AUSTRALIAN
Signpost
MATHS

2

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Australian Signpost Maths 2 (AC V9.0) Suggested Program

Term 1

Page	Unit and Title	Strand	Curriculum Code/s	Curriculum sub-elements
1	Thinking skills	Critical and creative thinking		
2	1A Combinations to 10	Number and algebra	AC9M2N04	Additive strategies
3	1B Subtraction to 10	Number and algebra	AC9M2N04	Additive strategies (subtraction)
4	1C Position words	Space	AC9M2SP02	Positioning and locating
5	1D Modelling Numbers	Number and algebra	AC9M2N01	Number and place value
6	2A Addition	Number and algebra	AC9M2N04, AC9M2A02	Additive strategies (addition)
7	2B Addition to 20	Number and algebra	AC9M2N04, AC9M2A02	Additive strategies (addition)
8	2C Addition to 20	Number and algebra	AC9M2N04	Additive strategies (addition)
9	2D Thinking about graphs	Statistics	AC9M2ST02	Interpreting and representing data
10	3A Doubling and near doubling	Number and algebra	AC9M2N04, AC9M2A02	Additive strategies (addition)
11	3B Sharing	Number and algebra	AC9M2N05	Multiplicative strategies (division)
12	3C Sharing	Number and algebra	AC9M2N05	Multiplicative strategies (division)
13	3D 2D shapes	Space	AC9M2SP01	Understanding geometric properties (2D)
14	4A Subtraction	Number and algebra	AC9M2N04, AC9M2A02	Additive strategies (subtraction)
15	4B Subtraction to 20	Number and algebra	AC9M2N04, AC9M2A02	Additive strategies (subtraction)
16	4C Ordinal numbers and calendars	Measurement	AC9M2M03	Measuring time (time)
17	4D The calendar	Measurement	AC9M2M03	Measuring time (time)
18	5A Addition to 20	Number and algebra	AC9M2N04, AC9M2A02	Additive strategies (addition)
19	5B Addition by looking for tens	Number and algebra	AC9M2N04	Additive strategies (addition)
20	5C Directions	Space	AC9M2SP02	Positioning and locating
Progress test 1				
21	5D Using graphs	Statistics	AC9M2ST02	Interpreting and representing data
22	6A Sharing and grouping	Number and algebra	AC9M2N05	Multiplicative strategies (division)
23	6B Groups and rows	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
24	6C Clocks	Measurement	AC9M2M04	Measuring time (time)
25	6D Analog time	Measurement	AC9M2M04	Measuring time (time)
26	7A Groups and rows	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
27	7B Multiplication	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
28	7C Features of 2D shapes	Space	AC9M2SP01	Understanding geometric properties (2D)
29	7D Drawing 2D shapes	Space	AC9M2SP01	Understanding geometric properties (2D)
30	8A Subtraction to 20	Number and algebra	AC9M2N04, AC9M2A02	Additive strategies (subtraction)
31	8B Differences	Number and algebra	AC9M2N04	Additive strategies (subtraction)
32	8C Lists, graphs and tables	Statistics	AC9M2ST01,AC9M2ST02	Interpreting and representing data
33	8D Comparing masses	Measurement	AC9M2M01	Understanding units of measurement (mass)

Australian Signpost Maths 2 (AC V9.0) Suggested Program

Term 2

Page	Unit and title	Strand	Curriculum Code/s	Curriculum sub-elements
34	9A Linking addition and subtraction	Number and algebra	AC9M2A02, AC9M2N04	Additive strategies / Algebraic thinking (+ and -)
35	9B Linking addition and subtraction	Number and algebra	AC9M2A02, AC9M2N04	Additive strategies / Algebraic thinking (+ and -)
36	9C Informal units of length	Measurement	AC9M2M01	Understanding units of measurement (length)
37	9D Informal units of length	Measurement	AC9M2M01	Understanding units of measurement (length)
38	10A Addition and subtraction facts	Number and algebra	AC9M2N04, AC9M2A02	Additive strategies (addition and subtraction)
39	10B Adding 10s	Number and algebra	AC9M2N04	Additive strategies (addition and subtraction)
40	10C Capacity	Measurement	AC9M2M01	Understanding units of measurement (capacity)
41	10D Ordering capacities	Measurement	AC9M2M01	Understanding units of measurement (capacity)
42	11A How many more?	Number and algebra	AC9M2N04, AC9M2A02	Combining and separating (addition)
43	11B Adding and subtracting 10s	Number and algebra	AC9M2N04	Combining and separating (addition)
44	11C Capacity	Measurement	AC9M2M01	Understanding units of measurement (capacity)
45	11D Using tally marks	Statistics	AC9M2ST01	Interpreting and representing data
46	12A Half of a group	Number and algebra	AC9M2N03	Interpreting fractions
47	12B Halves	Number and algebra	AC9M2N03	Interpreting fractions
Progress test 2				
48	12C Problem solving	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
49	12D Estimating time passed	Measurement	AC9M2M03	Measuring time
50	13A Multiplication sign	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
51	13B Multiplication sign	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
52	13C Multiplication	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
53	13D Patterns	Number and algebra	AC9M2A01	Number patterns and algebraic thinking
54	14A Using arrays	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
55	14B Using rows	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
56	14C Arrays	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
57	14D Money	Number and algebra	AC9M2N04, AC9M2N06	Understanding money
58	15A Using skip counting	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
59	15B Using columns to multiply	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
60	15C x 2, x 10	Number and algebra	AC9M2N03, AC9M2N05	Multiplicative strategies (multiplication)
61	15D Balance scales	Measurement	AC9M2M01	Understanding units of measurement (mass)

Australian Signpost Maths 2 (AC V9.0) Suggested Program

Term 2 cont.

62	16A Numbers to 150	Number and algebra	AC9M2N02	Number and place value
63	16B Numbers to 1000	Number and algebra	AC9M2N02	Number and place value
64	16C Informal units of length	Measurement	AC9M2M01	Understanding units of measurement (length)
65	16D Telling the story from data	Statistics	AC9M2ST01	Interpreting and representing data

Australian Signpost Maths 2 (AC V9.0) Suggested Program

Term 3

Page	Unit and title	Strand	Curriculum Code/s	Curriculum sub-elements
66	17A Numbers to 1000	Number and algebra	AC9M2N01, AC9M2N02	Number and place value
67	17B Numbers to 1000	Number and algebra	AC9M2N01, AC9M2N02	Number and place value
68	17C Inverse operations	Number and algebra	AC9M2N04, AC9M2A02	Additive strategies (addition and subtraction)
69	17D Informal units of length	Measurement	AC9M2M01	Understanding units of measurement (length)
70	18A Numbers to 1000	Number and algebra	AC9M2N01, AC9M2N02	Number and place value
71	18B Numbers to 1000	Number and algebra	AC9M2N01	Number and place value
72	18C Number patterns	Number and algebra	AC9M2N01, AC9M2A01	Counting processes / Number patterns and algebra
73	18D Gathering data	Statistics	AC9M2ST01	Interpreting and representing data
74	19A Number lines	Number and algebra	AC9M2N04, AC9M2N05	Multiplicative and additive strategies
75	19B Related problems	Number and algebra	AC9M2N04	Additive strategies
76	19C Comparing areas	Measurement	AC9M2M01	Understanding units of measurement (area)
77	19D Area	Measurement	AC9M2M01	Understanding units of measurement (area)
78	20A Australian money	Number and algebra	AC9M2N06	Understanding money
79	20B Symmetry	Number and algebra	AC9M1N04, AC9M1A01	Additive strategies / Number patterns and algebraic thinking
80	20C Symmetry	Space	AC9M2SP01	Understanding geometric properties (2D)
81	20D Symmetry in our world	Space	AC9M2SP01	Understanding geometric properties (2D)
82	21A Value of coins	Number and algebra	AC9M2N06	Understanding money
83	21B Value of coins	Number and algebra	AC9M2N06	Understanding money
Progress test 3				
84	21C Numbers	Number and algebra	AC9M2N01, AC9M2N02	Number and place value
85	21D Area using informal units	Measurement	AC9M2M01	Understanding units of measurement (area)
86	22A Amounts to $2	Number and algebra	AC9M2N06	Understanding money
87	22B Using groups	Number and algebra	AC9M2N05	Multiplicative strategies (multiplication)
88	22C Prisms and cylinders	Space	AC9M2SP01	Understanding geometric properties (3D)
89	22D 3D objects	Space	AC9M2SP01	Understanding geometric properties (3D)
90	23A Building to the next 10	Number and algebra	AC9M2N04	Additive strategies (addition)
91	23B Building to the next 10	Number and algebra	AC9M2N04	Additive strategies (addition)
92	23C Angles	Space	AC9M2SP01	Understanding geometric properties (2D)
93	23D Using column graphs	Statistics	AC9M2ST02	Interpreting and representing data

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Term 3 cont.

94	24A Split strategy (addition)	Number and algebra	AC9M2N04	Additive strategies (addition)
95	24B Split strategy (addition)	Number and algebra	AC9M2N04	Additive strategies (addition)
96	24C Ordering masses	Measurement	AC9M2M01	Understanding units of measurement (mass)
97	24D Balance scales	Measurement	AC9M2M01	Understanding units of measurement (mass)
98	25A Building to the next 10	Number and algebra	AC9M2N04	Additive strategies (addition)
99	25B Repeated subtraction	Number and algebra	AC9M2N05	Multiplicative strategies (division)
100	25C Turning a shape	Space	AC9M2M05	Understanding geometric properties
101	25D Turning shapes	Space	AC9M2M05	Understanding geometric properties

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Term 4

Page	Unit and title	Strand	Curriculum Code/s	Curriculum sub-elements
102	26A Division sign	Number and algebra	AC9M2N05	Multiplicative strategies (division)
130	26B Division as repeated subtraction	Number and algebra	AC9M2N05	Multiplicative strategies (division)
104	26C Division as repeated subtraction	Number and algebra	AC9M2N05	Multiplicative strategies (division)
105	26D Making graphs	Statistics	AC9M2ST01, AC9M2ST02	Interpreting and representing data
106	27A Jump strategy (addition)	Number and algebra	AC9M2N04	Additive strategies (addition)
107	27B Jump strategy (subtraction)	Number and algebra	AC9M2N04	Additive strategies (subtraction)
108	27C Giving directions	Space	AC9M2SP02	Positioning and locating
Progress test 4				
109	27D Gather and organise data	Statistics	AC9M2ST01	Interpreting and representing data
110	28A Jump strategy	Number and algebra	AC9M2N04	Additive strategies (addition and subtraction)
111	28B Quarters of a group	Number and algebra	AC9M2N03	Interpreting fractions
112	28C Halves and quarters	Measurement	AC9M2M02, AC9M2N03	Interpreting fractions
113	28D Duration / time lines	Measurement	AC9M2M03, AC9M2ST01	Measuring time
114	29A Fractions of a group	Number and algebra	AC9M2N03	Interpreting fractions
115	29B Halves / quarters	Number and algebra	AC9M2N03	Interpreting fractions
116	29C Duration of time	Measurement	AC9M2M03	Measuring time
117	29D Graphs	Statistics	AC9M2ST02	Interpreting and representing data
118	30A Problem solving	Number and algebra	AC9M2N05, AC9M2N06	Multiplicative strategies (multiplication and division)
119	30B Problem solving	Number and algebra	AC9M2N05, AC9M2N06	Multiplicative strategies (multiplication and division)
120	30C Parallel lines	Space	AC9M2SP01	Understanding geometric properties (2D)
121	30D Following instructions	Space	AC9M2SP02	Positioning and locating
122	31A Doubling and halving	Number and algebra	AC9M2N03, AC9M2N05	Multiplicative strategies (multiplication and division)
123	31B Doubling (2 x) and halving (÷ 2)	Number and algebra	AC9M2N05, AC9M2A03	Multiplicative strategies (multiplication and division)
124	31C Fractions of a whole	Space	AC9M2M02, AC9M2N03	Interpreting fractions
125	31D Calendars	Measurement	AC9M2M03	Measuring time
126	32A Number patterns	Number and algebra	AC9M2A01	Number patterns and algebraic thinking (additive strategies)
127	32B Counting by 10s	Number and algebra	AC9M2A01	Number patterns and algebraic thinking
128	32C Quarter turns	Space	AC9M2M05	Understanding units of measurement
Progress test 5				
129	32D Half and quarter turns	Space	AC9M2SM05	Understanding units of measurement

Australian Signpost Maths 2 (AC V9.0) Curriculum Map

Strand	Code	Descriptor	Australian Signpost Maths 2 Lessons
Number	AC9M2N01	recognise, represent and order numbers to at least 1000 using physical and virtual materials, numerals and number lines	1D Modelling numbers 17A-17B Numbers to 1000 18A-18B Numbers to 1000 18C Number patterns 21C Numbers 25A Rounding to the nearest 100
Number	AC9M2N02	partition, rearrange, regroup and rename two- and three-digit numbers using standard and non-standard groupings; recognise the role of a zero digit in place value notation	16A Numbers to 150 16B Numbers to 1000 17A-17B Numbers to 1000 18A Numbers to 1000 21C Numbers
Number	AC9M2N03	recognise and describe one-half as one of 2 equal parts of a whole and connect halves, quarters and eighths through repeated halving	12A Half of a group 12B Halves 15C x 2, x 10 28B Quarters of a group 28C Halves and quarters 29A Fractions of a group 29B Halves/quarters
Number	AC9M2N04	add and subtract one- and two-digit numbers, representing problems using number sentences, and solve using part part whole reasoning and a variety of calculation	1C Combinations to 10 1B Subtraction to 10 2A Addition 2B-2C Addition to 20 3A Doubling and near doubling 4A Subtraction 4B Subtraction to 20 5A Addition to 20 5B Addition by looking for tens 8A Subtraction to 20 8B Differences 9A-9B Linking addition and subtraction 10A Addition and subtraction facts 10B Adding 10s 11A How many more? 11B Adding and subtracting 10s 17C Inverse operations 19A Number lines 23A-23B Building to the next 10 24A-24B Split strategy (addition) 25B Building to then next 10 27A Jump strategy (addition) 27B Jump strategy (subtraction) 28A Jump strategy 33A Using a strategy 33B Choosing a strategy 34B Inve4rst strategy, subtraction 35C Problem solving with addition
Number	AC9M2N05	multiply and divide one-digit numbers using repeated addition, equal grouping, arrays, and partitioning to support a variety of calculation strategies	3B-3C Sharing 6A Sharing and grouping 6B and 7A Groups and rows 7B Multiplication 12C Problem solving 13A-13B Multiplication sign 13C Multiplication

Australian Signpost Maths 2 (AC V9.0) Curriculum Map

Number	AC9M2N05 cont.	multiply and divide one-digit numbers using repeated addition, equal grouping, arrays, and partitioning to support a variety of calculation strategies	14A Using arrays 14B Using rows 14C Arrays 15A Using skip counting 15B Using columns to multiply 15C x 2, x 10 19A Number lines 22B Using groups 26A The division sign 26B-26C Division as repeated subtraction 30A-30B Problem solving 31A Doubling and halving 31B Multiplication and division facts 34A How many more? 35D Problem solving with groups
Number	AC9M2N06	Use mathematical modelling to solve practical problems involving additive and multiplicative situations, including money transactions; represent situations and choose calculation strategies; interpret and communicate solutions in terms of the situation	14D Money 20A Australian money 21A Value of coins 21B Value of coins 22A Amounts to $2 30A-30B Problem solving 34C Money 35C Problem solving with addition 35D Problem solving with groups
Algebra	AC9M2A01	recognise, describe and create additive patterns that increase or decrease by a constant amount, using numbers, shapes and objects, and identify missing elements in the pattern	13D Patterns 18C Number patterns 19B Related problems 32A Number patterns 32B Counting by tens 34A How many more?
Algebra	AC9M2A02	recall and demonstrate proficiency with addition facts to 20; extend and apply facts to develop related subtraction facts	2A Addition 2B Addition to 20 3A Doubling and near doubling 4A Subtraction 4B Subtraction to 20 5A Addition to 20 8A Subtraction to 20 9A-9B Linking addition and subtraction 10A Addition and subtraction facts 11A How many more? 17C Inverse operations
Algebra	AC9M2A03	recall and demonstrate proficiency with multiplication facts for twos; extend and apply facts to develop the related division facts using doubling and halving	31B Multiplication and division facts
Measurement	AC9M2M01	measure and compare objects based on length, capacity and mass using appropriate uniform informal units and smaller units for accuracy when necessary	8D Comparing masses 9C-9D Informal units of length 10C Capacity 10D Ordering capacities 11C Capacity 15D Balance scales 16C and 17D Informal units of length 19C Comparing areas 19D Area 21D Area using informal units 24C ordering masses 24D Balance scales 34D Comparing objects

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Australian Signpost Maths 2 (AC V9.0) Curriculum Map

Measurement	AC9M2M02	identify common uses and represent halves, quarters and eighths in relation to shapes, objects and events	28C Halves and quarters 28D Duration / time lines 31C Fractions of a whole
Measurement	AC9M2M03	identify the date and determine the number of days between events using calendars	4C Ordinal numbers and calendars 4D The calendar 12D Estimated time passed 29C Duration of time 31D Calendars
Measurement	AC9M2M04	recognise and read the time represented on an analog clock to the hour, half-hour and quarter-hour	6C Clocks 6D Analog time
Measurement	AC9M2M05	identify, describe and demonstrate quarter, half, three-quarter and full measures of turn in everyday situations	25C Turning a shape 25D Turning shapes 32C Quarter turns 32D Half and quarter turns 34D Comparing objects
Space	AC9M2SP01	recognise, compare and classify shapes, referencing the number of sides and using spatial terms such as "opposite", "parallel", "curved" and "straight"	3D 2D shapes 7C Features of 2D shapes 7D Drawing 2D shapes 20B-20C Symmetry 20 D Symmetry in our world 22C Prisms and cylinders 22D 3D objects 23C Angles 25C Turning a shapes 25D Turning shapes 30C Parallel lines 33C Combine and separate shapes 33D 3D objects 35B More shapes
Space	AC9M2SP02	locate positions in two dimensional representations of a familiar space; move positions by following directions and pathways	1C Position words 5C Directions 27C Giving directions 30D Following instructions 35A Giving directions
Statistics	AC9M2ST01	acquire data for categorical variables through surveys, observation, experiment and using digital tools; sort data into relevant categories and display data using lists and tables	8C Lists, graphs and tables 11D Using tally marks 16D Telling the story from data 18D Gathering data 26D Making graphs 27D Gather and organise data 28D Duration / time lines
Statistics	AC9M2ST02	create different graphical representations of data using software where appropriate; compare the different representations, identify and describe common and distinctive features in response to questions	2D Thinking about graphs 5D Using graphs 8C Lists, graphs and tables 23D Using column graphs 26D Making graphs 29D Graphs

Australian Signpost Maths 2 (AC V9.0) Suggested Program

Term 4 cont.

130	33A Using a strategy	Number and algebra	AC9M2N04	Additive strategies (addition and subtraction)
131	33B Choosing a strategy	Number and algebra	AC9M2N04	Additive strategies (addition and subtraction)
132	33C Combine and separate shapes	Space	AC9M2SP01	Understanding geometric properties (2D)
133	33D 3D objects	Space	AC9M2SP01	Understanding geometric properties (3D)
134	34A How many more?	Number and algebra	AC9M2N04	Additive strategies
135	34B Inverse strategy, subtraction	Number and algebra	AC9M2N04	Additive strategies (subtraction)
136	34C Money	Number and algebra	AC9M2N06	Understanding money
137	34D Comparing objects	Measurement	AC9M2M01	Understanding units of measurement (length, area, volume, mass)
138	35A Giving directions	Space	AC9M2SP02	Positioning and locating
139	35B More shapes (extension)	Space	AC9M2SP01	Understanding geometric properties (2D)
140	35C Problem solving with addition	Number and algebra	AC9M2N04, AC9M2N06	Additive strategies (addition)
141	35D Problem solving with groups	Number and algebra	AC9M2N05, AC9M2N06	Multiplicative strategies (multiplication)

What is Australian Signpost Maths?

Australian Signpost Maths is a mathematics program providing direction and support for teaching and learning. The series covers the content and skills presented in the Australian Curriculum (v9) Mathematics F–6.

A Student Book and an online Teacher Resource are provided for Foundation.

For Years 1 to 6, a Student Book, an online Teacher Resource and a Mentals Book are provided for each year level. The online Teacher Resources provide a wealth of support for teachers.

The content has been carefully sequenced within each year level and across the F–6 series to take into account students' expected mathematical development. However, from the rich and varied material provided, teachers can develop individual learning programs to meet the needs of each student.

The Student Books are designed to support explicit teaching methods. Many group activities are provided in Activity, Investigation and Fun spots within the Student Books and the online Teacher Resource.

To maximise the benefits of the program, the Student Book, the online Teacher Resource and the Mentals Book should be used together.

Student Books

Mentals Books

Teacher Resource

This is Australian Signpost Maths.

Structure of Australian Signpost Maths

In the F–2 books, the worksheet pages cover all three elements: Number sense and algebra, Measurement and geometry, and Statistics and probability. These are presented in a recommended order. Each unit of 4 pages usually begins with Number or Algebra. The Contents cross-reference allows teachers to quickly find the pages where each concept has been covered.

Within the program, explicit teaching, critical and creative thinking, language development and identification and treatment of weaknesses are given high priority.

Identification and addressing areas of need

Five progress tests are designed to identify each student's areas of need, and the follow-up program after each of the tests is designed to address these needs. A reference to the relevant worksheet page is given for each test question. A remediation record page is used to track the student's progress.

These testing resources can be found in the online Teacher Resource.

Parallel progress retests are provided for further testing after remediation has taken place. See pages 142 and 143 of this book for more information.
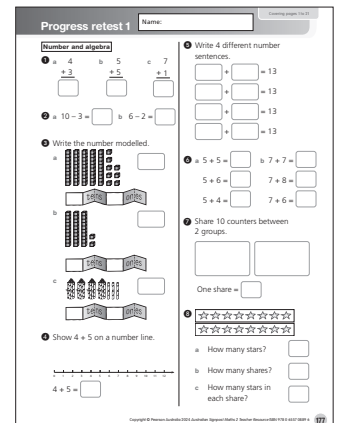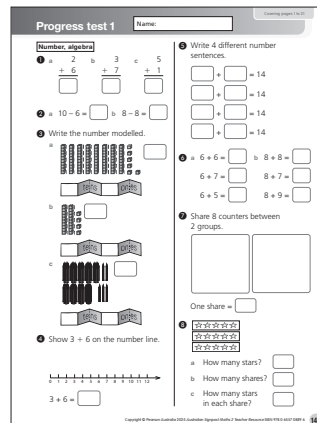
Special features of Australian Signpost Maths

● **The traffic light icons**

These are found on the top right of each worksheet page in the Student Books. They allow students to assess their own progress and give feedback to the teacher.

● ☐ **Green:** I found this work easy.

● ☐ **Orange:** I found some work on the page difficult.

● ☐ **Red:** I don't understand the work on this page.

● **Dictionary**

Terms used in the Student Book and terms that should be understood at this level are recorded here to provide a reference for students and teachers. This is found on pages xiii–xviii of this book.

● **ID cards (Years 1 to 6)**

These cards review the language of Mathematics by asking students to identify common terms, shapes and symbols. They are designed to be reused and are found in the online Teacher Resource and in the front of the Mentals Books.

● **Progress tests**

These allow the teacher to identify each student's strengths and needs. Cross-references for each question direct teachers and students to the pages where that work is introduced. Tables are provided to record the follow-up that takes place and parallel tests are provided for retesting. These tests can be found in the online Teacher Resource.

● **Year 2 Consolidation booklet**

This 32 page booklet is found in the online Teacher Resource. It is designed to reinforce work completed in class and provides practice of important skills and addition and subtraction facts. The booklet can be used when there is limited supervision or when a student finishes classwork early.

● **Answers**

These are supplied in the online Teacher Resource.

● **Blackline masters (BLM)**

References are made to the blackline masters in the teaching suggestions provided for each student work page.

● **Differentiation**

Each student work page has a Teacher Resource page to support it. Cross-references direct the teacher to pages where the concept is introduced and developed. These references may be from the Student Book for the previous year, the current year or the next year.

The Teacher Resource support pages provide additional learning activities for students who need remediation or extension activities. The blackline masters provide activities to support students of various learning abilities.

● **Cartoons**

Cartoons are used to motivate and instruct.

Learn more at pearson.com.au/asm
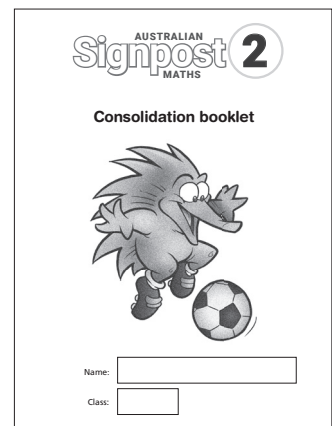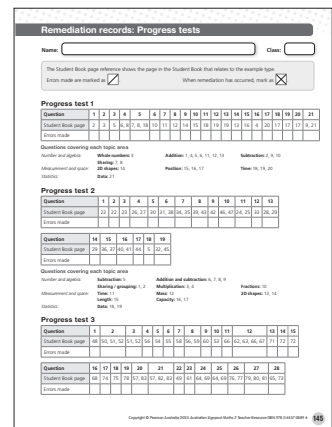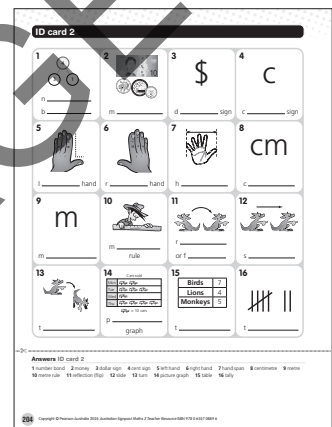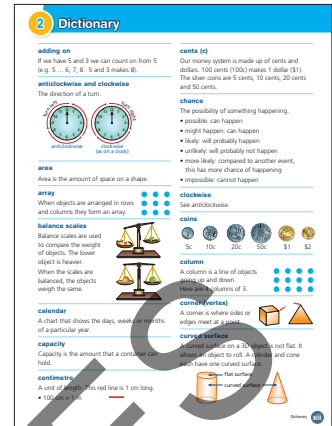
Australian Signpost Maths icons

Signpost icons are used throughout the book as cues to the essential nature of exercises and activities, and as a guide to ways of engaging with them. These icons often indicate alternative or more concrete approaches to dealing with concepts.

CONCEPT This icon highlights **important rules and concepts** occurring throughout the book. It often appears with worked examples.

INVESTIGATION Investigations allow students to **explore and discover** maths concepts.

ACTIVITY Activities provide **applications and enrichment**. These activities usually involve the use of concrete materials and partner or group work.

I'm on the top of each page.

FUN SPOT These enjoyable activities are used to **motivate and involve** students in mathematical pursuits. They usually involve games and puzzles.

Structure of the Australian Curriculum, F–6 (v9)

Numeracy elements
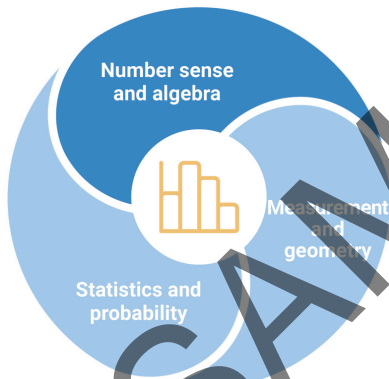
Number sense and algebra

Measurement and geometry

Statistics and probability

Curriculum content is organised under 6 interrelated strands: Number, Algebra, Measurement, Space, Statistics and Probability.

Sub-elements for Number sense and algebra

| Number and place value | Counting processes | Additive strategies |

| Multiplicative strategies | Interpreting fractions |

| Number patterns and algebraic thinking | Understanding money |

Sub-elements for Measurement and geometry

| Understanding units of measurement | Understanding geometric properties |

| Positioning and locating | Measuring time |

Sub-elements for Statistics and probability

| Understanding chance | Interpreting and representing data |

The Curriculum strives to develop in students proficiency in Mathematics, highlighting Understanding, Fluency, Reasoning and Problem solving.

Mathematics content of the Australian Curriculum

- It is important that you download the GENERAL CAPABILITIES document from 'Downloads' in the top navigation bar of the website homepage. It contains the tables that list the progression level expectations for each year, F to 10. It also provides the content of all progression levels.

- The LEARNING AREAS download gives a summary of Content descriptions and Elaborations. CROSS-CURRICULUM PRIORITIES can also be found there.

13 − 7

7 plus what equals 13?

7	?
13	

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
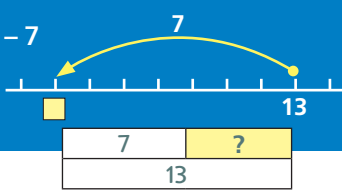
1 Complete these by counting on or counting back.

a

10− : 0 7 3 8 9 5 4 2 6 1

b

13− : 1 6 0 3 4 5 7 9 2 8

c

12− : 1 9 5 2 8 6 0 4 7 3
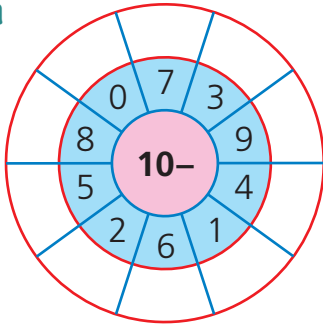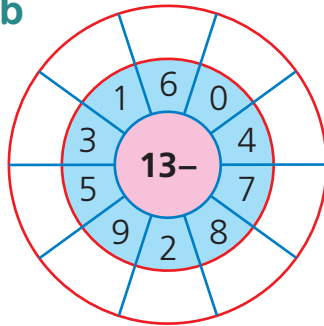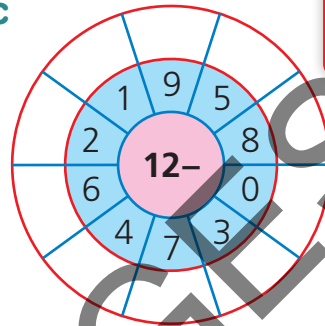
Subtracting zero is easy. 10 − 0 = 10
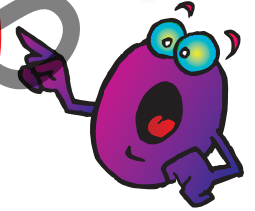
2 Colour the boxes. 10 = red, 9 = blue, 8 = green, 7 = yellow

14 − 4	13 − 4	9 − 2	13 − 6	11 − 4	16 − 7	20 − 10
12 − 3	15 − 5	14 − 5	12 − 5	15 − 6	19 − 9	17 − 8
11 − 3	12 − 4	16 − 6	19 − 10	18 − 8	14 − 6	16 − 8
8 − 1	15 − 7	18 − 9	17 − 7	11 − 2	10 − 3	13 − 5

3 Use this code to find the message.

A	E	H	I	K	L	M	S	T
8	6	2	3	9	4	5	7	10

10 − 7 = ☐

Ask:
7 plus what makes 10?

7 + ☐ = 10

Message:

10−7	12−8	9−6	11−2	10−4
☐	☐	☐	☐	☐

8−3	9−1	10−0	7−5	9−2
☐	☐	☐	☐	☐

FUN SPOT

Make a message of your own using the code.

The difference between 3 and 7 is the same as between 5 and 9.

$$7 - 3 = 9 - 5$$

CONCEPT
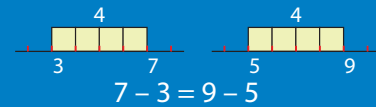
A Is the difference between 11 and 6 the same as between 8 and 3? **yes**

$$11 - 6 = 5$$

$$8 - 3 = 5$$

$$11 - 6 = 8 - 3$$
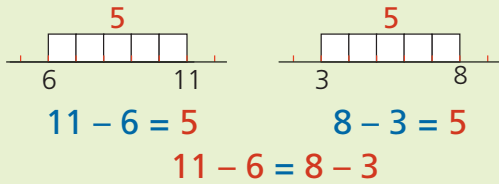
B **Finding the difference**
The difference between 9 and 2 = **7**

1
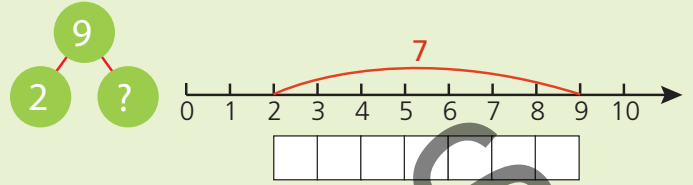
a The difference between 10 and 6 = ☐.

b The difference between 15 and 8 = ☐.

c The difference between 12 and 6 = ☐.

2 14 – 8 is the difference between 8 and 14.

$$2 + 5 = 7 \text{ so}$$
$$14 - 8 = 7$$
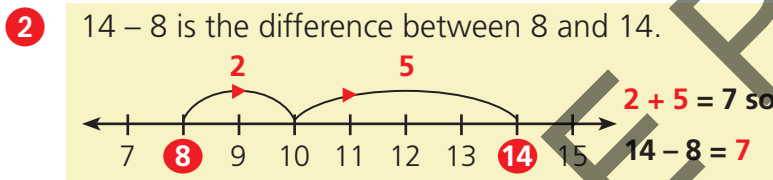
a Is the difference between 7 and 4 the same as between 17 and 14? ☐

b Is the difference between 8 and 5 the same as between 16 and 13? ☐

c Is the difference between 12 and 8 the same as between 11 and 5? ☐

3 Fill in the diagram using addition facts.

15 – 7 Ask: What adds to 7 to give 15? $15 - 7 = (15 - 5) - 2 = 8$

less than compare difference between minus take away

12 + ☐
5 + ☐
9 + ☐
8 + ☐
10 + ☐
15
7 + ☐
11 + ☐
6 + ☐

4 + ☐
11 + ☐
9 + ☐
7 + ☐
6 + ☐
14
8 + ☐
5 + ☐
10 + ☐

8C Lists, graphs and tables
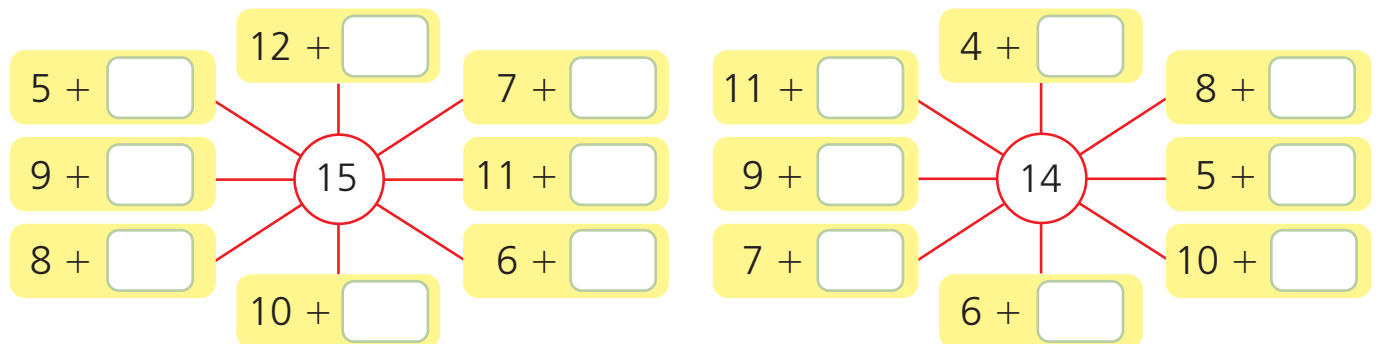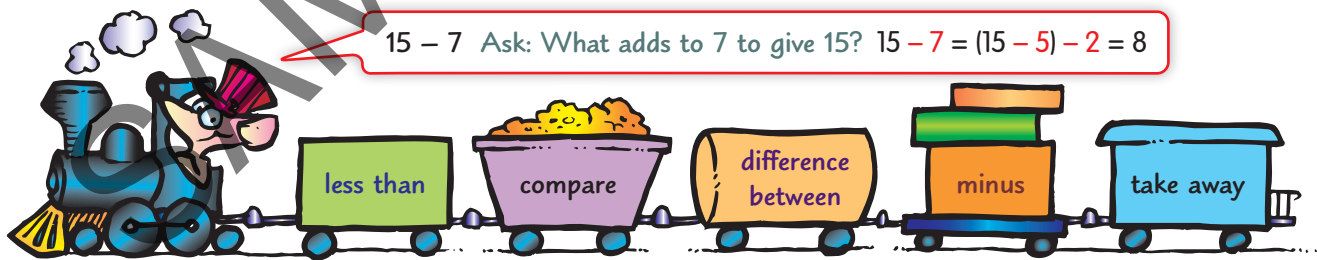
Displaying information

We can show data using objects, pictures, words or symbols.
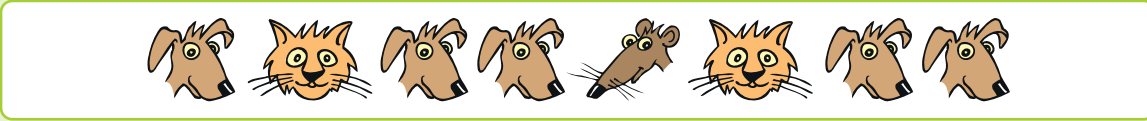
Table	
Pet	**Number**
Cat	2
Dog	5
Rat	1

We might ask why there were only 8 pets.

Graph: Class pets
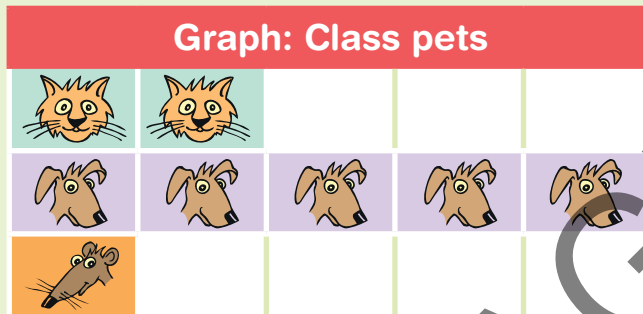
List

Dog, Cat, Dog, Dog, Rat, Cat, Dog, Dog

Use the data above to answer these questions.

a How many cats? ☐

b How many more dogs than cats? ☐

---

1 Students were asked which animal they liked best out of **elephant**, **lion** and **monkey**. Use the list to finish the graph and table.

List

Monkey, Lion, Lion, Monkey, Elephant, Lion, Monkey, Elephant, Elephant, Elephant, Lion, Elephant, Monkey, Elephant, Monkey

Animals chosen

Animal	Number
Elephant	
Lion	
Monkey	

Discuss the results. Could some students have a different favourite?
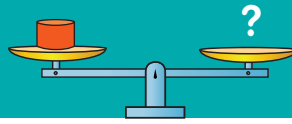
Why would I need more ones blocks than marbles?

ACTIVITY

1 **a** Handle two objects like these and **estimate** which one is heavier.

I estimate the [   ] to be

heavier than the [   ].

pencil case   lunch box

b Use marbles and a balance scale to find the mass of each object.

The [   ] has a mass equal to [   ] marbles.

The [   ] has a mass equal to [   ] marbles.

2 Choose three pairs of objects in the classroom.

- Estimate which object is heavier in each pair by hefting.
- Check by using a balance scale and marbles.
- Complete this chart.
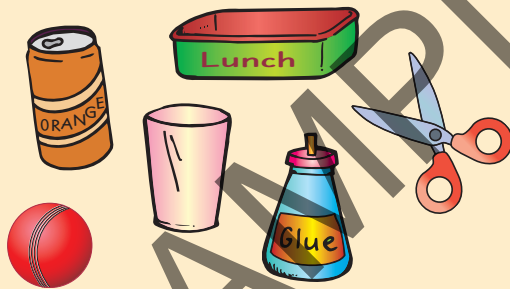
Estimate by hefting	Number of units	Was your estimate correct?
[ ] is heavier than [ ]	[ ] [ ]	Yes / No
[ ] is heavier than [ ]	[ ] [ ]	Yes / No
[ ] is heavier than [ ]	[ ] [ ]	Yes / No

INVESTIGATION

Estimating mass

Choose two objects. Estimate what their mass would be using marbles. Use a balance scale to measure. How close were your estimates?

Object	Estimate	Real mass	Difference
[ ]	[ ] marbles	[ ] marbles	[ ] marbles
[ ]	[ ] marbles	[ ] marbles	[ ] marbles

9A Linking addition and subtraction

CONCEPT
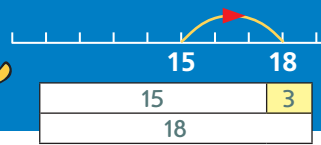
If $8 + 12 = 20$ then $12 + 8 = 20$

$20 - 8 = 12$

$20 - 12 = 8$

8	12
20	

19
13   6

$13 + 6 = 19$

$6 + 13 = 19$

$19 - 6 = 13$

$19 - 13 = 6$

These are linked.

Number line: 8   12   0   8   20

Number line: 13   6   0   13   19
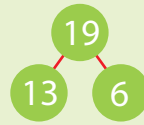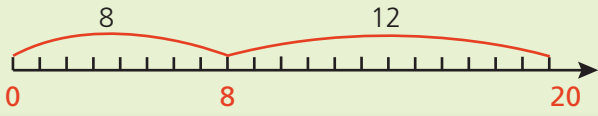
1   **a**   If $7 + 15 = 22$ then $15 + 7 =$ ☐   **b** $9 + 8 =$ ☐

7	15
22	

$22 - 7 =$ ☐

$22 - 15 =$ ☐

$7 + 15 =$ ☐

17
9   8

$8 + 9 =$ ☐

$17 - 9 =$ ☐

$17 - 8 =$ ☐

2   Use the pictures to help fill in the missing numerals.

a

☐ $+$ ☐ $=$ ☐

☐ $+$ ☐ $=$ ☐

☐ $-$ ☐ $=$ ☐

☐ $-$ ☐ $=$ ☐

b

☐ $+$ ☐ $=$ ☐

☐ $+$ ☐ $=$ ☐

☐ $-$ ☐ $=$ ☐

☐ $-$ ☐ $=$ ☐

$7 + 4 = 11$ so $11 - 7 = 4$
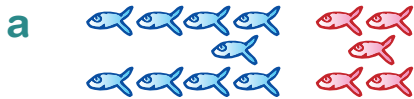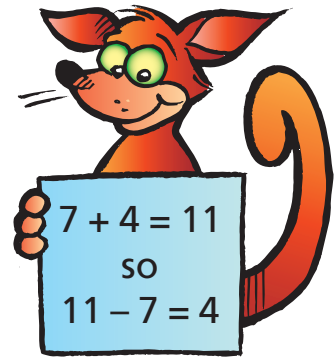
3   Write two addition and two subtraction facts for this picture.

☐ $+$ ☐ $=$ ☐   ☐ $-$ ☐ $=$ ☐

☐ $+$ ☐ $=$ ☐   ☐ $-$ ☐ $=$ ☐

4   Write two addition and two subtraction facts for this picture.

☐ $+$ ☐ $=$ ☐   ☐ $-$ ☐ $=$ ☐

☐ $+$ ☐ $=$ ☐   ☐ $-$ ☐ $=$ ☐

12	8
20	
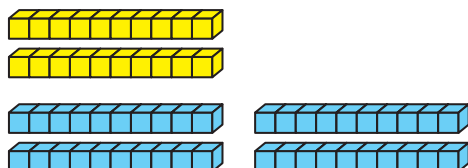
$$6 + 4 = 10$$

so $10 - 6 = 4$ and $10 - 4 = 6$

> Addition and subtraction are linked.

$$12 + 8 = 20 \begin{cases} 20 - 8 = 12 \\ 20 - 12 = 8 \end{cases}$$

1 Write two linking subtraction number sentences for each addition.

a $8 + 7 = 15$

☐ − ☐ = ☐
☐ − ☐ = ☐

b $6 + 8 = 14$

☐ − ☐ = ☐
☐ − ☐ = ☐

c $7 + 5 = 12$

☐ − ☐ = ☐
☐ − ☐ = ☐

d $14 + 6 = 20$

☐ − ☐ = ☐
☐ − ☐ = ☐

e $22 + 9 = 31$

☐ − ☐ = ☐
☐ − ☐ = ☐

f $17 + 9 = 26$

☐ − ☐ = ☐
☐ − ☐ = ☐

FUN SPOT

Make linked number sentences of your own.

☐ + ☐ = ☐   ☐ − ☐ = ☐   ☐ − ☐ = ☐

8 squares long

CONCEPT
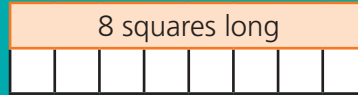
How many times will the width of my finger fit along my pencil?

finger widths

widths

1 Use the different measuring units to find the length of your pencil.

Unit used	Length of your pencil
place-value ones blocks	[ ] blocks
paperclips	[ ] paperclips
finger widths	[ ] finger widths

2 Use hand spans to measure the length of:

		Guess	Check
a	this book		
b	a bag		
c	a window		
d	your arm.		

Order these lengths from shortest to longest.

ACTIVITY

Estimate then measure how many steps from where you are to:

		Guess	Check
a	the school canteen		
b	the lunch seats		
c	the library.		

Each step should be the same length.

Order these distances from shortest to longest.

CONCEPT

1 Use the different measuring units to find the length of your desk.

Unit used	Length of your desk
this book	[ ] books
a pencil	[ ] pencils
finger lengths	[ ] fingers

How many times will my pen fit across my desk?

2 Use your hand span to measure the length of each object.

Your desk	[ ] hand spans
Teacher's desk	[ ] hand spans
Cupboard	[ ] hand spans
Door	[ ] hand spans
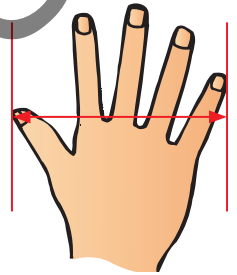
Which is longer?

[ ]

Which is shorter?

[ ]

3 Estimate, then use craft sticks to measure these lengths.
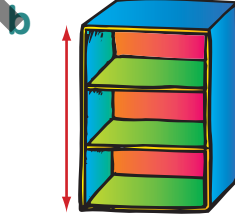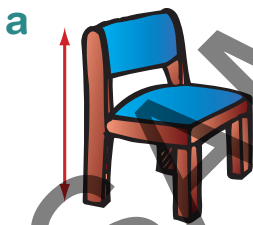
a

Estimate: [ ] sticks

Measure: [ ] sticks

b

Estimate: [ ] sticks

Measure: [ ] sticks

c

cat
1
2
3
4

Estimate: [ ] sticks

Measure: [ ] sticks

ACTIVITY

Use string to compare the length of objects in the room.

[ ] is longer than [ ] .

[ ] is longer than [ ] .

10A Addition and subtraction facts

+ −

Are you a tables champion?

Memorise your addition facts up to 10 + 10.
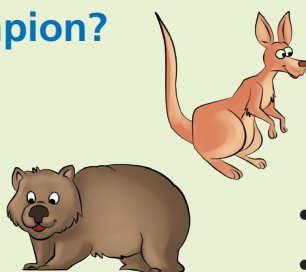
Once you learn your addition tables, use them for subtraction.

CONCEPT

- If 6 + 7 = 13, then 13 − 6 = 7 and 13 − 7 = 6.
- If 8 + 9 = 17, then 17 − 8 = 9 and 17 − 9 = 8.

1 Use a pencil to join each question to the correct answer. You could practise your tables facts by rubbing out your answers and doing them again.

a +

Question	Answer
2 + 6	1
4 + 6	7
0 + 1	8
5 + 7	9
5 + 6	10
0 + 7	11
4 + 5	12
7 + 10	15
8 + 7	17
10 + 10	18
9 + 9	20

Scores:

b +

Question	Answer
2 + 3	4
4 + 3	5
2 + 2	7
5 + 4	9
8 + 5	8
8 + 0	10
7 + 5	11
1 + 9	12
10 + 5	13
6 + 5	15
10 + 9	19

Scores:

c +

Question	Answer
3 + 6	6
2 + 8	7
4 + 2	8
5 + 2	9
4 + 7	10
3 + 5	11
9 + 6	12
6 + 6	13
8 + 8	14
7 + 6	15
10 + 4	16

Scores:

d +

Question	Answer
3 + 4	5
6 + 2	6
4 + 5	7
3 + 2	8
2 + 4	9
8 + 4	10
4 + 9	11
5 + 5	12
4 + 7	13
7 + 8	14
5 + 9	15

Scores:

e −

Question	Answer
8 − 6	1
10 − 4	0
1 − 0	2
12 − 5	4
11 − 6	6
7 − 7	5
9 − 5	7
17 − 7	8
15 − 7	10
11 − 8	9
18 − 9	3

Scores:

f −

Question	Answer
5 − 2	2
7 − 3	3
4 − 2	4
9 − 4	5
13 − 5	0
8 − 8	1
12 − 5	6
10 − 9	7
15 − 5	8
11 − 5	10
19 − 10	9

Scores:

g −

Question	Answer
6 − 4	0
5 − 2	1
10 − 9	2
7 − 7	3
9 − 3	4
7 − 3	5
10 − 3	6
14 − 5	7
9 − 4	8
18 − 8	9
10 − 2	10

Scores:

h −

Question	Answer
6 − 5	0
9 − 9	1
6 − 3	2
8 − 6	3
8 − 4	4
16 − 9	5
9 − 4	6
16 − 7	7
17 − 7	8
10 − 4	9
17 − 9	10

Scores:

$2 + 20 = 22$ $4 + 30 = 34$

CONCEPT

I added each row to my total.

2
12
22

I can use the pattern 2, 12, 22 to add 10s.

1 Write the totals, adding another 10 for each row.

a

b

c

d

e

f

2 Add 20 to each number.

a 3 ☐   **b** 36 ☐   **c** 17 ☐   **d** 52 ☐   **e** 94 ☐

3 Add 30 to each number.

a 1 ☐   **b** 35 ☐   **c** 68 ☐   **d** 19 ☐   **e** 33 ☐

ACTIVITY

Line up place-value blocks to create your own addition of tens pattern.

☐ , ☐ , ☐ , ☐ , ☐ , ☐
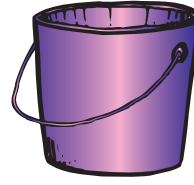
Capacity is how much a container can hold.

1 **a** Use sand or water to pour from one container to another. Order the capacities of containers like these (**L**, **M** and **N**).
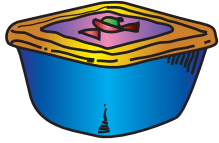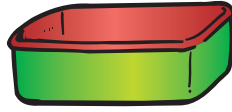
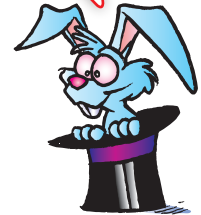**L** container   **M** lunch box   **N** bucket

Holds most: ☐

Holds least: ☐

b Would you use a spoon, a cup or a milk container as the unit to measure the capacities of the containers? ☐ Discuss.

c Use a cup to estimate and measure each container.

Container		Estimate	Count
L		☐ cups	☐ cups
M		☐ cups	☐ cups
N		☐ cups	☐ cups

Use a full cup each time so that each unit is the same.

d The ☐ holds the least and the ☐ holds the most.

Was the cup a good unit to use to measure these containers?

e The bucket holds ☐ more cups than the lunch box.

f The container holds ☐ more cups than the lunch box.

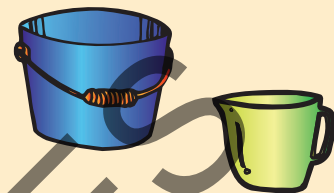**2** Explain what you did to measure the capacity of the bucket.

☐
☐
☐

ACTIVITY

1 Choose sets of three containers and measure the capacity of each. Record your results in the table below.

a

Container	Estimate	Count
	cups	cups
	cups	cups
	cups	cups

Use a full cup each time

b

Container	Estimate	Count
	cups	cups
	cups	cups
	cups	cups

2 Order each set of containers above from "holds least" to "holds most".

a 1 ⬚ 2 ⬚ 3 ⬚

b 1 ⬚ 2 ⬚ 3 ⬚

3 Tina recorded these results. Answer the following questions.

a Which container held 15 cups? ⬚

b Which container held 26 cups? ⬚

c Which container held less than the large pot? ⬚

Container	Number	Comment
large pot	15 cups	2nd largest
bucket	11 cups	holds least
box	26 cups	holds most

d Which container held more than the large pot? ⬚

e Order the containers from smallest to largest.

1 ⬚ 2 ⬚ 3 ⬚

AUSTRALIAN Signpost MATHS

Teacher Resource 2

Alan McSeveny   Rachel McSeveny   Diane McSeveny-Foster

Attributions

Acknowledgement of Country

Pearson respects and honours Aboriginal and Torres Strait Islander Elders past, present and future. We acknowledge the stories, traditions and living cultures of the Traditional Custodians of the lands on which our company is located and where we conduct our business. Pearson is committed to honouring Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to the land, waters and seas and their rich contribution to society.

Aboriginal and Torres Strait Islander peoples are advised that this text may contain images, voices and names of deceased persons.

Contents

SAMPLE PAGES

Learn more at pearson.com.au/asm

N.B. Many of the BLMs can be laminated and used over and over again by students.

Signpost Year 2 Consolidation booklet (separate booklet to download)

N.B. The Consolidation booklet can be used when students finish early or when they have minimal supervision.

About Australian Signpost Maths

Australian Signpost Maths has been written to meet the requirements of the Australian Curriculum (v9) Mathematics F–6.

A Student Book and an online Teacher Resource are provided for the Foundation year. For Years 1–6, a Student Book, an online Teacher Resource and a Mentals Book are provided.

Together these resources provide a complete and fully integrated learning program. The structure of the program supports thorough and imaginative classroom teaching.

Aims of the Signpost Maths series

Our aim is to provide the very best set of resources possible to help students reach their full potential and gain confidence and a love of mathematics.

The Signpost program has been designed to facilitate:

● explicit teaching and a sound foundation of knowledge and skills

● working through carefully sequenced developmental steps in each aspect of the syllabus

● developing concepts by using concrete materials and real-life experiences

● involving students in cooperative group work posing, constructing and solving problems as an integral part of teaching

● developing language and extending vocabulary

● recognising the importance of evaluation and consequent remediation

● extending more capable students

● engaging students with technology as a tool for understanding concepts and developing skills

● motivation of students through creative illustrations and cartoons.

Learn more at pearson.com.au/asm
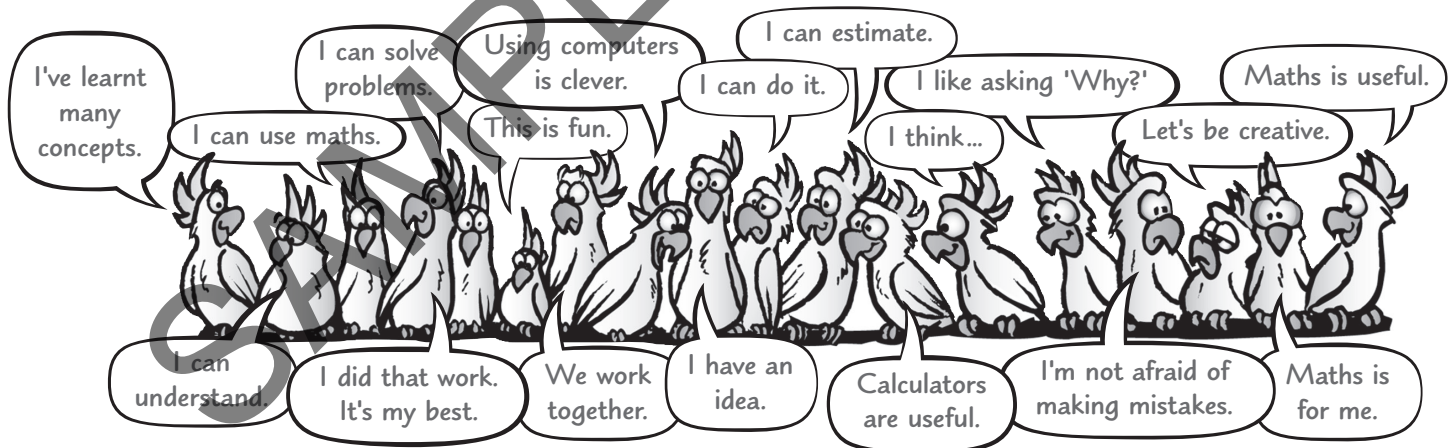
Organisation of the Signpost program

The Student Book and Teacher Resource

In Student Books for Foundation, Year 1 and Year 2, pages are presented in the intended teaching order to allow students to work through the book from the beginning to the end. In Student Books for Years 3 to 6, the pages are organised in sections, reflecting the strands of the syllabus. This allows more teaching flexibility in programming.

Answers

The Answers for Student Book pages are provided on the Teacher Resource pages.

Teacher Resource pages

The Teacher Resource pages provide syllabus references, notes about the student page, additional teaching activities, extension work, language, resources needed, cross-references, evaluation and answers for each page of the Student Book.

Student Book contents

The Year 2 Student Book contents shows the content area of each page as a coloured dot. The Contents included in this Teacher Resource also provides the 'Progression level' and relevant 'Content descriptions' for each Student Book page.

Content cross-reference

This is found on pages xxiii–xxiv of the Teacher Resource and shows the pages of the Student Book that address the important themes of the syllabus. The content cross-reference can be used to construct programs, treat weaknesses after testing and direct students to work that will remediate or extend.

Progress tests and retests

It is essential to identify and treat students' weaknesses, recognise areas where a student's memory is fading and discover concepts missed or not understood. Testing is of great value when you use the test results to help the student master the concepts. Revise / reteach areas of weakness that are discovered to remove barriers to future learning of related concepts.

Progress tests 1 to 5 are found on pages 147–170 and Progress retests are found on pages 174–197 of this resource. After each test, *notes* and *answers* are supplied. Progress test questions are cross-referenced to appropriate Student Book pages. These cross-references are found on the Remediation records pages and on the Notes and answers pages for each test.

The recommended times for administering the Progress tests are found in the Student Book Contents.

The Remediation record pages are used to provide a record of each student's progress. For each error recorded, the question should be explained, practice should occur (using the page given in the Student Book cross-reference) and retesting should take place using the retest question related to the weakness addressed. A checklist of skills for Year 2 is provided on pages 142–144 for teachers who would like to record students' understanding of the syllabus.

Summary

1. Test recent work using the progress tests.
2. Enter mistakes in the *Remediation records*.
3. Use this to direct your revision / reteaching.
4. Use the matching retest questions to ensure understanding.

Dictionary

A dictionary of important mathematical terms is provided at the start of the Student Book.

Blackline masters (BLMs)

A collection of blackline masters is provided within this resource. Advice for the best use of these BLMs is found throughout the Teacher Resource pages.

Signpost Year 2 Consolidation booklet

This booklet is designed to reinforce work completed in class. It provides practice of important skills and addition and subtraction number facts. The booklet can be used when students or the class have limited supervision or when students finish early. It can provide meaningful work and tables review.

Progress tests and retests

Here is an example of a Year 2 Progress test. More information about the Progress tests and retests can be found on page viii of this resource.

Progress test 2

Notes and answers for Progress test 2

Remediation records: Progress tests

Cross-references

Answers

Progress test 2:
Remediation records

Page reference and title is the same as in the Student Book.

The strand and content descriptions for the page are identified with codes linking to the Curriculum website.

The element and sub-element for the page are provided.

Useful information about the student page is given.

Activities, Fun spots and Investigations enrich the learning experience.

More teaching suggestions are given to support the lesson.

The Teacher Resource page number is the same as in the Student Book.

References to blackline materials are provided in teaching context.

Extension work is provided for fast or more capable students.

Recommended language vocabulary for the lesson is given.

Resources for all suggested activities are listed.

Cross-reference allows teachers to easily find other related pages.

The lesson's key ideas are identified for evaluation.

Answers for the Student Book page are provided.

Number

14A Using arrays

Number: AC9M2N05
- multiply and divide by one-digit numbers using repeated addition, equal grouping, arrays, and partitioning to support a variety of calculation strategies

Number sense and algebra: Multiplicative strategies Coordinating composite units (Level **P4**)

About this page
- Finding 'rows of' or 'groups of' is a form of skip counting. 5, 10, 15, 20, 25 … is skip counting by 5 and can be used to find how many objects are in a given number of groups of 5.
- *Header*: Read the definition of an array (objects are lined up into equal rows and columns). Have students make 2 rows of 3 counters and 3 rows of 2 counters. Ensure the rows and columns are lined up. Ask students to find the total in each group.
- *Concept box*: Talk about Felicity's discovery that the trays will look the same if she turns her tray through a quarter turn. Whether 12 objects are arranged in rows or columns, the total remains the same (even if the objects are turned around). On the first tray, students can draw lines in red to separate the rows and lines in green to separate the columns. Conclude that 3 rows of 4 gives the same answer as 4 columns of 3 (or in fact 4 rows of 3, which are shown on the second tray).
- Remind students that 'rows of' can be replaced by the multiplication sign.
- *Question 1*: Ask students to describe each array. Talk about the different ways of recording the diagram (i.e. 2 × 6, 2 rows of 6 and 6 columns of 2). Compare the arrangements in 1a and 1b.
- *Question 2*: To find the answer, we can use either 'rows of' or 'columns of'. Either way, we get the same answer.

Activity
Ask students to make a number of arrays that are equal. Encourage students to describe each array to a friend.

More teaching suggestions
- When skip counting by 2, all answers are even (i.e. the answers end in 2, 4, 6, 8 or 0). When skip counting by 5s: the answers end in 5 or 0. When skip counting by 10s: the answers end in zero. When skip counting by 4s: the answers end in 0, 2, 4, 6 or 8 (an even number).

- Ask students to model skip counting by 2, 3, 4, 5 and 10 using number lines (**BLM 17**). By varying the starting and ending points of the number line, larger numbers can be shown.
- Provide frequent opportunities for students to count by 2s, 3s, 4s, 5s and 10s, using a Number chart (**BLM 43** or **BLM 2**) if necessary.
- Provide opportunities for students to describe and complete patterns made by others.

Extension work
- One student makes an array and describes its features (3 rows of 7 and 7 columns of 3). The second student then makes a different array using the same numbers (7 rows of 3 and 3 columns of 7). Ask them to explain how the two arrays are alike.

Language
arrays, rows of, columns of, multiply, total, the same as, skip counting, count by 2s, 5s, 10s

Resources
- counters, blocks etc.
- BLMs: 2 Number chart, 43 Skip counting / number chart

Cross-reference
See also: pp 56, 58, 59
Year 1 p 82
Year 3 pp 51, 55, 56, 59

Evaluation
Is the student able to do the following?
- use counters to make arrays that are equal
- use arrays to find the total

Answers
1 a 12, 2 rows of 6 = 12, Number of sixes in 12 = 2
  b 12, 6 rows of 2 = 12, Number of twos in 12 = 6
  c 2 rows of 6 is the same as 6 rows of 2. Total = 12
2 a 8, 4 rows of 2 = 8 **b** 8, 2 rows of 4 = 8
  c 4 rows of 2 = 2 rows of 4 **d** 2 × 4 = 4 × 2 = 8

Activity
2 rows of 3 = 6

54 Australian Signpost Maths 2 Teacher Resource

Structure of the Australian Curriculum (v9)

Numeracy elements
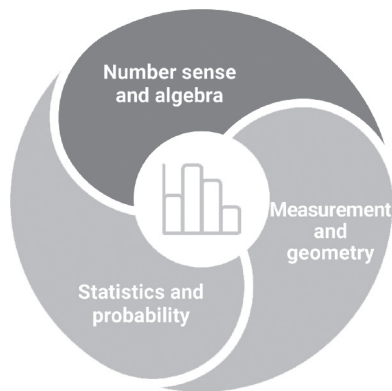
Curriculum content is organised under 6 interrelated strands: Number, Algebra, Measurement, Space, Statistics and Probability.

Sub-elements for Number sense and algebra

| Number and place value | Counting processes | Additive strategies |

| Multiplicative strategies | Interpreting fractions | Proportional thinking |

| Number patterns and algebraic thinking | Understanding money |

Sub-elements for Measurement and geometry

| Understanding units of measurement | Understanding geometric properties |

| Positioning and locating | Measuring time |

Sub-elements for Statistics and probability

| Understanding chance | Interpreting and representing data |

The Curriculum strives to develop in students proficiency in mathematics, highlighting understanding, fluency, reasoning and problem solving.

See the Australian Curriculum website: v9.australiancurriculum.edu.au.

Curriculum structure

"While Literacy and Numeracy are fundamental to all learning areas, Numeracy development is core to the Mathematical curriculum. In addition, the general capabilities of most relevance and application to mathematics are Critical and Creative Thinking, Digital Literacy and Ethical Understanding.

These general capabilities are identified in content descriptions where they are developed or applied through the content. They are also identified in content elaborations where they offer opportunities to add depth and richness to student learning." (Australian Curriculum, Understanding this learning area – Mathematics)

Literacy

- There are three elements under Literacy: Speaking and listening (including three sub-elements), Reading and viewing (including four sub-elements) and Writing (including five sub-elements).

Numeracy

- There are three elements under Numeracy: Number sense and algebra (including eight sub-elements), Measurement and geometry (including four sub-elements) and Statistics and probability (including two sub-elements).

Critical and creative thinking

- These help students inquire about and understand the world around them.
- There are four elements under Critical and creative thinking: Inquiring (including two sub-elements), Generating (including three sub-elements), Analysing (including three sub-elements) and Reflecting (including two sub-elements).

Digital literacy

- There are four elements under Digital literacy: Speaking and listening (including three sub-elements), Investigating (including three sub-elements), Creating and exchanging (including three sub-elements) and Managing and operating (including three sub-elements).

Ethical understanding

● There are two elements under Ethical understanding: Understanding ethical concepts and perspectives (including three sub-elements) and Responding to ethical issues (including three sub-elements).

Mathematics content in the Australian Curriculum

● The recommended progression levels (Year expectations) for each year are presented in tables. The expected progression levels for each sub-element are defined there.

SAMPLE PAGES

Year level expectations

Number sense and algebra

Alignment to AC: Mathematics Year level	Year level										
Sub-element	F	1	2	3	4	5	6	7	8	9	10
	Progression level										
Number and place value	P1–3	P4	P4–5	P6–7	P7–8	P8	P9			P10	
Counting processes	P1–4	P4–6	P6–7		P7–8	P8					
Additive strategies	P1–2	P3–6	P6–7	P8		P8–9	P9	P9–10	P10		
Multiplicative strategies	P1	P2	P3–5	P5	P6–7		P8–9	P9–10	P10		
Interpreting fractions			P1–3	P4–5	P5–6	P6–8	P7–8	P8–9	P9		
Proportional thinking						P1–2	P2	P2–4	P4–5	P6–7	
Number patterns and algebraic thinking	P1–2	P3		P3–4		P5–6		P7–8		P8–9	P9
Understanding money	P1	P1–3	P3	P4	P4–7	P7	P7–8	P8	P8–9	P9–10	P10

Measurement and geometry

Alignment to AC: Mathematics Year level	Year level										
Sub-element	F	1	2	3	4	5	6	7	8	9	10
	Progression level										
Understanding units of measurement	P1–2	P2–3		P4–6	P6	P6–7	P8	P8–9	P9–10		P10
Understanding geometric properties	P1	P2	P3–4		P4		P5	P5–6	P6–7		
Positioning and locating	P1	P2	P2–3	P3	P4	P4–5	P5				
Measuring time	P1	P2		P3	P4	P5	P5–6			P6	P7

Statistics and probability

Alignment to AC: Mathematics Year level	Year level										
Sub-element	F	1	2	3	4	5	6	7	8	9	10
	Progression level										
Understanding chance				P1–3			P4	P5	P6		
Interpreting and representing data	P1	P2	P3	P4		P4–5		P5–6	P7	P8	

Mathematics Content of the Australian Curriculum

Go to v9.australiancurriculum.edu.au and you can find:

1 **Content descriptions** like AC9MFN01.

2 **General capabilities** (found by clicking one of the symbols shown)

3 **Elaborations** which provide teaching suggestions.

It is important that you download the **General Capabilities** document from 'Downloads' in the top navigation bar of the website homepage. It contains the tables above that list the progression level expectations for each Year, F to 10. It also provides the content of all progression levels.

The **Learning Areas** download gives a summary of Content descriptions and Elaborations. **Cross-curriculum priorities** can also be found there.

Mathematics teaching and learning

Group work and language

Group work activities are provided in Activity and Investigation boxes throughout the Student Book. The Teacher Resource pages also provide group work activities under the headings 'More teacher suggestions' and 'Extension work'.

Working together encourages the use of the mathematical language and fosters a love of learning. Students should be given the opportunity to discuss and write about their group work, reflecting on and evaluating tasks completed. Reporting, recording, describing, drawing, manipulating and making models all enhance a student's development of the language and understanding of the mathematical concepts.

Groups can have a mixture of abilities or have students of equal ability levels, with tasks assigned that are adjusted to suit the group's ability level. A task or role can be allocated to each group member to encourage the participation of each student. Ensure that no one student dominates and that less able students are given adequate support and consideration.

Calculators and computers

Most students have access to calculators and computers at home. It is important that the calculator is not used as a replacement for developing skills such as knowledge of addition and multiplication tables.

Motivation and positive attitudes

There is no substitute for good preparation and enthusiasm, but students need motivation to sustain their love of learning. The certificates on p xviii can be used effectively to encourage and reinforce positive attitudes and good work habits. By recognising positive responses in students, each student can be given legitimate praise and a positive teacher–student relationship can be developed. The involvement of parents immediately following the activity will further increase the certificate's value.

Suggestions for using merit certificates

- Write the subject and task for which the certificate is given.
- Sign each certificate.
- Ask students to show the certificate to their parents.
- Allow for parental feedback.
- Keep a record of certificates given.
- During each term ensure that every student receives at least one merit certificate.

Merit certificates are found on page xviii.

Problem solving

Problem solving and modelling are important in encouraging students to experience, test and refine ideas. Through problem solving, students can see mathematics as a vital tool for living in the real world. In Australian Signpost Maths, students are engaged in practical problem solving as well as developing strategies and skills.

Students need to be given opportunities to solve routine and non-routine problems. Routine problems are problems similar to those the students have seen before where they are familiar with the steps needed to solve the problem. Non-routine problems are problems where a method is not immediately obvious to students and they are required to find a way to understand and create their own method to solve the problem.

What is a problem?

A problem is a task, the solution of which is not immediately apparent. Reasoning or pondering is needed. If the method to be used is obvious, solving the problem may be simply an exercise in modelling an operation. Consider the question: 'Tom had twenty frogs. Six got away. How many were left?' For most students this is a simple translation and not a problem that needs reasoning or pondering. However, in Year 2, students may need to ponder the method to be used and resort to using concrete materials to model the problem.

What is modelling?

Modelling is a representation of a concept or problem in order to make it clear. A model will assist in understanding and investigating the problem. Often concrete materials or graphing techniques are used to produce the model. Students will also learn to form mental representations of problems.

Stages in problem solving

The solution of a problem could have four stages.

- Question formulation or review – 'What do we wish to find?' Read and reread the question, underlining the important words.

- Problem solving or investigation and planning – 'What should I do next?'
- Verifying or testing solutions – 'Does this work?'
- Reflecting on or evaluating the process and solution – 'This is how I did it. Is there another way?'

Strategies for problem solving

Students bring to mathematics their own collection of problem-solving strategies and processes. Throughout the Australian Signpost Maths program these increase in number and sophistication. Each year, particular strategies are emphasised.

In Foundation, students are encouraged to work together, to talk about problem situations and to draw pictures. They act out problems using concrete materials and are encouraged to categorise and compare groups, express their ideas verbally and look for patterns.

In early years, these skills are reinforced. Students extend their mathematical language and begin to understand and predict the properties of objects around them.

As problem-solving skills develop, *Draw a diagram* and *Act it out* are the strategies reinforced. A particular *Draw a diagram* strategy is modelled in Year 1 and will continue throughout Years 2 to 6.

6	
8	

This diagram could demonstrate:
- 8 take away what leaves 6?
- 6 and what makes 8?
- How much smaller than 8 is 6?

Other problem-solving strategies include *Look for patterns*; *Trial and error*; *Make a model*; *Make a list*, *chart*, *table or tally*; *Eliminate possibilities*; *Work backwards*; and *Simplify the problem*.

Our aim is not just to get the right answer. Students need confidence in themselves and a willingness to apply their experiences to solving problems. Risk-taking is part of the process. Allow students to use their own methods and have them share these with the class.

Problem solving

Enriching problem solving

Using open-ended problems makes students consider the whole of their mathematical knowledge. As often as possible, challenge students to construct their own questions and pose their own problems. Instead of giving only problems that are clearly defined and have one definitive answer, let students question the question, interpret the direction themselves and involve various strategies in the solution. The responsibility for developing these kinds of problems rests largely with the teacher. However, the examples presented here suggest some possibilities.

Example 1

Sit this family at the table. Dad sits at one end. Tom, Alan and Peter are not allowed to sit beside one another.

Dad	Mum	Lyn	Tom	Alan	Peter
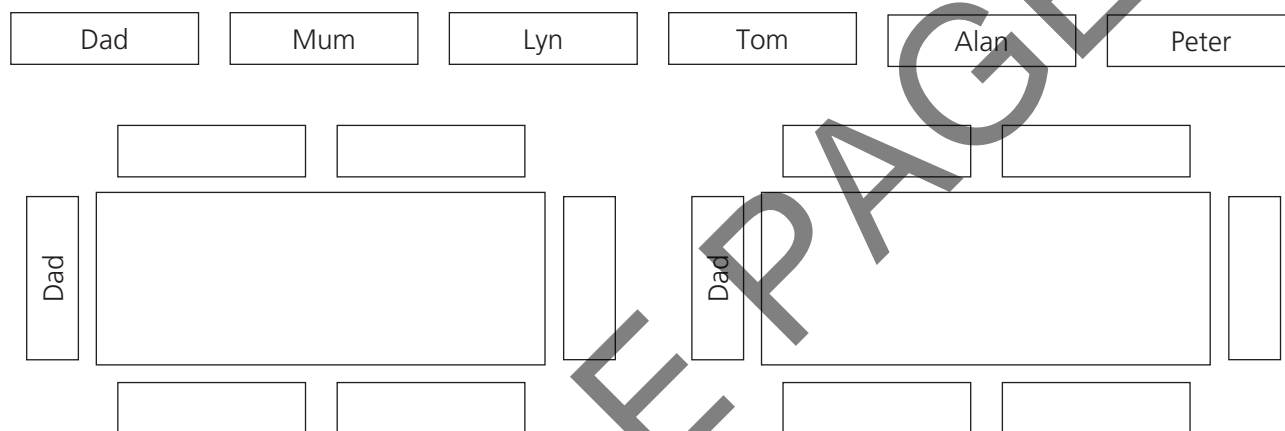
Example 2

In each picture, draw lines to join as many circles as you can without crossing over any other lines that you have drawn. How many lines did you draw?
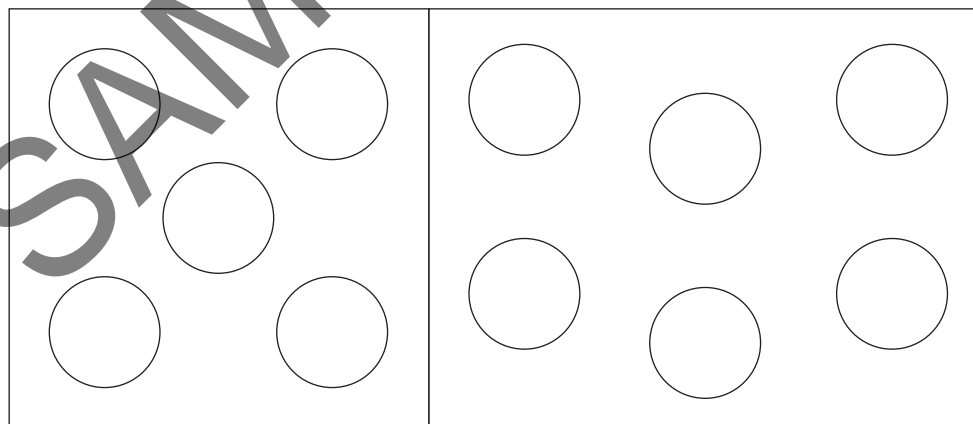
Example 3

Use only four colours to colour each picture. Don't make any two side-by-side parts the same colour.
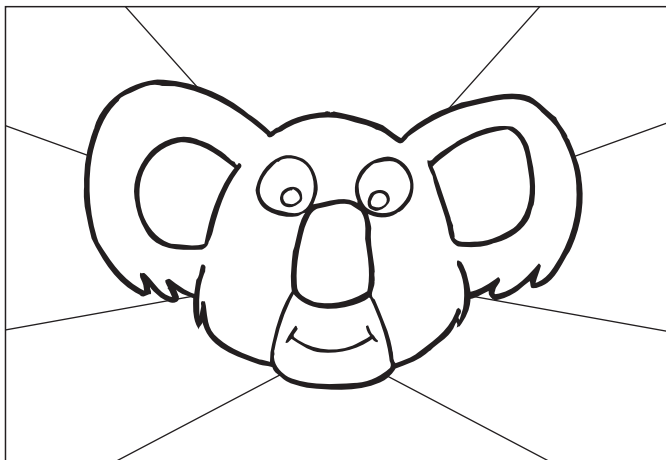
Open-ended problems

Open-ended problems like these examples are very powerful in developing mathematical thinking. They encourage participation, particularly if they are relevant to the students' experiences. Since the students are involved in setting the direction and limits of their own investigations, the problems are a challenge to students of every ability.

- Students have some control over their own learning. The teacher and student can engage in a form of equal dialogue, sharing points of view.
- Students are encouraged to question, discover, analyse, explain, estimate, validate, see alternatives and develop wider perspectives.

Problem-solving summary

- Our approach to problem solving should consider the needs of students, related to culture, gender and intellectual ability.

- We need to impart basic skills and introduce a variety of strategies so that students can gain maximum benefit from solving problems.
- Teaching through problem solving and investigation wherever practical relates the content to real life.
- A balance is needed in the types of problems presented. The traditional problem still has a place and setting out such problems using terms such as 'Find', 'Number sentence', 'Working' and 'Answer' is still relevant.

The ability to pose, construct and solve problems is perhaps the most important mathematical skill we can impart to our students.

8A Subtraction to 20

Number: AC9M2N04
- add and subtract one- and two-digit numbers, representing problems using number sentences, and solve using part-part-whole reasoning and a variety of calculation strategies

Algebra: AC9M2A02
- recall and demonstrate proficiency with addition facts to 20; extend and apply facts to develop related subtraction facts

Number sense and algebra: Additive strategies

Flexible strategies with combinations to 10 (Level **P6**)

About this page
- *Header*: Discuss the diagram and the fact that we can choose from two strategies to find the answer.

  Strategy 1: We can use the number line by starting at 13 and counting back (subtracting) 7 to give the answer 6.

  Strategy 2: We can start at 7 and count on (add 6) until we reach 13. Ultimately students should know their addition facts so well that 7 + 6 = 13 will come to mind and the answer will be obvious. Either strategy will give the correct answer provided the procedure is followed correctly.

- *Question 1*: Remind students that when a number is taken away the answer is less than the number you started with, except when you take away zero, in which case, the number does not change.

- Once students have completed the number webs, they can check their answers by adding the two numbers to ensure they equal the number in the centre (i.e. they total 10, 13 and 12).

- *Question 2*: All boxes will be coloured either red, blue, green or yellow.

- *Question 3*: Some explanation may be necessary to solve the message.

Fun spot
- **1** Students write a simple message involving 9 letters or less using only A, E, H, I, K, L, M, S and T.
- **2** Write the corresponding numbers in the second row.
- **3** Write a number fact above each number in the second row.

More teaching suggestions
- Use concrete materials to model subtraction. Have the students use numeral and symbol cards (**BLM 1**) to record their number sentences.
- Have students make a stack of twenty Unifix cubes. Taking away one cube at a time, they record the subtraction facts using cards (**BLM 1**).

- Place a selection of cards, 1 (Ace) to 10, face down in a pile on the desk. Have students work in groups of 3 and take turns to pick up two cards at a time. The aim is to practise subtraction. Remind students to take the smaller number from the larger number. The student with the most correct number of pairs, that are also even numbers, wins.

- For more capable students, have two different-coloured dice (e.g. red and blue). Roll the (red) die and add 10 to that number, so if a 5 was rolled, 10 would be added to make 15. Roll the (blue) die and take that number away, so if a 6 was rolled, it becomes 15 – 6 = 9. The emphasis is on subtracting mentally. If needed concrete materials or a number line (**BLM 17**) could be used.

- Complete subtraction webs (**BLM 19**) and addition and subtraction facts (**BLM 21**).

- Revise counting backwards using the number chart (**BLM 2**). Vary the starting points.

- Practise subtraction facts (**BLM 41** and **42**).

- Students can practise subtraction by using a double workspace in the Place-value blocks tool. Students should create a value in the upper workspace and model subtraction by taking blocks away from the original number and dragging them to the lower workspace.

- Students can demonstrate subtraction using the Number lines tool. They should extend the line to 20 and place an arc on the starting value and then drag the arrow to the left to model the subtraction. Students should write a number sentence to show what they have created using the text button.

Extension work
- Have students use the code in Question 3 to make more messages using subtraction questions in the top row of diagrams, like the one in the Fun spot.

Language
counting on, counting back, subtraction, difference, more, how many more, remove, take away, left, leaves, what's left, equals, is equal to, code

Resources
- any classroom objects that can be counted (e.g. counters, marbles, shells, buttons, ones blocks)
- red, blue, green and yellow pencils
- dice
- decks of cards
- BLMs: 1 Numeral and symbol cards, 2 Number chart, 5 Word and symbol cards, 17 Number lines, 19 Subtraction webs, 21 Addition and subtraction facts, 41 Subtraction facts to 10, 42 Subtraction facts to 20
- Maths tools: Place-value blocks, Number lines

Cross-reference

Evaluation

Is the student able to do the following?
- use counting on and counting back to solve subtraction problems involving one- and two-digit numbers
- recall related subtraction facts for numbers up to 20

Answers

❶ a   b   c
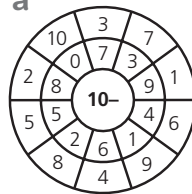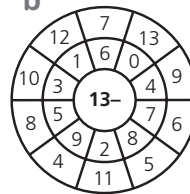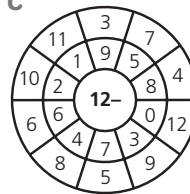
❷ Colour red: $14 - 4$, $20 - 10$, $15 - 5$, $19 - 9$, $16 - 6$, $18 - 8$, $17 - 7$

Colour blue: $13 - 4$, $16 - 7$, $12 - 3$, $14 - 5$, $15 - 6$, $17 - 8$, $19 - 10$, $18 - 9$, $11 - 2$

Colour green: $11 - 3$, $12 - 4$, $14 - 6$, $16 - 8$, $15 - 7$, $13 - 5$

Colour yellow: $9 - 2$, $13 - 6$, $11 - 4$, $12 - 5$, $8 - 1$, $10 - 3$

$10 - 7 = 3$, $7 + 3 = 10$

❸ I LIKE MATHS

Fun spot

Answers will vary.

8B Differences

Number: AC9M2N04
- add and subtract one- and two-digit numbers, representing problems using number sentences, and solve using part-part whole reasoning and a variety of calculation strategies

Number sense and algebra: Additive strategies
Flexible strategies with combinations to 10 (Level **P6**)

About this page
- *Header*: A diagram is used to help students understand number relationships. Discuss the statement, 'If 7 – 3 = 4 and 9 – 5 = 4 then 7 – 3 = 9 – 5 because they have the same difference.' Encourage students to use diagrams to solve problems.
- Concept box: Talk about example B. Explore the use of blocks, the number line, and the number bond as ways to find the difference between 9 and 2.
- Talk about the word 'difference' and that it is another way of doing subtraction.
- *Question 1*: Discuss the number line and how it can help us find the difference between two numbers. A ruler could also be used as a number line.
- Encourage students to use the number line to answer the questions by using their fingers to count the difference or drawing the jump on the number line.
- *Question 2*: Ask students to record the answer to the first part of each question and compare it with the answer to the second part of the question, so that the differences can be compared and a 'yes' or 'no' response written.
- Discuss the use of the number line and the strategy of breaking up a number to find the answer.
- *Question 3*: Ask students to 'count on', 'count back' or use known addition facts to complete the addition facts diagrams. Students will find it easier to stick to the same process for each question.
- Discuss what you found when filling in the boxes. (5 + 10, 10 + 5, 9 + 6, 6 + 9, 7 + 8, 8 + 7 and 11 + 4 all add up to 15, so we could call these 'friends of 15'.)
- Discuss the words listed that mean 'subtraction' (i.e. less than, compare, difference between, minus and take away).

More teaching suggestions
- Provide students with number lines (**BLM 17**) and have students show the difference between two numbers. Encourage students to explain how they arrived at the answer.
- Use addition and subtraction facts (**BLM 21**) for practice and testing of number facts.

- Demonstrate creating your own number facts with a specified result, using the Number lines tool. The arrow needs to point to the result, so extend to a length and then move the arc so that it is in the correct position. This concept can be quite challenging.
- Students can use the Number lines tool to find the subtraction fact that give a result of 7 and 8 as shown in Question 3.

Extension work
- Have students make up addition and subtraction examples and show them on an empty number line (**BLM 17**).

Language
number line, order, subtraction, take away, minus, less than, compare, difference between, remove, how many left, equals, leaves, is equal to

Resources
- any classroom objects that can be counted (e.g. counters, marbles, shells, buttons, ones blocks, Unifix cubes, centicubes, plastic coins)
- ruler
- BLMs: 17 Number lines, 21 Addition and subtraction facts
- Maths tool: Number lines

Cross-reference
See also: pp 14, 15, 30, 38
Year 1 pp 70, 71
Year 3 p 38

Evaluation
Is the student able to do the following?
- add and subtract one- and two-digit numbers up to 20
- use a variety of strategies to solve problems (e.g. counting on, counting back, doubles, near doubles or use known addition facts).

Answers
❶ a 4　　**b** 7　　**c** 6
❷ a yes　　**b** yes　　**c** no
❸ 15: 12 + 3,　7 + 8,　11 + 4,　6 + 9,　10 + 5,　8 + 7,　9 + 6,　5 + 10
　　14: 4 + 10,　8 + 6,　5 + 9,　10 + 4,　6 + 8,　7 + 7,　9 + 5,　11 + 3

8C Lists, graphs and tables

Statistics: AC9M2ST01

- acquire data for categorical variables through surveys, observation, experiment and using digital tools; sort data into relevant categories and display data using lists and tables

Statistics: AC9M2ST02

- create different graphical representations of data using software where appropriate; compare the different representations, identify and describe common and distinctive features in response to questions

Statistics and probability: Interpreting and representing data

Basic one-to-one data displays (Level P2)

Collecting, displaying and interpreting categorical data (Level **P3**)

About this page

- *Header*: Ask, 'What has the echidna drawn?' 'How many more squares are there than stars?'
- Discuss graphs and their purpose. They are used to display, inform and compare information about objects and groups. It is a way of recording information so that it can be more easily interpreted and understood.
- *Concept box*: Discuss the data displays (the pictures, table, list and picture graph) and review the features and advantages of each. Discuss how the pictures and list of words have been converted into a picture graph and a table. Ask, 'Why do you think there are only 8 pets included in the table/graph?' We are not told what the data represents or how the data was collected. Would our understanding of the data be better if we were told these things?
- Discuss the features of a picture graph: heading or title, names or pictures representing each category, symbols/ shapes representing each response, symbols are the same size, symbols equally spaced across the graph, pictures in rows or columns, a baseline or starting line that is used to show where each row begins.
- Discuss various strategies to count the data. (e.g. Use a tally crossing off each animal as it is counted.) Ask, 'How can we make sure the count of our data is correct?' 'How can we check that it is correct?'
- *Question 1*: Ensure students complete the numbers of each animal in the table on the right. Discuss how the information can be recorded on the picture graph (e.g. pictures can be drawn, ones blocks can be put in the squares, or we could colour in or tick a square to represent each animal).
- Discuss the results and the question: 'Could some students have a different favourite?' (Refer to the question being asked.)

More teaching suggestions

- Give students practice in making graphs using a handful of coloured counters by separating them into columns of different colours. Make a table showing the distribution of each of the colours. Discuss which group has the greatest number of counters and which group has the least. Ask, 'Do any groups have the same number?' 'What is the total number of counters used?'
- Compare groups (e.g. the colours of pencils in a pencil case) and discuss ways of making a data display of these groups. Take a handful of coloured pencils and use square grid paper (**BLM 33**), colouring one square to represent each coloured pencil.
- Students could work in groups following this process and make up picture graphs of their own.
- Use the Data and graphs tool and make the headings in the table 'Animal' and 'Number of legs' and then ask students to list types of animals with 2, 4, 6 and 8 legs. Discuss names given to these groups of animals. Model the data as a picture graph, bar graph and horizontal bar graph.
- Students could use the Data and graphs tool to create their own series of graphs to model favourite foods, holiday events and sports.

Extension work

- Compare groups of items by placing them in columns like a graph (e.g. marbles, books, blocks) and discuss the display made. From the display have students draw symbols, write a list and draw a graph using 1 cm grid paper (**BLM 33**).
- Give students opportunities to gather data. Students could pose a question to ask the students in the class. (e.g. 'What is your favourite ... ?', 'How many people live in your house?', 'How many pets does your family have?') Encourage students to display the data as symbols or pictures, lists, in a table and in a graph. Students could use computer drawing software to publish their work.

Language

symbols or pictures, lists, tables, graphs, data, baseline, category, equally spaced, title, result

Resources

- various classroom objects (e.g. blocks, books, marbles)
- computer drawing software
- BLM: 33 1 cm square grid paper
- Maths tool: Data and graphs
- Maths tool activity: Data and graphs

Learn more at pearson.com.au/asm

Cross-reference

See also: pp 9, 21, 45, 65, 73, 93, 105, 109, 117

Year 1 pp 9, 53, 61, 97, 129

Year 3 pp 142, 143, 144, 145, 151, 152, 155

Evaluation

Is the student able to do the following?

● organise collected data into lists and tables to display information

● interpret information presented

● record answers using the information presented

Answers

Concept box

a 2   **b** 3

❶

Favourite Animals						

Animal	Number
Elephant	6
Lion	4
Monkey	5

8D Comparing masses

Measurement: AC9M2M01
- measure and compare objects based on length, capacity and mass using appropriate uniform informal units and smaller units for accuracy when necessary

Measurement and geometry: Understanding units of measurement (mass)

Using informal units of measurement (Level **P3**)

Estimating measurements (Level **P3**)

About this page
- *Header*: Discuss the question. More ones blocks than counters would be needed because counters are heavier than ones blocks. The lighter the unit the more you will need to balance an object. Conversely, the heavier the unit the fewer you will need. If the arms are level, the scales are balanced.
- Revise how balance scales work. If the heavier side goes down, the lighter side goes up. If the sides carry the same mass (or weight) they will be level (balanced).
- *Question 1*: Encourage students to estimate before using an equal-arm balance. Discuss the difference between the estimate and the result. This will allow students to develop this skill over time.
- Note: If the unit used is marbles, each marble should have the same mass.
- *Question 2*: Make students aware that balance scales have their limitations. Objects chosen to be weighed should not be too heavy or so big that they won't fit on the scales. Discuss appropriate objects to be used.
- Talk about the difference between the estimate and the correct answer.
- Remind students that hefting is used to compare masses by lifting one object in each hand.
- Ask, 'For what purpose do we use balance scales?' (They are used to compare the mass of objects or to measure the mass of an object using a unit of mass.)

Investigation
- Have students work in small groups to encourage the use of the language of mass. Students should estimate, heft and then use balance scales to compare objects. Compare the estimation to the measure.

More teaching suggestions
- Provide opportunities for students to heft two objects to estimate which one Is the heavier. Ask students to check estimations by placing one object on each end of a set of balance scales.
- Have students choose one unit of measure and use that unit to balance each object in turn. Record the mass of each object. Marbles, blocks or bolts could be used as units.

Extension work
- Provide opportunities for students to experience conservation of mass (e.g. melting ice, rolling dough, cutting a ball of Plasticine, squeezing a tube of toothpaste). Here, the mass remains the same.

Language
mass, balance, weigh, weight, balance scales. unit of measure, estimate, heft, compare, lighter, heavier, about the same, level balance, number of units

Resources
- various classroom objects to balance and weigh (e.g. balls, blocks, bolts, bottles, Centicubes, cups, golf balls, marbles, pebbles, sand, tins)
- balance scales

Cross-reference
See also: pp 96, 97

Year 1 pp 56, 57, 117

Year 3 pp 93, 94, 95, 100, 101, 102, 110, 111

Evaluation
Is the student able to do the following?
- estimate the mass of objects
- compare mass using a balance scale

Answers

Activity

1 Answers will vary.

2 Answers will vary.

Investigation

Answers will vary.

9A Linking addition and subtraction

Algebra: AC9M2A02
- recall and demonstrate proficiency with addition facts to 20; extend and apply facts to develop related subtraction facts

Number: AC9M2N04
- add and subtract one- and two-digit numbers, representing problems using number sentences, and solve using part-part-whole reasoning and a variety of calculation strategies

Number sense and algebra: Additive strategies

Flexible strategies with combinations to 10 (Level **P6**)

Flexible strategies with two-digit numbers (Level **P7**)

About this page

- 9A Linking addition and subtraction (p 34) and 9B Linking addition and subtraction (p 35) could be completed in the same lesson.
- *Header*: Place 15 pencils in a pile and 3 more pencils in another pile. Count all of the pencils. Put the number sentence 15 + 3 = 18 on the board. Switch the piles so that this time there are 3 pencils first and the pile of 15 pencils second. Ask, 'What is different? Does it affect how many pencils there are altogether?' Use the diagram to show that 18 – 15 = 3 and 18 – 3 = 15. Emphasise that if you know one of these facts, you should know all four. They are linked.
- *Concept box*: Demonstrate each number sentence and how they are linked using the number lines, the diagram and the number bond.
- *Question 1*: 1a Relate the number sentences to the diagram. The diagram is used to help students understand number relationships. Discuss the relationship between addition and subtraction. Encourage students to use these diagrams as a problem-solving strategy when needed (i.e. they are opposites).
- *Question 2*: Some students may benefit from using concrete materials such as counters, so they can physically manipulate objects to consolidate their understanding of linking addition and subtraction.
- *Questions 3* and *4*: The groups may not appear obvious to students, so they can draw a line between the group of 9 stars and the group of 7 stars. A line could also be drawn between the 2 tens blocks and the 4 tens blocks.
- Remind students that when we subtract, we take the smaller number away from the larger number (e.g. 15 – 8 and 15 – 7).

More teaching suggestions

- The most important use of this relationship is when accessing a known addition fact to perform subtraction. I can answer 11 – 7 because I know that 7 + 4 = 11.

- Ask students to use number bonds (**BLM 12** and **18**) to practise addition and subtraction facts and (**BLM 13**) to make up examples of their own.
- Discuss relationships like 5 + 3 = 3 + 5.
- Give students an addition number sentence and ask them to write the related number sentences.
- Consider all questions that could relate to a picture from Question 2. Have fast workers use subtraction webs (**BLM 19**) even if they have completed them before.
- Review the use of number lines (**BLM 17**) to work out subtraction problems to 20.
- Drill and practise number facts from Consolidation booklet, worksheet 31 Addition facts table.
- For further reinforcement complete Consolidation booklet, worksheet 18 Linking addition and subtraction.
- Demonstrate the link between addition and subtraction using the Number lines tool. Ask students to create an arc between 8 and 5 and write a true number sentence to explain the diagram. Then ask them to do exactly the same thing on the number line below/above but in a different way.
- Ask students to create a group of 5, 3 and 8 counters onto a workspace using the Counters tool. Students should click on the text button to make four true number sentences (e.g. 5 + 3 = 8, 3 + 5 = 8, 8 – 3 = 5 and 8 – 5 = 3).

Extension work

- Have students draw their own pictures and write four number sentences relating to each one.
- Use addition and subtraction facts (**BLM 21**) for further practice.

Language

linked, addition, add, plus, subtraction, take away, minus, remove, how many left, leaves, is equal to, equals, larger number, smaller number, diagram, number bond, tens blocks

Resources

- concrete materials (e.g. pencils, counters, place-value ones)
- tens blocks
- BLMs: 12 Number bonds (addition), 13 Number bond houses (blank), 17 Number lines, 18 Number bonds (subtraction), 19 Subtraction webs, 21 Addition and subtraction facts
- Consolidation booklet: 18 Linking addition and subtraction, 31 Addition facts table
- Maths tools: Number lines, Counters
- Maths tool activity: Number lines

Cross-reference

Evaluation

Is the student able to do the following?

- add and subtract one- and two-digit numbers
- represent problems using concrete materials, number lines, diagrams or number sentences
- model and explain how addition and subtraction are inverse operations
- use known addition and subtraction facts to complete problems

Answers

1 **a** 22, 15, 7, 22   **b** 17, 17, 8, 9

2 **a** 9 + 5 = 14, 5 + 9 = 14, 14 − 9 = 5, 14 − 5 = 9
   b 7 + 8 = 15, 8 + 7 = 15, 15 − 7 = 8, 15 − 8 = 7

3 9 + 7 = 16, 7 + 9 = 16, 16 − 9 = 7, 16 − 7 = 9

4 20 + 40 = 60, 40 + 20 = 60,
   60 − 20 = 40, 60 − 40 = 20

9B Linking addition and subtraction

Algebra: AC9M2A02
- recall and demonstrate proficiency with addition facts to 20; extend and apply facts to develop related subtraction facts

Number: AC9M2N04
- add and subtract one- and two-digit numbers, representing problems using number sentences, and solve using part-part-whole reasoning and a variety of calculation strategies

Number sense and algebra: Additive strategies
Flexible strategies with combinations to 10 (Level **P6**)

Number sense and algebra: Additive strategies
Flexible strategies with two-digit numbers (Level **P7**)

About this page
- *Header*: Discuss the relationship between 12, 8 and 20 in the diagram.
- *Concept box*: 6 + 4 = 10 is linked to the subtraction number sentences 10 – 6 = 4 and 10 – 4 = 6. Demonstrate this by using blocks, Multilink cubes or counters. See the previous page (p 34) for more detail.
- *Question 1*: Here students are just asked to give the linked subtraction sentences, as opposed to the previous page where they were also asked to provide the alternative addition number sentence.
- Remind students that when we subtract, we take the smaller number from the larger number (e.g. 15 – 8 and 15 – 7). The answer is smaller than the number with which you began.
- The most important use of this relationship is when accessing a known addition fact to perform subtraction. I can answer 11 – 7 because I know that 7 + 4 = 11.

Fun spot
- Some students might benefit from using concrete materials and guided instruction to complete this activity.

More teaching suggestions
- Ask students to use number bonds (**BLM 12**) or number lines (**BLM 17**) to make up examples of their own.
- Have students write the two subtraction number sentences related to:

  a 3 + 5 = 8   **b** 1 + 9 = 10
  c 4 + 3 = 7   **d** 8 + 7 = 15
- Use counters to show each number sentence above.
- Review addition of numbers by counting on from the larger number.

- Continue to test recall of number facts to 20. Use addition and subtraction facts (**BLM 21**), addition webs (**BLM 14**) and subtraction webs (**BLM 19**).
- For further reinforcement complete Consolidation booklet, worksheet 18 Linking addition and subtraction.
- Create a double workspace using the Place-value blocks tool. In the upper workspace place 6 blocks and in the lower workspace place 5 blocks. Highlight the 5 blocks and drag to the upper workspace to show 6 + 5 = 11. Drag the 5 blocks back to the lower workspace and discuss the subtraction formed 11 – 5 = 6. Is there any other way we could have moved the groups? Repeat the process but this time move the 6 blocks to the lower workspace and back to show 5 + 6 = 11 and 11 – 6 = 5.
- Give students an opportunity to create four number sentences using a given number of blocks in a double workspace using the Place-value blocks tool.

Extension work
- Link larger numbers using related number sentences, such as those on the Student Book page, using a calculator.

Language
linked, addition, add, plus, subtraction, take away, minus, remove, how many left, leaves, is equal to, equals, larger number, smaller number, diagram, number bond

Resources
- concrete materials (e.g. Multilink cubes, counters, blocks)
- calculators
- BLMs: 12 Number bonds (addition) 14 Addition webs, 17 Number lines, 19 Subtraction webs, 21 Addition and subtraction facts
- Consolidation booklet: 18 Linking addition and subtraction
- Maths tool: Place-value blocks

Cross-reference
See also: p 34
Year 1 pp 115, 116
Year 3 pp 32, 38

Evaluation
Is the student able to do the following?
- use the commutative property for addition and subtraction
- use an addition number sentence to write two linked subtraction number sentences

Answers

1 **a** 15 − 7 = 8, 15 − 8 = 7
b 14 − 6 = 8, 14 − 8 = 6
c 12 − 7 = 5, 12 − 5 = 7
d 20 − 14 = 6, 20 − 6 = 14
e 31 − 22 = 9, 31 − 9 = 22
f 26 − 17 = 9, 26 − 9 = 17

Fun spot

Answers will vary; however, students will begin with an addition number sentence and write the two linked subtraction number sentences.

9C Informal units of length

Measurement: AC9M2M01

- measure and compare objects based on length, capacity and mass using appropriate uniform informal units and smaller units for accuracy when necessary

Measurement and geometry: Understanding units of measurement (Length)

- Using informal units of measurement (Level **P3**)

About this page

- *Header*: Discuss the heading 'Informal units of length'. Ask students to suggest some informal units that could be used to measure length (e.g. paper clips, pegs).
- *Concept box*: Discuss that the pencil measures about 10 finger spaces. Demonstrate the terms side-by-side. Ask students to get a pencil and measure how many times their finger will fit along their pencil. Record the result. Compare the results and discuss why some students have different answers (e.g. length of the pencil, width of fingers).
- On this page, we will give the closest answer when using units. If a length is closer to 3 hand spans than to 2 or 4 hand spans, we will write the answer as 3 hand spans.
- *Question 1*: Discuss the method of measuring side-by-side without gaps or overlaps when we use ones blocks and end-to-end when we use paperclips. Other appropriate units can be used, but remind students to change the unit in the answer.
- *Question 2*: Demonstrate how we use a hand span to measure length. Remind students that a hand span is the widest distance your hand can reach. Ensure students estimate first.
- Discuss the results of Question 2. Ask, 'Did everyone get the same answer? Why do you think this is so?' Discuss the advantages and disadvantages of informal units to measure lengths or distances.

Activity

- Note: Measuring lengths using informal units allows us to compare lengths or distances when the two lengths cannot be brought together for comparison. In this case, we are using steps as a means of measuring distances (i.e. the distance to the school canteen, the lunch seats and to the library).
- Discuss the need for a formal unit of length. 'Why would we want one?' 'What use would it be?' 'What units of length do you know?' 'Who has heard of the metre?' 'Who has heard of the centimetre?' 'How big are these units?'

More teaching suggestions

- Provide opportunities around the classroom and the playground for measuring distances using informal units. (e.g. 'How many book lengths from your desk to the door?')
- Provide experiences where students measure the length or width of items using any object as a unit. Emphasise that units must be placed end-to-end with no gaps or overlaps between each unit. Encourage students to measure in straight lines where possible.
- Discuss choices and suitability of different units. (e.g. 'Which is more suitable to measure the length of a blackboard: a paintbrush or a paperclip?')
- Cut out footprints on cardboard (ensure they are all the same size). Use them as a unit to measure items in the room. Laminate the footprints to give extra rigidity.

Extension work

- Discuss the disadvantages of informal units of measure.
- Use string to compare the circumferences of cylindrical objects.

Language

units, as long as, distance, equal lengths, length, shortest, longest, same, measure, guess, check

Resources

- various classroom objects (e.g. blocks, paperclips, craft sticks)
- (laminated) cardboard footprints
- Example questions: Informal units of length

Cross-reference

See also: pp 37, 64, 69

Year 1 pp 29, 40, 41

Year 3 pp 77, 78

Evaluation

Is the student able to do the following?

- measure the lengths of objects using informal units
- record length comparisons using numerals and words, and by referring to the uniform informal unit used

Answers

❶ Answers will vary.

❷ Answers will vary.

Activity

Answers will vary.

9D Informal units of length

Measurement: AC9M2M01
- measure and compare objects based on length, capacity and mass using appropriate uniform informal units and smaller units for accuracy when necessary

Measurement and geometry: Understanding units of measurement (Length)
- Using informal units of measurement (Level **P3**)

About this page

- Note: Students should be encouraged to describe a length as the number and type of units used (e.g. the desk is 10 craft sticks long).
- *Concept box*: Discuss how many times the pen will fit across the desk. Talk about how the boy has marked the length of the pen so he can count the total number of pens. This ensures a consistent unit of measurement. The mark should be made at the tip of the pen, and the end of the pen placed next to the mark with no gaps or overlaps. A tally could also be kept to keep a count of the number of pen lengths used to measure the length of the desk. Ask, 'What if the width of the desk is not exactly 4 pencils? How could we record this length?' (We could say: 'almost 4 pencils long', 'a bit more than 4 pencils long' 'about 4 pencils long'.)
- Talk about students' answers on this page. Discuss any differences and ask why this may be the case.
- On this page, we will give the closest answer when using units. Explain, 'If a length is closer to 3 hand spans than to 2 or 4 hand spans, we will write the answer as 3 hand spans. If a length is closer to 11 sticks in length than to 10 or 12 sticks, then we will write the answer as 11 sticks.'
- *Question 1*: Highlight the fact that the unit used is included in the answer.
- Ask students about the relationship between the size of a unit and the number of units needed. (i.e. The shorter the unit, the more units are required.) Conversely, the longer the unit, the fewer units are required. (e.g. There will be more finger lengths needed to measure the desk than pencils.)
- *Question 2*: Demonstrate how we use a hand span to measure length. Remind students that a hand span is the widest distance your hand can reach. Discuss the terms 'shorter ' and 'longer'.
- Ask students to compare their results and discuss why there may be discrepancies. (Students have different-sized hand spans.)
- *Question 3*: Encourage students to estimate (guess) then count the number of craft sticks required to measure the length. Ensure students understand that there should be no gaps or overlaps.

Activity
- Note: Using a piece of string to compare lengths is called 'indirect comparison'. We use indirect comparison when the two lengths cannot be brought together so that their lengths can be aligned. We can use a length of string, a piece of wood, or the distance between the tips of our fingers as a means of carrying the 'length' of the first object to the second object to compare the lengths.
- Students need to make sure they measure from the end of the string. Emphasise that when using the string, students should try to be as accurate as possible.

More teaching suggestions
- Ask students to brainstorm a list of uniform informal units that could be used to measure the length of an object in the classroom (e.g. a bookshelf). Discuss the appropriateness of each unit. Suggest three objects to measure (e.g. a book, a desk and the length of the room). Make a list of the most appropriate uniform informal unit to measure each object. Discuss the list. Ask, 'Would any of these units be suitable to measure the length of a road? Why or why not?'
- Ask students to select three informal units. Make a list (like that in Question 1) with the headings: Units used, Guess (estimation) and Length. Measure the bookcase using each of the units.
- Ensure students understand the importance of measuring with no gaps or overlaps. Encourage students to measure in a straight line.
- Stress the importance of estimating before measuring. If our measure does not match our estimate, we should measure again, in case we have made a mistake in our measuring. Compare the results. Are they different? Why?
- Ross the builder says: 'Measure twice, cut once.' Discuss what he might mean. (If we do this it will give us greater accuracy and less room for error.)

Extension work
- How long is your shoe? Have each student trace their shoe onto thin cardboard and cut out the shape (or use prepared laminated 'shoes' of varying lengths. Ask the student to choose an informal unit to measure the length of the shoe and record the length.
- A different uniform informal unit can be chosen, and the process repeated. Discuss the results.

Language
length, distance, end-to-end, gaps, overlaps, hand span, units of length, 10 shoes long etc., shorter than, longer than, measure

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Resources

- books, pencils, craft sticks
- string
- cardboard and textas (or laminated cardboard shoe prints of varying lengths)
- Example questions: Informal units of length

Cross-reference

See also: pp 64, 69

Year 1 pp 29, 40, 41

Year 3 pp 77, 78

Evaluation

Is the student able to do the following?

- measure the lengths of objects using informal units
- record length comparisons using drawings, numerals and words, and by referring to the uniform informal unit used

Answers

1 Answers will vary.

2 Answers will vary.

3 Answers will vary.

Activity

Answers will vary.

10A Addition and subtraction facts

Number: AC9M2N04
- add and subtract one- and two-digit numbers, representing problems using number sentences, and solve using part-part whole reasoning and a variety of calculation strategies

Algebra: AC9M2A02
- recall and demonstrate proficiency with addition facts to 20; extend and apply facts to develop related subtraction facts

Number sense and algebra: Additive strategies
Flexible strategies with combinations to 10 (Level **P6**)

About this page
- This page may need to be done in two lessons. Alternatively, one column at a time could be used at the beginning of several lessons.
- *Heading*: Talk about the heading (Addition and subtraction facts) and the addition sign (and, add, plus) and the subtraction sign (take away, minus, subtract).
- *Concept box*: Discuss the title 'Tables champion' and how it can be achieved. (i.e. Know all your addition facts up to 10 + 10 and be able to use these to answer subtraction questions.)
- Talk about how to join the answer to the question within a table. Students could use a ruler and pencil to join the dots.
- *Question 1*: Remind students that they can use the number line to answer questions if they need assistance. The score for each attempt can be recorded.
- Encourage students to learn their addition facts by heart.

More teaching suggestions
- Place a selection of cards, 1 (Ace) to 10, face down in a pile on the desk. Have students work in groups of three and take turns to pick a card, one at a time. The aim is to make a number sentence to equal 20. If the card is not used it is put on the bottom of the pile. It can take as many cards as the student chooses (i.e. 2, 3, 4, or 5 cards. The first student to make the total to equal 20 wins the game).
- For further drill and practice of addition and subtraction facts, refer to Year 1 Student Book pages 123 and 125.
- Frequently drill and practise addition facts to 20 using Consolidation booklet, worksheet 31 Addition facts table.
- For further reinforcement of number facts complete Consolidation booklet, worksheet 10 Addition and subtraction to 20.
- Provide students with the opportunity to practise writing numerals correctly (**BLM 3** or **4**).

Extension work
- Make up several addition and subtraction sums. Have students make up a coded message using the answers to the subtraction questions similar to that on page 30 of the Student Book.

Language
addition, add, plus, total, altogether, number sentence, number line, is equal to, makes, answer, memorise, addition facts (tables), score, subtraction, take away, minus, difference, leaves, subtraction facts (tables), code

Resources
- packs of cards
- Year 1 Student Book pages 123 and 125.
- BLMs: 3 Writing numbers, 4 Naming numbers 21 to 40
- Consolidation booklet: 10 Addition and subtraction to 20, 31 Addition facts table

Cross-reference
See also: pp 2, 3, 6, 7, 10, 18, 14, 30, 31
Year 1 pp 34, 35, 38, 47, 48, 54, 55, 58, 59, 60, 120
Year 3 p 32

Evaluation
Is the student able to do the following?
- model and solve addition problems
- model and solve subtraction problems

Answers

a +

2 + 6	1
4 + 6	7
0 + 1	8
5 + 7	9
5 + 6	10
0 + 7	11
4 + 5	12
7 + 10	15
8 + 7	17
10 + 10	18
9 + 9	20

b +

2 + 3	4
4 + 3	5
2 + 2	7
5 + 4	9
8 + 5	8
8 + 0	10
7 + 5	11
1 + 9	12
10 + 5	13
6 + 5	15
10 + 9	19

c +

3 + 6	6
2 + 8	7
4 + 2	8
5 + 2	9
4 + 7	10
3 + 5	11
9 + 6	12
6 + 6	13
8 + 8	14
7 + 6	15
10 + 4	16

d +

3 + 4	5
6 + 2	6
4 + 5	7
3 + 2	8
2 + 4	9
8 + 4	10
4 + 9	11
5 + 5	12
4 + 7	13
7 + 8	14
5 + 9	15

e −

8 − 6	1
10 − 4	0
1 − 0	2
12 − 5	4
11 − 6	6
7 − 7	5
9 − 5	7
17 − 7	8
15 − 7	10
11 − 8	9
18 − 9	3

f −

5 − 2	2
7 − 3	3
4 − 2	4
9 − 4	5
13 − 5	0
8 − 8	1
12 − 5	6
10 − 9	7
15 − 5	8
11 − 5	10
19 − 10	9

g −

6 − 4	0
5 − 2	1
10 − 9	2
7 − 7	3
9 − 3	4
7 − 3	5
10 − 3	6
14 − 5	7
9 − 4	8
18 − 8	9
10 − 2	10

h −

6 − 5	0
9 − 9	1
6 − 3	2
8 − 6	3
8 − 4	4
16 − 9	5
9 − 4	6
16 − 7	7
17 − 7	8
10 − 4	9
17 − 9	10

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10B Adding 10s

Number: AC9M2N04
- add and subtract one- and two-digit numbers, representing problems using number sentences, and solve using part-part-whole reasoning and a variety of calculation strategies

Number sense and algebra: Additive strategies

Flexible strategies with two-digit numbers (Level **P7**)

About this page
- *Header*: Demonstrate the number sentences using place-value blocks.
- Ask students to count by tens on and off the decade. Note: Counting by rote establishes the repeated pattern for counting (i.e. twenty-three, thirty-three, forty-three, fifty-three).
- *Question 1*: Ensure students write the beginning number first. Note: '1c' begins with a two-digit number.
- *Question 2*: 20 is added each time.
- *Question 3*: 30 is added each time.
- Some students may require help by continuing to use place-value blocks or using a number chart (**BLM 2**).

Activity
- Encourage students to start their addition of tens pattern using larger numbers (e.g. 47). Initially encourage students to use place-value blocks to show their understanding. Ask more capable students to try to create more addition of tens patterns without using any concrete materials.

More teaching suggestions
- Use class breaks to practise counting by tens on and off the decade, forwards and backwards.
- Use place-value flip books to create a 2-digit number. Add tens by flipping the number in the tens column. Make a note that only the number in the tens column changes when ten is added, except when it passes to the next hundred.
- Make number tracks with numbers counting by 10s on and off the decade. Have students cut up the number tracks, mix them up, then place them in the correct order. Number tracks (**BLM 14** Year 1 Teacher Resource) could be modified for this activity.
- Use a number chart (**BLM 2**) to count or colour patterns, counting by tens.
- Ask students to work in small groups. One thinks of a number (multiple of 10) up to 120 and writes it down without anyone seeing it. The other students take turns to guess the number by asking questions about the secret number. The number cannot be guessed until at least three questions about the number have been asked.

- Place cards with multiples of ten on them (up to 120) in a pile face down. Ask students to pick a card and place it in order along an unmarked line. When there are no more cards left, check the order by counting by 10.
- Model the addition of tens using the Place-value blocks tool to find the result and compare the numbers in a single place-value chart. Discuss the properties of the digits using numeral expanders.
- Students can practise modelling the addition of tens using the Number lines tool. Create patterns investigating and predicting patterns formed.

Extension work
- Have students count by tens off the decade starting at a three-digit number (e.g. 136, 146, 156, 166, … and 581, 591, 601, 612, …).
- Show students a collection of 10c, 5c, and old 2c and 1c coins (mostly 10c coins are needed). Have the students start with a small amount (e.g. 7 cents). Have them add 10c coins, one at a time, and state the value of their pile of coins. This is also a great opportunity to discuss the past use of 1c and 2c coins and why they are no longer used. Numeral cards (**BLM 1**) could be used to replace 1c, 2c and 5c coins if necessary.

Language
add, sum, total, tens, tens block, ones block, place-value blocks, pattern, coins, value, 10 cents, 5 cents, 2 cents, 1 cent

Resources
- place-value blocks
- place-value flip book
- plastic 10c, 5c, 2c and 1c coins (or real coins)
- cards with multiples of 10, up to 120
- Year 1 Teacher Resource: BLM 14 Number tracks
- BLMs: 1 Numeral and symbol cards, 2 Number chart
- Maths tools: Place-value blocks, Number lines

Cross-reference
See also: pp 43, 62, 72, 126, 127
Year 1 pp 22, 23
Year 3 pp 1, 15

Evaluation
Is the student able to do the following?
- count forwards and backwards by tens, on and off the decade, using two-digit numbers
- add 10 to two-digit numbers

Learn more at pearson.com.au/asm

Answers

1
- **a** 4, 14, 24, 34
- **b** 1, 11, 21, 31
- **c** 14, 24, 34
- **d** 8, 18, 28
- **e** 12, 22, 32
- **f** 9, 19, 29

2   **a** 23   **b** 56   **c** 37   **d** 72   **e** 114

3   **a** 31   **b** 65   **c** 98   **d** 49   **e** 63

Activity

Answers will vary.

10C Capacity

Measurement: AC9M2M01
- measure and compare objects based on length, capacity and mass using appropriate uniform informal units and smaller units for accuracy when necessary

Measurement and geometry: Understanding units of measurement (Capacity)

Using informal units of measurement (Level **P3**)
Estimating measurements (Level **P3**)

About this page
- 10C Capacity (p 40) and 10D Ordering capacities (p 41) could be completed in the same lesson.
- *Header*: Discuss the definition of capacity.
- The terms 'capacity' and 'internal volume' have the same meaning. Note: Providing students with opportunities to manipulate objects and describe the activities allows them to use the language of capacity.
- *Question 1*: Students should guess the order of the capacities of the containers. The container they think is the smallest should be filled, and the contents of that container poured into the next container. The contents of the larger container should be poured into the third container. This should discover the order, but the process may need to be repeated. Explain that each picture of a container is represented by a letter, and that letter will be written in the box provided to answer the question.
- 1b is for students to choose the most appropriate unit to measure the capacity of all three objects. Ask students to justify their choice.
- Students could work in small groups to complete questions 1c–f; however, the containers and cups should be the same for each group. Instruct students to use a full cup and demonstrate exactly what a full cup looks like. Discuss why this is important (i.e. so we can compare answers).
- Ask, 'Was the cup a good unit to measure the capacity of the containers?' Talk about what other units might be appropriate.
- *Question 2*: As a class, discuss the procedure and write the points on the board. The students could then copy them onto the page.

More teaching suggestions
- Through free or directed play, provide students with opportunities to compare and order the capacities of two or three containers by filling each, and counting the number of informal units used.
- Students could use tally marks as a strategy for counting the number of informal units used to fill the containers. Remind students how we form tally marks and their usefulness for keeping count.

- Show students three different-sized containers. They could be: a plastic (1 kg) flour jar, a milk bottle (1 litre) and a plastic sauce bottle (500 ml). Ask students to brainstorm a list of the same informal units that could be used to fill all of these containers (e.g. a glass, a yoghurt container and a spice jar). Discuss the lists and the appropriateness of each container.
- Ask students about the relationship between the size of a unit and the number of units needed. The smaller the unit, the more units are required. Conversely, the larger the unit the fewer units are required.

Extension work
- Instruct students to choose larger containers and a suitable unit to fill them, then guess how many units it would take to fill these containers. Check, compare and order the capacity of these larger containers.

Language
capacity, space, container, pour, fill, full, order, holds more, more than, holds less, less than, informal unit of measure, measure, guess, estimate, predict, check

Resources
- ice-cream containers, lunch boxes, buckets, cups
- plastic (1 kg) flour jars, milk bottles (1 litre) and plastic sauce bottles (500 ml)
- glasses, yoghurt containers and spice jars
- larger containers (saucepans, jugs, ice-cream containers, cordial containers)
- water, rice or sand
- sand or water trays

Cross-reference
See also: p 41
Year 1 pp 44, 45, 49
Year 3 pp 83, 84, 104

Evaluation
Is the student able to do the following?
- compare, order and record the capacities of two or more containers by measuring using uniform informal units
- estimate capacity by referring to the number and type of uniform informal unit used

Learn more at pearson.com.au/asm

Answers

Answers may vary depending on the size of the containers used.

❶ **a** holds most: N (the bucket), holds least: M (lunch box)

b A cup could be used as the unit of measure. Discussion should take place.

c Answers will vary but the cup must be full each time it is used to measure the capacity.

d The lunch box would probably hold the least and the bucket, the most.

e Answers will vary.

f Answers will vary.

❷ Answers will vary but an explanation of the procedure will be given.

10D Ordering capacities

About this page

Activity

● The title on this page uses the term 'capacity'. This has the same meaning as 'internal volume'.

● This lesson can be completed in small groups. The results should be compared and discussed. Note: Providing students with opportunities to manipulate objects and describe the activities allows them to use the language of capacity.

● *Header*: Discuss the order of the capacities of the containers shown (smallest to largest).

● *Questions 1 and 2*: Remind students that the cup should be full each time it is used to measure the capacity of objects. Encourage students to estimate the number of cups for each question before measuring (to the nearest cup), as this develops a useful life skill. The estimates and actual results should be discussed so students can assess their accuracy. Remind students that they are ordering three containers in each part. They are not ordering all six containers.

● Three containers should be chosen each time. Only these three will be compared in each case.

● *Question 3*: Consider questions with more than one answer. 'Which container(s) held **more than** the bucket?' and 'Which container(s) held **less than** the box?'

More teaching suggestions

● Using a water tray and through free or directed play, provide students with opportunities to compare and order the capacities of two or three containers by filling each and counting the number of informal units used.

● Students could use tally marks as a strategy for counting the number of informal units used to fill the containers. Remind students how we form tally marks.

● Show students three different-sized containers. They could be: large jug (2 litres), a vase (about 600 mL) and a cup (250 mL). Ask students to brainstorm a list of informal units that could be used to fill each of these containers (e.g. a cup for the large container, a small bottle for the vase and an egg-cup for the cup). Draw three columns using the name of the containers as the headings. Discuss the lists. If we wish to order the capacities of the three containers, we could use what

we consider the smallest container as the informal unit. Discuss this idea.

● Ask students about the relationship between the size of a unit and the number of units needed. (The smaller the unit, the more units are required. Conversely, the larger the unit the fewer number of units are required.)

Extension work

● Provide students with same-sized sheets of thin cardboard.

● In groups, students construct containers to hold rice.

● Discuss the different shapes and the capacities of the containers made.

Language

capacity, space, container, pour, fill, full, order, holds more, more than, holds less, less than, informal unit of measure, measure, guess, estimate, predict, check

Resources

● various containers of different sizes (e.g. caps from medicine bottles, egg-cups, jugs, plastic bottles, saucepans, plastic boxes, buckets)

● water, rice or sand

● sand or water trays

● same-sized sheets of thin cardboard for making containers

Cross-reference

See also: p 40

Year 1 pp 44, 45, 49

Year 3 pp 83, 84, 104

Evaluation

Is the student able to do the following?

● compare, order and record the capacities of two or more containers

● measure using uniform informal units

● estimate capacity referring to the number and type of uniform informal units

Answers

Activity

❶ Answers will vary.

❷ Answers will vary.

❸ **a** large pot
   b box
   c bucket
   d box
   e bucket, large pot, box

Progress test 2

Name: _____

Date: _____

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
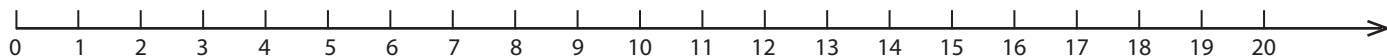
Number, algebra

1 Draw lines to show how you would share these collections equally

a 10 counters
2 children

b 12 mushrooms
4 children

2 How many students could be given:
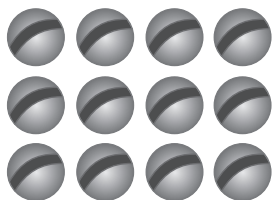
a 2 balls? ☐

b 3 balls? ☐

3

How many groups? ☐

How many in each group? ☐

How many altogether? ☐

☐ groups of ☐ = ☐

☐ + ☐ + ☐ = ☐

4
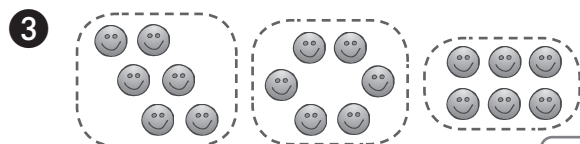
The birds show:

☐ rows of ☐ = ☐

6 + ☐ = ☐

5 **a** $15 - 5 =$ ☐

b $16 - 4 =$ ☐

c $12 - 5 =$ ☐

d $16 - 8 =$ ☐

6 **a** $6 + 8 =$ ☐

b $4 + 5 =$ ☐

c ☐ $+ 7 = 15$

d $5 +$ ☐ $= 13$

e $14 - 8 =$ ☐

f $12 - 6 =$ ☐

g 7 less than 11 = ☐

h $5 +$ ☐ $= 10$

i $12 +$ ☐ $= 20$

j What is the difference between 12 and 8? ☐

Progress test 2 (continued)

7
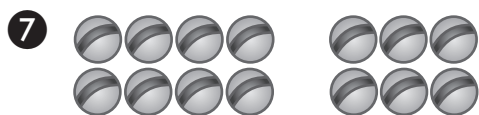
a $8 + 6 = \boxed{}$

b $6 + 8 = \boxed{}$

c Write 2 different subtraction number sentences to match the picture above.

$\boxed{} - \boxed{} = \boxed{}$

$\boxed{} - \boxed{} = \boxed{}$

8 Write the totals, adding another ten for each row.

a $\boxed{}$

$+ \quad \boxed{}$

$+ \quad \boxed{}$
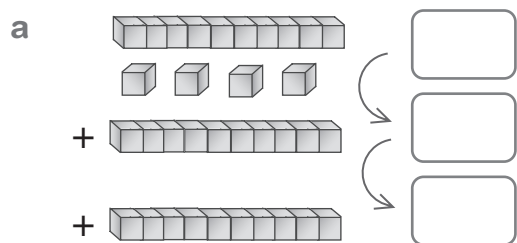
b 17, 27, 37, $\boxed{}$, $\boxed{}$, $\boxed{}$

c 98, 88, 78, $\boxed{}$, $\boxed{}$, $\boxed{}$

d $54 + 20 = \boxed{}$

e $39 + 40 = \boxed{}$

f $75 - 10 = \boxed{}$

g $76 - 30 = \boxed{}$

9 Find the missing numbers. First count to the next 10.

a $6 + \boxed{} = 13$

b $18 + \boxed{} = 23$

c $26 + \boxed{} = 31$

Use the same method to find:

d $21 - \boxed{} = 16$

e $35 - \boxed{} = 27$

10 Draw a line at the halfway point for each row of pictures.

a

How many in each half? $\boxed{}$

b

How many in each half? $\boxed{}$

Colour half of this group.

c
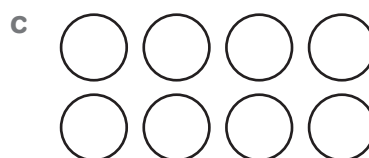
How many in each half? $\boxed{}$

Progress test 2 (continued)

Name:

Measurement, space

⓫ Write the time.

a

b

c

d

show the time.

e

half past 7

f

quarter past 9

⓬
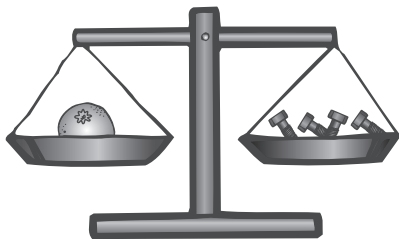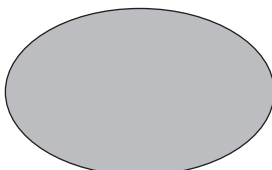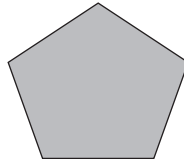
How many bolts would be needed to balance 2 oranges?
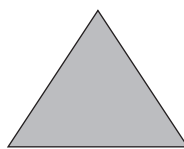
bolts

⓭ Name each shape.

a

b

c

d

⓮ Draw an octagon

. . . .

. . . .

. . . .

. . . .

. . . .

. . . .

. . . .

Progress test 2 (continued)

⑮ Use finger widths to mark and measure this pencil and pen.
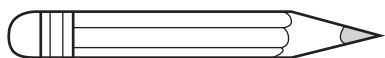
Length of pencil: ☐

Width of pencil: ☐

Length of pencil: ☐

Width of pencil: ☐

Complete this sentence.

The ☐ is ☐ finger widths longer than the ☐ .

⑯

Vase	4 cups
Box	8 cups

a Which container has the smaller capacity? ☐

b How much greater is the capacity of the box? ☐ cups

⑰ A ⊢10 cups

⊢ 5 cups

5 cups of water

B ⊢10 cups

⊢ 5 cups

Ball in the water
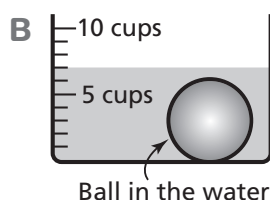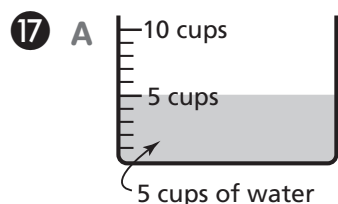
If the water from **A** was poured into **B**, would it overflow?

Statistics

⑱ Write the number shown.

a ЖⅡ ☐

b Ж Ж Ⅰ ☐

c These are called

☐ .

⑲ Use this list to complete the table and graph.

Favourite colour

purple, yellow, purple, purple, yellow

Table ☐ Favourite colour

purple	
yellow	

Graph ☐

purple				
yellow				

Notes and answers for Progress test 2

Objective
- Diagnose weaknesses for future treatment.

Follow-up
- Any weakness discovered should be treated. Copies of Student Book pages are cross-referenced for follow-up.
- Questions and Student Book pages are cross-referenced on the Remediation records Progress tests pages.
- A record of each student's progress can be kept using the Remediation records Progress tests pages (see pages 145–146).
- The content of the tests should be revised and reinforced throughout the year where possible. When teaching new concepts and skills, it is important to build on previously known work.

Question topic cross-reference

❶	Sharing	p 22
❷	Grouping	p 22
❸	Multiplication	p 23
❹	Multiplication	pp 26, 27
❺	Subtraction	p 30
❻	Addition and subtraction	pp 31, 38
❼	Addition and subtraction	pp 34, 35
❽	Addition and subtraction	pp 39, 43
❾	Addition and subtraction	p 42
❿	Fractions	pp 46, 47
⓫	Time	pp 24, 25
⓬	Mass	p 33
⓭	2D shapes	pp 28, 29
⓮	2D shapes	p 29
⓯	Length	36, 37
⓰	Capacity	pp 40, 41
⓱	Capacity	p 44
⓲	Data	p 45
⓳	Data	p 32

Progress test 2 answers

❶ **a**   **b**

❷ **a** 6   **b** 4

❸ 3, 6, 18, $\underline{3}$ groups of $\underline{6}$ = $\underline{18}$, $\underline{6}$ + $\underline{6}$ + $\underline{6}$ = $\underline{18}$

❹ $\underline{2}$ rows of $\underline{6}$ = $\underline{12}$, 6 + $\underline{6}$ = $\underline{12}$

❺ **a** 10   **b** 12   **c** 7   **d** 8

❻ **a** 14   **b** 9   **c** $\underline{8}$ + 7 = 15
   d 5 + $\underline{8}$ = 13   **e** 6   **f** 6
   g 4   **h** 5 + $\underline{5}$ = 10   **i** 12 + $\underline{8}$ = 20   **j** 4

❼ **a** 14   **b** 14   **c** $\underline{14 - 8} = 6$ $14 - \underline{6} = \underline{8}$

❽ 14, 24, 34   17, 27, 37, $\underline{47}$, $\underline{57}$, $\underline{67}$
   98, 88, 78, $\underline{68}$, $\underline{58}$, $\underline{48}$ 74, 79, 65, 46

❾ **a** 6 + $\underline{7}$ = 13   **b** 18 + $\underline{5}$ = 23
   c 26 + $\underline{5}$ = 31   **d** 21 − $\underline{5}$ = 16
   e 35 − $\underline{8}$ = 27

❿ **a** 3
   b 5
   c 4 balls will be coloured

⓫ **a** 10 o'clock   **b** 3 thirty or half past 3
   c 5 fifteen or quarter past 5
   d 7 forty-five or quarter to 8
   e   **f**

⓬ 8 (bolts)

⓭ **a** rectangle   **b** oval   **c** pentagon
   d triangle

⓮   Answers can vary but the shape must have 8 straight sides.

⓯ Answers will vary.

⓰ **a** the vase   **b** 4 (cups)

⓱ yes

⓲ **a** 7   **b** 11   **c** tally marks

⓳ **Favourite colour**

purple, yellow, purple, purple, yellow

Table — Favourite colour

	tally	total
purple	|||	3
yellow	||	2

Graph — Favourite colour

purple				
yellow				

Progress retest 2

Name: _____

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
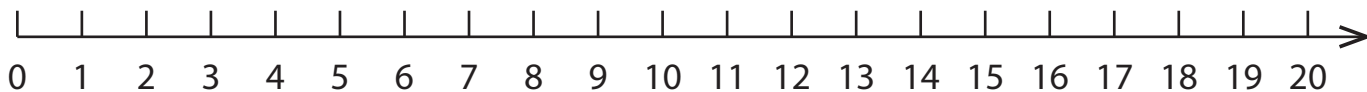
Number and algebra

❶ Draw lines to show how you would share these collections equally.

a 12 ice blocks
2 families

b 12 butterflies
4 groups

❷ How many students could be given:

a 2 bananas? ☐

b 4 bananas? ☐

❸

How many groups? ☐

How many in each group? ☐

How many altogether? ☐

☐ groups of ☐ = ☐

☐ + ☐ + ☐ = ☐

❹

The tomatoes show:

☐ rows of ☐ = ☐

4 + ☐ = ☐

❺ **a** $7 - 2 =$ ☐   **c** $11 - 3 =$ ☐

b $15 - 7 =$ ☐   **d** $17 - 8 =$ ☐

❻ **a** $7 + 8 =$ ☐

b $5 + 3 =$ ☐

c ☐ $+ 5 = 14$

d $6 +$ ☐ $= 11$

e $16 - 5 =$ ☐

f $11 - 4 =$ ☐

g 5 less than $13 =$ ☐

h $3 +$ ☐ $+ 2 = 12$

i $14 +$ ☐ $+ 5 = 25$

j What is the difference between 18 and 16? ☐

Progress retest 2 (continued)

7
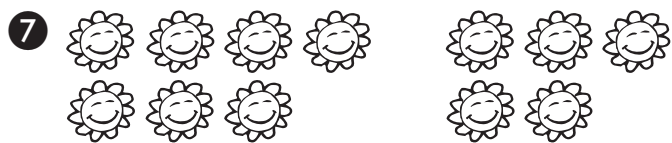
a 7 + 5 = ☐

b 5 + 7 = ☐

c Write 2 different subtraction number sentences to match the picture above.

☐ – ☐ = ☐

☐ – ☐ = ☐

8 Write the totals, adding another 10 for each row.

a ☐

☐

+ ☐

b 12, 22, 32, ☐ , ☐ , ☐

c 85, 75, 65, ☐ , ☐ , ☐

d 32 + 20 = ☐

e 22 + 40 = ☐

f 85 – 20 = ☐

g 75 – 40 = ☐

9 a Find the missing numbers. First count to the next 10.

a 9 + ☐ = 12

b 17 + ☐ = 21

c 28 + ☐ = 33

Use the same method to find:

d 24 – ☐ = 17

e 32 – ☐ = 26

10 Draw a line at the halfway point for each row of pictures.

a

How many in each half? ☐

b
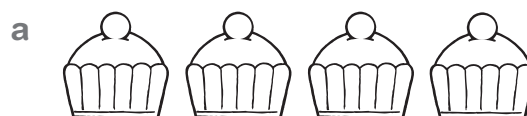
How many in each half? ☐

c Colour half of this group.
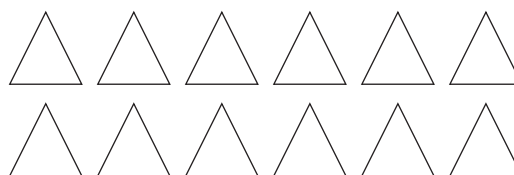
How many in each half? ☐

Progress retest 2 (continued)

Name:

Measurement and space

11 Write the time.

a

b

c

d

Show the time.

e

f
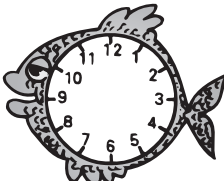
half past 9   quarter past 6

12
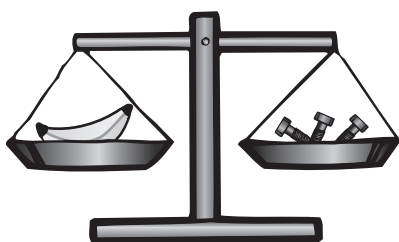
How many bolts would be needed to balance 2 bananas?

☐ bolts

13 Name and describe each shape.

a

☐ vertices

☐ sides   ☐ angles

b

☐ vertices

☐ sides   ☐ angles

c

☐ vertices

☐ sides   ☐ angles

d

☐ vertices

☐ sides   ☐ angles

14 Draw a hexagon.

Progress retest 2 (continued)

⑮ Use finger widths to mark and measure this train and rectangle.
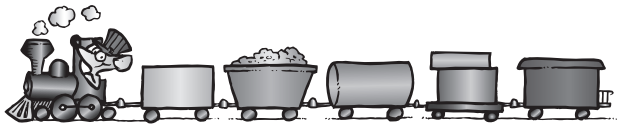
Length of train:

☐ finger widths

Height of train:

☐ finger widths

Length of rectangle:

☐ finger widths

Height of rectangle:

☐ finger widths

The ☐ is

☐ finger widths longer

than the ☐ .

⑯

bottle	2 cups
box	4 cups

a Which container has a smaller capacity? ☐

b How much greater is the capacity of the box? ☐ cups

⑰ A ⌐10 cups / 5 cups / 3 cups of water   **B** ⌐10 cups / 5 cups / Ball in the water
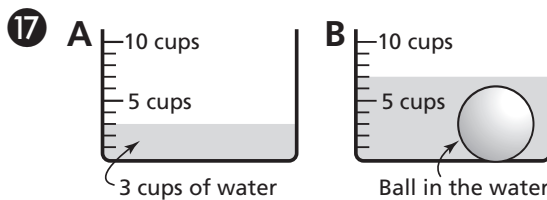
If the water from A was poured into B, would it overflow? ☐

Statistics

⑱ Make a tally to show the different Christmas baubles.

Christmas baubles	
Green Ⓖ	
Red Ⓡ	
Yellow	

⑲ Use this list to complete the table and graph.

Favourite pet

dog, dog, cat, dog, cat, dog, cat, dog

Table Favourite pet

	tally	total
Dog		
Cat		

Graph

Dog					
Cat					

Notes and answers for Progress retest 2

Objective
● Diagnose weaknesses for future treatment.

Follow-up
● Any weakness discovered should be treated. Copies of Student Book pages are cross-referenced for follow-up.
● Questions and Student Book pages are cross-referenced on the Remediation records Progress retests pages.
● A record of each student's progress can be kept using the Remediation records Progress retests pages (see pp 172–173).
● The content of the tests should be revised and reinforced throughout the year where possible. When teaching new concepts and skills, it is important to build on previously known work.

Question topic cross-reference

❶ Sharing — p 22
❷ Grouping — p 22
❸ Multiplication — p 23
❹ Multiplication — pp 26, 27
❺ Subtraction — p 30
❻ Addition and subtraction — pp 31, 38
❼ Addition and subtraction — p 34, 35
❽ Addition and subtraction — p 39, 43
❾ Addition and subtraction — p 42
❿ Fractions — p 46, 47
⓫ Time — p 24, 25
⓬ Mass — p 33
⓭ 2D shapes — p 28, 29
⓮ 2D shapes — p 29
⓯ Length — pp 36, 37
⓰ Capacity — p 40, 41
⓱ Capacity — p 44
⓲ Data — p 32, 45
⓳ Data — p 32, 45

Progress retest 2 answers

❶ a

or

❷ a 4   b 2

❸ 3, 5, 15, <u>3</u> groups of <u>5</u> = <u>15</u>, 5 + <u>5</u> + <u>5</u> = <u>15</u>

❹ <u>2</u> rows of <u>4</u> = <u>8</u>, 4 + <u>4</u> = <u>8</u>

❺ a 5   b 8   c 8   d 9

❻ a 15   b 8   c <u>9</u> + 5 = 14
   d 6 + <u>5</u> = 11   e 11   f 7
   g 8   h 3 + <u>7</u> + 2 = 12
   i 14 + <u>6</u> + 5 = 25   j 2

❼ a 12   b 12   c <u>12</u> − <u>7</u> = <u>5</u>   <u>12</u> − <u>5</u> = <u>7</u>

❽ a 8, 18, 28   b 12, 22, 32, <u>42</u>, <u>52</u>, <u>62</u>
   c 85, 75, 65, <u>55</u>, <u>45</u>, <u>35</u>   d 52
   e 62   f 65   g 35

❾ a 9 + <u>3</u> = 12   b 17 + <u>4</u> = 21
   c 28 + <u>5</u> = 33   d 24 − <u>7</u> = 17
   e 32 − <u>6</u> = 26

❿
   c 6 triangles will be coloured. 6

⓫ a 4 o'clock (or 4:00)
   b 2 thirty or half past 2 (or 2:30)
   c quarter past 7 or 7 fifteen (or 7:15)
   d quarter to 12 or 11 forty-five (or 11:45)
   e   f

⓬ 6 (bolts)

⓭ a triangle, 3 vertices, 3 sides, 3 angles
   b octagon, 8 vertices, 8 sides, 8 angles
   c hexagon, 6 vertices, 6 sides, 6 angles
   d pentagon, 5 vertices, 5 sides, 5 angles

⓮   Answers will vary but the shape must have 6 straight sides.

⓯ Answers will vary

⓰ a bottle   b 2 (cups)

⓱ no

⑱

Christmas baubles	
Green Ⓖ	‖‖‖ ‖‖‖ ‖
Red Ⓡ	‖‖‖
Yellow Ⓨ	‖‖‖

⑲ **Favourite pet:**

dog, dog, cat, dog, cat, dog, cat, dog

Table: Favourite pet

	tally	total
Dog	‖‖‖	5
Cat	‖‖‖	3

Graph: Favourite pet

Dog					
Cat					

AUSTRALIAN
Signpost
MATHS

Mentals 2

Alan McSeveny   Rachel McSeveny   Diane McSeveny-Foster

Introduction

Using the Mentals Books

Each unit of a Mentals Book is programmed to review content from the previous two units of the Student Books. For example, Signpost Mentals Book Unit 5 can be used to review Signpost Student Book Units 3 and 4 while the Student Book Unit 5 is being taught. Unit 5 from both books should be completed in the same week.

Presentation

- The content of the strands Number, Algebra, Measurement, Space, and Statistics is revised.
- Essential number skills and language are given a high profile.

ID cards

- The ID cards on pages 5 and 6 review important terms addressed at Year 2 level.
- These cards can be used over and over again to improve and consolidate understanding.

Mixed-topic questions

The units present questions in a mixed-topic format.

- This is essential for thorough understanding and continuous review.
- It will allow the teacher to discover weaknesses that could otherwise pass unnoticed.
- The approach reflects real life – similar questions do not often occur together.
- It provides a real test of understanding.

If you do not use a Student Book

This book will be invaluable to those who do not use a Student Book, as it ensures both thorough coverage and constant review of the syllabus content.

Multiple-choice questions

The multiple-choice questions on page 77 introduce a variety of question types.

- The headers on each double-page spread provide an opportunity for discussion.

- Two lizards are hidden on each page for students to find.

- Cartoons make mathematics more appealing.
- Regular review of number facts to encourage faster recall.
- The third section of each unit sometimes contains counting exercises in the border.

❶
$$12 \quad 18 \quad 14$$
$$-\ 9 \quad -\ 3 \quad -\ 5$$
_____ _____ _____

❷ 7 + 5 + 5 = _____

4 + 4 + 3 = _____

6 + 6 + 2 = _____

1 + 3 + 3 = _____

3 + 7 + 7 = _____

❸ Circle the 8th crocodile.

❹ 19 cakes. ☐

5 eaten. – ☐

How many now? ☐

❺ Complete these number sentences.

___8___ + _____ = ☐

___6___ + _____ = ☐ 15

___11___ + _____ = ☐

❻ How many days in:

a March? _____

b September? _____

c July? _____

❼ Look for tens to find:
$$2 \qquad 7 \qquad 9$$
$$1 \qquad 4 \qquad 1$$
$$8 \qquad 2 \qquad 5$$
$$+\ 4 \qquad +\ 3 \qquad +\ 5$$
☐ ☐ ☐

❽ Start at 'Start'. Follow the path and write the letters you pass through. Do not go back to 'Start' for b and c.

G	S	V	Y	A
A	P	G	E	D
T	I	N	K	R
Start	S	A	T	U

a 1 right, 1 up, 1 left _____

b 2 up, 1 right, 1 up _____

c 2 right, 2 up _____

❾ Does 3 + 6 = 6 + 3? _____

Does 5 + 7 = 7 + 5? _____

❿ 65 = _____ tens _____ ones

6:2 🐍〰️🐟🐍〰️🐟 🐍⫽🐟⫽🐍⫽ , ⬜ – ⬜ = ⬜

1

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
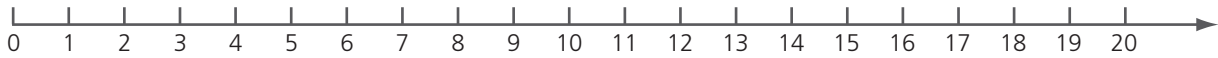
14 – 7 = _____   15 – 5 = _____   12 – 3 = _____   19 – 6 = _____

2 **a** How many birds? _____

Animals in the park

b How many more dogs than cats? _____

c How many animals altogether? _____

Dogs   Fish   Birds   Cats

d How many dogs and cats were there at the park? _____

e There are _____ more fish than cats at the park.

3 Write the number 1 more than: 45 _____   63 _____   38 _____

Write the number 1 less than: 36 _____   57 _____   72 _____

4 6 + 3 ⬜   4 + 3 ⬜   5 + 2 ⬜   7 + 3 ⬜   3 + 3 ⬜

6:3 🦜🦜🦜🦜🦜🦜🦜🦜🦜🦜 + 🦜🦜, ⬜ + ⬜ = ⬜

1 Complete these addition facts.

	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8	+ 9
4									

	+ 5	+ 9	+ 2	+ 7	+ 8	+ 1	+ 3	+ 6	+ 4
7									

❶ Say each clock time above.

❷ 5 + 3 + 3 = _____

8 + 2 + 2 = _____

4 + 4 + 5 = _____

❸ Complete these number sentences.

_7_ + _____ =

_9_ + _____ = | 17

_8_ + _____ =

❹ Look for tens to find:

6	9	2
3	7	4
4	1	8
+ 1	+ 3	+ 3

❺ Draw a line to share 8 stickers between 2 children.

One share = _____

❻ Circle 3 rows of 4.

_____ + _____ + _____ = _____
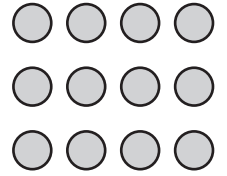
_____ rows of _____ = _____

❼ Start at 'Start'. Follow the path and write the letters you pass through.

T	E	T	S	A
A	R	A	D	S
R	A	E	P	N
Start	T	R	A	I

a 4 right, 2 up _____

b 3 up, 1 right _____

❽ Circle groups to show how many students could have 2 pears.
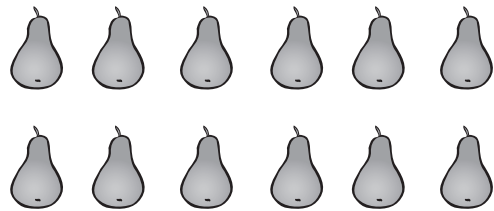
_____ students could have 2 pears.

❾ 85 = _____ tens _____ ones

❿ 8 + 1 ☐   3 + 3 ☐   3 + 6 ☐   4 + 3 ☐   4 + 4 ☐

❶

a ⭐⭐⭐⭐⭐⭐⭐⭐
   ⭐⭐⭐⭐⭐⭐⭐⭐

____ rows of ____ = _____

____ + ____ = _____

b 〇〇〇〇〇〇〇
   〇〇〇〇〇〇〇
   〇〇〇〇〇〇〇

____ rows of ____ = _____

____ + ____ + ____ = _____

c △△△△△△
   △△△△△

____ rows of ____ = _____

____ + ____ = _____

d ⬭⬭⬭⬭⬭
   ⬭⬭⬭⬭⬭
   ⬭⬭⬭⬭⬭

____ rows of ____ = _____

____ + ____ + ____ = _____
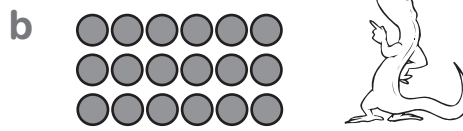
❷ Draw the time shown.
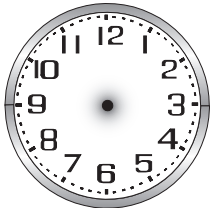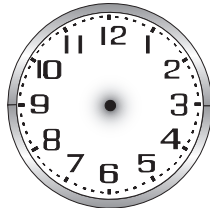
6 o'clock	half past 3	quarter past 4	quarter to 11
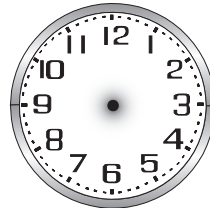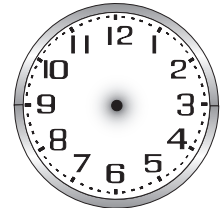
❸ At a quarter past, the minute hand has moved _____ minutes around the clock from 12. This is a quarter of the way around the clock.

❶ Complete these number sentences for each total.

a
10 + ____ =
8 + ____ =
12 + ____ =
9 + ____ =
[16]

b
11 + ____ =
7 + ____ =
10 + ____ =
8 + ____ =
[13]

c
16 + ____ =
9 + ____ =
15 + ____ =
10 + ____ =
[20]

❶ Draw a line to share 10 stars between 2 children.

⭐ ⭐ ⭐ ⭐ ⭐

⭐ ⭐ ⭐ ⭐ ⭐

One share = _____

❷ 12 cars. Circle groups to show how many children could take 4 cars.
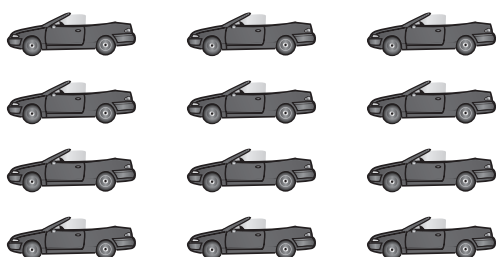
_____ children could take 4 cars.

❸ Show:
a half past 9   **b** quarter to 3

❹
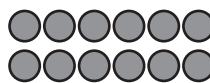
_____ groups of _____ = _____

4 + _____ + _____ = _____
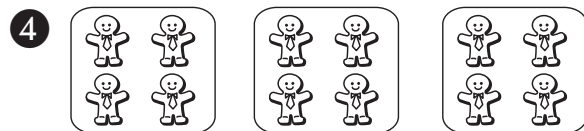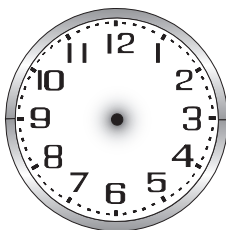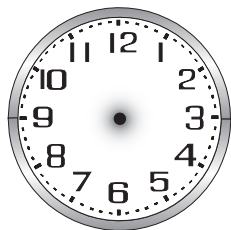
❺ Colour all of the hexagons above.

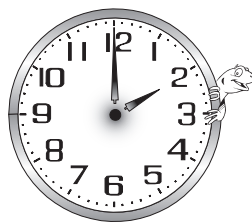**❻** Use a ruler to draw triangles. Start and finish each line at a dot.

• • • • • • • • • •
• • • • • • • • • •
• • • • • • • • • •
• • • • • • • • • •

❼ 2 rows of 6 = _____

_____ + _____ = _____

❽ Write the time shown.

_____

_____

_____

_____
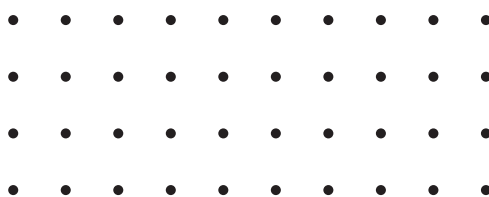
❾ 5 – 2 _____   10 – 1 _____

8 – 3 _____   9 – 4 _____

5 – 3 _____   8 – 2 _____

❿ 6 + 2 ☐   3 + 4 ☐   5 + 2 ☐   5 + 4 ☐   2 + 1 ☐

❶ Draw a line to join each shape to its name.

hexagon

circle

square

triangle

rectangle

star

diamond

pentagon

oval

❷ Write the time shown.

a

b

c

Half past nine

Half

d

e

f

Quarter past 11

Quarter

_____

_____

_____

_____

_____

_____

8:3 ❀ ❀ ❀ ❀ ❀ ❀ ❀ ❀ ❀ , [ ] **groups of** [ ] **=** [ ]

❶

❷

_____ groups of _____ = _____

_____ groups of _____ = _____

5 + 5 + _____ = _____

3 + 3 + _____ + _____ = _____