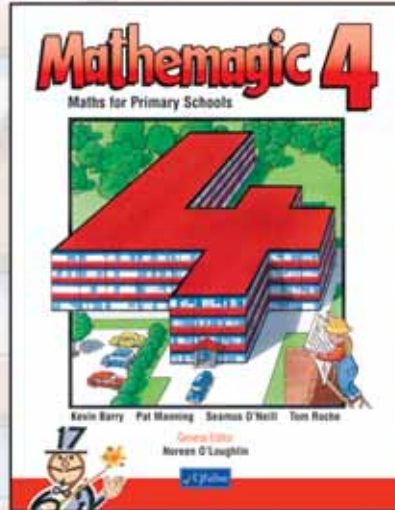


# Mathemagic 4

## Teacher's Resource Book



Noreen O'Loughlin



# Mathemagic

## FOURTH CLASS

BOOK  
TEACHER'S RESOURCE

Noreen O'Loughlin



Published by  
C J Fallon  
Lucan Road, Palmerstown, Dublin 20, Ireland

Editorial Content  
©  
Noreen O'Loughlin

Artwork and Design  
©  
C J Fallon

First Edition April 2003

All rights reserved. No part of this publication may be reproduced or transmitted, in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior written permission of the publishers.

The publishers acknowledge permission from the Department of Education and Science to reproduce extracts for fourth class from the Mathematics Curriculum and Mathematics Teachers Guidelines. Permission to publish does not imply Departmental approval for this book or its contents.

## PREFACE

This Teacher's Resource Book, accompanying *Mathemagic 4*, is designed to help the teacher plan for and support the learning of mathematics in **Fourth Class**.

### Key features include:

#### ⊙ **Review of important aspects of the mathematics programme**

#### ⊙ **Overview of each Strand Unit**

An overview, including the objectives, of each Strand Unit is offered under the following headings:

- Page references — relevant pages in pupil's book and Shadow Book
- Language — some of the relevant language associated with the Strand Unit
- Resources — a list of appropriate resources to support the necessary hands-on experience
- Linkage — possible linkages with other aspects of the mathematics curriculum

#### ⊙ **Detailed treatment of aspects of each Strand Unit**

Each aspect of the various Strand Units is dealt with separately, under the following headings, to ensure maximum attention to the important concepts:

- Keep in Mind — the new concept/skill is placed in context
- Page Notes — each relevant page in the pupil's book is treated to ensure optimum value and consolidation

### Included in the Appendices are

#### ⊙ **Schemes of work**

Taking cognisance of the objectives provided in the curriculum, a suggested progression is provided in each area to give teachers an overview of the entire Strand Unit and to aid planning.

#### ⊙ **Planning grids for each term**

Planning is aided using all curriculum objectives divided into work for the three terms. Photocopiable.

#### ⊙ **Pupil profile**

Records pupil progress using descriptors including personal qualities, application to mathematics as well as overall development in key areas of the curriculum. Photocopiable.

#### ⊙ **Assessment**

Objectives are listed and used as a means of recording the detailed progress of individual pupils. Photocopiable.

#### ⊙ **Lesson plans to support problem-solving pages**

Given the importance of problem-solving in the programme, a suggested approach is offered to support the process.

# CONTENTS

	<b>Preface</b> .....	iii	
	<b>Overview of programme</b> .....	vi-vii	
Chapter 1	<b>Key aspects of the Mathematics Curriculum</b> .....		<b>1</b>
	Constructivism .....	2	
	Language .....	2	
	Estimation .....	3	
	Mental mathematics .....	4	
	Calculator .....	5	
	Problem-solving .....	5	
	Assessment .....	6	
Chapter 2	<b>Strand: Number</b> .....		<b>7</b>
	<b>Strand Unit: Place value</b> .....	8	
	Place value to 9999 .....	9	
	Estimation strategies .....	10	
	<b>Strand Unit: Operations (Addition and Subtraction)</b> .....	11	
	Addition and subtraction without and with renaming to 9999 .....	12	
	<b>Strand Unit: Multiplication</b> .....	13	
	Multiplication .....	14	
	<b>Strand Unit: Division</b> .....	17	
	Division without and with remainders .....	18	
	Linking the operations (addition, subtraction, multiplication, division) .....	20	
	Word problems (addition, subtraction, multiplication, division) .....	21	
	<b>Strand Unit: Fractions</b> .....	23	
	Families of fractions .....	24	
	<b>Strand Unit: Decimals</b> .....	26	
	Decimals .....	27	
Chapter 3	<b>Strand: Algebra</b> .....		<b>31</b>
	<b>Strand Unit: Number patterns and sequences</b> .....	32	
	Number patterns and sequences .....	32	
	<b>Strand Unit: Number sentences</b> .....	34	
	Number sentences .....	35	
Chapter 4	<b>Strand: Shape and Space</b> .....		<b>37</b>
	<b>Strand Unit: 2-D Shapes</b> .....	38	
	2-D Shapes .....	39	

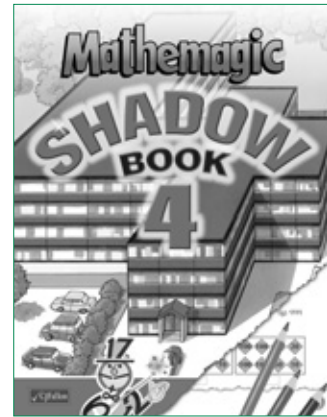
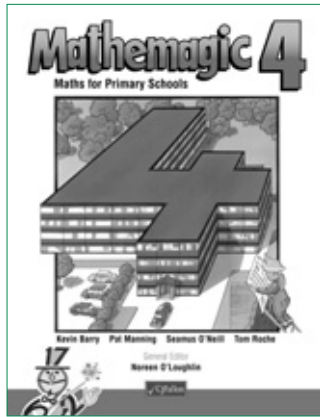
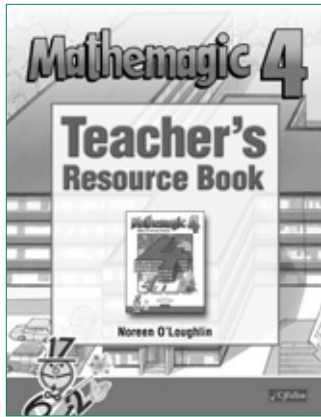
# CONTENTS

	<b>Strand Unit: 3-D Shapes</b> .....	41	
	3-D Shapes .....	42	
	<b>Strand Unit: Symmetry</b> .....	44	
	Symmetry .....	45	
	<b>Strand Unit: Lines and Angles</b> .....	46	
	Lines and Angles .....	47	
Chapter 5	<b>Strand: Measures</b> .....		<b>49</b>
	<b>Strand Unit: Length</b> .....	50	
	Length .....	51	
	<b>Strand Unit: Area</b> .....	53	
	Area .....	53	
	<b>Strand Unit: Weight</b> .....	55	
	Weight .....	56	
	<b>Strand Unit: Capacity</b> .....	58	
	Capacity .....	59	
	<b>Strand Unit: Time</b> .....	61	
	Time .....	63	
	<b>Strand Unit: Money</b> .....	64	
	Money .....	65	
Chapter 6	<b>Strand: Data</b> .....		<b>67</b>
	<b>Strand Unit: Representing and interpreting data</b> .....	68	
	Representing and interpreting data .....	69	
	<b>Strand Unit: Chance</b> .....	70	
	Chance .....	71	
Chapter 7	<b>Problem-solving</b> .....		<b>73</b>
	<b>Problem-solving strategies</b> .....	75	
	Work backwards .....	76	
	Use or make a table .....	77	
Chapter 8	<b>Appendices ... PHOTOCOPIABLE</b> .....		<b>79</b>
	(Listing page 81)		



# OVERVIEW OF **Mathemagic** FOURTH CLASS PROGRAMME

TEACHER'S RESOURCE BOOK, PUPIL'S BOOK AND SHADOW BOOK Actual size 210 x 272 mm



## CLASSROOM POSTERS

Actual size 680 x 455 mm

### Big numbers

10 tens = 1 hundred (100)

10 hundreds = 1 thousand (1000)

1 thousand = 1 hundred + 4 tens + 3 units = 1143

th	h	t	u
1	1	4	3

1

### Adding big numbers

Regroup units to tens, tens to hundreds and hundreds to thousands.

**first step** Add the units and regroup to tens.

$$\begin{array}{r} \text{th} \text{ h} \text{ t} \text{ u} \\ 2 \ 6 \ 4 \ 7 \\ + 1 \ 5 \ 8 \ 4 \\ \hline \end{array}$$

**second step** Add the tens and regroup to hundreds.

$$\begin{array}{r} \text{th} \text{ h} \text{ t} \text{ u} \\ 2 \ 6 \ 4 \ 7 \\ + 1 \ 5 \ 8 \ 4 \\ \hline \end{array}$$

**third step** Add the hundreds and regroup to thousands.

$$\begin{array}{r} \text{th} \text{ h} \text{ t} \text{ u} \\ 2 \ 6 \ 4 \ 7 \\ + 1 \ 5 \ 8 \ 4 \\ \hline \end{array}$$

**fourth step** Add the thousands.

$$\begin{array}{r} \text{th} \text{ h} \text{ t} \text{ u} \\ 2 \ 6 \ 4 \ 7 \\ + 1 \ 5 \ 8 \ 4 \\ \hline 4 \ 2 \ 0 \ 1 \end{array}$$

### Subtracting big numbers

**first step** Remove 1 unit to units and subtract the units.

$$\begin{array}{r} \text{th} \text{ h} \text{ t} \text{ u} \\ 5 \ 4 \ 8 \ 7 \\ - 1 \ 6 \ 8 \ 0 \\ \hline \end{array}$$

**second step** Remove 1 hundred to tens and subtract the tens.

$$\begin{array}{r} \text{th} \text{ h} \text{ t} \text{ u} \\ 5 \ 4 \ 8 \ 7 \\ - 1 \ 6 \ 8 \ 0 \\ \hline \end{array}$$

**third step** Remove 1 thousand to hundreds and subtract the hundreds.

$$\begin{array}{r} \text{th} \text{ h} \text{ t} \text{ u} \\ 5 \ 4 \ 8 \ 7 \\ - 1 \ 6 \ 8 \ 0 \\ \hline \end{array}$$

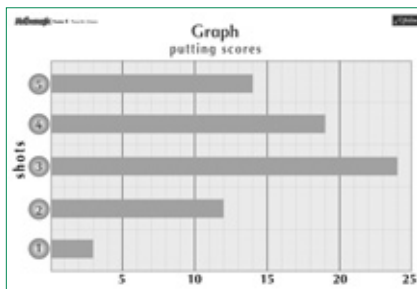
**fourth step** Subtract the thousands.

$$\begin{array}{r} \text{th} \text{ h} \text{ t} \text{ u} \\ 5 \ 4 \ 8 \ 7 \\ - 1 \ 6 \ 8 \ 0 \\ \hline 3 \ 7 \ 0 \ 7 \end{array}$$

2

### The calculator

3



4

### Multiplication

This card shows  $7 \times 5 = 42$ .  
Turn it on its side.  
It now shows  $5 \times 7 = 42$ .  
We see that  $7 \times 5 = 5 \times 7 = 42$ .

$7 \times 3 = 21$  or  $(5 \times 3) + (2 \times 3) = 21$

$4 \times 20 = 80$  or  $4 \text{ times } 2 \text{ tens} = 8 \text{ tens} = 80$

$3 \times 30 = 90$  or  $3 \text{ times } 3 \text{ tens} = 9 \text{ tens} = 90$

5

### Multiplication

$3 \times 4 = 12$  or  $3 \times 4 = 4 \times 3 = 12$

$4 \times 3 = 12$

$(5 \times 4) = 20$  or  $(5 \times 4) = 20$  or  $(5 \times 4) = 20$

$(5 \times 4) \text{ three times} = 60$  or  $(5 \times 4) \times 3 = 20 \times 3 = 60$

$7 \times 5 = 35$  or  $(4 \times 5) = 20$  or  $(3 \times 5) = 15$

$7 \times 5 = 35$  or  $(2 \times 5) = 10$  or  $(5 \times 5) = 25$

6

**Multiplication**

$17 \times 4 = ?$

(a) Addition method  
 $17 + 17 + 17 + 17 = 68$

(b) Multiplication method  
 $(10 \times 4) + (7 \times 4)$   
 $= 40 + 28 = 68$

(c) Quick method

17
$\times 4$
68

$28 \Rightarrow (7 \times 4)$   
 $68 \Rightarrow (10 \times 6.8)$   
 $68 \Rightarrow (17 \times 4)$

$17 \times 4 = ?$

1	7
$\times$	4
6	8

short way  $\times$

1	7
$\times$	4
6	8

$17 \times 4 = 68$

7

**2-D shapes**

square, rhombus, rectangle, parallelogram, trapezium, trapezoid, octagon, diamond, square, pentagon, irregular pentagon, hexagon, triangle, isosceles triangle, scalene triangle, equilateral triangle

isosceles triangle has three equal sides.  
 An equilateral triangle has three equal sides.  
 A scalene triangle has no equal sides.

8

**Compass/clocks**

North, South, East, West

acute angle, obtuse angle

These two watches show a 5 minutes past 7 or just after four past 7.

These two watches show a 5 minutes past 9 or exactly half past 9.

9

**Fractions**

**1 unit**

$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$
$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$

10

**Fractions**

Each shape is divided into five equal parts. Each part is one fifth ( $\frac{1}{5}$ ).  
 $\frac{1}{5}$  of the rectangle is coloured.  
 $\frac{1}{5}$  of the circle is coloured.

$\frac{1}{5}$  of the fraction wall is coloured.  
 $\frac{1}{5}$  of the number line is coloured.

Each shape is divided into ten equal parts. Each part is one tenth ( $\frac{1}{10}$ ).  
 $\frac{1}{10}$  of the rectangle is coloured.  
 $\frac{1}{10}$  of the circle is coloured.

$\frac{1}{10}$  of the fraction wall is coloured.  
 $\frac{1}{10}$  of the number line is coloured.

11

**Decimals**

units, tenths

$1$   $\frac{1}{10}$

$0 \cdot 1$   
 $\frac{1}{10} = 0.1$

units, tenths

$0$   $\frac{2}{10}$

$0 \cdot 2$   
 $\frac{2}{10} = 0.2$

units, tenths

$2$   $\frac{3}{10}$

$2 \cdot 3$   
 $\frac{3}{10} = 2.3$

12

**Decimals**

ones tenths hundredths

units tenths hundredths

$1 \cdot 0 \cdot 1$   
 $\frac{1}{100} = 0.01$

units tenths hundredths

$1 \cdot 0 \cdot 2$   
 $\frac{2}{100} = 0.02$

units tenths

$1 \cdot 1$   
 $\frac{1}{10} = 0.1$

units tenths

$2 \cdot 1$   
 $\frac{1}{10} = 0.1$

units tenths

$2 \cdot 1$   
 $\frac{1}{10} = 0.1$

13

**Adding decimals**

$0.4 + 0.7 = 1.1$

$2 \cdot 3 + 1 \cdot 8 = 4 \cdot 1$

**Subtracting decimals**

$4 \cdot 3 - 1 \cdot 8 = 2 \cdot 5$

$6 \cdot 3 - 4 \cdot 1 = 2 \cdot 2$

$1 \cdot 8 - 1 \cdot 3 = 0 \cdot 5$

$2 \cdot 5 - 1 \cdot 3 = 1 \cdot 2$

14

**3-D shapes**

2-D shapes

shapes around us

construction

square, cube, cube, rectangle, cuboid, cuboid, triangle, triangular prism, triangular prism, square, pyramid, square based pyramid

15

**Multiplying decimals**

units, tenths, hundredths

$1 \cdot 00 \times 2 = 2 \cdot 00$   
 $1 \cdot 00 \times 2 = 2 \cdot 00$   
 $1 \cdot 00 \times 2 = 2 \cdot 00$

Estimate = 2

$1 \cdot 00 \times 2 = 2 \cdot 00$   
 $1 \cdot 00 \times 2 = 2 \cdot 00$   
 $1 \cdot 00 \times 2 = 2 \cdot 00$

Estimate = 2

**Dividing decimals**

$2 \cdot 25 \div 1.2 = 1 \cdot 875$

$2 \cdot 25 \div 1.2 = 1 \cdot 875$

$2 \cdot 25 \div 1.2 = 1 \cdot 875$

Estimate = 1.8

$2 \cdot 25 \div 1.2 = 1 \cdot 875$

$2 \cdot 25 \div 1.2 = 1 \cdot 875$

$2 \cdot 25 \div 1.2 = 1 \cdot 875$

16





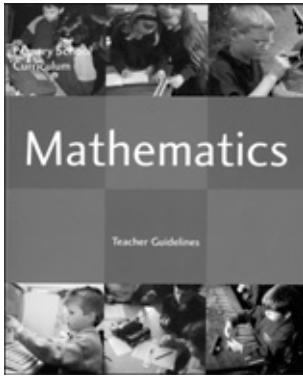


---

*Key Aspects of the Mathematics Curriculum*

---

## CONSTRUCTIVISM



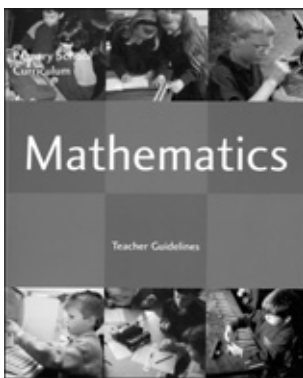
See page 3

*Constructivism approaches are central to this mathematics curriculum. To learn mathematics children must construct their own internal structures.*

**Mathematics Teacher Guidelines**

- ⊙ **Constructivism** is a philosophy of learning, **not** a methodology of teaching. Traditional whole-class or small group teaching approaches can sit happily in a constructivist environment.
- ⊙ To be true to the notion of constructivism, teachers must keep in mind the child's perspective, the learning rather than the teaching. In this way, the teacher's main purpose is to try to ascertain what makes sense to the child i.e., what makes the penny drop for them.
- ⊙ Children generate their own mathematical truths for themselves, at their own pace, but with the guidance of the teacher who offers them appropriate tasks and opportunities for discussion.

## LANGUAGE



See page 30

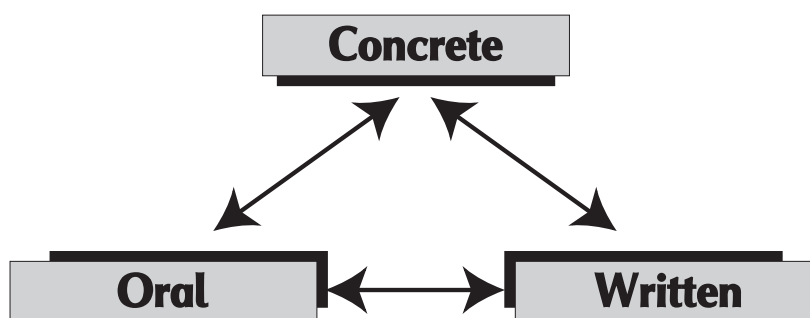
*When children use mathematical language it is important that they use it accurately. Understanding mathematical language leads to the correct interpretation of mathematical symbols and accurate reading of algorithms or word problems.*

**Mathematics Teacher Guidelines**

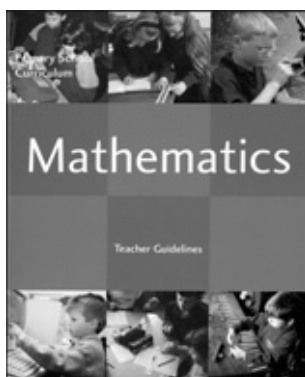
- ⊙ Dealing with mathematics requires that the children understand and apply new mathematical terms and symbols as well as gain a new sense of familiar ordinary **language** as applied in a mathematics context.
- ⊙ Although there is a temptation to introduce **symbols** at an early stage, the use of written symbols should be delayed for as long as possible. The greatest difficulty for the pupils is the premature use of written symbols.
- ⊙ Using **manipulatives** and generating **discussion** offers a more structured and scaffolded approach to the development of difficult

concepts. Only when a child can explain, discuss and use manipulatives demonstrating their grasp of a concept should symbols be introduced.

- ⊙ A simple, but effective three-pronged approach is offered below. In introducing a concept, it suggests that the teacher present the idea using **manipulatives**, that generous time be allotted to **discussing** the concept and that finally, **recording** of the activity take place. Recording an account of the activity does not require formal written symbolism from the outset. It could take the form of using the materials to show an outcome, drawing a picture or writing a story using ordinary language. This transition phase is vital in bridging the move from using manipulatives to using formal written symbols.



## ESTIMATION



See page 32

*Throughout all the strands of this curriculum, emphasis has been placed on the development of estimation strategies.*

*Mathematics Teacher Guidelines*

- ⊙ **Estimation** is a life skill. It is arguably the mathematical skill used most often each day by any one of us. Think about today. You have probably already estimated how long it would take to come to school; how much money you need for today; how much change you are due; if you have enough petrol to complete your journey; about what time you will get home.
- ⊙ In the mathematics context, estimation is about replacing exact figures with approximations in order to make calculations more

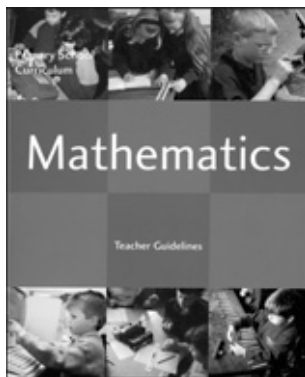
manageable. The objective is to either find a **rough** answer or to check if an answer is **reasonable**.

- ⊙ In the age of **calculators**, the ability to estimate is becoming even more necessary.
- ⊙ Children who can estimate well develop a greater **sense of number** which positively affects their computational skills.
- ⊙ The skill of estimating needs to be taught. While **rounding** is the approach most familiar to us, there are other useful and effective strategies also.

## MENTAL MATHEMATICS

- ⊙ Recall of important mathematics facts is vital if pupils are to make progress in all aspects of the mathematics programme.
- ⊙ In the past, being able to ‘sing off the tables’ was seen as the objective, with speed being the yardstick by which mental arithmetic was measured. **Fluency** in number facts is a better goal. In this way, the children are encouraged to derive mathematics facts from previous knowledge, rather than solely from memory. This skill will stand to them in the long term.
- ⊙ Effective and fluent **recall** can only take place in the context of learning which is supported and scaffolded appropriately with manipulatives.
- ⊙ Skills in mental mathematics involve developing in young children the ability to produce **exact answers** to simple problems and in the older classes, **approximate answers** to more complicated problems.

## CALCULATOR



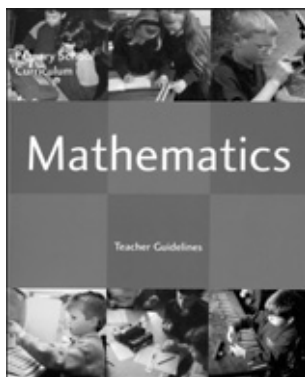
See page 60

*The calculator can play a significant role in the mathematics programme from fourth to sixth class.*

**Mathematics Teacher Guidelines**

- ⊙ Calculators are a useful resource in supporting complex calculations, motivating pupils and supporting problem solving.
- ⊙ Pupils will need to have a well-developed sense of number, particularly estimation, in order to utilise the calculator efficiently.
- ⊙ A balance between paper-and-pencil, mental and calculator-based approaches is necessary in ensuring pupils are equipped to deal with mathematics.

## PROBLEM-SOLVING



See page 35

*Problems in mathematics have often been seen as textbook examples at the end of a section on a particular topic. Problems in life are rarely that simple...*

**Mathematics Teacher Guidelines**

- ⊙ The ultimate reason for guiding the pupils to learn mathematics concepts and skills is to equip them to deal with them in a **real** context. It is worth thinking about when you last used mathematics in your life - take a typical day and look at where mathematics was significant. One thing is for sure, not since you left school were you asked to complete a **page of sums**. Learning to solve problems is a useful skill across all curricular areas.
- ⊙ Problems are often narrowly perceived as solely word problems. A problem may be more broadly defined as a task where the solution or the **procedure for finding the solution** is **initially unclear**. All mathematics lessons can be presented as problems. *I wonder how we might solve this. Do you have any idea how we might go about this one?*



- ⊙ A broad spectrum of problems is vital to extend the children's thinking skills. **Puzzles, investigations, games** are all useful. Traditional word problems which usually focus on applying skills recently learned also have a role, but should not dominate the work.
- ⊙ Children need to be taught appropriate problem-solving strategies. These should not be rushed and plenty of time for pair-work, group-work and discussion needs to be allowed.

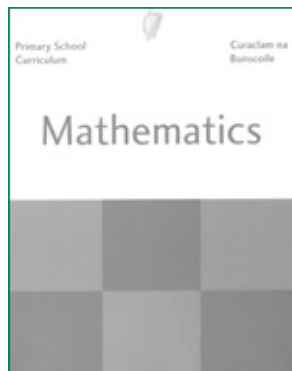
## ASSESSMENT

- ⊙ Assessment is a continuous, dynamic and often informal process.



**STRAND**

Number

**STRAND UNIT:***Place value*

See page 64

**Objectives:***The child should be enabled to*

- explore and identify place value in whole numbers, 0-9999
- read, write and order four-digit numbers and solve simple problems
- round whole numbers to the nearest thousand
- explore and identify place value in decimal numbers to two places of decimals

*Mathematics Curriculum***Page references:**

- ⊙ *Mathemagic 4* pages 7-10, 115-119
- ⊙ Review pages 67, 128, 169, 173
- ⊙ *Shadow Book 4* pages 1, 49-50

**Language:**

- ⊙ units, tens, hundreds, thousands, digit, number, rename, groups, bundles, regroup

**Resources:**

- ⊙ *Teacher's Resource Book (TRB4)* Appendices 3.1, 3.2
- ⊙ Posters 1, 2 (see page vi)

**Linkage:**

- ⊙ operations, problem-solving, measures

## PLACE VALUE TO 9999

## Keep in Mind

- ⊙ Attention has been given in third class to place value up to 999. It is important that time is given to an in-depth review of concepts acquired at that stage, using manipulatives and discussion.
- ⊙ Children have applied what they have learned about place value in terms of addition and subtraction with renaming.
- ⊙ Sometimes, as adults, we forget how difficult the concept of place value really is. Take, for example, 5432. To fully understand this number, it requires us to know that the right-most digit represents units and that each place is ten times greater as we move to the left. So there are 2 units, 3 tens, 4 hundreds and 5 thousands. This gives us  $(2 \times 1)$ ,  $(3 \times 10)$ ,  $(4 \times 100)$ ,  $(5 \times 1000)$ . This works out as 2, 30, 400, 5000. But we still have to add them to find the value  $2 + 30 + 400 + 5000 = 5432$ .

## Page Notes

Chapter 2 Big numbers

1. What number is shown on each notation board?

2. Show the following numbers on your notation board.

3. Use your notation board to show the following.

Page 7

Thousands

1. What number is shown on each notation board?

2. Show the following numbers on your notation board.

3. Do the following in the same way.

Page 8

Thousands

1. Fill in the missing numbers on each flag.

2. Write tens for each of these groups of number bags.

3. Draw number bags to show the following numbers.

Page 9

Thousands

1. Write the following numbers in figures.

2. Write the following numbers in words.

3. Write 0 in words. 0 in figures. Write the value of the underlined digit.

4. Write the number that is nearest to the given number.

Page 10

**page 7** The relationship between 10 groups of ten and one hundred, and between 10 groups of one hundred and one thousand is illustrated to support pupils' hands-on activity. A link is made between the concrete representations and the already-familiar notation board. It is very important that pupils see the value of each digit in relation to its place in the number.

**page 8** Further exposure to the notation board is offered. This should not prove difficult for the pupils – however, it will be necessary to probe them to determine the level of their understanding. Writing

numbers in their expanded form, as in the last section, will help in this regard.

**page 9** Ordering four-digit numbers is the objective on this page. Filling in the missing sequence is enjoyable and effective in so doing. Adding groups of 1000s, 100s, 10s and 1s helps develop the relationship between each group. It is also a good foundation for the development of mental strategies which will come later.

**page10** Pupils are given amounts in words and asked to write the number in figures and vice versa. Ensure the children understand the concept of place value by having them identify the value of each of the digits according to their place in the number.

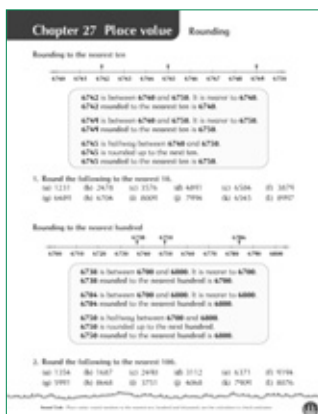
## ESTIMATION STRATEGIES

### Keep in Mind

- ⊙ At this point, pupils have had exposure to the front-end strategy focusing on using the tens and also to rounding to the nearest ten and hundred.
- ⊙ Research has shown that children who develop the ability to estimate well become more accurate in computation as it develops their number sense and encourages them to be alert to the reasonableness of their answer.
- ⊙ Children often feel that estimates give wrong answers. They will need to be reassured that it is a very useful skill and that we don't always need an accurate answer.
- ⊙ Use contexts where an estimate is appropriate, e.g. shopping, measuring.

### Page Notes

**page 115** reviews pupils' understanding of place value concepts of four-digit numbers and their knowledge of rounding to the nearest ten and hundred. It focuses on identifying the ten which is nearest to various numbers. Rounding to the nearest 100 follows the same procedure. Using the number line to plot the numbers readily shows their proximity to the nearest ten or hundred.



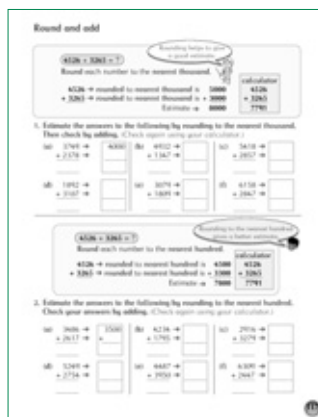
Page 115

**page 116** A similar approach is taken to rounding to the nearest thousand. The support of the number line is offered and a real-life example is offered to help put the skill of estimation in context.

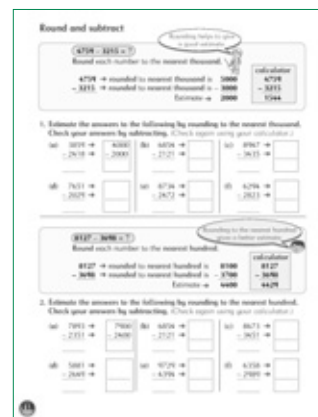
**pages 117/118** Applying the skill to the operation is the next step. This is done in stages – first by rounding to the nearest thousand and then by rounding to the nearest hundred. Pupils will need to carry out the actual operation to see the relevance of estimation. Have them say if the estimate was close. They should be encouraged to use their calculator to check their answers. It may also be useful to have them use their calculators to compare their answer to their estimate.



Page 116



Page 117



Page 118

# STRAND UNIT: *Operations (Addition and Subtraction)*



See page 65

## Objectives:

*The child should be enabled to*

- add and subtract, without and with renaming, within 9999
- know and recall addition and subtraction facts
- solve word problems involving addition and subtraction

**Mathematics Curriculum**



**Page references:**

- ⊙ *Mathemagic 4* pages 11-15
- ⊙ *Review* pages 67, 128, 171
- ⊙ *Shadow Book 4* pages 2-4

**Language:**

- ⊙ combine, partition, make, count, altogether, add, plus, equals, more, sign, sum, jump, split, total, regroup, estimate, units, tens, hundreds, digit, less than, more than, take away, subtract, minus, leave, difference between, compare, how much less? how many are left? count on, count back

**Resources:**

- ⊙ *TRB4* Appendices 3.3, 3.4
- ⊙ *Posters* 2, 3 (see page vi)

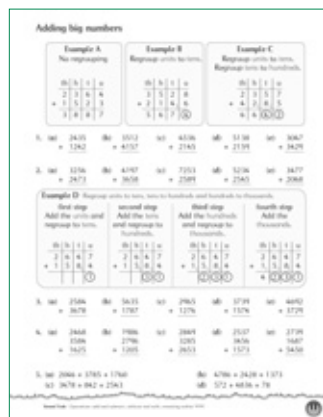
**Linkage:**

- ⊙ place value, measures, problem-solving

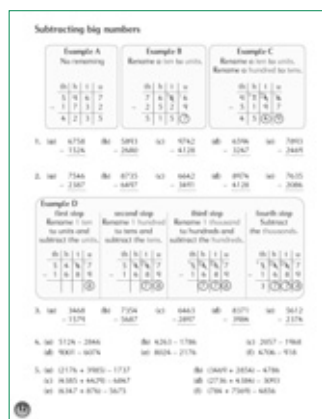
**ADDITION AND SUBTRACTION WITHOUT AND WITH RENAMING TO 9999**

**Keep in Mind**

- ⊙ Addition and subtraction, without and with renaming to 999, has been introduced to pupils in previous classes using materials, e.g. lollipop sticks, the notation board or the abacus with which the children will be familiar. The skills of addition and subtraction should not prove too great a step at this point, but it is important to keep reminding the pupils of the value of each number and the relationship between each.
- ⊙ This work on these operations comes at a point when pupils can build on the extended place value concepts which they have just encountered.



Page 11



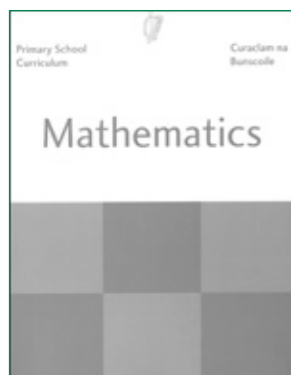
Page 12

## Page Notes

- p 11/12** support pupils' introduction to the addition of four-digit numbers by building on their understanding of place value and regrouping/renaming. It highlights the importance of correctly aligning the digits according to their value. Pupils are guided through each step and are offered opportunities for practice and consolidation using vertical and horizontal formats.

# STRAND UNIT:

## Multiplication



See pages 65 and 66

### Objectives:

*The child should be enabled to*

- ▶ develop an understanding of multiplication as repeated addition and vice versa
- ▶ explore, understand and apply the zero, commutative and distributive properties of multiplication
- ▶ develop and recall multiplication facts within 100
- ▶ multiply a two-digit or three-digit number by a one or two-digit number
- ▶ use a calculator to check estimates
- ▶ solve and complete practical tasks and problems involving multiplication of whole numbers

*Mathematics Curriculum*

### Page references:

- ☉ *Mathemagic 4* pages 24-28, 83-89, 99-100, 107-110
- ☉ *Review* pages 68, 70, 130, 171, 173, 174
- ☉ *Shadow Book 4* pages 7-8, 32-33, 40-41, 45-46

**Language:**

- ⊙ count, equal groups of, times, multiply by, amount, total, altogether, equals, columns, rows, repeated, horizontally, vertically, inverse, rounding

**Resources:**

- ⊙ *TRB 4* Appendix: 3.17
- ⊙ *Poster* 3, 5, 6 and 7 (see pages vi and vii)

**Linkage:**

- ⊙ addition, division, problem-solving, measures

**MULTIPLICATION****Keep in Mind**

- ⊙ In previous classes, the pupils have had significant experience of deriving multiplication facts through repeated addition. The approach taken early in *Mathemagic 4* dovetails neatly with this.
- ⊙ At this point, pupils will have had considerable opportunities to experience the development of the concept of multiplication and should be fluent in their multiplication facts up to 100.
- ⊙ Reviewing the zero, commutative and distributive properties of multiplication is useful in helping the children recall and derive facts. Looking again at multiplication of 1, 10 and 0 is important in preparation for long multiplication.
- ⊙ Long multiplication is a complex operation and requires that all the prerequisite concepts/skills are in place. These include multiplication facts to 100, multiplication by 10, addition and place value.



**Chapter 19: Multiplication 2** Interesting facts

1. Complete these. (You may use your preferred to help you.)

So  $(3 \times 4) \times 2 = 12 \times 2 = 24$   
 $(4 \times 3) \times 2 = 12 \times 2 = 24$   
 $(2 \times 6) \times 2 = 12 \times 2 = 24$   
 $(6 \times 2) \times 2 = 12 \times 2 = 24$

2. Use the following facts to complete the tables.

3. Do the following sums in the same way.

4. Do the following sums in the same way.

5. Do these the short way (multiplying by 10 by writing the zero last).

Page 83

Interesting facts

Use counters or make diagrams to show that:

1.  $(3 \times 4) \times 2 = 12 \times 2 = 24$   
 $(4 \times 3) \times 2 = 12 \times 2 = 24$   
 $(2 \times 6) \times 2 = 12 \times 2 = 24$   
 $(6 \times 2) \times 2 = 12 \times 2 = 24$

2. Use the following facts to complete the tables.

3. Do the following sums in the same way.

4. Do the following sums in the same way.

5. Do these the short way (multiplying by 10 by writing the zero last).

Page 84

Multiplying big numbers

1. A quick look back.

2. Do the following sums in the same way.

3. Fill in the boxes to make these number sentences true.

4. Complete these:

Page 85

Multiplying big numbers

1. A quick look back.

2. Do the following sums in the same way.

3. Do the following sums in the same way.

4. Do the following sums in the same way.

5. Do these the short way (multiplying by 10 by writing the zero last).

Page 86

**page 83** illustrates the associative property clearly. As before, it is advisable to ask the pupils to use materials to experience this for themselves.

**page 84** Opportunities to reinforce this concept and that of the distributive property are provided on this page.

**page 85** In preparation for multiplication of larger numbers, a quick revision of the work covered to this point, i.e. multiplication facts through the various properties, is provided.

**page 86** This page extends the use of the associative property to use when multiplying by multiples of ten. The method used will, in time, be a very useful basis for a mental strategy. Even at this point, it may be beneficial to have the pupils undertake the tasks orally in order to grasp the concept. Pupils are encouraged to multiply by the unit first and then to multiply the answer by 10.

**page 87** focuses on multiplying by a two-digit number. This approach is not new to the pupils. They are gently moved to draw together the many strands which they have already used – multiplication facts to 100, multiplication by 10, the distributive property and vertical multiplication. Practice exercises are given to help consolidate the concept.

Multiplying big numbers

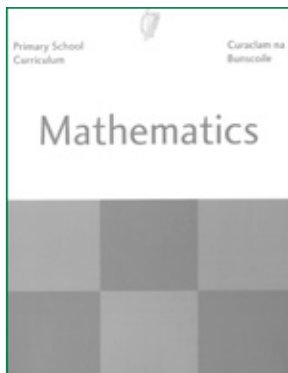
1. Do these using the horizontal method, and (b) the vertical method.

2. Use method (b), the vertical method, to do these.

3. Do these using method (a) and method (b).

4. Use method (b) the vertical method to do these.

Page 87

**STRAND UNIT:***Division*

See pages 67 and 68

**Objectives:**

*The child should be enabled to*

- ▶ develop an understanding of division as sharing and repeated subtraction, without and with remainders
- ▶ develop and/or recall division facts within 100
- ▶ divide a three-digit number by a one-digit number, without and with remainders
- ▶ use calculators to check estimates
- ▶ solve and complete practical tasks and problems involving division of whole numbers

**Mathematics Curriculum**

**Page references:**

- ⊙ *Mathemagic 4* pages 29-32, 89-92, 99-100
- ⊙ *Review* pages 68, 70, 130, 171
- ⊙ *Shadow Book 4* pages 9-10, 34-35, 40-41, 43-44

**Language:**

- ⊙ share, equally, fair, shares, sharing, one each, two each, groups of, grouping, repeat, repeated subtraction, how many times?, divide, divided by, divided into, left over, remainder, inverse

**Resources:**

- ⊙ *TRB 4* Appendices 3.8, 3.9
- ⊙ *Poster 3* (see page vi)

**Linkage:**

- ⊙ subtraction, multiplication, fractions, problem-solving, money



# DIVISION WITHOUT AND WITH REMAINDERS

## Keep in Mind

- It is important to review the concept of division as sharing and grouping at this point using suitable materials. Remainders can also be revisited in the course of this hands-on process. A similar approach is taken to division as repeated subtraction.
- The division facts necessary for dealing with division formally have already been covered and should be fluently available to the pupils at this stage.

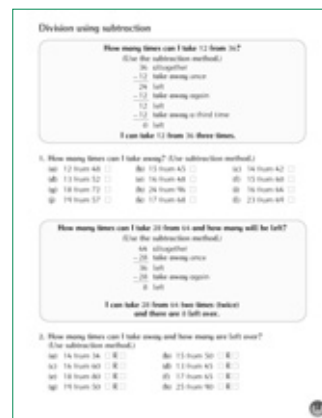
## Page Notes



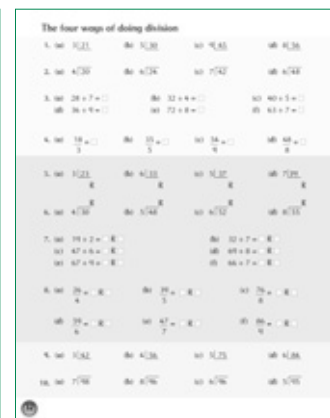
Page 29



Page 30



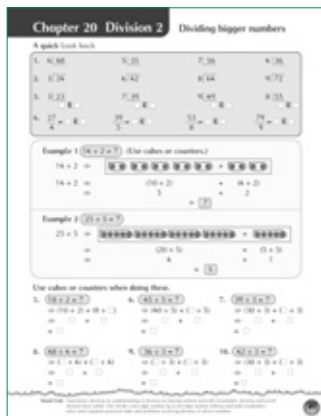
Page 31



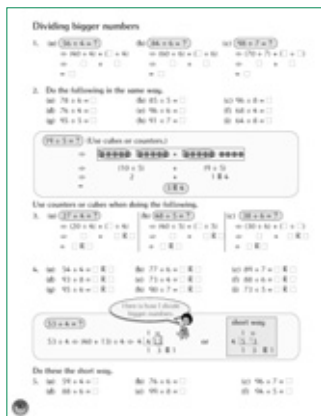
Page 32

- page 29** Using illustrations, division as sharing is reviewed. Remainders are also addressed. Extensive discussion will benefit the pupils before completing the exercises.
- page 30** Similar to the previous page, illustrations are used to review division as grouping. Remainders are also included. Extensive discussion will benefit the pupils before completing the exercises.
- page 31** Following naturally from the application of using division as grouping, division as repeated subtraction is revisited. This is best supported with hands-on activities before using symbolic representation. Record each action as it happens, i.e. as you take each group of 12 from 36. Remainders are also used.
- page 32** revises the four different ways of recording division. Each has been covered in depth in third class and already revised in the earlier *Look back* and so should not prove difficult. Discussion is vital so

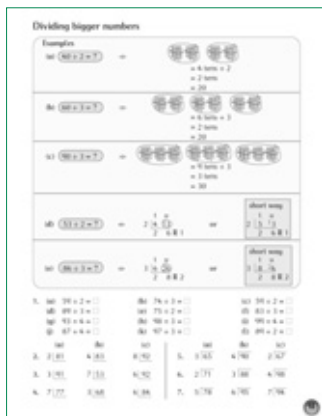
that pupils are assured that while the appearance and presentation is different, the result is exactly the same.



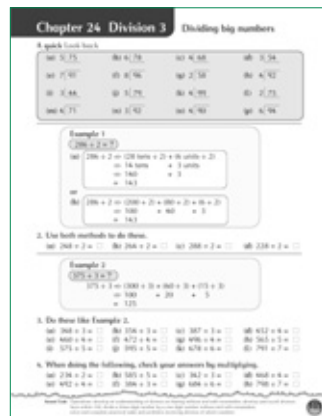
Page 89



Page 90



Page 91



Page 103

**page 89** gives another opportunity to review the division facts with and without remainders before embarking on division of numbers beyond the scope of the memorised division facts. The pupils are prepared for the transition by applying the distributive property to already-known division facts. As they deal with larger numbers, it is important that the result of the first brackets is no more than 10. It would be useful for the pupils to use base-ten materials or to sketch what is happening as they proceed.

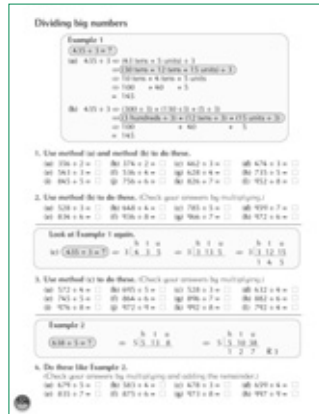
**page 90** provides further practice of the introductory exercises given on the previous pages. Remainders are introduced. The more conventional way of dividing numbers outside the tables is demonstrated at the end of the page.

**page 91** follows on in the same vein, extending into bigger numbers. The pupils are eased into this by linking it with place value concepts and grouping the dividend in bundles of ten. The move to numbers which are not multiples of ten is best introduced by using materials, e.g. lollipop sticks. Practice exercises are offered in two different formats.

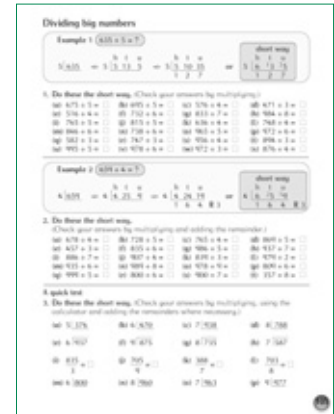
**page 103** The extension to the division of 3-digit numbers is presented as an extension of an earlier approach. Two alternative approaches are presented. Both are based on an understanding of place value. The use of lollipop sticks or base-ten material is advised. Example 1 (a) lends itself to mental approaches, focusing on groups of ten. Example 1(b) also depends on a sound understanding of place value, but it uses the distributive property and is a natural extension of the approach used earlier.

**page 104** Larger numbers are dealt with here. The same approaches are promoted. As with the previous page, the use of materials is recommended. The more conventional format is introduced in a manner which demonstrates the place and purpose of renaming. It follows from the earlier example and from the approach used when dividing 2-digit numbers. The transition to using the remainder should not prove difficult.

**page 105** Further examples and exercises are offered here. Towards the end of the page, alternative formats are used.



Page 104



Page 105

**LINKING THE OPERATIONS (ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION)**

**Keep in Mind**

- ⊙ At this stage, the pupils are familiar with all the operations, their conceptual basis and how to carry out each one. The value of linking addition and subtraction and of linking multiplication and division as they are being introduced has already been emphasised. This inverse relationship is important not only in terms of the pupils’ conceptual development but in terms of facilitating the recall of the related number facts. In other ways and at a different time, the relationship between multiplication and addition and between division and subtraction has been underlined. The following table may help us to see the interrelationships between the operations. It is important that we encourage the pupils to see the operations as closely related and not to allow a pigeon-holed approach to emerge.

## Page Notes

Page 99

Page 100

**page 99** This page should provide a quick revision of multiplication and division facts already memorised by the pupils. Apart from reviewing the facts themselves, the main objective is to emphasise the relationship between multiplication and division. Pupils can be encouraged to make up their own similar exercises and to swap them with a partner. The word ‘inverse’ is introduced.

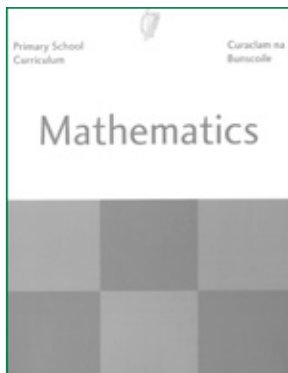
**page 100** Again, the link between repeated addition and multiplication and between repeated subtraction and division is underlined. The exercises also incorporate operations on bigger numbers, estimation and using the calculator.

## WORD PROBLEMS (ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION)

### Keep in Mind

- ⊙ Problems are an effective means of developing children’s understanding of number by having them apply and practice their number skills.
- ⊙ A variety of problems need to be used so that pupils do not begin to apply the same approach to each problem without adequately examining or thinking through the problem.
- ⊙ Pupils will require explicit instruction in approaching problems.
- ⊙ A collaborative approach is promoted with the teacher providing the greatest part of the direction, but moving progressively towards children working together in pairs/groups to tackle the problem.

- ⊙ Language can be an issue. Reading a problem can be difficult for many children. Words like **more** and **less** create serious obstacles for many pupils.
- ⊙ Much of the preparatory work in each of the operations has been taught and reviewed at this stage.
- ⊙ It is helpful if pupils are asked to make up stories around the operation tasks which they have carried out.
- ⊙ The focus is initially on having the children think about the context, the story and the operation. Rather than confusing the issue of understanding with computation, no values are used. Tell stories which require the pupil to decide the operation and to say why.
- ⊙ Using problems which have no numbers involved can be hugely beneficial in focusing the pupils' attention on the heart of the problem. In this way, they are not reading it to use the numbers and to find an answer.
- ⊙ A similar approach can be used when introducing two-step problems. It is useful to tell stories about given number sentences, e.g.  $(23 \times 16) + 4 =$  Perhaps this can be extended to and supported by the use of the number line.
- ⊙ It is important that pupils develop a sense of number and can estimate what their answer will be. In some cases, they may be able to calculate the answer mentally by simply asking *will my answer be more or less than I have now?*

**STRAND UNIT:***Fractions*

See pages 68 and 69

**Objectives:**

*The child should be enabled to*

- ▶ identify fractions and equivalent forms of fractions with denominations of 2, 3, 4, 5, 6, 8, 9, 10 and 12
- ▶ compare and order fractions with appropriate denominators and position on the number line
- ▶ calculate a fraction of a set using concrete materials
- ▶ calculate a number, given a multiple fraction of the number
- ▶ express one number as a fraction of another number
- ▶ solve and complete practical tasks and problems involving fractions

**Mathematics Curriculum**

**Page references:**

- ⊙ *Mathemagic 4* pages 41-47, 53-56
- ⊙ *Review* pages 69, 70, 129, 172, 174
- ⊙ *Shadow Book 4* pages 15-16, 19-20

**Language:**

- ⊙ unit, whole, parts, share between, half, halves, quarters, thirds, sixths, ninths, twelfths, fifths, tenths

**Resources:**

- ⊙ *Posters* 10, 11 (see page vii)

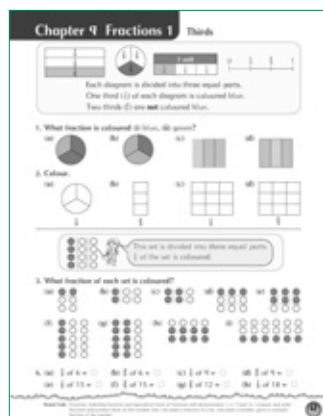
**Linkage:**

- ⊙ decimals, measures

## FAMILIES OF FRACTIONS

### Keep in Mind

- ⊙ Children will have been introduced to the concept of fractions and at this stage are familiar with halves, quarters, eighths and tenths. They know the relationship between them and how to find fractions of sets. It is important to revisit the hands-on work of earlier classes by using manipulatives when introducing new families of fractions to the pupils. Paper-folding is, as before, a valuable approach.
- ⊙ Much of the work on thirds and the other families of fractions needs to be done using materials, only introducing the symbols when discussion of the activity has taken place.
- ⊙ The relationship between the families is crucial to later work on equivalence and consequently to comparing and ordering fractions on the number line.
- ⊙ Calculating a fraction of a set or calculating a number given a multiple fraction of a set can be difficult concepts for the pupils to grasp if they are presented at an abstract level. Concrete means of introducing this aspect are presented clearly in the pupil's book.



Page 41

### Page Notes

- page 41** The progression used to introduce thirds is similar to that used with previous fractions. A fraction wall and segment of the number line are used to represent fractions. Pupils are guided through the identification of thirds, through colouring thirds. They are offered illustrations to support and consolidate their hands-on experience of finding a third of a set before using symbols.
- page 42** builds on the previous page and moves the pupil to finding two-thirds of a set.
- page 43** Sixths are introduced in a similar manner with the fraction wall, number line and illustrated examples. The relationship with thirds is explored and pupils' attention is drawn to the equivalence of thirds and sixths. Pupils will need to use paper-folding or the fraction wall to experience this for themselves.



Page 42

Page 43

Page 44

**page 44** Similar to previous pages, the pupils are given illustrations to consolidate hands-on work in finding unit and multiple fractions of a set.

Page 45

Page 46

Page 47

**page 45** A similar approach to page 43 is suggested.

**page 46** A similar approach to page 44 is suggested.

**page 47** There is a focus here on identifying and colouring twelfths of units. The fraction wall can be used to highlight the relationship with thirds. Attention is also given to finding the whole number when given a multiple fraction. This needs to be introduced using materials and pupils should not use symbols until the concept involved is firmly in place.

Page 53

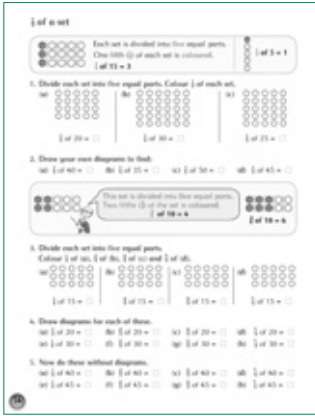
**page 53** A similar approach to page 41 is suggested.

**page 54** A similar approach to page 42 is suggested.

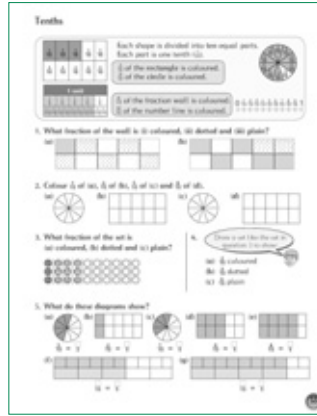
**page 55** A similar approach to page 43 is suggested.



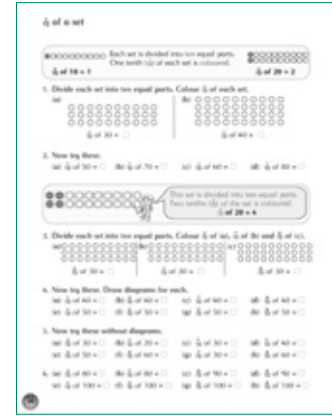
**page 56** A similar approach to page 44 is suggested.



Page 54



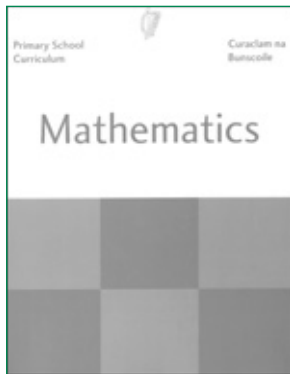
Page 55



Page 56

# STRAND UNIT:

# Decimals



See page 69

## Objectives:

*The child should be enabled to*

- express tenths and hundredths as fractions and decimals
- identify place value of whole numbers and decimals to two places and write in expanded form
- order decimals on the number line
- add and subtract whole numbers and decimals up to two places
- multiply and divide a decimal number up to two places by a single-digit whole number
- solve problems involving decimals

**Mathematics Curriculum**

### Page references:

- ☉ *Mathemagic 4* pages 57-61, 78-79, 138-141
- ☉ Review pages 129, 131, 172, 173, 174

- ☉ *Shadow Book 4* pages 21-22, 29-30, 57-58

### Language:

- ☉ tenths, hundredths, whole numbers, order, estimate

### Resources:

- ☉ *TRB 4* Appendix 3.11

*Posters* 12, 13, 14, 16 (see page vii)

### Linkage:

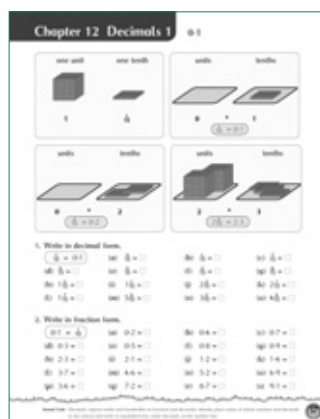
- ☉ fractions, operations, place value, measures

## DECIMALS

### Keep in Mind

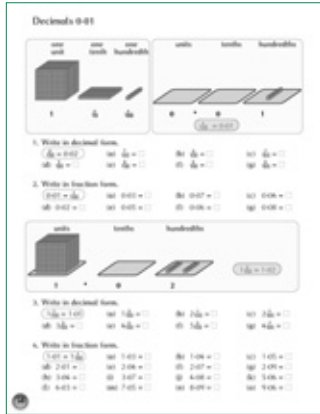
- ☉ The basis and foundation for decimals is firmly laid in the exploration of fractions, particularly tenths.
- ☉ A review of tenths is necessary so the pupils are reminded that 0.1 is equal to  $\frac{1}{10}$  and as preparation for the introduction of  $\frac{1}{100}$  as 0.01.
- ☉ Emphasising the use of decimals in money and measurement gives the pupils a real, tangible representation of their application. It gives them a sense of one hundredth in relation to a whole/full euro or to a whole/full metre.

### Page Notes



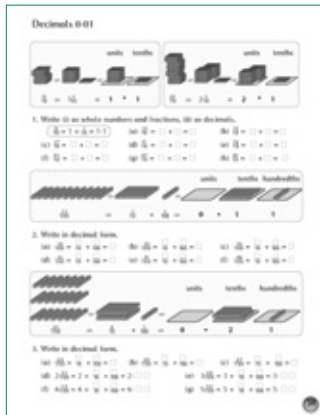
**page 57** reviews the foundations of decimals by following on closely from the chapter immediately preceding on tenths. Illustrations are used to reflect materials likely to have been used in class. In this case, Dienes blocks are used as they are ideal for introducing the concepts of  $\frac{1}{100}$  and will also be appropriate for later introducing  $\frac{1}{1000}$ . Discussion before undertaking these exercises will ensure a thorough review of the concept and a smooth transition to hundredths. Pupils are asked to write simple and mixed fractions in tenths as decimals and vice versa.

**page 58** Retaining a similar approach, pupils are introduced to hundredths. This is only one way to illustrate this concept. As it is quite a step for the children, it is important to use several ways to illustrate the representation of 1 as tenths or hundredths. Refer to the metre stick and show a centimetre as 1 of 100 centimetres or to a cent as 1 of 100 cent in a euro. For many children, it is easier to understand the significance of €0.01, in the context of money than in the abstract as 0.01. The first section of the page explores the relationship between hundredths in their fractional and decimal forms. The second section extends this to include whole numbers, i.e. mixed fractions. Neither section includes tenths at this point.

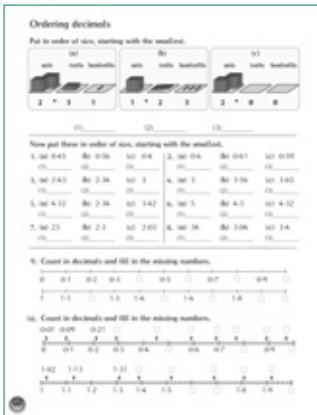


Page 58

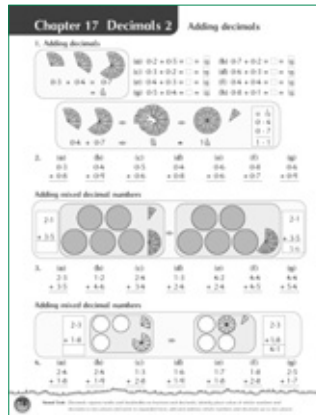
**page 59** The first section develops the concept to include tenths, writing them in an extended form to demonstrate their relationship with their notation in decimal format. For example,  $1\frac{1}{10}$  is 1 whole unit and  $\frac{1}{10}$  which can be written using decimals as 1.1. The same approach is taken in writing hundredths as fractions. Mixed fractions are also written as decimals.



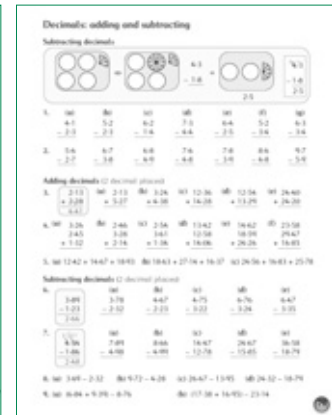
Page 59



Page 60



Page 78



Page 79

**page 60** To facilitate the ordering of decimals, it would be useful to use concrete materials and mats to allow pupils to see the difference in amount between each of the numbers before attempting to plot them on a number line, which can be quite difficult for pupils. This is another place in which pupils can more readily compare the amounts if there is a € sign before them. It can be helpful to do so. The children will need to discuss each of the earlier exercises before attempting to write answers. The second section based on the number line is more abstract and again needs discussion.

**page 78** Having done considerable work on the concepts of tenths and hundredths, the pupil are now directed towards addition and

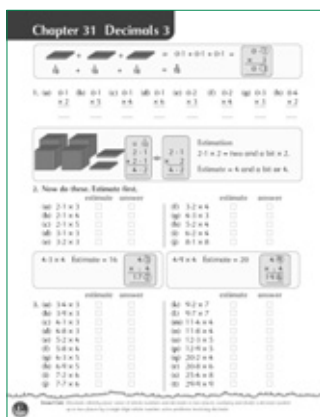
subtraction of tenths. The underlying principles are no different to adding whole numbers and generally do not cause great difficulty for pupils. Nonetheless, it is important to support the operation with concrete materials or representations as used on page 57, particularly with the introduction of renaming of tenths as units.

**page 79** extends to subtraction of tenths and hundredths following a similar approach, without and with renaming, using vertical and horizontal formats. Again, discussion and materials will be vital in ensuring a sound understanding of the concept.

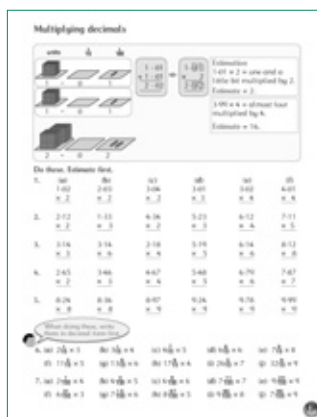
**page 138** The principles used in developing the concept of multiplication with whole numbers are built upon here, i.e. repeated addition. Illustrations are shown to support this approach. In this way, the placement of the decimal point is based on sound mathematical principles. Good practice in first estimating is encouraged as it helps to develop number sense which will further support their understanding of the placement of the decimal point.

**page 139** extends the same principles of repeated addition to develop the multiplication of decimal numbers without and with renaming.

**page 140** Again, it is advisable to use plenty of discussion and concrete materials to develop this concept. Children should be asked to physically divide amounts between a number of children. In this way, when they are recording the operation, the placement of the decimal point will make sense and not be a mechanical exercise.



Page 138



Page 139



Page 140

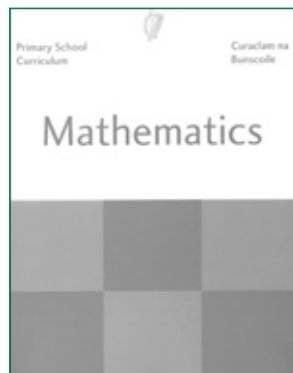




**STRAND**

Algebra

# STRAND UNIT: *Number patterns and sequences*



See page 70

## Objectives:

*The child should be enabled to*

- ▶ explore, recognise and record patterns in number, 0-9999
- ▶ explore, extend and describe sequences
- ▶ use patterns as an aid for memorisation of number facts

*Mathematics Curriculum*

## Page references:

- ⊙ *Mathemagic 4* pages 63-66
- ⊙ Review pages 67, 69
- ⊙ *Shadow Book 4* pages 24-25

## Language:

- ⊙ pattern, sequences, order, describe

## Linkage:

- ⊙ operations, number sentences

## NUMBER PATTERNS AND SEQUENCES

### Keep in Mind

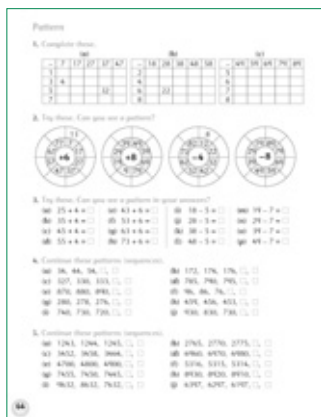
- ⊙ Children enjoy finding patterns in numbers and working with them. They will have had extensive experience of using concrete materials, e.g. the number line and hundred square.
- ⊙ Pattern has helped to develop addition and subtraction strategies and subsequently to support the memorisation of related facts. The development of strategies and number facts in multiplication and division is also supported by the exploration and extension of number patterns.

- ⊙ Using the hundred square can provide a visual support for the pupils to explore the relationship between numbers.
- ⊙ The calculator is an ideal tool for the development, exploration and extension of number patterns.

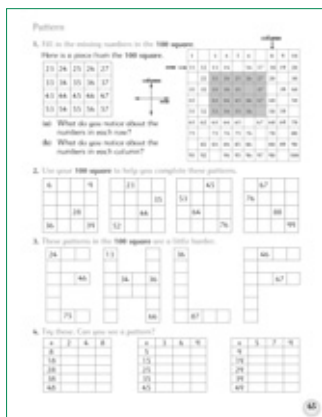
### Page Notes



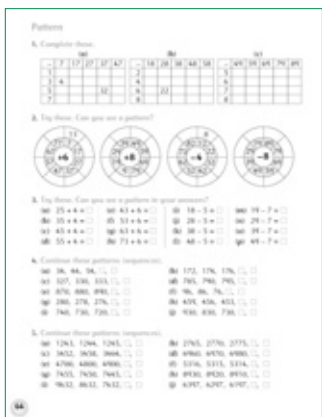
Page 63



Page 64



Page 65



Page 66

**page 63** builds on the pupils’ previous handling of materials to review the concept of pattern. The tasks are presented using verbal sentences. A number line is offered to form the basis of later more formal representation of number sentences. As well as identifying the answer, it would be worthwhile to have the pupils write the appropriate number sentence, e.g. Q.2 (b)

$$B + 2 = \underline{\quad};$$

$$B = 579$$

$$\text{so } B + 2 = \underline{\quad} \Rightarrow 579 + 2 = 581$$

**page 64** extends the exploration of patterns in number. All the exercises here can be solved by calculating the answers using addition or subtraction. This in itself is useful but the objective is that the pupils see patterns emerge. With this in mind, it is important that after having completed 3 terms of each exercise, the pupils are asked to describe the pattern, to predict the next term and to then verify their answer. For example,  $7 - 1 = 6$ ;  $17 - 1 = 16$ ;  $27 - 1 = 26$ . At this point, ask the children to describe what they see happening in terms of a pattern emerging, predict what the next term will be and justify their prediction, before extending the pattern. This approach will prepare them for questions 4 and 5. In this case, they will first need to ascertain what operation has been carried out before completing the pattern.

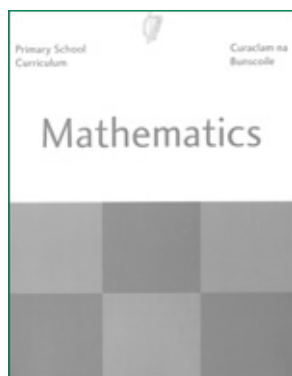


**page 65** is based on manipulating the 100 square; the objective is the completion of each block or section. This is a fun exercise for the children through which their knowledge of patterns, number structure and ability to use mathematical language can be explored and extended. This can be achieved by asking the pupils to explain and justify their answer in each case.

**page 66** Page 66 gives guidance on how to use the repeat function of the equals sign on a calculator. It is appropriate to have the pupils experiment with their own calculator before structuring it more formally.

## STRAND UNIT:

## *Number sentences*



See page 71

### **Objectives:**

*The child should be enabled to*

- ▶ translate an addition, subtraction, multiplication or division number sentence with a frame into a word problem
- ▶ translate a one-step problem into a number sentence
- ▶ solve one-step number sentences

*Mathematics Curriculum*

### **Page references:**

- ⊙ *Mathemagic 4* pages 162-165
- ⊙ *Shadow Book 4* pages 69-70

### **Language:**

- ⊙ frame, pattern, sequences, order, describe

**Linkage:**

- ⊙ operations, problem-solving

**NUMBER SENTENCES**

**Keep in Mind**

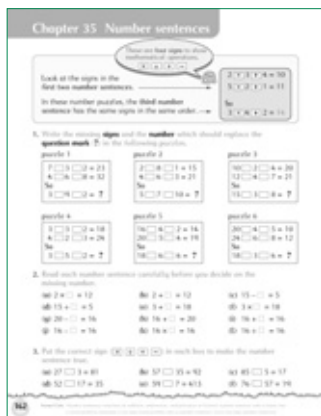
- ⊙ Translating a word sentence into a number sentence needs to be supported by using stories and contexts relevant to the pupils.
- ⊙ Tasks involving frames can be far too abstract for pupils to solve without teacher guidance and support.
- ⊙ It is important that pupils solve several problems and begin to see a pattern emerge as to how they may find the answer. It is not appropriate to tell them which operation to use. Present  $18 - ? = 23$  as *what must I add to 18 to make 23?* Use a story to help them progress. *I have 18c but I need 23c to buy a pencil. How much more do I need?*

- ⊙ Work on problem-solving will support the completion of number sentences.

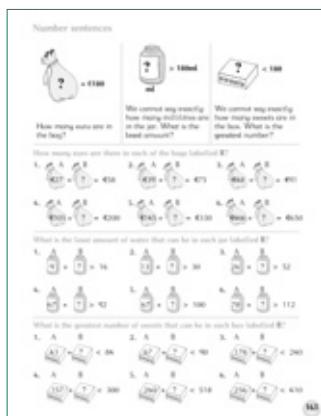
**Page Notes**

**page 162** Puzzles are used to focus the pupils on the operations in each number sentence. Linking with their earlier work on patterns, the pupils are guided to complete the puzzle knowing that the operations will be in the same order. In the next exercise, the pupils must fill in the second number. While most of the number facts used will already be familiar to them, it is important that each is discussed so that they can be directed to see another way of solving them. For example, they may know that  $2 \times \boxed{6} = 12$ , but they need to be guided to see that the solution is also found by saying  $12 \div 2 = \boxed{6}$ . This will be vital at a later stage when the numbers will be bigger and the number facts may not be immediately evident to the pupils.

**page 163** Illustrations help present a context for number sentences using inequalities. In many ways, the concept is not new. It can be difficult for pupils to appreciate the use or application of inequalities. It is important to place them in context through discussion.



Page 162



Page 163

**page 164** An opportunity is given to build on earlier work by allowing pupils to make up word stories from number sentences. Apart from solving the problems, the pupils are required to link the word sentences with the correct number sentence.

**page 165** A similar approach involving larger numbers is used supported by illustrations. A good sense of number and an ability to estimate will help the pupils. Encourage pupils to use their calculator to check their answers.

Number sentences

Match each word story with its correct picture and number sentence.  
Here is one match to get you started. (A, B and C)

1. Six legs. 2 insects in each. 3 entire insects.	A		$3 \times 6 = 18$
2. Three legs. 3 insects in each. 6 entire insects.	B		$3 \times 6 = 18$
3. Four legs. 2 insects in each. Six sets of insects.	C		$6 \times 2 = 12$
4. Three legs. 4 insects in each. 3 insects are eaten.	D		$3 \times 3 = 9$
5. Four legs. 4 insects in each. Six sets of insects.	E		$2 \times 3 = 6$
6. Six legs. 4 insects in each. 3 entire insects.	F		$6 \times 4 = 24$

7. Write a story and number sentence to match each of these two pictures.

8. Write a story and draw pictures to match each of these two number sentences.

Page 164

Number sentences

Bears in the Toy Factory

Sample 1  
Three boxes contain the same number of toy parts. There are 252 rubber bands altogether in the two boxes. How many rubber bands are there in each box?  
 $252 \div 2 = 126$  or  $126 \times 2 = 252$

Sample 2  
Three boxes contain paper clips. There are 630 clips altogether in the two boxes. One box has 247 blue clips. How many green clips are there in the other box?  
 $630 - 247 = 383$  or  $247 + 383 = 630$

Write a story to go with each picture and number sentence.

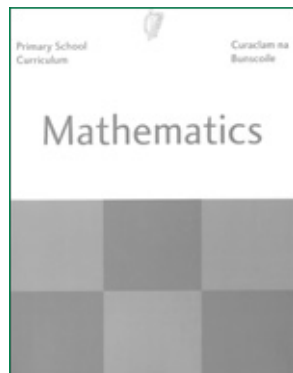
$3 \times \square = 362$	$3 \times \square = 675$	$980 \div \square = 980$
$4 \times \square = 732$	$362 \div \square = 1015$	$437 \times \square = 1400$
$230 + 675 \times \square = 1201$	$975$	$762$

Page 165



**STRAND**

*Shape and Space*

**STRAND UNIT:****2-D shapes**

See page 72

**Objectives:***The child should be enabled to*

- identify, describe and classify 2-D shapes
- explore, describe and compare the properties of 2-D shapes
- construct and draw 2-D shapes
- combine, tessellate and make patterns with 2-D shapes
- identify the use of 2-D shapes in the environment
- solve and complete practical tasks and problems involving 2-D shapes

**Mathematics Curriculum****Page references:**

- ⊙ *Mathemagic 4* pages 33-37
- ⊙ *Review* pages 68-170
- ⊙ *Shadow Book 4* pages 11-12

**Language:**

- ⊙ square, rectangle, triangle, circle, semicircle, oval, size, corners, sides, curved, flat, straight, edge, round, point, side, fit together, construct, design

**Resources:**

- ⊙ *TRB 4* Appendices 3.19, 3.20
- ⊙ *Posters* 8, 15 (see page vii)

**Linkage:**

- ⊙ spatial awareness, 3-D shapes, fractions, area, symmetry, angles, pattern

## 2-D SHAPES

### Keep in Mind

- ⊙ Children can now identify squares, circles, semicircles, rectangles, triangles, ovals and hexagons. Use the classroom and school as settings for studying shapes in their environment. Review the properties of each by comparing each shape in terms of number of sides, number of corners and length of sides. Discuss the similarities and differences between them.
- ⊙ Link this unit with other *Shape and Space* strand units to enrich each of them.
- ⊙ Children will need to manipulate the shapes, draw them and construct them using templates, geoboards and geostrips. Use the square grid provided to draw the shapes. Use straws to construct each shape.
- ⊙ Pay particular attention to the rhombus, parallelogram and pentagon which are now being introduced. Discuss their properties. Use cut-outs and trace around templates to appreciate their properties. Use bands to make rhombus, parallelograms and pentagons (regular and irregular) on the geoboard. Compare them to other polygons.
- ⊙ Use pairs of the same cut-out 2-D shapes to combine shapes. Discuss what happens when two rectangles are put together. Is there more than one way of combining them? How many sides/corners does the new shape have? Try it with other shapes. Discuss them in a similar way. Try a similar exercise combining two different shapes. This can lead to a seemingly endless variety of combinations. Extend this to using several of each shape to make a pattern of inter-connecting shapes.
- ⊙ Take individual shapes, fold them and tear or cut them to see what happens. Having explored halves, extend to quarters. This links with symmetry and fractions and sets the scene for the study of tessellation.
- ⊙ Build a school-based mathematics trail around the theme of 2-D shapes.

Page Notes

**Chapter 7 2-D shapes** New shapes

1. A **rhombus** is a square pushed out of shape. It looks like a **diamond**.  
The four angles of a square are called **right angles**.  
a) Are all the sides of a rhombus equal?  
b) Are all the angles of a rhombus equal?

2. A **parallelogram** is a rectangle pushed out of shape.  
The four angles of a rectangle are called **right angles**.  
a) Are all sides of a parallelogram equal?  
b) Are all angles of a parallelogram equal?

3. **Regular pentagons** have five equal sides and five equal angles.  
a) How many sides has a pentagon?  
b) How many equal sides has pentagon C?  
c) How many equal sides has pentagon D?

Page 33

**Polygons**

1. How many triangles make up this square?  
a) Are all the triangles equal?

2. Paper folding activity  
a) **OCTAGON**  
b) **HEXAGON**

3. What shapes can you see in these pictures?

Page 34

**Triangles**

1. **Equilateral triangle** has three equal sides.  
**Isosceles triangle** has two equal sides.  
**Scalene triangle** has no equal sides.

2. The following shapes can be made using **halfpenny sticks, string or spaghetti**.  
a) How many equilateral triangles are there altogether in this shape?  
b) Remove one halfpenny stick to leave three equilateral triangles. (They will not all be the same size.)  
c) Remove two halfpenny sticks to leave three equilateral triangles.  
d) Remove five halfpenny sticks to leave a rhombus.

3. a) How many equilateral triangles are there altogether in this shape?  
b) How many rhombuses can you find in the large triangle?  
c) How many parallelograms can you find in the large triangle?  
d) Remove six halfpenny sticks to leave a hexagon.  
e) How many equilateral triangles can you find in the hexagon?

4. a) How many triangles altogether can you see in the picture?  
b) How many isosceles triangles are there?  
c) How many scalene triangles are there?  
d) How many squares are there?  
e) Are there any equilateral triangles in the picture?

Page 35

**Looking at shapes**

1. Name these shapes.

2. Complete this table using the above shapes.  
The grid paper right-angle measure to see if the angles are greater than, less than or equal to a right angle.

Shape	Number of squares	Number of right angles	Number of angles less than a right angle	Number of angles greater than a right angle
Triangle				
Circle				
Square				
Rectangle				
Pentagon				
Hexagon				
Heptagon				
Octagon				
Nonagon				
Tenagon				
Elevenagon				
Twelveagon				

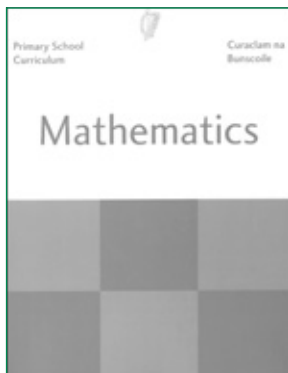
Page 36

**page 33** Each of the sections on this page are intended to supplement hands-on work of the nature described above. Pupils will have no difficulty summarising the properties of each shape. It is important that pupils discuss similarities and differences between the shapes.

**page 34** demonstrates the properties of the octagon and hexagon and shows pupils how to construct them. This is based on the pupils’ prior knowledge of the circle and of fractions. While there is no substitute for experiencing real-life examples of 2-D shapes in the environment, illustrations are used in the final section to aid discussion.

**page 35** While the pupils can already identify, recognise and describe triangles at this point, their knowledge is being extended to enable them to redefine triangles as equilateral, isosceles and scalene. Hands-on puzzles are used to consolidate this knowledge.

**page 36** draws together all the shapes and examines them and summarises them according to their properties.

**STRAND UNIT:****3-D shapes**

See page 73

**Objectives:***The child should be enabled to*

- ▶ identify, describe and classify 3-D shapes
- ▶ establish and appreciate properties of prisms
- ▶ explore and describe the relationship of 3-D shapes with constituent 2-D shapes
- ▶ construct 3-D shapes
- ▶ solve and complete practical tasks and problems involving 2-D and 3-D shapes

**Mathematics Curriculum****Page references:**

- ⊙ *Mathemagic 4* pages 132-137
- ⊙ *Review* page 170
- ⊙ *Shadow Book 4* pages 55-56

**Language:**

- ⊙ solid, prism, triangular prism, pyramid, cube, cuboid, cylinder, sphere, cone, square, circle, rectangle, point, sides, faces, edges, vertices, roll, slide, straight, round, curved, construction, net, tessellate, parallelogram

**Resources:**

- ⊙ *TRB 4* Appendices 3.19, 3.20
- ⊙ *Ancillaries* 3-D shapes, 2-D shapes
- ⊙ *Posters* 8, 15 (see page vii)

**Linkage:**

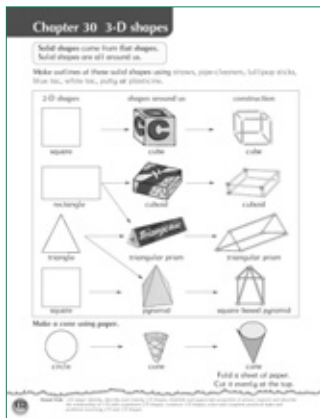
- ⊙ 2-D shapes, symmetry, lines and angles, area, number pattern, fractions



3-D SHAPES

Keep in Mind

- ⊙ A review of previously covered 3-D shapes will be necessary. Discuss the features of a variety of the shapes already familiar to the pupils. This might be done by carrying out a trail around the school or at home in search of 3-D shapes.
- ⊙ 3-D shapes have been covered in earlier classes; however, the focus is now on further examining the properties of the 3-D shapes rather than merely identifying them. This is addressed by exploring the relationship between 3-D and 2-D shapes and constructing 3-D shapes from 2-D shapes and from straws.

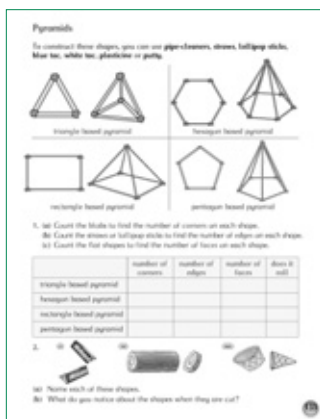


Page 132

- ⊙ Look at the properties of each in terms of faces, edges, vertices and constituent 2-D shapes. Analyse all the 3-D shapes under these different headings. Make a summary chart as you proceed.
- ⊙ Allow the pupils the opportunity to deconstruct all familiar 3-D shapes in order to appreciate how they are constituted. Use commercially-available construction sets to make 3-D shapes.

Page Notes

**page 132** The relationship between 2-D and 3-D shapes is explored by linking 3-D shapes to their constituent 2-D shapes and to their outlines. This exercise will need to be based on actual hands-on manipulation of each of the shapes.



Page 133

**page 133** Using a similar approach, different types of pyramid are explored by constructing them and then their features are summarised on a table.

**page 134** Saying which 2-D shapes are used to make up the 3-D shapes should not prove difficult if the pupils have had a chance to construct them for themselves. The table in the second part of the page allows the pupils to list the features of each of these 3-D shapes and thereby to compare them.

**page 135** Pupils enjoy making nets. It would be very helpful if they have deconstructed 3-D shapes and have seen their constituent 2-D parts. These exercises are ideally suited to developing spatial awareness. If it is helpful, this page can be photocopied, enlarged

and distributed to allow the pupils to cut them out and to ease their construction of the 3-D shapes.

**page 136** reviews tessellations involving all the 2-D shapes covered at this point. In the latter section, the pupils are invited to make patterns using shapes. Using shapes which they construct themselves, pupils can be encouraged to make further patterns.

**page 137** facilitates, in a step-by-step manner, the construction of squares, rectangles and parallelograms. This can be quite a difficult task and is best left to this stage of the year. While the pupils are guided through each shape, it is a good idea to ask the pupils to sketch each first. In that way, they will have an image of the end-product. Tell them to start with drawing the base line using a ruler and pencil. When making the angle, use a set square to ensure a right angle. Mark the length of the side. Follow the same procedure to draw the second vertical side and, finally, to complete the shape.

**Facts about shapes**

1. Name each of the following shapes.  
 Say what 2-D shape or 2-D shapes are used to make each.

2. Count the number of corners, edges and faces on these shapes.  
 Say if they will or will not if they have parallel lines.

Shape	number of corners	number of edges	number of faces	Does it have 2 parallel lines?	Does it have 3 parallel lines?	Does it have 4 parallel lines?
Cube	8	12	6	Yes	Yes	Yes
Square based pyramid						
Cone						
Hexagonal based pyramid						
Cylinder						
Triangular prism						
Sphere						

Page 134

**Making nets**

1. Copy the nets of these shapes. Cut them out and make the shapes.

2. What solid shapes can be made from these nets?

Page 135

**Tessellations**

1. What shapes fit closely together leaving no spaces between them, so they fill the space? Which of the shapes below tessellate?

2. Copy and extend these patterns on your squared centimeter paper.

Page 136

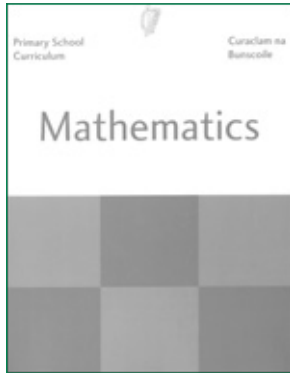
**Constructing shapes: Constructing shapes with set squares**

1. Making a square  $10\text{cm} \times 10\text{cm}$ .

2. Making a rectangle  $10\text{cm} \times 8\text{cm}$ .

3. Making a parallelogram  $10\text{cm} \times 7\text{cm}$ .

Page 137

**STRAND UNIT:***Symmetry*

See page 74

**Objectives:***The child should be enabled to*

- identify line symmetry in shapes and in the environment
- identify line symmetry as horizontal, vertical or diagonal
- use understanding of line symmetry to complete missing half of a shape, picture or pattern

**Mathematics Curriculum****Page references:**

- ⊙ *Mathemagic 4* pages 97-98
- ⊙ Review page 131
- ⊙ *Shadow Book 4* page 39

**Language:**

- ⊙ fold, line, axis, symmetry, symmetrical, mirror, reflection, match, complete, half, fit, exactly

**Resources:**

- ⊙ *TRB 4* Appendices 3.19, 3.20
- ⊙ *Posters* 8, 9 (see page vii)

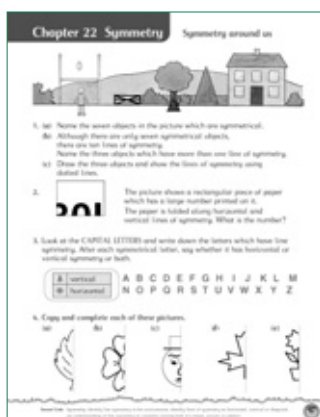
**Linkage:**

- ⊙ 2-D shapes, 3-D shapes, area, angles, fractions

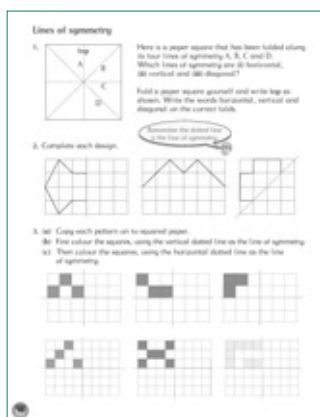
## SYMMETRY

## Keep in Mind

- ☉ Symmetry is a dominant characteristic of both the natural and man-made environment and observing this should feature prominently in introducing pupils to identifying line symmetry. A mathematics trail would be an ideal means of reviewing previous concepts of symmetry.
- ☉ Most children have a natural feel for symmetry. Observe when they draw pictures or use construction sets how they are drawn towards making their endeavours symmetrical.
- ☉ Review line symmetry by creating a display of natural and man-made objects which have line symmetry. Discuss with the pupils the patterns visible and ask them to describe them and to say if they notice particular aspects of the pattern which makes it special.
- ☉ At this stage, they will have sufficient experience of the other related strand units in the Shape and Space strand to be able to see relationships and to make connections. Particular attention is given to the types of lines of symmetry (horizontal, vertical or diagonal) in 2-D shapes.
- ☉ At this point, the focus moves from identifying and drawing lines of symmetry to completing half-pictures. It is useful to do this in a hands-on manner with cards or by using the geoboard. Photocopiables are available to enrich this skill.



Page 97



Page 98

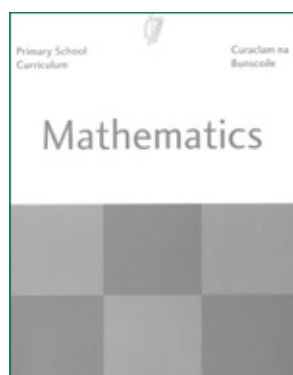
**page 97** Activities are presented to review line symmetry in familiar, environment-based items. The illustration can be used as a starting point for further discussion on the area. Pupils' attention is drawn to vertical and horizontal lines of symmetry. They are already familiar with these concepts. Pupils will have had experience of folding and marking lines of symmetry as well as drawing the line of symmetry and will enjoy this 'complete the picture' activity. They may have previously come across them in puzzle books.

**page 98** reviews horizontal, vertical and diagonal lines of symmetry. It is important that pupils have experience of actually folding the paper for themselves. In preparation for the next series of activities, it would be worthwhile to ask the pupils to fold a piece of squared

paper along various lines of symmetry. When the paper is folded, have them pierce the paper with their pens so that both sides of the paper are holed through. Make a series of such holes. Open out the paper. Join the holes to make a pattern. Now do the same on the opposite side of the page. You can now see the original and its image. The last section develops their spatial awareness and links very usefully with their recent study of area. Again, preparatory work can take place by using tiles, squares or the geoboard.

## STRAND UNIT:

## *Lines and angles*



See page 75

### **Objectives:**

*The child should be enabled to*

- ▶ identify, describe and classify oblique and perpendicular lines
- ▶ draw, discuss and describe intersecting lines and their angles
- ▶ classify angles as greater than, less than or equal to a right angle.

*Mathematics Curriculum*

### **Page references:**

- ⊙ *Mathemagic 4* pages 37-40
- ⊙ Review page 69
- ⊙ *Shadow Book 4* pages 13-14

### **Language:**

- ⊙ angle, corner, square corner, right angle, fits exactly, vertical, oblique, horizontal, parallel, rotation, clockwise, anti-clockwise, greater than, less than, acute, obtuse, diagonal, strut, perpendicular, direction

**Resources:**

- ⊙ *TRB 4* Appendices 3.19, 3.20
- ⊙ *Posters* 8, 9, 15 (see page vii)

**Linkage:**

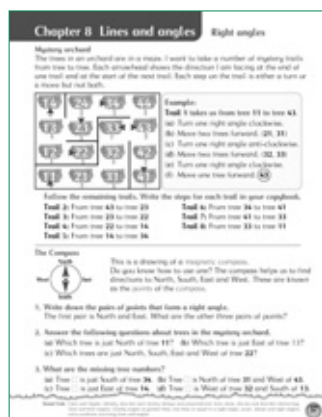
- ⊙ 2-D shapes, 3-D shapes, symmetry, estimation

**LINES AND ANGLES****Keep in Mind**

- ⊙ Static, dynamic and right angles have been given attention during earlier study of this area and in the analysis of shapes to date.
- ⊙ Attention now needs to be given to acute and obtuse angles in relation to right angles. In this sense, they will be defined as less than or greater than, respectively, a right angle. The right angle measure already made in third class will be useful again in categorising angles in the classroom and school environment.
- ⊙ Use the clock and directional compass to support the concept of clockwise and anti-clockwise.
- ⊙ Observe lines in the classroom environment. Find examples of vertical, horizontal and parallel lines. Introduce perpendicular and oblique lines. It is a great opportunity to extend the children's mathematical language. Elicit definitions from them regarding each type of line. Explore the lines, compare them and relate them to each other.

**Page Notes**

- page 37** Children enjoy treasure hunts or trails. A preparatory activity might take place in the school grounds. You may decide to issue directions and the pupils must follow them to find the correct destination. Alternatively, you may decide to ask them to write the directions themselves to get to a particular point. In undertaking the 'maze' activity, pupils are likely to have different steps to get to the endpoint. Ask them to swap their solutions with a companion to check if the directions are correct. Children will need to see and experience a compass to fully appreciate the next set of exercises.



Page 37

By using N, S, W and E, pupils extend their application of right angles.


**page 38** Pupils will have experience of right angles and will have classified angles according to whether they were less than, greater than or equal to a right angle or a quarter of a rotation. By exploring angles, folding paper and manipulating the hands of the clock, they now have opportunities to identify, describe and make right, acute or obtuse angles.

**page 39** focuses on lines in real contexts. Use the classroom and school to support this. The concepts of vertical, horizontal, diagonal and parallel are familiar to the pupils from their study of shapes, the concept of perpendicular lines is not. The latter should be introduced in the context of describing the lines which form right angles. Therefore, when looking at the properties of a square, highlight the lines which meet at the corner to form a right angle are perpendicular lines. It is a good idea to review the right angles found in the classroom to demonstrate that every time we find a right angle, we find perpendicular lines and vice versa. Use the right-angle measure.

**page 40** One of the difficulties of this strand unit is the amount of new language which it opens up to the pupils. Apart from new concepts involved, the labels or words are long and difficult to pronounce and spell. This page offers a fun way to revise, practise and consolidate the new terms.


**Right angles – greater than, less than**

1. Make a paper right angle and measure the following angles. Say if each is greater than, less than or equal to a right angle.



2. Make one from fold in great paper right angle so that you have half a right angle measure.

Any size of angle less than a right angle is called an acute angle.



3. Open out the folded paper so that you can see the right-angled acute angles.


Any size of angle greater than a right angle but less than two right angles is called an obtuse angle.

4. How many different obtuse angles can you see in the corners of the paper?

**Angles in the hands of a clock**


5. The hands of a clock make an acute angle for all the following clock times except one. Can you find the odd one out?

a) 5 minutes past 12  
b) 20 minutes past 3  
c) half past 4  
d) 1 minute past 6  
e) 10 o'clock




6. The hands of a clock make an obtuse angle for all the following clock times except one. Can you find the odd one out?

a) 5 minutes past 6  
b) 4 o'clock  
c) 10 minutes to 12  
d) in quarter past 10  
e) 5 minutes to 7



Page 38

**Lines**




Placing rain that falls straight down is said to fall vertically. Flagpoles, spindles, uprights and telegraph poles are all vertical. Can you name other vertical objects? Consider whether any horizontal. The pavement on which the rain is falling is horizontal.

Stained rain will be said behind it could be said to be oblique in the way it falls. When falling down a hill or the side of a ship might also be oblique. Can you name other oblique objects? Another word for oblique is diagonal.

1. Construct a square, triangle and hexagon with balsa sticks or straws. Use two pencils to make a diagonal line in the square (a) in the hexagon.


a) Mark about the lines which are vertical, horizontal, diagonal or oblique.



b) Lines which run in the same direction are said to be parallel to each other. Which lines in the shapes above are parallel to each other? Repeat! Lines never cross intersect to each other.

c) Lines making right angles with each other are said to be perpendicular to each other. Name any lines in the shapes above that are perpendicular to each other. Vertical is perpendicular to horizontal. A line from North to South is perpendicular to a line from East to West.

2. A street map



**True or false**

a) Brown Street is parallel to Green Street.  
b) Brown Street and Elm Street are perpendicular to each other.  
c) Red Street is perpendicular to Green Street and Brown Street.  
d) Red Street and Elm Street are parallel to each other.

Page 39

**Parallel word search**

1. True or false

a) A right angle is half a complete turn.

b) An obtuse angle is greater than two right angles.

c) An acute angle is greater than a right angle.

d) The Lancing Tower of Pisa is vertical.

e) When 1 the down is horizontal.

f) Parallel lines run in the same direction.

g) Two oblique lines cannot be parallel.

h) Oblique is another word for diagonal.

i) Lines which are perpendicular form a right angle at their intersection.

j) When a car is going forward, its wheels turn in a clockwise direction.

2. Find the words in green in question 1 above in the word search.

R	E	N	D	I	T	E	T	P	R	A	L	P
I	P	D	I	A	N	G	P	A	R	A	L	A
P	E	R	P	E	N	D	I	C	U	L	L	A
A	R	E	D	V	L	V	E	R	T	A	L	A
R	P	G	N	B	E	L	R	A	N	T	A	L
A	F	H	H	O	R	I	Z	O	N	T	A	L
L	N	T	O	B	T	L	L	E	N	C	E	
I	D	A	R	T	I	A	G	O	D	N	U	L
E	N	I	U	C	B	N	G	L	Q	T	R	
L	C	G	Z	A	D	A	G	I	V	E	P	
V	U	L	O	E	L	I	D	L	L	H	T	
R	E	L	E	N	G	D	V	R	L	Q	H	T
I	A	N	T	C	L	O	C	K	W	I	N	T

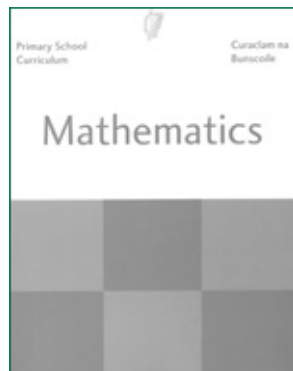
Page 40



**STRAND**

*Measures*



**STRAND UNIT:***Length*

See page 76

**Objectives:***The child should be enabled to*

- estimate, compare, measure and record length using appropriate metric units
- rename units of length using decimal or fraction form
- understand, estimate and measure the perimeter of regular 2-D shapes
- solve and complete practical tasks and problems involving the addition, subtraction, multiplication and division of units of length (m, cm, km)

**Mathematics Curriculum****Page references:**

- ⊙ *Mathemagic 4* pages 75-77, 80-82, 111-114
- ⊙ Review pages 129, 131
- ⊙ *Shadow Book 4* pages 28, 31, 47

**Language:**

- ⊙ length, width, height, long, longer, longest, short, shorter, shortest, thick, thin, compare, estimate, measure, the same as, metre, metre stick, centimetre, about, longer than, shorter than, tall, taller than, kilometre, measurement

**Resources:**

- ⊙ *TRB 4* Appendix 3.16

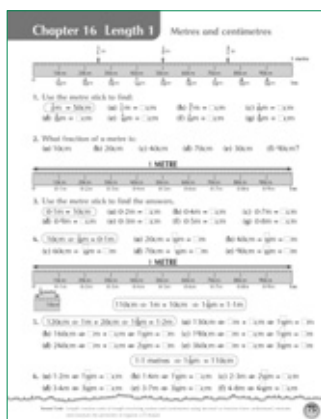
**Linkage:**

- ⊙ counting and numeration, operations, data, weight, capacity, area, estimation

**LENGTH**

**Keep in Mind**

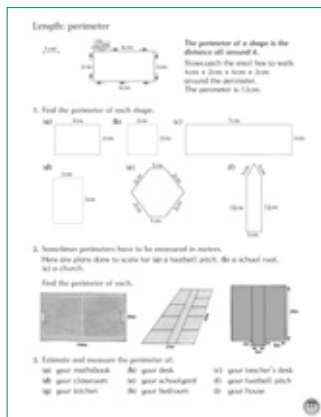
- ⊙ Pupils have been introduced to measuring length in previous classes by comparing, estimating and using non-standard units. They are now at the stage where they have progressed to using the kilometre, metre and centimetre as standard units of measure.
- ⊙ Renaming kilometres, metres and centimetres is extended to using decimal and fractional forms. It is a central focus of the objectives at this stage. It is worth reviewing the approach taken in third class. The decimal form is the most useful and most widely-used. Writing lengths as fractions of kilometres, metres or centimetres can be seen as a stepping stone.
- ⊙ With renaming addressed, the actual task of using operations in the context of length should not be an issue.
- ⊙ Perimeter is a new aspect of this unit which uses the pupils’ knowledge of length and spatial concepts. Pupils often confuse perimeter and area. There is no substitute for hands-on activity in developing this concept.



Page 75



Page 76



Page 77

- p 75/76** use a representation of a metre stick to help review the renaming of metres as centimetres. It is best to use a real metre stick to review the relationship between metres and centimetres.
- page 77** Exploring the perimeter is best undertaken using real settings. Children enjoy practical exercises of this type. It may be helpful to mark the starting point, as Slowcoach the Snail does, to aid discussion and to find a solution. When perimeter is dealt with effectively and separate to area, they are less likely to be confused.

**page 80** introduces a new unit to measure length. Previous units, e.g. the metre and centimetre, were easily demonstrated. The kilometre does not lend itself to this as easily. In this context, it is vital to make any appropriate reference to kilometres as they arise. Find out how far a kilometre is from the school – that way it will be a relevant reference point for them. Various units of measure are reviewed and compared. Discuss each and list other appropriate applications for them. Explain the relationship between metres and kilometres.

**pages 81/82** Using a representation of a kilometre, intervals are shown marking out each 100m. It is helpful to give the pupils an image of the approximate length of each length. For example, when referring to 1km, ask the pupils how far from the school would 1km take them. Discuss why each 100m =  $\frac{1}{10}$  of a kilometre. The use of fractions will help the transition to using decimals to rename each length. Consolidation exercises are given to reinforce the renaming of metres as kilometres and vice versa using fractions and decimals.

**Chapter 18 Length 2** Metres and kilometres

1. Exercise how far it is to:  
 (a) school to home? (b) home to nearest town? (c) Dublin to Galway?  
 (d) Cork to Donegal? (e) Dublin to London? (f) Dublin to Paris?

2. Which unit of measurement would you use to measure the length of:  
 (a) your small finger? (b) your classroom?  
 (c) your class to the principal's office? (d) your school to your home?  
 (e) your home to the nearest town? (f) Dublin to New York?

3. How long does it take to:  
 (a) walk to the principal's office? (b) run around the football pitch?  
 (c) walk from school to home? (d) travel by car from school to home?  
 (e) travel by train from Dublin to London? (f) travel by plane from Dublin to London?  
 (g) travel by plane from Warsaw to New York?

4. How long is 87 for a step for long distances.

length of notebook	width of desk	height of chair	width of door	length of hallway	width of window
10 cm	60 cm	45 cm	80 cm	3 m	1.2 m

5. Which is longer? Find estimates, then measure or use a step:  
 (a) the length of the teacher's desk or the height of the door  
 (b) from the classroom to the principal's office or the length of the yard  
 (c) Dublin to Galway or Dublin to Limerick (see map)  
 (d) Dublin to Paris or London to Dublin (see map)

Page 80

**Lengths: metres and kilometres**

1. How many metres in...  
 (a) 1 km = 1000 m (b) 2 km = 2000 m (c) 3 km = 3000 m (d) 4 km = 4000 m  
 (e) 5 km = 5000 m (f) 6 km = 6000 m (g) 7 km = 7000 m (h) 8 km = 8000 m  
 (i) 9 km = 9000 m (j) 10 km = 10000 m

2. What fraction of a kilometre is...  
 (a) 100 m =  $\frac{1}{10}$  km (b) 200 m =  $\frac{2}{10}$  km (c) 300 m =  $\frac{3}{10}$  km (d) 400 m =  $\frac{4}{10}$  km  
 (e) 500 m =  $\frac{5}{10}$  km (f) 600 m =  $\frac{6}{10}$  km (g) 700 m =  $\frac{7}{10}$  km (h) 800 m =  $\frac{8}{10}$  km  
 (i) 900 m =  $\frac{9}{10}$  km (j) 1000 m = 1 km

3. Write an addition and a subtraction of kilometres.  
 (a) 1 km + 2 km = 3 km (b) 1 km - 500 m = 500 m (c) 2 km + 3 km = 5 km  
 (d) 3 km - 1 km = 2 km (e) 4 km + 6 km = 10 km (f) 7 km - 2 km = 5 km  
 (g) 8 km + 1 km = 9 km (h) 9 km - 4 km = 5 km (i) 10 km + 0 km = 10 km  
 (j) 1 km + 1 km = 2 km (k) 2 km + 2 km = 4 km (l) 3 km + 3 km = 6 km  
 (m) 4 km + 4 km = 8 km (n) 5 km + 5 km = 10 km (o) 6 km + 6 km = 12 km  
 (p) 7 km + 7 km = 14 km (q) 8 km + 8 km = 16 km (r) 9 km + 9 km = 18 km  
 (s) 10 km + 10 km = 20 km

4. Write an addition and a subtraction of metres.  
 (a) 100 m + 200 m = 300 m (b) 100 m - 50 m = 50 m (c) 200 m + 300 m = 500 m  
 (d) 300 m + 400 m = 700 m (e) 400 m + 600 m = 1000 m (f) 500 m + 500 m = 1000 m  
 (g) 600 m + 400 m = 1000 m (h) 700 m + 300 m = 1000 m (i) 800 m + 200 m = 1000 m  
 (j) 900 m + 100 m = 1000 m (k) 1000 m + 0 m = 1000 m (l) 1000 m - 500 m = 500 m  
 (m) 1000 m - 100 m = 900 m (n) 1000 m - 200 m = 800 m (o) 1000 m - 300 m = 700 m  
 (p) 1000 m - 400 m = 600 m (q) 1000 m - 500 m = 500 m (r) 1000 m - 600 m = 400 m  
 (s) 1000 m - 700 m = 300 m (t) 1000 m - 800 m = 200 m (u) 1000 m - 900 m = 100 m  
 (v) 1000 m - 1000 m = 0 m

5. Write an addition and a subtraction of metres.  
 (a) 100 m + 200 m = 300 m (b) 100 m - 50 m = 50 m (c) 200 m + 300 m = 500 m  
 (d) 300 m + 400 m = 700 m (e) 400 m + 600 m = 1000 m (f) 500 m + 500 m = 1000 m  
 (g) 600 m + 400 m = 1000 m (h) 700 m + 300 m = 1000 m (i) 800 m + 200 m = 1000 m  
 (j) 900 m + 100 m = 1000 m (k) 1000 m + 0 m = 1000 m (l) 1000 m - 500 m = 500 m  
 (m) 1000 m - 100 m = 900 m (n) 1000 m - 200 m = 800 m (o) 1000 m - 300 m = 700 m  
 (p) 1000 m - 400 m = 600 m (q) 1000 m - 500 m = 500 m (r) 1000 m - 600 m = 400 m  
 (s) 1000 m - 700 m = 300 m (t) 1000 m - 800 m = 200 m (u) 1000 m - 900 m = 100 m  
 (v) 1000 m - 1000 m = 0 m

Page 81

**Lengths: metres and kilometres**

1. How many laps in each of the following races...  
 (a) 1000 m (b) 2000 m (c) 3000 m (d) 4000 m (e) 5000 m (f) 6000 m  
 (g) 7000 m (h) 8000 m (i) 9000 m (j) 10000 m

2. Write the following race distances in kilometres...  
 (a) 1000 m = 1 km (b) 2000 m = 2 km (c) 3000 m = 3 km (d) 4000 m = 4 km  
 (e) 5000 m = 5 km (f) 6000 m = 6 km (g) 7000 m = 7 km (h) 8000 m = 8 km  
 (i) 9000 m = 9 km (j) 10000 m = 10 km

3. The first person in the sprint race ran 100 metres in 15 seconds. In the same time, the second person ran 150 m and the third person ran only 75 m. These distances in kilometres are 100 m = 0.1 km, 150 m = 0.15 km and 75 m = 0.075 km.

4. Write the following distances in kilometres.  
 (a) 1000 m = 1 km (b) 2000 m = 2 km (c) 3000 m = 3 km (d) 4000 m = 4 km  
 (e) 5000 m = 5 km (f) 6000 m = 6 km (g) 7000 m = 7 km (h) 8000 m = 8 km  
 (i) 9000 m = 9 km (j) 10000 m = 10 km

5. Write the following distances in metres.  
 (a) 1 km = 1000 m (b) 2 km = 2000 m (c) 3 km = 3000 m (d) 4 km = 4000 m  
 (e) 5 km = 5000 m (f) 6 km = 6000 m (g) 7 km = 7000 m (h) 8 km = 8000 m  
 (i) 9 km = 9000 m (j) 10 km = 10000 m

Page 82

**Chapter 26 Length 3** Metres and centimetres

1. How many centimetres in...  
 (a) 1 m = 100 cm (b) 2 m = 200 cm (c) 3 m = 300 cm (d) 4 m = 400 cm  
 (e) 5 m = 500 cm (f) 6 m = 600 cm (g) 7 m = 700 cm (h) 8 m = 800 cm  
 (i) 9 m = 900 cm (j) 10 m = 1000 cm

2. Write in decimal form and add.  
 (a) 1.2 m + 2.3 m = 3.5 m (b) 1.5 m + 1.8 m = 3.3 m (c) 1.1 m + 2.4 m = 3.5 m  
 (d) 1.3 m + 1.7 m = 3.0 m (e) 1.4 m + 1.6 m = 3.0 m (f) 1.5 m + 1.5 m = 3.0 m  
 (g) 1.6 m + 1.4 m = 3.0 m (h) 1.7 m + 1.3 m = 3.0 m (i) 1.8 m + 1.2 m = 3.0 m  
 (j) 1.9 m + 1.1 m = 3.0 m

3. Write in decimal form and multiply.  
 (a) 1.2 m × 2 = 2.4 m (b) 1.5 m × 2 = 3.0 m (c) 1.1 m × 2 = 2.2 m  
 (d) 1.3 m × 2 = 2.6 m (e) 1.4 m × 2 = 2.8 m (f) 1.5 m × 2 = 3.0 m  
 (g) 1.6 m × 2 = 3.2 m (h) 1.7 m × 2 = 3.4 m (i) 1.8 m × 2 = 3.6 m  
 (j) 1.9 m × 2 = 3.8 m

4. Write in decimal form and divide.  
 (a) 1.2 m ÷ 2 = 0.6 m (b) 1.5 m ÷ 2 = 0.75 m (c) 1.1 m ÷ 2 = 0.55 m  
 (d) 1.3 m ÷ 2 = 0.65 m (e) 1.4 m ÷ 2 = 0.7 m (f) 1.5 m ÷ 2 = 0.75 m  
 (g) 1.6 m ÷ 2 = 0.8 m (h) 1.7 m ÷ 2 = 0.85 m (i) 1.8 m ÷ 2 = 0.9 m  
 (j) 1.9 m ÷ 2 = 0.95 m

Page 111

**Problems**

1. Find the total height of:  
 (a) John and Emma (b) Manning and John (c) Emma and Manning

2. How much taller is the tree than John?

3. How much smaller is Manning than the tree?

4. What is the total height of Manning, John and Emma?

5. What is the total height of the tree and the phone box?

6. Henry is 1.5m tall. Michael is 1.8m smaller than this. How tall is Michael?

7. Heather can jump 1.2m. Adam can jump 1m. How much higher than Heather can Adam jump?

8. Three planks of wood are placed end to end as in time. The first is 2.5m long. The second is 1m. The third is 2.5m long. What is the total length of the three planks?

9. A rope is 1.45m long. What is the total length of 6 similar ropes?

10. A carpenter had a piece of wood 2.5m long. He cut it into 8 equal pieces. How long was each piece?

11. A well in Killybegs is 13m deep. A well in Malinbeg is 7m deep. How much deeper is the Killybegs well?

12. A tower in Kerry is 1.7m tall. A tower in London is 9 times taller than this. How tall is the tower in London?

13. Martin is 1m 70cm tall. Meena is 1m 20cm tall. A pole is 4m 20cm tall. How much taller is the pole than the total height of Martin and Meena?

14. A chess 60cm long was joined to a chess 80cm long. The new chess was divided into 5 equal parts. How long was each part?

Page 112

**Length: kilometres and metres**

1. How many metres in...  
 (a) 1 km = 1000 m (b) 2 km = 2000 m (c) 3 km = 3000 m (d) 4 km = 4000 m  
 (e) 5 km = 5000 m (f) 6 km = 6000 m (g) 7 km = 7000 m (h) 8 km = 8000 m  
 (i) 9 km = 9000 m (j) 10 km = 10000 m

2. Write the following race distances in kilometres...  
 (a) 1000 m = 1 km (b) 2000 m = 2 km (c) 3000 m = 3 km (d) 4000 m = 4 km  
 (e) 5000 m = 5 km (f) 6000 m = 6 km (g) 7000 m = 7 km (h) 8000 m = 8 km  
 (i) 9000 m = 9 km (j) 10000 m = 10 km

3. The first person in the sprint race ran 100 metres in 15 seconds. In the same time, the second person ran 150 m and the third person ran only 75 m. These distances in kilometres are 100 m = 0.1 km, 150 m = 0.15 km and 75 m = 0.075 km.

4. Write the following distances in kilometres.  
 (a) 1000 m = 1 km (b) 2000 m = 2 km (c) 3000 m = 3 km (d) 4000 m = 4 km  
 (e) 5000 m = 5 km (f) 6000 m = 6 km (g) 7000 m = 7 km (h) 8000 m = 8 km  
 (i) 9000 m = 9 km (j) 10000 m = 10 km

5. Write the following distances in metres.  
 (a) 1 km = 1000 m (b) 2 km = 2000 m (c) 3 km = 3000 m (d) 4 km = 4000 m  
 (e) 5 km = 5000 m (f) 6 km = 6000 m (g) 7 km = 7000 m (h) 8 km = 8000 m  
 (i) 9 km = 9000 m (j) 10 km = 10000 m

Page 113

**Length**

1. How many metres in...  
 (a) 1 m = 100 cm (b) 2 m = 200 cm (c) 3 m = 300 cm (d) 4 m = 400 cm  
 (e) 5 m = 500 cm (f) 6 m = 600 cm (g) 7 m = 700 cm (h) 8 m = 800 cm  
 (i) 9 m = 900 cm (j) 10 m = 1000 cm

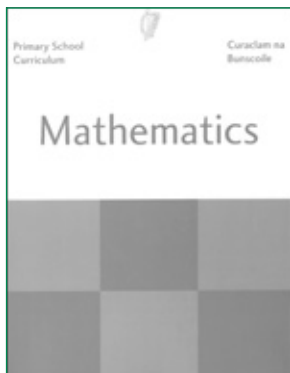
2. Write in decimal form and add.  
 (a) 1.2 m + 2.3 m = 3.5 m (b) 1.5 m + 1.8 m = 3.3 m (c) 1.1 m + 2.4 m = 3.5 m  
 (d) 1.3 m + 1.7 m = 3.0 m (e) 1.4 m + 1.6 m = 3.0 m (f) 1.5 m + 1.5 m = 3.0 m  
 (g) 1.6 m + 1.4 m = 3.0 m (h) 1.7 m + 1.3 m = 3.0 m (i) 1.8 m + 1.2 m = 3.0 m  
 (j) 1.9 m + 1.1 m = 3.0 m

3. Write in decimal form and multiply.  
 (a) 1.2 m × 2 = 2.4 m (b) 1.5 m × 2 = 3.0 m (c) 1.1 m × 2 = 2.2 m  
 (d) 1.3 m × 2 = 2.6 m (e) 1.4 m × 2 = 2.8 m (f) 1.5 m × 2 = 3.0 m  
 (g) 1.6 m × 2 = 3.2 m (h) 1.7 m × 2 = 3.4 m (i) 1.8 m × 2 = 3.6 m  
 (j) 1.9 m × 2 = 3.8 m

4. Write in decimal form and divide.  
 (a) 1.2 m ÷ 2 = 0.6 m (b) 1.5 m ÷ 2 = 0.75 m (c) 1.1 m ÷ 2 = 0.55 m  
 (d) 1.3 m ÷ 2 = 0.65 m (e) 1.4 m ÷ 2 = 0.7 m (f) 1.5 m ÷ 2 = 0.75 m  
 (g) 1.6 m ÷ 2 = 0.8 m (h) 1.7 m ÷ 2 = 0.85 m (i) 1.8 m ÷ 2 = 0.9 m  
 (j) 1.9 m ÷ 2 = 0.95 m

Page 114

**pages 111-114** Having had extensive practice at renaming units of length using fraction and decimal form, using the operations should not cause a difficulty for the pupils. Decimal form is the most useful and widely-used way of expressing these measures.

**STRAND UNIT:***Area*

See page 77

**Objectives:**

*The child should be enabled to*

- ▶ estimate, compare and measure the area of regular and irregular shapes using standard square units

**Mathematics Curriculum**

**Page references:**

- ⊙ *Mathemagic 4* pages 93-97
- ⊙ Review page 131
- ⊙ *Shadow Book 4* pages 36-38

**Language:**

- ⊙ estimate, cover, surface, edge, flat, overlap, fit, space, same area as, greater/smaller area than, angles, squares, square units, regular, irregular, tessellate

**Resources:**

- ⊙ *TRB 4* Appendices 3.19, 3.20

**Linkage:**

- ⊙ counting and numeration, length, 2-D shapes, lines and angles

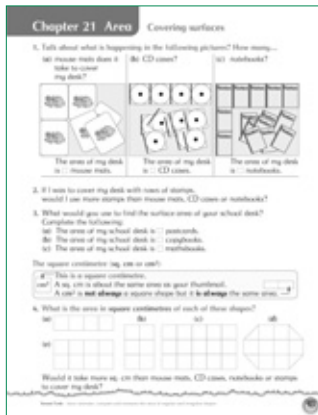
**AREA****Keep in Mind**

- ⊙ The concept of area is a difficult one for young children. It involves an awareness of both the length and the width of items. While they have no particular difficulty with either the length or width of objects, dealing with both together and the notion of an enclosed space can cause problems. Neither do they have a clear

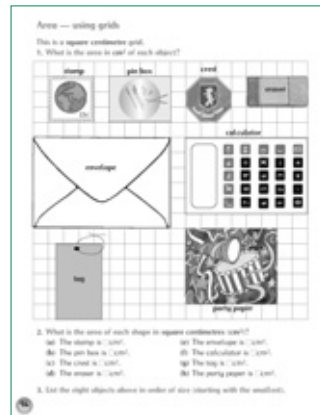
idea of surface. With this in mind, they will have spent much time in earlier classes identifying and covering surfaces before attempting to measure the area of objects using square units.

- ⊙ It is important to revisit these activities, even for a short while, to ensure that the concept of area is not confused with that of perimeter.
- ⊙ Remember there is no substitute for the real experience of hands-on activity using square centimetre tiles. Copy the grid in Appendix 3.20 and cut out the squares. This will be especially useful in explaining the difference between  $\text{cm}^2$  and square centimetres.
- ⊙ Link with aspects of the Shape and Space strand, e.g. drawing symmetrical shapes using squared paper/grid; 2-D shapes, lines and angles etc.

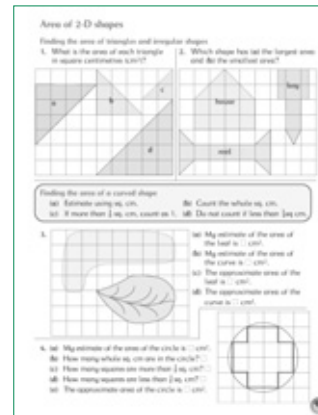
### Page Notes



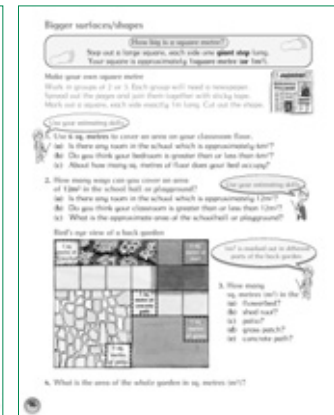
Page 93



Page 94



Page 95



Page 96

**page 93** reviews many of the aspects which may have caused difficulties for the pupils. It highlights the notion of surface, discusses the choice of an appropriate unit of measure and addresses the issue of  $\text{cm}^2$  and square centimetres. While square units are familiar to the pupils, square centimetres are not. Use the grid in Appendix 3.20 to introduce them. Allow the pupils to cut them out, manipulate them and make shapes — regular and irregular — from them.

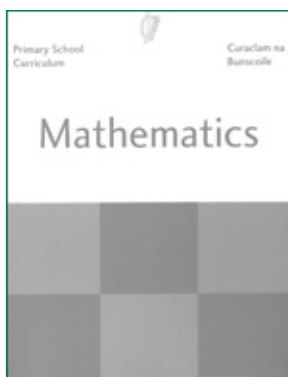
**page 94** mirrors hands-on activities which can be delivered using a copy of the grid supplied. Copy it onto an OHP transparency to facilitate discussion. Use several other real examples.

**page 95** In order to explain how to calculate the area of irregular shapes as these, particularly with half-squares, it may help to copy them with the gridlines visible, cut them up and put them together in full squares. For shapes with curved edges, discuss with them how they think the area might best be measured before guiding them. Emphasise the importance of estimating first. Have them justify their estimate.

**page 96** extends the pupils’ knowledge of measuring surface area to using bigger units, i.e. square metres. It is worthwhile taking the children outside to ‘step’ out and measure the area of a part of the school environment. Using newspapers is a great way to show what a square metre ‘feels’ and looks like. The issue of a  $m^2$  and a square metre arises, but can best be addressed using these approaches.

## STRAND UNIT:

## Weight



See page 77

### Objectives:

*The child should be enabled to*

- ▶ estimate, compare, measure and record the weight of a variety of objects using appropriate metric units
- ▶ rename units of weight in kg and g
- ▶ rename units of weight using decimal or fraction form
- ▶ solve and complete practical tasks and problems involving the addition, subtraction, multiplication and division of units of weight

*Mathematics Curriculum*

### Page references:

- ⊙ *Mathemagic 4* pages 120-125
- ⊙ *Review* pages 173, 174

- ⊙ *Shadow Book 4* pages 52-53

**Language:**

- ⊙ weigh, weighs, weight, balance, heavy, heavier, heaviest, light, lighter, lightest, too many, too few, about, just over, just under, estimate, kilogramme, half, quarter, grammes, total

**Linkage:**

- ⊙ counting and numeration, data, length, capacity, operations, estimation, fractions

**WEIGHT****Keep in Mind**

- ⊙ Pupils will be able to discriminate between kilogrammes and grammes. It is important to review some of the principles of estimating, comparing and measuring items in this context.
- ⊙ While children will have experience in weighing objects, it is fair to say that encountering grammes can pose some difficulties. Even for adults, it can be difficult to estimate or compare the weight of items in grammes.
- ⊙ The association between weight and size is also an issue for children. This can only be resolved by experiencing several examples of different types and sizes of items.
- ⊙ Remember there is no substitute for the real experience of hands-on activity.
- ⊙ Renaming kilogrammes as grammes and vice versa is extended to using decimal and fractional forms. It is a central focus of the objectives at this stage. It is worth reviewing the approach taken in third class. The decimal form is the most useful and the most widely-used. Writing weights as fractions can be seen as a stepping stone to this end.
- ⊙ With renaming addressed, the actual task of using operations in the context of weight should not be an issue.



### Page Notes

**pages 120/121** reviews aspects of weight from previous classes – the suitability of units, kilogrammes or grammes to measure various weights; making amounts up to 1000g; estimating, weighing and calculating the difference and renaming kilogrammes as grammes and vice versa.

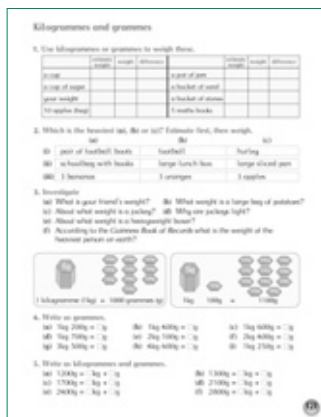


Page 120

**page 122** Illustrations showing weights of 1kg equalling 10 weights of 100g help to explain how  $100g = \frac{1}{10}$  of a kg. Use a balance and 10 x 100g weights to show this. Allow sufficient discussion for the pupils to appreciate this. Exercises in renaming kilogrammes as grammes using fractions follow. It may be helpful to have the weights illustrated available in the classroom. If not, perhaps it may suffice to draw each given weight as a step in renaming it.

**page 123** follows on from renaming as fractions to renaming as decimals. The transition should be supported with discussion and appropriate materials. It may help to direct the children by asking how many full kilogrammes are there – for example 1250g has 1 full kilogramme,  $\frac{2}{10}$  of a kg and  $\frac{50}{100}$  of a kg, leading to 1.25kg.

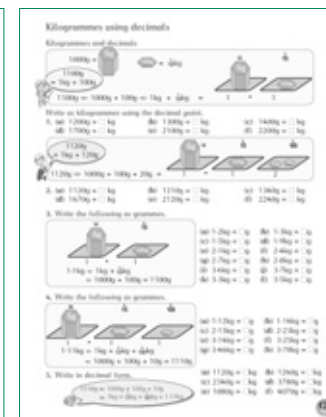
**page 124** Having had extensive practice at renaming units of weight using fractional and decimal form, using the operations should not cause difficulty for the pupils. Decimal form is the most useful and widely-used way of expressing these measures and of carrying out operations thereon.



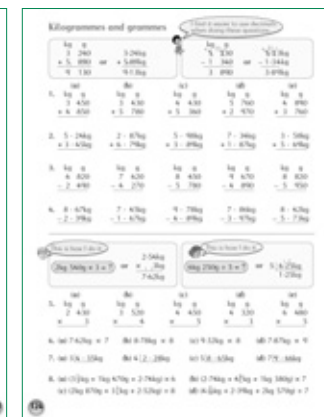
Page 121



Page 122

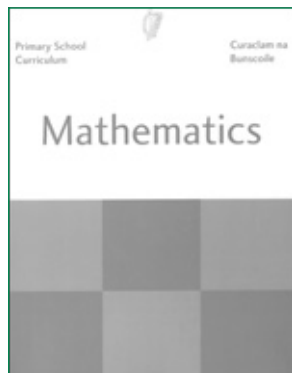


Page 123



Page 124



**STRAND UNIT:***Capacity*

See page 78

**Objectives:***The child should be enabled to*

- ▶ estimate, compare, measure and record the capacity of a variety of objects using appropriate metric units
- ▶ rename units of capacity in *l* and *ml*
- ▶ rename units of capacity using decimal or fraction form
- ▶ solve and complete practical tasks and problems involving the addition, subtraction, multiplication and division of units of capacity

**Mathematics Curriculum****Page references:**

- ◎ *Mathemagic 4* pages 157-161
- ◎ Review pages 173, 174
- ◎ *Shadow Book 4* pages 67-68

**Language:**

- ◎ full, empty, measure, compare, estimate, litre, millilitre, nearly full, nearly empty, half, quarter, container, holds more, holds less, capacity, exactly

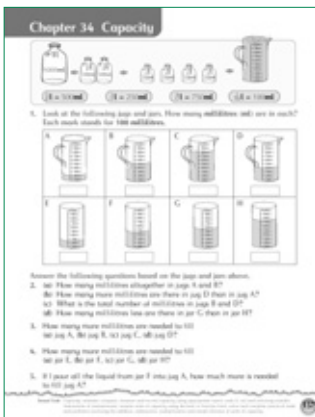
**Linkage:**

- ◎ counting and numeration, data, length, weight, operations, estimation, fractions

**CAPACITY**

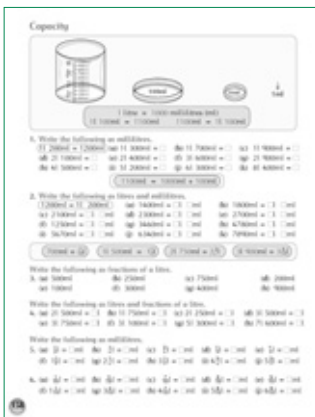
**Keep in Mind**

- ⊙ Pupils will be able to discriminate between a litre and millilitres at this point. It is important to review some of the principles of estimating, comparing and measuring items in this context.
- ⊙ While children will have experience in measuring objects, it is fair to say that encountering millilitres can pose some difficulties. Even for adults, it can be difficult to estimate or compare the capacity of items in millilitres.
- ⊙ The association between capacity and the shape of the containers can be an issue for children. This can only be resolved by experiencing several examples of different types of shapes and sizes of containers and of pouring liquids from one to the other.
- ⊙ Remember there is no substitute for the real experience of hands-on activity.
- ⊙ Renaming litres as millilitres and vice versa is extended to using decimal and fraction forms. It is a central focus of the objectives at this stage. It is worth reviewing the approach taken in third class. The decimal form is the most useful and the most widely-used. Writing amounts as fractions can be seen as a stepping stone.
- ⊙ With renaming addressed, the actual task of using operations in the context of capacity should not be an issue.



Page 157

**page 157** revisits aspects of capacity which children have previously met. Use suitable jugs and some water to demonstrate that it takes 10 measures of 100ml to make a litre. This will form a solid basis for renaming. The pupils also get an opportunity to calculate amounts up to 1 litre.



Page 158

**page 158** Initially the pupils are drawn to rename litres and millilitres as millilitres and vice versa. It is useful to ask them if there are enough millilitres to make a full litre, e.g. 1200ml allows us to make a full litre and to have 200ml left over. Illustrations showing measures of 1 litre equalling 10 measures of 100 millilitres help to explain how  $100\text{ml} = \frac{1}{10}$  of a litre. Use a container and  $10 \times 100\text{ml}$

Capacity

1. Write the following on lines using the decimal point.

(1) 100ml = 0.10 l    (2) 1000ml = 1 l    (3) 1000ml = 1 l    (4) 1000ml = 1 l  
 (5) 100ml = 0.1 l    (6) 1000ml = 1 l    (7) 1000ml = 1 l    (8) 1000ml = 1 l  
 (9) 100ml = 0.1 l    (10) 1000ml = 1 l    (11) 1000ml = 1 l    (12) 1000ml = 1 l

2. Write the following on millilitres.

(1) 1.2 l = 1200 ml    (2) 1.4 l = 1400 ml    (3) 1.5 l = 1500 ml    (4) 1.6 l = 1600 ml  
 (5) 1.7 l = 1700 ml    (6) 1.8 l = 1800 ml    (7) 1.9 l = 1900 ml    (8) 2.0 l = 2000 ml  
 (9) 2.1 l = 2100 ml    (10) 2.2 l = 2200 ml    (11) 2.3 l = 2300 ml    (12) 2.4 l = 2400 ml

3. Write the following on litres using the decimal point.

(1) 1000ml = 1 l    (2) 2000ml = 2 l    (3) 3000ml = 3 l    (4) 4000ml = 4 l  
 (5) 5000ml = 5 l    (6) 6000ml = 6 l    (7) 7000ml = 7 l    (8) 8000ml = 8 l  
 (9) 9000ml = 9 l    (10) 10000ml = 10 l    (11) 11000ml = 11 l    (12) 12000ml = 12 l

4. Write the following on millilitres.

(1) 1.2 l = 1200 ml    (2) 1.4 l = 1400 ml    (3) 1.5 l = 1500 ml    (4) 1.6 l = 1600 ml  
 (5) 1.7 l = 1700 ml    (6) 1.8 l = 1800 ml    (7) 1.9 l = 1900 ml    (8) 2.0 l = 2000 ml  
 (9) 2.1 l = 2100 ml    (10) 2.2 l = 2200 ml    (11) 2.3 l = 2300 ml    (12) 2.4 l = 2400 ml

Page 159

page 159

measures to show this. Allow sufficient discussion for the pupils to appreciate this. Exercises in renaming litres as millilitres using fractions follow. It may be helpful to have the measures illustrated available in the classroom.

follows on from renaming as fractions to renaming as decimals. The transition should be supported with discussion and appropriate materials. It may help to direct the children by asking how many full litres are there – for example 1120ml has 1 full litre,  $\frac{1}{10}$  of a litre and  $\frac{20}{100}$  of a litre leading to 1.12l.

page 160

Having had extensive practice at renaming units of capacity using fraction and decimal form, using the operations should not cause difficulty for the pupils. Decimal form is the most useful and widely-used way of expressing these measures.

Capacity

1. Write the following on lines using the decimal point.

(1) 100ml = 0.10 l    (2) 1000ml = 1 l    (3) 1000ml = 1 l    (4) 1000ml = 1 l  
 (5) 100ml = 0.1 l    (6) 1000ml = 1 l    (7) 1000ml = 1 l    (8) 1000ml = 1 l  
 (9) 100ml = 0.1 l    (10) 1000ml = 1 l    (11) 1000ml = 1 l    (12) 1000ml = 1 l

2. Write the following on millilitres.

(1) 1.2 l = 1200 ml    (2) 1.4 l = 1400 ml    (3) 1.5 l = 1500 ml    (4) 1.6 l = 1600 ml  
 (5) 1.7 l = 1700 ml    (6) 1.8 l = 1800 ml    (7) 1.9 l = 1900 ml    (8) 2.0 l = 2000 ml  
 (9) 2.1 l = 2100 ml    (10) 2.2 l = 2200 ml    (11) 2.3 l = 2300 ml    (12) 2.4 l = 2400 ml

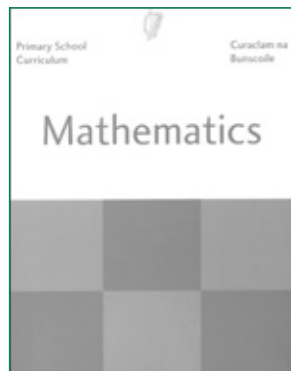
3. Write the following on litres using the decimal point.

(1) 1000ml = 1 l    (2) 2000ml = 2 l    (3) 3000ml = 3 l    (4) 4000ml = 4 l  
 (5) 5000ml = 5 l    (6) 6000ml = 6 l    (7) 7000ml = 7 l    (8) 8000ml = 8 l  
 (9) 9000ml = 9 l    (10) 10000ml = 10 l    (11) 11000ml = 11 l    (12) 12000ml = 12 l

4. Write the following on millilitres.

(1) 1.2 l = 1200 ml    (2) 1.4 l = 1400 ml    (3) 1.5 l = 1500 ml    (4) 1.6 l = 1600 ml  
 (5) 1.7 l = 1700 ml    (6) 1.8 l = 1800 ml    (7) 1.9 l = 1900 ml    (8) 2.0 l = 2000 ml  
 (9) 2.1 l = 2100 ml    (10) 2.2 l = 2200 ml    (11) 2.3 l = 2300 ml    (12) 2.4 l = 2400 ml

Page 160

**STRAND UNIT:***Time*

See pages 79 and 80

**Objectives:**

*The child should be enabled to*

- ▶ consolidate and develop a sense of time passing
- ▶ read time in one-minute intervals on analogue and digital clock
- ▶ express digital time as analogue time and vice versa
- ▶ read and interpret simple timetables
- ▶ rename minutes as hours and hours as minutes
- ▶ read dates from calendars and express weeks as days and vice versa
- ▶ solve and complete practical tasks and problems involving times and dates and the addition and subtraction of hours and minutes.

*Mathematics Curriculum*

**Page references:**

- ⊙ *Mathemagic 4* pages 71-74, 150-153
- ⊙ *Review* pages 128, 169, 170, 174
- ⊙ *Shadow Book 4* pages 26-27, 62-63

**Language:**

- ⊙ names of the days, months, seasons, hours, minutes, digital, next/last, early, earlier, earliest, late, later, latest, exactly, just before, just after, today/yesterday/tomorrow, date, o'clock, half past, quarter to, quarter past, long/short hand, before/after, first/second/third etc., counting in fives, rename, timetable

**Resources:**

- ⊙ *TRB 4* Appendix 3.15
- ⊙ *Poster 9* (see page vii)

### Linkage:

- ⊙ counting and numeration, operations, data, fractions, ordinal numbers

## TIME

### Keep in Mind

- ⊙ The concepts involved require not only an appreciation of the passage of time, but also understanding and reading recorded times both in analogue and digital formats.
- ⊙ Young children's ideas about time develop slowly. Landmark dates need to be recorded. They need to see time as cyclical, e.g. days, months, seasons. Times of various class activities need to be recorded using both analogue and digital means.
- ⊙ Addition and subtraction of hours and minutes needs to be put in context. In the real world, many of us count on/back in hours and minutes to make such calculations. It is a valuable skill worth considering at this stage in this context. Renaming hours as minutes effectively introduces them to using a different number base system (groups of 60) which can cause problems for them.



Page 71

### Page Notes

**page 71** gives an opportunity to review the passage of time by investigating and discussing past and historical events and by sequencing them.

**page 72** builds on the work of the previous page and of third class by using digital clocks showing times in one-minute intervals and asking pupils to say what time it will be before/after by a particular period of time.

**page 73** follows this theme but extends it to writing times presented in analogue form in one-minute intervals as digital times.

**page 74** Counting on in minutes is a useful skill especially in the context of timetables. It may be useful to use a clock and move the minute-hand forward the number of minutes in question. The pupils are asked to match times with the times shown on the analogue clocks in the last exercise.



Page 72

**Minute by minute**

Example: These two watches show 1 minute past 7. How long is the journey?

1. Write the digital times for each of these clocks.

2. Write the digital times for each of these clocks.

3. Match the digital times with the clocks.

Page 73

**Counting on minutes**

1. Write the digital times for each of these clocks.

2. Write the digital times for each of these clocks.

3. Match each answer with a time on the digital watches below.

Page 74

**Chapter 33 Time 2**

1. Write the following minutes in hours (hrs) and minutes (mins).

2. Write the following times in minutes only.

3. Write the following times in minutes only.

4. Complete this table.

5. Match each answer with a time on the digital watches below.

Page 150

**Adding hours and minutes**

1. Write the digital times for each of these clocks.

2. Write the digital times for each of these clocks.

3. Match each answer with a time on the digital watches below.

Page 151

**page 150** features renaming of hours and minutes. Again, using a clock to count through 60 minutes and beyond shows that 61 minutes is 1 hour and 1 minute. This will help other pupils to see that 80 minutes is 1 hour and 20 minutes. Half and quarter hours are explored in minutes also. Adding hours and minutes, without renaming, should not pose a difficulty for the pupils. It is also worth teaching them how to count on, e.g. 2hrs 15mins + 1hr 35mins can be calculated by counting on 1 hour to get 3hrs 15mins, then counting 30mins to reach 3hrs 45mins and finally, another 5 minutes to arrive at 3hrs 50mins.

**Adding hours and minutes**

1. Write the digital times for each of these clocks.

2. Write the digital times for each of these clocks.

3. Match each answer with a time on the digital watches below.

Page 152

**page 151** The counting-on approach is useful in dealing with this timetable. Where renaming is necessary, the approach used here recommends that the calculation is carried out first and the resulting answer is renamed appropriately. The final result is matched to its digital version.

**page 152** Further context-based renaming and calculations are given. Subtraction requires renaming before beginning the operation. It can be difficult for pupils to appreciate that hours are renamed as 60 minutes. This effectively requires the pupils to operate in a new number base. Talk the children through it carefully. Counting back to check the answers is recommended.

**Timetables**

Station	Dep. (08:00)	Arr. (08:47)
Newton	08:00	08:47
Railby	08:02	08:52
Wingham	08:12	09:02
Canon	08:20	09:10
Barkby	08:30	09:20
Easthorpe	08:40	09:30
Charnock	08:50	09:40

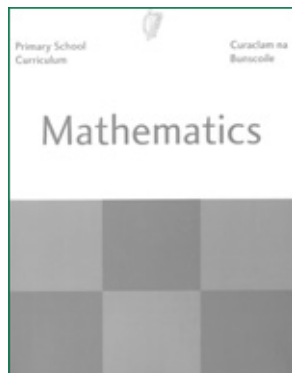
1. How long does the complete journey take?

2. If the bus was 10 minutes late departing from Canon, at what time did it depart?

3. If the bus arrived 15 minutes late at Charnock, at what time did it arrive?

Page 153

**page 153** Using a timetable, a range of relevant context-based problems are presented to the pupils which draw together and consolidate many of the skills and concepts introduced at this point.

**STRAND UNIT:***Money*

See page 81

**Objectives:***The child should be enabled to*

- ▶ rename amounts of money as euro and cent and record using symbols and decimal point
- ▶ solve and complete one-step problems and tasks involving the addition, subtraction, multiplication and division of money

**Mathematics Curriculum****Page references:**

- ⊙ *Mathemagic 4* pages 48-52, 142-147
- ⊙ *Review* pages 70, 170, 174
- ⊙ *Shadow Book 4* pages 17-18, 59-60

**Language:**

- ⊙ coins, cent, price, spend, how much?, buy, sell, pay, change, costs, less, more, equals, exchange, cheap, cheaper, total cost, amount, altogether, same value as, calculate

**Resources:**

- ⊙ *TRB 4* Appendix 3.10

**Linkage:**

- ⊙ comparing, place value, operations, counting and numeration, pattern, problem-solving

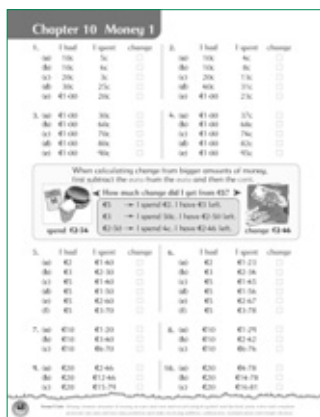


**MONEY**

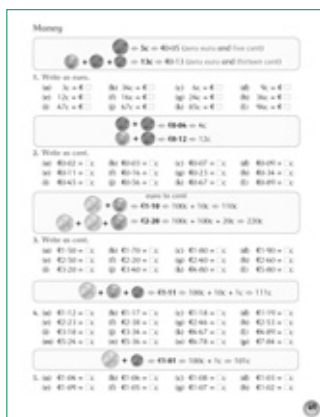
**Keep in Mind**

- ⊙ Review all the coins up to €2 already covered. Use cut-outs to identify and exchange them.
- ⊙ There are many complex concepts involved in dealing effectively with money — place value, operations, equivalence. It is wise to hasten slowly, offering ample opportunity for the children to manipulate, swap and use coins to make purchases.
- ⊙ These hands-on activities will facilitate their understanding and skill in renaming. Writing amounts as cent and as euro needs hands-on work to allow pupils to realise the significance of the decimal point. It is worth guiding them to see that the decimal point is acting as a separator – separating the euro from the cent. Using the decimal point in this context will be extremely useful in supporting the concept of place value in other contexts.
- ⊙ Following from renaming, pupils will be well-equipped to tackle one-step and two-step problems using all the operations.

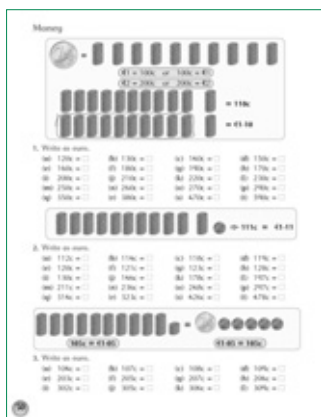
**Page Notes**



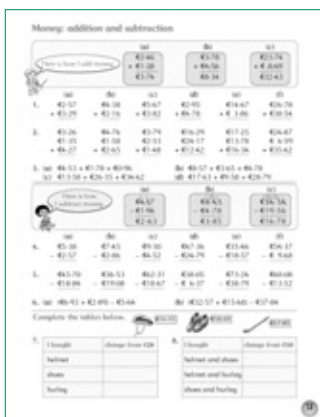
Page 48



Page 49



Page 50



Page 51

**page 48** This page reviews the work of previous classes. The pupils are asked to find the change due to them having made a purchase. Pupils may be familiar with calculating change from smaller amounts but some may need to count on to find the appropriate change. Counting on may be a more useful means of calculating change from larger amounts. Subtraction may also be an appropriate method of finding the change. Estimating first is advisable.



**page 49** focuses on renaming amounts of money as euro and cent using decimals. Thinking of the decimal point as a separator of euro and cent can be helpful to the pupils, but will later need to be addressed in the context of hundredths. Discuss with the children that every full euro equals 100 cent. Therefore, €1·40 can be renamed as 100 + 40 cent or 140 cent.

**page 50** Renaming amounts in cent as euro and cent using the decimal point is best approached by focusing on groups of 100 cent. Tell the children that when we have 100 cent, we have enough to make a full euro and that we use the decimal point to separate the full euro from the cent. Therefore, 120 cent can be written as 1 full euro, (€1), and 20 cent. Using the decimal point to separate it from the cent, we can write it as €1·20.

**page 51** The addition and subtraction of amounts of money is tackled on this page. At this point, the operations should not pose a difficulty for the pupils. It is still advisable to have the pupils estimate their answers before calculating the actual total.

**page 142** introduces the pupils to the multiplication and division of amounts of money. At this point, the pupils can apply these operations and have a good understanding of place value. Before multiplying, it is important that the pupils estimate what the result will be. For example, €2·38 x 4 can be estimated by rounding to €3 and estimate the answer as approximately €12. In carrying out the operation, it is better that pupils rename the amount in cent, multiply and then rename as euro using the decimal point.

**pages 143/144** follow the same principles as on page 142.

**Chapter 32 Money 2**

1.  $100 \times 1 = 100$        $100 \times 10 = 1000$        $100 \times 100 = 10000$   
 2.  $1000 \div 10 = 100$        $10000 \div 100 = 1000$        $100000 \div 1000 = 10000$

3. Before multiplying these, estimate your answers first by rounding to the nearest euro. (Can you see your calculation in each answer?)

4.  $40 \times 3 = 120$        $40 \times 4 = 160$        $40 \times 5 = 200$        $40 \times 6 = 240$        $40 \times 7 = 280$        $40 \times 8 = 320$        $40 \times 9 = 360$        $40 \times 10 = 400$        $40 \times 11 = 440$        $40 \times 12 = 480$        $40 \times 13 = 520$        $40 \times 14 = 560$        $40 \times 15 = 600$

5.  $40 \times 16 = 640$        $40 \times 17 = 680$        $40 \times 18 = 720$        $40 \times 19 = 760$        $40 \times 20 = 800$

6.  $40 \times 21 = 840$        $40 \times 22 = 880$        $40 \times 23 = 920$        $40 \times 24 = 960$        $40 \times 25 = 1000$

7.  $40 \times 26 = 1040$        $40 \times 27 = 1080$        $40 \times 28 = 1120$        $40 \times 29 = 1160$        $40 \times 30 = 1200$

8.  $40 \times 31 = 1240$        $40 \times 32 = 1280$        $40 \times 33 = 1320$        $40 \times 34 = 1360$        $40 \times 35 = 1400$

9.  $40 \times 36 = 1440$        $40 \times 37 = 1480$        $40 \times 38 = 1520$        $40 \times 39 = 1560$        $40 \times 40 = 1600$

10.  $40 \times 41 = 1640$        $40 \times 42 = 1680$        $40 \times 43 = 1720$        $40 \times 44 = 1760$        $40 \times 45 = 1800$

11.  $40 \times 46 = 1840$        $40 \times 47 = 1880$        $40 \times 48 = 1920$        $40 \times 49 = 1960$        $40 \times 50 = 2000$

12.  $40 \times 51 = 2040$        $40 \times 52 = 2080$        $40 \times 53 = 2120$        $40 \times 54 = 2160$        $40 \times 55 = 2200$

13.  $40 \times 56 = 2240$        $40 \times 57 = 2280$        $40 \times 58 = 2320$        $40 \times 59 = 2360$        $40 \times 60 = 2400$

14.  $40 \times 61 = 2440$        $40 \times 62 = 2480$        $40 \times 63 = 2520$        $40 \times 64 = 2560$        $40 \times 65 = 2600$

15.  $40 \times 66 = 2640$        $40 \times 67 = 2680$        $40 \times 68 = 2720$        $40 \times 69 = 2760$        $40 \times 70 = 2800$

16.  $40 \times 71 = 2840$        $40 \times 72 = 2880$        $40 \times 73 = 2920$        $40 \times 74 = 2960$        $40 \times 75 = 3000$

17.  $40 \times 76 = 3040$        $40 \times 77 = 3080$        $40 \times 78 = 3120$        $40 \times 79 = 3160$        $40 \times 80 = 3200$

18.  $40 \times 81 = 3240$        $40 \times 82 = 3280$        $40 \times 83 = 3320$        $40 \times 84 = 3360$        $40 \times 85 = 3400$

19.  $40 \times 86 = 3440$        $40 \times 87 = 3480$        $40 \times 88 = 3520$        $40 \times 89 = 3560$        $40 \times 90 = 3600$

20.  $40 \times 91 = 3640$        $40 \times 92 = 3680$        $40 \times 93 = 3720$        $40 \times 94 = 3760$        $40 \times 95 = 3800$

21.  $40 \times 96 = 3840$        $40 \times 97 = 3880$        $40 \times 98 = 3920$        $40 \times 99 = 3960$        $40 \times 100 = 4000$

22.  $40 \times 101 = 4040$        $40 \times 102 = 4080$        $40 \times 103 = 4120$        $40 \times 104 = 4160$        $40 \times 105 = 4200$

23.  $40 \times 106 = 4240$        $40 \times 107 = 4280$        $40 \times 108 = 4320$        $40 \times 109 = 4360$        $40 \times 110 = 4400$

24.  $40 \times 111 = 4440$        $40 \times 112 = 4480$        $40 \times 113 = 4520$        $40 \times 114 = 4560$        $40 \times 115 = 4600$

25.  $40 \times 116 = 4640$        $40 \times 117 = 4680$        $40 \times 118 = 4720$        $40 \times 119 = 4760$        $40 \times 120 = 4800$

26.  $40 \times 121 = 4840$        $40 \times 122 = 4880$        $40 \times 123 = 4920$        $40 \times 124 = 4960$        $40 \times 125 = 5000$

27.  $40 \times 126 = 4960$        $40 \times 127 = 5000$        $40 \times 128 = 5040$        $40 \times 129 = 5080$        $40 \times 130 = 5120$

28.  $40 \times 131 = 5160$        $40 \times 132 = 5200$        $40 \times 133 = 5240$        $40 \times 134 = 5280$        $40 \times 135 = 5320$

29.  $40 \times 136 = 5360$        $40 \times 137 = 5400$        $40 \times 138 = 5440$        $40 \times 139 = 5480$        $40 \times 140 = 5520$

30.  $40 \times 141 = 5560$        $40 \times 142 = 5600$        $40 \times 143 = 5640$        $40 \times 144 = 5680$        $40 \times 145 = 5720$

31.  $40 \times 146 = 5760$        $40 \times 147 = 5800$        $40 \times 148 = 5840$        $40 \times 149 = 5880$        $40 \times 150 = 5920$

32.  $40 \times 151 = 5960$        $40 \times 152 = 6000$        $40 \times 153 = 6040$        $40 \times 154 = 6080$        $40 \times 155 = 6120$

33.  $40 \times 156 = 6160$        $40 \times 157 = 6200$        $40 \times 158 = 6240$        $40 \times 159 = 6280$        $40 \times 160 = 6320$

34.  $40 \times 161 = 6360$        $40 \times 162 = 6400$        $40 \times 163 = 6440$        $40 \times 164 = 6480$        $40 \times 165 = 6520$

35.  $40 \times 166 = 6560$        $40 \times 167 = 6600$        $40 \times 168 = 6640$        $40 \times 169 = 6680$        $40 \times 170 = 6720$

36.  $40 \times 171 = 6760$        $40 \times 172 = 6800$        $40 \times 173 = 6840$        $40 \times 174 = 6880$        $40 \times 175 = 6920$

37.  $40 \times 176 = 6960$        $40 \times 177 = 7000$        $40 \times 178 = 7040$        $40 \times 179 = 7080$        $40 \times 180 = 7120$

38.  $40 \times 181 = 7160$        $40 \times 182 = 7200$        $40 \times 183 = 7240$        $40 \times 184 = 7280$        $40 \times 185 = 7320$

39.  $40 \times 186 = 7360$        $40 \times 187 = 7400$        $40 \times 188 = 7440$        $40 \times 189 = 7480$        $40 \times 190 = 7520$

40.  $40 \times 191 = 7560$        $40 \times 192 = 7600$        $40 \times 193 = 7640$        $40 \times 194 = 7680$        $40 \times 195 = 7720$

41.  $40 \times 196 = 7760$        $40 \times 197 = 7800$        $40 \times 198 = 7840$        $40 \times 199 = 7880$        $40 \times 200 = 7920$

42.  $40 \times 201 = 7960$        $40 \times 202 = 8000$        $40 \times 203 = 8040$        $40 \times 204 = 8080$        $40 \times 205 = 8120$

43.  $40 \times 206 = 8160$        $40 \times 207 = 8200$        $40 \times 208 = 8240$        $40 \times 209 = 8280$        $40 \times 210 = 8320$

44.  $40 \times 211 = 8360$        $40 \times 212 = 8400$        $40 \times 213 = 8440$        $40 \times 214 = 8480$        $40 \times 215 = 8520$

45.  $40 \times 216 = 8560$        $40 \times 217 = 8600$        $40 \times 218 = 8640$        $40 \times 219 = 8680$        $40 \times 220 = 8720$

46.  $40 \times 221 = 8760$        $40 \times 222 = 8800$        $40 \times 223 = 8840$        $40 \times 224 = 8880$        $40 \times 225 = 8920$

47.  $40 \times 226 = 8960$        $40 \times 227 = 9000$        $40 \times 228 = 9040$        $40 \times 229 = 9080$        $40 \times 230 = 9120$

48.  $40 \times 231 = 9160$        $40 \times 232 = 9200$        $40 \times 233 = 9240$        $40 \times 234 = 9280$        $40 \times 235 = 9320$

49.  $40 \times 236 = 9360$        $40 \times 237 = 9400$        $40 \times 238 = 9440$        $40 \times 239 = 9480$        $40 \times 240 = 9520$

50.  $40 \times 241 = 9560$        $40 \times 242 = 9600$        $40 \times 243 = 9640$        $40 \times 244 = 9680$        $40 \times 245 = 9720$

51.  $40 \times 246 = 9760$        $40 \times 247 = 9800$        $40 \times 248 = 9840$        $40 \times 249 = 9880$        $40 \times 250 = 9920$

52.  $40 \times 251 = 9960$        $40 \times 252 = 10000$        $40 \times 253 = 10040$        $40 \times 254 = 10080$        $40 \times 255 = 10120$

53.  $40 \times 256 = 10160$        $40 \times 257 = 10200$        $40 \times 258 = 10240$        $40 \times 259 = 10280$        $40 \times 260 = 10320$

54.  $40 \times 261 = 10360$        $40 \times 262 = 10400$        $40 \times 263 = 10440$        $40 \times 264 = 10480$        $40 \times 265 = 10520$

55.  $40 \times 266 = 10560$        $40 \times 267 = 10600$        $40 \times 268 = 10640$        $40 \times 269 = 10680$        $40 \times 270 = 10720$

56.  $40 \times 271 = 10760$        $40 \times 272 = 10800$        $40 \times 273 = 10840$        $40 \times 274 = 10880$        $40 \times 275 = 10920$

57.  $40 \times 276 = 10960$        $40 \times 277 = 11000$        $40 \times 278 = 11040$        $40 \times 279 = 11080$        $40 \times 280 = 11120$

58.  $40 \times 281 = 11160$        $40 \times 282 = 11200$        $40 \times 283 = 11240$        $40 \times 284 = 11280$        $40 \times 285 = 11320$

59.  $40 \times 286 = 11360$        $40 \times 287 = 11400$        $40 \times 288 = 11440$        $40 \times 289 = 11480$        $40 \times 290 = 11520$

60.  $40 \times 291 = 11560$        $40 \times 292 = 11600$        $40 \times 293 = 11640$        $40 \times 294 = 11680$        $40 \times 295 = 11720$

61.  $40 \times 296 = 11760$        $40 \times 297 = 11800$        $40 \times 298 = 11840$        $40 \times 299 = 11880$        $40 \times 300 = 11920$

62.  $40 \times 301 = 11960$        $40 \times 302 = 12000$        $40 \times 303 = 12040$        $40 \times 304 = 12080$        $40 \times 305 = 12120$

63.  $40 \times 306 = 12160$        $40 \times 307 = 12200$        $40 \times 308 = 12240$        $40 \times 309 = 12280$        $40 \times 310 = 12320$

64.  $40 \times 311 = 12360$        $40 \times 312 = 12400$        $40 \times 313 = 12440$        $40 \times 314 = 12480$        $40 \times 315 = 12520$

65.  $40 \times 316 = 12560$        $40 \times 317 = 12600$        $40 \times 318 = 12640$        $40 \times 319 = 12680$        $40 \times 320 = 12720$

66.  $40 \times 321 = 12760$        $40 \times 322 = 12800$        $40 \times 323 = 12840$        $40 \times 324 = 12880$        $40 \times 325 = 12920$

67.  $40 \times 326 = 12960$        $40 \times 327 = 13000$        $40 \times 328 = 13040$        $40 \times 329 = 13080$        $40 \times 330 = 13120$

68.  $40 \times 331 = 13160$        $40 \times 332 = 13200$        $40 \times 333 = 13240$        $40 \times 334 = 13280$        $40 \times 335 = 13320$

69.  $40 \times 336 = 13360$        $40 \times 337 = 13400$        $40 \times 338 = 13440$        $40 \times 339 = 13480$        $40 \times 340 = 13520$

70.  $40 \times 341 = 13560$        $40 \times 342 = 13600$        $40 \times 343 = 13640$        $40 \times 344 = 13680$        $40 \times 345 = 13720$

71.  $40 \times 346 = 13760$        $40 \times 347 = 13800$        $40 \times 348 = 13840$        $40 \times 349 = 13880$        $40 \times 350 = 13920$

72.  $40 \times 351 = 13960$        $40 \times 352 = 14000$        $40 \times 353 = 14040$        $40 \times 354 = 14080$        $40 \times 355 = 14120$

73.  $40 \times 356 = 14160$        $40 \times 357 = 14200$        $40 \times 358 = 14240$        $40 \times 359 = 14280$        $40 \times 360 = 14320$

74.  $40 \times 361 = 14360$        $40 \times 362 = 14400$        $40 \times 363 = 14440$        $40 \times 364 = 14480$        $40 \times 365 = 14520$

75.  $40 \times 366 = 14560$        $40 \times 367 = 14600$        $40 \times 368 = 14640$        $40 \times 369 = 14680$        $40 \times 370 = 14720$

76.  $40 \times 371 = 14760$        $40 \times 372 = 14800$        $40 \times 373 = 14840$        $40 \times 374 = 14880$        $40 \times 375 = 14920$

77.  $40 \times 376 = 14960$        $40 \times 377 = 15000$        $40 \times 378 = 15040$        $40 \times 379 = 15080$        $40 \times 380 = 15120$

78.  $40 \times 381 = 15160$        $40 \times 382 = 15200$        $40 \times 383 = 15240$        $40 \times 384 = 15280$        $40 \times 385 = 15320$

79.  $40 \times 386 = 15360$        $40 \times 387 = 15400$        $40 \times 388 = 15440$        $40 \times 389 = 15480$        $40 \times 390 = 15520$

80.  $40 \times 391 = 15560$        $40 \times 392 = 15600$        $40 \times 393 = 15640$        $40 \times 394 = 15680$        $40 \times 395 = 15720$

81.  $40 \times 396 = 15760$        $40 \times 397 = 15800$        $40 \times 398 = 15840$        $40 \times 399 = 15880$        $40 \times 400 = 15920$

82.  $40 \times 401 = 15960$        $40 \times 402 = 16000$        $40 \times 403 = 16040$        $40 \times 404 = 16080$        $40 \times 405 = 16120$

83.  $40 \times 406 = 16160$        $40 \times 407 = 16200$        $40 \times 408 = 16240$        $40 \times 409 = 16280$        $40 \times 410 = 16320$

84.  $40 \times 411 = 16360$        $40 \times 412 = 16400$        $40 \times 413 = 16440$        $40 \times 414 = 16480$        $40 \times 415 = 16520$

85.  $40 \times 416 = 16560$        $40 \times 417 = 16600$        $40 \times 418 = 16640$        $40 \times 419 = 16680$        $40 \times 420 = 16720$

86.  $40 \times 421 = 16760$        $40 \times 422 = 16800$        $40 \times 423 = 16840$        $40 \times 424 = 16880$        $40 \times 425 = 16920$

87.  $40 \times 426 = 16960$        $40 \times 427 = 17000$        $40 \times 428 = 17040$        $40 \times 429 = 17080$        $40 \times 430 = 17120$

88.  $40 \times 431 = 17160$        $40 \times 432 = 17200$        $40 \times 433 = 17240$        $40 \times 434 = 17280$        $40 \times 435 = 17320$

89.  $40 \times 436 = 17360$        $40 \times 437 = 17400$        $40 \times 438 = 17440$        $40 \times 439 = 17480$        $40 \times 440 = 17520$

90.  $40 \times 441 = 17560$        $40 \times 442 = 17600$        $40 \times 443 = 17640$        $40 \times 444 = 17680$        $40 \times 445 = 17720$

91.  $40 \times 446 = 17760$        $40 \times 447 = 17800$        $40 \times 448 = 17840$        $40 \times 449 = 17880$        $40 \times 450 = 17920$

92.  $40 \times 451 = 17960$        $40 \times 452 = 18000$        $40 \times 453 = 18040$        $40 \times 454 = 18080$        $40 \times 455 = 18120$

93.  $40 \times 456 = 18160$        $40 \times 457 = 18200$        $40 \times 458 = 18240$        $40 \times 459 = 18280$        $40 \times 460 = 18320$

94.  $40 \times 461 = 18360$        $40 \times 462 = 18400$        $40 \times 463 = 18440$        $40 \times 464 = 18480$        $40 \times 465 = 18520$

95.  $40 \times 466 = 18560$        $40 \times 467 = 18600$        $40 \times 468 = 18640$        $40 \times 469 = 18680$        $40 \times 470 = 18720$

96.  $40 \times 471 = 18760$        $40 \times 472 = 18800$        $40 \times 473 = 18840$        $40 \times 474 = 18880$        $40 \times 475 = 18920$

97.  $40 \times 476 = 18960$        $40 \times 477 = 19000$        $40 \times 478 = 19040$        $40 \times 479 = 19080$        $40 \times 480 = 19120$

98.  $40 \times 481 = 19160$        $40 \times 482 = 19200$        $40 \times 483 = 19240$        $40 \times 484 = 19280$        $40 \times 485 = 19320$

99.  $40 \times 486 = 19360$        $40 \times 487 = 19400$        $40 \times 488 = 19440$        $40 \times 489 = 19480$        $40 \times 490 = 19520$

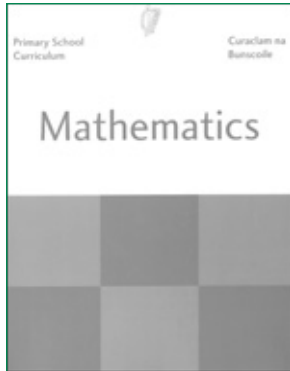
100.  $40 \times 491 = 19560$        $40 \times 492 = 19600$        $40 \times 493 = 19640$        $40 \times 494 = 19680$



**STRAND**

*Data*

# STRAND UNIT: *Representing and interpreting data*



See page 82

## Objectives:

*The child should be enabled to*

- ▶ collect, organise and represent data using pictograms, block graphs, bar charts and bar-line graphs
- ▶ read and interpret bar-line graphs and simple pie charts
- ▶ use data sets to solve and complete practical tasks and problems

**Mathematics Curriculum**

## Page references:

- ⊙ *Mathemagic 4* pages 18-23
- ⊙ *Shadow Book 4* pages 5-6

## Language:

- ⊙ count, how many?, rows, columns, collect, collection, sets, construct, record, table, chart, information, more, fewer/less, fewest/least, difference, tally, total, estimate, pictogram, block graph, bar chart, title, scale, bar-line

## Resources:

- ⊙ *TRB 4* Appendices 3.5, 3.6, 3.7, 3.19, 3.20
- ⊙ Poster 4 (see page vi)

## Linkage:

- ⊙ counting, operations, fractions, 2-D shapes, 3-D shapes, number pattern, measures

REPRESENTING AND INTERPRETING DATA

Keep in Mind

- ⊙ Interpreting data has become a daily experience for us all. An examination of any newspaper shows how much information we are given in tables, charts and diagrams. An emphasis is being placed on the collection, organisation and representation as well as the analysis of data for this reason.
- ⊙ Analysis of information on graphs and charts can be a basis for exploration of other aspects of the mathematics curriculum, e.g. addition, subtraction, fractions, pattern.
- ⊙ It is vital that the pupils carry out investigations for themselves so that they manipulate their own data as it is only at that point that the representation and interpretation becomes real for them.

Page Notes

**Chapter 4 Data** Organising information

Essential to work: 4 weeks  
The 130 workers at a factory were asked how they travelled to work.  
The following table shows the result of the survey.

mode	train	bus	car	cycle	walk
number of people	76	103	57	64	36

1. Round each number to the nearest 10.  
nearest 10

2. Copy and complete this pictogram to represent the information. Use the rounded numbers and let  $\square$  represent 10 people.

travelling to work

mode	train	bus	car	cycle	walk
number of people					

3. Answer these questions using the rounded numbers.

- How many people walk to work?
- How many more people use the bus than the car?
- Do more than half of the people use any one means of getting to work?
- The number of people who are both in the factory system could be represented by 20 pence  $\text{p}$ . How many  $\text{p}$  in the coinage?
- The number of people in the factory who have mobile phones could be represented by 15 pence. How many  $\text{p}$  do not have mobile phones?

Page 18

**Keeping a tally**

Four children, Aarti, Bachi, Cane and Dan, played a game of putting out 18 holes. The scores at each hole are given on the golf hole.

Copy the table and use tallies to record the number of shots each score was made for the 18 holes. Find out how many golf shots were taken in the whole game. Tally in groups of five (5s).

shots	tally marks	golf shot
1		1 =
2		2 =
3		3 =
4		4 =
5		5 =
Total =		

Page 19

**Using a scale**

This horizontal bar chart shows the number of times each score was made in the putting game. Check it against your tally marks on the previous page.

putting scores

1. Which number of shots was hit most common and 2) how often was it scored?  
3. How many more holes on three than holes on one were scored?  
4. How many more holes on three than holes on two were scored?  
5. How many more holes on three than holes on four were scored?  
6. How many more holes on three than holes on five were scored?

Aarti took 14 shots, Bachi 13 shots, Cane 17 shots and Dan 11 shots. Check their combined total against the total golf shots you marked out from your tally on the previous page. The children's scores could also be represented on a bar chart. Aarti's score is shown.

Copy and complete the vertical bar chart on squared paper.

each player's score

8. What was the difference between the highest and lowest scores?  
9. In 10 shots, 10 who was scored, 10 who was third and 10 who was last?  
10. If Aarti scored two less and Bachi scored two more, who would have won?

Page 20

**Using a scale**

The following pictogram shows the number of soft drinks sold in the Pitch and Put Club Shop during one week.

Each coin symbol  $\text{c}$  represents 1 coin.

1. How many coins were sold each day?  
2. How many coins in total were sold during the week?  
3. On which two days were the same number of coins sold?  
4. How many more coins were sold on Saturday than on Sunday?  
5. On which three consecutive days was a total of 100 coins sold?  
6. Which were the three best days for sales of soft drinks? What reason would you give for this?  
7. How many coins were sold in total on the other four days (the mid-week days)?  
8. If each coin was sold for 50c, how many more was taken on soft drinks during the week?

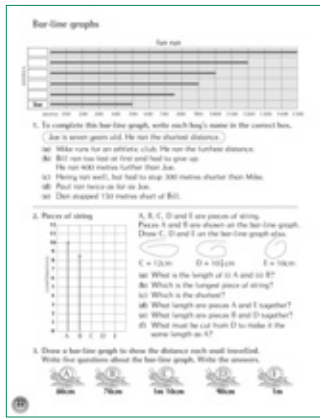
The above data may be shown on a bar chart. Complete the chart on squared paper.

soft drinks sold during the week

Page 21

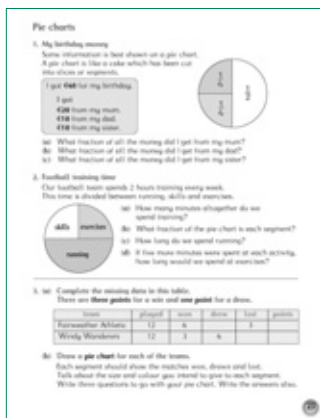
**page 18** presents information in the form of a table. The pupils are asked to use their knowledge of rounding to the nearest 10. They are familiar with using pictograms and with using scale. Pupils must complete the pictogram and are then asked to answer questions using the rounded figures.

**page 19** reviews the use of tallies. The table is filled in according to the number of shots taken over the 18 holes. Therefore, 1 shot was taken 3 times (at the 12th, 15th and 16th holes), so 3 tally marks are marked, 1 x 3 means 3 shots. By following this pattern, we can find out how many shots were taken altogether.



Page 22

**page 20** shows the bar chart resulting from the information on the previous page. The questions following allow for its analysis with the intention of showing pupils that the same information can be utilised and analysed in many different ways. This bar chart needs to be completed on the basis of the information supplied, before being interpreted through the questions supplied.



Page 23

**page 21** reviews the use of scale and construction of a bar chart and offers opportunity for analysis of the information through the questions provided.

**page 22** offers an interesting way of introducing bar-line graphs. The information is presented but the labels containing the names are not attached. Clues are given, linking with the area of problem solving. The second section gives information and a sample bar-line graph to guide the pupils.

**page 23** presents a simple pie chart using familiar fractions. Discuss the information given in each. Ask the pupils to interpret them using the questions given. In the last section, pupils are given an incomplete table and are required to fill in the missing information and to draw a pie chart to represent the performance of each of the teams.

# STRAND UNIT:

# Chance



See page 83

## Objectives:

*The child should be enabled to*

- use vocabulary of uncertainty and chance
- order events in terms of likelihood of occurrence
- identify and record outcomes of simple random processes

**Mathematics Curriculum**

**Page references:**

- ⊙ *Mathemagic 4* pages 166-169
- ⊙ *Shadow Book 4* pages 71-72

**Language:**

- ⊙ happen, occur, certain, possible, impossible, maybe, yes, no, perhaps, will, will not, might, might not, likely, unlikely, very likely, definitely, toss, predict, occurrence, likelihood, random, uncertainty, experiment

**Linkage:**

- ⊙ data, fractions

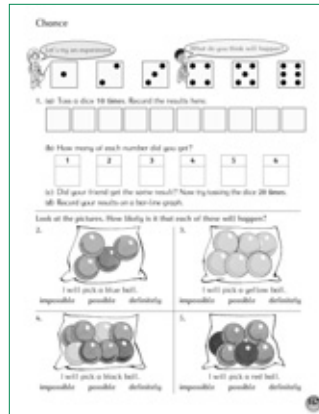
**CHANCE****Keep in Mind**

- ⊙ Much of the work in achieving the objectives in this unit will depend largely on developing the appropriate language and extending and using the vocabulary necessary to be able to discuss the chance or likelihood of occurrence.
- ⊙ At this early stage the topic should not prove difficult but it is important that the concept of uncertainty is explored thoroughly as a foundation for later work in this area.
- ⊙ Children’s perceptions of chance is often complicated by what they see as fair or unfair. For example, they feel that in tossing a coin, there comes a time when it is only fair that their choice comes up.
- ⊙ Calculating the chances of the likelihood of an occurrence needs to be taken slowly and supported with actual hands-on activities, rather than a purely theoretical approach. Experiments are provided to support this approach.

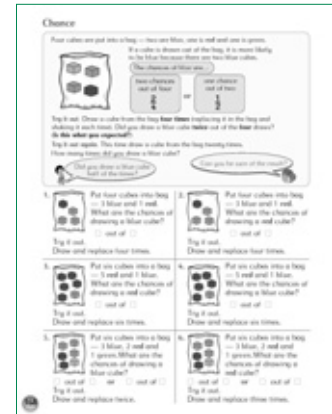
Page Notes



Page 166



Page 167



Page 168

**page 166** Page 166 presents situations for the development of this difficult concept. Sufficient time should be allowed for discussion of each. Apart from choosing the appropriate word as a response, it is important for the pupils to explain why they have made the choice. Ask them why they have chosen one word above another.

**page 167** Page 167 offers a means of introducing an experiment tossing a dice. Pupils need to carry out the experiment themselves more than once if possible, to experience the variety of outcomes possible. It is an ideal opportunity for pair work. Give each pair a dice and have them record their results. Discuss the different outcomes. Follow a similar approach with the second experiment. Discuss the possibilities in terms of the likelihood of their occurring – impossible, possible, definitely.

**page 168** This page takes the previous experiment a step further by calculating the chances of an event occurring. Talk the children through this aspect carefully. Use a situation similar to that illustrated. Show them the bag and put in the cubes. Discuss the chances of each colour being chosen. *What are the chances of pulling out a red/green cube? What about a blue cube?* Talk about the possibilities in terms of  $x$  out of 4. Ask them how you would write this in fractional form. Apart from expressing the chances as a fraction, it is important that pupils see that even having done so, it is not a predictor of what will happen when a cube is drawn.

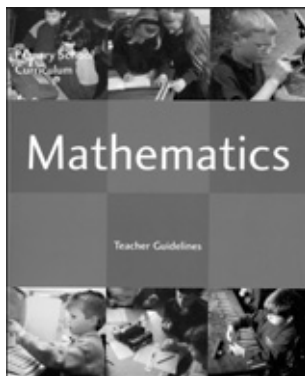


---

*Problem-solving*

---





See page 35

*Problems in mathematics have often been seen as textbook examples at the end of a section on a particular topic. Problems in life are rarely that simple...*

**Mathematics Teacher Guidelines**

Problem solving is at the heart of mathematics. All aspects of the mathematics programme should serve to progress the ability to solve apply in a real context. The **nuts and bolts** of mathematics needs particular attention in the early years. However, it is worth reminding ourselves that when the students' schooldays are over, they are rarely, if ever, asked to complete a page of sums.

In this context, we must prepare them to use the skills and concepts they have learned in the classroom-based instruction. Problems are not solely those which have traditionally come at the end of chapters. These are usually opportunities to **practice and consolidate** the skills just covered. Mathematical problems in this series of textbooks have a broader definition. We are defining a problem as **a task for which the pupil is uncertain initially about the solution procedure**. Problems include tasks ranging from relatively routine application of concepts and skills to non-routine, open-ended questions, puzzles and investigations. It is appropriate at this point in the child's education to use the calculator as a tool to support problem-solving through facilitating computation, where necessary.

Problem-solving **strategies** need to be taught. They will not be caught. **A structured approach** is necessary. There are 10 key strategies which are appropriate for children in the primary school. Five are introduced in this book. A teaching plan is offered for each as well as supplementary problems for each strategy.

## PROBLEM-SOLVING STRATEGIES

- ⊙ **Act out or use objects:** Encourage the children to either act out the problem or to use objects which may help solve it.
- ⊙ **Make a picture/diagram:** Try to illustrate the problem with the help of a picture or a diagram.
- ⊙ **Use or make a table:** Put the information you have on a table so you can organise it better.
- ⊙ **Make an organised list:** Organise your information in an organised way so you don't leave any out.
- ⊙ **Guess and check:** Encourage children to 'have a go' but also to refine their guesses.
- ⊙ **Use or look for a pattern:** Examine the information.
- ⊙ **Work backwards:** Given the information in the problem, it may be easier to work backwards to find the original starting point.
- ⊙ **Use logical reasoning:** Try to see a relationship between pieces of information.
- ⊙ **Make it simpler:** There are two ways to make problems simpler. Either break the problem up into parts and solve each part individually or else replace large or complex figures with simpler ones.
- ⊙ **Brainstorm:** In a whole-class situation, focus a discussion which may direct the pupils to solve a problem, perhaps, using some of the other strategies.

The **teaching plans** which follow are intended to help you get started. They are to guide you through the problems in *Mathemagic 4*. Remember to give the children hints and cues rather than a direct instruction or direction as to how they should approach the problem.

**STRATEGY:***Work backwards*

**Solve the puzzles**

1. On a trip to a farm, Emma and Evan saw lots of different farm animals and farm birds.  
They saw 4 more hens than chickens.  
They saw half as many chickens as cows.  
They spent a long time looking at the lambs.  
There were three times as many lambs as cows.  
They counted 12 cows.  
How many animals and birds did they see on their trip?



2. At the school Fun Day, children from the school took part in the many different events.  
Twice as many jumped on the trampoline as went swimming in the pool.  
There were 10 more running a race than were swimming.  
Half as many children were having their faces painted as were swimming.  
16 children went swimming.  
How many children took part in the Fun Day?



Read Like: Problem-solving work backwards

Page 101

⊙ **Understand the problem**

*Read the problem.*

*Read it a second, third or fourth time.*

*Re-tell the story to your friend in your words.*

*What are you trying to find out?*

*What will your answer tell us?*

⊙ **Devise a plan**

*What do you know for sure?*

*How many cows did they count?*

*How many lambs were there?*

*How many chickens were there?*

*How many hens were there?*

⊙ **Carry out your plan**

*Look again at the information. Now that you know how many cows were there, can you calculate how many lambs were there? If you know the number of cows, can you say how many lambs were there? Continue on to find the number of birds and animals altogether on the farm.*

⊙ **Check it!**

*Remember to check what you were asked to find out!*

*Look at the problem. Go back and read the clues again.*

*Does your answer make sense?*

# STRATEGY:

# Use or make a table

**Solve the puzzles**

1. The circus has come to town. The trapeze artist is called Tigtoe. Tigtoe climbs up and down the ladder many times during her act. To begin she climbs to the top step, bows to the audience and swings into her first act. She lands 8 steps below where she started. Up she goes 6 steps and performs the next act. This brings her down 10 more steps. For her final act, she climbs up 7 steps, does a double twirl and lands 8 steps lower down.

On which step does she finish her act?

2. Sally and Sam planted two sunflowers. Each sunflower grows 1cm each day. Sally's sunflower is 4cm high. Sam's sunflower is 12cm high. How high will each be when Sam's sunflower is twice the height of Sally's?

Use this table to help.

Sally	4	5							
Sam	12	13							

3. Wiggly and Woggly are worms. They live in a wormery. Wiggly is 7 days old and Woggly is 25 days old. How old will each be when Woggly is twice as old as Wiggly?

Use this table to help.

Wiggly	7	8							
Woggly	25	26							

Page 148

- ⊙ **Understand the problem**

*Read the problem.*

*Read it a second, third or fourth time.*

*Re-tell the story to your friend in your words.*

*What are you trying to find out?*

*What will your answer look like?*
- ⊙ **Devise a plan**

*What do you know for sure? Fill into the table the information you have. What else do you know? What do you need to find out?*
- ⊙ **Carry out your plan**

*Can you begin to fill in the table for Sally's sunflower? Now fill in the table for Sam's sunflower. Keep a close eye on the table to see the pattern of the growth of the flowers. How high will Sam's sunflower be when it is twice the height of Sally's?*
- ⊙ **Check it!**

*Remember to check what you were asked to find out!*

*Look at the problem.*





PHOTOCOPIABLE  
*Appendices*



<b>No.</b>	<b>Appendix Title</b>	<b>Page</b>
1	Outline Schemes of Work .....	83
2	Planning Grid Term 1 .....	91
2a	Planning Grid Term 2 .....	92
2b	Planning Grid Term 3 .....	93
	Introduction to photocopiable pupils' work pages .....	94
3.1	Big numbers .....	96
3.2	Big numbers .....	97
3.3	Adding big numbers .....	98
3.4	Using the calculator .....	99
3.5	Data .....	100
3.6	Graphs .....	101
3.7	Bar-line graphs .....	102
3.8	Sharing .....	103
3.9	Grouping .....	104
3.10	Money .....	105
3.11	Decimals .....	106
3.12	Pattern .....	107
3.13	Pattern .....	108
3.14	Pattern .....	109
3.15	Time .....	110
3.16	Length .....	111
3.17	Multiplication and division .....	112
3.18	Rounding .....	113
3.19	Dots .....	114
3.20	Grid .....	115
4	Pupil Profile .....	116
5	Pupil Assessment .....	117
6	Mathemagic Book 4 Answers .....	120
7	Mathemagic Shadow Book 4 Answers .....	136





# Outline Schemes of Work

<b>Number: Place value</b>	
1	Review numbers from 0 to 999. .... <input type="checkbox"/>
2	Use manipulatives to review groups of hundreds, tens and units. Review <i>hundreds, tens</i> and <i>units</i> . .... <input type="checkbox"/>
3	Review multiples of one hundred up to 999 and introduce number words to 9999. .... <input type="checkbox"/>
4	Use manipulatives to represent amounts beyond 999 to 9999, paying attention to the significance of zero. .... <input type="checkbox"/>
5	Represent amounts between 999 and 9999 using the notation board, paying attention to zero. .... <input type="checkbox"/>
6	Count in multiples of 1000 to 9999. .... <input type="checkbox"/>
7	Position numbers up to 9999 on number line. .... <input type="checkbox"/>
8	Discuss number which comes before or after a number. .... <input type="checkbox"/>
9	Sequence a series of numbers up to 9999. .... <input type="checkbox"/>
10	Make a number from 4 digit cards. In each number, say which digit has the greatest value. .... <input type="checkbox"/>
11	Review renaming of numbers as thousands, hundreds, tens and units e.g., $2748 = 2 \text{ thousands} + 7 \text{ hundreds} + 4 \text{ tens} + 8 \text{ units}$ . .... <input type="checkbox"/>
12	Using number line, round numbers to the nearest thousand. .... <input type="checkbox"/>

<b>Number: Addition</b>	
1	Review addition facts to 20. .... <input type="checkbox"/>
2	Review addition without renaming to 999. .... <input type="checkbox"/>
3	Review addition with renaming to 999. .... <input type="checkbox"/>
4	Estimate sums by rounding to nearest thousand. Check estimates without and with a calculator. .... <input type="checkbox"/>
5	Estimate sums by rounding to nearest hundred. Check estimates without and with a calculator. .... <input type="checkbox"/>
6	Apply to word problems. .... <input type="checkbox"/>

<b>Number: Subtraction</b>	
1	Review subtraction facts to 20. .... <input type="checkbox"/>
2	Review subtraction without renaming to 999. .... <input type="checkbox"/>
3	Review subtraction with renaming to 999. .... <input type="checkbox"/>
4	Estimate differences by rounding to nearest thousand. Check estimates without and with a calculator. .... <input type="checkbox"/>
5	Estimate differences by rounding to nearest hundred. Check estimates without and with a calculator. .... <input type="checkbox"/>
6	Apply to word problems. .... <input type="checkbox"/>

**Number: Multiplication**

- 1 Review multiplication facts within 100. ....
- 2 Explore, understand and apply the commutative, distributive and zero properties of multiplication using manipulatives and the number line to support the recall of facts. ....
- 3 Review multiplication as repeated addition. Record as addition and multiplication sentences. ....
- 4 Use horizontal and vertical representations of multiplication. ....
- 5 Review multiplication of two-digit numbers by 0-10. ....
- 6 Multiply two-digit numbers by multiples of ten  
e.g.,  $14 \times 20 = (14 \times 2) \times 10 = 28 \times 10 = 280$ . ....
- 7 Multiply two-digit numbers by two-digit numbers  
e.g.,  $45 \times 24 = (45 \times 20) + (45 \times 4) = 900 + 180 = 1080$  ....

$$\begin{array}{r}
 45 \\
 \times 24 \\
 \hline
 180 \quad (45 \times 4) \\
 + 900 \quad (45 \times 20) \\
 \hline
 1080
 \end{array}$$

- 8 Multiply three-digit numbers by numbers 0-10 ....   
e.g.,  $132 \times 4 = (2 \times 4) + (30 \times 4) + (100 \times 4) = 8 + 120 + 400 = 528$
- 9 Multiply three-digit numbers by two-digit numbers ....   
e.g.,  $265 \times 23 = (265 \times 3) + (265 \times 20) = 795 + 5300 = 6095$

- 10 Finally, use the conventional approach ....

$$\begin{array}{r}
 265 \\
 \times 23 \\
 \hline
 795 \quad (265 \times 3) \\
 + 5300 \quad (265 \times 20) \\
 \hline
 6095 \quad (265 \times 23)
 \end{array}$$

- 11 Estimate amount by first rounding to the nearest ten or hundred. Check estimates without and with a calculator. ....
- 12 Apply to problems. ....

**Number: Division**

- 1 Review division facts within 100. Support recall of number facts by linking with multiplication. Where appropriate, make link with fractions. ....
- 2 Review ways of recording division e.g.,  $7 \overline{)21}$ ;  $7/21$ ;  $\frac{21}{7}$  .....
- 3 Review the division of two-digit numbers by a one-digit number without remainders.....
- 4 Review the division of two-digit numbers by a one-digit number with remainders.....
- 5 Divide three-digit numbers by a one-digit number without remainders using the distributive property of division. .... 
  - $284 \div 4 =$
  - $(28 \text{ tens} \div 4) + (4 \text{ units} \div 4)$
  - $= 7 \text{ tens} + 1 \text{ unit}$
  - $= 71$
  - Or
  - $284 \div 4 =$
  - $(200 \div 4) + (80 \div 4) + (4 \div 4)$
  - $= 50 + 20 + 1$
  - $= 71$
- Move towards recording, using the conventional method. Check answer by multiplying. ....
- 6 Divide three-digit numbers by a one-digit number with remainders. Check answer by multiplying. ....
- 7 Estimate amount by first rounding to the nearest ten or hundred. Check estimates without and with a calculator. ....
- 8 Apply to problems. ....

**Number: Fractions**

- 1 Review previous work on halves, quarters and eighths. ....
- 2 Explore shapes divided into 3 equal parts. ....
- 3 Recognise shapes divided in thirds. Discuss the necessary attributes i.e., (a) shape must be divided in 3 parts and (b) the parts must be equal to each other. ....
- 4 Divide shapes into thirds. ....
- 5 Colour one-third of various shapes. ....
- 6 Show one-third of different shapes. ....
- 7 Show thirds on a fraction wall. ....
- 8 Position fractions on the number line.....
- 9 Order and compare fractions, using the fraction wall and number line. ....
- 10 Find one-third of various amounts using manipulatives e.g.,  $\frac{1}{3}$  of 15 = ....
- 11 Find the whole amount when given the fraction e.g.,  $\frac{1}{3}$  of a number is 3, what is the whole amount? ....
- 12 Find the whole amount when given a multiple fraction e.g.,  $\frac{2}{3}$  of a number is 6, what is the whole amount? ....
- 13 Express one number as a fraction of another e.g.,  $4 = \frac{1}{3}$  of 12 ....
- 14 Introduce sixths, ninths, twelfths following steps 2-12. ....
- 15 Introduce fifths, tenths following steps 2-12. ....

- 16 Develop relationship between fractions and division. ....
- 17 Apply to problems. ....

**Number: Decimals**

- 1 Review previous work done on 0.1. ....
- 2 Display a unit divided into ten equal parts identifying each as  $\frac{1}{10}$  with each  $\frac{1}{10}$  further divided into ten equal parts i.e.  $\frac{1}{100}$  ....
- 3 Express hundredths as decimal fractions:  $\frac{1}{100} = 0.01$  ....
- 4 Express decimal fractions as hundredths:  $0.03 = \frac{3}{100}$  ....
- 5 Express units and tenths as decimal fractions:  $2\frac{1}{10} = 2.1$  ....
- 6 Express decimal fractions as units and tenths:  $1.3 = 1\frac{3}{10}$  ....
- 7 Express tenths and hundredths as decimal fractions:  $\frac{15}{100} = 0.15$  ....
- 8 Express decimal fractions as hundredths and tenths:  $0.13 = \frac{13}{100}$  ....
- 9 Position decimals on the number line. ....
- 10 Order and compare decimals, using the fraction wall and number line. ....
- 11 Identify the value of each digit in the number. ....
- 12 Using manipulatives, introduce addition of decimals to two places. ....
- 13 Using manipulatives, introduce subtraction of decimals to two places. ....
- 14 Introduce the multiplication of decimals to two places by a single-digit number, using repeated addition. Estimate first by rounding to units. ....
- 15 Divide decimals to two places by a single-digit number. Estimate first by rounding to units....
- 16 Apply to problems. ....

**Algebra: Number patterns and sequences**

- 1 Review counting in ones, twos ... tens, hundreds from different numbers up to 999. ....
- 2 Explore pattern in odd and even numbers. ....
- 3 Explore pattern in addition facts e.g.,  $600 + 500 = 1100$ ,  $1600 + 500 = 2100$ ,  $2600 + 500 = 3100$  etc. ....
- 4 Extend pattern in addition facts e.g., addition / subtraction of 100 to explore addition / subtraction of 99. ....
- 5 Explore pattern in multiplication / division facts e.g., multiplying / dividing by 10 /100. ....
- 6 Extend number sequences beyond 100 to explore the multiplication / division facts. ....
- 7 Describe sequences (explain rule for) and extend accordingly. ....
- 8 Use calculator to explore repeated addition, subtraction, multiplication, division. ....

**Algebra: Number sentences**

- 1 Use stories to develop link between word problems and their written or symbolic representation. ....
- 2 Allow pupils to make up their own stories for written number sentences....
- 3 Translate a one-step problem into a number sentence....
- 4 Use manipulatives to help explain and support the use of frames in open sentences. ....
- 5 Explain use of brackets and link to word problems. ....

**Shape and Space: 2-D shapes**

- 1 Review the shapes already covered. ....
- 2 Sort shapes e.g., **square, rectangle, triangle, circle, semi-circle, oval** and **hexagon** according to their similarities and differences. ....
- 3 Identify and discuss each shape in the environment. ....
- 4 Explore and describe the properties of each shape according to the number of sides, length of sides, parallel and non-parallel sides and angles. ....
- 5 Use templates, geostrips or geoboards to construct shapes. ....
- 6 Identify and discuss the use of examples of the **equilateral, isosceles** and **scalene** triangles in the environment. ....
- 7 Explore and describe the properties of the **hexagon** according to the number of sides, length of sides, parallel and non-parallel sides and angles. ....
- 8 Use templates or geoboards to construct the **equilateral, isosceles** and **scalene** triangles. ....
- 9 Repeat steps 6-8 to introduce the **parallelogram, rhombus, pentagon** and **octagon**. ....
- 10 Explore shapes which tessellate by combining various shapes to make patterns / mosaics. ....
- 11 Cover surfaces with multiple numbers of the same shape. ....

**Shape and Space: 3-D shapes**

- 1 Review the 3-D shapes already covered. ....
- 2 Sort shapes e.g., **cube, cuboid, cylinder, sphere, triangular prism** and **pyramid** according to whether they roll, slide or stack. ....
- 3 Identify and discuss the use of examples of each shape in the environment. ....
- 4 Explore and describe the properties of each shape according to the number of faces, edges and corners. ....
- 5 Deconstruct each to examine the shape of its faces. ....
- 6 Identify and discuss the use of examples of the **triangular prism** in the environment. ....
- 7 Explore and describe the properties of the **triangular prism** according to the number and shape of its faces, edges and corners. ....
- 8 Deconstruct a triangular prism to examine the shape of its faces. ....
- 9 Establish that when prisms are sliced through each face is equal in shape and size. ....
- 10 Construct shapes by combining various 2-D and 3-D shapes. ....
- 11 Use straws or pipe cleaners to construct each 3-D shape. ....

**Shape and Space: Symmetry**

- 1 Review work done on line symmetry. Draw children's attention to shapes which have line symmetry in the environment e.g., leaves, insects etc. ....
- 2 Take a piece of newspaper, fold it in half. Tear or cut along edges. Open and examine the pattern. Draw the pupils' attention to the fact that each point on one side of the fold line has a corresponding point on the other; that each point and its image are an equal distance from the fold line; and that the fold line divides the pattern / picture into two equal parts. ....
- 3 Identify shapes / pictures that have a line of symmetry. Say whether the line of symmetry is horizontal, vertical or diagonal. ....
- 4 Draw a line of symmetry in shapes. ....
- 5 Examine 2-D shapes and the letters of the alphabet for lines of symmetry. Classify them according to the number and type of lines of symmetry. ....
- 6 Complete half-pictures. Use mirrors and squared paper to help. ....

**Shape and Space: Lines and angles**

- 1 Draw attention to lines in the environment. Describe them. ....
- 2 Review **horizontal**, **vertical** and **parallel lines**. Find examples in the environment. Describe and compare their characteristics. Draw examples of each. ....
- 3 Find examples of lines around the classroom which are not horizontal, vertical or parallel. Describe the features of the other lines and compare them. ....
- 4 Identify and classify lines as **oblique**. Find examples in the environment. Draw examples. ....
- 5 Identify and classify lines as **perpendicular**. Find examples in the environment. Draw examples. ....
- 6 Draw attention to the angles formed by lines when they intersect. A right angle is formed by perpendicular lines. ....
- 7 Review previous work done on angles as rotation and right angles. Construct a right-angle measure. Use the clock or the compass. ....
- 8 Classify acute and obtuse angles as angles which are less than or greater than right angles. ....

**Measures: Length**

- 1 Review the *metre* and the *centimetre*. Estimate and measure items with appropriate metric units. ....
- 2 Establish the need for a greater unit of measurement. ....
- 3 Introduce the **kilometre**. ....
- 4 Compare the kilometre with the metre. ....
- 5 List the distances which pupils will be familiar with which are longer than / about / shorter than a kilometre. ....
- 6 Estimate and measure distances. ....
- 7 Rename units of length using fraction and decimal form e.g., 125cm = 1m 25cm = 1¼m; 2km 500m = 2.5km = 2½km. ....
- 8 Use practical tasks to introduce addition, subtraction, multiplication, division of units of length. ....

**Measures: Area**

- 1 Review work to date on covering surfaces. ....
- 2 Establish the need for a standard unit of measurement. Use a variety of 2-D shapes to cover surfaces. Discuss the problems and disadvantages of using these shapes. Refer to tessellation. ....
- 3 Discuss the advantages of using square units to cover various surfaces in the classroom. ....
- 4 Measure the area of various regular and irregular shapes and objects using cut-out standard square (cm<sup>2</sup> or m<sup>2</sup>) units. ....
- 5 Estimate area of objects using standard square units before measuring. ....
- 6 Use table to display results: ....

item name	estimate	measure

- 7 Use the geoboard / pinboard to discover the different shapes which can be made from a particular number of square units. ....

**Measures: Weight**

- 1 Review the **kilogramme / gramme**. Estimate and measure items with appropriate metric units. ....
- 2 Rename units of weight using kilogrammes and grammes e.g., 2 kg 400g = 2400g .....
- 3 Rename units of weight using fraction and decimal form e.g., 500g =  $\frac{1}{2}$ kg = 0.5kg .....
- 4 Use practical tasks to introduce addition, subtraction, multiplication, division of units of weight. ....

**Measures: Capacity**

- 1 Review the **litre**. Estimate and measure items with appropriate metric units. ....
- 2 Rename units of capacity using litres and millilitres e.g., 3l 600ml = 3600ml .....
- 3 Rename units of capacity using fraction and decimal form e.g., 1500ml =  $1\frac{500}{1000}$ l = 1.5l .....
- 4 Use practical tasks to introduce addition, subtraction, multiplication, division of units of capacity. ....

**Measures: Time**

- 1 Review language of time. ....
- 2 Review previous work on the 12-hour analogue and digital clocks i.e. reading time in hours, half-hours and quarter-hours. ....
- 3 Review the need for a shorter unit of measurement i.e., one-minute intervals. ....
- 4 Read and recognise times in one-minute intervals e.g., 7 minutes past 3, 22 to 5 on the 12-hour analogue and digital clock. ....
- 5 Record times in one-minute intervals on analogue and digital clocks. ....
- 6 Use a calendar to read the day, date, month and season. Express weeks as days and vice versa. ....
- 7 Read and interpret a timetable. ....
- 8 Rename minutes as hours and minutes e.g., 96 minutes = 1 hour 36 minutes or 2 hours 18 minutes = 138 minutes. ....
- 9 Use practical tasks to introduce addition and subtraction problems involving hours and minutes. Encourage pupils to count on hours and minutes to check. ....

**Measures: Money**

- 1 Review coins previously covered by recognising coins up to €2 coin, exchanging them for others of an equal value and using them to solve problems. Calculate change. ....
- 2 Rename coins. **€2 = €1 + 50c + 10c + 10c + 10c + 10c + 10c** .....
- 3 Write amounts in cent as euro and cent i.e., 245 cent = €2.45 .....
- 4 Write amounts in euro and cent as cent i.e., €1.34 = 134 cent .....
- 5 Discuss how to use the decimal point when there is no full euro e.g., €0.55 .....
- 6 Use practical tasks to introduce addition, subtraction, multiplication, division of money. Encourage pupils to estimate the answer. ....

**Data: Representing and interpreting data**

- 1 Review the use of the pictogram and block graphs to represent information. Construct each using information relevant to and, if possible, collected by the children. ....
- 2 Keep a tally to discover the frequencies and to organise the information. ....
- 3 Review the use of the bar chart to represent information. Display a completed bar chart. Discuss the information presented on the bar chart. Write the story of the bar chart. Use it as the basis for simple calculations and comparison. ....



- 4 Construct a bar chart using information relevant to and, if possible, collected by the children.  
 Discuss each step as the bar chart develops e.g., the title, the layout.  
 Follow construction of bar chart with interpretation, analysis and computation, as above. ....
- 5 Display a completed pie chart representing the same / similar information. ....
- 6 Discuss the information presented on the pie chart. ....
- 7 Write the story of the pie chart.....
- 8 Use it as the basis for simple calculations and comparison. ....
- 9 Discuss the strengths and limitations of each type of representation of the data sets collected by the pupils. ....

**Data: Chance**

- 1 Review the language of uncertainty and chance  
 e.g., chance, certain, uncertain, possible, impossible, might, definitely, not sure,  
 likely, very likely, unlikely, never. Ask the children to use the words and discuss what emerges. ....
- 2 Discuss the likelihood of events occurring.  
 Allow them to offer suggestions in relation to each word listed above. ....
- 3 Use coloured cubes or counters to identify and record random outcomes of simple processes.  
 Say whether it is possible, impossible, definitely etc. ....
- 4 Experiment with tossing a die to see how many times it will fall on each number.  
 Try to predict what will happen the next time.  
 Repeat a number of times to determine the difference in outcomes. Record and discuss. ....
- 5 Link experiments with fractions. ....

# Planning Grid – Term 1

## STRAND *Number*

Strand Unit	Objective	Pages	Tick	Date
Place value	Explore, identify and record place value to 9999; read, write and order four-digit numbers	7-10		/ /
Addition	Add numbers to 9999 without and with renaming	11, 13-15		/ /
Subtraction	Subtract numbers without and with renaming within 9999	12, 13-15		/ /
Multiplication	Multiplication as repeated addition of groups; explore, understand and apply the properties of multiplication; develop multiplication facts within 100; multiply a two-digit number by a one-digit number	24-28		/ /
Division	Division as sharing and as repeated subtraction of groups without and with remainders; develop and recall division facts within 100; divide a two-digit number by a one-digit number without and with remainders	29-32		/ /
Fractions	Identify fractions and equivalent forms of fractions with denominators of 3, 6, 9, 12, 5 and 10; compare and order fractions and position on the number line; calculate a fraction of a set; calculate a number given a multiple fraction of the number; solve practical tasks and problems	41-47, 53-56		/ /
Decimals	Express tenths and hundredths as fractions and decimals; identify place value of whole numbers and decimals to two places and write in expanded form; order decimals on the number line	57-60		/ /

## STRAND *Algebra*

Strand Unit	Objective	Pages	Tick	Date
Extending and using pattern	Explore, recognise and record patterns 0-9999; explore, extend and describe sequences; use patterns as an aid for memorisation of number facts	63-66		/ /

## STRAND *Measures*

Strand Unit	Objective	Pages	Tick	Date
Money	Rename amounts of euro or cent and record using symbols and decimal point; solve one-step problems involving addition and subtraction	48-52		/ /

## STRAND *Shape and space*

Strand Unit	Objective	Pages	Tick	Date
2-D Shapes	Identify, describe and classify 2-D shapes; explore, describe and compare the properties of 2-D shapes; construct and draw 2-D shapes; identify the use of 2-D shapes in the environment	33-36		/ /
Lines and angles	Identify, describe and classify oblique and perpendicular lines; draw, discuss and describe intersecting lines and their angles; classify angles as greater than, less than or equal to a right angle	37-40		/ /

## STRAND *Data*

Strand Unit	Objective	Pages	Tick	Date
Representing and interpreting data	Collect, organise and represent data using pictograms, block graphs bar charts and bar-line charts; read and interpret bar-line graphs and simple pie-charts; use data sets to solve problems	18-23		/ /
Problem-solving		40, 61, 62		/ /

# Planning Grid – Term 2

## STRAND *Number*

Strand Unit	Objective	Pages	Tick	Date
Multiplication	<i>Multiplication as repeated addition of groups; explore, understand and apply the properties of multiplication; develop multiplication facts within 100; multiply a two-digit or three-digit number by a one-digit or two-digit number</i>	83-88, 99-100		/ /
Division	<i>Division as sharing and as sharing without and with remainders; develop and recall division facts within 100; divide a two-digit number or three-digit number by a one-digit number without and with remainders; solve practical tasks and problems</i>	89-92, 99-100		/ /
Place value	<i>Round whole numbers to the nearest 10, 100 or 1000; use the calculator to check estimates</i>	115-119		
Decimals	<i>Express tenths and hundredths as fractions and decimals; identify place value of whole numbers and decimals to two places and write in expanded form; add and subtract whole numbers and decimals up to two places</i>	78-79	/ /	

## STRAND *Measures*

Strand Unit	Objective	Pages	Tick	Date
Length	<i>Estimate, compare, measure and record length using appropriate metric units; rename units of length in decimal or fraction form; understand, estimate and measure the perimeter of regular 2-D shapes</i>	75-77, 80-82, 111-114		/ /
Area	<i>Estimate, compare and measure the area of regular and irregular shapes</i>	93-96		/ /
Time	<i>Consolidate and develop a further sense of time passing; read time in one-minute intervals on analogue and digital clocks; express digital time as analogue time and vice versa</i>	71-74		/ /
Weight	<i>Estimate, compare, measure and record weight using appropriate metric units; rename units of weight using decimal or fraction form; solve practical tasks and problems</i>	120-125		/ /
Symmetry	<i>Identify line symmetry in the environment; identify lines of symmetry as horizontal, vertical or diagonal; use understanding of line symmetry to complete missing half of a shape, picture or pattern</i>	97-98		/ /
Problem-solving		101-102, 126		/ /

# Planning Grid – Term 3

## STRAND *Number*

Strand Unit	Objective	Pages	Tick	Date
Multiplication	<i>Develop mental strategies for multiplication</i>	154		/ /
Decimals	<i>Identify place value of whole numbers and decimals to two places; multiply and divide a decimal number up to two places by a one-digit whole number; solve problems involving decimals</i>	138-141, 155		/ /

## STRAND *Algebra*

Strand Unit	Objective	Pages	Tick	Date
Number sentences	<i>Translate an addition, subtraction, multiplication or division number sentence with a frame into a word problem; translate a one-step word problem into a number sentence; solve one-step problems</i>	162-165		/ /

## STRAND *Shape and space*

Strand Unit	Objective	Pages	Tick	Date
3-D shapes	<i>Identify, describe and classify 3-D shapes; establish and appreciate properties of prisms; explore and describe the relationship of 3-D shapes with constituent 2-D shapes; construct 3-D shapes; solve practical tasks and problems</i>	132-137		/ /

## STRAND *Measures*

Strand Unit	Objective	Pages	Tick	Date
Money	<i>Rename amounts of euro or cent and record using symbols and decimal point; solve one-step and two-step problems</i>	142-147		/ /
Time	<i>Consolidate and develop a sense of time passing, read time in one-minute intervals on analogue and digital clock (12 hour); express digital time as analogue time and vice-versa; read and interpret simple timetables; rename hours as hours and minutes</i>	150-153		/ /
Capacity	<i>Estimate, compare, measure and record capacity using appropriate metric units; rename units of capacity using decimal or fraction form; solve practical tasks and problems</i>	157-161		/ /
Chance	<i>Use vocabulary of uncertainty and chance; order events in terms of likelihood of occurrence; identify and record outcomes of simple random processes</i>	166-168		/ /
Problem-solving		148-149, 156		/ /

## Introduction to photocopiable pupils' work pages

- 3.1** Similar to page 8 of *Mathemagic 4*, it offers an opportunity for pupils to explore big numbers using the notation board and to develop place value concepts using renaming.
- 3.2** Similar to page 9 of *Mathemagic 4*, numbers in a sequence can be extended. The composition of big numbers can be developed by filling in amounts on each of the different bags.
- 3.3** This page allows for practice in adding or subtracting big numbers.
- 3.4** This page encourages pupils to become familiar with the workings of the calculator and to have fun with it.
- 3.5** This page allows pupils to easily organise, tabulate and represent information collected by them.
- 3.6** Pupils can represent data collected using either a vertical or horizontal bar chart.
- 3.7** Pupils can represent data collected using either a vertical or horizontal bar-line graph.
- 3.8** Consolidation of sharing is offered here.
- 3.9** Renaming of amounts of money as euro and cent as cent and vice versa and opportunities for addition and subtraction of amounts are provided.
- 3.10** Consolidation of grouping is offered here.
- 3.11** Renaming decimals as hundredths and vice versa and practice of ordering and plotting numbers on the number line are provided here.
- 3.12** This page is similar to page 63 of *Mathemagic 4*.
- 3.13** This page is similar to page 64 of *Mathemagic 4*.
- 3.14** This page is similar to page 65 of *Mathemagic 4*.
- 3.15** This page consolidates the link between analogue, digital and written means of telling the time.

- 3.16** Pupils can consolidate and practice renaming units of measure.
- 3.17** Similar to page 8 of *Mathemagic 4*, it offers an opportunity for pupils to explore the relationship between multiplication and division.
- 3.18** Pupils practice rounding and applying to real situations.
- 3.19** Use to support drawing of lines, 2-D shapes, symmetrical shapes and half of items.
- 3.20** Use to support drawing of lines, 2-D shapes, symmetrical shapes and half of items.

# Big numbers

1.

(a)

th	h	t	u

(b)

th	h	t	u

(c)

th	h	t	u

(d)

th	h	t	u

(e)

th	h	t	u

(f)

th	h	t	u

(g)

th	h	t	u

(h)

th	h	t	u

(i)

th	h	t	u

2.

\_\_\_\_\_ =  thousands +  hundreds +  tens +  units

\_\_\_\_\_ =  thousands +  hundreds +  tens +  units

\_\_\_\_\_ =  thousands +  hundreds +  tens +  units

\_\_\_\_\_ =  thousands +  hundreds +  tens +  units

\_\_\_\_\_ =  thousands +  hundreds +  tens +  units

\_\_\_\_\_ =  thousands +  hundreds +  tens +  units

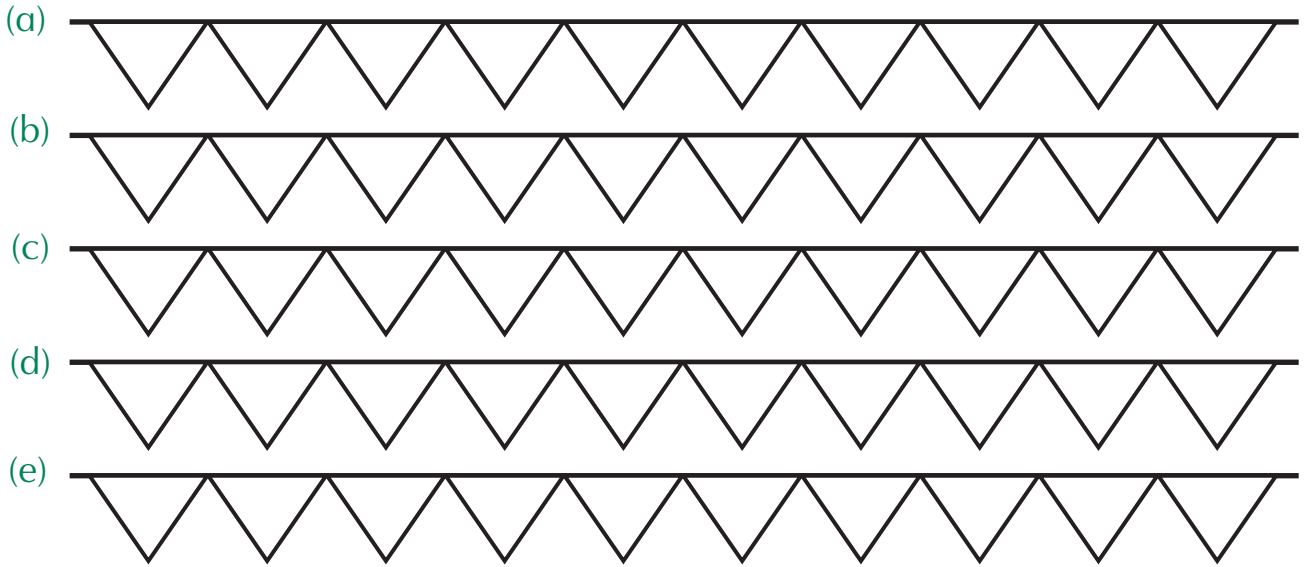
\_\_\_\_\_ =  thousands +  hundreds +  tens +  units

\_\_\_\_\_ =  thousands +  hundreds +  tens +  units

\_\_\_\_\_ =  thousands +  hundreds +  tens +  units

# Big numbers

1. Fill in the missing numbers on each flag.



2. Write totals for each of the groups of number bags.

(a)		<input type="text"/>
(b)		<input type="text"/>
(c)		<input type="text"/>
(d)		<input type="text"/>
(e)		<input type="text"/>
(f)		<input type="text"/>
(g)		<input type="text"/>
(h)		<input type="text"/>



# Adding big numbers

1. (a)

th	h	t	u
+			

(b)

th	h	t	u
+			

(c)

th	h	t	u
+			

2. (a)

th	h	t	u
+			

(b)

th	h	t	u
+			

(c)

th	h	t	u
+			

3. (a)

th	h	t	u
+			

(b)

th	h	t	u
+			

(c)

th	h	t	u
+			

4. (a)

th	h	t	u
+			

(b)

th	h	t	u
+			

(c)

th	h	t	u
+			

5. (a)

th	h	t	u
+			

(b)

th	h	t	u
+			

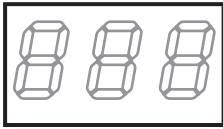
(c)

th	h	t	u
+			

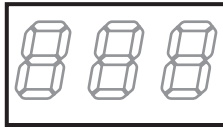
# Using the calculator

1. Make and colour the following numbers as they appear in the screen display.

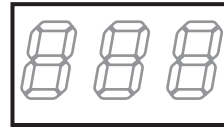
(a)



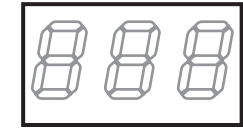

(b)



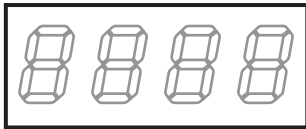

(c)



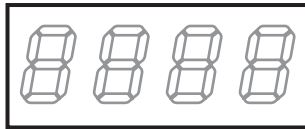

(d)



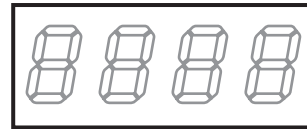

(e)



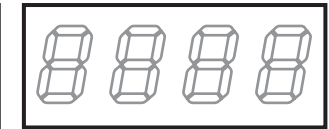

(f)




(g)

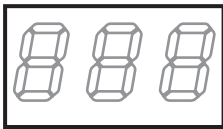



(h)

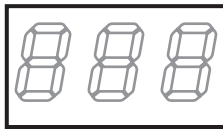



2.

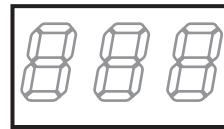
(a)



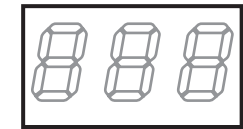

(b)



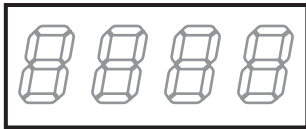

(c)



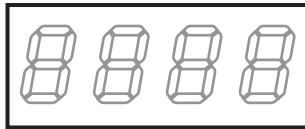

(d)



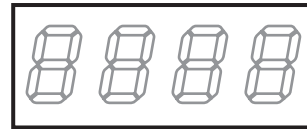

(e)



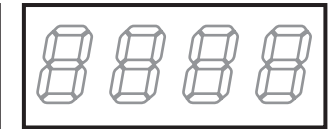

(f)




(g)

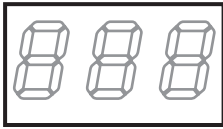



(h)

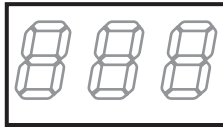



3.

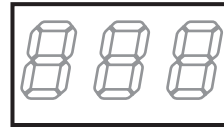
(a)



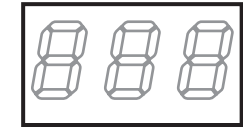

(b)



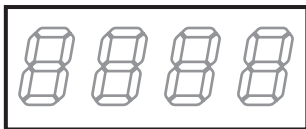

(c)



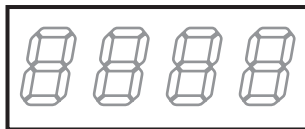

(d)



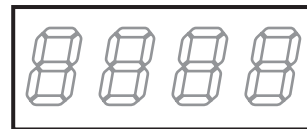

(e)



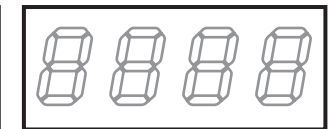

(f)




(g)




(h)



# Data

(a)


(b)

--	--	--	--	--	--

(c)

	Title:

---

(d)


(e)

--	--	--	--	--	--

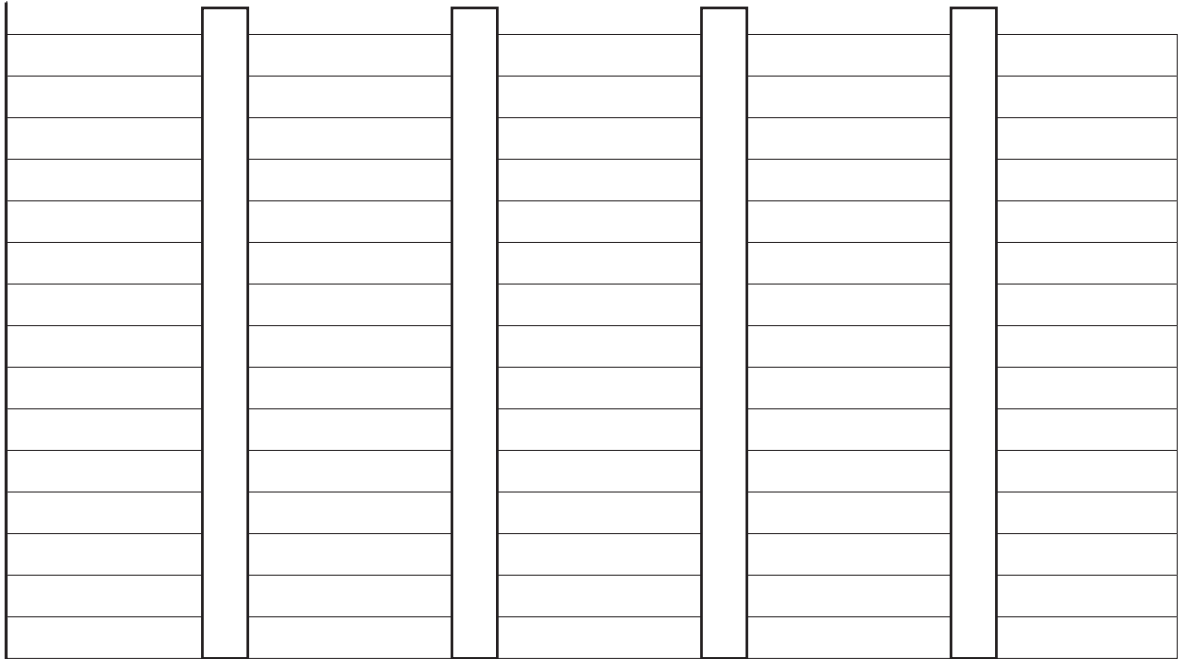
(f)

	Title:

# Graphs

## 1. Bar chart

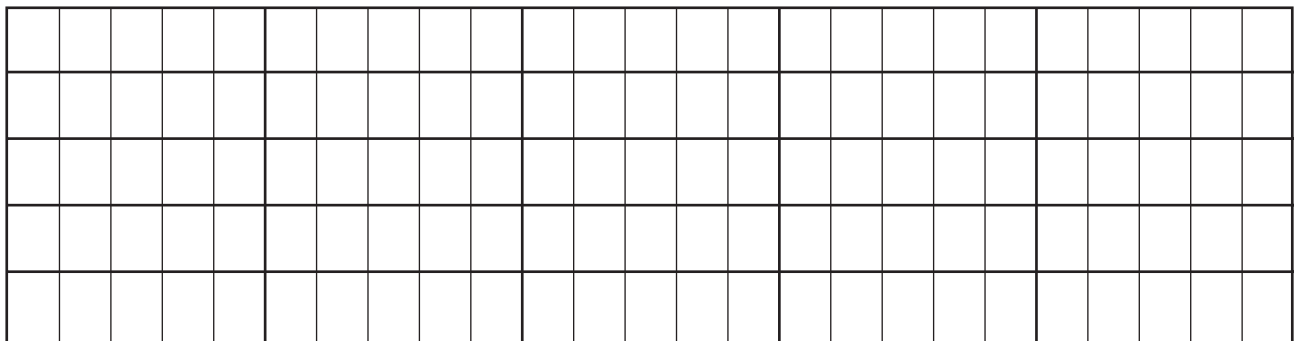
Title:



---

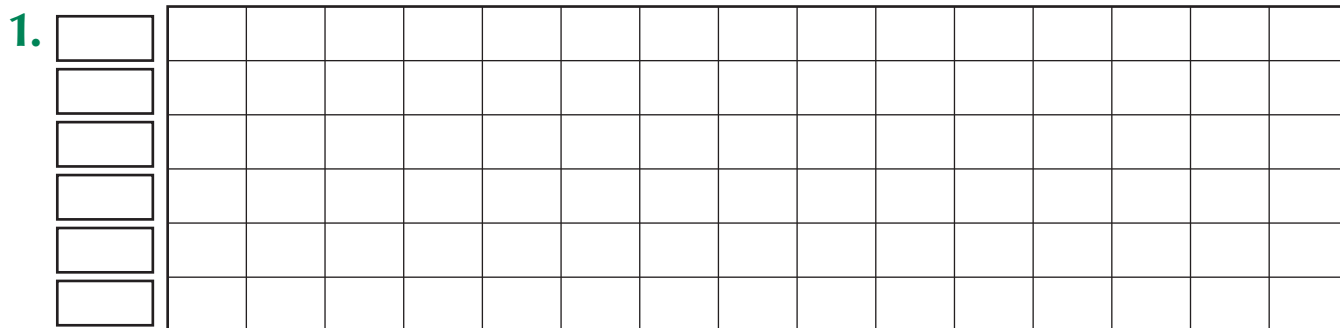
## 2. Bar chart

Title:



# Bar-line graph

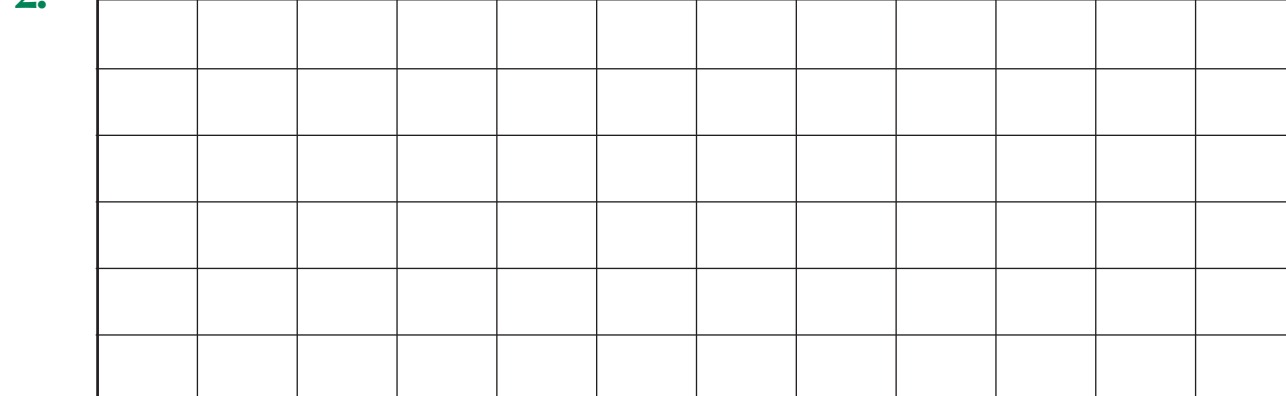
Title \_\_\_\_\_



---

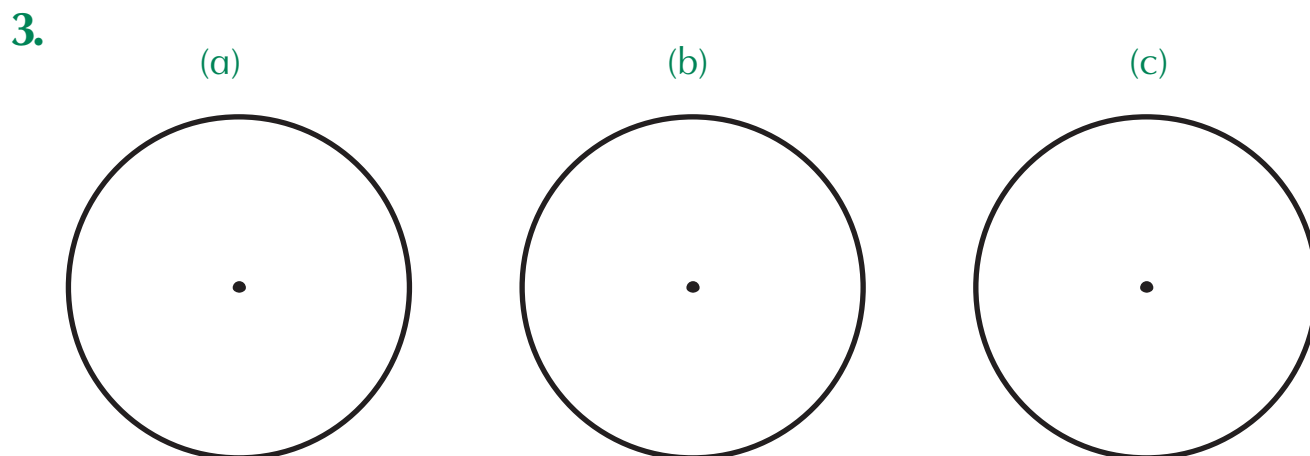
# Bar-line graph

Title \_\_\_\_\_


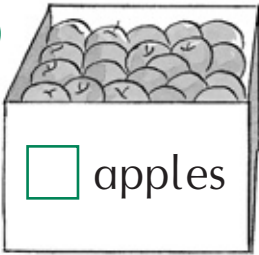
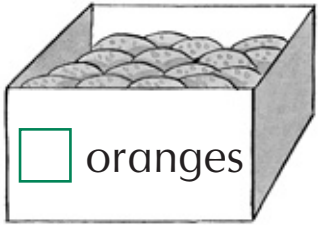
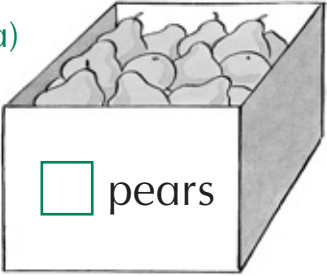
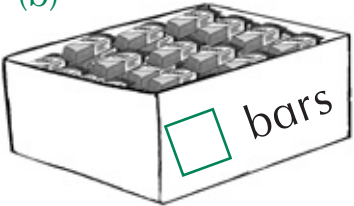
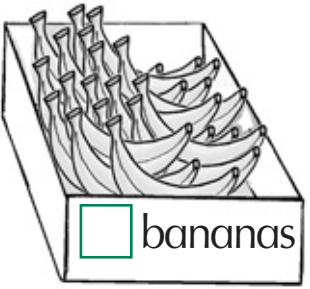

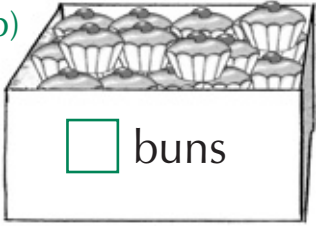

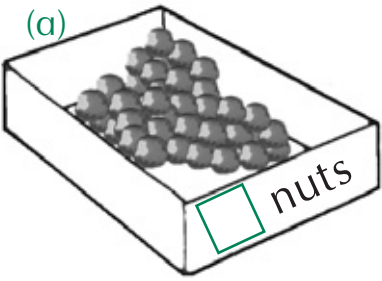
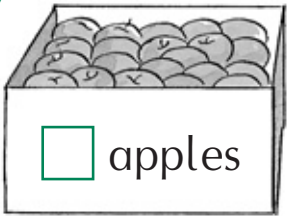
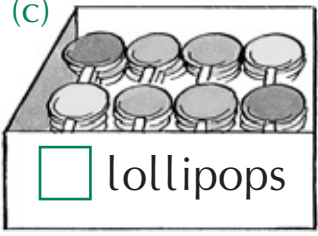


---

# Pie chart

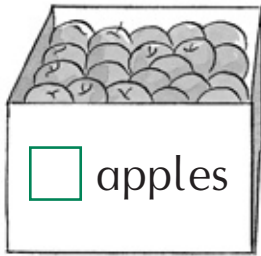


# Sharing

<p>1. (a) </p> <p><input type="text"/> children Each gets <input type="text"/> sweets</p>	<p>(b) </p> <p><input type="text"/> apples</p> <p><input type="text"/> children Each gets <input type="text"/> apples</p>	<p>(c) </p> <p><input type="text"/> oranges</p> <p><input type="text"/> children Each gets <input type="text"/> oranges</p>
<p>2. (a) </p> <p><input type="text"/> pears</p> <p><input type="text"/> children Each gets <input type="text"/> pears</p>	<p>(b) </p> <p><input type="text"/> bars</p> <p><input type="text"/> children Each gets <input type="text"/> bars</p>	<p>(c) </p> <p><input type="text"/> bananas</p> <p><input type="text"/> children Each gets <input type="text"/> bananas</p>
<p>3. (a) </p> <p><input type="text"/></p> <p><input type="text"/> children Each gets <input type="text"/> sweets</p>	<p>(b) </p> <p><input type="text"/> buns</p> <p><input type="text"/> children Each gets <input type="text"/> buns</p>	<p>(c) </p> <p><input type="text"/> cakes</p> <p><input type="text"/> children Each gets <input type="text"/> cakes</p>
<p>4. (a) </p> <p><input type="text"/> nuts</p> <p><input type="text"/> children Each gets <input type="text"/> nuts</p>	<p>(b) </p> <p><input type="text"/> apples</p> <p><input type="text"/> children Each gets <input type="text"/> apples</p>	<p>(c) </p> <p><input type="text"/> lollipops</p> <p><input type="text"/> children Each gets <input type="text"/> lollipops</p>

# Grouping

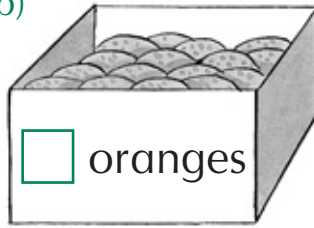
1. (a)



4 bags

in each bag

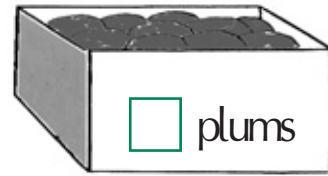
(b)



6 bags

in each bag

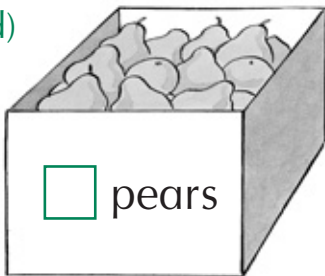
(c)



5 bags

in each bag

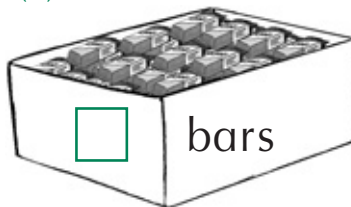
(d)



7 in each bag

bags

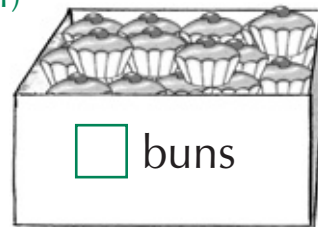
(e)



9 in each bag

bags

(f)

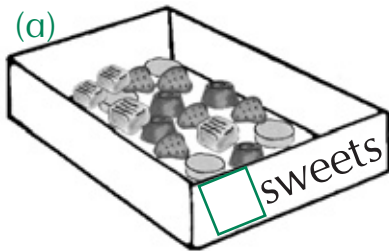


8 in each bag

bags

2.

(a)

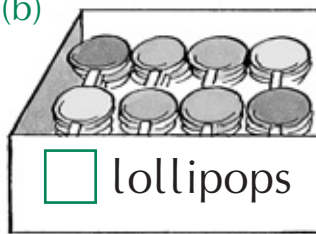


3 bags

in each bag

sweets left

(b)

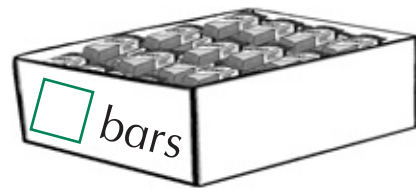


4 bags

in each bag

lollipops left

(c)

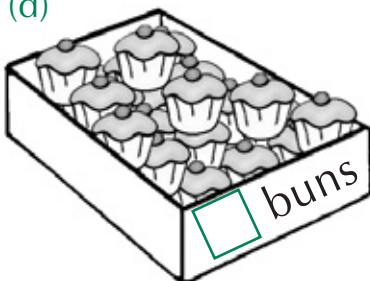


6 bags

in each bag

bars left

(d)

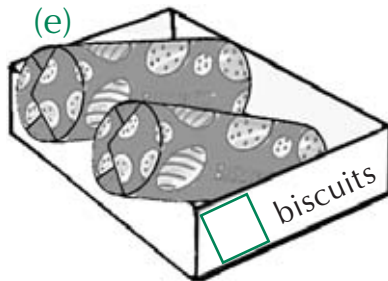


8 on each plate

plates

buns left

(e)

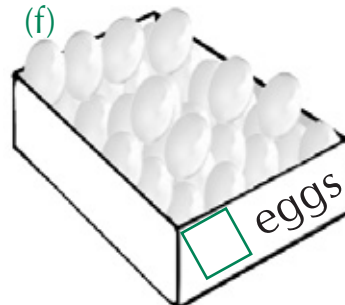


9 on each plate

plates

biscuits left

(f)



7 on each plate

plates

eggs left

# Money

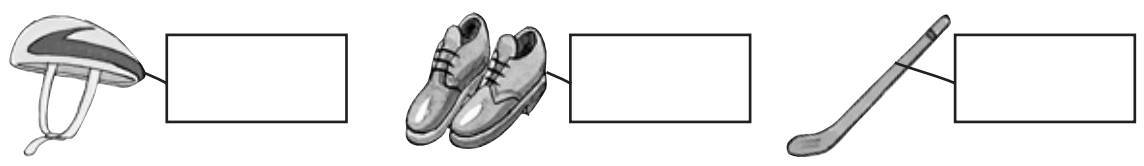
1. Write as euro.

(a)	___ c = € <input type="text"/>	___ c = € <input type="text"/>	___ c = € <input type="text"/>
(b)	___ c = € <input type="text"/>	___ c = € <input type="text"/>	___ c = € <input type="text"/>
(c)	___ c = € <input type="text"/>	___ c = € <input type="text"/>	___ c = € <input type="text"/>
(d)	___ c = € <input type="text"/>	___ c = € <input type="text"/>	___ c = € <input type="text"/>
(e)	___ c = € <input type="text"/>	___ c = € <input type="text"/>	___ c = € <input type="text"/>

2. Write as cent.

(a)	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c
(b)	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c
(c)	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c
(d)	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c
(e)	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c	€ ___ = <input type="text"/> c

3. Complete the tables below.



I bought	change from € ___
helmet	
shoes	
hurley	

I bought	change from € ___
helmet	
shoes	
hurley	

I bought	change from € ___
helmet and	
shoes and	
hurley and	

I bought	change from € ___
helmet and	
shoes and	
hurley and	



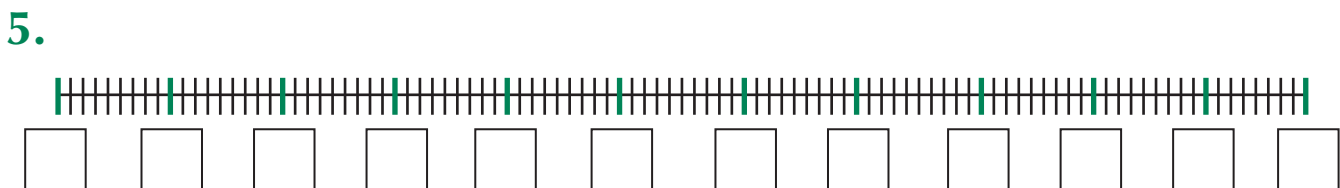
# Decimals

1.  $\overline{100} = \square$      $\overline{100} = \square$      $\overline{100} = \square$      $\overline{100} = \square$   
 $\overline{100} = \square$      $\overline{100} = \square$      $\overline{100} = \square$      $\overline{100} = \square$   
 $\overline{100} = \square$      $\overline{100} = \square$      $\overline{100} = \square$      $\overline{100} = \square$

2.  $\underline{\quad} = \overline{100}$      $\underline{\quad} = \overline{100}$      $\underline{\quad} = \overline{100}$      $\underline{\quad} = \overline{100}$   
 $\underline{\quad} = \overline{100}$      $\underline{\quad} = \overline{100}$      $\underline{\quad} = \overline{100}$      $\underline{\quad} = \overline{100}$   
 $\underline{\quad} = \overline{100}$      $\underline{\quad} = \overline{100}$      $\underline{\quad} = \overline{100}$      $\underline{\quad} = \overline{100}$

3.  $\square \overline{100} = \square \cdot$      $\square \overline{100} = \square \cdot$      $\square \overline{100} = \square \cdot$   
 $\square \overline{100} = \square \cdot$      $\square \overline{100} = \square \cdot$      $\square \overline{100} = \square \cdot$   
 $\square \overline{100} = \square \cdot$      $\square \overline{100} = \square \cdot$      $\square \overline{100} = \square \cdot$   
 $\square \overline{100} = \square \cdot$      $\square \overline{100} = \square \cdot$      $\square \overline{100} = \square \cdot$

4.  $\square \cdot = \square \overline{100}$      $\square \cdot = \square \overline{100}$      $\square \cdot = \square \overline{100}$   
 $\square \cdot = \square \overline{100}$      $\square \cdot = \square \overline{100}$      $\square \cdot = \square \overline{100}$   
 $\square \cdot = \square \overline{100}$      $\square \cdot = \square \overline{100}$      $\square \cdot = \square \overline{100}$   
 $\square \cdot = \square \overline{100}$      $\square \cdot = \square \overline{100}$      $\square \cdot = \square \overline{100}$



# Pattern

1. Continue the pattern. Draw the next \_\_\_\_\_ shapes in each.

(a)



(b)



(c)



(d)



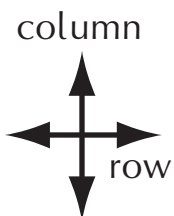
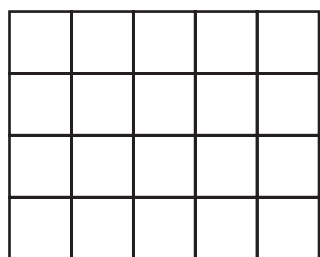
2.



3.

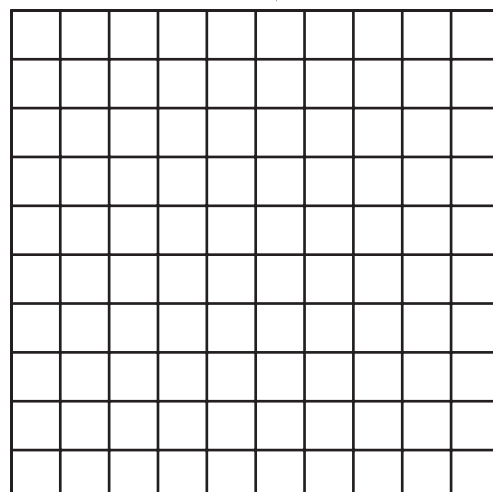


# Pattern



row →

column  
↓



- Fill in the missing numbers in the 100 square. Here is a piece from the 100 square.

- Use your 100 square to help you complete these patterns.

(a) (b) (c) (d)

- These patterns in the 100 square are a little harder.

(a) (b) (c) (d)

- Try these. Can you see a pattern?

(a) (b) (c)

# Time

1. Look at the time on each clock. Write the correct times **before** or **after**.

(a)	(b)	(c)	(d)	(e)
10 minutes from now	15 minutes from now	10 minutes ago	25 minutes from now	50 minutes ago

2. Write the time which is (i) five minutes **earlier**, (ii) five minutes **later** than each of these times.

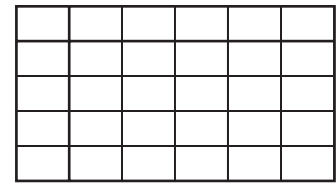
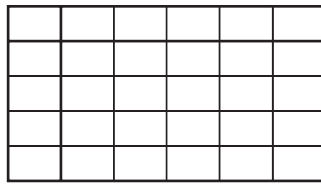
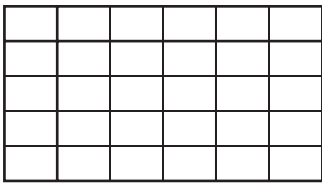
(a)	(b)	(c)	(d)	(e)

3. Write the digital times for each of these clocks.

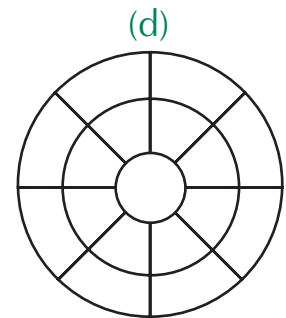
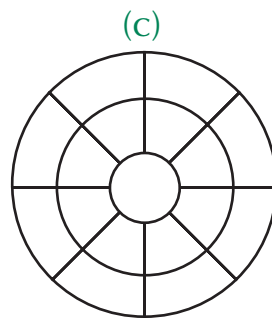
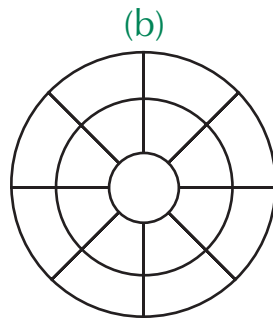
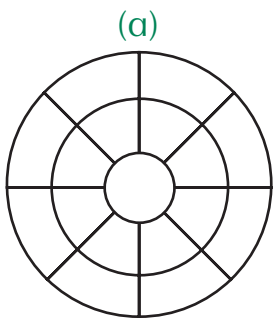
(a)	(b)	(c)	(d)	(e)

# Pattern

1. Complete these.



2. Try these. Can you see a pattern?



3. Try these. Can you see a pattern in your answers?

(a)

$$23 + \square = \square$$

$$33 + \square = \square$$

$$43 + \square = \square$$

$$53 + \square = \square$$

(b)

$$46 + \square = \square$$

$$56 + \square = \square$$

$$66 + \square = \square$$

$$76 + \square = \square$$

(c)

$$82 - \square = \square$$

$$72 - \square = \square$$

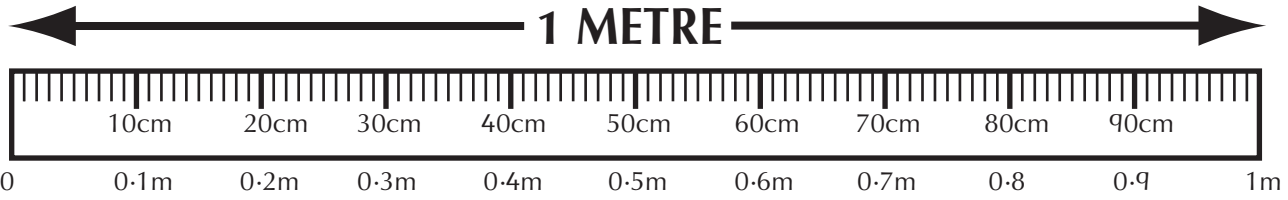
$$62 - \square = \square$$

$$52 - \square = \square$$

4. Continue these patterns (sequences).

—	,	—	,	—	,	<input type="text"/>	,	<input type="text"/>		
—	,	—	,	—	,	—	,	<input type="text"/>	,	<input type="text"/>
—	,	—	,	—	,	—	,	<input type="text"/>	,	<input type="text"/>
—	,	—	,	—	,	—	,	<input type="text"/>	,	<input type="text"/>
—	,	—	,	—	,	—	,	<input type="text"/>	,	<input type="text"/>
—	,	—	,	—	,	—	,	<input type="text"/>	,	<input type="text"/>

# Length



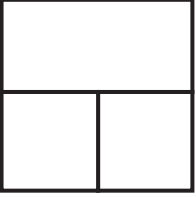
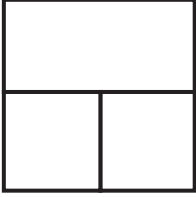
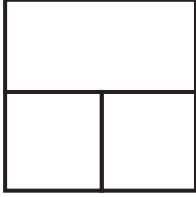
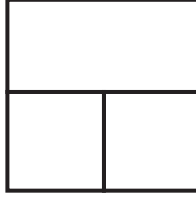
## 1.

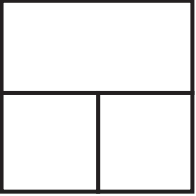
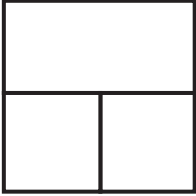
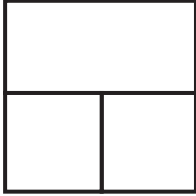
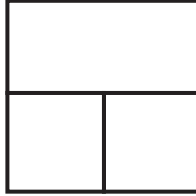
- (a) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (b) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (c) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (d) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (e) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (f) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (g) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (h) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (i) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (j) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (k) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m
- (l) \_\_\_ cm = \_\_\_ m    \_\_\_ cm =  $\frac{\cdot}{\quad}$  m

## 2.

- (a) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (b) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (c) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (d) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (e) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (f) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (g) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (h) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (i) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (j) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (k) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm
- (l) \_\_\_\_\_ mm = \_\_\_ cm    \_\_\_ mm = \_\_\_\_\_ cm

# Multiplication and division

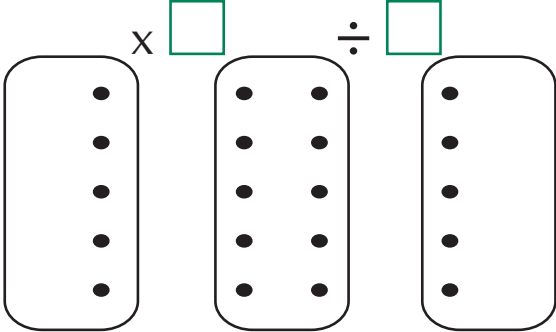
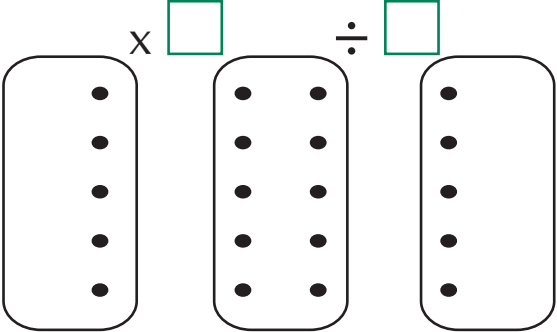
1. (a)  (b)  (c)  (d) 

(e)  (f)  (g)  (h) 

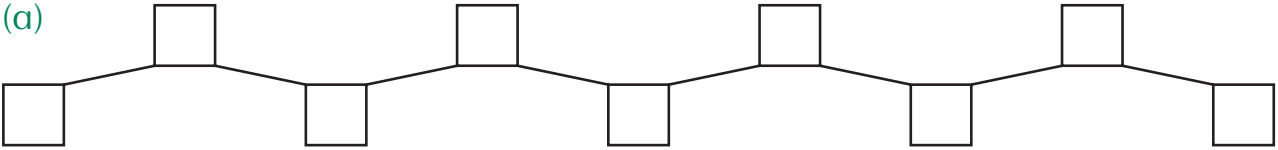
2. Complete these.

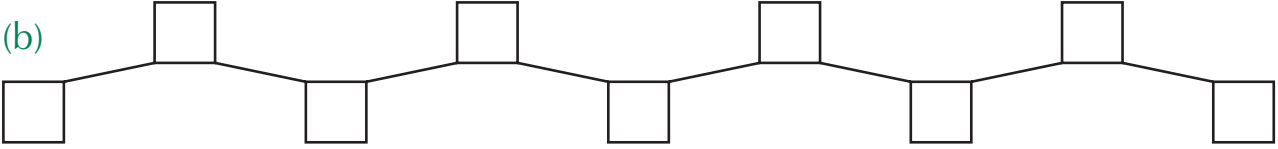
$\underline{\quad} \times \square = \underline{\quad}$	$\square \times \underline{\quad} = \underline{\quad}$	$\square \times \underline{\quad} = \underline{\quad}$
$\square \times \underline{\quad} = \underline{\quad}$	$\square \times \underline{\quad} = \underline{\quad}$	$\underline{\quad} \times \square = \underline{\quad}$
$\underline{\quad} \times \square = \underline{\quad}$	$\underline{\quad} \times \square = \underline{\quad}$	$\square \times \underline{\quad} = \underline{\quad}$
$\square \times \underline{\quad} = \underline{\quad}$	$\underline{\quad} \times \square = \underline{\quad}$	$\underline{\quad} \times \square = \underline{\quad}$

3. Complete these.

(a)  (b) 

4. Fill in the missing numbers.

(a) 

(b) 

# Rounding



1. Round the following to the nearest 1000.

- (a) \_\_\_\_\_  
\_\_\_\_\_
- (b) \_\_\_\_\_  
\_\_\_\_\_
- (c) \_\_\_\_\_  
\_\_\_\_\_
- (d) \_\_\_\_\_  
\_\_\_\_\_
- (e) \_\_\_\_\_  
\_\_\_\_\_
- (f) \_\_\_\_\_  
\_\_\_\_\_
- (g) \_\_\_\_\_  
\_\_\_\_\_
- (h) \_\_\_\_\_  
\_\_\_\_\_
- (i) \_\_\_\_\_  
\_\_\_\_\_
- (j) \_\_\_\_\_  
\_\_\_\_\_
- (k) \_\_\_\_\_  
\_\_\_\_\_
- (l) \_\_\_\_\_  
\_\_\_\_\_

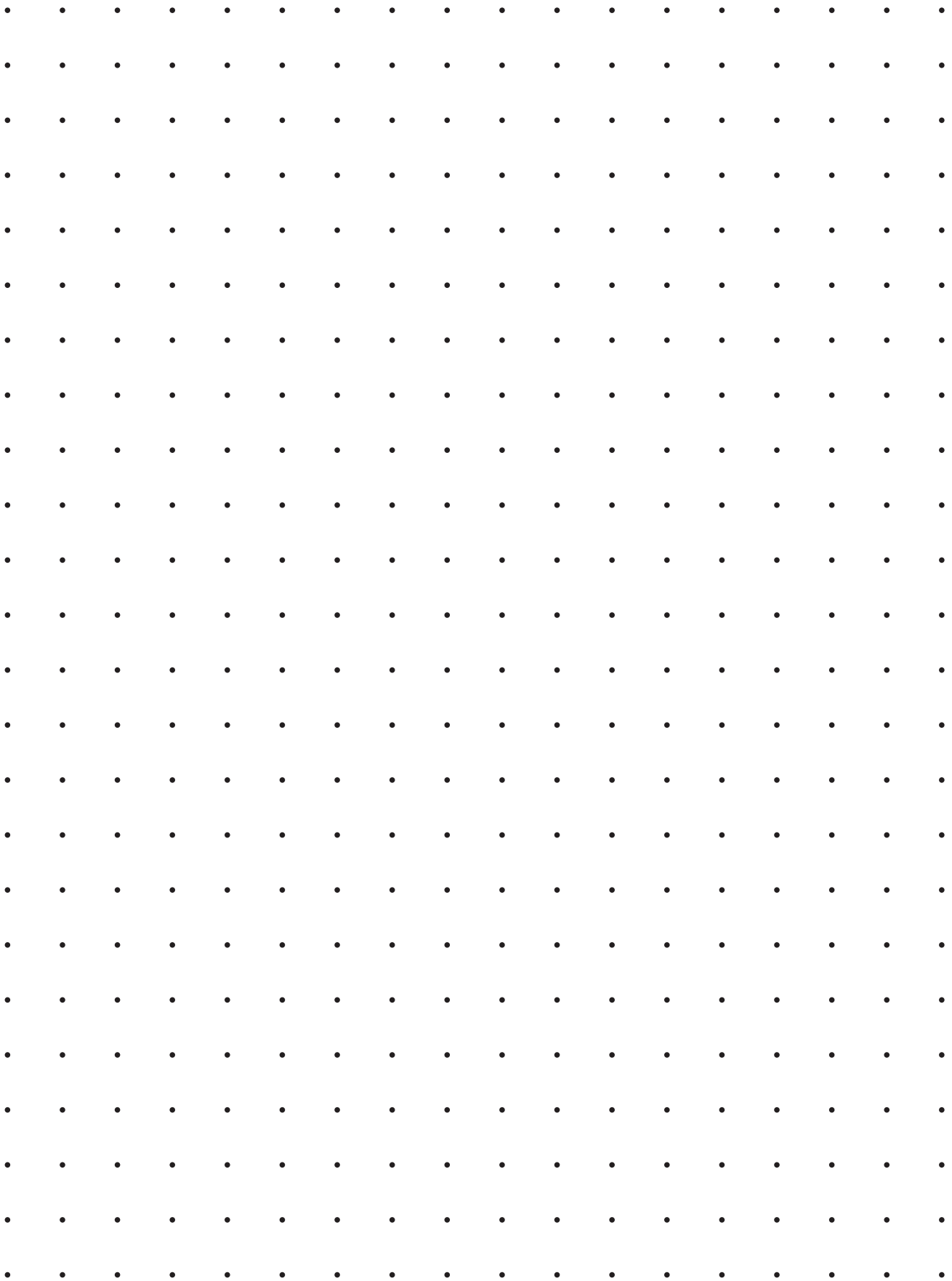
2. Round the following.

- (a) to the nearest 10      (b) to the nearest 100      (c) to the nearest 1000

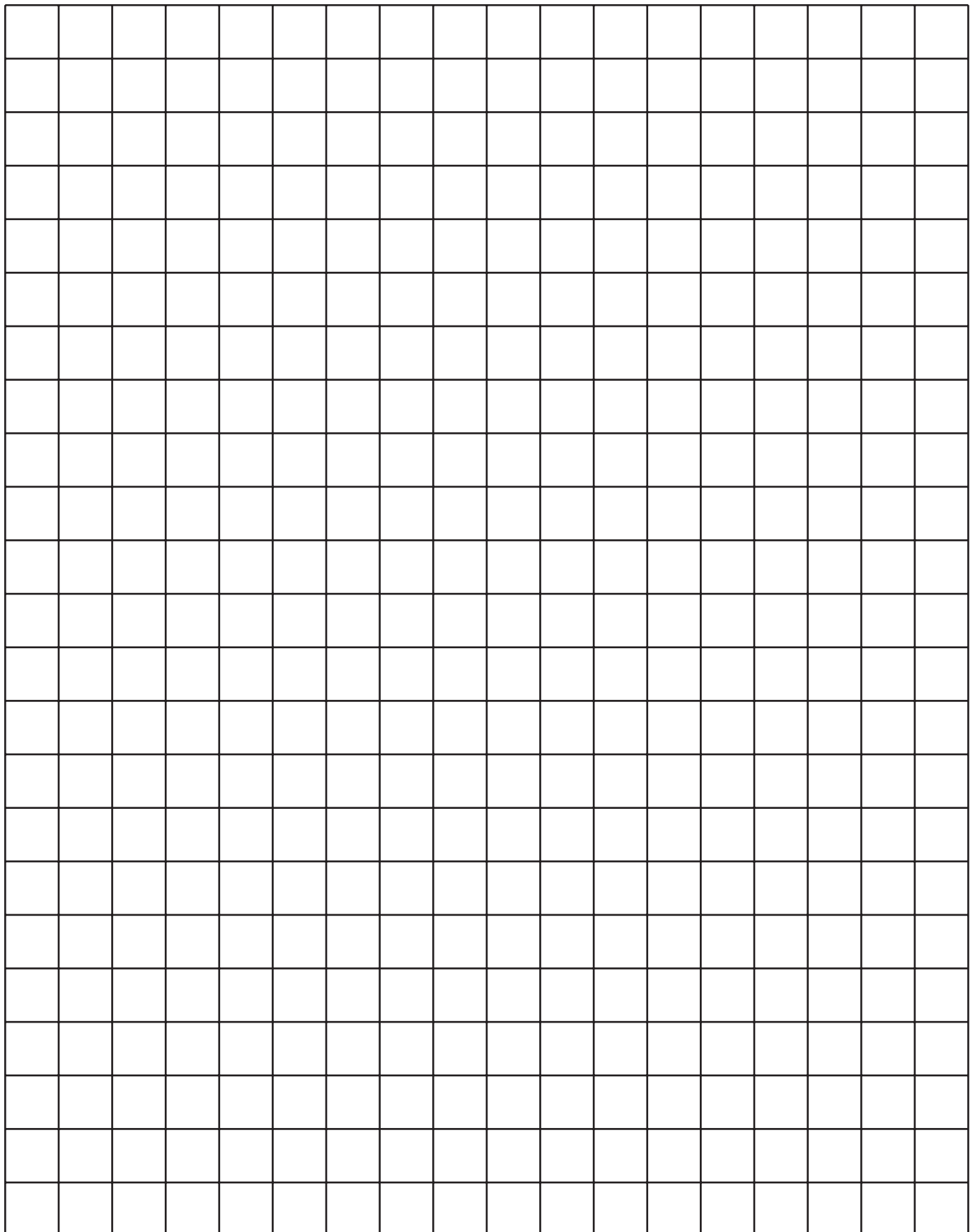
	to the nearest 10	to the nearest 100	to the nearest 1000
(a)			
(b)			
(c)			
(d)			
(e)			
(f)			
(g)			
(h)			
(i)			
(j)			
(k)			



# Dots



# Grid



# Pupil Profile

Pupil Name:	
Teacher:	
Date:	
Age:	yrs mths

**NOTE:** Use the keys to give summary information on the pupil's progress in each area.

PERSONAL QUALITIES (1 = poor 5 = excellent)		
●	Attitude	
●	Confidence	
●	Perseverance	
●	Consistence	
●	Concentration	
●	Works independently	
●	Achieving potential	
●	Work rate	
APPLICATION TO MATHEMATICS (1 = poor 5 = excellent)		
●	Ability to recall facts	
●	Ability to discuss concepts	
●	Ability to apply concepts	
●	Ability to record	
●	Presentation of work	

## OVERALL MATHEMATICAL ATTAINMENT

- 1 — Topic not covered
- 2 — Poor understanding
- 3 — Basic understanding – unable to apply
- 4 — Basic understanding – able to apply
- 5 — Good understanding
- 6 — Full understanding

### NUMBER

Attainment

●	Place value	
●	Addition	
●	Subtraction	
●	Multiplication	
●	Division	
●	Fractions	
●	Decimals	

### ALGEBRA

●	Number patterns and sequences	
●	Number sentences	

### SHAPE AND SPACE

●	2-D shape	
●	3-D shape	
●	Symmetry	
●	Lines and angles	

### MEASURES

●	Length	
●	Area	
●	Weight	
●	Capacity	
●	Time	
●	Money	

### DATA

●	Representing and interpreting data	
●	Chance	





