## (no-code)

**recognise situations, including financial , that use ; locate and represent on a and as on the**

•

**Elaborations**

• extending the in the negative direction to locate and represent , recognising the difference in location between (- 2 2 2 ) and (+ 2 2 2 ) and their relationship to as - 2 < 0 < 2 2< 0< 2 2 < 0 < 2

• using to represent quantities in financial , including the concept of profit and loss for a planned

• using horizontal and vertical to represent and find solutions to everyday problems involving locating and ordering around ; for example, elevators, above and below sea level; distinguishing a location by referencing to the 4 4 4 quadrants of the

• recognising that the sign (positive or negative) indicates a direction in to ; for example, 30 30 3 0 metres left of the admin block is (- 30 30 3 0 ) and 20 20 2 0 metres right of the admin block is (+ 20 20 2 0 ); programming robots to move along a which is either horizontal or vertical but not both at the same time

• representing the temperatures of the different planets in the solar system, using a diagram of a thermometer that models a vertical

Students learn to:

## recognise situations, including financial contexts, that use integers; locate and repr on a number line and as coordinates on the Cartesian plane

(AC9M6N01)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Measurement and geometry**

• Positioning and locating

**Number sense and algebra**

• Number and place value

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Number sense and algebra**

• Understanding money

**Measurement and geometry**

• Positioning and locating

**Measurement and geometry**

• Positioning and locating

### Related content

This content description can be taught with the following content descriptions from other learning areas.

AC9TDI6K03

### Resources

### Work Samples

## WS03 - Interpreting and comparing data

### Snapshot – Positioning and locating

## Numeracy: Measurement and geometry: Positioning and locating

### Content description

AC9M6N01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Using formal maps and plans**

• locates position on maps using grid references (e.g. locates the school in cell E5; uses grid references to identify specific locations on a stage and when creating a stage plan, lighting design or prompt script)
• describes routes using landmarks and directional language including reference to quarter, half, three-quarter turns; turns to the left and right; clockwise and anticlockwise turns (e.g. communicates strategic plays in relation to coaching a team game or sport)
• interprets keys, simple scales and compass directions contained within a map to locate features (e.g. uses a map and compass directions when bush walking or orienteering)

### Using proportional thinking for scaling

• interprets the scale used to create plans, drawings or maps (e.g. interprets scale to determine the approximate distance between two locations when orienteering)
• interprets and uses plans and maps involving scale (e.g. creates and interprets scale drawings when designing and making set pieces for a production)
• describes and interprets maps to determine the geographical location and positioning of states and territories within Australia and of countries relative to Australia
• interprets and uses more formal directional language such as compass bearings, degrees of turn, coordinates and distances to locate position or the distance from one location to another (e.g. identifies coordinates using GPS technologies)

## Snapshot – Number and place value

# Numeracy: Number sense and algebra: Number and place value

## Content description

AC9M6N01

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

### Numeral recognition and identification

• identifies, reads, writes and interprets decimal numbers applying knowledge of the place value periods of tenths, hundredths and thousandths and beyond

### Place value

• compares the size of decimals to other numbers including natural numbers and decimals expressed to different numbers of places (e.g. selects 0.35 0.35 0 . 3 5 as the greatest number from the set 0.2 , 0.125 , 0.35 0.2, 0.125, 0.35 0 . 2 , 0 . 1 2 5 , 0 . 3 5 ; explains that 2 2 2 is greater than 1.845 1.845 1 . 8 4 5 )
• describes the multiplicative relationship between the adjacent positions in place value for decimals (e.g. understands that 0.2 0.2 0 . 2 is 10 10 1 0 times as great as 0.02 0.02 0 . 0 2 and that 100 100 1 0 0 times 0.005 0.005 0 . 0 0 5 is 0.5 0.5 0 . 5 )
• compares and orders decimals greater than one including those expressed to an unequal number of places (e.g. compares the heights of students in the class that are expressed in metres such as 1.6 1.6 1 . 6 m is taller than 1.52 1.52 1 . 5 2 m; correctly orders the numbers 1.4 1.4 1 . 4 , 1.375 1.375 1 . 3 7 5 and 2.15 2.15 2 . 1 5 from least to greatest)
• rounds decimals to one and 2 decimal places for a purpose

### Numeral recognition and identification

• reads, represents, interprets and uses negative numbers in computation (e.g. explains that the temperature – 10 10 1 0 °C is colder than the temperature – 2.5 2.5 2 . 5 °C; recognises that negative numbers are less than zero; locates – 12 12 1 2 on a number line)

### Place value

• identifies that negative numbers are integers that represent both size and direction (e.g. uses a number line to represent position and order negative numbers; uses negative numbers in financial contexts such as to model an overdrawn account)
• understands that multiplying and dividing numbers by 10 , 100 , 1000 10, 100, 1000 1 0 , 1 0 0 , 1 0 0 0 changes the positional value of the digits (e.g. explains that 100 100 1 0 0 times 0.125 0.125 0 . 1 2 5 is 12.5 12.5 1 2 . 5 because each digit value in 0.125 0.125 0 . 1 2 5 is multiplied by 100 100 1 0 0 , so 100 × 0.1 100 \times 0.1 1 0 0 × 0 . 1 is 10 10 1 0 , 100 × 0.02 100 \times 0.02 1 0 0 × 0 . 0 2 is 2 2 2 and 100 × 0.005 100 \times 0.005 1 0 0 × 0 . 0 0 5 is 0.5 0.5 0 . 5 ; converts between units of centimetres and millimetres when planning, measuring and marking materials

for cutting)
• rounds decimals to a specified number of decimal places for a purpose (e.g. the mean distance thrown in a school javelin competition was rounded to 2 2 2 decimal places; if the percentage profit was calculated as 12.467921 12.467921 1 2 . 4 6 7 9 2 1 %, rounds the calculation to 12.5 12.5 1 2 . 5 %)

**Numeral recognition and identification**

• identifies, reads and interprets very large numbers and very small numbers (e.g. reads that the world population is estimated to be seven billion and interprets this to mean 7 7 7 000 000 0 0 0 000 000 0 0 0 000 000 0 0 0 or 7 × 1 0 9 7 \times 10^9 7 × 1 0 9 ; interprets the approximate mass of protons and neutrons as 1.67 × 1 0 – 24 1.67 \times10^{-24} 1 . 6 7 × 1 0 – 2 4 g; identifies and interprets the value of national government debt)

**Place value**

• compares and orders very large numbers and very small numbers (e.g. understands the relative size of very large time scales such as a millennium)
• relates place value parts to exponents (e.g. 1000 1000 1 0 0 0 is 100 100 1 0 0 times greater than 10 10 1 0 , and that is why 10 × 1 0 2 = 1 0 3 10 \times 10^2 = 10^3 1 0 × 1 0 2 = 1 0 3 and why 1 0 3 10^3 1 0 3 divided by 10 10 1 0 is equal to 1 0 2 10^2 1 0 2 )
• expresses numbers in scientific notation (e.g. when calculating the distance of the Earth from the sun uses 1.5 × 1 0 8 1.5\times 10^8 1 . 5 × 1 0 8 as an approximation; a nanometre has an order of magnitude of – 9 9 9 and is represented as 1 0 – 9 10^{-9} 1 0 – 9 )

## Snapshot – Understanding money

# Numeracy: Number sense and algebra: Understanding money

## Content description

AC9M6N01

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Working with money additively**

• calculates the total cost of several different items in dollars and cents
• counts the change required for simple transactions to the nearest 5 5 5 cents
• calculates the change, to the nearest 5 5 5 cents, after a purchase using additive strategies (e.g adds change to obtain the amount tendered)
• determines the conditions for a profit or a loss on a transaction

**Working with money multiplicatively**

• calculates the total cost of several identical items in dollars and cents
• connects the multiplicative relationship between dollars and cents to decimal notation (e.g. explains that a quarter of dollar is equal to $ 0.25 \$0.25 $ 0 . 2 5 or 25 25 2 5 cents; calculates what 150 150 1 5 0 copies will cost if they are advertised at 15 15 1 5 c a print and expresses this in dollars and cents as $ 22.50 \$22.50 $ 2 2 . 5 0 )
• solves problems, such as repeated purchases, splitting a bill or calculating monthly subscription fees, using multiplicative strategies
• makes and uses simple financial plans (e.g. creates a classroom budget for an excursion; planning for a school fete)

**Working with money proportionally**

• calculates the percentage change with and without the use of digital tools (e.g. using GST as 10 10 1 0 % multiplies an amount by 0.1 0.1 0 . 1 to calculate the GST payable or divides the total paid by 11 11 1 1 to calculate the amount of GST charged; calculates the cost after a 25 25 2 5 % discount on items)
• calculates income tax payable using taxation tables
• interprets an interest rate from a given percentage and calculates simple interest payable on a short-term loan (e.g. calculates the total interest payable on a car loan)

## Snapshot – Positioning and locating

# Numeracy: Measurement and geometry: Positioning and locating

## Content description

AC9M6N01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

#### Using formal maps and plans

• locates position on maps using grid references (e.g. locates the school in cell E5; uses grid references to identify specific locations on a stage and when creating a stage plan, lighting design or prompt script)
• describes routes using landmarks and directional language including reference to quarter, half, three-quarter turns; turns to the left and right; clockwise and anticlockwise turns (e.g. communicates strategic plays in relation to coaching a team game or sport)
• interprets keys, simple scales and compass directions contained within a map to locate features (e.g. uses a map and compass directions when bush walking or orienteering)

#### Using proportional thinking for scaling

• interprets the scale used to create plans, drawings or maps (e.g. interprets scale to determine the approximate distance between two locations when orienteering)
• interprets and uses plans and maps involving scale (e.g. creates and interprets scale drawings when designing and making set pieces for a production)
• describes and interprets maps to determine the geographical location and positioning of states and territories within Australia and of countries relative to Australia
• interprets and uses more formal directional language such as compass bearings, degrees of turn, coordinates and distances to locate position or the distance from one location to another (e.g. identifies coordinates using GPS technologies)

## Snapshot – Positioning and locating

# Numeracy: Measurement and geometry: Positioning and locating

### Content description

AC9M6N01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

#### Using formal maps and plans

• locates position on maps using grid references (e.g. locates the school in cell E5; uses grid references to identify specific locations on a stage and when creating a stage plan, lighting design or prompt script)
• describes routes using landmarks and directional language including reference to quarter, half, three-quarter turns; turns to the left and right; clockwise and anticlockwise turns (e.g. communicates strategic plays in relation to coaching a team game or sport)
• interprets keys, simple scales and compass directions contained within a map to locate features (e.g. uses a map and compass directions when bush walking or orienteering)

#### Using proportional thinking for scaling

• interprets the scale used to create plans, drawings or maps (e.g. interprets scale to determine the approximate distance between two locations when orienteering)
• interprets and uses plans and maps involving scale (e.g. creates and interprets scale drawings when designing and making set pieces for a production)
• describes and interprets maps to determine the geographical location and positioning of states and territories within Australia and of countries relative to Australia
• interprets and uses more formal directional language such as compass bearings, degrees of turn, coordinates and distances to locate position or the distance from one location to another (e.g. identifies coordinates using GPS technologies)

## Resource – WS03 - Interpreting and comparing data

By the end of Year 6, students use integers to represent points on a number line and in the Cartesian plane.■They solve problems using the properties of prime, composite and square numbers.■Students order common fractions, giving reasons, and add and subtract fractions with related denominators.■They use all 4 operations with decimals and connect decimal representations of measurements to the metric system.■Students solve problems involving finding a fraction, decimal or

percentage of a quantity and use estimation to find approximate solutions to problems involving rational numbers and percentages.■They use mathematical modelling to solve financial and other practical problems involving percentages and rational numbers, formulating and solving the problem, and justifying choices.■Students find unknown values in numerical equations involving combinations of arithmetic operations.■They identify and explain rules used to create growing patterns.■Students create and use algorithms to generate sets of numbers, using a rule.

They interpret and use timetables.■Students convert between common units of length, mass and capacity.■They use the formula for the area of a rectangle and angle properties to solve problems.■Students identify the parallel cross-section for right prisms.■They create tessellating patterns using combinations of transformations.■Students locate an ordered pair in any one of the 4 quadrants on the Cartesian plane.

They compare distributions of discrete and continuous numerical and ordinal categorical data sets as part of their statistical investigations, using digital tools.■Students critique arguments presented in the media based on statistics.■They assign probabilities using common fractions, decimal and percentages.■Students conduct simulations using digital tools, to generate and record the outcomes from many trials of a chance experiment.■They compare observed frequencies to the expected frequencies of the outcomes of chance experiments.

## AC9M6ST01

interpret and compare data sets for ordinal and nominal categorical, discrete and continuous numerical variables using comparative displays or visualisations and digital tools; compare distributions in terms of mode, range and shape

## AC9M6N01

recognise situations, including financial contexts, that use integers; locate and represent integers on a number line and as coordinates on the Cartesian plane

## AC9M6A01

**recognise and use rules that generate visually and number patterns involving**

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**Elaborations**

• investigating patterns such as the number of tiles in a geometric pattern, or the number of dots or other in successive repeats of a strip or border pattern; looking for patterns in the way the numbers increase/decrease

• using a calculator or spreadsheet to experiment with number patterns that result from multiplying or dividing; for example, 1 ÷ 9 , 2 ÷ 9 , 3 ÷ 9 1 ÷ 9, 2 ÷ 9, 3 ÷ 9 1 ÷ 9 , 2 ÷ 9 , 3 ÷ 9 …, 210 × 11 , 211 × 11 , 212 × 11 210 \times 11, 211 \times 11, 212 \times 11 2 1 0 × 1 1 , 2 1 1 × 1 1 , 2 1 2 × 1 1 …, 111 × 11 , 222 × 11 , 333 × 11 111 \times 11, 222 \times 11, 333 \times 11 1 1 1 × 1 1 , 2 2 2 × 1 1 , 3 3 3 × 1 1 …, or 100 ÷ 99 , 101 ÷ 99 , 102 ÷ 99 100 ÷ 99, 101 ÷ 99, 102 ÷ 99 1 0 0 ÷ 9 9 , 1 0 1 ÷ 9 9 , 1 0 2 ÷ 9 9 …

• creating an extended number sequence that represents an pattern using ; for example, representing the pattern formed as students pay their $ 2.50 \$2.50 $ 2 . 5 0 for an incursion as 2.50 , 5.00 , 7.50 , 10.00 , 12.50 , 15.00 , 17.50 2.50, 5.00, 7.50, 10.00, 12.50, 15.00, 17.50 2 . 5 0 , 5 . 0 0 , 7 . 5 0 , 1 0 . 0 0 , 1 2 . 5 0 , 1 5 . 0 0 , 1 7 . 5 0 …

• investigating the number of regions created by successive folds of a sheet of paper: one fold, 2 2 2 regions; 2 2 2 folds, 4 4 4 regions; 3 3 3 folds, 8 8 8 regions, and describing the pattern using everyday language

• creating a pattern sequence with materials, writing the associated number sequence and then describing the sequence with a rule so someone else can replicate it with different materials; for example, using matchsticks or toothpicks to create a growing pattern of triangles using 3 3 3 for one triangle, 5 5 5 for 2 2 2 triangles, 7 7 7 for 3 3 3 triangles and describing the pattern as, “Multiply the number of triangles by 2 2 2 and then add one for the extra toothpick in the first triangle”

Students learn to:

## recognise and use rules that generate visually growing patterns and number patterns and rational numbers

(AC9M6A01)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Analysing**

• Interpret concepts and problems

**Generating**

• Consider alternatives

**Inquiring**

• Identify, process and evaluate information

**Number sense and algebra**

• Number patterns and algebraic thinking

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Inquiring**

• Identify, process and evaluate information

**Managing and operating**

• Select and operate tools

**Number sense and algebra**

• Number and place value

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Interpret concepts and problems

**Inquiring**

• Identify, process and evaluate information

### Snapshot – Interpret concepts and problems

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6A01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem

• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area

• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

### Snapshot – Consider alternatives

## Critical and Creative Thinking: Generating: Consider alternatives

### Content description

AC9M6A01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• consider alternatives by comparing different or creative ways to approach a task, issue or problem and recommend a preferred option

• consider alternatives by challenging or creatively adjusting existing ideas in situations where current approaches do not work and recommend a preferred option

• consider alternatives by creatively adapting ideas when information is limited or conflicting and recommend a preferred option

### Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6A01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Number patterns and algebraic thinking

## Numeracy: Number sense and algebra: Number patterns and algebraic thinking

### Content description

AC9M6A01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

#### Generalising patterns

• represents growing patterns where each successive term is determined by multiplying the previous term by a constant, using concrete materials, then summarises the pattern numerically (e.g. constructs a pattern using concrete materials such as tiles then summarises the pattern as 2 , 6 , 18 , 54 2, 6, 18, 54 2 , 6 , 1 8 , 5 4 ...)

• describes rules for copying or continuing patterns where each successive term is found by multiplying or dividing the previous term by the same factor (e.g. to determine the next term in the pattern 1 , 3 , 9 , 27 1, 3, 9, 27 1 , 3 , 9 , 2 7 … multiply by 3 3 3 )

#### Relational thinking

• uses relational thinking to determine the missing values in a number sentence (e.g. 6 + 6 +\space 6 + ? = 7 + 4 = 7 + 4 = 7 + 4 )

• uses equivalent number sentences involving addition or subtraction to calculate efficiently or to find an unknown (e.g. 527 + 96 = 527 + 96 = \space 5 2 7 + 9 6 = ? is the same as 527 + 100 – 4 = 527 + 100\space – 4 = \space 5 2 7 + 1 0 0 – 4 = ? ; If 6 + 6 + \space 6 + ? = 8 + 3 = 8 + 3 = 8 + 3 , then as I know 8 = 6 + 2 8 = 6 + 2 8 = 6 + 2 , I can write 8 + 3 8 + 3 8 + 3 as 6 + 2 + 3 6 + 2 + 3 6 + 2 + 3 , which is the same as 6 + 5 6 + 5 6 + 5 therefore '?' is 5 5 5 )

• solves numerical equations involving unknowns using the inverse relationship between multiplication and division (e.g. determines the missing number in 2 × 2 \times\space 2 × ? = 10 = 10 = 1 0 knowing 10 ÷ 2 10 ÷ 2 1 0 ÷ 2 is equal to 5 5 5 then ? must be 5 5 5 )

#### Generalising patterns

• creates and interprets tables used to summarise patterns (e.g. the cost of hiring a bike based on the cost per hour)

• identifies a single operation rule in numerical patterns and records it in words (e.g. European dress size = Australian dress size + 30 +30 + 3 0 )

• relates the position number of shapes within a pattern to the rule for the sequence (e.g. number of counters = = = shape number + 2 + 2 + 2 )

• determines a higher term of a pattern using the pattern's rule

• extends number patterns to include rational numbers (e.g. 2 , 2 1 4 , 2 1 2 , 2 3 4 , 3 2, 2 \frac14, 2\frac12, 2\frac34, 3 2 , 2 4 1 ■ , 2 2 1 ■ , 2 4 3 ■ , 3 …; 2 , 2, 2 , - 4 , 8 , 4, 8, 4 , 8 , - 16 16 1 6 …; 10 , 9.8 , 9.6 , 9.4 10, 9.8, 9.6, 9.4 1 0 , 9 . 8 , 9 . 6 , 9 . 4 …)

#### Relational thinking

• solves numerical equations involving one or more operations following conventions of order of operations (e.g. 5 × 2 + 4 = 4 × 2 + 5 \times 2 + 4 = 4 \times 2 + 5 × 2 + 4 = 4 × 2 + ?; 6 + 6 + 6 + ? × 4 = 9 × 2 \times 4 = 9 \times 2 × 4 = 9 × 2 )

• identifies and uses equivalence in number sentences to solve multiplicative problems involving numerical equations (e.g. uses a number balance or other materials to represent the number sentence 6 × 4 = 12 × 6 \times 4 = 12 \times 6 × 4 = 1 2 × ? in order to solve a problem)

**Representing unknowns**

• creates algebraic expressions to represent relationships involving one or more operations (e.g. when n = n = n = number of egg cartons, then the number of eggs can be represented by the expression 12 n 12n 1 2 n ; to find the number of neutrons n n n given the atomic mass A A A and number of protons p p p , uses n = A – p n = A - p n = A – p )

• uses words or symbols to express relationships involving unknown values (e.g. total number of apples = 48 × = 48\space\times = 4 8 × number of boxes; C = 20 + 30 h C = 20 + 30h C = 2 0 + 3 0 h where C C C is the total cost and h h h is the hours of labour; uses v = d t v=\frac dt v = t d ■ to represent the relationship between velocity, distance and time)

• evaluates an algebraic expression or equation by substitution (e.g. uses the formula for force F F F , F = m a F=ma F = m a to calculate the force given the mass m m m and the acceleration a a a )

## Snapshot – Identify, process and evaluate information

# Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6A01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Select and operate tools

# Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6A01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• select and use a range of digital tools to complete tasks

• attempt to solve a problem individually and with peers before seeking help

• select and use the core features of digital tools to efficiently complete tasks

• troubleshoot basic problems and identify repetitive tasks to automate

• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks

• troubleshoot common problems and automate repetitive tasks

## Snapshot – Number and place value

# Numeracy: Number sense and algebra: Number and place value

### Content description

AC9M6A01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Numeral recognition and identification**

• identifies, reads and writes numerals, beyond 4 4 4 digits in length, with spacing after every 3 3 3 digits (e.g. 10 10 1 0 204 204 2 0 4 , 25 25 2 5 000 000 0 0 0 000 000 0 0 0 ; 12 12 1 2 230.25 230.25 2 3 0 . 2 5 ; reads 152 152 1 5 2 450 450 4 5 0 as "one hundred and 52 52 5 2 thousand 4 4 4 hundred and 50 50 5 0 "; compares the size of populations for different countries or the cost of expensive items with an advertised selling price in the millions)

• identifies, reads and writes decimals to one and 2 2 2 decimal places (e.g. reads 4.75 4.75 4 . 7 5 as "four point seven five" or 4 4 4 and 75 75 7 5 hundredths; writes 4 4 4 dollars and 5 5 5 cents as $ 4.05 \$4.05 $ 4 . 0 5 )

**Place value**

• estimates and rounds natural numbers to the nearest 10 thousand, thousand etc. recognising the multiplicative relationships between the place value of the digits (e.g. estimates the crowd numbers at a football match; says that the $ 9863 \$9863 $ 9 8 6 3 raised at a charity event was close to $ 10 \$10 $ 1 0 000 000 0 0 0 ; recognises that 200 years is 10 times as large as 20 years, and applies this to environmental change)

• explains that the place value names for decimal numbers relate to the ones place value

• explains and demonstrates that the place value system extends beyond tenths to hundredths, thousandths … (e.g. uses decimals to represent part units of measurement for length, mass, capacity and temperature)

• represents, compares, orders and interprets decimals up to 2 2 2 decimal places (e.g. constructs a number line to include decimal values between zero and one, when asked "which is greater 0.19 0.19 0 . 1 9 or 0.2 0.2 0 . 2 ?", responds " 0.2 0.2 0 . 2 " ; interprets and compares measurements such as the temperature on different days or the change in height of a growing plant observed and recorded during science investigations)

• rounds decimals to the nearest natural number in order to estimate answers (e.g. estimates the length of material needed by rounding up the measurement to the nearest natural number)

**Numeral recognition and identification**

• identifies, reads, writes and interprets decimal numbers applying knowledge of the place value periods of tenths, hundredths and thousandths and beyond

**Place value**

• compares the size of decimals to other numbers including natural numbers and decimals expressed to different numbers of places (e.g. selects 0.35 0.35 0 . 3 5 as the greatest number from the set 0.2 , 0.125 , 0.35 0.2, 0.125, 0.35 0 . 2 , 0 . 1 2 5 , 0 . 3 5 ; explains that 2 2 2 is greater than 1.845 1.845 1 . 8 4 5 )

• describes the multiplicative relationship between the adjacent positions in place value for decimals (e.g. understands that 0.2 0.2 0 . 2 is 10 10 1 0 times as great as 0.02 0.02 0 . 0 2 and that 100 100 1 0 0 times 0.005 0.005 0 . 0 0 5 is 0.5 0.5 0 . 5 )

• compares and orders decimals greater than one including those expressed to an unequal number of places (e.g. compares the heights of students in the class that are expressed in metres such as 1.6 1.6 1 . 6 m is taller than 1.52 1.52 1 . 5 2 m; correctly orders the numbers 1.4 1.4 1 . 4 , 1.375 1.375 1 . 3 7 5 and 2.15 2.15 2 . 1 5 from least to greatest)

• rounds decimals to one and 2 decimal places for a purpose

**Numeral recognition and identification**

• reads, represents, interprets and uses negative numbers in computation (e.g. explains that the temperature – 10 10 1 0 °C is colder than the temperature – 2.5 2.5 2 . 5 °C; recognises that negative numbers are less than zero; locates – 12 12 1 2 on a number line)

**Place value**

• identifies that negative numbers are integers that represent both size and direction (e.g. uses a number line to represent position and order negative numbers; uses negative numbers in financial contexts such as to model an overdrawn account)

• understands that multiplying and dividing numbers by 10 , 100 , 1000 10, 100, 1000 1 0 , 1 0 0 , 1 0 0 0 changes the positional value of the digits (e.g. explains that 100 100 1 0 0 times 0.125 0.125 0 . 1 2 5 is 12.5 12.5 1 2 . 5 because each digit value in 0.125 0.125 0 . 1 2 5 is multiplied by 100 100 1 0 0 , so 100 × 0.1 100 \times 0.1 1 0 0 × 0 . 1 is 10 10 1 0 , 100 × 0.02 100 \times 0.02 1 0 0 × 0 . 0 2 is 2 2 2 and 100 × 0.005 100 \times 0.005 1 0 0 × 0 . 0 0 5 is 0.5 0.5 0 . 5 ; converts between units of centimetres and millimetres when planning, measuring and marking materials for cutting)

• rounds decimals to a specified number of decimal places for a purpose (e.g. the mean distance thrown in a school javelin competition was rounded to 2 2 2 decimal places; if the percentage profit was calculated as 12.467921 12.467921 1 2 . 4 6 7 9 2 1 %, rounds the calculation to 12.5 12.5 1 2 . 5 %)

## Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informatio

### Content description

AC9M6A01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Interpret concepts and problems**

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6A01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informatio

### Content description

AC9M6A01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

# AC9M6A02

**find unknown values in numerical involving brackets and combinations of arithmetic , using the properties of numbers and**

•
•

**Elaborations**

• using brackets and the to write and appreciating the need for an agreed of rules to complete multiple within the same ; for example, for 40 ÷ 2 × ( 4 + 6 ) = ■ 40 ÷ 2 \times (4 + 6) = \square 40 ÷ 2 × ( 4 + 6 ) = ■ , you solve what is in the brackets first then complete the from left to right as there is no hierarchy between and multiplication
• constructing involving brackets and combinations of the 4 4 4 ; explaining the need to have shared agreement on the when solving problems involving more than one operation to have unique solutions
• finding pairs of unknown values in numerical that make the hold true; for example, listing

possible combinations of that make this statement true: 6 + 4 × 8 = 6 × ■ + ■
6+4\times8\;=\;6\times\bigtriangleup+\square 6 + 4 × 8 = 6 × ■ + ■
• applying knowledge of and number properties to create ; removing one of the numbers and replacing it with a symbol, then swapping with a classmate to find the unknown values
Students learn to:

## find unknown values in numerical equations involving brackets and combinations o operations, using the properties of numbers and operations

(AC9M6A02)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Inquiring**

• Identify, process and evaluate information

**Number sense and algebra**

• Additive strategies
• Multiplicative strategies
• Number patterns and algebraic thinking

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Interpret concepts and problems

**Number sense and algebra**

• Additive strategies

**Analysing**

• Interpret concepts and problems

**Generating**

• Consider alternatives

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Interpret concepts and problems

**Inquiring**

• Identify, process and evaluate information

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6A02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Additive strategies**

## Numeracy: Number sense and algebra: Additive strategies

### Content description

AC9M6A02

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

#### Flexible strategies with three-digit numbers and beyond

• uses place value, standard and non-standard partitioning, trading or exchanging of units to mentally add and subtract numbers with 3 3 3 or more digits (e.g. to add 250 250 2 5 0 and 457 457 4 5 7 , partitions 250 250 2 5 0 into 2 2 2 hundreds and 5 5 5 tens, says 457 457 4 5 7 plus 2 2 2 hundreds is 657 657 6 5 7 , plus 5 5 5 tens is 707 707 7 0 7 ; to add 184 184 1 8 4 and 270 270 2 7 0 partitions into 150 + 34 + 250 + 20 = 400 + 34 + 20 = 454 150 + 34 + 250 + 20 = 400 + 34+ 20 = 454 1 5 0 + 3 4 + 2 5 0 + 2 0 = 4 0 0 + 3 4 + 2 0 = 4 5 4 )

• chooses and uses strategies including algorithms and technology to efficiently solve additive problems (e.g. develops total costings for ingredients or materials for a task or combines measurements to determine the total amount of materials required)

• uses estimation to determine the reasonableness of the solution to an additive problem (e.g. when asked to add 249 249 2 4 9 and 437 437 4 3 7 says " 250 + 440 250 + 440 2 5 0 + 4 4 0 is 690 690 6 9 0 ")

• represents a wide range of familiar real-world additive situations involving large numbers as standard number sentences explaining their reasoning

#### Flexible strategies with fractions and decimals

• uses knowledge of place value and how to partition numbers in different ways to make the calculation easier when adding and subtracting decimals with up to 3 3 3 decimal places

• identifies and justifies the need for a common denominator when solving additive problems involving fractions with related denominators

• represents a wide range of familiar real-world additive situations involving decimals and common fractions as standard number sentences, explaining their reasoning

#### Flexible strategies with rational numbers

• uses knowledge of equivalent fractions, multiplicative thinking and how to partition fractional numbers to make calculations easier when adding and subtracting fractions with different denominators

• solves additive problems involving the addition and subtraction of rational numbers including fractions with unrelated denominators and integers

• chooses and uses appropriate strategies to solve multi-step problems involving the addition and subtraction of rational numbers

## Snapshot – Multiplicative strategies

# Numeracy: Number sense and algebra: Multiplicative strategies

### Content description

AC9M6A02

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

#### Flexible strategies for multi-digit multiplication and division

• solves multi-step problems involving multiplicative situations using appropriate mental strategies, digital tools and algorithms (e.g. uses a rate of application to determine the amount of paint required to cover a large area and determines how many tins of paint are required)

• interprets, represents and solves multifaceted problems involving all 4 4 4 operations with natural numbers

#### Flexible strategies for multiplication and division of rational numbers

• expresses a number as a product of its prime factors for a purpose

• expresses repeated factors of the same number in exponent form (e.g. 2 × 2 × 2 × 3 × 3 = 2 3 × 3 2 2 \times 2 \times 2 \times 3 \times 3 = 2^3\times 3^2 2 × 2 × 2 × 3 × 3 = 2 3 × 3 2

• identifies and describes products of the same number as square or cube numbers (e.g. 3 × 3 3 \times 3 3 × 3 is the same as 3 2 3^2 3 2 which is read as 3 3 3 squared)

• describes the effect of multiplication by a decimal or fraction less than one (e.g. when multiplying natural numbers by a fraction or decimal less than one such as 15 × 1 2 = 7.5 15 \times\frac12 = 7.5 1 5 × 2 1 ■ = 7 . 5 )

• connects and converts decimals to fractions to assist in mental computation involving multiplication or division (e.g. to calculate 16 × 0.25 16 \times 0.25 1 6 × 0 . 2 5 , recognises 0.25 0.25 0 . 2 5 as a quarter, and determines a quarter of 16 16 1 6 or determines 0.5 ÷ 0.25 0.5 ÷ 0.25 0 . 5 ÷ 0 . 2 5 , by reading this as "one half, how many quarters?" and gives the answer as 2 2 2 )
• calculates the percentage of a quantity flexibly using multiplication and division (e.g. to calculate 13 13 1 3 % of 1600 1600 1 6 0 0 uses 0.13 × 1600 0.13 \times 1600 0 . 1 3 × 1 6 0 0 or 1600 ÷ 100 × 13 1600 ÷ 100 \times 13 1 6 0 0 ÷ 1 0 0 × 1 3 )
• uses multiplicative strategies efficiently to solve problems involving rational numbers including integers (e.g. calculates the average temperature for Mt Wellington for July to be ■ 1.6 1.6 1 . 6 ■C)

**Flexible strategies for working multiplicatively**

• uses knowledge of place value and multiplicative partitioning to multiply and divide decimals efficiently (e.g. 0.461 × 200 = 0.461 × 100 × 2 = 46.1 × 2 = 92.2 0.461 \times 200 = 0.461 \times 100 \times 2 = 46.1 \times 2 = 92.2 0 . 4 6 1 × 2 0 0 = 0 . 4 6 1 × 1 0 0 × 2 = 4 6 . 1 × 2 = 9 2 . 2 )
• flexibly operates multiplicatively with extremely large or very small numbers expressed in scientific notation (e.g. calculates the area of a computer chip measuring 2.56 × 1 0 – 6 2.56 \times 10^{-6} 2 . 5 6 × 1 0 – 6 m in width by 1.4 × 1 0 – 7 1.4 \times 10^{-7} 1 . 4 × 1 0 – 7 m in length)
• chooses and uses appropriate strategies to solve multi-step problems and model situations involving rational numbers
• represents and solves multifaceted problems in a wide range of multiplicative situations including scientific notation for those involving very small or very large numbers (e.g. chooses to calculate the percentage of a percentage to determine successive discounts; determines the time it takes for sunlight to reach the earth)

## Snapshot – Number patterns and algebraic thinking

# Numeracy: Number sense and algebra: Number patterns and algebraic thinking

## Content description

AC9M6A02

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Generalising patterns**

• represents growing patterns where each successive term is determined by multiplying the previous term by a constant, using concrete materials, then summarises the pattern numerically (e.g. constructs a pattern using concrete materials such as tiles then summarises the pattern as 2 , 6 , 18 , 54 2, 6, 18, 54 2 , 6 , 1 8 , 5 4 ...)
• describes rules for copying or continuing patterns where each successive term is found by multiplying or dividing the previous term by the same factor (e.g. to determine the next term in the pattern 1 , 3 , 9 , 27 1, 3, 9, 27 1 , 3 , 9 , 2 7 … multiply by 3 3 3 )

**Relational thinking**

• uses relational thinking to determine the missing values in a number sentence (e.g. 6 + 6 +\space 6 + ? = 7 + 4 = 7 + 4 = 7 + 4 )
• uses equivalent number sentences involving addition or subtraction to calculate efficiently or to find an unknown (e.g. 527 + 96 = 527 + 96 = \space 5 2 7 + 9 6 = ? is the same as 527 + 100 – 4 = 527 + 100\space – 4 = \space 5 2 7 + 1 0 0 – 4 = ? ; If 6 + 6 + \space 6 + ? = 8 + 3 = 8 + 3 = 8 + 3 , then as I know 8 = 6 + 2 8 = 6 + 2 8 = 6 + 2 , I can write 8 + 3 8 + 3 8 + 3 as 6 + 2 + 3 6 + 2 + 3 6 + 2 + 3 , which is the same as 6 + 5 6 + 5 6 + 5 therefore '?' is 5 5 5 )
• solves numerical equations involving unknowns using the inverse relationship between multiplication and division (e.g. determines the missing number in 2 × 2 \times\space 2 × ? = 10 = 10 = 1 0 knowing 10 ÷ 2 10 ÷ 2 1 0 ÷ 2 is equal to 5 5 5 then ? must be 5 5 5 )

**Generalising patterns**

• creates and interprets tables used to summarise patterns (e.g. the cost of hiring a bike based on the cost per hour)
• identifies a single operation rule in numerical patterns and records it in words (e.g. European

dress size = Australian dress size + 30 +30 + 3 0 )
• relates the position number of shapes within a pattern to the rule for the sequence (e.g. number of counters = = = shape number + 2 + 2 + 2 )
• determines a higher term of a pattern using the pattern's rule
• extends number patterns to include rational numbers (e.g. 2 , 2 1 4 , 2 1 2 , 2 3 4 , 3 2, 2 \frac14, 2\frac12, 2\frac34, 3 2 , 2 4 1 ■ , 2 2 1 ■ , 2 4 3 ■ , 3 …; 2 , 2, 2 , - 4 , 8 , 4, 8, 4 , 8 , - 16 16 1 6 …; 10 , 9.8 , 9.6 , 9.4 10, 9.8, 9.6, 9.4 1 0 , 9 . 8 , 9 . 6 , 9 . 4 …)

**Relational thinking**

• solves numerical equations involving one or more operations following conventions of order of operations (e.g. 5 × 2 + 4 = 4 × 2 + 5 \times 2 + 4 = 4 \times 2 + 5 × 2 + 4 = 4 × 2 + ?; 6 + 6 + 6 + ? × 4 = 9 × 2 \times 4 = 9 \times 2 × 4 = 9 × 2 )
• identifies and uses equivalence in number sentences to solve multiplicative problems involving numerical equations (e.g. uses a number balance or other materials to represent the number sentence 6 × 4 = 12 × 6 \times 4 = 12 \times 6 × 4 = 1 2 × ? in order to solve a problem)

**Representing unknowns**

• creates algebraic expressions to represent relationships involving one or more operations (e.g. when n = n = n = number of egg cartons, then the number of eggs can be represented by the expression 12 n 12n 1 2 n ; to find the number of neutrons n n n given the atomic mass A A A and number of protons p p p , uses n = A – p n = A - p n = A – p )
• uses words or symbols to express relationships involving unknown values (e.g. total number of apples = 48 × = 48\space\times = 4 8 × number of boxes; C = 20 + 30 h C = 20 + 30h C = 2 0 + 3 0 h where C C C is the total cost and h h h is the hours of labour; uses v = d t v=\frac dt v = t d ■ to represent the relationship between velocity, distance and time)
• evaluates an algebraic expression or equation by substitution (e.g. uses the formula for force F F F , F = m a F=ma F = m a to calculate the force given the mass m m m and the acceleration a a a )

## Snapshot – Interpret concepts and problems

# Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6A02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

## Snapshot – Additive strategies

# Numeracy: Number sense and algebra: Additive strategies

### Content description

AC9M6A02

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Flexible strategies with three-digit numbers and beyond**

• uses place value, standard and non-standard partitioning, trading or exchanging of units to mentally add and subtract numbers with 3 3 3 or more digits (e.g. to add 250 250 2 5 0 and 457 457 4 5 7 , partitions 250 250 2 5 0 into 2 2 2 hundreds and 5 5 5 tens, says 457 457 4 5 7 plus 2 2 2 hundreds is 657 657 6 5 7 , plus 5 5 5 tens is 707 707 7 0 7 ; to add 184 184 1 8 4 and 270 270 2 7 0 partitions into 150 + 34 + 250 + 20 = 400 + 34 + 20 = 454 150 + 34 + 250 + 20 = 400 + 34+ 20 = 454 1 5 0 + 3 4 + 2 5 0 + 2 0 = 4 0 0 + 3 4 + 2 0 = 4 5 4 )
• chooses and uses strategies including algorithms and technology to efficiently solve additive problems (e.g. develops total costings for ingredients or materials for a task or combines measurements to determine the total amount of materials required)
• uses estimation to determine the reasonableness of the solution to an additive problem (e.g. when asked to add 249 249 2 4 9 and 437 437 4 3 7 says " 250 + 440 250 + 440 2 5 0 + 4 4 0 is 690 690 6 9

0 ")
• represents a wide range of familiar real-world additive situations involving large numbers as standard number sentences explaining their reasoning

**Flexible strategies with fractions and decimals**

• uses knowledge of place value and how to partition numbers in different ways to make the calculation easier when adding and subtracting decimals with up to 3 3 3 decimal places
• identifies and justifies the need for a common denominator when solving additive problems involving fractions with related denominators
• represents a wide range of familiar real-world additive situations involving decimals and common fractions as standard number sentences, explaining their reasoning

**Flexible strategies with rational numbers**

• uses knowledge of equivalent fractions, multiplicative thinking and how to partition fractional numbers to make calculations easier when adding and subtracting fractions with different denominators
• solves additive problems involving the addition and subtraction of rational numbers including fractions with unrelated denominators and integers
• chooses and uses appropriate strategies to solve multi-step problems involving the addition and subtraction of rational numbers

## Snapshot – Interpret concepts and problems

# Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6A02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

## Snapshot – Consider alternatives

# Critical and Creative Thinking: Generating: Consider alternatives

### Content description

AC9M6A02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• consider alternatives by comparing different or creative ways to approach a task, issue or problem and recommend a preferred option
• consider alternatives by challenging or creatively adjusting existing ideas in situations where current approaches do not work and recommend a preferred option
• consider alternatives by creatively adapting ideas when information is limited or conflicting and recommend a preferred option

## Snapshot – Identify, process and evaluate information

# Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6A02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual

information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Interpret concepts and problems**

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6A02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6A02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

# AC9M6A03

**create and use involving a sequence of steps and decisions that use rules to generate of numbers; identify, interpret and explain emerging patterns**

•
•

**Elaborations**

• using an algorithm to create extended number sequences involving , using a rule and , explaining any emerging patterns
• designing an algorithm to model , using the concept of input and output, describing and explaining relationships and any emerging patterns; for example, using to model and recognising and comparing and relationships
• designing an algorithm or writing a simple program to generate a sequence of numbers based on the user's input and a chosen operation, discussing any emerging patterns; for example, generating a sequence of numbers and comparing how quickly the sequences are growing in comparison to each other using the rule adding 2 2 2 to the input number compared to multiplying the input number by 2 2 2

Students learn to:

## create and use algorithms involving a sequence of steps and decisions that use rul sets of numbers; identify, interpret and explain emerging patterns

(AC9M6A03)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Analysing**

• Draw conclusions and provide reasons

**Generating**

• Create possibilities

**Number sense and algebra**

• Number patterns and algebraic thinking

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Draw conclusions and provide reasons

**Managing and operating**

• Select and operate tools

**Analysing**

• Draw conclusions and provide reasons

**Analysing**

• Interpret concepts and problems

• Draw conclusions and provide reasons

### Related content

This content description can be taught with the following content descriptions from other learning areas.

AC9TDI6P02

**Snapshot – Draw conclusions and provide reasons**

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6A03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

**Snapshot – Create possibilities**

## Critical and Creative Thinking: Generating: Create possibilities

### Content description

AC9M6A03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• create possibilities by connecting or creatively expanding on new and known ideas in a variety of ways

• create possibilities by changing, combining, or elaborating on new and known ideas in a variety of creative ways

• create possibilities by adapting, combining or elaborating on new and known ideas, and proposing a range of different or creative combinations

**Snapshot – Number patterns and algebraic thinking**

## Numeracy: Number sense and algebra: Number patterns and algebraic thinking

### Content description

AC9M6A03

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Generalising patterns**

• represents growing patterns where each successive term is determined by multiplying the previous term by a constant, using concrete materials, then summarises the pattern numerically (e.g.

constructs a pattern using concrete materials such as tiles then summarises the pattern as 2 , 6 , 18 , 54 2, 6, 18, 54 2 , 6 , 1 8 , 5 4 ...)

• describes rules for copying or continuing patterns where each successive term is found by multiplying or dividing the previous term by the same factor (e.g. to determine the next term in the pattern 1 , 3 , 9 , 27 1, 3, 9, 27 1 , 3 , 9 , 2 7 … multiply by 3 3 3 )

**Relational thinking**

• uses relational thinking to determine the missing values in a number sentence (e.g. 6 + 6 +\space 6 + ? = 7 + 4 = 7 + 4 = 7 + 4 )

• uses equivalent number sentences involving addition or subtraction to calculate efficiently or to find an unknown (e.g. 527 + 96 = 527 + 96 = \space 5 2 7 + 9 6 = ? is the same as 527 + 100 – 4 = 527 + 100\space – 4 = \space 5 2 7 + 1 0 0 – 4 = ? ; If 6 + 6 + \space 6 + ? = 8 + 3 = 8 + 3 = 8 + 3 , then as I know 8 = 6 + 2 8 = 6 + 2 8 = 6 + 2 , I can write 8 + 3 8 + 3 8 + 3 as 6 + 2 + 3 6 + 2 + 3 6 + 2 + 3 , which is the same as 6 + 5 6 + 5 6 + 5 therefore '?' is 5 5 5 )

• solves numerical equations involving unknowns using the inverse relationship between multiplication and division (e.g. determines the missing number in 2 × 2 \times\space 2 × ? = 10 = 10 = 1 0 knowing 10 ÷ 2 10 ÷ 2 1 0 ÷ 2 is equal to 5 5 5 then ? must be 5 5 5 )

**Generalising patterns**

• creates and interprets tables used to summarise patterns (e.g. the cost of hiring a bike based on the cost per hour)

• identifies a single operation rule in numerical patterns and records it in words (e.g. European dress size = Australian dress size + 30 +30 + 3 0 )

• relates the position number of shapes within a pattern to the rule for the sequence (e.g. number of counters = = = shape number + 2 + 2 + 2 )

• determines a higher term of a pattern using the pattern's rule

• extends number patterns to include rational numbers (e.g. 2 , 2 1 4 , 2 1 2 , 2 3 4 , 3 2, 2 \frac14, 2\frac12, 2\frac34, 3 2 , 2 4 1 ■ , 2 2 1 ■ , 2 4 3 ■ , 3 …; 2 , 2, 2 , - 4 , 8 , 4, 8, 4 , 8 , - 16 16 1 6 …; 10 , 9.8 , 9.6 , 9.4 10, 9.8, 9.6, 9.4 1 0 , 9 . 8 , 9 . 6 , 9 . 4 …)

**Relational thinking**

• solves numerical equations involving one or more operations following conventions of order of operations (e.g. 5 × 2 + 4 = 4 × 2 + 5 \times 2 + 4 = 4 \times 2 + 5 × 2 + 4 = 4 × 2 + ?; 6 + 6 + 6 + ? × 4 = 9 × 2 \times 4 = 9 \times 2 × 4 = 9 × 2 )

• identifies and uses equivalence in number sentences to solve multiplicative problems involving numerical equations (e.g. uses a number balance or other materials to represent the number sentence 6 × 4 = 12 × 6 \times 4 = 12 \times 6 × 4 = 1 2 × ? in order to solve a problem)

**Representing unknowns**

• creates algebraic expressions to represent relationships involving one or more operations (e.g. when n = n = n = number of egg cartons, then the number of eggs can be represented by the expression 12 n 12n 1 2 n ; to find the number of neutrons n n n given the atomic mass A A A and number of protons p p p , uses n = A – p n = A - p n = A – p )

• uses words or symbols to express relationships involving unknown values (e.g. total number of apples = 48 × = 48\space\times = 4 8 × number of boxes; C = 20 + 30 h C = 20 + 30h C = 2 0 + 3 0 h where C C C is the total cost and h h h is the hours of labour; uses v = d t v=\frac dt v = t d ■ to represent the relationship between velocity, distance and time)

• evaluates an algebraic expression or equation by substitution (e.g. uses the formula for force F F F , F = m a F=ma F = m a to calculate the force given the mass m m m and the acceleration a a a )

## Snapshot – Draw conclusions and provide reasons

# Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

## Content description

AC9M6A03

## Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and

across discipline areas to provide reasons and evaluate arguments for choices made

**Snapshot – Select and operate tools**

## Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6A03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• select and use a range of digital tools to complete tasks
• attempt to solve a problem individually and with peers before seeking help
• select and use the core features of digital tools to efficiently complete tasks
• troubleshoot basic problems and identify repetitive tasks to automate
• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks
• troubleshoot common problems and automate repetitive tasks

**Snapshot – Draw conclusions and provide reasons**

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6A03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

**Snapshot – Interpret concepts and problems**

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6A03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

**Snapshot – Draw conclusions and provide reasons**

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6A03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## AC9M6M01

**convert between common metric of length, and ; choose and use representations of metric measurements relevant to the of a problem**

•

•

### Elaborations

• recognising the significance of the prefixes in of measurement
• identifying and using the correct when converting between including millimetres, centimetres, metres, kilometres, milligrams, grams, kilograms, tonnes, millilitres, litres, kilolitres and megalitres
• recognising the equivalence of measurements, such as 1.25 1.25 1 . 2 5 metres is the same as 125 125 1 2 5 centimetres

Students learn to:

## convert between common metric units of length, mass and capacity; choose and us representations of metric measurements relevant to the context of a problem

(AC9M6M01)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

### Analysing

• Interpret concepts and problems
• Draw conclusions and provide reasons

### Inquiring

• Identify, process and evaluate information

### Measurement and geometry

• Understanding units of measurement

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

### Number sense and algebra

• Multiplicative strategies

### Analysing

• Interpret concepts and problems

### Related content

This content description can be taught with the following content descriptions from other learning areas.

AC9S6I03

### Resources

### Work Samples

## WS01 - How tall?

### Snapshot – Interpret concepts and problems

#### Critical and Creative Thinking: Analysing: Interpret concepts and problems

##### Content description

AC9M6M01

##### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

### Snapshot – Draw conclusions and provide reasons

#### Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

##### Content description

AC9M6M01

##### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

# Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6M01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Understanding units of measurement

# Numeracy: Measurement and geometry: Understanding units of measurement

### Content description

AC9M6M01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Using metric units**

• calculates perimeter using properties of two-dimensional shapes to determine unknown lengths

• measures and calculates the area of different shapes using metric units and a range of strategies

**Angles as measures of turn**

• estimates and measures angles in degrees up to one revolution (e.g. uses a protractor to measure the size of an angle; estimates angles, such as those formed at the elbows when releasing an object; determines the effect of angles on the trajectory, height and distance of flight during jumps and throws in athletics)

**Converting units**

• converts between metric units of measurement of the same attribute (e.g. converts centimetres into millimetres by multiplying by 10 10 1 0 ; uses the consistent naming of metric prefixes to convert between adjacent units)

• describes and uses the relationship between metric units of measurement and the base- 10 10 1 0 place value system to accurately measure and record measurements using decimals

**Using metric units and formulas**

• establishes and uses formulas and metric units for calculating the area of rectangles and triangles

**Angles as measures of turn**

• measures and uses key angles ( 45 45 4 5 ■, 90 90 9 0 ■, 180 180 1 8 0 ■, 360 360 3 6 0 ■) to define other angles according to their size (e.g. measures a right angle to be 90■ and uses this to determine if 2 2 2 lengths are perpendicular)

**Using metric units and formulas**

• establishes and uses formulas for calculating the area of parallelograms, trapeziums, rhombuses and kites

• establishes and uses formulas for calculating the volume and surface area of a range of right

prisms

### Circle measurements

• informally estimates the circumference of a circle using the radius or diameter

• establishes the relationship between the circumference and the diameter of a circle as the constant π \pi π

• calculates the circumference and the area of a circle using π \pi π and a known diameter or radius

## Snapshot – Multiplicative strategies

# Numeracy: Number sense and algebra: Multiplicative strategies

## Content description

AC9M6M01

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

### Flexible strategies for multiplication and division

• uses multiplication and division as inverse operations to solve problems, including solving problems with digital tools and to justify a solution (e.g. when solving 14 × 14\space\times\space 1 4 × ? = 336 = 336 = 3 3 6 chooses to use division 336 ÷ 14 = 336 ÷ 14 =\space 3 3 6 ÷ 1 4 = ? ; determines how long it will take to save up for a purchase and tests the effect of changing the amount saved each period)

• uses known mental and written strategies such as using the distributive property, partitioning into place value or factors to solve multiplicative problems involving numbers with up to 3 3 3 digits and can justify their use (e.g. 7 × 83 = 7 × 80 + 7 × 3 7 \times 83 = 7 × 80 + 7 × 3 7 × 8 3 = 7 × 8 0 + 7 × 3 ; to multiply a number by 48 48 4 8 , first multiplies by 12 12 1 2 and then multiplies the result by 4 4 4 ; to solve 16 × 15 16 \times 15 1 6 × 1 5 , uses double and half, such as 16 × 15 = 8 × 30 16 \times 15 = 8 \times 30 1 6 × 1 5 = 8 × 3 0 )

• uses estimation and rounding to check the reasonableness of products and quotients (e.g. multiplies 200 200 2 0 0 by 30 30 3 0 to determine if 6138 6138 6 1 3 8 is a reasonable answer to 198 × 31 198 \times 31 1 9 8 × 3 1 )

### Flexible strategies for multi-digit multiplication and division

• solves multi-step problems involving multiplicative situations using appropriate mental strategies, digital tools and algorithms (e.g. uses a rate of application to determine the amount of paint required to cover a large area and determines how many tins of paint are required)

• interprets, represents and solves multifaceted problems involving all 4 4 4 operations with natural numbers

### Flexible strategies for multiplication and division of rational numbers

• expresses a number as a product of its prime factors for a purpose

• expresses repeated factors of the same number in exponent form (e.g. 2 × 2 × 2 × 3 × 3 = 2 3 × 3 2 2 \times 2 \times 2 \times 3 \times 3 = 2^3\times 3^2 2 × 2 × 2 × 3 × 3 = 2 3 × 3 2

• identifies and describes products of the same number as square or cube numbers (e.g. 3 × 3 3 \times 3 3 × 3 is the same as 3 2 3^2 3 2 which is read as 3 3 3 squared)

• describes the effect of multiplication by a decimal or fraction less than one (e.g. when multiplying natural numbers by a fraction or decimal less than one such as 15 × 1 2 = 7.5 15 \times\frac12 = 7.5 1 5 × 2 1 ■ = 7 . 5 )

• connects and converts decimals to fractions to assist in mental computation involving multiplication or division (e.g. to calculate 16 × 0.25 16 \times 0.25 1 6 × 0 . 2 5 , recognises 0.25 0.25 0 . 2 5 as a quarter, and determines a quarter of 16 16 1 6 or determines 0.5 ÷ 0.25 0.5 ÷ 0.25 0 . 5 ÷ 0 . 2 5 , by reading this as "one half, how many quarters?" and gives the answer as 2 2 2 )

• calculates the percentage of a quantity flexibly using multiplication and division (e.g. to calculate 13 13 1 3 % of 1600 1600 1 6 0 0 uses 0.13 × 1600 0.13 \times 1600 0 . 1 3 × 1 6 0 0 or 1600 ÷ 100 × 13 1600 ÷ 100 \times 13 1 6 0 0 ÷ 1 0 0 × 1 3 )

• uses multiplicative strategies efficiently to solve problems involving rational numbers including integers (e.g. calculates the average temperature for Mt Wellington for July to be ■ 1.6 1.6 1 . 6 ■C)

## Snapshot – Interpret concepts and problems

# Critical and Creative Thinking: Analysing: Interpret concepts and problems

## Content description

AC9M6M01

## Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem

• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area

• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

## Resource – WS01 - How tall?

By the end of Year 6, students use integers to represent points on a number line and in the Cartesian plane.■They solve problems using the properties of prime, composite and square numbers.■Students order common fractions, giving reasons, and add and subtract fractions with related denominators.■They use all 4 operations with decimals and connect decimal representations of measurements to the metric system. Students solve problems involving finding a fraction, decimal or percentage of a quantity and use estimation to find approximate solutions to problems involving rational numbers and percentages.■They use mathematical modelling to solve financial and other practical problems involving percentages and rational numbers, formulating and solving the problem, and justifying choices.■Students find unknown values in numerical equations involving combinations of arithmetic operations.■They identify and explain rules used to create growing patterns.■Students create and use algorithms to generate sets of numbers, using a rule.

They interpret and use timetables. Students convert between common units of length, mass and capacity. They use the formula for the area of a rectangle and angle properties to solve problems. Students identify the parallel cross-section for right prisms.■They create tessellating patterns using combinations of transformations.■Students locate an ordered pair in any one of the 4 quadrants on the Cartesian plane.

They compare distributions of discrete and continuous numerical and ordinal categorical data sets as part of their statistical investigations, using digital tools.■Students critique arguments presented in the media based on statistics.■They assign probabilities using common fractions, decimal and percentages.■Students conduct simulations using digital tools, to generate and record the outcomes from many trials of a chance experiment.■They compare observed frequencies to the expected frequencies of the outcomes of chance experiments.

## AC9M6N04

apply knowledge of place value to add and subtract decimals, using digital tools where appropriate; use estimation and rounding to check the reasonableness of answers

## AC9M6N06

multiply and divide decimals by multiples of powers of 10 without a calculator, applying knowledge of place value and proficiency with multiplication facts; using estimation and rounding to check the reasonableness of answers

## AC9M6M01

convert between common metric units of length, mass and capacity; choose and use decimal representations of metric measurements relevant to the context of a problem

## AC9M6M02

establish the formula for the area of a rectangle and use it to solve practical problems

## AC9M6M04

identify the relationships between angles on a straight line, angles at a point and vertically opposite angles; use these to determine unknown angles, communicating reasoning

## AC9M6M02

**establish the formula for the of a and use it to solve practical problems**

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•

**Elaborations**

• using one centimetre grid paper to a variety of , recording the side lengths and the related of the in a table to establish the formula for the of a by recognising the relationship between the length of the sides and its calculated

• using the relationship between the length and of square and the array structure to derive a formula for calculating the of a from the lengths of its sides

• solving problems involving the comparison of lengths and using appropriate

• investigating the connection between the of different with the same and between the of with the same

Students learn to:

## establish the formula for the area of a rectangle and use it to solve practical problem

(AC9M6M02)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Analysing**

• Interpret concepts and problems

**Inquiring**

• Identify, process and evaluate information

**Measurement and geometry**

• Understanding units of measurement

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Draw conclusions and provide reasons

### Resources

### Work Samples

## WS01 - How tall?

### Snapshot – Interpret concepts and problems

#### Critical and Creative Thinking: Analysing: Interpret concepts and problems

##### Content description

AC9M6M02

##### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem

• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area

• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

### Snapshot – Identify, process and evaluate information

#### Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

##### Content description

AC9M6M02

##### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual

information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Understanding units of measurement

# Numeracy: Measurement and geometry: Understanding units of measurement

### Content description

AC9M6M02

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Using metric units**

• calculates perimeter using properties of two-dimensional shapes to determine unknown lengths
• measures and calculates the area of different shapes using metric units and a range of strategies

**Angles as measures of turn**

• estimates and measures angles in degrees up to one revolution (e.g. uses a protractor to measure the size of an angle; estimates angles, such as those formed at the elbows when releasing an object; determines the effect of angles on the trajectory, height and distance of flight during jumps and throws in athletics)

**Converting units**

• converts between metric units of measurement of the same attribute (e.g. converts centimetres into millimetres by multiplying by 10 10 1 0 ; uses the consistent naming of metric prefixes to convert between adjacent units)
• describes and uses the relationship between metric units of measurement and the base- 10 10 1 0 place value system to accurately measure and record measurements using decimals

**Using metric units and formulas**

• establishes and uses formulas and metric units for calculating the area of rectangles and triangles

**Angles as measures of turn**

• measures and uses key angles ( 45 45 4 5 ■, 90 90 9 0 ■, 180 180 1 8 0 ■, 360 360 3 6 0 ■) to define other angles according to their size (e.g. measures a right angle to be 90■ and uses this to determine if 2 2 2 lengths are perpendicular)

**Using metric units and formulas**

• establishes and uses formulas for calculating the area of parallelograms, trapeziums, rhombuses and kites
• establishes and uses formulas for calculating the volume and surface area of a range of right prisms

**Circle measurements**

• informally estimates the circumference of a circle using the radius or diameter
• establishes the relationship between the circumference and the diameter of a circle as the constant π \pi π
• calculates the circumference and the area of a circle using π \pi π and a known diameter or radius

## Snapshot – Draw conclusions and provide reasons

# Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6M02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and

across discipline areas to provide reasons and evaluate arguments for choices made

## AC9M6M03

### interpret and use timetables and itineraries to plan activities and determine the of and journeys

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### Elaborations

• planning a trip involving one or more of public transport
• developing a timetable of daily activities for a planned ; for example, a sports carnival
• investigating different ways is represented in timetables and using different timetables to plan a journey

Students learn to:

## interpret and use timetables and itineraries to plan activities and determine the dura and journeys

(AC9M6M03)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Analysing**

• Interpret concepts and problems

**Inquiring**

• Identify, process and evaluate information

**Measurement and geometry**

• Measuring time

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Interpret concepts and problems

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Interpret concepts and problems

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Interpret concepts and problems

**Inquiring**

• Identify, process and evaluate information

### Resources

### Work Samples

## WS04 - Travel itinerary

### Snapshot – Interpret concepts and problems

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6M03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

## Snapshot – Identify, process and evaluate information

### Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

#### Content description

AC9M6M03

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Measuring time

### Numeracy: Measurement and geometry: Measuring time

#### Content description

AC9M6M03

#### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Measuring time**

• uses standard instruments and units to describe and measure time to hours, minutes and seconds (e.g. measures time using a stopwatch; sets a timer on an appliance; estimates the time it would take to walk to the other side of the school oval and uses minutes as the unit of measurement)
• reads and interprets different representations of time (e.g. reads the time on an analog clock, watch or digital clock; uses lap times on a stop watch or fitness app)
• identifies the minute hand movement on an analog clock and the 60 60 6 0 -minute markings, interpreting the numbers as representing lots of 5 5 5 (e.g. interprets the time on an analog clock to read 7 7 7 : 40 40 4 0 , by reading the hour hand and the minute hand and explaining how they are related)
• uses smaller units of time such as seconds to record duration of events (e.g. records reaction times in sports or in relation to safe driving)
• uses a calendar to calculate time intervals in days and weeks, bridging months (e.g. develops fitness plans, tracks growth and development progress and sets realistic personal and health goals using a calendar)

**Relating units of time**

• identifies the relationship between units of time (e.g. months and years; seconds, minutes and hours)
• uses am and pm notation to distinguish between morning and afternoon using 12 12 1 2 -hour time
• determines elapsed time using different units such as hours and minutes, weeks and days (e.g. when developing project plans, time schedules and tracking growth)
• interprets and uses a timetable
• constructs timelines using a time scale (e.g. chronologically sequences the history of the school)

**Converting between units of time**

• interprets and converts between 12 12 1 2 -hour and 24 24 2 4 -hour digital time, and analog and digital representations of time to solve duration problems
• converts between units of time, using appropriate conversion rates, to solve problems involving time (e.g. uses that there are 60 60 6 0 seconds in a minute to calculate the percentage improvement a 1500 1500 1 5 0 0 m runner made to their personal best time)
• uses rates involving time to solve problems (e.g. "travelling at 60 60 6 0 km/h, how far will I travel in 30 30 3 0 minutes?"; adjusts cooking or baking times based on weight or the size of the container)

## Snapshot – Interpret concepts and problems

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6M03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem

• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area

• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6M03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Interpret concepts and problems**

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6M03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem

• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area

• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6M03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

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• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Interpret concepts and problems**

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6M03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

## Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6M03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Resource – WS04 - Travel itinerary

By the end of Year 6, students use integers to represent points on a number line and in the Cartesian plane.■They solve problems using the properties of prime, composite and square numbers.■Students order common fractions, giving reasons, and add and subtract fractions with related denominators.■They use all 4 operations with decimals and connect decimal representations of measurements to the metric system.■Students solve problems involving finding a fraction, decimal or percentage of a quantity and use estimation to find approximate solutions to problems involving rational numbers and percentages. They use mathematical modelling to solve financial and other practical problems involving percentages and rational numbers, formulating and solving the problem, and justifying choices. Students find unknown values in numerical equations involving combinations of arithmetic operations.■They identify and explain rules used to create growing patterns.■Students create and use algorithms to generate sets of numbers, using a rule.

They interpret and use timetables. Students convert between common units of length, mass and capacity.■They use the formula for the area of a rectangle and angle properties to solve problems.■Students identify the parallel cross-section for right prisms.■They create tessellating patterns using combinations of transformations.■Students locate an ordered pair in any one of the 4 quadrants on the Cartesian plane.

They compare distributions of discrete and continuous numerical and ordinal categorical data sets as part of their statistical investigations, using digital tools.■Students critique arguments presented in the media based on statistics.■They assign probabilities using common fractions, decimal and percentages.■Students conduct simulations using digital tools, to generate and record the outcomes from many trials of a chance experiment.■They compare observed frequencies to the expected frequencies of the outcomes of chance experiments.

## AC9M6N07

solve problems that require finding a familiar fraction, decimal or percentage of a quantity, including percentage discounts, choosing efficient calculation strategies and using digital tools

where appropriate

## AC9M6N09

use mathematical modelling to solve practical problems, involving rational numbers and percentages, including in financial contexts; formulate the problems, choosing operations and efficient calculation strategies, and using digital tools where appropriate; interpret and communicate solutions in terms of the situation, justifying the choices made

## AC9M6M03

interpret and use timetables and itineraries to plan activities and determine the duration of events and journeys

## AC9M6M04

**identify the relationships between , and ; use these to determine unknown , communicating reasoning**

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### Elaborations

• using protractors or dynamic geometry software to and generalise about the size of formed when are crossed, and combinations of that meet at a , including combinations that form right or

• demonstrating the meaning of language associated with properties of , including right, complementary, complement, straight, supplement, vertically opposite, and

• using the properties of and complementary to represent spatial situations with and solving to find the size of unknown

Students learn to:

## identify the relationships between angles on a straight line, angles at a point and ve opposite angles; use these to determine unknown angles, communicating reasonin

(AC9M6M04)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Analysing**

• Interpret concepts and problems

**Inquiring**

• Identify, process and evaluate information

**Measurement and geometry**

• Understanding geometric properties

• Understanding units of measurement

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Draw conclusions and provide reasons

**Generating**

• Consider alternatives

**Managing and operating**

• Select and operate tools

### Related content

This content description can be taught with the following content descriptions from other learning areas.

AC9S6U02

### Resources

### Work Samples

## WS01 - How tall?

**Snapshot – Interpret concepts and problems**

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6M04

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem

• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area

• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

## Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6M04

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Understanding geometric properties

## Numeracy: Measurement and geometry: Understanding geometric properties

### Content description

AC9M6M04

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

#### Properties of shapes and object

• identifies, names and classifies two-dimensional shapes according to their side and angle properties (e.g. describes a square as a regular rectangle)

• identifies key features of shapes (e.g. explains that quadrilaterals have 2 2 2 diagonals however they are not always equal in length)

• aligns three-dimensional objects to their two-dimensional nets

• identifies the relationship between the number of faces, edges and the number of vertices of a three-dimensional object (e.g. uses a table to list the number of faces, edges and vertices of common three-dimensional objects and identifies the relationships in the data)

#### Transformations

• identifies that shapes can have rotational symmetry (e.g. "this drawing of a flower is symmetrical as I can spin it around both ways and it always looks exactly the same")

• creates symmetrical designs using a range of shapes and identifies the type of symmetry as appropriate (e.g. uses symmetry as a stimulus for choreographing a dance; analyses the symmetrical qualities, shapes and lines in examples of Islamic art)

• creates tessellating patterns with common shapes, deciding which will tessellate and which will not by referring to their sides and angles

#### Angles

• estimates, compares and constructs angles (e.g. uses a ruler and protractor to construct a 45■ angle; compares the size of angles in the environment and estimates their size)

• describes angles in the environment according to their size as acute, obtuse, right, straight, reflex or a revolution and identifies them in shapes and objects (e.g. identifies slope as angles in the environment such as the ramp outside of the school block)

### Properties of shapes and objects

• classifies three-dimensional objects according to their properties (e.g. describes the difference between a triangular prism and a triangular pyramid)
• creates two-dimensional nets for pyramids and prisms

### Transformations

• uses combinations of reflecting, translating and rotating shapes to describe and create patterns and solve problems
• identifies tessellations used in the environment and explains why some combinations of shapes will tesselate while others will not (e.g. tiling a wall using a combination of different shaped tiles; exploring regular and semi-regular tessellations in architectural design)
• explains the result of changing critical and non-critical properties of shapes (e.g. "if I enlarge a square, it's still a square, or if I rotate a square, it remains a square, but if I change the length of one of its sides, it's no longer a square")

### Angles

• identifies supplementary and complementary angles and uses them to solve problems
• identifies that angles at a point add to 360 360 3 6 0 ° and that vertically opposite angles are equal and reasons to solve problems

### Properties of shapes and objects

• investigates and uses reasoning to explain the properties of a triangle (e.g. explains why the longest side is always opposite the largest angle in a triangle; recognises that the combined length of 2 2 2 sides of a triangle must always be greater than the length of the third side)
• uses relevant properties of common geometrical shapes to determine unknown lengths and angles

### Transformations

• enlarges and reduces shapes according to a given scale factor and explains what features change and what stay the same (e.g. says 'when I double the dimensions of the rectangle, all of the lengths are twice as long as they were, but the size of the angles stay the same)
• applies angle properties to solve problems that involve the transformation of shapes and objects and how they are used in practice (e.g. determines which shapes tessellate)

### Angles

• uses angle properties to identify perpendicular and parallel lines (e.g. develops a computer-aided design drawing involving the creation of parallel and perpendicular lines)
• demonstrates that the angle sum of a triangle is 180 180 1 8 0 ■ and uses this to solve problems
• identifies interior angles in shapes to calculate angle sum
• uses angle properties to identify and calculate unknown angles in familiar two-dimensional shapes

## Snapshot – Understanding units of measurement

# Numeracy: Measurement and geometry: Understanding units of measurement

## Content description

AC9M6M04

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

### Using metric units

• calculates perimeter using properties of two-dimensional shapes to determine unknown lengths
• measures and calculates the area of different shapes using metric units and a range of strategies

### Angles as measures of turn

• estimates and measures angles in degrees up to one revolution (e.g. uses a protractor to measure the size of an angle; estimates angles, such as those formed at the elbows when releasing an object; determines the effect of angles on the trajectory, height and distance of flight during jumps and throws in athletics)

### Converting units

• converts between metric units of measurement of the same attribute (e.g. converts centimetres into millimetres by multiplying by 10 10 1 0 ; uses the consistent naming of metric prefixes to convert between adjacent units)
• describes and uses the relationship between metric units of measurement and the base- 10 10 1 0 place value system to accurately measure and record measurements using decimals

**Using metric units and formulas**

• establishes and uses formulas and metric units for calculating the area of rectangles and triangles

**Angles as measures of turn**

• measures and uses key angles ( 45 45 4 5 ■, 90 90 9 0 ■, 180 180 1 8 0 ■, 360 360 3 6 0 ■) to define other angles according to their size (e.g. measures a right angle to be 90■ and uses this to determine if 2 2 2 lengths are perpendicular)

**Using metric units and formulas**

• establishes and uses formulas for calculating the area of parallelograms, trapeziums, rhombuses and kites

• establishes and uses formulas for calculating the volume and surface area of a range of right prisms

**Circle measurements**

• informally estimates the circumference of a circle using the radius or diameter

• establishes the relationship between the circumference and the diameter of a circle as the constant π \pi π

• calculates the circumference and the area of a circle using π \pi π and a known diameter or radius

## Snapshot – Draw conclusions and provide reasons

### Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

#### Content description

AC9M6M04

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Consider alternatives

### Critical and Creative Thinking: Generating: Consider alternatives

#### Content description

AC9M6M04

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• consider alternatives by comparing different or creative ways to approach a task, issue or problem and recommend a preferred option

• consider alternatives by challenging or creatively adjusting existing ideas in situations where current approaches do not work and recommend a preferred option

• consider alternatives by creatively adapting ideas when information is limited or conflicting and recommend a preferred option

## Snapshot – Select and operate tools

### Digital Literacy: Managing and operating: Select and operate tools

#### Content description

AC9M6M04

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• select and use a range of digital tools to complete tasks

• attempt to solve a problem individually and with peers before seeking help

• select and use the core features of digital tools to efficiently complete tasks

• troubleshoot basic problems and identify repetitive tasks to automate

• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks

• troubleshoot common problems and automate repetitive tasks

## AC9M6SP01

**compare the parallel of and recognise their relationships to**

•

### Elaborations

• using made of foam or polystyrene, slice along different , and record the different of faces that result; comparing of different
• using different pieces of fruit, slicing across different , drawing the ; reporting back to the class the results of the investigation
• observing and drawing the resulting from different ways of slicing through familiar ; for example, slicing carrots at different or cutting through playdough models of ; using playdough models, fruit or to establish which can be cut in such a way that the will always be the same
• understanding that are where parallel to the base of the are the same and size
• connecting different to the of their parallel , such as a triangular which can be described as a stack of the same sized triangles, and a cube or square , which can be described as a stack of the same sized squares
• investigating the design of First Nations Australians' dwellings, exploring the relationship between the and the dwellings' construction

Students learn to:

## compare the parallel cross-sections of objects and recognise their relationships to

(AC9M6SP01)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Measurement and geometry**

• Understanding geometric properties

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Interpret concepts and problems

**Analysing**

• Interpret concepts and problems

**People**

• The significant and ongoing contributions of First Nations Australians and their histories and cultures are acknowledged locally, nationally and globally.

### Snapshot – Understanding geometric properties

## Numeracy: Measurement and geometry: Understanding geometric properties

### Content description

AC9M6SP01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Properties of shapes and object**

• identifies, names and classifies two-dimensional shapes according to their side and angle properties (e.g. describes a square as a regular rectangle)
• identifies key features of shapes (e.g. explains that quadrilaterals have 2 2 2 diagonals however they are not always equal in length)
• aligns three-dimensional objects to their two-dimensional nets
• identifies the relationship between the number of faces, edges and the number of vertices of a three-dimensional object (e.g. uses a table to list the number of faces, edges and vertices of common three-dimensional objects and identifies the relationships in the data)

**Transformations**

• identifies that shapes can have rotational symmetry (e.g. "this drawing of a flower is symmetrical as I can spin it around both ways and it always looks exactly the same")
• creates symmetrical designs using a range of shapes and identifies the type of symmetry as

appropriate (e.g. uses symmetry as a stimulus for choreographing a dance; analyses the symmetrical qualities, shapes and lines in examples of Islamic art)
• creates tessellating patterns with common shapes, deciding which will tessellate and which will not by referring to their sides and angles

### Angles

• estimates, compares and constructs angles (e.g. uses a ruler and protractor to construct a 45■ angle; compares the size of angles in the environment and estimates their size)
• describes angles in the environment according to their size as acute, obtuse, right, straight, reflex or a revolution and identifies them in shapes and objects (e.g. identifies slope as angles in the environment such as the ramp outside of the school block)

### Properties of shapes and objects

• classifies three-dimensional objects according to their properties (e.g. describes the difference between a triangular prism and a triangular pyramid)
• creates two-dimensional nets for pyramids and prisms

### Transformations

• uses combinations of reflecting, translating and rotating shapes to describe and create patterns and solve problems
• identifies tessellations used in the environment and explains why some combinations of shapes will tesselate while others will not (e.g. tiling a wall using a combination of different shaped tiles; exploring regular and semi-regular tessellations in architectural design)
• explains the result of changing critical and non-critical properties of shapes (e.g. "if I enlarge a square, it’s still a square, or if I rotate a square, it remains a square, but if I change the length of one of its sides, it’s no longer a square")

### Angles

• identifies supplementary and complementary angles and uses them to solve problems
• identifies that angles at a point add to 360 360 3 6 0 ° and that vertically opposite angles are equal and reasons to solve problems

### Properties of shapes and objects

• investigates and uses reasoning to explain the properties of a triangle (e.g. explains why the longest side is always opposite the largest angle in a triangle; recognises that the combined length of 2 2 2 sides of a triangle must always be greater than the length of the third side)
• uses relevant properties of common geometrical shapes to determine unknown lengths and angles

### Transformations

• enlarges and reduces shapes according to a given scale factor and explains what features change and what stay the same (e.g. says ‘when I double the dimensions of the rectangle, all of the lengths are twice as long as they were, but the size of the angles stay the same)
• applies angle properties to solve problems that involve the transformation of shapes and objects and how they are used in practice (e.g. determines which shapes tessellate)

### Angles

• uses angle properties to identify perpendicular and parallel lines (e.g. develops a computer-aided design drawing involving the creation of parallel and perpendicular lines)
• demonstrates that the angle sum of a triangle is 180 180 1 8 0 ■ and uses this to solve problems
• identifies interior angles in shapes to calculate angle sum
• uses angle properties to identify and calculate unknown angles in familiar two-dimensional shapes

## Snapshot – Interpret concepts and problems

# Critical and Creative Thinking: Analysing: Interpret concepts and problems

## Content description

AC9M6SP01

## Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

**Snapshot – Interpret concepts and problems**

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6SP01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem

• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area

• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

# AC9M6SP02

**locate in the 4 quadrants of a ; describe changes to the when a is moved to a different position in the plane**

•

### Elaborations

• understanding that the provides a graphical or visual way of describing location with respect to a fixed origin

• understanding that the axes are that can have different , including and , depending on purpose

• understanding that the horizontal coordinate is written first and is changed if there is a move to the left or right, whereas a move up or down will change the vertical coordinate

• using the to draw and polygons, listing co-ordinates in the correct order to complete a polygon

• exploring how can be used to input positional for artificial intelligence systems to locate positions in an image or other space

• investigating and connecting land or star maps used by First Nations Australians with the through a graphical or visual way of describing location

Students learn to:

## locate points in the 4 quadrants of a Cartesian plane; describe changes to the coord point is moved to a different position in the plane

(AC9M6SP02)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Measurement and geometry**

• Positioning and locating

**Number sense and algebra**

• Number and place value

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Measurement and geometry**

• Understanding geometric properties

**Analysing**

• Interpret concepts and problems

**Statistics and probability**

• Understanding chance

**Analysing**

• Interpret concepts and problems

**Generating**

• Consider alternatives

**Country/Place**

• First Nations communities of Australia maintain a deep connection to, and responsibility for, Country/Place and have holistic values and belief systems that are connected to the land, sea, sky

and waterways.

## Snapshot – Positioning and locating

# Numeracy: Measurement and geometry: Positioning and locating

## Content description

AC9M6SP02

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

### Using formal maps and plans

• locates position on maps using grid references (e.g. locates the school in cell E5; uses grid references to identify specific locations on a stage and when creating a stage plan, lighting design or prompt script)

• describes routes using landmarks and directional language including reference to quarter, half, three-quarter turns; turns to the left and right; clockwise and anticlockwise turns (e.g. communicates strategic plays in relation to coaching a team game or sport)

• interprets keys, simple scales and compass directions contained within a map to locate features (e.g. uses a map and compass directions when bush walking or orienteering)

### Using proportional thinking for scaling

• interprets the scale used to create plans, drawings or maps (e.g. interprets scale to determine the approximate distance between two locations when orienteering)

• interprets and uses plans and maps involving scale (e.g. creates and interprets scale drawings when designing and making set pieces for a production)

• describes and interprets maps to determine the geographical location and positioning of states and territories within Australia and of countries relative to Australia

• interprets and uses more formal directional language such as compass bearings, degrees of turn, coordinates and distances to locate position or the distance from one location to another (e.g. identifies coordinates using GPS technologies)

## Snapshot – Number and place value

# Numeracy: Number sense and algebra: Number and place value

## Content description

AC9M6SP02

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

### Numeral recognition and identification

• identifies, reads, writes and interprets decimal numbers applying knowledge of the place value periods of tenths, hundredths and thousandths and beyond

### Place value

• compares the size of decimals to other numbers including natural numbers and decimals expressed to different numbers of places (e.g. selects 0.35 0.35 0 . 3 5 as the greatest number from the set 0.2 , 0.125 , 0.35 0.2, 0.125, 0.35 0 . 2 , 0 . 1 2 5 , 0 . 3 5 ; explains that 2 2 2 is greater than 1.845 1.845 1 . 8 4 5 )

• describes the multiplicative relationship between the adjacent positions in place value for decimals (e.g. understands that 0.2 0.2 0 . 2 is 10 10 1 0 times as great as 0.02 0.02 0 . 0 2 and that 100 100 1 0 0 times 0.005 0.005 0 . 0 0 5 is 0.5 0.5 0 . 5 )

• compares and orders decimals greater than one including those expressed to an unequal number of places (e.g. compares the heights of students in the class that are expressed in metres such as 1.6 1.6 1 . 6 m is taller than 1.52 1.52 1 . 5 2 m; correctly orders the numbers 1.4 1.4 1 . 4 , 1.375 1.375 1 . 3 7 5 and 2.15 2.15 2 . 1 5 from least to greatest)

• rounds decimals to one and 2 decimal places for a purpose

### Numeral recognition and identification

• reads, represents, interprets and uses negative numbers in computation (e.g. explains that the temperature – 10 10 1 0 °C is colder than the temperature – 2.5 2.5 2 . 5 °C; recognises that negative numbers are less than zero; locates – 12 12 1 2 on a number line)

### Place value

• identifies that negative numbers are integers that represent both size and direction (e.g. uses a number line to represent position and order negative numbers; uses negative numbers in financial contexts such as to model an overdrawn account)
• understands that multiplying and dividing numbers by 10 , 100 , 1000 10, 100, 1000 1 0 , 1 0 0 , 1 0 0 0 changes the positional value of the digits (e.g. explains that 100 100 1 0 0 times 0.125 0.125 0 . 1 2 5 is 12.5 12.5 1 2 . 5 because each digit value in 0.125 0.125 0 . 1 2 5 is multiplied by 100 100 1 0 0 , so 100 × 0.1 100 \times 0.1 1 0 0 × 0 . 1 is 10 10 1 0 , 100 × 0.02 100 \times 0.02 1 0 0 × 0 . 0 2 is 2 2 2 and 100 × 0.005 100 \times 0.005 1 0 0 × 0 . 0 0 5 is 0.5 0.5 0 . 5 ; converts between units of centimetres and millimetres when planning, measuring and marking materials for cutting)
• rounds decimals to a specified number of decimal places for a purpose (e.g. the mean distance thrown in a school javelin competition was rounded to 2 2 2 decimal places; if the percentage profit was calculated as 12.467921 12.467921 1 2 . 4 6 7 9 2 1 %, rounds the calculation to 12.5 12.5 1 2 . 5 %)

### Numeral recognition and identification

• identifies, reads and interprets very large numbers and very small numbers (e.g. reads that the world population is estimated to be seven billion and interprets this to mean 7 7 7 000 000 0 0 0 000 000 0 0 0 000 000 0 0 0 or 7 × 1 0 9 7 \times 10^9 7 × 1 0 9 ; interprets the approximate mass of protons and neutrons as 1.67 × 1 0 – 24 1.67 \times10^{-24} 1 . 6 7 × 1 0 – 2 4 g; identifies and interprets the value of national government debt)

### Place value

• compares and orders very large numbers and very small numbers (e.g. understands the relative size of very large time scales such as a millennium)
• relates place value parts to exponents (e.g. 1000 1000 1 0 0 0 is 100 100 1 0 0 times greater than 10 10 1 0 , and that is why 10 × 1 0 2 = 1 0 3 10 \times 10^2 = 10^3 1 0 × 1 0 2 = 1 0 3 and why 1 0 3 10^3 1 0 3 divided by 10 10 1 0 is equal to 1 0 2 10^2 1 0 2 )
• expresses numbers in scientific notation (e.g. when calculating the distance of the Earth from the sun uses 1.5 × 1 0 8 1.5\times 10^8 1 . 5 × 1 0 8 as an approximation; a nanometre has an order of magnitude of – 9 9 9 and is represented as 1 0 – 9 10^{-9} 1 0 – 9 )

## Snapshot – Understanding geometric properties

# Numeracy: Measurement and geometry: Understanding geometric properties

## Content description

AC9M6SP02

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

### Properties of shapes and object

• identifies, names and classifies two-dimensional shapes according to their side and angle properties (e.g. describes a square as a regular rectangle)
• identifies key features of shapes (e.g. explains that quadrilaterals have 2 2 2 diagonals however they are not always equal in length)
• aligns three-dimensional objects to their two-dimensional nets
• identifies the relationship between the number of faces, edges and the number of vertices of a three-dimensional object (e.g. uses a table to list the number of faces, edges and vertices of common three-dimensional objects and identifies the relationships in the data)

### Transformations

• identifies that shapes can have rotational symmetry (e.g. "this drawing of a flower is symmetrical as I can spin it around both ways and it always looks exactly the same")
• creates symmetrical designs using a range of shapes and identifies the type of symmetry as appropriate (e.g. uses symmetry as a stimulus for choreographing a dance; analyses the symmetrical qualities, shapes and lines in examples of Islamic art)
• creates tessellating patterns with common shapes, deciding which will tessellate and which will not by referring to their sides and angles

### Angles

• estimates, compares and constructs angles (e.g. uses a ruler and protractor to construct a 45■ angle; compares the size of angles in the environment and estimates their size)
• describes angles in the environment according to their size as acute, obtuse, right, straight, reflex or a revolution and identifies them in shapes and objects (e.g. identifies slope as angles in the environment such as the ramp outside of the school block)

**Properties of shapes and objects**

• classifies three-dimensional objects according to their properties (e.g. describes the difference between a triangular prism and a triangular pyramid)
• creates two-dimensional nets for pyramids and prisms

**Transformations**

• uses combinations of reflecting, translating and rotating shapes to describe and create patterns and solve problems
• identifies tessellations used in the environment and explains why some combinations of shapes will tesselate while others will not (e.g. tiling a wall using a combination of different shaped tiles; exploring regular and semi-regular tessellations in architectural design)
• explains the result of changing critical and non-critical properties of shapes (e.g. "if I enlarge a square, it's still a square, or if I rotate a square, it remains a square, but if I change the length of one of its sides, it's no longer a square")

**Angles**

• identifies supplementary and complementary angles and uses them to solve problems
• identifies that angles at a point add to 360 360 3 6 0 ° and that vertically opposite angles are equal and reasons to solve problems

**Properties of shapes and objects**

• investigates and uses reasoning to explain the properties of a triangle (e.g. explains why the longest side is always opposite the largest angle in a triangle; recognises that the combined length of 2 2 2 sides of a triangle must always be greater than the length of the third side)
• uses relevant properties of common geometrical shapes to determine unknown lengths and angles

**Transformations**

• enlarges and reduces shapes according to a given scale factor and explains what features change and what stay the same (e.g. says 'when I double the dimensions of the rectangle, all of the lengths are twice as long as they were, but the size of the angles stay the same)
• applies angle properties to solve problems that involve the transformation of shapes and objects and how they are used in practice (e.g. determines which shapes tessellate)

**Angles**

• uses angle properties to identify perpendicular and parallel lines (e.g. develops a computer-aided design drawing involving the creation of parallel and perpendicular lines)
• demonstrates that the angle sum of a triangle is 180 180 1 8 0 ■ and uses this to solve problems
• identifies interior angles in shapes to calculate angle sum
• uses angle properties to identify and calculate unknown angles in familiar two-dimensional shapes

## Snapshot – Interpret concepts and problems

# Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6SP02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

## Snapshot – Understanding chance

# Numeracy: Statistics and probability: Understanding chance

### Content description

AC9M6SP02

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Fairness**

• identifies all possible outcomes of one-step experiments and records outcomes in tables and charts
• explains why outcomes of chance experiments may differ from expected results (e.g. "just because there are 6 6 6 numbers on a dice doesn't mean you are going to roll a 6 6 6 every 6 6 6 rolls, you may not roll a 6 6 6 in the entire game")
• explains the difference between the notion of equal likelihood of possible outcomes and those that are not equally likely (e.g. explains the use of phrases such as fifty-fifty when there are 2 2 2 outcomes and when 2 2 2 events occurring are equally likely as opposed to head and tail are more likely than 2 2 2 heads or 2 2 2 tails)
• identifies unfair elements in games that affect the chances of winning (e.g. having an unequal number of turns; weighted dice)
• explains that the outcomes of chance events are either "certain to happen", "certain not to happen" or lie somewhere in between and knows that impossible events are events that are "certain not to happen"
• identifies events where the chance of one event occurring will not affect the occurrence of the other (e.g. if a coin is tossed and heads have come up 7 7 7 times in a row, it is still equally likely that the next toss will be either a head or a tail)

**Probabilities**

• expresses the theoretical probability of an event as the number of ways an event can happen out of the total number of possibilities
• identifies a range of chance events that have a probability from 0 – 1 0 – 1 0 – 1 (e.g. you have zero probability of rolling a 7 7 7 with one roll of a standard 6 6 6 -sided dice; the probability that tomorrow is Wednesday given today is Tuesday is one)
• describes probabilities as fractions of one (e.g. the probability of an even number when rolling a dice is 3 6 \frac36 6 3 ■ )
• expresses probabilities as fractions, decimals, percentages and ratios recognising that all probabilities lie on a measurement scale of zero to one (e.g. uses numerical representations such as 75 75 7 5 % chance of rain or 4 4 4 out 5 5 5 people liked the story; explains why you can't have a probability less than zero)

**Calculating probabilities**

• determines the probability of compound events and explains why some results have a higher probability than others (e.g. the results from tossing 2 2 2 coins)
• represents diagrammatically all possible outcomes (e.g. tree diagrams, two-way tables, Venn diagrams)
• measures and compares expected results to the actual results of a chance event over a number of trials, and compares and explains the variation in results (e.g. uses probability to determine expected results of a spinner prior to trial)
• recognises that the chance of something occurring or its complement has a total probability of one (e.g. the probability of rolling a 3 3 3 is 1 6 \frac16 6 1 ■ and the probability of not rolling a 3 3 3 is 5 6 \frac56 6 5 ■
• calculates and explains the difference between the probabilities of chance events with and without replacement (e.g. "if we put all of the class names in a hat and draw them out one at a time without putting the name back in, the probability of your name getting called out increases each time because the total number of possible outcomes decreases")
• calculates the probabilities of future events based on historical data (e.g. uses historical rainfall data to plan the date for an outdoor event)

## Snapshot – Interpret concepts and problems

# Critical and Creative Thinking: Analysing: Interpret concepts and problems

## Content description

AC9M6SP02

## Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that

approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

**Snapshot – Consider alternatives**

## Critical and Creative Thinking: Generating: Consider alternatives

### Content description

AC9M6SP02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• consider alternatives by comparing different or creative ways to approach a task, issue or problem and recommend a preferred option
• consider alternatives by challenging or creatively adjusting existing ideas in situations where current approaches do not work and recommend a preferred option
• consider alternatives by creatively adapting ideas when information is limited or conflicting and recommend a preferred option

# AC9M6SP03

**recognise and use combinations of to create and other , using where appropriate**

•
•

**Elaborations**

• using to create of , including paver and tiling patterns, describing the used and discussing why these tessellate; identifying or combinations of that will or will not tessellate, answering questions such as, “Do all triangles tessellate
• designing a school or brand logo using the of one or more and describing the used
• using and to experiment with ; for example, to demonstrate when the order of produces different results; experimenting with and their application to fractals
• designing an algorithm as a of instructions to transform a , including getting back to where you started from; for example, programming a robot to move around the plane using instructions for movements, such as 2 down, 3 to the right, and combinations of these to transform
• investigating symmetry, and tessellation in different on , including rock formations, insects, and land and sea animals, discussing the purpose or role symmetry plays in their physical structure

Students learn to:

# recognise and use combinations of transformations to create tessellations and othe patterns, using dynamic geometric software where appropriate

(AC9M6SP03)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Creating and exchanging**

• Create, communicate and collaborate

**Managing and operating**

• Select and operate tools

**Measurement and geometry**

• Understanding geometric properties

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Draw conclusions and provide reasons

**Managing and operating**

• Select and operate tools

**Analysing**

• Interpret concepts and problems

**Generating**

• Create possibilities
• Put ideas into action

**Generating**

• Create possibilities

**Creating and exchanging**

• Create, communicate and collaborate

**Managing and operating**

• Select and operate tools

**Generating**

• Create possibilities

**Creating and exchanging**

• Create, communicate and collaborate

**Managing and operating**

• Select and operate tools

**Analysing**

• Interpret concepts and problems
• Evaluate actions and outcomes

**Country/Place**

• First Nations communities of Australia maintain a deep connection to, and responsibility for, Country/Place and have holistic values and belief systems that are connected to the land, sea, sky and waterways.

### Related content

This content description can be taught with the following content descriptions from other learning areas.

AC9TDI6P05

### Snapshot – Create, communicate and collaborate

## Digital Literacy: Creating and exchanging: Create, communicate and collaborate

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• use the core features of a range of digital tools to create content and communicate and collaborate with peers and trusted adults
• select and control a variety of features in appropriate digital tools to create content and communicate and collaborate with trusted groups
• select and control advanced features of appropriate digital tools to independently create content and effectively communicate and collaborate with wider groups

### Snapshot – Select and operate tools

## Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• select and use a range of digital tools to complete tasks
• attempt to solve a problem individually and with peers before seeking help
• select and use the core features of digital tools to efficiently complete tasks
• troubleshoot basic problems and identify repetitive tasks to automate
• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks
• troubleshoot common problems and automate repetitive tasks

### Snapshot – Understanding geometric properties

## Numeracy: Measurement and geometry: Understanding geometric properties

### Content description

AC9M6SP03

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

### Properties of shapes and object

• identifies, names and classifies two-dimensional shapes according to their side and angle properties (e.g. describes a square as a regular rectangle)
• identifies key features of shapes (e.g. explains that quadrilaterals have 2 2 2 diagonals however they are not always equal in length)
• aligns three-dimensional objects to their two-dimensional nets
• identifies the relationship between the number of faces, edges and the number of vertices of a three-dimensional object (e.g. uses a table to list the number of faces, edges and vertices of common three-dimensional objects and identifies the relationships in the data)

### Transformations

• identifies that shapes can have rotational symmetry (e.g. "this drawing of a flower is symmetrical as I can spin it around both ways and it always looks exactly the same")
• creates symmetrical designs using a range of shapes and identifies the type of symmetry as appropriate (e.g. uses symmetry as a stimulus for choreographing a dance; analyses the symmetrical qualities, shapes and lines in examples of Islamic art)
• creates tessellating patterns with common shapes, deciding which will tessellate and which will not by referring to their sides and angles

### Angles

• estimates, compares and constructs angles (e.g. uses a ruler and protractor to construct a 45■ angle; compares the size of angles in the environment and estimates their size)
• describes angles in the environment according to their size as acute, obtuse, right, straight, reflex or a revolution and identifies them in shapes and objects (e.g. identifies slope as angles in the environment such as the ramp outside of the school block)

### Properties of shapes and objects

• classifies three-dimensional objects according to their properties (e.g. describes the difference between a triangular prism and a triangular pyramid)
• creates two-dimensional nets for pyramids and prisms

### Transformations

• uses combinations of reflecting, translating and rotating shapes to describe and create patterns and solve problems
• identifies tessellations used in the environment and explains why some combinations of shapes will tesselate while others will not (e.g. tiling a wall using a combination of different shaped tiles; exploring regular and semi-regular tessellations in architectural design)
• explains the result of changing critical and non-critical properties of shapes (e.g. "if I enlarge a square, it’s still a square, or if I rotate a square, it remains a square, but if I change the length of one of its sides, it’s no longer a square")

### Angles

• identifies supplementary and complementary angles and uses them to solve problems
• identifies that angles at a point add to 360 360 3 6 0 ° and that vertically opposite angles are equal and reasons to solve problems

### Properties of shapes and objects

• investigates and uses reasoning to explain the properties of a triangle (e.g. explains why the longest side is always opposite the largest angle in a triangle; recognises that the combined length of 2 2 2 sides of a triangle must always be greater than the length of the third side)
• uses relevant properties of common geometrical shapes to determine unknown lengths and angles

### Transformations

• enlarges and reduces shapes according to a given scale factor and explains what features change and what stay the same (e.g. says ‘when I double the dimensions of the rectangle, all of the lengths are twice as long as they were, but the size of the angles stay the same)
• applies angle properties to solve problems that involve the transformation of shapes and objects and how they are used in practice (e.g. determines which shapes tessellate)

### Angles

• uses angle properties to identify perpendicular and parallel lines (e.g. develops a computer-

aided design drawing involving the creation of parallel and perpendicular lines)
• demonstrates that the angle sum of a triangle is 180 180 1 8 0 ■ and uses this to solve problems
• identifies interior angles in shapes to calculate angle sum
• uses angle properties to identify and calculate unknown angles in familiar two-dimensional shapes

**Snapshot – Draw conclusions and provide reasons**

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

**Snapshot – Select and operate tools**

## Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• select and use a range of digital tools to complete tasks
• attempt to solve a problem individually and with peers before seeking help
• select and use the core features of digital tools to efficiently complete tasks
• troubleshoot basic problems and identify repetitive tasks to automate
• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks
• troubleshoot common problems and automate repetitive tasks

**Snapshot – Interpret concepts and problems**

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

**Snapshot – Create possibilities**

## Critical and Creative Thinking: Generating: Create possibilities

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• create possibilities by connecting or creatively expanding on new and known ideas in a variety of ways
• create possibilities by changing, combining, or elaborating on new and known ideas in a variety of creative ways
• create possibilities by adapting, combining or elaborating on new and known ideas, and proposing a range of different or creative combinations

**Snapshot – Put ideas into action**

## Critical and Creative Thinking: Generating: Put ideas into action

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• put ideas into action by predicting an outcome, trialling options and assessing their effectiveness

• put ideas into action by predicting potential or future outcomes and systematically testing a range of options

• put ideas into action by making predictions, testing and evaluating options, and reconsidering approaches in complex or unfamiliar situations

## Snapshot – Create possibilities

## Critical and Creative Thinking: Generating: Create possibilities

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• create possibilities by connecting or creatively expanding on new and known ideas in a variety of ways

• create possibilities by changing, combining, or elaborating on new and known ideas in a variety of creative ways

• create possibilities by adapting, combining or elaborating on new and known ideas, and proposing a range of different or creative combinations

## Snapshot – Create, communicate and collaborate

## Digital Literacy: Creating and exchanging: Create, communicate and collaborate

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• use the core features of a range of digital tools to create content and communicate and collaborate with peers and trusted adults

• select and control a variety of features in appropriate digital tools to create content and communicate and collaborate with trusted groups

• select and control advanced features of appropriate digital tools to independently create content and effectively communicate and collaborate with wider groups

## Snapshot – Select and operate tools

## Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• select and use a range of digital tools to complete tasks

• attempt to solve a problem individually and with peers before seeking help

• select and use the core features of digital tools to efficiently complete tasks

• troubleshoot basic problems and identify repetitive tasks to automate

• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks

• troubleshoot common problems and automate repetitive tasks

## Snapshot – Create possibilities

## Critical and Creative Thinking: Generating: Create possibilities

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• create possibilities by connecting or creatively expanding on new and known ideas in a variety of

ways
• create possibilities by changing, combining, or elaborating on new and known ideas in a variety of creative ways
• create possibilities by adapting, combining or elaborating on new and known ideas, and proposing a range of different or creative combinations

### Snapshot – Create, communicate and collaborate

## Digital Literacy: Creating and exchanging: Create, communicate and collaborate

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• use the core features of a range of digital tools to create content and communicate and collaborate with peers and trusted adults
• select and control a variety of features in appropriate digital tools to create content and communicate and collaborate with trusted groups
• select and control advanced features of appropriate digital tools to independently create content and effectively communicate and collaborate with wider groups

### Snapshot – Select and operate tools

## Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• select and use a range of digital tools to complete tasks
• attempt to solve a problem individually and with peers before seeking help
• select and use the core features of digital tools to efficiently complete tasks
• troubleshoot basic problems and identify repetitive tasks to automate
• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks
• troubleshoot common problems and automate repetitive tasks

### Snapshot – Interpret concepts and problems

## Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

### Snapshot – Evaluate actions and outcomes

## Critical and Creative Thinking: Analysing: Evaluate actions and outcomes

### Content description

AC9M6SP03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• evaluate the outcome of a task by explaining ideas, conclusions and actions, including using a given set of criteria to support decisions
• evaluate the effectiveness of a course of action or the outcome of a task, including using a given or co-developed set of criteria to support decisions
• evaluate the effectiveness of a course of action or the outcome of a task and account for expected and unexpected results, including using a given or co-developed set of criteria to support decisions

## AC9M6ST01

**interpret and compare for ordinal and nominal categorical, discrete and using comparative displays or and ; compare distributions in terms of , and**

•
•
•

### Elaborations

• determining the for a by finding the difference between the highest and the lowest value in the and comparing the for different
• representing acquired using , comparing the of each using the , the highest for each using the , and discussing the
• representing ordinal collected through , using visualisation tools including and bar charts, and discussing the distribution of in terms of
• using technology to access and graphing software to or stacked ; comparing that are grouped by gender, year level, age group or other and discussing findings

Students learn to:

## interpret and compare data sets for ordinal and nominal categorical, discrete and co numerical variables using comparative displays or visualisations and digital tools; c distributions in terms of mode, range and shape

(AC9M6ST01)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Investigating**

• Interpret data

**Statistics and probability**

• Interpreting and representing data

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Generating**

• Consider alternatives

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Investigating**

• Interpret data

**Managing and operating**

• Select and operate tools

### Related content

This content description can be taught with the following content descriptions from other learning areas.
AC9HS6S02
AC9HS6S03
AC9S6I04
AC9TDI6K03

### Resources

### Work Samples

## WS02 - Fundraiser

## WS03 - Interpreting and comparing data

### Snapshot – Draw conclusions and provide reasons

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

### Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

### Snapshot – Interpret data

## Digital Literacy: Investigating: Interpret data

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions
• analyse and visualise data using a range of digital tools to identify patterns and make predictions
• analyse and visualise data by selecting and using a range of digital tools to infer relationships and make predictions

### Snapshot – Interpreting and representing data

## Numeracy: Statistics and probability: Interpreting and representing data

### Content description

AC9M6ST01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

#### Collecting, displaying and interpreting categorical data

• designs survey questions to collect categorical data (e.g. creates a suite of survey questions to plan the end of year class party)
• collects, records and displays one-variable data in variety of ways such as tables, charts, plots and graphs using the appropriate digital tools (e.g. uses a spreadsheet to record data collected in a class survey and generates a column graph to display the results)
• displays and interprets categorical data in one-to-many data displays
• interprets and represents categorical data in simple displays such as bar and column graphs, pie charts, models, maps, colour wheels, and pictorial timelines, and makes simple inferences from such displays
• makes comparisons from categorical data displays using relative heights from a common baseline (e.g. compares the heights of the columns in a simple column graph to determine the tallest and recognises this as the most frequent response)

#### Collecting, displaying and interpreting numerical data

• collects and records discrete numerical data using an appropriate method for recording (e.g. uses a frequency table to record the experimental results for rolling a dice; records sample measurements taken during a science investigation)
• constructs graphical representations of numerical data and explains the difference between continuous and discrete data (e.g. explains that measurements such as length, mass and temperature are continuous data whereas a count such as the number of people in a queue is discrete)
• explains how data displays can be misleading (e.g. whether a scale should start at zero; not using uniform intervals on the axes)
• interprets visual representations of data displayed using a multi-unit scale, reading values between the marked units and describing any variation and trends in the data

#### Collecting, displaying, interpreting and analysing numerical data

• poses questions based on variations in continuous numerical data and chooses the appropriate method to collect and record data (e.g. collects information on the heights of buildings or daily temperatures, tabulates the results and represents these graphically; uses a survey to collect primary data or secondary data extracted from census data)
• uses numerical and graphical representations relevant to the purpose of the collection of the data and explains their reasoning (e.g. "I can’t use a frequency histogram for categorical data because there is no numerical connection between the categories"; converts their data to percentages in order to compare the girls' results to those of the boys, as the total number of boys and girls who participated in the survey was different)
• determines and calculates the most appropriate statistic to describe the spread of data (e.g. when creating an infographic, uses the mean of the data to describe household income and the median of the data for house prices)
• calculates simple descriptive statistics such as mode, mean or median as measures to represent typical values of a distribution (e.g. describes the mean kilojoule intake and median hours of exercise of a sample population when investigating community health and wellbeing; describes central tendency when analysing road safety statistics)
• compares the usefulness of different representations of the same data (e.g. chooses to use a line graph to illustrate trends, a bar graph to compare the living standards of different economies and a histogram to show income distribution)
• describes the spread of a data distribution in terms of the range, clusters, skewness and symmetry of the graphical display, and determines and makes connections to the mode, median and mean of the data

## Snapshot – Consider alternatives

# Critical and Creative Thinking: Generating: Consider alternatives

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• consider alternatives by comparing different or creative ways to approach a task, issue or problem and recommend a preferred option
• consider alternatives by challenging or creatively adjusting existing ideas in situations where current approaches do not work and recommend a preferred option
• consider alternatives by creatively adapting ideas when information is limited or conflicting and recommend a preferred option

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Draw conclusions and provide reasons**

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Draw conclusions and provide reasons**

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Draw conclusions and provide reasons

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Interpret data

## Digital Literacy: Investigating: Interpret data

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions

• analyse and visualise data using a range of digital tools to identify patterns and make predictions

• analyse and visualise data by selecting and using a range of digital tools to infer relationships and make predictions

## Snapshot – Select and operate tools

# Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6ST01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• select and use a range of digital tools to complete tasks

• attempt to solve a problem individually and with peers before seeking help

• select and use the core features of digital tools to efficiently complete tasks

• troubleshoot basic problems and identify repetitive tasks to automate

• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks

• troubleshoot common problems and automate repetitive tasks

## Resource – WS02 - Fundraiser

By the end of Year 6, students use integers to represent points on a number line and in the Cartesian plane.■They solve problems using the properties of prime, composite and square numbers.■Students order common fractions, giving reasons, and add and subtract fractions with related denominators.■They use all 4 operations with decimals and connect decimal representations of measurements to the metric system.■Students solve problems involving finding a fraction, decimal or percentage of a quantity and use estimation to find approximate solutions to problems involving rational numbers and percentages.■They use mathematical modelling to solve financial and other practical problems involving percentages and rational numbers, formulating and solving the problem, and justifying choices. Students find unknown values in numerical equations involving combinations of arithmetic operations.■They identify and explain rules used to create growing patterns.■Students create and use algorithms to generate sets of numbers, using a rule.

They interpret and use timetables.■Students convert between common units of length, mass and capacity.■They use the formula for the area of a rectangle and angle properties to solve problems.■Students identify the parallel cross-section for right prisms.■They create tessellating patterns using combinations of transformations.■Students locate an ordered pair in any one of the 4 quadrants on the Cartesian plane.

They compare distributions of discrete and continuous numerical and ordinal categorical data sets as part of their statistical investigations, using digital tools. Students critique arguments presented in the media based on statistics.■They assign probabilities using common fractions, decimal and percentages.■Students conduct simulations using digital tools, to generate and record the outcomes from many trials of a chance experiment.■They compare observed frequencies to the expected frequencies of the outcomes of chance experiments.

## AC9M6N04

apply knowledge of place value to add and subtract decimals, using digital tools where appropriate; use estimation and rounding to check the reasonableness of answers

## AC9M6N07

solve problems that require finding a familiar fraction, decimal or percentage of a quantity, including percentage discounts, choosing efficient calculation strategies and using digital tools

where appropriate

## AC9M6N08

approximate numerical solutions to problems involving rational numbers and percentages, including financial contexts, using appropriate estimation strategies

## AC9M6N09

use mathematical modelling to solve practical problems involving natural and rational numbers and percentages, including in financial contexts; formulate the problems, choosing operations and efficient calculation strategies, and using digital tools where appropriate; interpret and communicate solutions in terms of the situation, justifying the choices made

## AC9M6ST01

interpret and compare data sets for ordinal and nominal categorical, discrete and continuous numerical variables using comparative displays or visualisations and digital tools; compare distributions in terms of mode, range and shape

## AC9M6ST03

plan and conduct statistical investigations by posing and refining questions or identifying a problem and collecting relevant data; analyse and interpret the data and communicate findings within the context of the investigation

### Resource – WS03 - Interpreting and comparing data

By the end of Year 6, students use integers to represent points on a number line and in the Cartesian plane.■They solve problems using the properties of prime, composite and square numbers.■Students order common fractions, giving reasons, and add and subtract fractions with related denominators.■They use all 4 operations with decimals and connect decimal representations of measurements to the metric system.■Students solve problems involving finding a fraction, decimal or percentage of a quantity and use estimation to find approximate solutions to problems involving rational numbers and percentages.■They use mathematical modelling to solve financial and other practical problems involving percentages and rational numbers, formulating and solving the problem, and justifying choices.■Students find unknown values in numerical equations involving combinations of arithmetic operations.■They identify and explain rules used to create growing patterns.■Students create and use algorithms to generate sets of numbers, using a rule.

They interpret and use timetables.■Students convert between common units of length, mass and capacity.■They use the formula for the area of a rectangle and angle properties to solve problems.■Students identify the parallel cross-section for right prisms.■They create tessellating patterns using combinations of transformations.■Students locate an ordered pair in any one of the 4 quadrants on the Cartesian plane.

They compare distributions of discrete and continuous numerical and ordinal categorical data sets as part of their statistical investigations, using digital tools.■Students critique arguments presented in the media based on statistics.■They assign probabilities using common fractions, decimal and percentages.■Students conduct simulations using digital tools, to generate and record the outcomes from many trials of a chance experiment.■They compare observed frequencies to the expected frequencies of the outcomes of chance experiments.

## AC9M6ST01

interpret and compare data sets for ordinal and nominal categorical, discrete and continuous numerical variables using comparative displays or visualisations and digital tools; compare distributions in terms of mode, range and shape

## AC9M6N01

recognise situations, including financial contexts, that use integers; locate and represent integers on a number line and as coordinates on the Cartesian plane

## AC9M6ST02

**identify statistically informed arguments presented in traditional and digital media; discuss and**

**critique methods, representations and conclusions**

•
•
•

### Elaborations

• investigating representations in the media and discussing what they illustrate and the messages the people who created them might want to convey
• evaluating reports and secondary relating to the distribution and use of non-renewable resources around the world
• identifying potentially misleading representations in the media; for example, graphs with broken axes or non-linear , graphics not drawn to , not related to the about which the claims are made and pie charts in which the whole pie does not represent the entire about which the claims are made
• investigating both traditional and digital media relating to First Nations Australians, identifying and critiquing statistically informed arguments

Students learn to:

## identify statistically informed arguments presented in traditional and digital media; critique methods, data representations and conclusions

(AC9M6ST02)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Responding to ethical issues**

• Explore ethical issues

**Understanding ethical concepts and perspectives**

• Explore ethical concepts

**Statistics and probability**

• Interpreting and representing data

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Responding to ethical issues**

• Explore ethical issues

**Understanding ethical concepts and perspectives**

• Explore ethical concepts

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Responding to ethical issues**

• Explore ethical issues

**Understanding ethical concepts and perspectives**

• Explore ethical concepts

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Investigating**

• Acquire and collate data

• Interpret data

**Culture**

• The First Peoples of Australia (Aboriginal Peoples) belong to the world's oldest continuous cultures. First Nations Australians demonstrate resilience in the maintenance, practice and revitalisation of culture despite the many historic and enduring impacts of colonisation, and continue to celebrate and share the past, present and future manifestations of their cultures.

## Related content

This content description can be taught with the following content descriptions from other learning areas.

AC9HP6P09

AC9HS6S02

AC9HS6S03

## Snapshot – Draw conclusions and provide reasons

### Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

#### Content description

AC9M6ST02

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

### Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

#### Content description

AC9M6ST02

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Explore ethical issues

### Ethical Understanding: Responding to ethical issues: Explore ethical issues

#### Content description

AC9M6ST02

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• use examples to describe how people may have different values and perspectives that they apply to an ethical issue

• describe how ethical perspectives or approaches to ethical issues may vary in different situations
• analyse■the relationships between values, ethical perspectives■and ethical frameworks when responding to ethical issues

## Snapshot – Explore ethical concepts

# Ethical Understanding: Understanding ethical concepts and perspectives: Explor

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify ethical concepts, such as respect and tolerance, and describe how a situation or context affects actions and behaviour
• identify and describe ethical concepts, such as truth and justice, and explain how perspectives may vary according to the situation or context
• analyse■the similarities and differences between ethical concepts, such as integrity, loyalty and equality, in a range of situations and contexts

## Snapshot – Interpreting and representing data

# Numeracy: Statistics and probability: Interpreting and representing data

### Content description

AC9M6ST02

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Collecting, displaying and interpreting categorical data**

• designs survey questions to collect categorical data (e.g. creates a suite of survey questions to plan the end of year class party)
• collects, records and displays one-variable data in variety of ways such as tables, charts, plots and graphs using the appropriate digital tools (e.g. uses a spreadsheet to record data collected in a class survey and generates a column graph to display the results)
• displays and interprets categorical data in one-to-many data displays
• interprets and represents categorical data in simple displays such as bar and column graphs, pie charts, models, maps, colour wheels, and pictorial timelines, and makes simple inferences from such displays
• makes comparisons from categorical data displays using relative heights from a common baseline (e.g. compares the heights of the columns in a simple column graph to determine the tallest and recognises this as the most frequent response)

**Collecting, displaying and interpreting numerical data**

• collects and records discrete numerical data using an appropriate method for recording (e.g. uses a frequency table to record the experimental results for rolling a dice; records sample measurements taken during a science investigation)
• constructs graphical representations of numerical data and explains the difference between continuous and discrete data (e.g. explains that measurements such as length, mass and temperature are continuous data whereas a count such as the number of people in a queue is discrete)
• explains how data displays can be misleading (e.g. whether a scale should start at zero; not using uniform intervals on the axes)
• interprets visual representations of data displayed using a multi-unit scale, reading values between the marked units and describing any variation and trends in the data

**Collecting, displaying, interpreting and analysing numerical data**

• poses questions based on variations in continuous numerical data and chooses the appropriate method to collect and record data (e.g. collects information on the heights of buildings or daily temperatures, tabulates the results and represents these graphically; uses a survey to collect primary data or secondary data extracted from census data)
• uses numerical and graphical representations relevant to the purpose of the collection of the data and explains their reasoning (e.g. "I can’t use a frequency histogram for categorical data because there is no numerical connection between the categories"; converts their data to percentages in order to compare the girls' results to those of the boys, as the total number of boys and girls who

participated in the survey was different)
• determines and calculates the most appropriate statistic to describe the spread of data (e.g. when creating an infographic, uses the mean of the data to describe household income and the median of the data for house prices)
• calculates simple descriptive statistics such as mode, mean or median as measures to represent typical values of a distribution (e.g. describes the mean kilojoule intake and median hours of exercise of a sample population when investigating community health and wellbeing; describes central tendency when analysing road safety statistics)
• compares the usefulness of different representations of the same data (e.g. chooses to use a line graph to illustrate trends, a bar graph to compare the living standards of different economies and a histogram to show income distribution)
• describes the spread of a data distribution in terms of the range, clusters, skewness and symmetry of the graphical display, and determines and makes connections to the mode, median and mean of the data

**Snapshot – Draw conclusions and provide reasons**

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Explore ethical issues**

## Ethical Understanding: Responding to ethical issues: Explore ethical issues

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• use examples to describe how people may have different values and perspectives that they apply to an ethical issue
• describe how ethical perspectives or approaches to ethical issues may vary in different situations
• analyse■the relationships between values, ethical perspectives■and ethical frameworks when responding to ethical issues

**Snapshot – Explore ethical concepts**

## Ethical Understanding: Understanding ethical concepts and perspectives: Explor

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify ethical concepts, such as respect and tolerance, and describe how a situation or context affects actions and behaviour

• identify and describe ethical concepts, such as truth and justice, and explain how perspectives may vary according to the situation or context

• analyse■the similarities and differences between ethical concepts, such as integrity, loyalty and equality, in a range of situations and contexts

## Snapshot – Draw conclusions and provide reasons

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Draw conclusions and provide reasons

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Explore ethical issues

## Ethical Understanding: Responding to ethical issues: Explore ethical issues

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• use examples to describe how people may have different values and perspectives that they apply to an ethical issue
• describe how ethical perspectives or approaches to ethical issues may vary in different situations
• analyse■the relationships between values, ethical perspectives■and ethical frameworks when responding to ethical issues

## Snapshot – Explore ethical concepts

## Ethical Understanding: Understanding ethical concepts and perspectives: Explor

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify ethical concepts, such as respect and tolerance, and describe how a situation or context affects actions and behaviour
• identify and describe ethical concepts, such as truth and justice, and explain how perspectives may vary according to the situation or context
• analyse■the similarities and differences between ethical concepts, such as integrity, loyalty and equality, in a range of situations and contexts

## Snapshot – Draw conclusions and provide reasons

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual

information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

### Snapshot – Acquire and collate data

## Digital Literacy: Investigating: Acquire and collate data

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• collect and access data using a range of digital tools and methods in response to a defined question
• collect and access data using a range of digital tools and methods in response to a defined question or problem
• collect and access data from a range of sources, using specialised digital tools in response to problems, and evaluate it for relevance

### Snapshot – Interpret data

## Digital Literacy: Investigating: Interpret data

### Content description

AC9M6ST02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions
• analyse and visualise data using a range of digital tools to identify patterns and make predictions
• analyse and visualise data by selecting and using a range of digital tools to infer relationships and make predictions

# AC9M6ST03

**plan and conduct by posing and refining questions or identifying a problem and collecting relevant ; analyse and interpret the and communicate findings within the of the investigation**

•
•

### Elaborations

• selecting and using appropriate peripherals; for example, using a scientific probe to collect about changing soil moisture for plants, interpreting the and sharing the results as a digital chart
• using a spreadsheet to record and analyse , recognising the difference between cell formats in spreadsheets; for example, changing the default general format to numerical, text or date as needed
• investigating the daily water usage by a student in the home compared to the World Health Organization claim of 50 litres of clean water allocated per person per day
• collecting of ; for example, the number of cars or pets in a household, where the class is surveyed, then other classes are surveyed, and is analysed and compared, discussing findings
• collecting through the use of a ; for example, surveying each member of the class where they are asked to indicate their preference on a five-point for a particular graphic and colour combination of a proposed school logo
• collecting ordinal for ranking nominees for school captain with respect to several criteria, contrasting the use of a five-point compared with using a four-point

Students learn to:

## plan and conduct statistical investigations by posing and refining questions or iden
## problem and collecting relevant data; analyse and interpret the data and communica

## the context of the investigation

(AC9M6ST03)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Develop questions

• Identify, process and evaluate information

**Statistics and probability**

• Interpreting and representing data

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Investigating**

• Interpret data

**Managing and operating**

• Select and operate tools

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Investigating**

• Interpret data

**Managing and operating**

• Select and operate tools

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Draw conclusions and provide reasons

**Inquiring**

• Identify, process and evaluate information

**Investigating**

• Interpret data

### Related content

This content description can be taught with the following content descriptions from other learning areas.

AC9HS6S02

AC9HS6S03

AC9S6I02
AC9S6I03
AC9S6I04

### Resources

### Work Samples

## WS02 - Fundraiser

### Snapshot – Draw conclusions and provide reasons

#### Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

##### Content description

AC9M6ST03

##### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

### Snapshot – Develop questions

#### Critical and Creative Thinking: Inquiring: Develop questions

##### Content description

AC9M6ST03

##### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• develop■questions to examine unfamiliar ideas and topics

• questions developed support the process of improving knowledge and understanding about a topic or investigation

• develop■questions to examine unfamiliar ideas and topics

• questions developed focus on improving understanding about a topic and clarifying information about processes or procedures

• develop questions to investigate complex issues and topics

• questions developed assist in forming an understanding of why phenomena or issues arise

### Snapshot – Identify, process and evaluate information

#### Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

##### Content description

AC9M6ST03

##### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

### Snapshot – Interpreting and representing data

#### Numeracy: Statistics and probability: Interpreting and representing data

##### Content description

AC9M6ST03

##### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

### Collecting, displaying and interpreting categorical data

• designs survey questions to collect categorical data (e.g. creates a suite of survey questions to plan the end of year class party)
• collects, records and displays one-variable data in variety of ways such as tables, charts, plots and graphs using the appropriate digital tools (e.g. uses a spreadsheet to record data collected in a class survey and generates a column graph to display the results)
• displays and interprets categorical data in one-to-many data displays
• interprets and represents categorical data in simple displays such as bar and column graphs, pie charts, models, maps, colour wheels, and pictorial timelines, and makes simple inferences from such displays
• makes comparisons from categorical data displays using relative heights from a common baseline (e.g. compares the heights of the columns in a simple column graph to determine the tallest and recognises this as the most frequent response)

### Collecting, displaying and interpreting numerical data

• collects and records discrete numerical data using an appropriate method for recording (e.g. uses a frequency table to record the experimental results for rolling a dice; records sample measurements taken during a science investigation)
• constructs graphical representations of numerical data and explains the difference between continuous and discrete data (e.g. explains that measurements such as length, mass and temperature are continuous data whereas a count such as the number of people in a queue is discrete)
• explains how data displays can be misleading (e.g. whether a scale should start at zero; not using uniform intervals on the axes)
• interprets visual representations of data displayed using a multi-unit scale, reading values between the marked units and describing any variation and trends in the data

### Collecting, displaying, interpreting and analysing numerical data

• poses questions based on variations in continuous numerical data and chooses the appropriate method to collect and record data (e.g. collects information on the heights of buildings or daily temperatures, tabulates the results and represents these graphically; uses a survey to collect primary data or secondary data extracted from census data)
• uses numerical and graphical representations relevant to the purpose of the collection of the data and explains their reasoning (e.g. "I can’t use a frequency histogram for categorical data because there is no numerical connection between the categories"; converts their data to percentages in order to compare the girls' results to those of the boys, as the total number of boys and girls who participated in the survey was different)
• determines and calculates the most appropriate statistic to describe the spread of data (e.g. when creating an infographic, uses the mean of the data to describe household income and the median of the data for house prices)
• calculates simple descriptive statistics such as mode, mean or median as measures to represent typical values of a distribution (e.g. describes the mean kilojoule intake and median hours of exercise of a sample population when investigating community health and wellbeing; describes central tendency when analysing road safety statistics)
• compares the usefulness of different representations of the same data (e.g. chooses to use a line graph to illustrate trends, a bar graph to compare the living standards of different economies and a histogram to show income distribution)
• describes the spread of a data distribution in terms of the range, clusters, skewness and symmetry of the graphical display, and determines and makes connections to the mode, median and mean of the data

## Snapshot – Draw conclusions and provide reasons

# Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

## Content description

AC9M6ST03

## Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• draw conclusions and make choices when completing tasks, using observation and prior knowledge to

provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Interpret data**

## Digital Literacy: Investigating: Interpret data

### Content description

AC9M6ST03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions
• analyse and visualise data using a range of digital tools to identify patterns and make predictions
• analyse and visualise data by selecting and using a range of digital tools to infer relationships and make predictions

**Snapshot – Select and operate tools**

## Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6ST03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• select and use a range of digital tools to complete tasks
• attempt to solve a problem individually and with peers before seeking help
• select and use the core features of digital tools to efficiently complete tasks
• troubleshoot basic problems and identify repetitive tasks to automate
• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks
• troubleshoot common problems and automate repetitive tasks

**Snapshot – Draw conclusions and provide reasons**

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide

reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

### Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

#### Content description

AC9M6ST03

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Interpret data

### Digital Literacy: Investigating: Interpret data

#### Content description

AC9M6ST03

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions
• analyse and visualise data using a range of digital tools to identify patterns and make predictions
• analyse and visualise data by selecting and using a range of digital tools to infer relationships and make predictions

## Snapshot – Select and operate tools

### Digital Literacy: Managing and operating: Select and operate tools

#### Content description

AC9M6ST03

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• select and use a range of digital tools to complete tasks
• attempt to solve a problem individually and with peers before seeking help
• select and use the core features of digital tools to efficiently complete tasks
• troubleshoot basic problems and identify repetitive tasks to automate
• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks
• troubleshoot common problems and automate repetitive tasks

## Snapshot – Draw conclusions and provide reasons

### Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

#### Content description

AC9M6ST03

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and

across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

### Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

#### Content description

AC9M6ST03

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Draw conclusions and provide reasons

### Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

#### Content description

AC9M6ST03

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

## Snapshot – Identify, process and evaluate information

### Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

#### Content description

AC9M6ST03

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Draw conclusions and provide reasons

### Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

#### Content description

AC9M6ST03

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made

• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made

• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Draw conclusions and provide reasons**

## Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons

### Content description

AC9M6ST03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• draw conclusions and make choices when completing tasks, using observation and prior knowledge to provide reasons and construct arguments for choices made
• draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
• draw conclusions and make choices when completing tasks by connecting evidence from within and across discipline areas to provide reasons and evaluate arguments for choices made

**Snapshot – Identify, process and evaluate information**

## Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

### Content description

AC9M6ST03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• condense and combine selected information related to the topic of study
• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources
• compare information and opinion that can be verified against claims based on personal preference
• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources
• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

**Snapshot – Interpret data**

## Digital Literacy: Investigating: Interpret data

### Content description

AC9M6ST03

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions
• analyse and visualise data using a range of digital tools to identify patterns and make

predictions
• analyse and visualise data by selecting and using a range of digital tools to infer relationships and make predictions

## AC9M6P01

**recognise that probabilities lie on numerical of 0 – 1 or 0% – 100% and use to that occur in a given , using common , and**

•

**Elaborations**

• recognising that the of an occurring can be represented numerically as either a number ranging from to one or a percentage from 0 0 0 % to 100 100 1 0 0 % where or 0 0 0 % it won't happen and one or 100 100 1 0 0 % it is certain to happen
• using a of to one or 0 0 0 % to 100 100 1 0 0 % to estimate chances of
• listing the different possible outcomes for rolling a dice and using a to locate the relative by considering the chance of more or less than for each possible ; for example, the of getting a number greater than 4 4 4
• recognising the language used to describe situations involving uncertainty, such as what it to be lucky, a 75 75 7 5 % chance of rain or a 1 1 1 -in- 100 100 1 0 0 years flood
• exploring how probabilities are used in artificial intelligence for machine learning and decision-making; for example, when choosing a video on a streaming service or travelling in a self-driving autonomous car, where artificial intelligence estimate the of a pedestrian crossing the road, which helps the autonomous car make decisions about when to stop or slow down
• exploring First Nations Australian children's instructive games, such as Weme from the Warlpiri Peoples of Central Australia, to investigate and that will occur, indicating their estimated likelihood

Students learn to:

## recognise that probabilities lie on numerical scales of 0 – 1 or 0% – 100% and use e

## assign probabilities that events occur in a given context, using common fractions, p

## decimals

(AC9M6P01)

### General capabilities and cross-curriculum priorities

This content description connects to the following general capabilities and cross-curriculum priorities.

**Number sense and algebra**

• Proportional thinking

**Statistics and probability**

• Understanding chance

### Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Analysing**

• Interpret concepts and problems

**Generating**

• Consider alternatives

**Inquiring**

• Identify, process and evaluate information

**Analysing**

• Interpret concepts and problems

**Statistics and probability**

• Understanding chance

**Culture**

• First Nations Australians' ways of life reflect unique ways of being, knowing, thinking and doing.

### Snapshot – Proportional thinking

## Numeracy: Number sense and algebra: Proportional thinking

### Content description

AC9M6P01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

#### Understanding percentages and relative size

• explains that a percentage is a proportional relationship between a quantity and 100 100 1 0 0 (e.g. 25 25 2 5 % means 25 25 2 5 for every one hundred)
• demonstrates that 100 100 1 0 0 % is a complete whole (e.g. explains that in order to get 100 100 1 0 0 % on a quiz, you must answer every question correctly)
• uses percentage to describe, represent and compare relative size (e.g. selects which beaker is 75 75 7 5 % full, describes an object as 50 50 5 0 % of another object; describes and represents clean air as having 21 21 2 1 % oxygen)
• recognises that complementary percentages add to give 100 100 1 0 0 % and applies to situations (e.g. if 10 10 1 0 % of the jellybeans in a jar are black then 90 90 9 0 % are not black)

#### Determines a percentage as a part of a whole

• explains and fluently uses interchangeably the equivalence relationship between a fraction, decimal and percentage (e.g. 1 2 = 0.5 = 50 \frac12 = 0.5 = 50 2 1 ■ = 0 . 5 = 5 0 %; explains that at quarter time, 75 75 7 5 % of the game is left to play; ; interchangeably refers to a response from 50 50 5 0 %, 0.5 0.5 0 . 5 or half of the audience when evaluating how an audience responded to an aspect of a performance)
• uses key percentages and their equivalences to determine the percentage of a quantity (e.g. to solve 75 75 7 5 % of 160 160 1 6 0 , knows that 50 50 5 0 % [half] of 160 160 1 6 0 is 80 80 8 0 , and 25 25 2 5 % [quarter] is 40 40 4 0 so 75 75 7 5 % is 120 120 1 2 0 )
• calculates a percentage of an amount (e.g. interprets that a 15 15 1 5 % discount on an $ 80 \$80 $ 8 0 purchase means 15 15 1 5 % × $ 80 \times \space\$80 × $ 8 0 and determines 10 10 1 0 % × $ 80 \times\space\$80 × $ 8 0 is $ 8 \$8 $ 8 , so 5 5 5 % × $ 80 \times\space\$80 × $ 8 0 is $ 4 \$4 $ 4 therefore 15 15 1 5 % × $ 80 \times \$80 × $ 8 0 is $ 8 + $ 4 = $ 12 \$8 + \$4 = \$12 $ 8 + $ 4 = $ 1 2 ; calculates the amount of sugar/fat in a breakfast cereal to make a recommendation on a healthy choice, such as 12 12 1 2 % of 250 250 2 5 0 grams = 30 30 3 0 grams)
• expresses one quantity as a percentage of another (e.g. determines what percentage 7 7 7 is of 35 35 3 5 ; determines what percentage 10 10 1 0 millilitres is of 200 200 2 0 0 millilitres when calculating appropriate doses of medicine)
• uses the complement of the percentage to calculate the amount after a percentage discount (e.g. to calculate how much to pay after a 20 20 2 0 % discount, calculates 80 80 8 0 % of the original cost)

## Snapshot – Understanding chance

# Numeracy: Statistics and probability: Understanding chance

### Content description

AC9M6P01

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

#### Fairness

• identifies all possible outcomes of one-step experiments and records outcomes in tables and charts
• explains why outcomes of chance experiments may differ from expected results (e.g. "just because there are 6 6 6 numbers on a dice doesn't mean you are going to roll a 6 6 6 every 6 6 6 rolls, you may not roll a 6 6 6 in the entire game")
• explains the difference between the notion of equal likelihood of possible outcomes and those that are not equally likely (e.g. explains the use of phrases such as fifty-fifty when there are 2 2 2 outcomes and when 2 2 2 events occurring are equally likely as opposed to head and tail are more likely than 2 2 2 heads or 2 2 2 tails)
• identifies unfair elements in games that affect the chances of winning (e.g. having an unequal number of turns; weighted dice)
• explains that the outcomes of chance events are either "certain to happen", "certain not to happen" or lie somewhere in between and knows that impossible events are events that are "certain

not to happen"
• identifies events where the chance of one event occurring will not affect the occurrence of the other (e.g. if a coin is tossed and heads have come up 7 7 7 times in a row, it is still equally likely that the next toss will be either a head or a tail)

**Probabilities**

• expresses the theoretical probability of an event as the number of ways an event can happen out of the total number of possibilities
• identifies a range of chance events that have a probability from 0 – 1 0 – 1 0 – 1 (e.g. you have zero probability of rolling a 7 7 7 with one roll of a standard 6 6 6 -sided dice; the probability that tomorrow is Wednesday given today is Tuesday is one)
• describes probabilities as fractions of one (e.g. the probability of an even number when rolling a dice is 3 6 \frac36 6 3 ■ )
• expresses probabilities as fractions, decimals, percentages and ratios recognising that all probabilities lie on a measurement scale of zero to one (e.g. uses numerical representations such as 75 75 7 5 % chance of rain or 4 4 4 out 5 5 5 people liked the story; explains why you can’t have a probability less than zero)

**Calculating probabilities**

• determines the probability of compound events and explains why some results have a higher probability than others (e.g. the results from tossing 2 2 2 coins)
• represents diagrammatically all possible outcomes (e.g. tree diagrams, two-way tables, Venn diagrams)
• measures and compares expected results to the actual results of a chance event over a number of trials, and compares and explains the variation in results (e.g. uses probability to determine expected results of a spinner prior to trial)
• recognises that the chance of something occurring or its complement has a total probability of one (e.g. the probability of rolling a 3 3 3 is 1 6 \frac16 6 1 ■ and the probability of not rolling a 3 3 3 is 5 6 \frac56 6 5 ■
• calculates and explains the difference between the probabilities of chance events with and without replacement (e.g. "if we put all of the class names in a hat and draw them out one at a time without putting the name back in, the probability of your name getting called out increases each time because the total number of possible outcomes decreases")
• calculates the probabilities of future events based on historical data (e.g. uses historical rainfall data to plan the date for an outdoor event)

## Snapshot – Interpret concepts and problems

# Critical and Creative Thinking: Analysing: Interpret concepts and problems

### Content description

AC9M6P01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• identify and prioritise significant elements and relationships within a concept or problem
• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area
• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

## Snapshot – Consider alternatives

# Critical and Creative Thinking: Generating: Consider alternatives

### Content description

AC9M6P01

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• consider alternatives by comparing different or creative ways to approach a task, issue or problem and recommend a preferred option
• consider alternatives by challenging or creatively adjusting existing ideas in situations where current approaches do not work and recommend a preferred option
• consider alternatives by creatively adapting ideas when information is limited or conflicting and

recommend a preferred option

## Snapshot – Identify, process and evaluate information

### Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

#### Content description

AC9M6P01

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• condense and combine selected information related to the topic of study

• identify and examine relevant information and opinion from a range of sources, including visual information and digital sources

• compare information and opinion that can be verified against claims based on personal preference

• identify and clarify significant information and opinion from a range of sources, including visual information and digital sources

• evaluate the accuracy, validity and relevance of the information and opinion to the topic of study

## Snapshot – Interpret concepts and problems

### Critical and Creative Thinking: Analysing: Interpret concepts and problems

#### Content description

AC9M6P01

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• identify and prioritise significant elements and relationships within a concept or problem

• identify the relevant and significant aspects of a concept or problem, understanding that approaches may change depending on the subject or learning area

• identify the relevant aspects of a concept or problem, recognising gaps or missing elements necessary for understanding by using approaches and strategies suitable for the context

## Snapshot – Understanding chance

### Numeracy: Statistics and probability: Understanding chance

#### Content description

AC9M6P01

#### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Fairness**

• identifies all possible outcomes of one-step experiments and records outcomes in tables and charts

• explains why outcomes of chance experiments may differ from expected results (e.g. "just because there are 6 6 6 numbers on a dice doesn’t mean you are going to roll a 6 6 6 every 6 6 6 rolls, you may not roll a 6 6 6 in the entire game")

• explains the difference between the notion of equal likelihood of possible outcomes and those that are not equally likely (e.g. explains the use of phrases such as fifty-fifty when there are 2 2 2 outcomes and when 2 2 2 events occurring are equally likely as opposed to head and tail are more likely than 2 2 2 heads or 2 2 2 tails)

• identifies unfair elements in games that affect the chances of winning (e.g. having an unequal number of turns; weighted dice)

• explains that the outcomes of chance events are either "certain to happen", "certain not to happen" or lie somewhere in between and knows that impossible events are events that are "certain not to happen"

• identifies events where the chance of one event occurring will not affect the occurrence of the other (e.g. if a coin is tossed and heads have come up 7 7 7 times in a row, it is still equally likely that the next toss will be either a head or a tail)

**Probabilities**

• expresses the theoretical probability of an event as the number of ways an event can happen out of the total number of possibilities

• identifies a range of chance events that have a probability from 0 – 1 0 – 1 0 – 1 (e.g. you have zero probability of rolling a 7 7 7 with one roll of a standard 6 6 6 -sided dice; the probability that tomorrow is Wednesday given today is Tuesday is one)
• describes probabilities as fractions of one (e.g. the probability of an even number when rolling a dice is 3 6 \frac36 6 3 ■ )
• expresses probabilities as fractions, decimals, percentages and ratios recognising that all probabilities lie on a measurement scale of zero to one (e.g. uses numerical representations such as 75 75 7 5 % chance of rain or 4 4 4 out 5 5 5 people liked the story; explains why you can't have a probability less than zero)

**Calculating probabilities**

• determines the probability of compound events and explains why some results have a higher probability than others (e.g. the results from tossing 2 2 2 coins)
• represents diagrammatically all possible outcomes (e.g. tree diagrams, two-way tables, Venn diagrams)
• measures and compares expected results to the actual results of a chance event over a number of trials, and compares and explains the variation in results (e.g. uses probability to determine expected results of a spinner prior to trial)
• recognises that the chance of something occurring or its complement has a total probability of one (e.g. the probability of rolling a 3 3 3 is 1 6 \frac16 6 1 ■ and the probability of not rolling a 3 3 3 is 5 6 \frac56 6 5 ■
• calculates and explains the difference between the probabilities of chance events with and without replacement (e.g. "if we put all of the class names in a hat and draw them out one at a time without putting the name back in, the probability of your name getting called out increases each time because the total number of possible outcomes decreases")
• calculates the probabilities of future events based on historical data (e.g. uses historical rainfall data to plan the date for an outdoor event)

## AC9M6P02

**conduct■repeated and run with an increasing number of using ; compare observations with expected results and discuss the effect on of increasing the number of**

•
•

**Elaborations**

• using to simulate multiple tosses of a coin or dice and comparing the relative of an outcome as the number of increases; identifying the between and realising that the results tend to the prediction with larger numbers of
• using online of repeated random to recognise emerging patterns, discussing and comparing expected results to the actual results
• investigating the relative frequencies of all outcomes for a chance experiment and verifying that their sum equals one
• systematically recording the outcome of large numbers of spins on a spinner and analysing the relative frequencies of outcomes, representing these as

Students learn to:

## conduct■repeated■chance experiments and run simulations with an increasing nu digital tools; compare observations with expected results and discuss the effect on increasing the number of trials

(AC9M6P02)

**General capabilities and cross-curriculum priorities**

This content description connects to the following general capabilities and cross-curriculum priorities.

**Creating and exchanging**

• Create, communicate and collaborate

**Investigating**

• Interpret data

**Managing and operating**

• Select and operate tools

**Statistics and probability**

• Understanding chance

## Elaborations

Content elaborations provide suggestions of ways to teach the content description and connect it to general capabilities and cross-curriculum priorities. Content elaborations are optional .

**Creating and exchanging**

• Create, communicate and collaborate

**Investigating**

• Interpret data

**Managing and operating**

• Select and operate tools

**Number sense and algebra**

• Interpreting fractions

**Creating and exchanging**

• Create, communicate and collaborate

**Investigating**

• Interpret data

**Managing and operating**

• Select and operate tools

**Number sense and algebra**

• Interpreting fractions

**Number sense and algebra**

• Proportional thinking

**Snapshot – Create, communicate and collaborate**

### Digital Literacy: Creating and exchanging: Create, communicate and collaborate

#### Content description

AC9M6P02

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• use the core features of a range of digital tools to create content and communicate and collaborate with peers and trusted adults

• select and control a variety of features in appropriate digital tools to create content and communicate and collaborate with trusted groups

• select and control advanced features of appropriate digital tools to independently create content and effectively communicate and collaborate with wider groups

**Snapshot – Interpret data**

### Digital Literacy: Investigating: Interpret data

#### Content description

AC9M6P02

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.

• organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions

• analyse and visualise data using a range of digital tools to identify patterns and make predictions

• analyse and visualise data by selecting and using a range of digital tools to infer relationships and make predictions

**Snapshot – Select and operate tools**

### Digital Literacy: Managing and operating: Select and operate tools

#### Content description

AC9M6P02

#### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• select and use a range of digital tools to complete tasks
• attempt to solve a problem individually and with peers before seeking help
• select and use the core features of digital tools to efficiently complete tasks
• troubleshoot basic problems and identify repetitive tasks to automate
• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks
• troubleshoot common problems and automate repetitive tasks

## Snapshot – Understanding chance

# Numeracy: Statistics and probability: Understanding chance

## Content description

AC9M6P02

## Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

### Fairness

• identifies all possible outcomes of one-step experiments and records outcomes in tables and charts
• explains why outcomes of chance experiments may differ from expected results (e.g. "just because there are 6 6 6 numbers on a dice doesn't mean you are going to roll a 6 6 6 every 6 6 6 rolls, you may not roll a 6 6 6 in the entire game")
• explains the difference between the notion of equal likelihood of possible outcomes and those that are not equally likely (e.g. explains the use of phrases such as fifty-fifty when there are 2 2 2 outcomes and when 2 2 2 events occurring are equally likely as opposed to head and tail are more likely than 2 2 2 heads or 2 2 2 tails)
• identifies unfair elements in games that affect the chances of winning (e.g. having an unequal number of turns; weighted dice)
• explains that the outcomes of chance events are either "certain to happen", "certain not to happen" or lie somewhere in between and knows that impossible events are events that are "certain not to happen"
• identifies events where the chance of one event occurring will not affect the occurrence of the other (e.g. if a coin is tossed and heads have come up 7 7 7 times in a row, it is still equally likely that the next toss will be either a head or a tail)

### Probabilities

• expresses the theoretical probability of an event as the number of ways an event can happen out of the total number of possibilities
• identifies a range of chance events that have a probability from 0 – 1 0 – 1 0 – 1 (e.g. you have zero probability of rolling a 7 7 7 with one roll of a standard 6 6 6 -sided dice; the probability that tomorrow is Wednesday given today is Tuesday is one)
• describes probabilities as fractions of one (e.g. the probability of an even number when rolling a dice is 3 6 \frac36 6 3 ■ )
• expresses probabilities as fractions, decimals, percentages and ratios recognising that all probabilities lie on a measurement scale of zero to one (e.g. uses numerical representations such as 75 75 7 5 % chance of rain or 4 4 4 out 5 5 5 people liked the story; explains why you can't have a probability less than zero)

### Calculating probabilities

• determines the probability of compound events and explains why some results have a higher probability than others (e.g. the results from tossing 2 2 2 coins)
• represents diagrammatically all possible outcomes (e.g. tree diagrams, two-way tables, Venn diagrams)
• measures and compares expected results to the actual results of a chance event over a number of trials, and compares and explains the variation in results (e.g. uses probability to determine expected results of a spinner prior to trial)
• recognises that the chance of something occurring or its complement has a total probability of one (e.g. the probability of rolling a 3 3 3 is 1 6 \frac16 6 1 ■ and the probability of not rolling a 3 3 3 is 5 6 \frac56 6 5 ■
• calculates and explains the difference between the probabilities of chance events with and without replacement (e.g. "if we put all of the class names in a hat and draw them out one at a time without

putting the name back in, the probability of your name getting called out increases each time because the total number of possible outcomes decreases")
• calculates the probabilities of future events based on historical data (e.g. uses historical rainfall data to plan the date for an outdoor event)

## Snapshot – Create, communicate and collaborate

# Digital Literacy: Creating and exchanging: Create, communicate and collaborate

### Content description

AC9M6P02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• use the core features of a range of digital tools to create content and communicate and collaborate with peers and trusted adults
• select and control a variety of features in appropriate digital tools to create content and communicate and collaborate with trusted groups
• select and control advanced features of appropriate digital tools to independently create content and effectively communicate and collaborate with wider groups

## Snapshot – Interpret data

# Digital Literacy: Investigating: Interpret data

### Content description

AC9M6P02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions
• analyse and visualise data using a range of digital tools to identify patterns and make predictions
• analyse and visualise data by selecting and using a range of digital tools to infer relationships and make predictions

## Snapshot – Select and operate tools

# Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6P02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• select and use a range of digital tools to complete tasks
• attempt to solve a problem individually and with peers before seeking help
• select and use the core features of digital tools to efficiently complete tasks
• troubleshoot basic problems and identify repetitive tasks to automate
• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks
• troubleshoot common problems and automate repetitive tasks

## Snapshot – Interpreting fractions

# Numeracy: Number sense and algebra: Interpreting fractions

### Content description

AC9M6P02

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Comparing fractions**

• understands the equivalence relationship between a fraction, decimal and percentage as different representations of the same quantity (e.g. 1 2 = 0.5 = 50 \frac12 = 0.5 = 50 2 1 ■ = 0 . 5 = 5 0 % because 5 5 5 is half of 10 10 1 0 and 50 50 5 0 is half of 100 100 1 0 0 )
• identifies a fraction as a rational number that has relative size (e.g. describes a position as 2 3 \frac23 3 2 ■ of the way up a ladder or varies a movement by performing it at half speed;

understands "a quarter turn" as turning 90■ rather than turning once every four steps
• reasons and uses knowledge of equivalence to compare and order fractions of the same whole (e.g. compares two-thirds and three-quarters of the same collection or whole, by converting them into equivalent fractions of eight-twelfths and nine-twelfths; explains that three-fifths must be greater than four-ninths because three-fifths is greater than a half, and four-ninths is less than a half)

**Operating with fractions**

• adds or subtracts fractions with the same denominators and justifies the need for a common denominator
• uses strategies to calculate a fraction of a quantity (e.g. to find a time-point two-thirds of the way through a music video or animation, determines one-third then doubles; locates a position a third of the way across the stage by measuring the width of the stage and dividing by 3 3 3 )
• explains the difference between multiplying and dividing fractions (e.g. recognises 1 2 × 1 4 \frac12\times\frac14 2 1 ■ × 4 1 ■ as one-half of a quarter and 1 2 \frac12 2 1 ■ divided by 1 4 \frac14 4 1 ■ as how many quarters are in one half)
• expresses one quantity as a fraction of another (e.g. 12 12 1 2 defective items from the 96 96 9 6 that were produced represents one-eighth of all items produced)
• demonstrates why dividing by a fraction can result in a larger number

**Operating with fractions proportionally**

• demonstrates that a fraction can also be used as a ratio to compare the size of 2 2 2 sets (e.g. if the colour ratio of a black and white pattern is 2 : 3 2:3 2 : 3 , 2 5 \frac25 5 2 ■ is black and 3 5 \frac35 5 3 ■ is white and the representation of black is 2 3 \frac23 3 2 ■ of the white)

## Snapshot – Create, communicate and collaborate

# Digital Literacy: Creating and exchanging: Create, communicate and collaborate

### Content description

AC9M6P02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• use the core features of a range of digital tools to create content and communicate and collaborate with peers and trusted adults
• select and control a variety of features in appropriate digital tools to create content and communicate and collaborate with trusted groups
• select and control advanced features of appropriate digital tools to independently create content and effectively communicate and collaborate with wider groups

## Snapshot – Interpret data

# Digital Literacy: Investigating: Interpret data

### Content description

AC9M6P02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• organise, summarise and visualise data using a range of digital tools to identify patterns and answer questions
• analyse and visualise data using a range of digital tools to identify patterns and make predictions
• analyse and visualise data by selecting and using a range of digital tools to infer relationships and make predictions

## Snapshot – Select and operate tools

# Digital Literacy: Managing and operating: Select and operate tools

### Content description

AC9M6P02

### Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• select and use a range of digital tools to complete tasks
• attempt to solve a problem individually and with peers before seeking help
• select and use the core features of digital tools to efficiently complete tasks

• troubleshoot basic problems and identify repetitive tasks to automate
• select and use the advanced or unfamiliar features of digital tools to efficiently complete tasks
• troubleshoot common problems and automate repetitive tasks

## Snapshot – Interpreting fractions

# Numeracy: Number sense and algebra: Interpreting fractions

### Content description

AC9M6P02

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Comparing fractions**

• understands the equivalence relationship between a fraction, decimal and percentage as different representations of the same quantity (e.g. 1 2 = 0.5 = 50 \frac12 = 0.5 = 50 2 1 ■ = 0 . 5 = 5 0 % because 5 5 5 is half of 10 10 1 0 and 50 50 5 0 is half of 100 100 1 0 0 )
• identifies a fraction as a rational number that has relative size (e.g. describes a position as 2 3 \frac23 3 2 ■ of the way up a ladder or varies a movement by performing it at half speed; understands "a quarter turn" as turning 90■ rather than turning once every four steps
• reasons and uses knowledge of equivalence to compare and order fractions of the same whole (e.g. compares two-thirds and three-quarters of the same collection or whole, by converting them into equivalent fractions of eight-twelfths and nine-twelfths; explains that three-fifths must be greater than four-ninths because three-fifths is greater than a half, and four-ninths is less than a half)

**Operating with fractions**

• adds or subtracts fractions with the same denominators and justifies the need for a common denominator
• uses strategies to calculate a fraction of a quantity (e.g. to find a time-point two-thirds of the way through a music video or animation, determines one-third then doubles; locates a position a third of the way across the stage by measuring the width of the stage and dividing by 3 3 3 )
• explains the difference between multiplying and dividing fractions (e.g. recognises 1 2 × 1 4 \frac12\times\frac14 2 1 ■ × 4 1 ■ as one-half of a quarter and 1 2 \frac12 2 1 ■ divided by 1 4 \frac14 4 1 ■ as how many quarters are in one half)
• expresses one quantity as a fraction of another (e.g. 12 12 1 2 defective items from the 96 96 9 6 that were produced represents one-eighth of all items produced)
• demonstrates why dividing by a fraction can result in a larger number

**Operating with fractions proportionally**

• demonstrates that a fraction can also be used as a ratio to compare the size of 2 2 2 sets (e.g. if the colour ratio of a black and white pattern is 2 : 3 2:3 2 : 3 , 2 5 \frac25 5 2 ■ is black and 3 5 \frac35 5 3 ■ is white and the representation of black is 2 3 \frac23 3 2 ■ of the white)

## Snapshot – Proportional thinking

# Numeracy: Number sense and algebra: Proportional thinking

### Content description

AC9M6P02

### Learning progression extract

The following learning progression extract shows the alignment of the learning progression with this content.

**Understanding percentages and relative size**

• explains that a percentage is a proportional relationship between a quantity and 100 100 1 0 0 (e.g. 25 25 2 5 % means 25 25 2 5 for every one hundred)
• demonstrates that 100 100 1 0 0 % is a complete whole (e.g. explains that in order to get 100 100 1 0 0 % on a quiz, you must answer every question correctly)
• uses percentage to describe, represent and compare relative size (e.g. selects which beaker is 75 75 7 5 % full, describes an object as 50 50 5 0 % of another object; describes and represents clean air as having 21 21 2 1 % oxygen)
• recognises that complementary percentages add to give 100 100 1 0 0 % and applies to situations (e.g. if 10 10 1 0 % of the jellybeans in a jar are black then 90 90 9 0 % are not black)

**Determines a percentage as a part of a whole**

• explains and fluently uses interchangeably the equivalence relationship between a fraction, decimal and percentage (e.g. 1 2 = 0.5 = 50 \frac12 = 0.5 = 50 2 1 ■ = 0 . 5 = 5 0 %; explains that at quarter time, 75 75 7 5 % of the game is left to play; ; interchangeably refers to a response from 50 50 5 0 %, 0.5 0.5 0 . 5 or half of the audience when evaluating how an audience responded to an aspect of a performance)
• uses key percentages and their equivalences to determine the percentage of a quantity (e.g. to solve 75 75 7 5 % of 160 160 1 6 0 , knows that 50 50 5 0 % [half] of 160 160 1 6 0 is 80 80 8 0 , and 25 25 2 5 % [quarter] is 40 40 4 0 so 75 75 7 5 % is 120 120 1 2 0 )
• calculates a percentage of an amount (e.g. interprets that a 15 15 1 5 % discount on an $ 80 \$80 $ 8 0 purchase means 15 15 1 5 % × $ 80 \times \space\$80 × $ 8 0 and determines 10 10 1 0 % × $ 80 \times\space\$80 × $ 8 0 is $ 8 \$8 $ 8 , so 5 5 5 % × $ 80 \times\space\$80 × $ 8 0 is $ 4 \$4 $ 4 therefore 15 15 1 5 % × $ 80 \times \$80 × $ 8 0 is $ 8 + $ 4 = $ 12 \$8 + \$4 = \$12 $ 8 + $ 4 = $ 1 2 ; calculates the amount of sugar/fat in a breakfast cereal to make a recommendation on a healthy choice, such as 12 12 1 2 % of 250 250 2 5 0 grams = 30 30 3 0 grams)
• expresses one quantity as a percentage of another (e.g. determines what percentage 7 7 7 is of 35 35 3 5 ; determines what percentage 10 10 1 0 millilitres is of 200 200 2 0 0 millilitres when calculating appropriate doses of medicine)
• uses the complement of the percentage to calculate the amount after a percentage discount (e.g. to calculate how much to pay after a 20 20 2 0 % discount, calculates 80 80 8 0 % of the original cost)

**Identifies ratios as a part-to-part comparison**

• represents ratios using diagrams, physical or virtual materials (e.g. in a ratio 1 : 4 1:4 1 : 4 of red to blue counters, for each red counter there are 4 4 4 blue counters; uses physical or virtual materials to represent the ratio of hydrogen atoms to oxygen atoms in water molecules as 2 : 1 2:1 2 : 1 , 2 2 2 hydrogen atoms for every oxygen atom)
• interprets ratios as a comparison between 2 2 2 like quantities (e.g. ratio of students to teachers in a school is 20 : 1 20:1 2 0 : 1 ; ratio of carbohydrates to fat to protein in a food; interprets ratios such as debt equity ratio or savings-income ratio)
• interprets a rate as a comparison between 2 2 2 different types of quantities (e.g. water flow can be measured at a rate of 5 5 5 litres per second; change of concentration of reactants per time; the relationship between beats per minute and the pulse/rhythm of a dance phrase)
• expresses a ratio as equivalent fractions or percentages (e.g. the ratio of rainy days to fine days in Albany is 1 : 2 1:2 1 : 2 and so 1 3 \frac13 3 1 ■ of the days are rainy; in a ratio of 1 : 1 1:1 1 : 1 each part represents one 1 2 \frac12 2 1 ■ or 50 50 5 0 % of the whole; when interpreting food labels and making healthy eating choices)