(no-code)

interpret, compare and order numbers with more than 2 places, including numbers greater than one, using understanding; represent these on a

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Elaborations

• making models of including tenths, hundredths and thousandths by subdividing materials or grids, and explaining the relationship between consecutive places; for example, thousandths are 10 10 1 0 times smaller than hundredths; writing numbers into a chart to compare and order them

• renaming to assist with mental ; for example, when asked to solve $0.6 \div 10$ $0.6 \div 10$ $0.6 \div 10$ they 6 6 6 tenths as 60 60 6 0 hundredths and say, "if I divide 60 60 6 0 hundredths by 10 10 1 0 , I get 6 6 6 hundredths" and write $0.6 \div 10 = 0.06$ $0.6 \div 10 = 0.06$ $0.6 \div 10 = 0.06$

• using a or number track to represent and locate with varying numbers of places and numbers greater than one and justifying the placement; for example, 2.335 2.335 2 . 3 3 5 is halfway between 2.33 2.33 2 . 3 3 and 2.34 2.34 2 . 3 4 ; that is, 2.33 < 2.335 < 2.34 2.33 < 2.335 < 2.34 2 . 3 3 < 2 . 3 3 5 < 2 . 3 4 and 5.283 5.283 5 . 2 8 3 is between 5.28 5.28 5 . 2 8 and 5.29 5.29 5 . 2 9 , but closer to 5.28 5.28 5 . 2 8

• interpreting and comparing the in ; for example, the length or of animals or plants, such as a baby echidna weighing 1.78 1.78 1 . 7 8 kilograms and a platypus weighing 1.708 1.708 1 . 7 0 8 kilograms

• interpreting plans or diagrams showing length as , placing the numbers into a chart to connect the to their value

Students learn to:

interpret, compare and order numbers with more than 2 decimal places, including n one, using place value understanding; represent these on a number line

(AC9M5N01)

General capabilities and cross-curriculum priorities

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

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 .

Generating

• Consider alternatives

Number sense and algebra

• Interpreting fractions

Analysing

• Draw conclusions and provide reasons

Analysing

• Interpret concepts and problems

Measurement and geometry

• Understanding units of measurement

Analysing

• Interpret concepts and problems

Resources

Work Samples

WS01 - Who were the fastest swimmers?

WS02 - Locating decimals

Snapshot – Number and place value

Numeracy: Number sense and algebra: Number and place value

Content description

AC9M5N01
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

0.125 is 12.5 because each digit value in 0.125 is multiplied by 100, so 100×0.1 is 10, 100×0.02 is 2 and 100×0.005 is 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 decimal places; if the percentage profit was calculated as 12.467921 %, rounds the calculation to 12.5 %)

Snapshot – Consider alternatives

Critical and Creative Thinking: Generating: Consider alternatives

Content description

AC9M5N01

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 – Interpreting fractions

Numeracy: Number sense and algebra: Interpreting fractions

Content description

AC9M5N01

Learning progression extract

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

Equivalence of fractions

• identifies the need to have equal wholes to compare fractional parts (e.g. compares the pieces of pizza when 2 identical pizzas are cut into 6 and 8 and describes how one-sixth is greater than one-eighth)

• creates fractions greater than one by recreating the whole (e.g. when creating four-thirds, demonstrates that three-thirds corresponds to the whole and the fourth third is part of an additional whole)

• creates equivalent fractions by dividing the same-sized whole into different parts (e.g. shows two-sixths is the same as one-third of the same whole; creates a fraction wall)

• uses partitioning to establish relationships between fractions (e.g. creates one-sixth as one-third of one-half)

Fractions as numbers

• connects the concepts of fractions and division: a fraction is a quotient, or a division statement (e.g. two-sixths is the same as $2 \div 6$ or 2 partitioned into 6 equal parts or to solve "how to share 2 chocolate bars equally between 3 people", understands that it is 2 divided by 3, therefore each person gets two-thirds of a chocolate bar)

• justifies where to place fractions on a number line (e.g. to show two-thirds on a number line divides the space between zero and one into 3 equal parts and indicates the correct location)

• uses and explains the equivalence of decimals to benchmark fractions (e.g. $\frac14 = 0.25$, $\frac12 = 0.5$, $\frac34 = 0.75$, $\frac1{10} = 0.1$, $\frac1{100} = 0.01$; converts cup measures to millilitres)

Comparing fractions

• understands the equivalence relationship between a fraction, decimal and percentage as different representations of the same quantity (e.g. $\frac12 = 0.5 = 50$ % because 5 is half of 10 and 50 is half of 100)

• 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)

Snapshot – Draw conclusions and provide reasons

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

Content description

AC9M5N01

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

AC9M5N01

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 units of measurement

Numeracy: Measurement and geometry: Understanding units of measurement

Content description

AC9M5N01

Learning progression extract

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

Introducing metric units

• recognises standard metric units are used to measure attributes of shapes, objects and events (e.g. identifies units used to measure everyday items; recognises that distances in athletic events are measured in metres such as 100 and 200 metre races)
• uses the array structure to calculate area measured in square units (e.g. draws and describes the column and row structure to represent area as an array of square units, moving beyond counting of squares by ones)
• estimates the measurement of an attribute by visualising between known informal units (e.g. uses a cup to measure a half cup of rice; determines that about 3 3 3 sheets of paper would fit across a desk, and close to 6 6 6 might fit along it, so the area of the desk is about 18 18 1 8 sheets of paper)
• explains the difference between different attributes of the same shape or object and their associated metric units (e.g. length, mass and capacity)

Angles as measures of turn

• describes the size of an angle as a measure of turn and compares familiar measures of turn to known angles (e.g. the angle between the blades gets bigger as you open the scissors; a quarter turn creates a right angle)

Using metric units

• measures, compares and estimates length, perimeter and area of a surface using metric units (e.g. traces around their hand on centimetre grid paper and counts the number of squares to estimate the area of their hand print to be about 68 68 6 8 square centimetres)

• uses scaled instruments to measure length, mass, capacity and temperature, correctly interpreting any unlabelled calibrations (e.g. 3 3 3 marks between the numbered marks for kilograms means each gap represents 250 250 2 5 0 grams, so it's divided into quarter kilogram intervals)

• estimates measurements of an attribute using metric units (e.g. estimates the width of their thumb is close to a centimetre; compares the mass of 2 2 2 bags of fruit by hefting and says "this one feels like it weighs more than a kilogram"; approximates capacities based on the known capacity of a 600 600 6 0 0 -millilitre bottle of water)

Angles as measures of turn

• compares angles to a right angle and classifies them as equal to, less than or greater than a right angle (e.g. directly compares the size of angles to a right angle, by using the corner of a book; uses reference to a right angle to describe body positions during a choreographed dance or when practising a skill for a particular sport)

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)

Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5N01

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 - Who were the fastest swimmers?

By the end of Year 5, students use place value to write and order decimals including decimals greater than one. They express natural numbers as products of factors and identify multiples.■Students order and represent, add and subtract fractions with the same or related denominators.■They represent common percentages and connect them to their fraction and decimal equivalents.■Students use their proficiency with multiplication facts and efficient calculation strategies to multiply large numbers by one- and two-digit numbers and divide by single-digit numbers. They check the reasonableness of their calculations using estimation. Students use mathematical modelling to solve financial and other practical problems, formulating and solving problems, choosing arithmetic operations and interpreting results in terms of the situation.■They apply properties of numbers and operations to find unknown values in numerical equations involving multiplication and division.■Students create and use algorithms to identify and explain patterns in the factors and multiples of numbers.

They choose and use appropriate metric units to measure the attributes of length, mass and capacity, and to solve problems involving perimeter and area.■Students convert between 12- and 24-hour time.■They estimate, construct and measure angles in degrees.■Students use grid coordinates to locate and move positions.■They connect objects to their two-dimensional nets.■Students perform and describe the results of transformations and identify any symmetries.

They plan and conduct statistical investigations that collect nominal and ordinal categorical and discrete numerical data using digital tools.■Students identify the mode and interpret the shape of distributions of data in context.■They interpret and compare data represented in line graphs.■Students conduct repeated chance experiments, list the possible outcomes, estimate likelihoods and make comparisons between those with and without equally likely outcomes.

AC9M5N01

interpret, compare and order numbers with more than 2 decimal places, including numbers greater than one, using place value understanding; represent these on a number line

AC9M5N08

check and explain the reasonableness of solutions to problems including financial contexts using estimation strategies appropriate to the context

Resource – WS02 - Locating decimals

By the end of Year 5, students use place value to write and order decimals including decimals greater than one. They express natural numbers as products of factors and identify multiples. Students order and represent, add and subtract fractions with the same or related denominators. They represent common percentages and connect them to their fraction and decimal equivalents. Students use their proficiency with multiplication facts and efficient calculation strategies to multiply large numbers by one- and two-digit numbers and divide by single-digit numbers. They check the reasonableness of their calculations using estimation. Students use mathematical modelling to solve financial and other practical problems, formulating and solving problems, choosing arithmetic operations and interpreting results in terms of the situation. They apply properties of numbers and operations to find unknown values in numerical equations involving multiplication and division. Students create and use algorithms to identify and explain patterns in the factors and multiples of numbers.

They choose and use appropriate metric units to measure the attributes of length, mass and capacity, and to solve problems involving perimeter and area. Students convert between 12- and 24-hour time. They estimate, construct and measure angles in degrees. Students use grid coordinates to locate and move positions. They connect objects to their two-dimensional nets. Students perform and describe the results of transformations and identify any symmetries.

They plan and conduct statistical investigations that collect nominal and ordinal categorical and discrete numerical data using digital tools. Students identify the mode and interpret the shape of distributions of data in context. They interpret and compare data represented in line graphs. Students conduct repeated chance experiments, list the possible outcomes, estimate likelihoods and make comparisons between those with and without equally likely outcomes.

AC9M5N01

interpret, compare and order numbers with more than 2 decimal places, including numbers greater than one, using place value understanding; represent these on a number line

AC9M5A01

recognise and explain the connection between multiplication and as and use this to develop families of number facts

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Elaborations
• using materials or diagrams to develop and explain strategies, such as halving, using the inverse relationship to turn into a multiplication
• using , multiplication tables, and physical and to develop families of facts; for example, $3 \times 4 = 12$ $3 \times 4 = 12$, $4 \times 3 = 12$ $4 \times 3 = 12$, $12 \div 3 = 4$ $12 \div 3 = 4$ and $12 \div 4 = 3$ $12 \div 4 = 3$
• demonstrating using materials, diagrams or and recording 2 2 2 multiplication and 2 2 2 for each ;

$4 \times 6 = 24$ $4 \times 6 = 24$ $4 \times 6 = 2\ 4$, $6 \times 4 = 24$ $6 \times 4 = 24$ $6 \times 4 = 2\ 4$, $24 \div 4 = 6$ $24 \div 4 = 6$ $2\ 4 \div 4 = 6$ and $24 \div 6 = 4$ $24 \div 6 = 4$ $2\ 4 \div 6 = 4$; explaining how each is different from and connected to groups in the materials, diagrams or

• using materials, diagrams or to recognise and explain the inverse relationship between multiplication and ; for example, solving $240 \div 20 = \blacksquare$ $240 \div 20 = \square$ $2\ 4\ 0 \div 2\ 0 = \blacksquare$ by thinking $20 \times \blacksquare = 240$ $20 \times \square = 240$ $2\ 0 \times \blacksquare = 2\ 4\ 0$; using the inverse to make calculations easier; for example, solving $17 \times \blacksquare = 221$ $17 \times \square = 221$ $1\ 7 \times \blacksquare = 2\ 2\ 1$ using , $\blacksquare = 221 \div 17$ $\square = 221 \div 17$ $\blacksquare = 2\ 2\ 1 \div 1\ 7$

Students learn to:

recognise and explain the connection between multiplication and division as invers use this to develop families of number facts

(AC9M5A01)

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

Number sense and algebra

• Multiplicative strategies

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

Analysing

• Interpret concepts and problems

Inquiring

• Identify, process and evaluate information

Number sense and algebra

• Number patterns and algebraic thinking

Number sense and algebra

• Number patterns and algebraic thinking

Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5A01

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

AC9M5A01

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 – Multiplicative strategies

Numeracy: Number sense and algebra: Multiplicative strategies

Content description

AC9M5A01

Learning progression extract

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

Flexible strategies for single digit multiplication and division

• draws on the structure of multiplication to use known multiples in calculating related multiples (e.g. uses multiples of 4 4 4 to calculate multiples of 8 8 8)
• interprets a range of multiplicative situations using the context of the problem to form a number sentence (e.g. to calculate the total number of buttons in 2 containers, each with 5 buttons, uses the number sentence $2 \times 5 = ?$; if a packet of 20 20 2 0 pens is to be shared equally between 4 4 4 , writes $20 \div 4 = ?$)
• demonstrates flexibility in the use of single-digit multiplication facts (e.g. 7 7 7 boxes of 6 6 6 donuts is 42 42 4 2 donuts altogether because $7 \times 6 = 42$; multiplying any factor by one will always give a product of that factor i.e. $1 \times 6 = 6$; if you multiply any number by zero the result will always be zero)
• uses the commutative and distributive properties of multiplication to aid computation when solving problems (e.g. 5×6 is the same as 6×5 ; calculates 7×4 by adding 5×4 and 2×4)
• applies mental strategies for multiplication to division and can justify their use (e.g. to divide 64 64 6 4 by 4 4 4 , halves 64 64 6 4 then halves 32 32 3 2 to get an answer of 16 16 1 6)
• explains the idea of a remainder as what is "left over" from the division (e.g. an incomplete group, lot of, next row or multiple)

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 $14 \times ? = 336$ chooses to use division $336 \div 14 = ?$; 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. $7 \times 83 = 7 \times 80 + 7 \times 3$; 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 , uses double and half, such as $16 \times 15 = 8 \times 30$)
• 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)

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

Snapshot – Draw conclusions and provide reasons

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

Content description

AC9M5A01

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

AC9M5A01

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

AC9M5A01

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

AC9M5A01

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 – Number patterns and algebraic thinking

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

Content description

AC9M5A01

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)

AC9M5A02

find unknown values in numerical involving multiplication and using the properties of numbers and

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Elaborations

• using knowledge of to form and find unknown values in numerical ; for example, given that 3 × 5 = 15 3\times5=15 3 × 5 = 1 5 and 30 ÷ 2 = 15 30\div2=15 3 0 ÷ 2 = 1 5 then 3 × 5 = 30 ÷ 2 3\times5=30\div2 3 × 5 = 3 0 ÷ 2 therefore the solution to 3 × 5 = 30 ÷ ■ 3\times5=30\div\square 3 × 5 = 3 0 ÷ ■ is 2 2 2

• using relational thinking, an understanding of equivalence and number properties to determine and reason about numerical ; for example, explaining whether an involving multiplication is true, such as 15 ÷ 3 = 30 ÷ 6 15 ÷ 3 = 30 ÷ 6 1 5 ÷ 3 = 3 0 ÷ 6

• using materials, diagrams and to demonstrate that multiplication is and but is not; for example, using to demonstrate that 2 × 3 = 3 × 2 2 \times 3 = 3 \times 2 2 × 3 = 3 × 2 but 6 ÷ 3 6 ÷ 3 6 ÷ 3 does not equal 3 ÷ 6 3 ÷ 6 3 ÷ 6 ; demonstrating that 2 × 2 × 3 = 12 2 \times 2 \times 3 = 12 2 × 2 × 3 = 1 2 and 2 × 3 × 2 = 12 2 \times3 \times2 = 12 2 × 3 × 2 = 1 2 and 3 × 2 × 2 = 12 3 \times 2 \times 2 = 12 3 × 2 × 2 = 1 2 ; understanding that 8 ÷ 2 ÷ 2 = (8 ÷ 2) ÷ 2 = 2 8 ÷ 2 ÷ 2 = (8 ÷ 2) ÷ 2 = 2 8 ÷ 2 ÷ 2 = (8 ÷ 2) ÷ 2 = 2 but 8 ÷ (2 ÷ 2) = 8 ÷ 1 = 8 8 ÷ (2 ÷ 2) = 8 ÷ 1 = 8 8 ÷ (2 ÷ 2) = 8 ÷ 1 = 8

• using materials, diagrams or to recognise and explain the ; for example, where 4 × 13 = 4 × 10 + 4 × 3 4 \times 13 = 4 \times 10 + 4 \times 3 4 × 1 3 = 4 × 1 0 + 4 × 3

• constructing involving multiplication to form a numerical , and applying knowledge of , and the

property to find unknown values in numerical ; for example, considering 3 × 4 = 12 3 \times 4 = 12 3 × 4 = 1 2 and knowing 2 × 2 = 4 2 \times 2 = 4 2 × 2 = 4 then 3 × 4 3 \times 4 3 × 4 can be written as 3 × 3\times 3 × (2 × 2 2 \times 2 2 × 2) and using the property (3 × 2) × 2 3 \times 2) \times 2 3 × 2) × 2 so 3 × 4 = 6 × 2 3 \times 4 = 6 \times 2 3 × 4 = 6 × 2 and so 6 6 6 is the solution to 3 × 4 = ■ × 2 3 \times 4 = \square\times 2 3 × 4 = ■ × 2

Students learn to:

find unknown values in numerical equations involving multiplication and division us properties of numbers and operations

(AC9M5A02)

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

Number sense and algebra

• 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

Inquiring

• Identify, process and evaluate information

Analysing

• Interpret concepts and problems

Analysing

• Interpret concepts and problems

Analysing

• Interpret concepts and problems

Number sense and algebra

• Multiplicative strategies
• Number patterns and algebraic thinking

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

AC9M5A02

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 informatic

Content description

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 – Multiplicative strategies

Numeracy: Number sense and algebra: Multiplicative strategies

Content description

AC9M5A02

Learning progression extract

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

Flexible strategies for single digit multiplication and division

• draws on the structure of multiplication to use known multiples in calculating related multiples (e.g. uses multiples of 4 to calculate multiples of 8)
• interprets a range of multiplicative situations using the context of the problem to form a number sentence (e.g. to calculate the total number of buttons in 2 containers, each with 5 buttons, uses the number sentence $2 \times 5 = ?$; if a packet of 20 pens is to be shared equally between 4 , writes $20 \div 4 = ?$)
• demonstrates flexibility in the use of single-digit multiplication facts (e.g. 7 boxes of 6 donuts is 42 donuts altogether because $7 \times 6 = 42$; multiplying any factor by one will always give a product of that factor i.e. $1 \times 6 = 6$; if you multiply any number by zero the result will always be zero)
• uses the commutative and distributive properties of multiplication to aid computation when solving problems (e.g. 5×6 is the same as 6×5 ; calculates 7×4 by adding 5×4 and 2×4)
• applies mental strategies for multiplication to division and can justify their use (e.g. to divide 64 by 4 , halves 64 then halves 32 to get an answer of 16)
• explains the idea of a remainder as what is "left over" from the division (e.g. an incomplete group, lot of, next row or multiple)

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 $14 \times ? = 336$ chooses to use division $336 \div 14 = ?$; 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 digits and can justify their use (e.g. $7 \times 83 = 7 \times 80 + 7 \times 3$; to multiply a number by 48 , first multiplies by 12 and then multiplies the result by 4 ; to solve 16×15 , uses double and half, such as $16 \times 15 = 8 \times 30$)
• uses estimation and rounding to check the reasonableness of products and quotients (e.g. multiplies 200 by 30 to determine if 6138 is a reasonable answer to 198×31)

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

Snapshot – Number patterns and algebraic thinking
Numeracy: Number sense and algebra: Number patterns and algebraic thinking
Content description

AC9M5A02
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 , $F = ma$ 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

AC9M5A02

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 informatic

Content description

AC9M5A02

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

AC9M5A02

Continuum extract

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

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Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5A02

Continuum extract

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

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Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5A02

Continuum extract

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• identify and prioritise significant elements and relationships within a concept or problem
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Snapshot – Multiplicative strategies

Numeracy: Number sense and algebra: Multiplicative strategies

Content description

AC9M5A02

Learning progression extract

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

Flexible strategies for single digit multiplication and division

• draws on the structure of multiplication to use known multiples in calculating related multiples (e.g. uses multiples of 4 4 4 to calculate multiples of 8 8 8)

• interprets a range of multiplicative situations using the context of the problem to form a number sentence (e.g. to calculate the total number of buttons in 2 containers, each with 5 buttons, uses the number sentence $2 \times 5 = 2 \times 5 = 2 \times 5 = ?$; if a packet of 20 20 2 0 pens is to be shared equally between 4 4 4 , writes $20 \div 4 = 20 \div 4 = 2 0 \div 4 = ?$)

• demonstrates flexibility in the use of single-digit multiplication facts (e.g. 7 7 7 boxes of 6 6 6 donuts is 42 42 4 2 donuts altogether because $7 \times 6 = 42 \ 7 \times 6 = 42 \ 7 \times 6 = 4 2$; multiplying any factor by one will always give a product of that factor i.e. $1 \times 6 = 6 \ 1 \times 6 = 6 \ 1 \times 6 = 6$; if you multiply any number by zero the result will always be zero)

• uses the commutative and distributive properties of multiplication to aid computation when solving problems (e.g. $5 \times 6 \ 5 \times 6 \ 5 \times 6$ is the same as $6 \times 5 \ 6 \times 5 \ 6 \times 5$; calculates $7 \times 4 \ 7 \times 4 \ 7 \times 4$ by adding $5 \times 4 \ 5 \times 4 \ 5 \times 4$ and $2 \times 4 \ 2 \times 4 \ 2 \times 4$)

• applies mental strategies for multiplication to division and can justify their use (e.g. to divide 64 64 6 4 by 4 4 4 , halves 64 64 6 4 then halves 32 32 3 2 to get an answer of 16 16 1 6)

• explains the idea of a remainder as what is "left over" from the division (e.g. an incomplete group, lot of, next row or multiple)

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 $14 \times 14 \space \times \space 1 4 \times ? = 336 = 336 = 3 3 6$ chooses to use division $336 \div 14 = 336 \div 14 = \space 3 3 6 \div 1 4 = ?$; 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. $7 \times 83 = 7 \times 80 + 7 \times 3 \ 7 \times 83 = 7 \times 80 + 7 \times 3 \ 7 \times 8 3 = 7 \times 8 0 + 7 \times 3$; 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 $16 \times 15 \ 16 \times 15 \ 1 6 \times 1 5$, uses double and half, such as $16 \times 15 = 8 \times 30 \ 16 \times 15 = 8 \times 30 \ 1 6 \times 1 5 = 8 \times 3 0$)

• 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 $198 \times 31 \ 198 \times 31 \ 1 9 8 \times 3 1$)

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

Snapshot – Number patterns and algebraic thinking

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

Content description

AC9M5A02

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)

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5A02

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

Critical and Creative Thinking: Inquiring: Identify, process and evaluate informatie

Content description

AC9M5A02

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

AC9M5M01

choose appropriate metric when measuring the length, and of ; use smaller or a combination of to obtain a more accurate

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Elaborations

• ordering metric from the largest unit to the smallest; for example, kilometre, metre, centimetre, millimetre
• recognising that some of measurement are better suited to some tasks than others; for example, kilometres are more appropriate than metres to the distance between 2 2 2 towns
• deciding on the unit required to estimate the amount of paint or carpet for a room or a whole building; justifying the choice of unit in to the and the degree of accuracy required
• measuring and comparing distances, such as jumps or throws using a metre length of string; for example, then measuring the part metre with centimetres and/or millimetres; explaining which unit of is most accurate
• researching how the base are derived for the International System of Units (SI), commonly known as the metric system of , recognising that the metric unit names for the , length and are international standards for measurement
Students learn to:

choose appropriate metric units when measuring the length, mass and capacity of o units or a combination of units to obtain a more accurate measure

(AC9M5M01)

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

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

Inquiring

• Identify, process and evaluate information

Analysing

• Interpret concepts and problems

• Draw conclusions and provide reasons

Inquiring

• Identify, process and evaluate information

Analysing

• Interpret concepts and problems

• Draw conclusions and provide reasons

Inquiring

• Identify, process and evaluate information

Analysing

• Interpret concepts and problems

Inquiring

• Identify, process and evaluate information

Related content

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

AC9S5I03

Snapshot – Draw conclusions and provide reasons

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

Content description

AC9M5M01

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 informatio

Content description

AC9M5M01

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

AC9M5M01

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

AC9M5M01

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 information

Content description

AC9M5M01

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

AC9M5M01

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

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Snapshot – Identify, process and evaluate information

Critical and Creative Thinking: Inquiring: Identify, process and evaluate information

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Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

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

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Snapshot – Identify, process and evaluate information

Critical and Creative Thinking: Inquiring: Identify, process and evaluate information

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Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

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Snapshot – Identify, process and evaluate information

Critical and Creative Thinking: Inquiring: Identify, process and evaluate information

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AC9M5M02

solve practical problems involving the and of regular and using appropriate metric

-
-

Elaborations

- investigating problem situations involving ; for example, "How many metres of fencing are required around a paddock, or around a festival ?"
- using efficient ways to calculate the of , such as adding the length and width together and doubling the result
- solving measurement problems, such as "How much carpet would be needed to cover the entire floor of the classroom", using square metre templates to directly the floor space
- creating a model of a permaculture garden, dividing the up to provide the most efficient use of space for gardens and walkways, labelling the of each , and calculating the amount of resources needed; for example, compost to cover the vegetable garden
- using a physical or a virtual "geoboard app" to recognise the relationship between and and solve problems; for example, investigating what is the largest and what is the smallest that has the same
- exploring the designs of fishing and dwellings of First Nations Australians, investigating the , and purpose of the within the designs

Students learn to:

solve practical problems involving the perimeter and area of regular and irregular s appropriate metric units

(AC9M5M02)

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 .

Analysing

- Interpret concepts and problems

Inquiring

- Identify, process and evaluate information

Analysing

- Interpret concepts and problems
- Draw conclusions and provide reasons

Inquiring

- Identify, process and evaluate information

Analysing

- Interpret concepts and problems
- Draw conclusions and provide reasons

Inquiring

- Identify, process and evaluate information

Number sense and algebra

- Multiplicative strategies

Analysing

- Interpret concepts and problems
- Draw conclusions and provide reasons

Inquiring

- Identify, process and evaluate information

Measurement and geometry

- Understanding units of measurement

Inquiring

- Identify, process and evaluate information

Culture

- First Nations Australians' ways of life reflect unique ways of being, knowing, thinking and doing.

Related content

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

AC9TDE6P02

Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5M02

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- 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

AC9M5M02

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- draw conclusions and make choices when completing tasks, using discipline knowledge to provide reasons and evaluate arguments for choices made
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Snapshot – Identify, process and evaluate information

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

Content description

AC9M5M02

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The following continuum extract shows the alignment of the continuum with this content.
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Snapshot – Understanding units of measurement

Numeracy: Measurement and geometry: Understanding units of measurement

Content description

AC9M5M02

Learning progression extract

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

Using metric units

• measures, compares and estimates length, perimeter and area of a surface using metric units (e.g. traces around their hand on centimetre grid paper and counts the number of squares to estimate the area of their hand print to be about 68 68 6 8 square centimetres)
• uses scaled instruments to measure length, mass, capacity and temperature, correctly interpreting any unlabelled calibrations (e.g. 3 3 3 marks between the numbered marks for kilograms means each gap represents 250 250 2 5 0 grams, so it's divided into quarter kilogram intervals)
• estimates measurements of an attribute using metric units (e.g. estimates the width of their thumb is close to a centimetre; compares the mass of 2 2 2 bags of fruit by hefting and says "this one feels like it weighs more than a kilogram"; approximates capacities based on the known capacity of a 600 600 6 0 0 -millilitre bottle of water)

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• compares angles to a right angle and classifies them as equal to, less than or greater than a right angle (e.g. directly compares the size of angles to a right angle, by using the corner of a book; uses reference to a right angle to describe body positions during a choreographed dance or when practising a skill for a particular sport)

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

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• 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)

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• 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)
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Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5M02

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Snapshot – Identify, process and evaluate information

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

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AC9M5M02

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Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

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Snapshot – Draw conclusions and provide reasons

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

Content description

AC9M5M02

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
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Snapshot – Identify, process and evaluate information

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

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Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

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Snapshot – Draw conclusions and provide reasons

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

Content description

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Snapshot – Identify, process and evaluate information

Critical and Creative Thinking: Inquiring: Identify, process and evaluate information

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Snapshot – Multiplicative strategies

Numeracy: Number sense and algebra: Multiplicative strategies

Content description

AC9M5M02

Learning progression extract

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

Coordinating composite units

- identifies and represents multiplication in various ways and solves simple multiplicative problems using these representations (e.g. represents multiplication as equal groups and arrays)
- identifies and represents division in various ways such as sharing division or grouping division (e.g. to share a carton of 12 eggs equally between 4 people, draws 12 dots and circles 3 groups of 4 with 3 in each share)
- identifies and represents multiplication and division abstractly using the symbols $\times$ and $\div$ (e.g. represents 3 groups of 4 as 3×4; uses $9 \div 3$ to represent 9 pieces of fruit being equally shared by 3 people)

Flexible strategies for single digit multiplication and division

- draws on the structure of multiplication to use known multiples in calculating related multiples (e.g. uses multiples of 4 to calculate multiples of 8)
- interprets a range of multiplicative situations using the context of the problem to form a number sentence (e.g. to calculate the total number of buttons in 2 containers, each with 5 buttons, uses the number sentence $2 \times 5 = ?$; if a packet of 20 pens is to be shared equally between 4, writes $20 \div 4 = ?$)
- demonstrates flexibility in the use of single-digit multiplication facts (e.g. 7 boxes of 6 donuts is 42 donuts altogether because $7 \times 6 = 42$; multiplying any factor by one will always give a product of that factor i.e. $1 \times 6 = 6$; if you multiply any number by zero the result will always be zero)
- uses the commutative and distributive properties of multiplication to aid computation when solving problems (e.g. 5×6 is the same as 6×5; calculates 7×4 by adding 5×4 and 2×4)
- applies mental strategies for multiplication to division and can justify their use (e.g. to divide 64 by 4, halves 64 then halves 32 to get an answer of 16)
- explains the idea of a remainder as what is "left over" from the division (e.g. an incomplete group, lot of, next row or multiple)

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 $14 \times ? = 336$ chooses to use division $336 \div 14 = ?$; 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 digits and can justify their use (e.g. $7 \times 83 = 7 \times 80 + 7 \times 3$; to multiply a number by 48, first multiplies by 12 and then multiplies the result by 4; to solve 16×15, uses double and half, such as $16 \times 15 = 8 \times 30$)
- uses estimation and rounding to check the reasonableness of products and quotients (e.g. multiplies 200 by 30 to determine if 6138 is a reasonable answer to 198×31)

Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

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Snapshot – Draw conclusions and provide reasons

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

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Snapshot – Identify, process and evaluate information
Critical and Creative Thinking: Inquiring: Identify, process and evaluate informati

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Snapshot – Understanding units of measurement
Numeracy: Measurement and geometry: Understanding units of measurement

Content description

AC9M5M02
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• 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)

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Snapshot – Identify, process and evaluate information

Critical and Creative Thinking: Inquiring: Identify, process and evaluate informatic

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AC9M5M03

compare 12- and 24-hour time systems and solve practical problems involving the conversion between them

•

Elaborations

• using timetables written in 24 24 2 4 -hour time, such as flight schedules, to plan an overseas or interstate trip, converting between 24 24 2 4 - and 12 12 1 2 -hour time

• converting between the digital and analog representation of 24 24 2 4 -hour time, matching the same times represented in both systems; setting the time on an analog watch using a digital alarm clock

Students learn to:

compare 12- and 24-hour time systems and solve practical problems involving the c them

(AC9M5M03)

General capabilities and cross-curriculum priorities

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

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 .

Investigating

• Interpret data

Managing and operating

• Select and operate tools

Snapshot – Measuring time

Numeracy: Measurement and geometry: Measuring time

Content description

AC9M5M03

Learning progression extract

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

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)

Measuring time with large and small timescales

• uses appropriate metric prefixes to measure both large and small durations of time (e.g. millennia, nanoseconds)

• constructs timelines using an appropriate scale (e.g. chronologically sequences historical events)

Snapshot – Interpret data

Digital Literacy: Investigating: Interpret data

Content description

AC9M5M03

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

AC9M5M03

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

AC9M5M04

estimate, and in , using appropriate tools including a protractor, and relate these to names

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•

Elaborations

• using a protractor to in and classifying these using names; for example, an is less than 90 90 9 0 °, an is more than 90 90 9 0 ° and less than 180 180 1 8 0 °, a is equal to 90 90 9 0 ° and a is more than 180 180 1 8 0 ° and less than 360 360 3 6 0 °

• estimating the size of in the environment using a clinometer and describing the using names

• using a ruler and protractor to triangles, given the and side lengths

• using a protractor to when creating a pattern or string design within a

• recognising the size of within that do and do not tesselate, measuring the and using the sum of to explain why some will tesselate and other do not

Students learn to:

estimate, construct and measure angles in degrees, using appropriate tools includi and relate these measures to angle names

(AC9M5M04)

General capabilities and cross-curriculum priorities

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

Analysing

• Interpret concepts and problems

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

• Interpret concepts and problems

• Draw conclusions and provide reasons

Inquiring

• Identify, process and evaluate information

Analysing

• Interpret concepts and problems

Speaking and listening

• Speaking

Generating

• Create possibilities

Analysing

• Draw conclusions and provide reasons

Related content

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

AC9TDE6P02

Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5M04

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 units of measurement
Numeracy: Measurement and geometry: Understanding units of measurement
Content description
AC9M5M04
Learning progression extract
The following learning progression extract shows the alignment of the learning progression with this content.
Using metric units
• measures, compares and estimates length, perimeter and area of a surface using metric units (e.g. traces around their hand on centimetre grid paper and counts the number of squares to estimate the area of their hand print to be about 68 68 6 8 square centimetres)

• uses scaled instruments to measure length, mass, capacity and temperature, correctly interpreting any unlabelled calibrations (e.g. 3 3 3 marks between the numbered marks for kilograms means each gap represents 250 250 2 5 0 grams, so it's divided into quarter kilogram intervals)

• estimates measurements of an attribute using metric units (e.g. estimates the width of their thumb is close to a centimetre; compares the mass of 2 2 2 bags of fruit by hefting and says "this one feels like it weighs more than a kilogram"; approximates capacities based on the known capacity of a 600 600 6 0 0 -millilitre bottle of water)

Angles as measures of turn
• compares angles to a right angle and classifies them as equal to, less than or greater than a right angle (e.g. directly compares the size of angles to a right angle, by using the corner of a book; uses reference to a right angle to describe body positions during a choreographed dance or when practising a skill for a particular sport)

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)

Snapshot – Interpret concepts and problems
Critical and Creative Thinking: Analysing: Interpret concepts and problems
Content description
AC9M5M04
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

AC9M5M04

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 information

Content description

AC9M5M04

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

AC9M5M04

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 – Speaking

Literacy: Speaking and listening: Speaking

Content description

AC9M5M04

Learning progression extract

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

Crafting ideas

• creates spoken texts for a range of purposes across learning areas (e.g. explains how the mathematics problem was solved)
• uses complex sentence constructions including relative clauses (e.g. "The boy who drew the picture got a prize.") (see Grammar)
• adjusts register according to purpose and audience
• elaborates on ideas using a short sequence of sentences

- incorporates learnt content into spoken text
- sequences ideas and events appropriately
- uses mainly correct grammatical constructions (e.g. pronoun references; noun-verb agreement)
- varies volume and intonation to suit purpose and audience
- plans and delivers spoken presentations using appropriate structure and language
- includes video and audio enhancements to spoken texts, where appropriate (e.g. includes slides or pictures in a spoken presentation)

Vocabulary

- experiments with vocabulary drawn from a variety of sources
- uses adverbials to give more precise meaning to verbs (e.g. talking loudly) (see Grammar)
- uses a range of vocabulary to indicate connections (e.g. consequences)
- uses conditional vocabulary to expand upon ideas (e.g. "If Goldilocks ate all the porridge the bears would be hungry.")

Crafting ideas

- creates detailed spoken texts on a broad range of learning area topics
- includes details and elaborations to expand ideas
- uses connectives to signal a change in relationship (e.g. "however", "although", "on the other hand") or to show causal relationships (e.g. "due to", "since") (see Grammar)
- uses a range of expressions to introduce an alternative point of view (e.g. "in my opinion", "he did not agree with")
- rehearses spoken text to accommodate time and technology
- controls tone, volume, pitch and pace to suit content and audience
- uses technologies or audio and visual features to enhance spoken text (e.g. videos a spoken presentation with music, sound effect enhancements)

Vocabulary

- uses a broader range of more complex noun groups/phrases to expand description (e.g. "protective, outer covering")
- selects more specific and precise words to replace general words (e.g. uses "difficult" or "challenging" for "hard")
- uses some rhetorical devices (e.g. "don't you agree?")

Crafting ideas

- creates spoken texts responsive to audience and a broad range of learning area topics, clearly articulating words and ideas
- organises more complex ideas or concepts logically, selecting details to accentuate key points
- speaks audibly and coherently to a less familiar audience for a sustained period
- shows increasing awareness of audience by moderating length, content and delivery of spoken texts
- adjusts register according to purpose and audience
- does research to prepare spoken texts
- uses a range of technology, and audio and visual resources to engage audience and enhance content

Vocabulary

- varies vocabulary to add interest and to describe with greater precision (e.g. uses topic-specific noun groups/phrases such as "exploitation of resources") (see Grammar)
- uses language creatively (e.g. "the moon shines bravely")
- uses sensory vocabulary to engage the audience (e.g. "a gasp of dismay")
- uses technical vocabulary to demonstrate topic knowledge (e.g. "deforestation")
- consistently uses a range of synonyms to add variety and precision to spoken text
- uses abstractions (e.g. "freedom", "fairness")

Snapshot – Create possibilities

Critical and Creative Thinking: Generating: Create possibilities

Content description

AC9M5M04

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 – Draw conclusions and provide reasons

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

Content description

AC9M5M04

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

AC9M5SP01

connect to their and build from their using spatial and geometric reasoning

•

•

Elaborations

• designing and constructing exact for packaging particular shaped items or collections of interest, taking into consideration how the faces will be joined and how the package will be opened

• visualising folding some possible for a of and pyramids, predicating which will work and which cannot work, and justifying their choices, based on the number, size and position of particular in each diagram

• sketching for a of and pyramids considering the number, and placement of the faces, and test by cutting and folding

• investigating designed and developed by First Nations Australians, such as those used in fish traps and instructive toys, identifying the and relative position of each face to determine the net of the

Students learn to:

connect objects to their nets and build objects from their nets using spatial and geo reasoning

(AC9M5SP01)

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

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

Inquiring

• Identify, process and evaluate information

Analysing

• Draw conclusions and provide reasons

Inquiring

• Identify, process and evaluate information
Analysing

• Evaluate actions and outcomes
Analysing

• Draw conclusions and provide reasons
Generating

• Consider alternatives
Inquiring

• Identify, process and evaluate information
Culture

• First Nations Australians' ways of life reflect unique ways of being, knowing, thinking and doing.
Related content

This content description can be taught with the following content descriptions from other learning
areas.
AC9TDE6P02

Snapshot – Draw conclusions and provide reasons

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

Content description

AC9M5SP01

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 information

Content description

AC9M5SP01

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

AC9M5SP01

Learning progression extract

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

Properties of shapes and objects

• identifies the relationship between the number of sides of a two-dimensional shape and the number
of vertices (e.g. if the shape has 4 4 4 sides, it has 4 4 4 vertices)

• describes and identifies the two-dimensional shapes that form the faces of three-dimensional

objects (e.g. recognises the faces of a triangular prism as triangles and rectangles)

• represents shapes and objects (e.g. drawing and sketching; model building such as skeletal models and centi-cubes; using digital drawing packages; manipulates body to create shapes and objects when choreographing dance)

Transformations

• determines whether a shape has line symmetry (e.g. folds paper cut-outs of basic shapes to demonstrate which has line symmetry and which does not)

• identifies symmetry in the environment

• identifies and creates geometrical patterns involving the repetition of familiar shapes (e.g. uses pattern blocks to create a pattern and describes how the pattern was created)

Angles

• compares angles to a right angle, classifying them as greater than, less than or equal to a right angle

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

Snapshot – Draw conclusions and provide reasons

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

Content description

AC9M5SP01

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 informatic

Content description

AC9M5SP01

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

AC9M5SP01

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 informatic

Content description

AC9M5SP01

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 – Evaluate actions and outcomes

Critical and Creative Thinking: Analysing: Evaluate actions and outcomes

Content description

AC9M5SP01

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

Snapshot – Draw conclusions and provide reasons

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

Content description

AC9M5SP01

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

AC9M5SP01

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 information

Content description

AC9M5SP01

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

AC9M5SP02

a that uses to locate positions within a space; use and to describe position and movement

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Elaborations

• understanding how the numbers on the axes on a are numbers on a and are used to pinpoint locations
• discussing the conventions of indicating a in a ; for example, writing the horizontal axis number first and the vertical axis number second, using brackets and commas
• comparing a system to a (first quadrant only) by using both to play strategy games involving location; for example, "Quadrant Commander", deducing that in a the are numbered (starting from), not the spaces
• placing a coordinate grid over a contour , drawing and listing the of each in the picture, asking a peer to re-create the drawing using only the list of , and discussing the reasons for the potential similarities and differences between the 2 2 2 drawings
• investigating how autonomous vehicles use mapping, GPS systems, communication systems and path planning to navigate within a space

Students learn to:

construct a grid coordinate system that uses coordinates to locate positions within coordinates and directional language to describe position and movement

(AC9M5SP02)

General capabilities and cross-curriculum priorities

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

Speaking and listening

• Speaking

Measurement and geometry

• Positioning and locating

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

Speaking and listening

• Speaking

Measurement and geometry

• Positioning and locating
• Positioning and locating

Related content

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

AC9HS5S02

Snapshot – Speaking

Literacy: Speaking and listening: Speaking

Content description

AC9M5SP02

Learning progression extract

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

Crafting ideas

• creates short texts using a few connected sentences, on familiar and learnt topics (e.g. retells a familiar story or describes a process)
• speaks audibly and clearly to a familiar audience (e.g. own class)
• uses some extended sentences
• organises key ideas in logical sequence
• provides some supporting details
• expresses causal relationships (e.g. "when the egg cracked, the chicken came out")

• provides simple justifications (e.g. "I chose cherries because they are red.")

• uses some varying intonation or volume for emphasis

• regulates pace with pausing

Vocabulary

• uses some precise vocabulary from learning areas

• uses connectives to sequence ideas (e.g. "first", "then", "next", "finally") (see Grammar)

• uses vocabulary to express cause and effect (e.g. "The excursion was cancelled because it rained.")

• uses some modal language to influence or persuade (e.g. "should", "will") (see Grammar)

Crafting ideas

• creates spoken texts for a range of purposes across learning areas (e.g. explains how the mathematics problem was solved)

• uses complex sentence constructions including relative clauses (e.g. "The boy who drew the picture got a prize.") (see Grammar)

• adjusts register according to purpose and audience

• elaborates on ideas using a short sequence of sentences

• incorporates learnt content into spoken text

• sequences ideas and events appropriately

• uses mainly correct grammatical constructions (e.g. pronoun references; noun-verb agreement)

• varies volume and intonation to suit purpose and audience

• plans and delivers spoken presentations using appropriate structure and language

• includes video and audio enhancements to spoken texts, where appropriate (e.g. includes slides or pictures in a spoken presentation)

Vocabulary

• experiments with vocabulary drawn from a variety of sources

• uses adverbials to give more precise meaning to verbs (e.g. talking loudly) (see Grammar)

• uses a range of vocabulary to indicate connections (e.g. consequences)

• uses conditional vocabulary to expand upon ideas (e.g. "If Goldilocks ate all the porridge the bears would be hungry.")

Crafting ideas

• creates detailed spoken texts on a broad range of learning area topics

• includes details and elaborations to expand ideas

• uses connectives to signal a change in relationship (e.g. "however", "although", "on the other hand") or to show causal relationships (e.g. "due to", "since") (see Grammar)

• uses a range of expressions to introduce an alternative point of view (e.g. "in my opinion", "he did not agree with")

• rehearses spoken text to accommodate time and technology

• controls tone, volume, pitch and pace to suit content and audience

• uses technologies or audio and visual features to enhance spoken text (e.g. videos a spoken presentation with music, sound effect enhancements)

Vocabulary

• uses a broader range of more complex noun groups/phrases to expand description (e.g. "protective, outer covering")

• selects more specific and precise words to replace general words (e.g. uses "difficult" or "challenging" for "hard")

• uses some rhetorical devices (e.g. "don't you agree?")

Snapshot – Positioning and locating

Numeracy: Measurement and geometry: Positioning and locating

Content description

AC9M5SP02

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 – Consider alternatives

Critical and Creative Thinking: Generating: Consider alternatives

Content description

AC9M5SP02

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

AC9M5SP02

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 – Speaking

Literacy: Speaking and listening: Speaking

Content description

AC9M5SP02

Learning progression extract

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

Crafting ideas

• creates spoken texts for a range of purposes across learning areas (e.g. explains how the mathematics problem was solved)

• uses complex sentence constructions including relative clauses (e.g. "The boy who drew the picture got a prize.") (see Grammar)

• adjusts register according to purpose and audience

• elaborates on ideas using a short sequence of sentences

• incorporates learnt content into spoken text

• sequences ideas and events appropriately

• uses mainly correct grammatical constructions (e.g. pronoun references; noun-verb agreement)

• varies volume and intonation to suit purpose and audience

• plans and delivers spoken presentations using appropriate structure and language

• includes video and audio enhancements to spoken texts, where appropriate (e.g. includes slides or pictures in a spoken presentation)

Vocabulary

• experiments with vocabulary drawn from a variety of sources

• uses adverbials to give more precise meaning to verbs (e.g. talking loudly) (see Grammar)

• uses a range of vocabulary to indicate connections (e.g. consequences)

• uses conditional vocabulary to expand upon ideas (e.g. "If Goldilocks ate all the porridge the bears would be hungry.")

Crafting ideas

• creates detailed spoken texts on a broad range of learning area topics

• includes details and elaborations to expand ideas

• uses connectives to signal a change in relationship (e.g. "however", "although", "on the other hand") or to show causal relationships (e.g. "due to", "since") (see Grammar)

• uses a range of expressions to introduce an alternative point of view (e.g. "in my opinion", "he did not agree with")

• rehearses spoken text to accommodate time and technology

• controls tone, volume, pitch and pace to suit content and audience

• uses technologies or audio and visual features to enhance spoken text (e.g. videos a spoken presentation with music, sound effect enhancements)

Vocabulary

• uses a broader range of more complex noun groups/phrases to expand description (e.g. "protective, outer covering")

• selects more specific and precise words to replace general words (e.g. uses "difficult" or "challenging" for "hard")

• uses some rhetorical devices (e.g. "don't you agree?")

Crafting ideas

• creates spoken texts responsive to audience and a broad range of learning area topics, clearly articulating words and ideas

• organises more complex ideas or concepts logically, selecting details to accentuate key points

• speaks audibly and coherently to a less familiar audience for a sustained period

• shows increasing awareness of audience by moderating length, content and delivery of spoken texts

• adjusts register according to purpose and audience

• does research to prepare spoken texts

• uses a range of technology, and audio and visual resources to engage audience and enhance content

Vocabulary

• varies vocabulary to add interest and to describe with greater precision (e.g. uses topic-specific noun groups/phrases such as "exploitation of resources") (see Grammar)

• uses language creatively (e.g. "the moon shines bravely")

• uses sensory vocabulary to engage the audience (e.g. "a gasp of dismay")

• uses technical vocabulary to demonstrate topic knowledge (e.g. "deforestation")

• consistently uses a range of synonyms to add variety and precision to spoken text

• uses abstractions (e.g. "freedom", "fairness")

Snapshot – Positioning and locating

Numeracy: Measurement and geometry: Positioning and locating

Content description

AC9M5SP02

Learning progression extract

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

Using informal maps and plans

• draws an informal map or sketch to provide directions (e.g. draws a dance map when planning choreography; sketches the pathway to provide directions for a robotic vehicle to move from one location to another within a space)

• describes and locates relative positions on an informal map or plan (e.g. locates the starting position for the cross-country race using an informal map of the course; uses a seating plan to describe where they sit relative to the teacher's desk)

• orients an informal map using recognisable landmarks and current location (e.g. orients a map to show the location of the audience and locates the entry and exit points of the school gymnasium)

• locates self on an informal map to select an appropriate path to a given location

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

AC9M5SP02

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)

AC9M5SP03

describe and perform , and of , using where appropriate; recognise what changes and what remains the same, and identify any symmetries

•

•

•

Elaborations

• understanding and explaining that , and can change the position and orientation of a but not the or size

• using pattern blocks and paper tracing around a and conducting a series of a one-step ; continuing to trace each resulting image, then copying the original position and end position on a new sheet of paper

• demonstrating how different combinations of can produce the same resulting image

• challenging classmates to select a combination of to move from an original image to the final image, noting the different combinations by using different colours to trace images

• investigating how animal tracks can be interpreted by First Nations Australians using the of their to help determine and understand animal behaviour

Students learn to:

describe and perform translations, reflections and rotations of shapes, using dynan software where appropriate; recognise what changes and what remains the same, a symmetries

(AC9M5SP03)

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

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 .

Inquiring

• Identify, process and evaluate information

Creating and exchanging

• Create, communicate and collaborate

Managing and operating

• Select and operate tools

Generating

• Consider alternatives

Generating

• Consider alternatives

Analysing

• Interpret concepts and problems

• Draw conclusions and provide reasons

Inquiring

• Identify, process and evaluate information

People

• First Nations Australians have sophisticated political, economic and social organisation systems, which include family and kinship structures, laws, traditions, customs, land tenure systems, and protocols for strong governance and authority.

Related content

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

AC9TDE6P02

Snapshot – Identify, process and evaluate information

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

Content description

AC9M5SP03

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 – Create, communicate and collaborate

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

Content description

AC9M5SP03

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

AC9M5SP03

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

AC9M5SP03

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 – Identify, process and evaluate information

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

Content description

AC9M5SP03

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 – Create, communicate and collaborate

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

Content description

AC9M5SP03

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

AC9M5SP03

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 – Consider alternatives

Critical and Creative Thinking: Generating: Consider alternatives

Content description

AC9M5SP03

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 – Consider alternatives

Critical and Creative Thinking: Generating: Consider alternatives

Content description

AC9M5SP03

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 – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5SP03

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

AC9M5SP03

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 information

Content description

AC9M5SP03

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

AC9M5ST01

acquire, and represent for nominal and ordinal categorical and discrete , to address a question of interest or purpose using software including spreadsheets; discuss and report on in terms of highest ( ) and , in the of the

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Elaborations

• recognising that ordinal is a form of even though the being collected might be numbers; for example, a rating using numbers 1 – 5 1 – 5 1 – 5 to represent the categories people can choose from when asked, "What rating would you give this film out of 5 5 5 ?"
• determining the for a of and discussing that there may be more than one
• identifying the best methods of presenting to illustrate the results of investigations and justifying the choice of representations
• acquiring through , discussing and reporting on the distribution of outcomes and how this relates to equal and unequal outcomes
• using digital systems to ; for example, recognising the difference between numerical, text and date formats in spreadsheets; setting types in a spreadsheet to make sure a date is input correctly
• exploring how travel and online shopping websites and apps collect ordinal from users to provide customer satisfaction and popularity ratings, and how they use recommendation to assist customers in travel planning or retail purchasing
• investigating relating to Australia's reconciliation process with First Nations Australians, posing questions, discussing and reporting on findings

Students learn to:

acquire, validate and represent data for nominal and ordinal categorical and discrete variables, to address a question of interest or purpose using software including spr discuss and report on data distributions in terms of highest frequency (mode) and s context of the data

(AC9M5ST01)

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

Creating and exchanging

• Create, communicate and collaborate

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 .

Analysing

• Interpret concepts and problems

Analysing

• Draw conclusions and provide reasons

Statistics and probability

• Understanding chance

Creating and exchanging

• Create, communicate and collaborate

Investigating

• Interpret data

Investigating

• Acquire and collate data

Statistics and probability

• Interpreting and representing data
Inquiring
• Develop questions
People
• Australia has 2 distinct First Nations Peoples; each encompasses a diversity of nations across Australia. Aboriginal Peoples are the first peoples of Australia and have occupied the Australian continent for more than 60,000 years. Torres Strait Islander Peoples are the First Nations Peoples of the Torres Strait and have occupied the region for over 4,000 years.
Related content
This content description can be taught with the following content descriptions from other learning areas.
AC9HS5S02
AC9HS5S03
AC9S5I04
AC9TDI6K03
Snapshot – Draw conclusions and provide reasons
Critical and Creative Thinking: Analysing: Draw conclusions and provide reasons
Content description
AC9M5ST01
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 information
Content description
AC9M5ST01
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 – Create, communicate and collaborate
Digital Literacy: Creating and exchanging: Create, communicate and collaborate
Content description
AC9M5ST01
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

AC9M5ST01

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

AC9M5ST01

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 – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5ST01

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

AC9M5ST01

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 – Understanding chance

Numeracy: Statistics and probability: Understanding chance

Content description

AC9M5ST01

Learning progression extract

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

Comparing chance

• describes and orders the likelihood of events in non-quantitative terms such as certain, likely, highly likely, unlikely, impossible (e.g. "if there are more blue than red marbles in a bag, blue is more likely to be selected"; "I am certain that I won't win the competition because I didn't enter")
• records outcomes of chance experiments in tables and charts
• demonstrates that outcomes of chance experiments may differ from expected results (e.g. we will not get the same results every time we roll a dice)
• draws conclusions that recognise variation in results of chance experiments (e.g. you rolled a lot of sixes this game, I hope I get more sixes next time)

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 $\frac{3}{6}$ 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)

Snapshot – Create, communicate and collaborate

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

Content description

AC9M5ST01

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

AC9M5ST01

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 – Acquire and collate data

Digital Literacy: Investigating: Acquire and collate data

Content description

AC9M5ST01

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 – Interpreting and representing data

Numeracy: Statistics and probability: Interpreting and representing data

Content description

AC9M5ST01

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 – Develop questions

Critical and Creative Thinking: Inquiring: Develop questions

Content description

AC9M5ST01

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

AC9M5ST02

interpret representing change over time; discuss the relationships that are represented and conclusions that can be made

•

Elaborations

• reading and interpreting different , discussing how the horizontal axis represents of time such as days of the week or times of the day, and the vertical axis represents numerical quantities or ordinal such as , money, measurements or ratings such as fire hazard ratings

• interpreting real-life represented as a graph showing how measurements change over a period of time and make simple

• matching unlabelled to the they represent based on the stories of the different

• interpreting the represented in a graph making ; for example, reading that show the varying temperatures or UV over a period of a day and discussing when would be the best time to hold an outdoor assembly

• exploring how can be used to train AI systems to make predictions by providing historical and showing trends

Students learn to:

interpret line graphs representing change over time; discuss the relationships that and conclusions that can be made

(AC9M5ST02)

General capabilities and cross-curriculum priorities

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

Measurement and geometry

• Measuring time

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

• Interpret concepts and problems

Statistics and probability

• Interpreting and representing data

Related content

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

AC9HS5S02

AC9HS5S03

AC9S5I04

Snapshot – Measuring time

Numeracy: Measurement and geometry: Measuring time

Content description

AC9M5ST02

Learning progression extract

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

Measuring time with large and small timescales

• uses appropriate metric prefixes to measure both large and small durations of time (e.g. millennia, nanoseconds)

• constructs timelines using an appropriate scale (e.g. chronologically sequences historical events)

Measuring how things change over time

• investigates, describes and interprets data collected over time (e.g. uses a travel graph to describe a journey; interprets data collected over a period of time using a graphical representation and makes a prediction for the future behaviour of the data)

Snapshot – Interpreting and representing data

Numeracy: Statistics and probability: Interpreting and representing data

Content description

AC9M5ST02

Learning progression extract

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

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

Interpreting graphical representations

• uses features of graphical representations to make predictions (e.g. predicts audience numbers based on historical data; interprets a range of graphs to identify possible trends and make predictions such as economic growth, stock prices, interest rates, population growth)

• summarises data using fractions, percentages and decimals (e.g. $\frac{2}{3}$ ■ of a class live in the same suburb; represents road safety and sun safety statistics as a percentage of the Australian population)

• explains that continuous variables depicting growth or change often vary over time (e.g. creates growth charts to illustrate impacts of financial decisions; describes patterns in inflation rates, employment rates, migration rates over time; represents changes to fitness levels following the implementation of a personal fitness plan; interprets temperature charts)

• interprets graphs depicting motion such as distance–time and velocity–time graphs

• interprets and describes patterns in graphical representations of data from real-life situations such as the motion of a rollercoaster, flight trajectory of a basketball shot and the spread of disease

• investigates the association of 2 numerical variables through the representation and interpretation of bivariate data (e.g. uses scatter plots to represent bivariate data when investigating the relationship between 2 variables, such as income per capita, population density and life expectancy for different socio-economic groups)

• investigates, represents and interprets time series data (e.g. interrogates a time series graph showing the change in costs over time; uses a maximum daily temperature chart to determine the average temperature for the month)

• interprets the impact of changes to data (e.g. recognises the impact of outliers on a data set such as the income of a world-class professional athlete on the average income of players at the state/territory level; uses digital tools to enhance the quality of data in a science investigation)

Snapshot – Consider alternatives

Critical and Creative Thinking: Generating: Consider alternatives

Content description

AC9M5ST02

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 informatic

Content description

AC9M5ST02

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

AC9M5ST02

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 – Interpreting and representing data

Numeracy: Statistics and probability: Interpreting and representing data

Content description

AC9M5ST02

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

AC9M5ST03

plan and conduct by posing questions or identifying a problem and collecting relevant ; choose appropriate displays and interpret the ; communicate findings within the of the investigation

•

•

Elaborations

• posing questions about insect diversity in the playground, collecting by taping a one-metre-square piece of paper to the playground, and observing the type and number of insects on it over time
• posing a question or identifying a problem of interest, collecting, interpreting and analysing the and discussing if the generated provides the information necessary to answer the questions
• developing questions that are objective, without opinion and have a balanced of answer choices without
• exploring First Nations Ranger Groups' and other groups' biodiversity detection techniques to care for , posing investigative questions, collecting and interpreting related to represent and communicate findings

Students learn to:

plan and conduct statistical investigations by posing questions or identifying a prol collecting relevant data; choose appropriate displays and interpret the data; commu within the context of the investigation

(AC9M5ST03)

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

• Develop questions

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 .

Inquiring

• Develop questions
• Identify, process and evaluate information

Inquiring

• Develop questions

Speaking and listening

• Speaking

Inquiring

• Develop questions

Inquiring

• Develop questions

People

• Australia has 2 distinct First Nations Peoples; each encompasses a diversity of nations across Australia. Aboriginal Peoples are the first peoples of Australia and have occupied the Australian continent for more than 60,000 years. Torres Strait Islander Peoples are the First Nations Peoples of the Torres Strait and have occupied the region for over 4,000 years.

Related content

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

AC9HS5S02

AC9HS5S03

AC9S5I02

AC9S5I04

Snapshot – Interpret concepts and problems

Critical and Creative Thinking: Analysing: Interpret concepts and problems

Content description

AC9M5ST03

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

AC9M5ST03

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

AC9M5ST03

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 – Interpreting and representing data

Numeracy: Statistics and probability: Interpreting and representing data

Content description

AC9M5ST03

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 – Develop questions

Critical and Creative Thinking: Inquiring: Develop questions

Content description

AC9M5ST03

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

AC9M5ST03

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 – Develop questions

Critical and Creative Thinking: Inquiring: Develop questions

Content description

AC9M5ST03

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 – Speaking

Literacy: Speaking and listening: Speaking

Content description

AC9M5ST03

Learning progression extract

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

Crafting ideas

• creates spoken texts for a range of purposes across learning areas (e.g. explains how the mathematics problem was solved)
• uses complex sentence constructions including relative clauses (e.g. "The boy who drew the picture got a prize.") (see Grammar)
• adjusts register according to purpose and audience
• elaborates on ideas using a short sequence of sentences
• incorporates learnt content into spoken text
• sequences ideas and events appropriately
• uses mainly correct grammatical constructions (e.g. pronoun references; noun-verb agreement)
• varies volume and intonation to suit purpose and audience
• plans and delivers spoken presentations using appropriate structure and language
• includes video and audio enhancements to spoken texts, where appropriate (e.g. includes slides or pictures in a spoken presentation)

Vocabulary

• experiments with vocabulary drawn from a variety of sources
• uses adverbials to give more precise meaning to verbs (e.g. talking loudly) (see Grammar)
• uses a range of vocabulary to indicate connections (e.g. consequences)
• uses conditional vocabulary to expand upon ideas (e.g. "If Goldilocks ate all the porridge the bears would be hungry.")

Crafting ideas

• creates detailed spoken texts on a broad range of learning area topics
• includes details and elaborations to expand ideas
• uses connectives to signal a change in relationship (e.g. "however", "although", "on the other hand") or to show causal relationships (e.g. "due to", "since") (see Grammar)
• uses a range of expressions to introduce an alternative point of view (e.g. "in my opinion", "he did not agree with")
• rehearses spoken text to accommodate time and technology
• controls tone, volume, pitch and pace to suit content and audience
• uses technologies or audio and visual features to enhance spoken text (e.g. videos a spoken presentation with music, sound effect enhancements)

Vocabulary

• uses a broader range of more complex noun groups/phrases to expand description (e.g. "protective, outer covering")
• selects more specific and precise words to replace general words (e.g. uses "difficult" or "challenging" for "hard")
• uses some rhetorical devices (e.g. "don't you agree?")

Crafting ideas

• creates spoken texts responsive to audience and a broad range of learning area topics, clearly articulating words and ideas
• organises more complex ideas or concepts logically, selecting details to accentuate key points
• speaks audibly and coherently to a less familiar audience for a sustained period
• shows increasing awareness of audience by moderating length, content and delivery of spoken texts
• adjusts register according to purpose and audience
• does research to prepare spoken texts
• uses a range of technology, and audio and visual resources to engage audience and enhance content

Vocabulary

• varies vocabulary to add interest and to describe with greater precision (e.g. uses topic-specific noun groups/phrases such as "exploitation of resources") (see Grammar)
• uses language creatively (e.g. "the moon shines bravely")
• uses sensory vocabulary to engage the audience (e.g. "a gasp of dismay")
• uses technical vocabulary to demonstrate topic knowledge (e.g. "deforestation")
• consistently uses a range of synonyms to add variety and precision to spoken text
• uses abstractions (e.g. "freedom", "fairness")

Snapshot – Develop questions

Critical and Creative Thinking: Inquiring: Develop questions

Content description

AC9M5ST03
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 – Develop questions
Critical and Creative Thinking: Inquiring: Develop questions
Content description

AC9M5ST03
Continuum extract

AC9M5P01

list the possible outcomes of involving and compare to those which are not equally likely

•
Elaborations

• discussing what it for outcomes to be equally likely and comparing the number of possible and of chance ; for example, when drawing a card from a standard deck of cards there are 4 4 4 possible outcomes if you are interested in the suit, 2 2 2 possible outcomes if you are interested in the colour or 52 52 5 2 outcomes if you are interested in the exact card
• discussing how that have can be referred to as random chance ; for example, if all the names of students in a class are placed in a hat and one is drawn at random, each person has an equally likely chance of being drawn
• investigating how and fairness can relate to outcomes being equally and not equally likely, and discussing how this might inform strategies for mitigating in AI systems
• commenting on the chance of winning games by considering the number of possible outcomes and the consequent chance of winning
• investigating why some games are fair and others are not; for example, drawing a track game to resemble a running race and taking it in turns to roll 2 2 2 dice, where the first runner moves a square if the difference between the 2 2 2 dice is , one or 2 2 2 and the second runner moves a square if the difference is 3 , 4 3, 4 3 , 4 or 5 5 5 ; responding to the questions, "Is this game fair?", "Are some differences more likely to come up than others?" and "How can you work that out?"
• comparing the chance of a head or a tail when a coin is tossed, whether some numbers on a dice are more likely to be facing up when the dice is rolled, or the chance of getting a 1 , 2 1, 2 1 , 2 or 3 3 3 on a spinner with uneven regions for the numbers
• discussing supermarket promotions such as collecting stickers or and whether there is an equal chance of getting each of them
Students learn to:
list the possible outcomes of chance experiments involving equally likely outcomes
those which are not equally likely

(AC9M5P01)

General capabilities and cross-curriculum priorities

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

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 .

Generating

• Consider alternatives

Generating

• Consider alternatives

Understanding ethical concepts and perspectives

• Explore ethical concepts

Statistics and probability

• Understanding chance

Generating

• Consider alternatives

Analysing

• Draw conclusions and provide reasons

Inquiring

• Identify, process and evaluate information

Responding to ethical issues

• Making and reflecting on ethical decisions

Understanding ethical concepts and perspectives

• Explore ethical concepts

Inquiring

• Identify, process and evaluate information

Snapshot – Understanding chance

Numeracy: Statistics and probability: Understanding chance

Content description

AC9M5P01

Learning progression extract

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

Comparing chance

• describes and orders the likelihood of events in non-quantitative terms such as certain, likely, highly likely, unlikely, impossible (e.g. "if there are more blue than red marbles in a bag, blue is more likely to be selected"; "I am certain that I won't win the competition because I didn't enter")

• records outcomes of chance experiments in tables and charts

• demonstrates that outcomes of chance experiments may differ from expected results (e.g. we will not get the same results every time we roll a dice)

• draws conclusions that recognise variation in results of chance experiments (e.g. you rolled a lot of sixes this game, I hope I get more sixes next time)

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 $3\,6\,\frac{3}{6}\,6\,3\,\blacksquare$)
• 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)

Snapshot – Consider alternatives

Critical and Creative Thinking: Generating: Consider alternatives

Content description

AC9M5P01

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 – Explore ethical concepts

Ethical Understanding: Understanding ethical concepts and perspectives: Explor

Content description

AC9M5P01

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 – Understanding chance

Numeracy: Statistics and probability: Understanding chance

Content description

AC9M5P01

Learning progression extract

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

Comparing chance

• describes and orders the likelihood of events in non-quantitative terms such as certain, likely, highly likely, unlikely, impossible (e.g. "if there are more blue than red marbles in a bag, blue is more likely to be selected"; "I am certain that I won't win the competition because I didn't enter")

• records outcomes of chance experiments in tables and charts

• demonstrates that outcomes of chance experiments may differ from expected results (e.g. we will not get the same results every time we roll a dice)

• draws conclusions that recognise variation in results of chance experiments (e.g. you rolled a lot of sixes this game, I hope I get more sixes next time)

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 $\frac{3}{6}$ 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)

Snapshot – Consider alternatives

Critical and Creative Thinking: Generating: Consider alternatives

Content description

AC9M5P01

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 – Draw conclusions and provide reasons

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

Content description

AC9M5P01

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 information

Content description

AC9M5P01

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 – Making and reflecting on ethical decisions

Ethical Understanding: Responding to ethical issues: Making and reflecting on et

Content description

AC9M5P01

Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• describe decision-making processes with reference to ethical perspective and■values
• consider alternative■ethical responses■to an issue when making and reflecting on ethical decisions
• consider how values and beliefs influence approaches to ethical issues, and■analyse■how these affect■outcomes

Snapshot – Explore ethical concepts

Ethical Understanding: Understanding ethical concepts and perspectives: Explor

Content description

AC9M5P01

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 – Identify, process and evaluate information

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

Content description

AC9M5P01

Continuum extract

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• 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

AC9M5P02

conduct repeated including those with and without , observe and record the results; use to compare outcomes and estimate their likelihoods

•

Elaborations

• discussing and listing all the possible outcomes of an activity and conducting experiments to estimate the probabilities; for example, using coloured cards in a card game and experimenting with shuffling the deck and turning over one card at a time, recording and discussing the results
• conducting experiments, recording the outcomes and the number of times the outcomes occur, describing the relative of each outcome; for example, using "I threw the coin 10 10 1 0 times, and the results were 3 3 3 times for a head, so that is 3 3 3 out of 10 10 1 0 , and 7 7 7 times for a tail, so that is 7 7 7 out of 10 10 1 0 "
• experimenting with and comparing the outcomes of spinners with equal-coloured regions compared to unequal regions; responding to questions such as "How does this spinner differ to one where each of the colours has an equal chance of occurring?", giving reasons
• comparing the results of experiments using a fair dice and one that has numbers represented on faces more than once, explaining how this affects the likelihood of outcomes
• using spreadsheets to record the outcomes of an activity and calculate the total frequencies of different outcomes, representing these as a ; for example, using coloured balls in a bag, drawing one out at a time and recording the colour, replacing them in the bag after each draw
• investigating First Nations Australian children's instructive games; for example, Diyari koolchee from the Diyari Peoples near Lake Eyre in South Australia, to conduct repeated and explore predictable patterns, using where appropriate

Students learn to:

conduct repeated chance experiments including those with and without equally like observe and record the results; use frequency to compare outcomes and estimate t

(AC9M5P02)

General capabilities and cross-curriculum priorities

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

Number sense and algebra

• Counting processes

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 .

Investigating

• Acquire and collate data
• Interpret data

Statistics and probability

• Interpreting and representing data

Analysing

• Draw conclusions and provide reasons

Responding to ethical issues

• Making and reflecting on ethical decisions

Understanding ethical concepts and perspectives

• Explore ethical concepts

Analysing

• Draw conclusions and provide reasons

Responding to ethical issues

• Making and reflecting on ethical decisions

Understanding ethical concepts and perspectives

• Explore ethical concepts

Investigating

• Acquire and collate data

• Interpret data

Managing and operating

• Select and operate tools

Number sense and algebra

• Interpreting fractions

Statistics and probability

• Interpreting and representing data

Managing and operating

• Select and operate tools

Culture

• First Nations Australians' ways of life reflect unique ways of being, knowing, thinking and doing.

Snapshot – Counting processes

Numeracy: Number sense and algebra: Counting processes

Content description

AC9M5P02

Learning progression extract

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

Counting sequences

• counts in sequence forwards and backwards by tens or fives off the decade to 100 100 1 0 0 and by hundreds up to 1000 1000 1 0 0 0 and beyond using knowledge of place value (e.g. 2 , 12 , 22 2, 12, 22 2 , 1 2 , 2 2 … or 8 , 13 , 18 , 23 8, 13, 18, 23 8 , 1 3 , 1 8 , 2 3 ; 100 , 200 100, 200 1 0 0 , 2 0 0 … 1000 1000 1 0 0 0)

Perceptual counting

• counts large quantities in groups or multiples (e.g. groups items into piles of 10 10 1 0 , then counts the piles, adding on the residual to quantify the whole collection)

• estimates the number of items to count to assist with determining group sizes (e.g. decides that counting in twos would not be the most efficient counting strategy based on a quick estimate of the quantity and decides instead to use groups of 10 10 1 0)

Counting sequences

• counts forwards and backwards from any number

• applies counting processes flexibly to count in rational numbers (e.g. counts in thirds such as 1 3 $\frac{1}{3}$ 3 1 ■ , 2 3 , 1 , 1 1 3 , 1 2 3 , 2 $\frac{2}{3}$, 1, 1$\frac{1}{3}$, 1$\frac{2}{3}$, 2 3 2 ■ , 1 , 1 3 1 ■ , 1 3 2 ■ , 2 …; starting from 4 4 4 counts backwards by 0.3 0.3 0 . 3 (e.g. 4 , 3.7 , 3.4 , 3.1 4, 3.7, 3.4, 3.1 4 , 3 . 7 , 3 . 4 , 3 . 1 …)

• counts backwards from zero understanding that the count can be extended in the negative direction

(e.g. 0 0 0 , - 1 1 1 , - 2 2 2 , - 3 3 3 , - 4 4 4)

Abstract counting

• applies counting processes to quantify any type of conceivable collection (e.g. systematically counts the number of possible outcomes of an event; applies a frequency count; estimates and compares the difference between a word or character count in a text)

Snapshot – Understanding chance

Numeracy: Statistics and probability: Understanding chance

Content description

AC9M5P02

Learning progression extract

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

Comparing chance

• describes and orders the likelihood of events in non-quantitative terms such as certain, likely, highly likely, unlikely, impossible (e.g. "if there are more blue than red marbles in a bag, blue is more likely to be selected"; "I am certain that I won't win the competition because I didn't enter")

• records outcomes of chance experiments in tables and charts

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• draws conclusions that recognise variation in results of chance experiments (e.g. you rolled a lot of sixes this game, I hope I get more sixes next time)

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")

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• identifies unfair elements in games that affect the chances of winning (e.g. having an unequal number of turns; weighted dice)

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• 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 $\frac{3}{6}$ 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)

Snapshot – Acquire and collate data

Digital Literacy: Investigating: Acquire and collate data

Content description

AC9M5P02

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

AC9M5P02

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

AC9M5P02

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 – Interpreting and representing data

Numeracy: Statistics and probability: Interpreting and representing data

Content description

AC9M5P02

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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)

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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)
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Snapshot – Draw conclusions and provide reasons

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

Content description

AC9M5P02

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 – Making and reflecting on ethical decisions

Ethical Understanding: Responding to ethical issues: Making and reflecting on et

Content description

AC9M5P02

Continuum extract

The following continuum extract shows the alignment of the continuum with this content.
• describe decision-making processes with reference to ethical perspective and■values
• consider alternative■ethical responses■to an issue when making and reflecting on ethical decisions
• consider how values and beliefs influence approaches to ethical issues, and■analyse■how these affect■outcomes

Snapshot – Explore ethical concepts

Ethical Understanding: Understanding ethical concepts and perspectives: Explor

Content description

AC9M5P02

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

AC9M5P02
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Snapshot – Making and reflecting on ethical decisions
Ethical Understanding: Responding to ethical issues: Making and reflecting on et

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Snapshot – Explore ethical concepts
Ethical Understanding: Understanding ethical concepts and perspectives: Explor

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Snapshot – Acquire and collate data
Digital Literacy: Investigating: Acquire and collate data

Content description

AC9M5P02
Continuum extract

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• 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

AC9M5P02
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

AC9M5P02

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

AC9M5P02

Learning progression extract

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

Equivalence of fractions

• identifies the need to have equal wholes to compare fractional parts (e.g. compares the pieces of pizza when 2 2 2 identical pizzas are cut into 6 6 6 and 8 8 8 and describes how one-sixth is greater than one-eighth)

• creates fractions greater than one by recreating the whole (e.g. when creating four-thirds, demonstrates that three-thirds corresponds to the whole and the fourth third is part of an additional whole)

• creates equivalent fractions by dividing the same-sized whole into different parts (e.g. shows two-sixths is the same as one-third of the same whole; creates a fraction wall)

• uses partitioning to establish relationships between fractions (e.g. creates one-sixth as one-third of one-half)

Fractions as numbers

• connects the concepts of fractions and division: a fraction is a quotient, or a division statement (e.g. two-sixths is the same as $2 \div 6$ $2 \div 6$ $2 \div 6$ or 2 2 2 partitioned into 6 6 6 equal parts or to solve "how to share 2 chocolate bars equally between 3 3 3 people", understands that it is 2 2 2 divided by 3 3 3 , therefore each person gets two-thirds of a chocolate bar)

• justifies where to place fractions on a number line (e.g. to show two-thirds on a number line divides the space between zero and one into 3 3 3 equal parts and indicates the correct location)

• uses and explains the equivalence of decimals to benchmark fractions (e.g. $1 4 = 0.25$ $\frac14 = 0.25$ $4 1 \blacksquare = 0 . 2 5$, $1 2 = 0.5$ $\frac12 = 0.5$ $2 1 \blacksquare = 0 . 5$, $3 4 = 0.75$ $\frac34 = 0.75$ $4 3 \blacksquare = 0 . 7 5$, $1 10 = 0.1$ $\frac1{10} = 0.1$ $1 0 1 \blacksquare = 0 . 1$, $1 100 = 0.01$ $\frac1{100} = 0.01$ $1 0 0 1 \blacksquare = 0 . 0 1$; converts cup measures to millilitres)

Comparing fractions

• understands the equivalence relationship between a fraction, decimal and percentage as different representations of the same quantity (e.g. $1 2 = 0.5 = 50$ $\frac12 = 0.5 = 50$ $2 1 \blacksquare = 0 . 5 = 5 0 \%$ 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 $2 3$ $\frac23$ $3 2 \blacksquare$ 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)

Snapshot – Interpreting and representing data

Numeracy: Statistics and probability: Interpreting and representing data

Content description

AC9M5P02

Learning progression extract

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Collecting, displaying and interpreting categorical data

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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)

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• 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 – Select and operate tools

Digital Literacy: Managing and operating: Select and operate tools

Content description

AC9M5P02
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