

# Contents

<i>Focus</i>	<i>Activity</i>	<i>Page</i>
Introduction		5
Place value	'Number splits'	6–7
Mental calculation strategies	'Addition squares'	8–9
Subtraction	'Subtraction triangles'	10–11
Capacity	'Glasses of juice'	12–13
Shape and space	'Which shapes?'	14–15
Three-dimensional shapes	'Cube designs'	16–17
Reasoning about numbers	'Missing digits'	18–19
Mental calculation strategies	'Number pyramids'	20–21
Making decisions and checking results	'Number links'	22–23
Fractions	'Same or different?'	24–25
Understanding addition and subtraction	'Twos and fives'	26–27
Data handling	'True or false?'	28–29
Reading numbers from scales	'Who threw that?'	30–31
Using addition and calculation strategies	'Doubles and singles'	32–33
Money and real-life problems	'Changing coins'	34–35
Shape and space – position and direction	'Take a road trip'	36–37
Time	'Florence Nightingale'	38–39
Measures – mass	'How much fruit?'	40–41
Reasoning about numbers	'Pyramid sequences'	42–43
Real-life problems, making decisions	'Bus journey'	44–45
Understanding multiplication and division	'Number maze'	46–47
Fractions	'Fraction climb'	48–49
Handling data	'Animal facts' 'Animal data' 'My own animal data'	50–53
Estimation of numbers	'Matching numbers'	54–55
Real-life problems	'A family tree'	56–57
Written methods for addition and subtraction	'Find the digits'	58–59
Length	'Mystery rally'	60–61
Shape and space	'Following the leader'	62–63
Real-life problems	'Running race'	64–65
Counting and properties of numbers	'Ups and downs'	66–67
Understanding division	'Popular ride'	68–69
Money and real-life problems	'Cinema Three'	70–71
Fractions	'Find the digits'	72–73
Time problems	'A school day'	74–75
Handling data	'Solar system' 'Solar system information'	76–78

# Introduction

This series of six photocopiable books provides additional challenges for more able children. The materials enable you to meet the needs of able mathematicians without developing completely separate topics.

**Book 3 will provide challenges for children in Years 3–5.**

## You can use this book to:

- provide alternative, and more demanding, tasks for more able children during the daily maths lesson;
- provide challenging homework tasks for the more able mathematicians in your class;
- broaden the range of mathematical experience for a range of children.

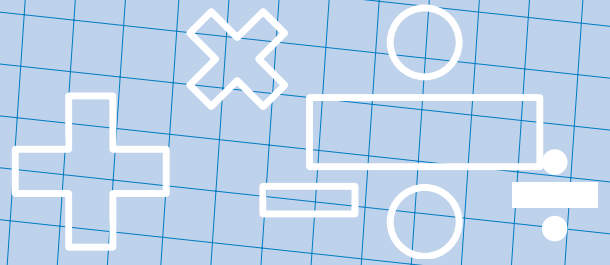
Many of the tasks in this book are of an investigative or puzzle-solving variety. In addition to mathematical knowledge, some logical thinking will often be required. The children should enjoy the level of challenge the activities provide, and also the opportunity to choose their own ways of working. This is fundamental to development in mathematics, and you should therefore allow children to decide what aids they will use to help them solve the problems. More able children are often comfortable with abstract tasks, but most of them will at some stage want to use practical apparatus, and this should be allowed.

## The activity sheets

Photocopiable activity sheets for the children to work on are provided for the lessons and can be used to support group work. For some lessons a photocopiable resource sheet is also provided. It is assumed that all the children will take part in the whole-class introduction to the lesson before tackling the task from this book.

The teacher notes will guide you in introducing the tasks to the children and in effective ways of working, as well as providing the solutions. These notes will help you to support children appropriately as they work.

# Place value



## Learning objectives

- ◆ Read and write whole numbers to at least 1000.
- ◆ Develop related vocabulary.

## Resources

'Number splits'

## Teacher's notes

In this problem-solving activity children use clues to identify numbers which have been split into two parts.

The activity is in two parts.

In the first part four numbers have been split into multiples of ten and single digits. Each number can only be used once.

<b>Multiples of ten:</b>	<b>10</b>	<b>30</b>	<b>50</b>	<b>60</b>
<b>Single digits:</b>	<b>5</b>	<b>4</b>	<b>9</b>	<b>2</b>

**Clue 1.** The number has two digits which are the same. It must be **55**. So  $5 + 50 = 55$ .

**Clue 2.** The odd number less than 20 can only be **19**. So  $9 + 10 = 19$ .

**Clues 3 and 4.** The even numbers are **32** and **64**. So  $2 + 30 = 32$  and  $4 + 60 = 64$ .

In the second part four numbers have been split into multiples of 100 and two-digit numbers. Each number can only be used once.

<b>Multiples of 100:</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>
<b>Two-digit numbers:</b>	<b>11</b>	<b>60</b>	<b>22</b>	<b>50</b>

**Clue 1.** Two numbers can be made with their three digits being the same; 111 and 222. Go to Clue 2 which helps to resolve this problem.

**Clue 2.** It is the largest number and odd. It must be **411**. So  $11 + 400 = 411$ . Go back to Clue 1. The number must be **222**. So  $22 + 200 = 222$ .

**Clue 3.** This is the smallest number and ends in 50. It is **150**. So  $50 + 100 = 150$ .

**Clue 4.** The number **360** is left. It is a multiple of 36. So  $60 + 300 = 360$ .

As an extension activity children can make up some similar puzzles of their own.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Number splits

- Four numbers have each been split into a multiple of ten and a single digit. The eight numbers are mixed up so you do not know which multiple of ten and single digit go together. Use each number once only.

<b>Multiples of ten:</b>	<b>10</b>	<b>30</b>	<b>50</b>	<b>60</b>
<b>Single digits:</b>	<b>5</b>	<b>4</b>	<b>9</b>	<b>2</b>

Does 60 go with 2 to make 62? Does 10 go with 4 to make 14?  
Use the clues to work out which multiples of ten and single digits go together. Each clue tells you about the complete number when a multiple of ten has been added to its single digit.

**Clue 1.** My two digits are the same.

I am \_\_\_\_\_. I am made by adding together \_\_\_\_\_.

**Clue 2.** I am an odd number. I am less than 20.

I am \_\_\_\_\_. I am made by adding together \_\_\_\_\_.

**Clue 3.** I am an even number. I am half the other even number.

I am \_\_\_\_\_. I am made by adding together \_\_\_\_\_.

**Clue 4.** I am an even number. I am twice the other even number.

I am \_\_\_\_\_. I am made by adding together \_\_\_\_\_.

- Four numbers have each been split into multiples of 100 and two-digit numbers. These eight numbers are mixed up. Use the clues to work out which multiples of 100 and two-digit numbers go together. Use each number once only.

<b>Multiples of 100:</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>
<b>Two-digit numbers:</b>	<b>11</b>	<b>60</b>	<b>22</b>	<b>50</b>

**Clue 1.** My three digits are the same.

I am \_\_\_\_\_. I am made by adding together \_\_\_\_\_.

**Clue 2.** I am an odd number. I am the largest number.

I am \_\_\_\_\_. I am made by adding together \_\_\_\_\_.

**Clue 3.** I am a multiple of 50. I am the smallest number.

I am \_\_\_\_\_. I am made by adding together \_\_\_\_\_.

**Clue 4.** I am a multiple of 36.

I am \_\_\_\_\_. I am made by adding together \_\_\_\_\_.

Make up some more puzzles of your own.

# Mental calculation strategies

## Learning objectives

- ◆ Use patterns of similar calculations.
- ◆ Use the relationship between addition and subtraction.

## Resources

'Addition squares'

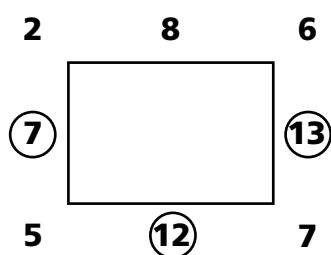
## Teacher's notes

In this activity children must work out which numbers are missing from the empty circles round the perimeter of a square.

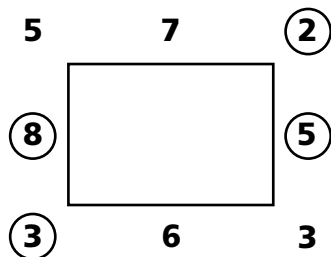
The rule to follow is: **the sum of the numbers on two corners is the number in the centre of a side.**

Make sure the children understand this rule; also that the number zero is not used. Addition and subtraction are required to find the missing numbers.

The solutions are:

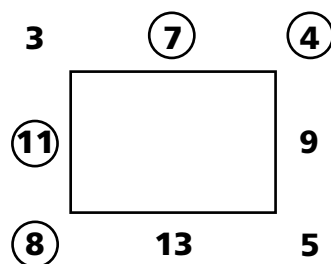


This square presents no real problems since all the corner numbers are known. Three additions are required.

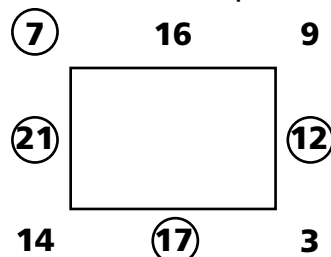


The top and bottom are completed by subtractions:  $7 - 5 = 2$  and  $6 - 3 = 3$ . Then the sides are completed by additions.

A sum of seven can be made in these ways:  $6 + 1 = 7$ ;  $5 + 2 = 7$ ;  $4 + 3 = 7$ . These pairs of numbers alternate round the square. So in the case of six and one the two sixes are diagonally opposite and so are the two ones.



Start by completing the base:  $13 - 5 = 8$ . The left side can then be completed. Complete the right side:  $9 - 5 = 4$ . The top can then be completed.



The top is completed by subtraction:  $16 - 9 = 7$ . The bottom is completed by addition:  $14 + 3 = 17$ . Then the sides are completed by additions.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Addition squares

In an addition square the number in the centre of a side is made by adding the two numbers at the corners.

**Example:**

<b>1</b>	<b>5</b>	<b>4</b>	<b>1 + 4 = 5</b>
<b>3</b>		<b>7</b>	<b>1 + 2 = 3</b>
<b>2</b>	<b>5</b>	<b>3</b>	<b>3 + 4 = 7</b>
			<b>2 + 3 = 5</b>

- Some numbers are missing from these addition squares. Write the missing numbers in the empty circles. The number 0 is not used.

<b>2</b>	<b>8</b>	<b>6</b>	<b>3</b>		
					<b>9</b>
<b>5</b>		<b>7</b>	<b>13</b>	<b>5</b>	

<b>5</b>	<b>7</b>		<b>16</b>	<b>9</b>
	<b>6</b>	<b>3</b>	<b>14</b>	

- This square has three solutions:

	<b>7</b>	
<b>7</b>		<b>7</b>
	<b>7</b>	

	<b>7</b>	
<b>7</b>		<b>7</b>
	<b>7</b>	

	<b>7</b>	
<b>7</b>		<b>7</b>
	<b>7</b>	