Dr Paul Swan & Narelle Rice

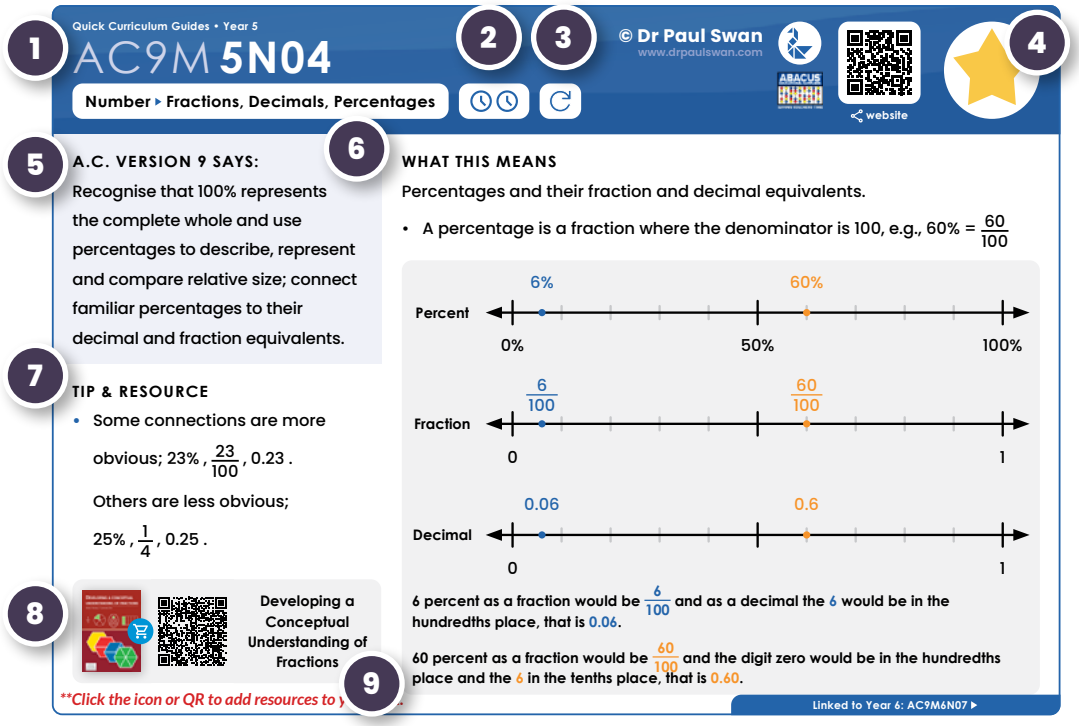
Year 5
Quick Curriculum Guide

A reference and guide to the Australian Curriculum Version 9

These **Quick Curriculum Guides** have been designed to take a look at the new Australian Mathematics Curriculum (AC9), explain terminology and provide interpretations. Narelle and I have used our professional judgement to put forward what is appropriate for students at this year level.

Using the Guide Cards

1. The Curriculum 9 code, strand, and our categorisation of content.
2. Our estimate of teaching time required.
   - = a short time (1 or a few lessons)
   - = more time (a few weeks)
   - = lots of time (3 weeks+)
3. This icon means we think this content is best approached with multiple exposures (interleaving).



4. The filled in star means, in our opinion, this is one of the most vital topics for the year level. Often these are pre-requisites for later learning.
5. Text from the curriculum. Terms we define are highlighted.
6. Our explanations, inferences, clarifications and suggestions.
7. Practical tips and sometimes activity ideas.
8. Resources and materials recommendations.
9. Links to other descriptors.
   Bottom left: previous year
   Middle: within this year
   Bottom right: next year

Dr Paul Swan & Narelle Rice

Year 5

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Acknowledgements

Authors: Dr Paul Swan & Narelle Rice

We would like to also thank Linda Marshall, David Dunstan and Lyndon Rice for comments and assistance.

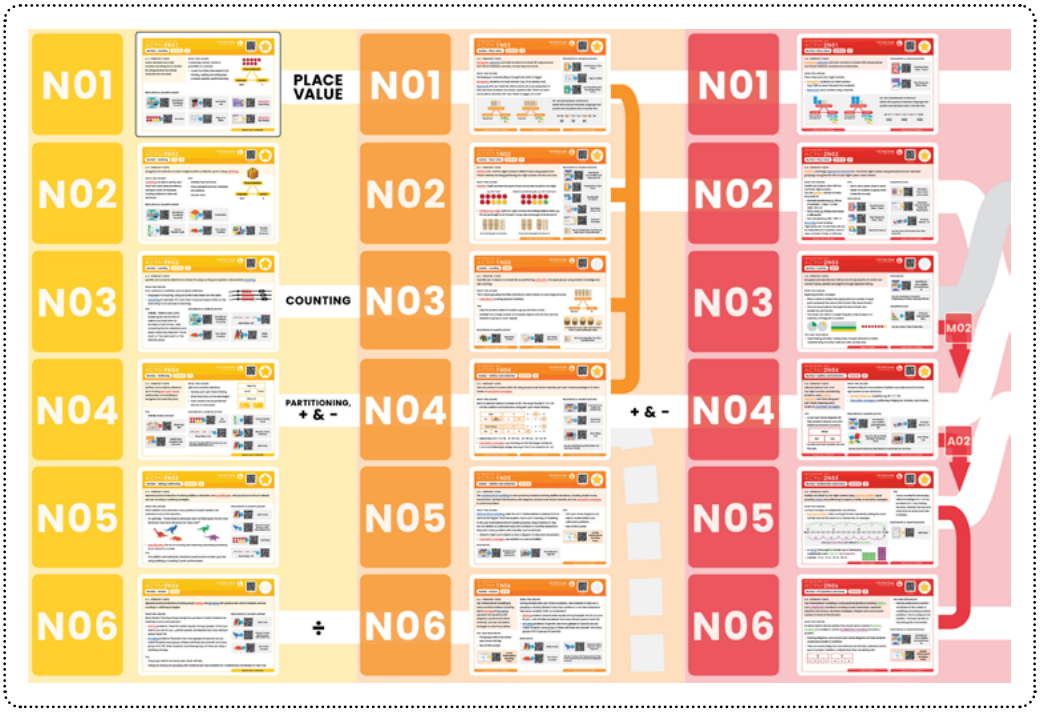
Visual Overview

For a visual overview / planner, see our accompanying overview documents.

We have illustrated the direct connections that exist between and within year levels.

With this information, you can check out the directly related cards in the previous / next year. This is helpful to:

- understand what the students should be bringing in from previous years, and what might need revision,
- the exact difference in understanding from previous years to this year,
- the content that you may be able to bundle together, and,
- what the curriculum describes for next year, so you can avoid accidentally teaching beyond the year level.



These documents serve as general advice only and do not take into account your specific needs and conditions. While best care has been taken in compiling these materials, mistakes may exist.

AC9M 5N01

Number ▸ Place Value

A.C. VERSION 9 SAYS:

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.

RESOURCES

Check the Clues Place Value Decimal Numbers

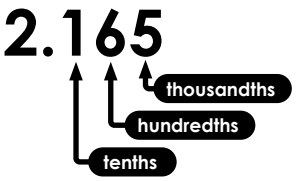
Teaching Place Value Year 5+

***Click the icon or QR to add resources to your cart.*

WHAT THIS MEANS

Place value to two decimal places and beyond.

- In our decimal place value system, the value of a digit depends on its position in a number. To the left, the numbers increase ten-fold; to the right they decrease by powers of ten.



- Students need to order numbers, working their way from the left-most digit.
- The number line will help students compare numbers to two decimal places and three decimal places.

TIP

- Measurement contexts are ideal for considering three decimal places.

◂ Linked to Year 4: AC9M4N01

AC9M 5N02

Number ▸ Properties

A.C. VERSION 9 SAYS:

Express natural numbers as products of their **factors**, recognise **multiples** and determine if one number is divisible by another.

WHAT THIS MEANS

Factors, multiples and divisibility rules.

- **Factors** of 12 would include 1, 2, 3, 4, 6 and 12. Factors divide into the number without leaving a remainder.
- **Multiples** of 12 would be 0, 12, 24, 36 ...

TIP

- Try *'Fill in the gap'* type activities;
  e.g., the multiples of 6 are:
  6, 12, __ __ __ __ __, 24, 30, ...

RESOURCE

Tackling Tables

***Click the icon or QR to add resources to your cart.*

Linked to Year 6: AC9M6N02 ▸

AC9M 5N03

website

Number ▸ Fractions

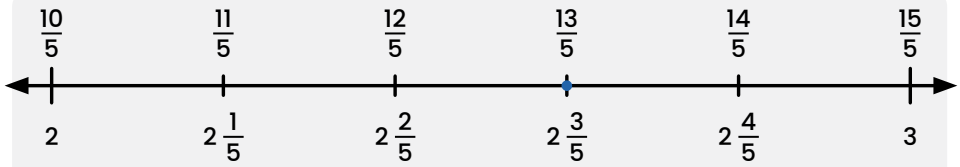
A.C. VERSION 9 SAYS:

Compare and order fractions with the same and related denominators including mixed numerals, applying knowledge of factors and multiples; represent these fractions on a number line.

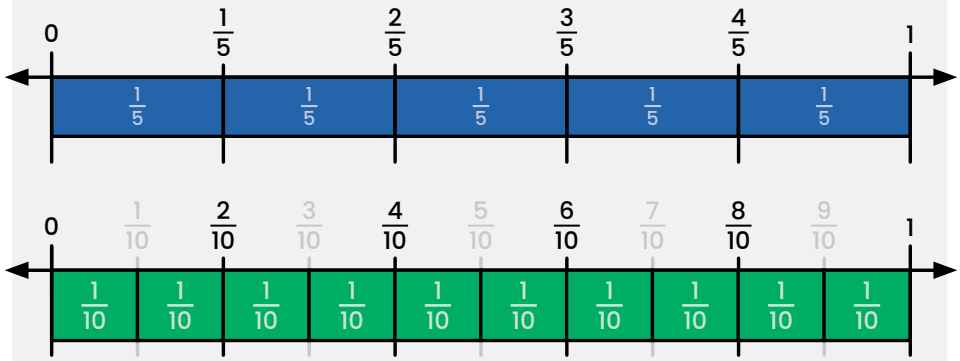
WHAT THIS MEANS

Order fractions where the denominators are related e.g., halves, fourths and eighths. Place them on a number line.

- Fraction walls focus on length as a model for ordering fractions. The length model can be linked to number lines.



Students can rename a mixed numeral e.g., $2\frac{3}{5}$ as an improper fraction $\frac{13}{5}$.



Double (parallel) number lines can help show equivalent fractions. e.g., $\frac{1}{5}$ and $\frac{2}{10}$.

◂ Linked to Year 4: AC9M4N03 and AC9M4N04

Linked to Year 6: AC9M6N03 ▸

AC9M 5N04

website

Number ▸ Fractions, Decimals, Percentages

A.C. VERSION 9 SAYS:

Recognise that 100% represents the complete whole and use percentages to describe, represent and compare relative size; connect familiar percentages to their decimal and fraction equivalents.

TIP & RESOURCE

- Some connections are more obvious; 23% , $\frac{23}{100}$, 0.23 .

  Others are less obvious;

  25% , $\frac{1}{4}$, 0.25 .

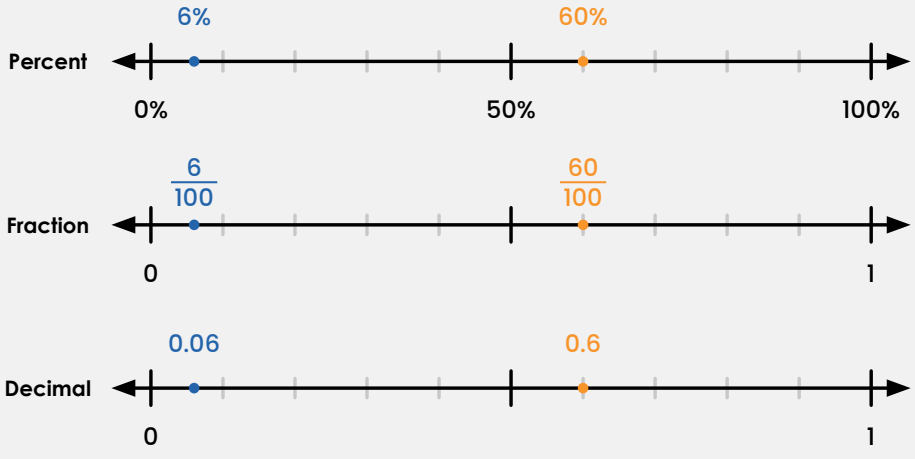
Developing a Conceptual Understanding of Fractions

***Click the icon or QR to add resources to your cart.*

WHAT THIS MEANS

Percentages and their fraction and decimal equivalents.

- A percentage is a fraction where the denominator is 100, e.g., 60% = $\frac{60}{100}$



6 percent as a fraction would be $\frac{6}{100}$ and as a decimal the 6 would be in the hundredths place, that is 0.06.

60 percent as a fraction would be $\frac{60}{100}$ and the digit zero would be in the hundredths place and the 6 in the tenths place, that is 0.60.

Linked to Year 6: AC9M6N07 ▸

AC9M 5N05

website

Number ▸ Fractions Addition & Subtraction

A.C. VERSION 9 SAYS:

Solve problems involving addition and subtraction of fractions with the **same or related denominators**, using different strategies.

TIP

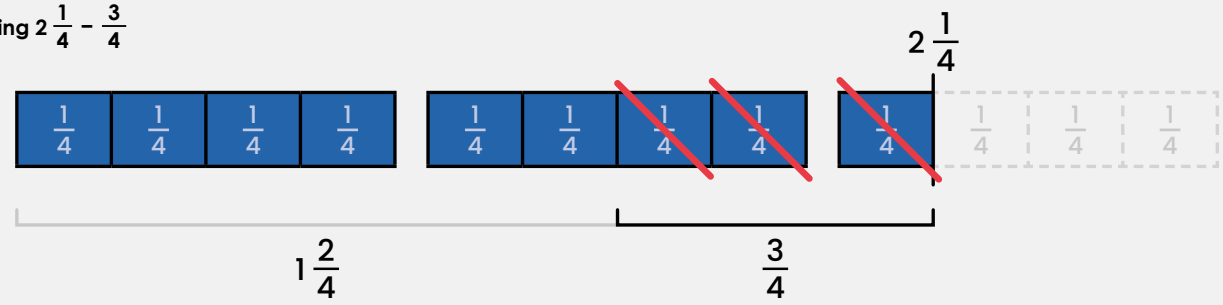
- To understand fraction walls and fraction bars students need prior experience folding paper strips.

WHAT THIS MEANS

Adding fractions like $\frac{1}{5} + \frac{3}{5}$, where the denominators are the same and $\frac{1}{3} + \frac{2}{6}$ where the denominators are related. This does not involve using a formal algorithm to add fractions.

- This can be applied to different situations such as measuring cups, fractions of a meter.
- Diagrams such as number lines can be used to help solve the problems. These are then recorded in fraction symbols i.e. $\frac{1}{2} + \frac{1}{4}$

Illustrating $2\frac{1}{4} - \frac{3}{4}$



Linked to Year 6: AC9M6N05 ▸

AC9M 5N06

website

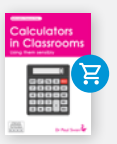
Number ▸ Multiplication

A.C. VERSION 9 SAYS:

Solve problems involving multiplication of larger numbers by one- or two-digit numbers, choosing efficient calculation strategies and using digital tools where appropriate; check the reasonableness of answers.

TIPS & RESOURCES

- Digital tool: Most likely a calculator.
- The examples shown in the elaborations show two-digit by two-digit or single-digit by three-digit multiplication.



Calculators in Classrooms Book

***Click the icon or QR to add resources to your cart.*

WHAT THIS MEANS

Multiplying numbers by one and two-digit numbers.

- The use of an array is recommended as it can then be used to explain how the standard written algorithm works. This is the first time the standard written algorithm for multiplication is mentioned.
- This is the last reference to multiplying whole numbers.

Example 1: Calculate 15 × 14

	10	5
10	100	5
4	40	20

Example 2: Calculate 45 × 37

	40	5
30	40 × 30 = 1200	5 × 30 = 150
7	40 × 7 = 280	5 × 7 = 35

Prior to using the array diagram shown students should have created similar diagrams using graph paper.

◂ Linked to Year 4: AC9M4N06

AC9M 5N07

Number ▸ Division

A.C. VERSION 9 SAYS:

Solve problems involving division, choosing efficient strategies and using digital tools where appropriate; interpret any remainder according to the context and express results as a whole number, decimal or fraction.

WHAT THIS MEANS

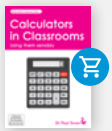
Perform a division calculation.

- No mention is made of standard written division algorithms, but appropriate use of digital tools (calculators) is.

TIPS

- The elaborations mostly show a single-digit divisor, many related to multiplication facts e.g., 56 ÷ 7.
- Context is used in relation to remainders. For example, it would not make sense to buy 15.6 boxes of cereal so 16 boxes would need to be bought.

RESOURCES



Calculators in Classrooms Book

Spindiv Games

Pocket Dice Book C

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◂ Linked to Year 4: AC9M4N06

AC9M 5N08

Number ▸ Estimation

A.C. VERSION 9 SAYS:

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

WHAT THIS MEANS

Deciding if the answer to a calculation makes sense.

- Check against the context.
- Use estimation techniques such as rounding to check calculations.

TIP

- Rather than rely on rounding rules consider the context. Often, we need to overestimate.
- There are several strategies students can use for estimation, e.g., a front-end strategy.

◂ Linked to Year 4: AC9M4N07

Linked to Year 6: AC9M6N08 ▸

AC9M 5N09

Number ▸ Problem Solving

A.C. VERSION 9 SAYS:

Use mathematical modelling to solve practical problems involving **additive** and **multiplicative** situations including financial contexts; formulate the problems, choosing operations and efficient calculation strategies, using **digital tools** where appropriate; interpret and communicate solutions in terms of the situation.

WHAT THIS MEANS

Students work out which operation to use and then solve the problem.

- **Additive** situations involve addition and/or subtraction.
- **Multiplicative** situations involve multiplication and/or division (including fractions).
- **Digital tools** include spreadsheets and calculators.

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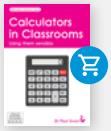
RESOURCES & MANIPULATIVES

ACARA's Mathematical Modelling Process Poster

Mathematics and Money Book



Calculators in Classrooms Book

Problem Solving Money Puzzles For Years 4-6

Calculators

◂ Linked to Year 4: AC9M4N08

Linked to Year 6: AC9M6N09 ▸

AC9M 5N10

Number ▸ Pattern

A.C. VERSION 9 SAYS:

Create and use algorithms involving a sequence of steps and decisions and digital tools to experiment with **factors**, **multiples** and **divisibility**; identify, interpret and describe emerging patterns.

WHAT THIS MEANS

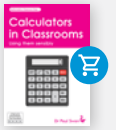
Write a step by step procedure to generate a pattern. e.g., a flow chart.

- This is NOT referring to standard written algorithms.
- Calculators (a digital tool) can be used to support understanding of factors and multiples. Divisibilty is mentioned in AC9M5N02.
- The function machine (shown below) is an example of an algorithm.

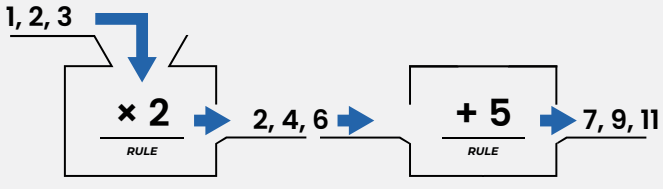
TIP

- Spreadsheets (a digital tool) can be used to generate numbers and create patterns.

RESOURCE



Calculators in Classrooms Book



This sequence involves doubling, or multiplying by two and adding five.

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◂ Linked to Year 4: AC9M4N09

AC9M 5A01

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Algebra ▸ Multiplication and Division

A.C. VERSION 9 SAYS:

Recognise and explain the connection between multiplication and division as inverse operations and use this to develop families of number facts.

WHAT THIS MEANS

Teach Fact Families.

- A Fact Family for 8 × 3 = 24, would be 3 × 8 = 24, 24 ÷ 3 = 8 and 24 ÷ 8 = 3. They are all part of the same family of facts.
- Students who understand fractions should be encouraged to add two more members to the family $\frac{1}{3}$ of 24 = 8 and $\frac{1}{8}$ of 24 = 3
- This will help develop understanding of inverse operations, that is, one operation undoes the other.
- Extend to 80 × 3, 8 × 30 ...
- This is the last reference to multiplication facts (aka tables) and division facts.

factor	×	factor	=	product
factor	×	?	=	product
product	÷	factor	=	factor

***Click the icon or QR to add resources to your cart.*

TIPS & RESOURCES

- Learning a fact in a family gets you three (later, five) facts free!

Multispin & Spindiv Games

Dice Games for Tables

◂ Linked to Year 4: AC9M4A02

Linked to AC9M5A02

AC9M 5A02

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Algebra ▸ Multiplication & Division

A.C. VERSION 9 SAYS:

Find unknown values in numerical equations involving multiplication and division using the properties of numbers and operations.

WHAT THIS MEANS

Working out the value of ? in calculations like 40 ÷ 5 = 4 ?

- Properties of number. For multiplication and division, these include:
  - Associative property of multiplication e.g., (3 × 2) × 4 = 3 × (2 × 4)
  - Commutative property of multiplication e.g., 3 × 2 = 2 × 3
  - Distributive property of multiplication (See Arrays game) e.g., 3 × (2 × 4) = (3 × 2) + (3 × 4)
- The elaborations refer to the use of factors and multiples in solving problems.

TIPS

- In Year 4 the focus is on addition and subtraction.
  In Year 5 the focus is on multiplication and division.
- No further reference is made to this concept in Year 6.

RESOURCE

Teaching Mathematics Through Story Books 3 (Years 4 - 6)

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Linked to AC9M5A01

AC9M 5M01

Measurement ▸ Units

A.C. VERSION 9 SAYS:

Choose appropriate metric units when measuring the length, mass and capacity of objects; use smaller units or a combination of units to obtain a more accurate measure.

WHAT THIS MEANS

Students *(not the teacher or worksheet)* choose which unit to use when measuring.

- Ideally students would choose the instrument used to measure.

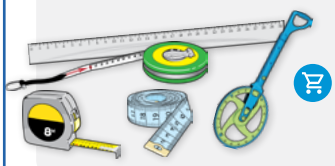
Length	mm, m, km, cm
Mass	g, kg
Capacity	mL, L

TIP

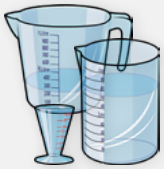
- The elaborations mention the SI (or metric) units.

MANIPULATIVES

Length Measures



Capacity Measures



Scales (Marked)

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◂ Linked to Year 4: AC9M4M01

Linked to Year 6: AC9M6M01 ▸

AC9M 5M02

Measurement ▸ Perimeter and Area

A.C. VERSION 9 SAYS:

Solve practical problems involving the perimeter and area of regular and irregular shapes using appropriate metric units.

WHAT THIS MEANS

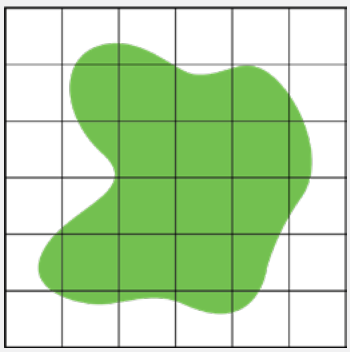
Calculating perimeter and working out the approximate area of shapes.

- Formulas are not mentioned.
- Perimeter is found by adding lengths.
- Area is found by direct measurement, that is placing squares on top of shapes to determine the area.

TIPS

- No further reference to perimeter is made in Year 6.
- When counting squares to determine area count any half squares or larger. Do not worry about the rest.

String can be placed around irregular shapes to determine the perimeter.



◂ Linked to Year 4: AC9M4M02

Linked to Year 6: AC9M6M02 ▸

AC9M 5M03

Measurement ▸ Time

A.C. VERSION 9 SAYS:

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

TIP

- Students will need to be clear about whether the time is morning or afternoon, that is, am or pm.
- Calculations of time differences can be quite difficult because of the non-decimal nature of time.

WHAT THIS MEANS

Converting between 12- and 24-hour time (analog and digital).

- This is the first mention of 24-hour time.

◂ Linked to Year 4: AC9M4M03

Linked to Year 6: AC9M6M03 ▸

AC9M 5M04

Measurement ▸ Angle

A.C. VERSION 9 SAYS:

Estimate, construct and measure angles in degrees, using appropriate tools including a protractor, and relate these measures to angle names.

TIP

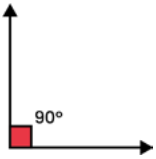
- Students need to know benchmark angles of 90, 180 and 360 degrees.
- Use a full 360 degree protractor rather than the 180 degree half protractor. There will be less problems mistaking 60 degrees for 120 degrees.

WHAT THIS MEANS

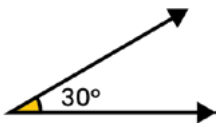
Use angle language, such as **acute**, **right** and **obtuse** when talking about angles. Make and measure angles using a ruler and protractor.

- This is the first mention of protractors.

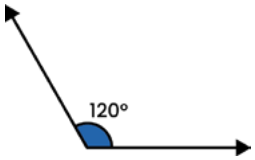
Right angle: (90°)



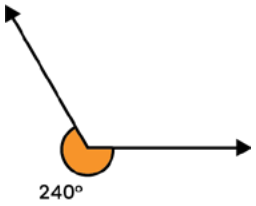
Acute angle: (under 90°)

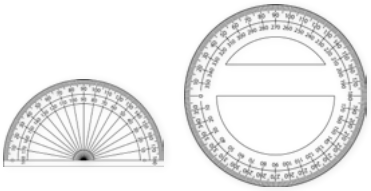


Obtuse angle: (>90° and <180°)



Reflex angle: (more than 90°)





◂ Linked to Year 4: AC9M4M04

Linked to Year 6: AC9M6M04 ▸

AC9M 5SP01

Space ▸ 2D / 3D

website

A.C. VERSION 9 SAYS:

Connect objects to their nets and build objects from their nets using spatial and geometric reasoning.

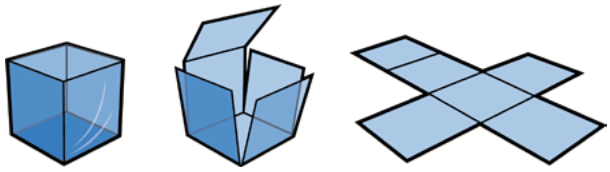
TIP

- Break down 3D objects (boxes) to understand the net, then make your own nets and try folding them to form 3D objects.

WHAT THIS MEANS

Link 2D nets to associated 3D objects.

- This is the first mention of nets.
- A net is a flat 2D shape that may be folded to form a 3D object.



- No further mention is made of linking 2D nets to 3D objects in Year 6.

MANIPULATIVES

2D3D Geometric Solids

Mini Geometric Solids

Polydron

***Click the icon or QR to add resources to your cart.*

◂ Linked to Year 4: AC9M4SP01

AC9M 5SP02

Space ▸ Location

website

A.C. VERSION 9 SAYS:

Construct a **grid coordinate** system that uses coordinates to locate positions within a space; use coordinates and directional language to describe position and movement.

WHAT THIS MEANS

Students can make a co-ordinate grid system, read coordinates and use them (e.g., in Battleships). Note: only the first quadrant is used in Year 5.

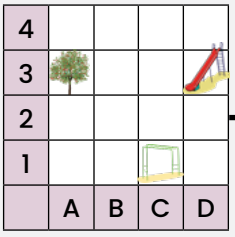
- This is the first mention of a grid coordinate system.
- Grid Coordinates refer to a specific point on a grid.
- Coordinates are read horizontally **(x-axis)** then vertically **(y-axis)**.

RESOURCE

Grid Page Download

YEAR 4

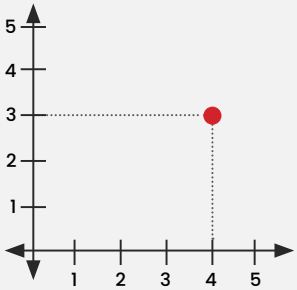
GRID REFERENCE



"The tree is at (A, 3)"

YEAR 5

GRID COORDINATE



"The dot is at (4, 3)"

Grid references refer to the whole space or square on a grid rather than a point / coordinate.

◂ Linked to Year 4: AC9M4SP02

Linked to Year 6: AC9M6SP02 ▸

AC9M 5SP03

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Space ▸ Transformations

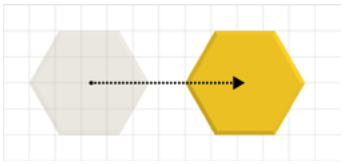
A.C. VERSION 9 SAYS:

Describe and perform translations, reflections and rotations of shapes, using dynamic geometric software where appropriate; recognise what changes and what remains the same, and identify any symmetries.

WHAT THIS MEANS

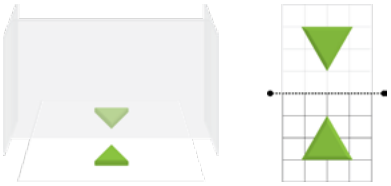
Students explain how reflections (flips), translations (slides) and rotations (turns) are used to create images.

- Students can draw images by hand or software using a combination of translations (slides), rotations (turns) or reflections (flips).
- Symmetry. Shapes may have no symmetry, line symmetry (single and multiple lines) and rotational symmetry.

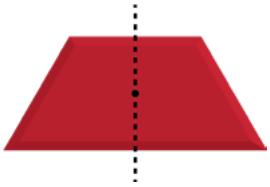


Translate (slide)

Rotate (turn)



Reflect (flip)



Line Symmetry

Rotational Symmetry

RESOURCES & MANIPULATIVES

Pattern Blocks

***Click the icon or QR to add resources to your cart.*

◂ Linked to Year 4: AC9M4SP03

Linked to Year 6: AC9M6SP03 ▸

AC9M 5ST01

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website

Statistics ▸ (1) Gather, (2) Display

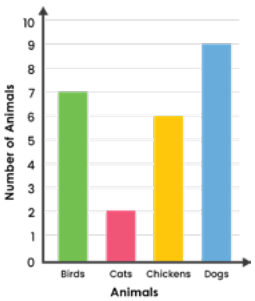
A.C. VERSION 9 SAYS:

Acquire, validate and represent data for **nominal** and **ordinal** categorical and **discrete** numerical variables to address a question of interest or purpose using software including spreadsheets; discuss and report on data distributions in terms of highest frequency (mode) and shape, in the context of the data.

WHAT THIS MEANS

Students collect data involving numbers and analyse it.

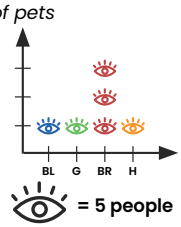
- This is the first mention of the term mode; most commonly occurring type.



The **mode** in this bar graph showing ***types of pets*** is dogs.

Qualitative Data
Categorical

Nominal ✓
descriptive categories
*e.g., eye colour, **types** of pets*

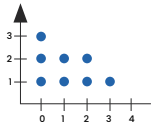


= 5 people

Ordinal ✓
ordered descriptive categories
e.g., product star ratings

Quantitative Data
Numerical

Discrete ✓
countable
*e.g., **number** of pets in the family ("how many families have one/two/three... pets")*



Continuous NOT YET
measured
e.g., height, rainfall

◂ Linked to Year 4: AC9M4ST01

Linked to AC9M5ST01

Linked to Year 6: AC9M6ST01 ▸

AC9M 5ST02

Statistics ▸ (3) Communicate

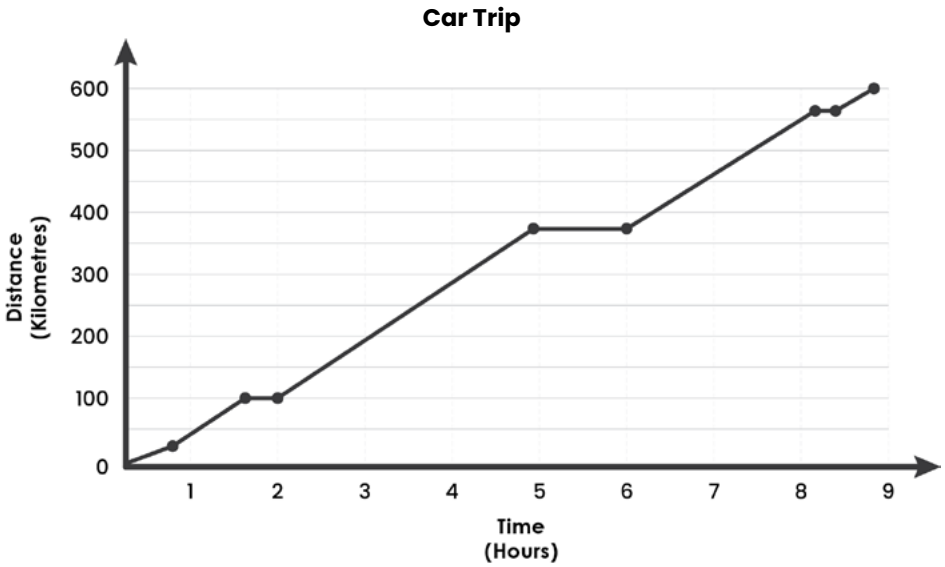
website

A.C. VERSION 9 SAYS:

Interpret line graphs representing change over time; discuss the relationships that are represented and conclusions that can be made.

WHAT THIS MEANS

- Draw conclusions from data depicted in line graphs.
- This is the first mention of line graphs.
- Typically line graphs are used to display continuous (measured data). The ones mentioned here relate to changes over time. The horizontal axis could show years, months days, hours, etc. The vertical axis would involve numbers, e.g., dollars, measurements, etc.



◂ Linked to Year 4: AC9M4ST02

Linked to AC9M5ST02

AC9M 5ST03

Statistics ▸ (1) Gather, (2) Display, (3) Communicate

website

A.C. VERSION 9 SAYS:

Plan and conduct statistical investigations by posing questions or identifying a problem and collecting relevant data; choose appropriate displays and interpret the data; communicate findings within the context of the investigation.

RESOURCE

ACARA's Statistical Investigation Process Poster

WHAT THIS MEANS

Creating questions that may be answered by collecting data, then using graphs and tables to communicate findings.

(1) Gather the data, (2) display the data using tables and graphs and (3) interpret and communicate the data.

- When formulating questions students need to consider whether the question can be misinterpreted or contains bias.

LINKING ST01, ST02 AND ST03

Elements of statistics this year:

(1) GATHER Ask a question → **(2) DISPLAY** Table, Graph → **(3) INTERPRET & COMMUNICATE**

◂ Linked to Year 4: AC9M4ST03

Linked to AC9M5ST03

Linked to Year 6: AC9M6ST03 ▸

AC9M 5P01

Probability ▸ Language

A.C. VERSION 9 SAYS:

List the possible outcomes of chance experiments involving equally likely outcomes and compare to those which are not equally likely.

WHAT THIS MEANS

Think about the possibilities and make predictions before trying chance experiments and try to list them systematically.

- Students may show outcomes with physical materials such as the outcome of flipping two coins. These could then be recorded as HH, HT/TH or TT.

TIP

- Do AC9M5P01 and AC9M5P02 together.

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

The outcomes for rolling two dice could be shown in a table.

RESOURCE

Probability Chance Experiments Upper Primary (Years 5 - 6)

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◂ Linked to Year 4: AC9M4P01 | Linked to AC9M5P02 | Linked to Year 6: AC9M6P01 ▸

AC9M 5P02

Probability ▸ Experiments

A.C. VERSION 9 SAYS:

Conduct repeated chance experiments including those with and without equally likely outcomes, observe and record the results; use frequency to compare outcomes and estimate their likelihoods.

WHAT THIS MEANS

Students perform a variety of chance experiments (e.g., they roll dice, flip coins, draw items out of a hat etc.)

- Prior to conducting the experiment student should have thought about and written down possible outcomes. (AC9M5P01)
- While performing the experiment students record the results. They can then compare their results to their predicted results. They should also compare their results to that of other groups and the combined results of the whole class, giving a larger sample.

TIP

- Do AC9M5P01 and AC9M5P02 together.

***Click the icon or QR to add resources to your cart.*

RESOURCES & MANIPULATIVES

Probability Chance Experiments Upper Primary (Years 5 - 6)

Dice (e.g., six / ten sided dice, pocket dice)

Spinners (round transparent spinners, suction spinners and plastic spinner arrows)

Red / Yellow Two Colour Counters

◂ Linked to Year 4: AC9M4P02 | Linked to AC9M5P01 | Linked to Year 6: AC9M6P02 ▸