 000 (ACMNA052)	<ul style="list-style-type: none"> <li>Placing four-digit numbers on a number line using an appropriate scale</li> <li>Reproducing numbers in words using their numerical representations and vice versa</li> </ul>	Beta lesson 16, 18
Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems (ACMNA053)	<ul style="list-style-type: none"> <li>Recognising that 10 000 equals 10 thousands, 100 hundreds, 1000 tens and 10 000 ones</li> <li>Justifying choices about partitioning and regrouping numbers in terms of their usefulness for particular calculations</li> </ul>	Beta lesson 7, 16, 18, 22, 24, 26, 28
Recognise and explain the connection between addition and subtraction (ACMNA054)	<ul style="list-style-type: none"> <li>Demonstrating the connection between addition and subtraction using partitioning or by writing equivalent number sentences</li> </ul>	Beta lesson 20, 22, 24, 26, 28
Recall addition facts for single digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation (ACMNA055)	<ul style="list-style-type: none"> <li>Recognising that certain single-digit number combinations always result in the same answer for addition and subtraction, and using this knowledge for addition and subtraction of larger numbers</li> <li>Combining knowledge of addition and subtraction facts and partitioning to aid computation (for example <math>57 + 19 = 57 + 20 - 1</math>)</li> </ul>	Beta lesson 20, 22, 24, 26, 28
Recall multiplication facts of two, three, five and ten and related division facts (ACMNA056)	<ul style="list-style-type: none"> <li>Establishing multiplication facts using number sequences</li> </ul>	Gamma lesson 3, 4, 5, 6
Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies (ACMNA057)	<ul style="list-style-type: none"> <li>Writing simple word problems in numerical form and vice versa</li> <li>Using a calculator to check the solution and reasonableness of the answer</li> </ul>	Gamma lesson 2, 3, 4, 5, 6
<b>Fractions and decimals</b>		
Model and represent unit fractions including $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{1}{5}$ and their multiples to a complete whole (ACMNA058)	<ul style="list-style-type: none"> <li>Partitioning areas, lengths and collections to create halves, thirds, quarters and fifths, such as folding the same sized sheets of paper to illustrate different unit fractions and comparing the number of parts with their sizes</li> <li>Locating unit fractions on a number line</li> </ul>	Epsilon lesson 2, 6, 7

	<ul style="list-style-type: none"> <li>Recognising that in English the term 'one third' is used (order: numerator, denominator) but that in other languages this concept may be expressed as 'three parts, one of them' (order: denominator, numerator) for example Japanese</li> </ul>	
<b>Money and financial mathematics</b>		
Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents (ACMNA059)	<ul style="list-style-type: none"> <li>Recognising the relationship between dollars and cents, and that not all countries use these denominations and divisions (for example Japanese Yen)</li> </ul>	Beta lesson 6, 8, 9, 10, 12, 13, 27  Gamma lesson 26  Zeta lesson 4, 5, 6
<b>Patterns and algebra</b>		
Describe, continue, and create number patterns resulting from performing addition or subtraction (ACMNA060)	<ul style="list-style-type: none"> <li>Identifying and writing the rules for number patterns</li> <li>Describing a rule for a number pattern, then creating the pattern</li> </ul>	Gamma lesson 2 – 6, 9, 13 – 20

<b>Measurement and Geometry</b>		
<b>Using units of measurement</b>		
Measure, order and compare objects using familiar metric units of length, mass and capacity (ACMMG061)	<ul style="list-style-type: none"> <li>Recognising the importance of using common units of measurement</li> <li>Recognising and using centimetres and metres, grams and kilograms, and millilitres and litres</li> </ul>	Beta lesson 14, 19  Gamma lesson 4, 5, 16  Zeta lesson 6, 7
Tell time to the minute and investigate the relationship between units of time (ACMMG062)	<ul style="list-style-type: none"> <li>Recognising there are 60 minutes in an hour and 60 seconds in a minute</li> </ul>	Primer lesson 26, 28  Beta lesson 21
<b>Shape</b>		
Make models of three dimensional objects and describe key features (ACMMG063)	<ul style="list-style-type: none"> <li>Exploring the creation of three-dimensional objects using origami, including prisms and pyramids</li> </ul>	
<b>Location and transformation</b>		
Create and interpret simple grid maps to show position and pathways (ACMMG065)	<ul style="list-style-type: none"> <li>Creating a map of the classroom or playground</li> </ul>	
Identify symmetry in the environment (ACMMG066)	<ul style="list-style-type: none"> <li>Identifying symmetry in Aboriginal rock carvings or art</li> <li>Identifying symmetry in the natural and built environment</li> </ul>	
<b>Geometric reasoning</b>		
Identify angles as measures of turn and compare angle sizes in everyday situations	<ul style="list-style-type: none"> <li>Opening doors partially and fully and comparing the size of the angles created</li> </ul>	

(ACMMG064)	<ul style="list-style-type: none"> <li>Recognising that analogue clocks use the turning of arms to indicate time, and comparing the size of angles between the arms for familiar times</li> </ul>	
<b>Statistics and Probability</b>		
<b>Chance</b>		
Conduct chance experiments, identify and describe possible outcomes and recognise variation in results (ACMSP067)	<ul style="list-style-type: none"> <li>Conducting repeated trials of chance experiments such as tossing a coin or drawing a ball from a bag and identifying the variations between trials</li> </ul>	
<b>Data representation and interpretation</b>		
Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording (ACMSP068)	<ul style="list-style-type: none"> <li>Refining questions and planning investigations that involve collecting data, and carrying out the investigation (for example narrowing the focus of a question such as 'which is the most popular breakfast cereal?' to 'which is the most popular breakfast cereal among Year 3 students in our class?')</li> </ul>	
Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies (ACMSP069)	<ul style="list-style-type: none"> <li>Exploring meaningful and increasingly efficient ways to record data, and representing and reporting the results of investigations</li> <li>Collecting data to investigate features in the natural environment</li> </ul>	Beta lesson 30
Interpret and compare data displays (ACMSP070)	<ul style="list-style-type: none"> <li>Comparing various student-generated data representations and describing their similarities and differences</li> </ul>	

Curriculum gaps:

Shape

Location and transformation

Geometric reasoning

Chance

Data collection and recording

Data interpretation

# Australian Curriculum Mathematics Alignment Document\_V8.1

Year 4

Content Descriptors	Elaborations	Math-U-See Linkage
<b>Number and Algebra</b>		
<b>Number and Place Value</b>		
Investigate and use the properties of odd and even numbers (ACMNA071)	<ul style="list-style-type: none"> <li>Using the four operations with pairs of odd or even numbers or one odd and one even number, then using the relationships established to check the accuracy of calculations</li> </ul>	
Recognise, represent and order numbers to at least tens of thousands (ACMNA072)	<ul style="list-style-type: none"> <li>Reproducing five-digit numbers in words using their numerical representations, and vice versa</li> </ul>	Delta lesson 14, 15 Gamma lesson 27
Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (ACMNA073)	<ul style="list-style-type: none"> <li>Recognising and demonstrating that the place-value pattern is built on the operations of multiplication or division of tens</li> </ul>	Beta lesson 16, 18, 20, 28 Delta lesson 14, 15 Gamma lesson 17, 18, 21 Zeta lesson 2
Investigate number sequences involving multiples of 3, 4, 6, 7, 8, and 9 (ACMNA074)	<ul style="list-style-type: none"> <li>Recognising that number sequences can be extended indefinitely, and determining any patterns in the sequences</li> </ul>	Gamma lesson 10 – 20
Recall multiplication facts up to $10 \times 10$ and related division facts (ACMNA075)	<ul style="list-style-type: none"> <li>Using known multiplication facts to calculate related division facts</li> </ul>	Delta lesson 2, 3, 4, 8, 10, 12 Epsilon lesson 11, 12, 25 Gamma lesson 10 – 20
Develop efficient mental and written strategies and use appropriate digital technologies for multiplication and for division where there is no remainder (ACMNA076)	<ul style="list-style-type: none"> <li>Using known facts and strategies, such as commutativity, doubling and halving for multiplication, and connecting division to multiplication when there is no remainder</li> </ul>	Delta lesson 2, 3, 4, 8, 10, 12, 17 Epsilon lesson 11, 12, 25 Gamma lesson 4 – 20
<b>Fractions and decimals</b>		
Investigate equivalent fractions used in contexts (ACMNA077)	<ul style="list-style-type: none"> <li>Exploring the relationship between families of fractions (halves, quarters and eighths or thirds and sixths) by folding a series of paper strips to construct a fraction wall</li> </ul>	Epsilon lesson 4, 5, 7, 12, 17 – 22 Gamma lesson 9, 13 Zeta lesson 3
Count by quarters halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line (ACMNA078)	<ul style="list-style-type: none"> <li>Converting mixed numbers to improper fractions and vice versa</li> <li>Investigating the use of fractions and sharing as a way of managing Country: for example taking no more than half the eggs from a nest to protect future bird populations</li> </ul>	Delta lesson 2 Epsilon lesson 13, 15

Recognise that the place value system can be extended to tenths and hundredths. Make connections between fractions and decimal notation (ACMNA079)	<ul style="list-style-type: none"> <li>Using division by 10 to extend the place-value system</li> <li>Using knowledge of fractions to establish equivalences between fractions and decimal notation</li> </ul>	Beta lesson 12, 14, 27  Epsilon lesson 29  Gamma lesson 5  Zeta lesson 3, 4, 5, 7, 9, 10, 11
<b>Money and financial mathematics</b>		
Solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies (ACMNA080)	<ul style="list-style-type: none"> <li>Recognising that not all countries use dollars and cents, e.g. India uses rupees.</li> <li>Carrying out calculations in another currency as well as in dollars and cents, and identifying both as decimal systems</li> </ul>	Beta lesson 12  Zeta lesson 4, 5, 6
<b>Patterns and algebra</b>		
Explore and describe number patterns resulting from performing multiplication (ACMNA081)	<ul style="list-style-type: none"> <li>Identifying examples of number patterns in everyday life</li> </ul>	The Gamma level lessons cover skip counting and relates this to the concept of multiplication. Investigation/ exploring patterns resulting from multiplication is the intent.
Solve word problems by using number sentences involving multiplication or division where there is no remainder (ACMNA082)	<ul style="list-style-type: none"> <li>Representing a word problem as a number sentence</li> <li>Writing a word problem using a given number sentence</li> </ul>	Delta lesson 2, 3, 4, 8, 10, 12, 15  Zeta lesson 1, 2, 6
Find unknown quantities in number sentences involving addition and subtraction and identify equivalent number sentences involving addition and subtraction (ACMNA083)	<ul style="list-style-type: none"> <li>Writing number sentences to represent and answer questions such as: 'when a number is added to 23 the answer is the same as 57 minus 19. What is the number?'</li> <li>Using partitioning to find unknown quantities in number sentences</li> </ul>	

<b>Measurement and Geometry</b>		
<b>Using units of measurement</b>		
Use scaled instruments to measure and compare lengths, masses, capacities and temperatures (ACMMG084)	<ul style="list-style-type: none"> <li>Reading and interpreting the graduated scales on a range of measuring instruments to the nearest graduation</li> </ul>	Beta lesson 14, 15, 18, 29  Epsilon 14, 16  Zeta lesson 7
Compare objects using familiar metric units of area and volume (ACMMG290)	<ul style="list-style-type: none"> <li>Comparing areas using grid paper</li> <li>Comparing volume using centicubes</li> <li>Recognising that metric units are not the only units used throughout the world, for example measuring the area of floor</li> </ul>	

	space using tatami mats (Japan), using squares for room and house area (Australia)	
Convert between units of time (ACMMG085)	<ul style="list-style-type: none"> <li>Identifying and using the correct operation for converting units of time</li> </ul>	Beta lesson 21
Use am and pm notation and solve simple time problems (ACMMG086)	<ul style="list-style-type: none"> <li>Calculating the time spent at school during a normal school day</li> <li>Calculating the time required to travel between two locations</li> <li>Determining arrival time given departure time</li> </ul>	
<b>Shape</b>		
Compare the areas of regular and irregular shapes by informal means (ACMMG087)	<ul style="list-style-type: none"> <li>Comparing areas using metric units, such as counting the number of square centimetres required to cover two areas by overlaying the areas with a grid of centimetre squares</li> </ul>	Gamma lesson 1, 4, 5, 6, 7
Compare and describe two dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies (ACMMG088)	<ul style="list-style-type: none"> <li>Identifying common two-dimensional shapes that are part of a composite shape by re-creating it from these shapes</li> <li>Creating a two-dimensional shapes from verbal or written instructions</li> </ul>	
<b>Location and transformation</b>		
Use simple scales, legends and directions to interpret information contained in basic maps (ACMMG090)	<ul style="list-style-type: none"> <li>Identifying the scale used on maps of cities and rural areas in Australia and a city in Indonesia and describing the difference</li> <li>Using directions to find features on a map</li> </ul>	
Create symmetrical patterns, pictures and shapes with and without digital technologies (ACMMG091)	<ul style="list-style-type: none"> <li>Using stimulus materials such as the motifs in Central Asian textiles, Tibetan artefacts, Indian lotus designs and symmetry in Yolngu or Central and Western Desert art</li> </ul>	
<b>Geometric reasoning</b>		
Compare angles and classify them as equal to, greater than or less than a right angle (ACMMG089)	<ul style="list-style-type: none"> <li>Creating angles and comparing them to a right angle using digital technologies</li> </ul>	Zeta lesson 30
<b>Statistics and Probability</b>		
<b>Chance</b>		
Describe possible everyday events and order their chances of occurring (ACMSP092)	<ul style="list-style-type: none"> <li>Using lists of events familiar to students and ordering them from 'least likely' to 'most likely' to occur</li> </ul>	
Identify everyday events where one cannot happen if the other happens (ACMSP093)	<ul style="list-style-type: none"> <li>Using examples such as weather, which cannot be dry and wet at the same time</li> </ul>	
Identify events where the chance of one will not be affected by the occurrence of the other (ACMSP094)	<ul style="list-style-type: none"> <li>Explaining why the probability of a new baby being either a boy or a girl does not depend on the sex of the previous baby</li> </ul>	
<b>Data representation and interpretation</b>		
Select and trial methods for data collection, including survey questions and recording sheets	<ul style="list-style-type: none"> <li>Comparing the effectiveness of different methods of collecting data</li> </ul>	

(ACMSP095)	<ul style="list-style-type: none"> <li>Choosing the most effective way to collect data for a given investigation</li> </ul>	
Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values (ACMSP096)	<ul style="list-style-type: none"> <li>Exploring ways of presenting data and showing the results of investigations</li> <li>Investigating data displays using many-to-one correspondence</li> </ul>	
Evaluate the effectiveness of different displays in illustrating data features including variability (ACMSP097)	<ul style="list-style-type: none"> <li>Interpreting data representations in the media and other forums in which symbols represent more than one data value</li> <li>Suggesting questions that can be answered by a given data display and using the display to answer questions</li> </ul>	

Curriculum gaps:

Properties of odd and even numbers

Exploring number patterns

Finding unknown quantities in number sentences

Area and volume

Time

Compare and describe 2D shapes

Location and transformation

Chance

Data representation and interpretation



Australian Curriculum Mathematics Alignment Document_V8.2		Year 5
Content Descriptors	Elaborations	Math-U-See Linkages
<b>Number and Algebra</b>		
<b>Number and Place Value</b>		
Identify and describe factors and multiples of whole numbers and use them to solve problems (ACMNA098)	<ul style="list-style-type: none"> <li>Exploring factors and multiples using number sequences</li> <li>Using simple divisibility tests</li> </ul>	Delta lesson 1, 2, 3, 4, 6, 8, 10, 12  Epsilon lesson 11, 12, 25  Gamma lesson 1, 4 – 8, 17, 18, 26  Zeta lesson 2  Pre-algebra lesson 21 <i>Honours pre-algebra lesson 22</i>
Use estimation and rounding to check the reasonableness of answers to calculations (ACMNA099)	<ul style="list-style-type: none"> <li>Recognising the usefulness of estimation to check calculations</li> <li>Applying mental strategies to estimate the result of calculations, such as estimating the cost of a supermarket trolley load</li> </ul>	Beta lesson 4, 11, 17, 18, 19  Gamma lesson 22
Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100)	<ul style="list-style-type: none"> <li>Exploring techniques for multiplication such as the area model, the Italian lattice method or the partitioning of numbers</li> <li>Applying the distributive law and using arrays to model multiplication and explain calculation strategies</li> </ul>	Delta lesson 1, 2, 3, 4, 8, 10, 12, 17  Gamma lesson 1, 4 – 7, 9, 11 – 21, 23, 24, 25, 28
Solve problems involving division by a one digit number, including those that result in a remainder (ACMNA101)	<ul style="list-style-type: none"> <li>Using the fact that equivalent division calculations result if both numbers are divided by the same factor</li> <li>Interpreting and representing the remainder in division calculations sensibly for the context</li> </ul>	Delta lesson 16  Zeta lesson 21
Use efficient mental and written strategies and apply appropriate digital technologies to solve problems (ACMNA291)	<ul style="list-style-type: none"> <li>Using calculators to check the reasonableness of answers</li> </ul>	Delta lesson 17 – 24  Gamma lesson 21, 23, 24, 25, 28
<b>Fractions and decimals</b>		
Compare and order common unit fractions and locate and represent them on a number line (ACMNA102)	<ul style="list-style-type: none"> <li>Recognising the connection between the order of unit fractions and their denominators</li> </ul>	Delta lesson 27  Epsilon lesson 1, 14, 16  Algebra 1 lesson 5
Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator (ACMNA103)	<ul style="list-style-type: none"> <li>Modelling and solving addition and subtraction problems involving fractions by using jumps on a number line, or making diagrams of fractions as parts of shapes</li> </ul>	Epsilon lesson 3, 17 – 22
Recognise that the place value system can be extended beyond hundredths (ACMNA104)	<ul style="list-style-type: none"> <li>Using knowledge of place value and division by 10 to extend the number system to thousandths and beyond</li> </ul>	Epsilon lesson 29

	<ul style="list-style-type: none"> <li>Recognising the equivalence of one thousandths and 0.001</li> </ul>	Zeta lesson 2, 10
Compare, order and represent decimals (ACMNA105)	<ul style="list-style-type: none"> <li>Locating decimals on a number line</li> </ul>	
<b>Money and financial mathematics</b>		
Create simple financial plans (ACMNA106)	<ul style="list-style-type: none"> <li>Creating a simple budget for a class fundraising event</li> <li>Identifying the GST component of invoices and receipts</li> </ul>	
<b>Patterns and algebra</b>		
Describe, continue and create patterns with fractions, decimals and whole numbers resulting from addition and subtraction (ACMNA107)	<ul style="list-style-type: none"> <li>Using the number line or diagrams to create patterns involving fractions or decimals</li> </ul>	
Find unknown quantities in number sentences involving multiplication and division and identify equivalent number sentences involving multiplication and division (ACMNA121)	<ul style="list-style-type: none"> <li>Using relevant problems to develop number sentences</li> </ul>	Delta lesson 1  Gamma lesson 8  Algebra 1 lesson 3

Measurement and Geometry		
Using units of measurement		
Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108)	<ul style="list-style-type: none"> <li>Recognising that some units of measurement are better suited for some tasks than others, for example kilometres rather than metres to measure the distance between two towns</li> <li>Investigating alternative measures of scale to demonstrate that these vary between countries and change over time, for example temperature measurement in Australia, Indonesia, Japan and USA</li> </ul>	Beta lesson 15  Zeta lesson 6
Calculate the perimeter and area of rectangles using familiar metric units (ACMMG109)	<ul style="list-style-type: none"> <li>Exploring efficient ways of calculating the perimeters of rectangles such as adding the length and width together and doubling the result</li> <li>Exploring efficient ways of finding the areas of rectangles</li> </ul>	Beta lesson 15  Delta lesson 1  Gamma lesson 1, 4, 5, 6, 7  Zeta lesson 1  Geometry lesson 8, 9
Compare 12- and 24-hour time systems and convert between them (ACMMG110)	<ul style="list-style-type: none"> <li>Investigating the ways time was and is measured in different Aboriginal Country, such as using tidal change</li> <li>Using units hours, minutes and seconds</li> </ul>	Pre-algebra lesson 26, 28
Shape		
Connect three-dimensional objects with their nets and other two-dimensional representations (ACMMG111)	<ul style="list-style-type: none"> <li>Identifying the shape and relative position of each face of a solid to determine the net of the solid, including that of prisms and pyramids</li> <li>Representing two-dimensional shapes such as photographs, sketches and images created by digital technologies</li> </ul>	
Location and transformation		
Use a grid reference system to describe locations. Describe routes using landmarks and directional language (ACMMG113)	<ul style="list-style-type: none"> <li>Comparing aerial views of Country, desert paintings and maps with grid references</li> <li>Creating a grid reference system for the classroom and using it to locate objects and describe routes from one object to another</li> </ul>	
Describe translations, reflections and rotations of two-dimensional shapes. Identify line and rotational symmetries (ACMMG114)	<ul style="list-style-type: none"> <li>Identifying and describing the line and rotational symmetry of a range of two-dimensional shapes, by manually cutting, folding and turning shapes and by using digital technologies</li> <li>Identifying the effects of transformations by manually flipping, sliding and turning two-dimensional shapes and by using digital technologies</li> </ul>	Geometry lesson 28
Apply the enlargement transformation to familiar two dimensional shapes and explore the properties of the resulting image compared with the original (ACMMG115)	<ul style="list-style-type: none"> <li>Using digital technologies to enlarge shapes</li> <li>Using a grid system to enlarge a favourite image or cartoon</li> </ul>	Geometry lesson 28

Geometric reasoning	Geometry lessons 1 and 2 are good for review and setting the scene for develop geometric reasoning. Honours geometry lesson 1, 11, 22 support the development of logical thinking and reasoning	
Estimate, measure and compare angles using degrees. Construct angles using a protractor (ACMMG112)	<ul style="list-style-type: none"> <li>Measuring and constructing angles using both <math>180^\circ</math> and <math>360^\circ</math> protractors</li> <li>Recognising that angles have arms and a vertex, and that size is the amount of turn required for one arm to coincide with the other</li> </ul>	Zeta lesson 29  Geometry lesson 1, 3, 4

Statistics and Probability		
Chance		
List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (ACMSP116)	<ul style="list-style-type: none"> <li>Commenting on the likelihood of winning simple games of chance by considering the number of possible outcomes and the consequent chance of winning in simple games of chance such as jan-ken-pon (rock-paper-scissors)</li> </ul>	Zeta lesson 26  Geometry lesson 2 (language for set notation)
Recognise that probabilities range from 0 to 1 (ACMSP117)	<ul style="list-style-type: none"> <li>Investigating the probabilities of all outcomes for a simple chance experiment and verifying that their sum equals 1</li> </ul>	Zeta lesson 26
Data representation and interpretation		
Pose questions and collect categorical or numerical data by observation or survey (ACMSP118)	<ul style="list-style-type: none"> <li>Posing questions about insect diversity in the playground, collecting data by taping a one-metre-square piece of paper to the playground and observing the type and number of insects on it over time</li> </ul>	Geometry lesson 2 <i>Honours geometry lesson 2 (Venn diagrams)</i>
Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119)	<ul style="list-style-type: none"> <li>Identifying the best methods of presenting data to illustrate the results of investigations and justifying the choice of representations</li> </ul>	Beta lesson 30  Geometry lesson 2, 3
Describe and interpret different data sets in context (ACMSP120)	<ul style="list-style-type: none"> <li>Using and comparing data representations for different data sets to help decision making</li> </ul>	Geometry lesson 2, 3  <i>Honours algebra 1 lesson 4</i>

Australian Curriculum Mathematics Alignment Document_V8.2		Year 6
Content Descriptors	Elaborations	Math-U-See links
<b>Number and Algebra</b>		
<b>Number and Place Value</b>	<b>Honours pre-algebra lesson 30 – developing reasoning and problem solving</b> <b>Honours algebra 1 lesson 1, 2, 3 – developing reasoning and problem solving</b>	
Identify and describe properties of prime, composite, square and triangular numbers (ACMNA122)	<ul style="list-style-type: none"> <li>Understanding that some numbers have special properties and that these properties can be used to solve problems</li> <li>Representing composite numbers as a product of their prime factors and using this form to simplify calculations by cancelling common primes</li> <li>Understanding that if a number is divisible by a composite number then it is also divisible by the prime factors of that number (for example 216 is divisible by 8 because the number represented by the last three digits is divisible by 8, and hence 216 is also divisible by 2 and 4)</li> </ul>	Epsilon lesson 11, 12, 13, 25  Gamma lesson 29  Zeta lesson 1  Pre-algebra lesson 21 <i>Honours pre-algebra lesson 12</i>  <i>Honours algebra 2 lesson 9</i>
Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)	<ul style="list-style-type: none"> <li>Applying strategies already developed for solving problems involving small numbers to those involving large numbers</li> <li>Applying a range of strategies to solve realistic problems and commenting on the efficiency of different strategies</li> </ul>	Delta lesson 18 – 25  Gamma lesson 17, 18  <i>Honours pre-algebra lesson 1</i>
Investigate everyday situations that use integers. Locate and represent these numbers on a number line (ACMNA124)	<ul style="list-style-type: none"> <li>Understanding that integers are ...-3, -2, -1, 0, 1, 2, 3 ...</li> <li>Solving everyday additive problems using a number line</li> <li>Investigating everyday situations that use integers, such as temperatures</li> <li>Using number lines to position and order integers around zero</li> </ul>	Pre-algebra lesson 1, 2, 4 (number lines) <i>Honours pre-algebra lesson 1, 2</i>  Algebra 1 lesson 5 <i>Honours algebra 1 lesson 5</i>
<b>Fractions and decimals</b>		
Compare fractions with related denominators and locate and represent them on a number line (ACMNA125)	<ul style="list-style-type: none"> <li>Demonstrating equivalence between fractions using drawings and models</li> </ul>	Epsilon lesson 3, 4, 7, 8, 12, 17 – 22
Solve problems involving addition and subtraction of fractions with the same or related denominators (ACMNA126)	<ul style="list-style-type: none"> <li>Understanding the processes for adding and subtracting fractions with related denominators and fractions as an operator, in preparation for calculating with all fractions</li> <li>Solving realistic additive (addition and subtraction) problems involving fractions to develop understanding of equivalent fractions and the use of fractions as operators</li> </ul>	Epsilon lesson 5, 6, 8, 17 – 22, 26, 28, 30  Zeta lesson 18

	<ul style="list-style-type: none"> <li>Modelling and solving additive problems involving fractions by using methods such as jumps on a number line, or by making diagrams of fractions as parts of shapes</li> </ul>	
Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies (ACMNA127)	<ul style="list-style-type: none"> <li>Recognising that finding one third of a quantity is the same as dividing by 3</li> </ul>	Delta lesson 27  Epsilon lesson 1  Zeta lesson 24  <i>Honours pre-algebra lesson 2</i>
Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (ACMNA128)	<ul style="list-style-type: none"> <li>Extending whole-number strategies to explore and develop meaningful written strategies for addition and subtraction of decimal numbers to thousandths</li> <li>Exploring and practising efficient methods for solving problems requiring operations on decimals, to gain fluency with calculating with decimals and with recognising appropriate operations</li> </ul>	Zeta lesson 4, 5, 6
Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies (ACMNA129)	<ul style="list-style-type: none"> <li>Interpreting the results of calculations to provide an answer appropriate to the context</li> </ul>	Zeta lesson 17, 18, 20, 21, 23
Multiply and divide decimals by powers of 10 (ACMNA130)	<ul style="list-style-type: none"> <li>Multiplying and dividing decimals by multiples of powers of 10</li> </ul>	Zeta lesson 3, 14, 17, 18, 19, 20
Make connections between equivalent fractions, decimals and percentages (ACMNA131)	<ul style="list-style-type: none"> <li>Connecting fractions, decimals and percentages as different representations of the same number, moving fluently between representations and choosing the appropriate one for the problem being solved</li> </ul>	Epsilon lesson 29  Zeta lesson 3, 7, 9 – 11, 13, 14, 17, 18, 21, 23, 24
<b>Money and financial mathematics</b>		
Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies (ACMNA132)	<ul style="list-style-type: none"> <li>Using authentic information to calculate prices on sale goods</li> </ul>	Zeta lesson 11, 12  Pre-algebra lesson 29
<b>Patterns and algebra</b>		
Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence (ACMNA133)	<ul style="list-style-type: none"> <li>Identifying and generalising number patterns</li> <li>Investigating additive and multiplicative patterns such as the number of tiles in a geometric pattern, or the number of dots or other shapes in successive repeats of a strip or border pattern looking for patterns in the way the numbers increase/decrease</li> </ul>	Zeta lesson 3  <i>Honours pre-algebra lesson 6, 7, 17, 21</i>
Explore the use of brackets and order of operations to write number sentences	<ul style="list-style-type: none"> <li>Appreciating the need for rules to complete multiple operations within the same number sentence</li> </ul>	Pre-algebra lesson 14

(ACMNA134)		Algebra 1 lesson 2
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Measurement and Geometry		
Using units of measurement		
Connect decimal representations to the metric system (ACMMG135)	<ul style="list-style-type: none"> <li>Recognising the equivalence of measurements such as 1.25 metres and 125 centimetres</li> </ul>	Gamma lesson 4, 18, 27, 30 Zeta lesson 7, 8, 14 <i>Honours pre-algebra lesson 24, 29</i>
Convert between common metric units of length, mass and capacity (ACMMG136)	<ul style="list-style-type: none"> <li>Identifying and using the correct operations when converting units including millimetres, centimetres, metres, kilometres, milligrams, grams, kilograms, tonnes, millilitres, litres, kilolitres and mega litres</li> <li>Recognising the significance of the prefixes in units of measurement</li> </ul>	Beta lesson 15, 19 Delta lesson 5 Gamma lesson 4, 18, 27, 30 Zeta lesson 7, 8, 14 <i>Honours pre-algebra lesson 2, 24, 29</i> Algebra 1 lesson 27
Solve problems involving the comparison of lengths and areas using appropriate units (ACMMG137)	<ul style="list-style-type: none"> <li>Recognising and investigating familiar objects using concrete materials and digital technologies</li> </ul>	<i>Honours geometry lesson 9, 10</i>
Connect volume and capacity and their units of measurement (ACMMG138)	<ul style="list-style-type: none"> <li>Recognising that 1ml is equivalent to 1cm<sup>3</sup></li> </ul>	Zeta lesson 6
Interpret and use timetables (ACMMG139)	<ul style="list-style-type: none"> <li>Planning a trip involving one or more modes of public transport</li> <li>Developing a timetable of daily activities</li> </ul>	Pre-algebra lesson 26, 28
Shape		
Construct simple prisms and pyramids (ACMMG140)	<ul style="list-style-type: none"> <li>Considering the history and significance of pyramids from a range of cultural perspectives including those structures found in China, Korea and Indonesia</li> <li>Constructing prisms and pyramids from nets, and skeletal models</li> </ul>	<i>Honours pre-algebra lesson 16</i>
Location and transformation		
Investigate combinations of translations, reflections and rotations, with and without the use of digital technologies (ACMMG142)	<ul style="list-style-type: none"> <li>Designing a school or brand logo using transformation of one or more shapes</li> <li>Understanding that translations, rotations and reflections can change the position and orientation but not shape or size</li> </ul>	



Introduce the Cartesian coordinate system using all four quadrants (ACMMG143)	<ul style="list-style-type: none"> <li>Understanding that the Cartesian plane provides a graphical or visual way of describing location</li> </ul>	Algebra 1 lesson 5-4
<b>Geometric reasoning</b>		
<b>Geometry lessons 1 and 2 are good for review and setting the scene for develop geometric reasoning. Honours geometry lesson 1, 11, 22 support the development of logical thinking and reasoning</b>		
Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles (ACMMG141)	<ul style="list-style-type: none"> <li>Identifying the size of a right angle as <math>90^\circ</math> and defining acute, obtuse, straight and reflex angles</li> <li>Measuring, estimating and comparing angles in degrees and classifying angles according to their sizes</li> <li>Investigating the use of rotation and symmetry in the diagrammatic representations of kinship relationships of Central and Western Desert people</li> <li>Recognising and using the two alternate conventions for naming angles</li> </ul>	Zeta lesson 29  Geometry lesson 1, 3

## Statistics and Probability

### Chance

Describe probabilities using fractions, decimals and percentages (ACMSP144)	<ul style="list-style-type: none"><li>Investigating games of chance popular in different cultures and evaluating the relative benefits to the organisers and participants (for example Pachinko)</li></ul>	Zeta lesson 26
Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies (ACMSP145)	<ul style="list-style-type: none"><li>Conducting repeated trials of chance experiments, identifying the variation between trials and realising that the results tend to the prediction with larger numbers of trials</li></ul>	
Compare observed frequencies across experiments with expected frequencies (ACMSP146)	<ul style="list-style-type: none"><li>Predicting likely outcomes from a run of chance events and distinguishing these from surprising results</li></ul>	

### Data representation and interpretation

Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)	<ul style="list-style-type: none"><li>Comparing different student-generated diagrams, tables and graphs, describing their similarities and differences and commenting on the usefulness of each representation for interpreting the data</li><li>Understanding that data can be represented in different ways, sometimes with one symbol representing more than one piece of data, and that it is important to read all information about a representation before making judgments</li></ul>	Zeta lesson 13 <i>Honours algebra 1 lesson 4</i>
Interpret secondary data presented in digital media and elsewhere (ACMSP148)	<ul style="list-style-type: none"><li>Investigating data representations in the media and discussing what they illustrate and the messages the people who created them might want to convey</li><li>Identifying potentially misleading data representations in the media, such as graphs with broken axes or non-linear scales, graphics not drawn to scale, data not related to the population about which the claims are made, and pie charts in which the whole pie does not represent the entire population about which the claims are made</li></ul>	<i>Honours geometry lesson 2, 3 (Venn diagrams)</i>

Australian Curriculum Mathematics Alignment Document_V8.2		Year 7
Content Descriptors	Elaborations	Math-U-See links
<b>Number and Algebra</b>		
<b>Number and Place Value</b>	<b>Honours pre-algebra lesson 30 – developing reasoning and problem solving</b> <b>Honours algebra 1 lesson 1, 2, 3 – developing reasoning and problem solving</b>	
Investigate index notation and represent whole numbers as products of powers of prime numbers S(ACMNA149)	<ul style="list-style-type: none"> <li>defining and comparing prime and composite numbers and explaining the difference between them</li> <li>applying knowledge of factors to strategies for expressing whole numbers as products of powers of prime factors, such as repeated division by prime factors or creating factor trees</li> <li>solving problems involving lowest common multiples and greatest common divisors (highest common factors) for pairs of whole numbers by comparing their prime factorisation</li> </ul>	Epsilon Lesson 13  Pre-algebra lesson 5, 6, 21, 22
Investigate and use square roots of perfect square numbers (ACMNA150)	<ul style="list-style-type: none"> <li>investigating square numbers such as 25 and 36 and developing square-root notation</li> <li>investigating between which two whole numbers a square root lies</li> </ul>	Pre-algebra lesson 8  Algebra 1 lesson 17
Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)	<ul style="list-style-type: none"> <li>understanding that arithmetic laws are powerful ways of describing and simplifying calculations</li> </ul>	Pre-algebra lesson 12, 13  Algebra 1 lesson 1, 4
Compare, order, add and subtract integers (ACMNA280)		Pre-algebra lesson 1, 2, 4 (number lines)
<b>Real numbers</b>		
Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line (ACMNA152)	<ul style="list-style-type: none"> <li>exploring equivalence among families of fractions by using a fraction wall or a number line (for example by using a fraction wall to show that <math>\frac{2}{3}</math> is the same as <math>\frac{4}{6}</math> and <math>\frac{6}{9}</math>)</li> </ul>	Epsilon Lesson 16  Algebra 1 lesson 5
Solve problems involving addition and subtraction of fractions, including those with unrelated denominators (ACMNA153)	<ul style="list-style-type: none"> <li>exploring and developing efficient strategies to solve additive problems involving fractions (for example by using fraction walls or rectangular arrays with dimensions equal to the denominators)</li> </ul>	Epsilon Lesson 5, 6, 8, 17, 18, 19, 20, 21, 22  <i>Honours pre-algebra lesson 4</i>
Multiply and divide fractions and decimals using efficient written strategies and digital technologies (ACMNA154)	<ul style="list-style-type: none"> <li>investigating multiplication of fractions and decimals, using strategies including patterning and multiplication as repeated addition, with both concrete materials and digital technologies, and identifying the processes for division as the inverse of multiplication</li> </ul>	Epsilon Lesson 9, 10, 23, 24, 26, 28, 30
Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)	<ul style="list-style-type: none"> <li>using authentic examples for the quantities to be expressed and understanding the reasons for the calculations</li> </ul>	Epsilon Lesson 9, 10, 23, 24, 26, 28, 30
Round decimals to a specified number of decimal places (ACMNA156)	<ul style="list-style-type: none"> <li>using rounding to estimate the results of calculations with whole numbers and decimals, and understanding the conventions for rounding</li> </ul>	<i>Honours pre-algebra lesson 3, 28</i>
Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)	<ul style="list-style-type: none"> <li>justifying choices of written, mental or calculator strategies for solving specific problems including those involving large numbers</li> </ul>	

	<ul style="list-style-type: none"> <li>understanding that quantities can be represented by different number types and calculated using various operations, and that choices need to be made about each</li> <li>calculating the percentage of the total local municipal area set aside for parkland, manufacturing, retail and residential dwellings to compare land use</li> </ul>	
Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies (ACMNA158)	<ul style="list-style-type: none"> <li>using authentic problems to express quantities as percentages of other amounts</li> </ul>	Pre-algebra lesson 29 <i>Honours pre-algebra lesson 26, 28</i>  <i>Honours algebra 2 lesson 14</i>
Recognise and solve problems involving simple ratios (ACMNA173)	<ul style="list-style-type: none"> <li>understanding that rate and ratio problems can be solved using fractions or percentages and choosing the most efficient form to solve a particular problem</li> </ul>	Pre-algebra lesson 19 <i>Honours pre-algebra lesson 1, 2</i>
<b>Money and financial mathematics</b>		
Investigate and calculate 'best buys', with and without digital technologies (ACMNA174)	<ul style="list-style-type: none"> <li>applying the unitary method to identify 'best buys' situations, such as comparing the cost per 100g</li> </ul>	
<b>Patterns and algebra</b>		
Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)	<ul style="list-style-type: none"> <li>understanding that arithmetic laws are powerful ways of describing and simplifying calculations and that using these laws leads to the generality of algebra</li> </ul>	Epsilon Lesson 24, 26, 28,30 Gamma lesson 8  Pre-algebra lesson 23 <i>Honours pre-algebra lesson 8, 9, 14, 18</i>  Algebra 1 lesson 16
Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)	<ul style="list-style-type: none"> <li>using authentic formulas to perform substitutions</li> </ul>	Gamma lesson 8  Pre-algebra lesson 9 <i>Honours pre-algebra lesson 6, 7, 11, 12, 14, 18</i>  <i>Honours algebra 2 lesson 5</i>
Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)	<ul style="list-style-type: none"> <li>identifying order of operations in contextualised problems, preserving the order by inserting brackets in numerical expressions, then recognising how order is preserved by convention</li> <li>moving fluently between algebraic and word representations as descriptions of the same situation</li> </ul>	Pre-algebra lesson 9, 12, 13, 23 <i>Honours pre-algebra lesson 5, 8, 9, 12, 18</i>  Algebra 1 lesson 3

Linear and non-linear relationships		
Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178)	<ul style="list-style-type: none"> <li>plotting points from a table of integer values and recognising simple patterns, such as points that lie on a straight line</li> </ul>	Algebra 1 lesson 5-4 <i>Honours algebra 1 lesson 5, 6</i>
Solve simple linear equations (ACMNA179)	<ul style="list-style-type: none"> <li>solving equations using concrete materials, such as the balance model, and explain the need to do the same thing to each side of the equation using substitution to check solutions</li> <li>investigating a range of strategies to solve equations</li> </ul>	
Investigate, interpret and analyse graphs from authentic data (ACMNA180)	<ul style="list-style-type: none"> <li>using travel graphs to investigate and compare the distance travelled to and from school</li> <li>interpreting features of travel graphs such as the slope of lines and the meaning of horizontal lines</li> <li>using graphs of evaporation rates to explore water storage</li> </ul>	<i>Honours pre-algebra lesson 2</i>  <i>Honours algebra 1 lesson 4</i>

Measurement and Geometry		
Using units of measurement		
Establish the formulas for areas of rectangles, triangles and parallelograms, and use these in problem-solving (ACMMG159)	<ul style="list-style-type: none"> <li>building on the understanding of the area of rectangles to develop formulas for the area of triangles</li> <li>establishing that the area of a triangle is half the area of an appropriate rectangle</li> <li>using area formulas for rectangles and triangles to solve problems involving areas of surfaces</li> </ul>	Delta lesson 9  Geometry lesson 9 <i>Honours geometry lesson 9, 13</i>  <i>Honours pre-algebra lesson 3, 4, 5, 12</i>
Calculate volumes of rectangular prisms (ACMMG160)	<ul style="list-style-type: none"> <li>investigating volumes of cubes and rectangular prisms and establishing and using the formula <math>V = l \times b \times h</math></li> <li>understanding and using cubic units when interpreting and finding volumes of cubes and rectangular prisms</li> </ul>	Delta lesson 26  Geometry lesson 14 (not cylinders) <i>Honours pre-algebra lesson 29</i>
Shape		
Draw different views of prisms and solids formed from combinations of prisms (ACMMG161)	<ul style="list-style-type: none"> <li>using aerial views of buildings and other 3-D structures to visualise the structure of the building or prism</li> </ul>	<i>Honours pre-algebra lesson 16</i>
Location and transformation		
Describe translations, reflections in an axis and rotations of multiples of $90^\circ$ on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)	<ul style="list-style-type: none"> <li>describing patterns and investigating different ways to produce the same transformation such as using two successive reflections to provide the same result as a translation</li> <li>experimenting with, creating and re-creating patterns using combinations of reflections and rotations using digital technologies</li> </ul>	
Geometric reasoning		
<b>Geometry lessons 1 and 2 are good for review and setting the scene for develop geometric reasoning.</b> <b>Honours geometry lesson 1, 11, 22 support the development of logical thinking and reasoning</b>		
Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165)	<ul style="list-style-type: none"> <li>identifying side and angle properties of scalene, isosceles, right-angled and obtuse-angled triangles</li> <li>describing squares, rectangles, rhombuses, parallelograms, kites and trapeziums</li> </ul>	Delta lesson 7, 13  Geometry lesson 10, 11 <i>Honours geometry lesson 25, 26</i>
Demonstrate that the angle sum of a triangle is $180^\circ$ and use this to find the angle sum of a quadrilateral (ACMMG166)	<ul style="list-style-type: none"> <li>using concrete materials and digital technologies to investigate the angle sum of a triangle and quadrilateral</li> </ul>	Geometry lesson 8, 10, 11 <i>Honours geometry lesson 25, 26</i>
Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal (ACMMG163)	<ul style="list-style-type: none"> <li>defining and classifying pairs of angles as complementary, supplementary, adjacent and vertically opposite</li> </ul>	Geometry lesson 6, 7 <i>Honours geometry lesson 7, 8, 24</i>
Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning (ACMMG164)	<ul style="list-style-type: none"> <li>constructing parallel and perpendicular lines using their properties, a pair of compasses and a ruler, and dynamic geometry software</li> <li>defining and identifying the relationships between alternate, corresponding and co-interior angles for a pair of parallel lines cut by a transversal</li> </ul>	Delta lesson 5  Geometry lesson 5, 6 <i>Honours geometry lesson 24, 25, 26</i>

## Statistics and Probability

### Chance

Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)	<ul style="list-style-type: none"> <li>discussing the meaning of probability terminology (for example probability, sample space, favourable outcomes, trial, events and experiments)</li> <li>distinguishing between equally likely outcomes and outcomes that are not equally likely</li> </ul>	Geometry lesson 2 (set notation)
Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)	<ul style="list-style-type: none"> <li>expressing probabilities as decimals, fractions and percentages</li> </ul>	

### Data representation and interpretation

Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)	<ul style="list-style-type: none"> <li>obtaining secondary data from newspapers, the Internet and the Australian Bureau of Statistics</li> <li>investigating secondary data relating to the distribution and use of non-renewable resources around the world</li> </ul>	Geometry lesson 2, 3  <i>Honours algebra 1 lesson 4</i>
Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)	<ul style="list-style-type: none"> <li>understanding that some data representations are more appropriate than others for particular data sets, and answering questions about those data sets</li> <li>using ordered stem-and-leaf plots to record and display numerical data collected in a class investigation, such as constructing a class plot of height in centimetres on a shared stem-and-leaf plot for which the stems 12, 13, 14, 15, 16 and 17 have been produced</li> </ul>	<i>Honours algebra 1 lesson 9</i>
Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)	<ul style="list-style-type: none"> <li>understanding that summarising data by calculating measures of centre and spread can help make sense of the data</li> </ul>	Delta lesson 11  <i>Honours pre-algebra lesson 27</i>
Describe and interpret data displays using median, mean and range (ACMSP172)	<ul style="list-style-type: none"> <li>using mean and median to compare data sets and explaining how outliers may affect the comparison</li> <li>locating mean, median and range on graphs and connecting them to real life</li> </ul>	<i>Honours pre-algebra lesson 27</i>

Australian Curriculum Mathematics Alignment Document_V8.2		Year 8
Content Descriptors	Elaborations	Math-U-See links
<b>Number and Algebra</b>		
<b>Number and Place Value</b>	<b>Honours pre-algebra lesson 30 – developing reasoning and problem solving</b> <b>Honours algebra 1 lesson 1, 2, 3 – developing reasoning and problem solving</b>	
Use index notation with numbers to establish the index laws with positive integral indices and the zero index (ACMNA182)	<ul style="list-style-type: none"> <li>evaluating numbers expressed as powers of positive integers</li> </ul>	Zeta lesson 1, 2  Pre-algebra lesson 5, 6  Algebra 1 lesson 17  Algebra 2 lesson 1
Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies (ACMNA183)	<ul style="list-style-type: none"> <li>using patterns to assist in finding rules for the multiplication and division of integers</li> <li>using the number line to develop strategies for adding and subtracting rational numbers</li> </ul>	Pre-algebra lesson 1, 2, 3, 4, 7, 21, 22
<b>Real numbers</b>		
Investigate terminating and recurring decimals (ACMNA184)	<ul style="list-style-type: none"> <li>recognising terminating, recurring and non-terminating decimals and choosing their appropriate representations</li> </ul>	Zeta lesson 21
Investigate the concept of irrational numbers, including $\pi$ (ACMNA186)	<ul style="list-style-type: none"> <li>understanding that the real number system includes irrational numbers</li> </ul>	Geometry lesson 17  Algebra 1 lesson 5
Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies (ACMNA187)	<ul style="list-style-type: none"> <li>using percentages to solve problems, including those involving mark-ups, discounts and GST</li> <li>using percentages to calculate population increases and decreases</li> </ul>	Zeta lesson 11, 12  <i>Honours pre-algebra lesson 19, 20</i>  Algebra 2 lesson 14
Solve a range of problems involving rates and ratios, with and without digital technologies (ACMNA188)	<ul style="list-style-type: none"> <li>understanding that rate and ratio problems can be solved using fractions or percentages and choosing the most efficient form to solve a particular problem</li> <li>calculating population growth rates in Australia and Asia and explaining their difference</li> </ul>	Pre-algebra lesson 20  Algebra 2 lesson 17
<b>Money and financial mathematics</b>		
Solve problems involving profit and loss, with and without digital technologies (ACMNA189)	<ul style="list-style-type: none"> <li>expressing profit and loss as a percentage of cost or selling price, comparing the difference</li> <li>investigating the methods used in retail stores to express discounts</li> </ul>	<i>Honours algebra 1 lesson 24, 25</i>  Algebra 2 lesson 14-2



<b>Patterns and algebra</b>		
Extend and apply the distributive law to the expansion of algebraic expressions (ACMNA190)	<ul style="list-style-type: none"> <li>applying the distributive law to the expansion of algebraic expressions using strategies such as the area model</li> </ul>	Pre-algebra lesson 12, 13 <i>Honours pre-algebra lesson 25</i>
Factorise algebraic expressions by identifying numerical factors (ACMNA191)	<ul style="list-style-type: none"> <li>recognising the relationship between factorising and expanding</li> <li>identifying the greatest common divisor (highest common factor) of numeric and algebraic expressions and using a range of strategies to factorise algebraic expressions</li> </ul>	
Simplify algebraic expressions involving the four operations (ACMNA192)	<ul style="list-style-type: none"> <li>understanding that the laws used with numbers can also be used with algebra</li> </ul>	Pre-algebra lesson 9, 19, 23 <i>Honours pre-algebra lesson 23</i>  Algebra 1 lesson 3, 16, 19 (addition)  Algebra 2 lesson 15
<b>Linear and non-linear relationships</b>		
Plot linear relationships on the Cartesian plane with and without the use of digital technologies (ACMNA193)	<ul style="list-style-type: none"> <li>completing a table of values, plotting the resulting points and determining whether the relationship is linear</li> <li>finding the rule for a linear relationship</li> </ul>	Algebra 1 lesson 6, 8, 9 <i>Honours algebra 1 lesson 10, 18</i>
Solve linear equations using algebraic and graphical techniques. Verify solutions by substitution (ACMNA194)	<ul style="list-style-type: none"> <li>solving real life problems by using variables to represent unknowns</li> </ul>	Pre-algebra lesson 9, 16, 17  <i>Honours algebra 1 lesson 8, 10, 13, 18</i>

Measurement and Geometry		
Using units of measurement		
Choose appropriate units of measurement for area and volume and convert from one unit to another (ACMMG195)	<ul style="list-style-type: none"> <li>choosing units for area including <math>\text{mm}^2</math>, <math>\text{cm}^2</math>, <math>\text{m}^2</math>, hectares, <math>\text{km}^2</math>, and units for volume including <math>\text{mm}^3</math>, <math>\text{cm}^3</math>, <math>\text{m}^3</math></li> <li>recognising that the conversion factors for area units are the squares of those for the corresponding linear units</li> <li>recognising that the conversion factors for volume units are the cubes of those for the corresponding linear units</li> </ul>	<i>Honours geometry lesson 15</i>  <i>Honours pre-algebra lesson 24</i>
Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites (ACMMG196)	<ul style="list-style-type: none"> <li>establishing and using formulas for areas such as trapeziums, rhombuses and kites</li> </ul>	Delta lesson 8, 13  Geometry lesson 8, 9 <i>Honours geometry lesson 9, 12</i>  <i>Honours pre-algebra lesson 3, 4</i>
Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area (ACMMG197)	<ul style="list-style-type: none"> <li>investigating the circumference and area of circles with materials or by measuring, to establish an understanding of formulas</li> <li>investigating the area of circles using a square grid or by rearranging a circle divided into sectors</li> </ul>	Epsilon lesson 27  Zeta lesson 16, 23  Geometry lesson 12, 13 (definitions only) <i>Honours geometry lesson 12, 16</i>  <i>Honours pre-algebra lesson 3, 4, 5</i>
Develop formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving volume (ACMMG198)	<ul style="list-style-type: none"> <li>investigating the relationship between volumes of rectangular and triangular prisms</li> </ul>	Geometry lesson 14, 15 <i>Honours geometry lesson 16, 19</i>
Solve problems involving duration, including using 12- and 24-hour time within a single time zone (ACMMG199)	<ul style="list-style-type: none"> <li>identifying regions in Australia and countries in Asia that are in the same time zone</li> </ul>	Pre-algebra lesson 26, 28 <i>Honours pre-algebra lesson 4</i>
Geometric reasoning		
<b>Geometry lessons 1 and 2 are good for review and setting the scene for develop geometric reasoning. Honours geometry lesson 1, 11, 22 support the development of logical thinking and reasoning</b>		
Define congruence of plane shapes using transformations (ACMMG200)	<ul style="list-style-type: none"> <li>understanding the properties that determine congruence of triangles and recognising which transformations create congruent figures</li> <li>establishing that two figures are congruent if one shape lies exactly on top of the other after one or more transformations (translation, reflection, rotation), and recognising that the matching sides and the matching angles are equal</li> </ul>	Zeta lesson 28  Geometry lesson 23

Develop the conditions for congruence of triangles (ACMMG201)	<ul style="list-style-type: none"> <li>• investigating the minimal conditions needed for the unique construction of triangles, leading to the establishment of the conditions for congruence (SSS, SAS, ASA and RHS)</li> <li>• solving problems using the properties of congruent figures</li> <li>• constructing triangles using the conditions for congruence</li> </ul>	Geometry lesson 24, 25, 26
Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problems using reasoning (ACMMG202)	<ul style="list-style-type: none"> <li>• establishing the properties of squares, rectangles, parallelograms, rhombuses, trapeziums and kites</li> <li>• identifying properties related to side lengths, parallel sides, angles, diagonals and symmetry</li> </ul>	Geometry lesson 23 <i>Honours geometry lesson 8, 24, 25, 26</i>

## Statistics and Probability

### Chance

Identify complementary events and use the sum of probabilities to solve problems (ACMSP204)	<ul style="list-style-type: none"><li>identifying the complement of familiar events</li><li>understanding that probabilities range between 0 to 1 and that calculating the probability of an event allows the probability of its complement to be found</li></ul>	
Describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and' (ACMSP205)	<ul style="list-style-type: none"><li>posing 'and', 'or' and 'not' probability questions about objects or people</li></ul>	Geometry lesson 2 (set terminology)
Represent events in two-way tables and Venn diagrams and solve related problems (ACMSP292)	<ul style="list-style-type: none"><li>using Venn diagrams and two-way tables to calculate probabilities for events, satisfying 'and', 'or' and 'not' conditions</li><li>understanding that representing data in Venn diagrams or two-way tables facilitates the calculation of probabilities</li><li>collecting data to answer the questions using Venn diagrams or two-way tables</li></ul>	<i>Honours geometry lesson 2, 3</i>

### Data representation and interpretation

Investigate techniques for collecting data, including census, sampling and observation (ACMSP284)	<ul style="list-style-type: none"><li>identifying situations where data can be collected by census and those where a sample is appropriate</li></ul>	
Explore the practicalities and implications of obtaining data through sampling using a variety of investigative processes (ACMSP206)	<ul style="list-style-type: none"><li>investigating the uses of random sampling to collect data</li></ul>	
Explore the variation of means and proportions of random samples drawn from the same population (ACMSP293)	<ul style="list-style-type: none"><li>using sample properties to predict characteristics of the population</li></ul>	
Investigate the effect of individual data values, including outliers, on the mean, and median (ACMSP207)	<ul style="list-style-type: none"><li>using displays of data to explore and investigate effects</li></ul>	<i>Honours pre-algebra lesson 27</i>

Australian Curriculum Mathematics Alignment Document_V8.2		Year 9
Content Descriptors	Elaborations	Math-U-See links
<b>Number and Algebra</b>		
<b>Real numbers</b>	<b>Honours pre-algebra lesson 30 – developing reasoning and problem solving</b> <b>Honours algebra 1 lesson 1, 2, 3 – developing reasoning and problem solving</b>	
Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems (ACMNA208)	<ul style="list-style-type: none"> <li>identifying direct proportion in real-life contexts</li> </ul>	Pre-algebra lesson 19, 20 <i>Honours pre-algebra lesson 19, 20</i>  Algebra 2 lesson 18, 19, 28-3, 28-4, 29-2, 29-3 <i>Honours algebra 2 lesson 2, 3, 4, 5, 16, 19</i>
Apply index laws to numerical expressions with integer indices (ACMNA209)	<ul style="list-style-type: none"> <li>simplifying and evaluating numerical expressions, using involving both positive and negative integer indices</li> </ul>	Pre-algebra lesson 5, 6, 7  Algebra 1 lesson 17, 18 <i>Honours algebra 1 lesson 21, 22 26</i>  Algebra 2 lesson 1
Express numbers in scientific notation (ACMNA210)	<ul style="list-style-type: none"> <li>representing extremely large and small numbers in scientific notation, and numbers expressed in scientific notation as whole numbers or decimals</li> </ul>	Algebra 1 lesson 31 <i>Honours algebra 1 lesson 31, 33</i>  Algebra 2 lesson 3 <i>Honours algebra 2 lesson 3, 4</i>
<b>Money and financial mathematics</b>		
Solve problems involving simple interest (ACMNA211)	<ul style="list-style-type: none"> <li>understanding that financial decisions can be assisted by mathematical calculations</li> </ul>	<i>Honours algebra 1 lesson 15, 16, 24, 25</i>
<b>Patterns and algebra</b>		
Extend and apply the index laws to variables, using positive integer indices and the zero index (ACMNA212)	<ul style="list-style-type: none"> <li>understanding that index laws apply to variables as well as numbers</li> </ul>	Algebra 1 lesson 17, 18, 25 <i>Honours algebra 1 lesson 21</i>  Algebra 2 lesson 3
Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate (ACMNA213)	<ul style="list-style-type: none"> <li>understanding that the distributive law can be applied to algebraic expressions as well as numbers</li> <li>understanding the relationship between expansion and factorisation and identifying algebraic factors in algebraic expressions</li> </ul>	Pre-algebra lesson 25 <i>Honours pre-algebra 1 lesson 25</i>  Algebra 1 lesson 16, 19, 20, 21, 22, 23, 24, 25

		<i>Honours algebra 1 lesson 23, 26</i>  Algebra 2 lesson 2, 5-3, 15, 28-2, 28-1 <i>Honours algebra 2 lesson 15, 23</i>
<b>Linear and non-linear relationships</b>		
Find the distance between two points located on the Cartesian plane using a range of strategies, including graphing software (ACMNA214)	<ul style="list-style-type: none"> <li>investigating graphical and algebraic techniques for finding distance between two points</li> <li>using Pythagoras' theorem to calculate distance between two points</li> </ul>	Algebra 2 lesson 22
Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294)	<ul style="list-style-type: none"> <li>investigating graphical and algebraic techniques for finding midpoint and gradient</li> <li>recognising that the gradient of a line is the same as the gradient of any line segment on that line</li> </ul>	Algebra 1 lesson 20, 22 <i>Honours algebra 1 lesson 7</i>  Algebra 2 lesson 3
Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215)	<ul style="list-style-type: none"> <li>determining linear rules from suitable diagrams, tables of values and graphs and describing them using both words and algebra</li> </ul>	Algebra 1 lesson 6, 7, 8, 9, 10 <i>Honours algebra 1 lesson 10, 11, 13, 18</i>  <i>Honours algebra 2 lesson 29</i>
Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations (ACMNA296)	<ul style="list-style-type: none"> <li>graphing parabolas, and circles connecting x-intercepts of a graph to a related equation</li> </ul>	Algebra 1 lesson 26 <i>Honours algebra 1 lesson 19, 20</i>  Algebra 2 lesson 23-2, 23-3, 24, 26 <i>Honours algebra 2 lesson 21, 22</i>

<b>Measurement and Geometry</b>		
<b>Using units of measurement</b>		
Calculate areas of composite shapes (ACMMG216)	<ul style="list-style-type: none"> <li>understanding that partitioning composite shapes into rectangles and triangles is a strategy for solving problems involving area</li> </ul>	<i>Honours geometry lesson 9, 13</i>  <i>Honours pre-algebra lesson 15</i>  <i>Honours algebra 2 lesson 18</i>
Calculate the surface area and volume of cylinders and solve related problems (ACMMG217)	<ul style="list-style-type: none"> <li>analysing nets of cylinders to establish formulas for surface area</li> <li>connecting the volume and capacity of a cylinder to solve authentic problems</li> </ul>	Geometry lesson 14, 16 <i>Honours geometry lesson 14, 16</i>  Pre-algebra lesson 24
Solve problems involving the surface area and volume of right prisms (ACMMG218)	<ul style="list-style-type: none"> <li>solving practical problems involving surface area and volume of right prisms</li> </ul>	Geometry lesson 15, 16 <i>Honours geometry lesson 15, 16, 19</i>  Pre-algebra lesson 15, 27  <i>Honours algebra 2 lesson 18</i>
Investigate very small and very large time scales and intervals (ACMMG219)	<ul style="list-style-type: none"> <li>investigating the usefulness of scientific notation in representing very large and very small numbers</li> </ul>	Algebra 1 lesson 31 <i>Honours algebra 1 lesson 31, 33</i>
<b>Geometric reasoning</b> <b>Geometry lessons 1 and 2 are good for review and setting the scene for develop geometric reasoning.</b> <b>Honours geometry lesson 1, 11, 22 support the development of logical thinking and reasoning</b>		
Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar (ACMMG220)	<ul style="list-style-type: none"> <li>establishing the conditions for similarity of two triangles and comparing this to the conditions for congruence</li> <li>using the properties of similarity and ratio, and correct mathematical notation and language, to solve problems involving enlargement (for example, scale diagrams)</li> <li>using the enlargement transformation to establish similarity, understanding that similarity and congruence help describe relationships between geometrical shapes and are important elements of reasoning and proof</li> </ul>	Geometry lesson 27
Solve problems using ratio and scale factors in similar figures (ACMMG221)	<ul style="list-style-type: none"> <li>establishing the relationship between areas of similar figures and the ratio of corresponding sides (scale factor)</li> </ul>	Geometry lesson 27 <i>Honours geometry lesson 10, 20</i>  <i>Honours algebra 2 lesson 5, 6</i>
<b>Pythagoras and trigonometry</b>		
Investigate Pythagoras' Theorem and its application to solving simple problems involving right angled triangles (ACMMG222)	<ul style="list-style-type: none"> <li>understanding that Pythagoras' Theorem is a useful tool in determining unknown lengths in right-angled triangles and has widespread applications</li> </ul>	Geometry lesson 18, 20, 21 <i>Honours geometry lesson 18, 21</i>

	<ul style="list-style-type: none"> <li>recognising that right-angled triangle calculations may generate results that can be integers, fractions or irrational numbers</li> </ul>	Pre-algebra 1 lesson 11 <i>Honours pre-algebra lesson 10, 13</i>  Algebra 2 lesson 31-1
Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles (ACMMG223)	<ul style="list-style-type: none"> <li>developing understanding of the relationship between the corresponding sides of similar right-angled triangles</li> </ul>	Geometry lesson 26, 27 <i>Honours geometry lesson 29</i>
Apply trigonometry to solve right-angled triangle problems (ACMMG224)	<ul style="list-style-type: none"> <li>understanding the terms 'adjacent' and 'opposite' sides in a right-angled triangle</li> <li>selecting and accurately using the correct trigonometric ratio to find unknown sides (adjacent, opposite and hypotenuse) and angles in right-angled triangles</li> </ul>	Geometry lesson 29 <i>Honours geometry lesson 30</i>  Algebra 2 lesson 31-4, 31-5



## Statistics and Probability

### Chance

List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events (ACMSP225)	<ul style="list-style-type: none"><li>conducting two-step chance experiments</li><li>using systematic methods to list outcomes of experiments and to list outcomes favourable to an event</li><li>comparing experiments which differ only by being undertaken with replacement or without replacement</li></ul>	Geometry lesson 2 (set terminology)
Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' (ACMSP226)	<ul style="list-style-type: none"><li>using Venn diagrams or two-way tables to calculate relative frequencies of events involving 'and', 'or' questions</li><li>using relative frequencies to find an estimate of probabilities of 'and', 'or' events</li></ul>	
Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians (ACMSP227)	<ul style="list-style-type: none"><li>investigating a range of data and its sources, for example the age of residents in Australia, Cambodia and Tonga; the number of subjects studied at school in a year by 14-year-old students in Australia, Japan and Timor-Leste</li></ul>	

### Data representation and interpretation

Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly and from secondary sources (ACMSP228)	<ul style="list-style-type: none"><li>comparing the annual rainfall in various parts of Australia, Pakistan, New Guinea and Malaysia</li></ul>	
Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal' (ACMSP282)	<ul style="list-style-type: none"><li>using stem-and-leaf plots to compare two like sets of data such as the heights of girls and the heights of boys in a class</li><li>describing the shape of the distribution of data using terms such as 'positive skew', 'negative skew' and 'symmetric' and 'bi-modal'</li></ul>	
Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (ACMSP283)	<ul style="list-style-type: none"><li>comparing means, medians and ranges of two sets of numerical data which have been displayed using histograms, dot plots, or stem and leaf plots</li></ul>	<i>Honours pre-algebra lesson 27</i>

Australian Curriculum Mathematics Alignment Document_V8.2		Year 10
Content Descriptors	Elaborations	Math-U-See links
<b>Number and Algebra</b>		
<b>Money and financial mathematics</b>		
Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229)	<ul style="list-style-type: none"> <li>working with authentic information, data and interest rates to calculate compound interest and solve related problems</li> </ul>	
<b>Patterns and algebra</b>		
Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230)	<ul style="list-style-type: none"> <li>using the distributive law and the index laws to factorise algebraic expressions</li> <li>understanding the relationship between factorisation and expansion</li> </ul>	Honours Algebra 1, lesson 26 Algebra 2, lessons 1, 2, 5
Simplify algebraic products and quotients using index laws (ACMNA231)	<ul style="list-style-type: none"> <li>applying knowledge of index laws to algebraic terms, and simplifying algebraic expressions using both positive and negative integral indices</li> </ul>	Algebra 2, lessons 2, 3, 15
Apply the four operations to simple algebraic fractions with numerical denominators (ACMNA232)	<ul style="list-style-type: none"> <li>expressing the sum and difference of algebraic fractions with a common denominator</li> <li>using the index laws to simplify products and quotients of algebraic fractions</li> </ul>	Algebra 2, lesson 5 (extension)
Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233)	<ul style="list-style-type: none"> <li>exploring the method of completing the square to factorise quadratic expressions and solve quadratic equations</li> <li>identifying and using common factors, including binomial expressions, to factorise algebraic expressions using the technique of grouping in pairs</li> <li>using the identities for perfect squares and the difference of squares to factorise quadratic expressions</li> </ul>	Algebra 2, lessons 5, 11, 12 Honours Algebra 2, lesson 17
Substitute values into formulas to determine an unknown (ACMNA234)	<ul style="list-style-type: none"> <li>solving simple equations arising from formulas</li> </ul>	Algebra 2, lesson 5 Honours Algebra 2, lesson 20
<b>Linear and non-linear relationships</b>		
Solve problems involving linear equations, including those derived from formulas (ACMNA235)	<ul style="list-style-type: none"> <li>representing word problems with simple linear equations and solving them to answer questions</li> </ul>	Algebra 2, lessons 18, 19
Solve linear inequalities and graph their solutions on a number line (ACMNA236)	<ul style="list-style-type: none"> <li>representing word problems with simple linear inequalities and solving them to answer questions</li> </ul>	Honours Algebra 1, lesson 12 Honours Algebra 2, lessons 27, 28
Solve linear simultaneous equations, using algebraic and graphical techniques, including using digital technology (ACMNA237)	<ul style="list-style-type: none"> <li>associating the solution of simultaneous equations with the coordinates of the intersection of their corresponding graphs</li> </ul>	Honours Algebra 1, lessons 14, 17 Algebra 2, lessons 28, 29, 30 (extension) Honours Algebra 2, lessons 24, 34

Solve problems involving parallel and perpendicular lines (ACMNA238)	<ul style="list-style-type: none"> <li>solving problems using the fact that parallel lines have the same gradient and conversely that if two lines have the same gradient then they are parallel</li> <li>solving problems using the fact that the product of the gradients of perpendicular lines is <math>-1</math> and conversely that if the product of the gradients of two lines is <math>-1</math> then they are perpendicular</li> </ul>	Algebra 2, lessons 20, 21
Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate (ACMNA239)	<ul style="list-style-type: none"> <li>sketching graphs of parabolas, and circles</li> <li>applying translations, reflections and stretches to parabolas and circles</li> <li>sketching the graphs of exponential functions using transformations</li> </ul>	Honours Algebra 1, lessons 19, 20
Solve linear equations involving simple algebraic fractions (ACMNA240)	<ul style="list-style-type: none"> <li>solving a wide range of linear equations, including those involving one or two simple algebraic fractions, and checking solutions by substitution</li> <li>representing word problems, including those involving fractions, as equations and solving them to answer the question</li> </ul>	Honours Algebra 1, lesson 27
Solve simple quadratic equations using a range of strategies (ACMNA241)	<ul style="list-style-type: none"> <li>using a variety of techniques to solve quadratic equations, including grouping, completing the square, the quadratic formula and choosing two integers with the required product and sum</li> </ul>	Honours Algebra 1, lessons 28, 34 Honours Algebra 2, lessons 13, 25, 26, 30

## Measurement and Geometry

### Using units of measurement

Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids (ACMMG242)	<ul style="list-style-type: none"> <li>investigating and determining the volumes and surface areas of composite solids by considering the individual solids from which they are constructed</li> </ul>	Geometry Honours, lesson 19
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### Geometric reasoning

**Geometry lessons 1 and 2 are good for review and setting the scene to develop geometric reasoning. Honours geometry lesson 1, 11, 22 support the development of logical thinking and reasoning**

Formulate proofs involving congruent triangles and angle properties (ACMMG243)	<ul style="list-style-type: none"> <li>applying an understanding of relationships to deduce properties of geometric figures (for example the base angles of an isosceles triangle are equal)</li> </ul>	Geometry, lesson 22 Geometry Honours, lessons 22, 23
Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes (ACMMG244)	<ul style="list-style-type: none"> <li>distinguishing between a practical demonstration and a proof (for example demonstrating triangles are congruent by placing them on top of each other, as compared to using congruence tests to establish that triangles are congruent)</li> <li>Performing a sequence of steps to determine an unknown angle giving a justification in moving from one step to the next.</li> <li>communicating a proof using a sequence of logically connected statements</li> </ul>	Geometry Honours, lessons 25, 26, 30

Pythagoras and trigonometry		
Solve right-angled triangle problems including those involving direction and angles of elevation and depression (ACMMG245)	<ul style="list-style-type: none"> <li>applying Pythagoras' Theorem and trigonometry to problems in surveying and design</li> </ul>	(Review – Pre-Calculus , lessons 1 – 5) Pre-Calculus, lesson 6 Geometry Honours, lessons 18, 21
Statistics and Probability		
Chance		
Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence (ACMSP246)	<ul style="list-style-type: none"> <li>recognising that an event can be dependent on another event and that this will affect the way its probability is calculated</li> </ul>	
Use the language of 'if ....then', 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247)	<ul style="list-style-type: none"> <li>using two-way tables and Venn diagrams to understand conditional statements</li> <li>using arrays and tree diagrams to determine probabilities</li> </ul>	
Data representation and interpretation		
Determine quartiles and interquartile range(ACMSP248)	finding the five-number summary (minimum and maximum values, median and upper and lower quartiles) and using its graphical representation, the box plot, as tools for both numerically and visually comparing the centre and spread of data sets	
Construct and interpret box plots and use them to compare data sets (ACMSP249)	<ul style="list-style-type: none"> <li>understanding that box plots are an efficient and common way of representing and summarising data and can facilitate comparisons between data sets</li> <li>using parallel box plots to compare data about the age distribution of Aboriginal and Torres Strait Islander people with that of the Australian population as a whole</li> </ul>	
Compare shapes of box plots to corresponding histograms and dot plots (ACMSP250)	<ul style="list-style-type: none"> <li>investigating data in different ways to make comparisons and draw conclusions</li> </ul>	
Use scatter plots to investigate and comment on relationships between two numerical variables (ACMSP251)	<ul style="list-style-type: none"> <li>using authentic data to construct scatter plots, make comparisons and draw conclusions</li> </ul>	
Investigate and describe bivariate numerical data where the independent variable is time (ACMSP252)	<ul style="list-style-type: none"> <li>investigating biodiversity changes in Australia since European occupation</li> <li>constructing and interpreting data displays representing bivariate data over time</li> </ul>	
Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data (ACMSP253)	<ul style="list-style-type: none"> <li>investigating the use of statistics in reports regarding the growth of Australia's trade with other countries of the Asia region</li> </ul>	

	<ul style="list-style-type: none"><li>• evaluating statistical reports comparing the life expectancy of Aboriginal and Torres Strait Islander people with that of the Australian population as a whole</li></ul>	
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