Primary Maths 1

Teacher Resource Book

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The *Primary Maths* series

What is *Primary Maths*?

Primary Maths is a unique new series that provides teachers with a complete and comprehensive mathematics teaching and learning program for students in years F to 6. This detailed *Primary Maths Teacher Resource Book* contains the program and acts as a foundation for the busy teacher.

The *Primary Maths* series at each year level includes:

- the *Teacher Resource Book*
- a full-colour *Student Activity Book*
- a *Practice & Homework Book* (except for the Foundation level).

Why was *Primary Maths* developed?

The *Primary Maths* series offers a range of stimulating and challenging activities for all strands, including Number and Algebra, Statistics and Probability, and Measurement and Geometry.

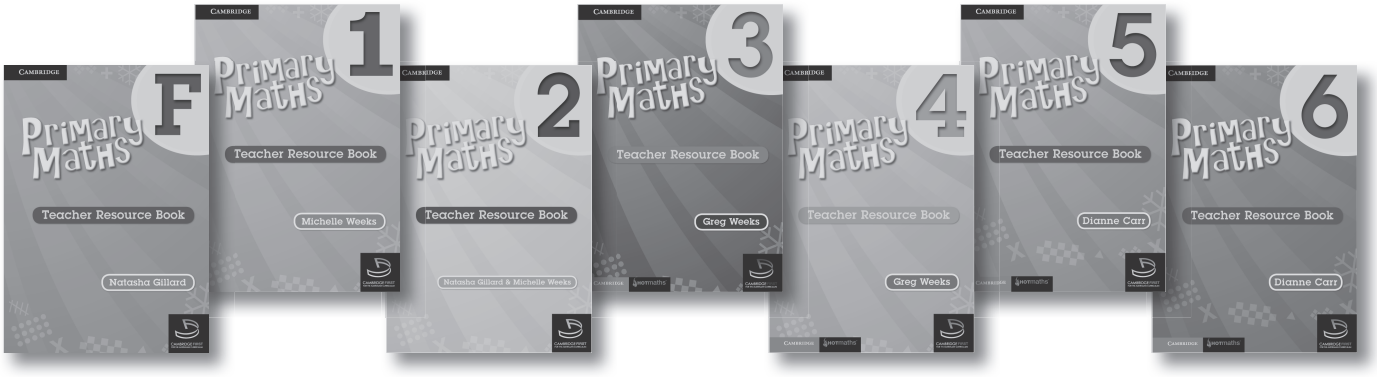
The philosophy upon which *Primary Maths* is based is the idea that students learn most effectively through physical and mental activities related to experiences in their world. The series breathes life into the mathematics curriculum by providing experiences that introduce and consolidate fundamental knowledge, skills and understanding.

Primary Maths is designed as a carefully sequenced program to support teachers in delivering quality mathematics experiences to students. With a suggested teaching sequence and detailed learning activities, it offers teachers full and continuous support.

Ideas on how to introduce and reflect on each lesson, tasks to support learners along the sequence, teaching tips and additional blackline masters and assessment pages are provided.

What do the different components of *Primary Maths* provide?

The *Primary Maths Teacher Resource Book* is the foundation of the series. It contains a yearly program, structured in 36 units of work. It includes weekly plans for teaching and learning, activities linked to assessment, teaching notes, half-yearly and yearly assessments, and blackline master pages.



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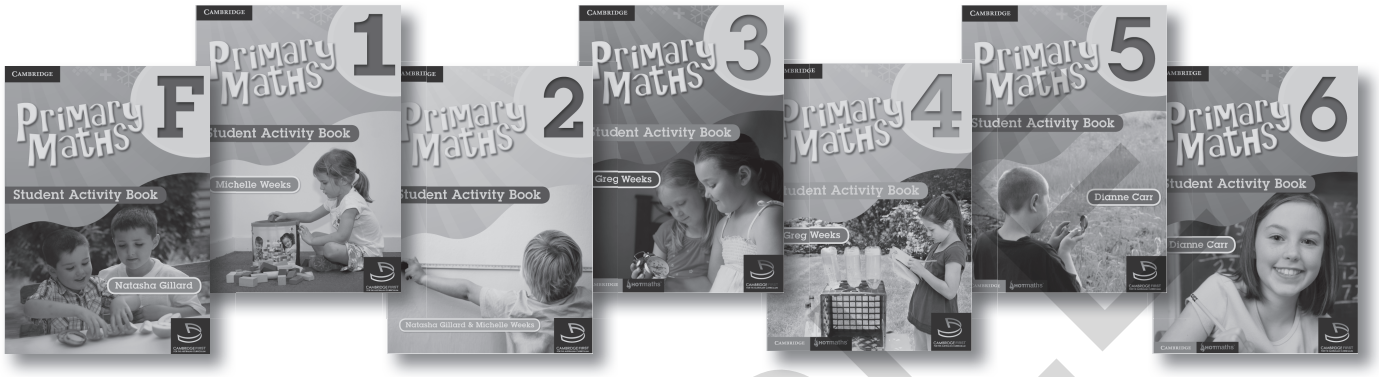
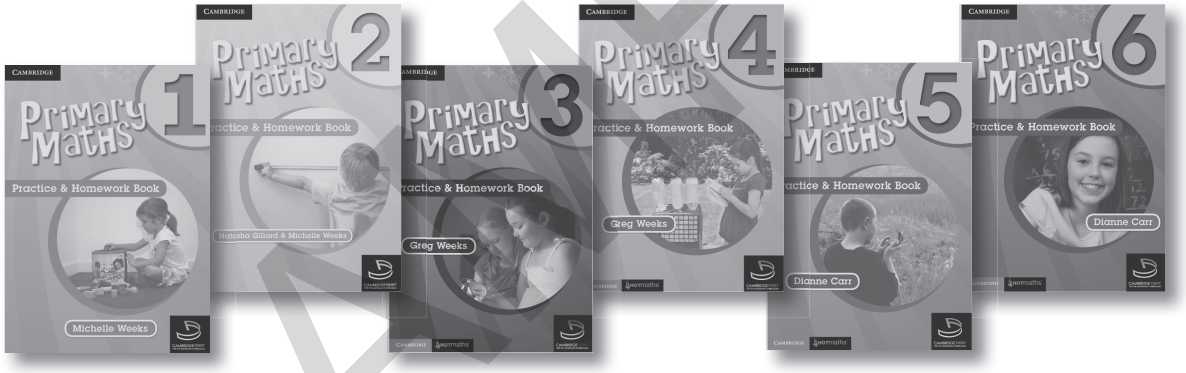
The *Primary Maths Student Activity Book* is filled with relevant, graded activities to motivate learners. Full-colour photos and illustrations link teaching and learning activities to everyday contexts and help to bring the maths curriculum alive. Arranged in strands and substrands, the pages allow for flexibility and for students to build on prior knowledge.

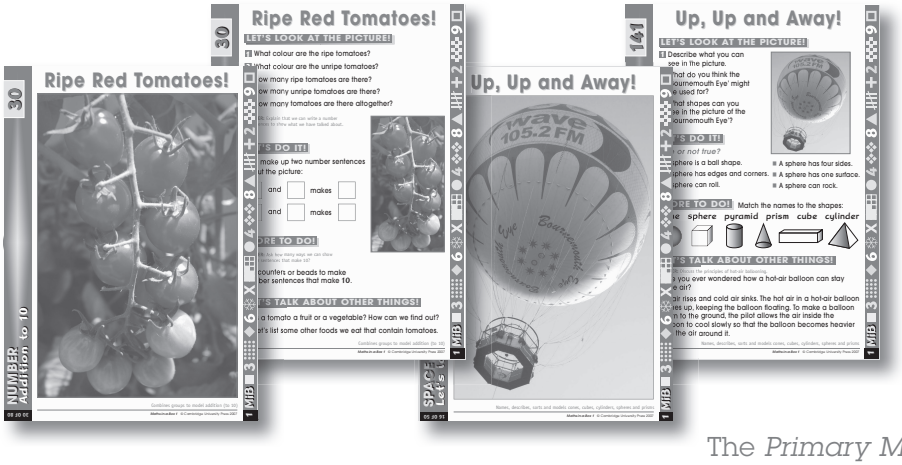


The *Primary Maths Practice & Homework Book* contains 36 double-page units of work that complement the *Student Activity Book*. It can be used for homework or to provide extra practice in the classroom.



Primary Maths includes links to relevant Cambridge HOTmaths lessons and activities. Cambridge HOTmaths is a comprehensive mathematics learning system – an interactive online maths learning, teaching and assessment resource for students and teachers. Visit the Cambridge HOTmaths website for more information: www.cambridge.edu.au/hotmaths

Primary Maths has also been conveniently referenced to Cambridge *Maths-in-a-Box*, a hands-on teaching resource that brings numeracy alive in the classroom. Each stage of *Maths-in-a-Box* contains 175 full-colour cards that provide additional support and enrichment for a complete classroom program.



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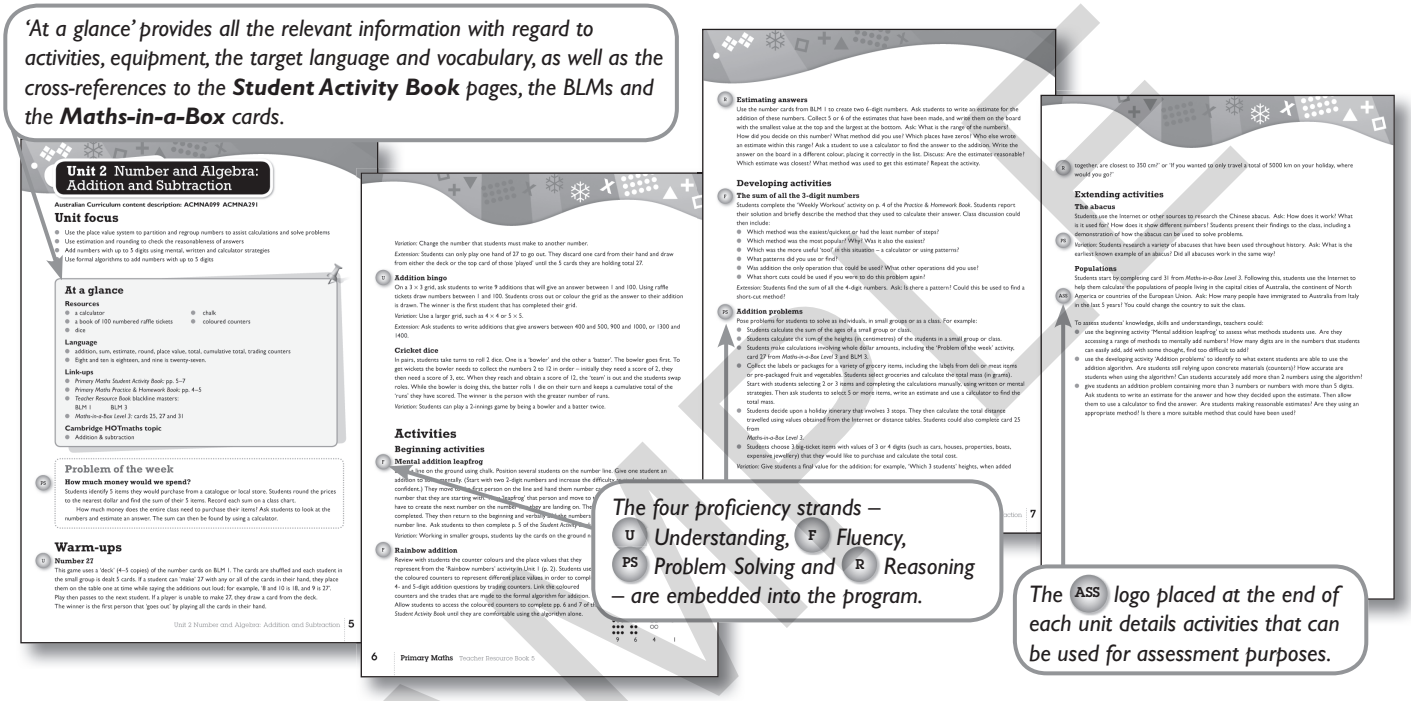
How do I use *Primary Maths*?

The *Primary Maths Teacher Resource Book* is designed to support teachers in delivering a comprehensive mathematics program. Opportunities have been taken to link learning across the substrands where appropriate.

The *Teacher Resource Book* contains a suggested sequence for learning, along with detailed lesson notes. The program includes ideas to introduce and reflect on each lesson and tasks to support learners along the sequence, including additional blackline masters (BLM) and assessment pages.

'At a glance' provides all the relevant information with regard to activities, equipment, the target language and vocabulary, as well as the cross-references to the ***Student Activity Book*** *pages, the BLMs and the* ***Maths-in-a-Box*** *cards.*



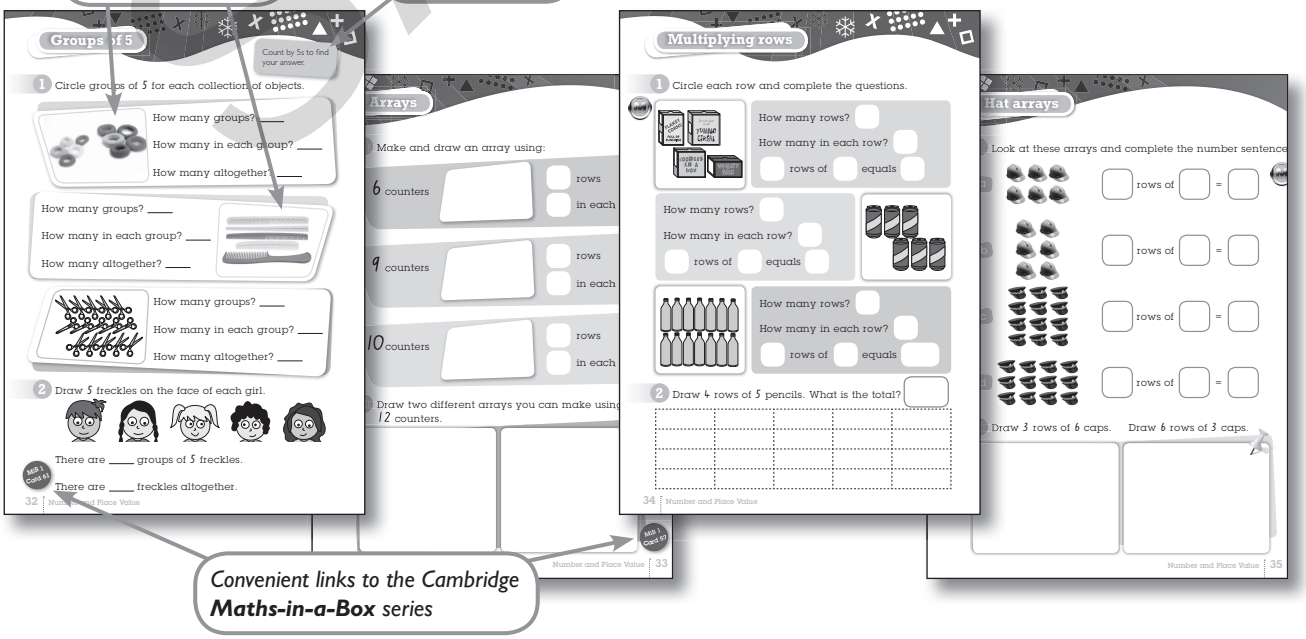
The four proficiency strands – U *Understanding,* F *Fluency,* PS *Problem Solving and* R *Reasoning – are embedded into the program.*

The ASS *logo placed at the end of each unit details activities that can be used for assessment purposes.*

The *Student Activity Book* is filled with interesting activities to motivate learners. Graded activities are presented using photos and illustrations that link to the real world and create interest. Discussion ideas, information boxes and challenge questions ensure that the book caters to students of all aptitudes.

Real-life illustrations and examples

Information box



Convenient links to the Cambridge ***Maths-in-a-Box*** *series*

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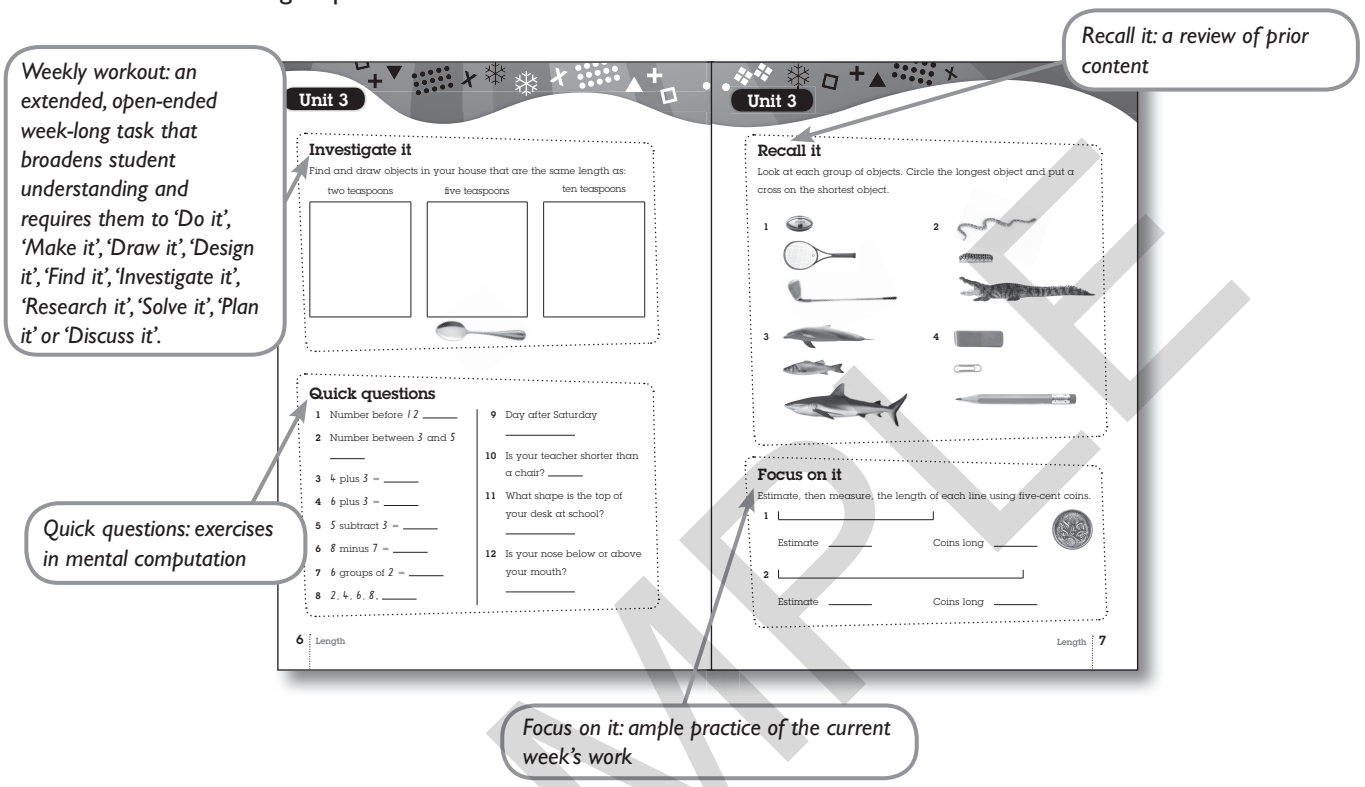
The *Practice & Homework Book* nicely complements the *Student Activity Book*. It provides extra classroom practice and/or homework activities. There are four sections in each of the 36 units, including real-world problems, quick mental questions, revision of prior learning and practice of new concepts. The units closely follow the teaching sequence set out in the *Teacher Resource Book*.



We encourage you to take possession of this program and use it as relevant to the needs of your students and yourself. You may use as much or as little of the wealth of information and ideas presented in this *Teacher Resource Book* as you like.

Ed Lewis and Jim Grant
Consultants

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Introduction

Primary Maths is an all-new series of resources written especially for the year F to 6 Australian Curriculum: Mathematics. It provides an authoritative and practical interpretation of the new content strands, content descriptors, elaborations and achievement standards, building on learning sequences and teaching methods that have been shown to work in the state curricula. *Primary Maths* provides a range of mathematics activities that encourage students to think about situations and problems, to talk to others about their ideas and to develop their own strategies as confident learners.

Mindful that the Australian Curriculum specifies minimum content to be covered, the series includes some topics that are necessary prerequisites for specified content. It also includes logical extensions in a range of topics. The result is a reliable teaching structure and sequence that can be taught confidently with the minimum of preparation. All activities, explanations and exercises have been designed to cater for the full range of ability levels.

Along with the three content strands (Number and Algebra, Measurement and Geometry, and Statistics and Probability), the four proficiency strands are clearly listed and defined within the *Teacher Resource Book*. Although some topics or lessons may lend themselves more closely to one particular proficiency strand, all of the strands play a role in good teaching and learning.

While the proficiency strands are interwoven and interdependent, clearly defining four separate strands helps us to think about what resources we might use in our classes. Creating a lesson plan or set of exercises that takes students along all four strands may take a little thought, but should be simple to put into practice.

As a class teacher, it is worthwhile considering how your lesson plan addresses each of the four proficiency strands. The four proficiency strands are:

Understanding

Students build a robust knowledge of adaptable and transferable mathematical concepts. They make connections between related concepts and progressively apply the familiar to develop new ideas. They develop an understanding of the relationship between the 'why' and the 'how' of mathematics. Students build understanding when they connect related ideas, when they represent concepts in different ways, when they identify commonalities and differences between aspects of content, when they describe their thinking mathematically and when they interpret mathematical information.

At year 1, Understanding includes connecting names, numerals and quantities, and partitioning numbers in various ways.

The appearance of this icon U in the *Teacher Resource Book* indicates that the Understanding proficiency strand is addressed by the activity adjacent to it.

Fluency

Students develop skills in choosing appropriate procedures; carrying out procedures flexibly, accurately, efficiently and appropriately; and readily recalling factual knowledge and concepts. Students are fluent when they calculate answers efficiently, when they recognise robust ways of answering questions, when they choose appropriate methods and approximations, when they recall definitions and regularly use facts, and when they can manipulate expressions and equations to find solutions.

At year 1, Fluency includes counting numbers in sequences readily forwards and backwards, locating numbers on a line, and naming the days of the week.

The appearance of this icon F in the *Teacher Resource Book* indicates that the Fluency proficiency strand is addressed by the activity adjacent to it.

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Problem Solving

Students develop the ability to make choice; interpret, formulate, model and investigate problem situations; and communicate solutions effectively. Students formulate and solve problems when they use mathematics to represent unfamiliar or meaningful situations, when they design investigations and plan their approaches, when they apply their existing strategies to seek solutions, and when they verify that their answers are reasonable.

At year 1, Problem Solving includes using materials to model authentic problems, giving and receiving directions to unfamiliar places, and using familiar counting sequences to solve unfamiliar problems and discussing the reasonableness of the answer.

The appearance of this icon PS in the *Teacher Resource Book* indicates that the Problem Solving proficiency strand is addressed by the activity adjacent to it.

Reasoning

Students develop an increasingly sophisticated capacity for logical thought and actions, such as analysing, proving, evaluating, explaining, inferring, justifying and generalising. Students are reasoning mathematically when they explain their thinking, when they deduce and justify strategies used and conclusions reached, when they adapt the known to the unknown, when they transfer learning from one context to another, when they prove that something is true or false, and when they compare and contrast related ideas and explain their choices.

At year 1, Reasoning includes explaining direct and indirect comparisons of length using uniform informal units, justifying representations of data, and explaining patterns that have been created.

The appearance of this icon R in the *Teacher Resource Book* indicates that the Reasoning proficiency strand is addressed by the activity adjacent to it.

The essential foundations of the *Primary Maths* series are:

- The interconnectedness of the components within each of the three content strands are emphasised and grouped into units of work that can be taught comfortably within a school year.
- All exercises classify questions according to the four proficiency strands of the Australian Curriculum, enabling teachers to easily offer a range of questions that emphasise different proficiencies. As well as the core understanding and fluency skills, much attention has been paid to problem-solving and reasoning questions to promote students' logical and analytical thought processes, enabling them to employ creative mathematical strategies in a wide range of contexts and to achieve a deeper understanding.

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Teaching sequence

Term 1

Unit 1	Unit 2	Unit 3
Number and Place Value **ACMNA012 ACMNA013**	***Addition and Subtraction*** **ACMNA015**	***Length*** **ACMMG019**
• Develop confidence with number sequences to and from 100 by ones from any starting point • Count, order and represent teen numbers • Identify the number before and after the number • Combine materials into tens and ones to show two-digit numbers • Represent numbers to fifty using numerals, words, objects and pictures	• Represent and solve simple addition and subtraction problems using a range of strategies • Use concrete materials to model addition and subtraction • Record number sentences using drawings, numerals, symbols and words	• Measure and compare the lengths of pairs of objects using uniform informal units • Use informal units to estimate and measure length and distance by placing units end to end without any gaps • Record measurements by referring to the number and type of informal units used
Unit 4	**Unit 5**	**Unit 6**
Shape **ACMMG022**	***Area***	***Chance*** **ACMSP024**
• Recognise and classify familiar three-dimensional objects using obvious features • Name, describe, sort and model cones, cylinders, spheres and prisms • Recognise three-dimensional objects in pictures and the environment	• Compare and order two or more areas • Use appropriate informal units to estimate and measure area	• Identify outcomes of familiar events involving chance and describe them using everyday language • Use familiar language to describe chance events • Recognise and describe the element of chance in familiar activities • Justify that some events are certain or impossible
Unit 7	**Unit 8**	**Unit 9**
Mass	***Location and Transformation*** **ACMMG023**	***Addition and Subtraction*** **ACMNA015**
• Estimate, measure, compare and record the masses of two or more objects using informal units • Compare and order the masses of two or more objects by hefting and then checking using an equal arm balance • Record mass by referring to the number and type of informal units used	• Give and follow directions to familiar locations • Describe the position of objects in models, photographs, and drawings • Make simple models from memory, photographs, drawings and descriptions • Describe the path from one location to another on a drawing • Understand the meaning and importance of words such as 'clockwise', 'anticlockwise', 'forward', and 'under' when giving and following instructions	• Represent and solve simple addition and subtraction problems using a range of strategies • Use a range of mental strategies and recording strategies for addition and subtraction, including counting on and back, using number lines • Record number sentences using drawings, numerals, symbols and words • Recognise and use the symbols +, – and =

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Term 2

Unit 10	Unit 11	Unit 12
Number and Place Value **ACMNA012 ACMNA013 ACMNA014**	***Volume and Capacity*** **ACMMG019**	***Multiplication and Division*** **ACMNA012**
• Count collections to 100 by partitioning numbers using place value • Recognise, model, read, write and order numbers to at least 100 • Locate numbers to 100 on a number line • Identify the number before and after the number • Count and represent large sets of objects by systematically grouping in tens • State the place value of digits in two-digit numbers • Use a number line or hundreds chart to assist with counting and ordering	• Measure and compare the capacities of objects using uniform informal units • Use appropriate informal units to estimate and measure volume and capacity • Compare and order the capacities of two or more containers and the volumes of two or more models or objects • Record measurements by referring to the number and type of informal unit used	• Use a range of mental strategies and concrete materials for multiplication and division • Model multiplication as equal groups • Find the total number of objects by rhythmic or skip counting • Describe collections of objects as 'groups of'
Unit 13	**Unit 14**	**Unit 15**
Shape **ACMMG022**	***Addition and Subtraction*** **ACMNA015**	***Length*** **ACMMG019**
• Recognise and classify two-dimensional shapes using obvious features • Manipulate, compare and describe features of two-dimensional shapes • Uses the terms 'sides' and 'corners' to describe features of two-dimensional shapes • Sort two-dimensional shapes by a given attribute • Identify and name hexagons and rhombuses in different orientations, and in pictures and the environment	• Represent and solve simple addition and subtraction problems using a range of strategies • Use a range of mental strategies and recording strategies for addition and subtraction, including counting on and back and using number lines	• Measure and compare the lengths of pairs of objects using uniform informal units • Record measurements of linear dimensions and curves by referring to the number and type of informal units used • Recognise the need for a formal unit to measure lengths or distance • Make and use a tape measure calibrated in informal units
Unit 16	**Unit 17**	**Unit 18**
Fractions and Decimals **ACMNA016**	***Location and Transformation*** **ACMMG023**	***Area***
• Recognise and describe one-half as one of two equal parts of a whole • Model and describe a half or quarter of a whole object • Describe equal parts of a whole • Describe parts of an object as 'about half', 'more than half' or 'less than half'	• Give and follow directions to familiar locations • Use the terms 'left' and 'right' to describe the position of objects in relation to themselves • Understand the people need to give and follow directions to and from a place and this involves turns, directions and distance • Interpret and follow directions around familiar locations	• Estimate, measure and record areas using informal units • Compare and order two or more areas • Use appropriate informal units to estimate and measure area

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Term 3

Unit 19	Unit 20	Unit 21
Time **ACMMG021**	***Number and Place Value*** **ACMNA012 ACMNA013 ACMNA014**	***Addition and Subtraction*** **ACMNA015**
• Describe duration using months, weeks, days and hours • Name and order the months and seasons of the year • Identify the day and date on a calendar • Describe the duration of familiar situations	• Recognise model, read, write and order numbers to at least 100 • Count collections to 100 by partitioning numbers using place value • Order two-digit numbers • Identify the number before and after a number • Combine materials into tens and ones to show two-digit numbers • Model numbers with a range of material and images • Understand two-digit numbers as comprised of tens and one units	• Represent and solve simple addition and subtraction problems using a range of strategies • Combine numbers that add to ten and use this knowledge to bridge to ten • Record number sentences using drawings, numerals, symbols and words • Recognise and use the symbols +, - and = • Rearrange parts to complete addition and subtraction problems
Unit 22	**Unit 23**	**Unit 24**
Shape **ACMMG022**	***Patterns and Algebra*** **ACMNA015 ACMNA018**	***Mass***
• Recognise and classify familiar three-dimensional objects using obvious features • Name, describe, sort and model cones, cylinders, spheres and prisms • Recognise three-dimensional objects in pictures and the environment • Identify and name cones, cubes, spheres and prisms from a collection of everyday objects • Focus on geometric features using everyday words such as 'corners', 'edges' and 'faces'	• Investigate and describe number patterns formed by skip counting and patterns with objects • Use the equals sign to record equivalent number relationships and to mean 'is the same as' rather than as an indication to perform an operation • Builds addition facts to at least 10 by recognising patterns or applying the commutative property • Model and record number patterns for individual numbers by making all possible combinations	• Place two objects on either side of an equal arm balance to obtain a level of balance • Measure the mass of an object by counting the number of informal units needed to balance the object • Records mass by referring to the number and type of informal units used • Understand that in order to compare objects, the unit of measurement must be the same size
Unit 25	**Unit 26**	**Unit 27**
Multiplication and Division	***Fractions and Decimals*** **ACMNA016**	***Shape*** **ACMMG022**
• Use a range of mental strategies and concrete materials for multiplication and division • Model multiplication as equal groups or an array of equal groups • Model division by sharing a collection of objects into equal groups or as equal rows in an array	• Recognise and describe one half as one of two equal parts of a whole • Share a collection of readily available materials into two equal portions	• Recognise and classify familiar two-dimensional shapes using obvious features • Make representations of two-dimensional shapes in different orientations, using drawings and a variety of materials • Use the terms 'sides' and 'corners' to describe features of two-dimensional shapes • Identify and name hexagons, rhombuses and trapeziums presented in different orientations, and in pictures in the environment

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Term 4

Unit 28	Unit 29	Unit 30
Money and Financial Maths **ACMNA017**	***Volume and Capacity*** **ACMMG019**	***Addition and Subtraction*** **ACMNA015**
• Recognise and describe and order Australian coins according to their value • Show that coins are different in other countries by comparing Asian coins to Australian coins • Understand that the value of Australian coins in not related to size • Describe the features of coins and notes that make it possible to identify them	• Measure and compare the capacities of pairs of objects using uniform informal units • Use appropriate informal units to estimate and measure volume and capacity • Compare and order the capacities of two or more containers and the volumes of two or more models or objects • Record measurements by referring to the number and type of informal units used	• Represent and solve simple addition and subtraction problems using a range of strategies • Combine numbers that add to 10 and use this knowledge to bridge to 10 • Record number sentences using drawings, numerals, symbols and words • Recognise and use the symbols +, and = • Solve addition and subtraction problems involving one- and two-digit numbers using concrete materials
Unit 31	**Unit 32**	**Unit 33**
Shape **ACMMG022**	***Data*** **ACMSP262 ACMSP263**	***Time*** **ACMMG020**
• Recognise and classify familiar two-dimensional shapes using obvious features • Join and separate an arrangement of shapes to form new shapes • Identify a line of symmetry on appropriate two-dimensional shapes • Makes symmetrical designs using pattern blocks, drawings and patterns	• Choose simple questions and gather responses • Represent data with objects and drawings where one object or drawing represents one data value • Gather data and keep track of what has been counted by using concrete materials, tally marks, words or symbols • Display data using concrete materials and pictorial representations and one-to-one correspondence • Use a baseline, equal spacing and same sized symbols • Interpret information presented in column graphs and picture graphs • Understand one-to-one correspondence • Determine which question will gather appropriate responses for a simple investigation	• Tell time to the hour and half hour • Read and record hour and half-hour time of digital and analog clocks • Use the terms 'o'clock', 'half past', 'hour' and 'minute' • Read time on analog and digital clocks and observe the characteristics of half-hour times
Unit 34	**Unit 35**	**Unit 36**
Multiplication and Division	***Location and Transformation*** **ACMMG023**	***Multiplication and Division*** **ACMMG015**
• Model multiplication as equal groups or an array of equal groups • Model division by sharing a collection of objects into equal groups or as equal rows in an array • Record multiplication and division problems using drawings, numerals, symbols and words	• Give and follow directions to familiar locations • Describe the position of objects in models, photographs and drawings • Make simple models from memory, photographs, drawings or descriptions • Use the terms 'left' and 'right' to describe the position of objects in relation to themselves	• Find the total number of objects by using repeated addition • Record multiplication and division problems using drawings, numerals, symbols and words

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