

Puzzling Shapes

Elspeth Graham, Rosalind Kerven
and Jenny Roberts

Reading
Tree

Stage 11

Maths

Jackdaw



OXFORD
UNIVERSITY PRESS

Great Clarendon Street, Oxford OX2 6DP

Oxford University Press is a department of the University of Oxford. It furthers the University's objective of excellence in research, scholarship, and education by publishing worldwide in

Oxford New York

Auckland Bangkok Buenos Aires Cape Town Chennai

Dar es Salaam Delhi Hong Kong Istanbul Karachi Kolkata

Kuala Lumpur Madrid Melbourne Mexico City Mumbai Nairobi

Sao Paulo Shanghai Singapore Taipei Tokyo Toronto

with an associated company in Berlin

Oxford is a registered trade mark of Oxford University Press

in the UK and in certain other countries

© Oxford University Press 2002

The moral rights of the author have been asserted

Database right Oxford University Press (maker)

First published 2002

All rights reserved. No part of this publication may be reproduced,

stored in a retrieval system, or transmitted, in any form or by any means,

without the prior permission in writing of Oxford University Press, or as

expressly permitted by law, or under terms agreed with the appropriate

reprographics rights organization. Enquiries concerning reproduction

outside the scope of the above should be sent to the Rights Department,

Oxford University Press, at the address above

You must not circulate this book in any other binding or cover

and you must impose this same condition on any acquirer

British Library Cataloguing in Publication Data

Data available

ISBN 0 19 919517 X

10 9 8 7 6 5 4 3 2 1

Also available in packs

Cross-Curricular Jackdaws Pack (one of each title) ISBN 0 19 919520 X

Cross-Curricular Jackdaws Class Pack (six of each title) ISBN 0 19 919521 8

Guided Reading Cards for Cross-Curricular Jackdaws ISBN 0 19 919670 2

Printed in Hong Kong

MATHEMATICS		Cross-Curricular Jackdaw	
Title	NLS Objectives	Cross-Curricular links	
The Maze	Y2T3 W7; Y3T1 W6	Mathematics	
Fiction	Extension: Y3T2 W13	Ma2 4a	
An Ice Cream Quiz and other Puzzles	Y2T3 T13; Y3T1 T17	Ma2 1a/b/c/d	
Non-fiction	Extension: Y3T3 T19	Ma2 4a/b	
The Puzzle of the Hollow Mountain	Y2T3 S3; Y3T1 S4	Ma3 4b	
	Extension: Y3T2 S9	Ma3 4a	

Acknowledgements

Illustrations are by: David Mostyn
pp 2-17; Susan Hutchison pp 18-23;
Martin Ursell pp 24-31
Front cover by PA Photos
Back cover by Susan Hutchison

CROSSHALL INFANT SCHOOL

Puzzling Shapes

Elsbeth Graham, Rosalind Kerven
and Jenny Roberts

Contents

The Maze	2
by Jenny Roberts	2
An Ice Cream Quiz and other Puzzles	18
by Elspeth Graham	18
The Puzzle of the Hollow Mountain	24
by Rosalind Kerven	24
Glossary	32

OXFORD
UNIVERSITY PRESS

CROSSHALL INFANT SCHOOL

The Maze

Jenny Roberts

Saturdays are the best days. That's when Dad takes

us out.

Mum always worries when we go.

"Don't worry, I'll take care of them," says Dad. Zoe and

I grin. We are always excited. When Dad takes care of us

we never know what will happen. Neither does Dad.

Last week, Dad wouldn't tell us where

we were going. "It's a secret," he

whispered. "Wait and see." But we were

too excited to wait and see.

"Is it the cinema? Is it the zoo? Is it the

pizza place?" we asked.

"No," said Dad, "but I'll give you a clue.

It will a-MAZE you!"



"The maze!" I yelled. "We're going to the maze!"

Dad nodded.

"We're going to the maze!" shouted Zoe. "We're

going to the maze!" Zoe likes to be my echo. Then she

said in a quieter voice, "What's a maze?"

"It's a sort of puzzle," explained Dad. "There are lots

of tall hedges and narrow paths. You have to try and

find the centre. It's great fun. Some people get lost!"

"I hope we won't get lost," said Zoe.

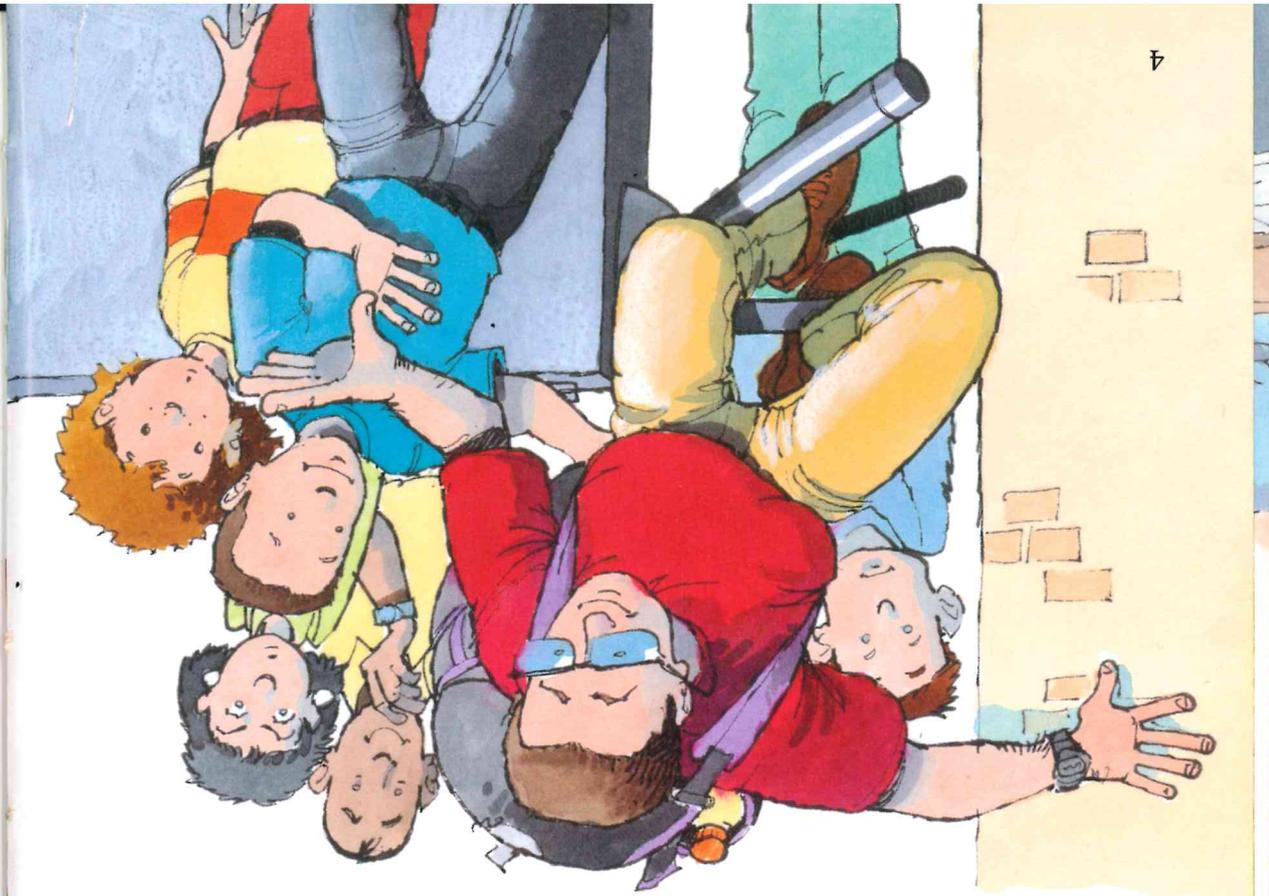
Dad laughed. "No way! I'm good at mazes. Just keep

close to me. Look, here we are!"



At the entrance there was a turnstile. We had to pay £1.00 to get in. Dad gave Zoe and me a £1.00 coin each. Taking it in turns, we put our money in the slot and pushed through the bars. Dad didn't have any more £1.00 coins, so he tried two 50p coins. The machine wouldn't take 50ps. He tried five 20p coins. The machine wouldn't take 20ps. He tried ten 10p coins. The machine wouldn't take 10ps.

The people in the queue behind were getting restless, so Dad put two 50p coins on top of the machine and climbed over the bars. He got in a bit of a tangle, but we helped him out.



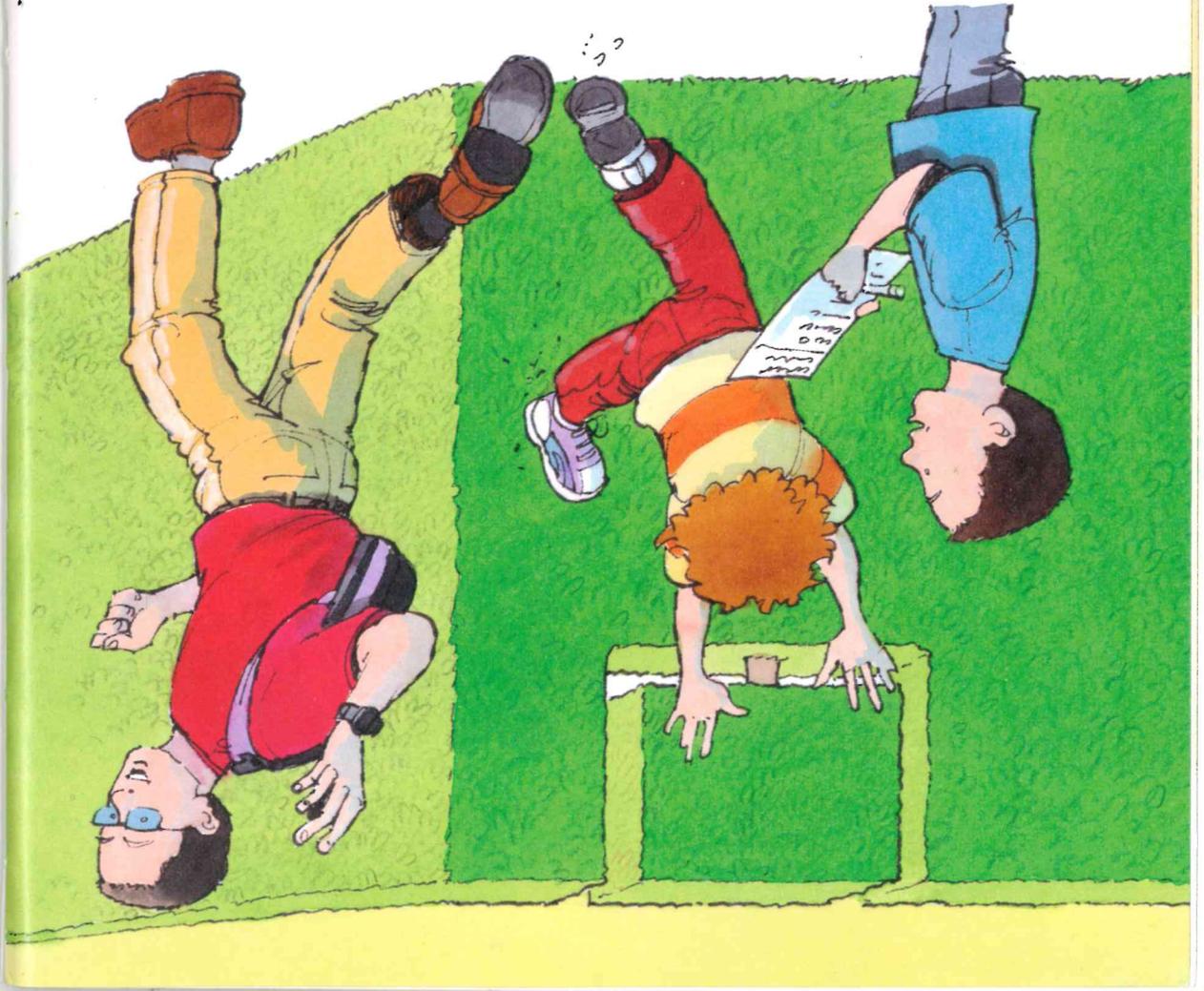
The outside of the maze looked like a wall of green leaves. We could hear people calling and laughing inside. Some gardeners were trimming the hedges. On the way in, Dad picked up a leaflet. It said, "Find the shapes in the maze:"

"Look," said Dad. "This will be fun. I'm good at finding things. Now, where did I put my glasses?"

"On the top of your head, Dad!" laughed Zoe.



"Right!" said Dad, giving me the list and a pencil. "Max, you tick off the shapes when we see them. Now just follow me. We'll be at the centre in no time!" We set off. Dad strode ahead. He knew the way, he said. He'd been there before. Zoe and I walked more slowly, but we noticed things that Dad didn't. "Come on you two," shouted Dad. "Keep up."



We turned right. We turned left. We turned right again. Then we walked straight on for what seemed like ages.

"Not far now," said Dad, beaming.

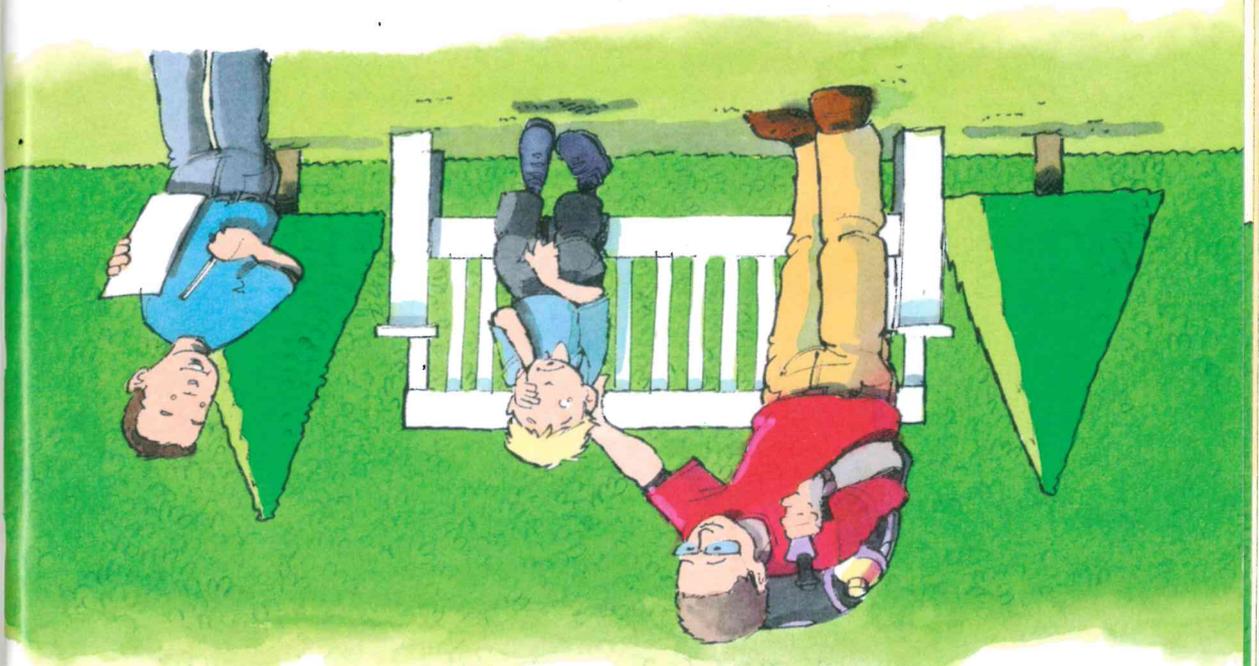
"Excuse me," said a woman. "You look as if you know where you are going. Can we follow you? We've been stuck in here for hours!" She had a baby in a buggy and a very tired-looking toddler.

"Of course," smiled Dad. He liked to be the leader.

The woman looked very relieved. We set off again. Dad started to whistle.

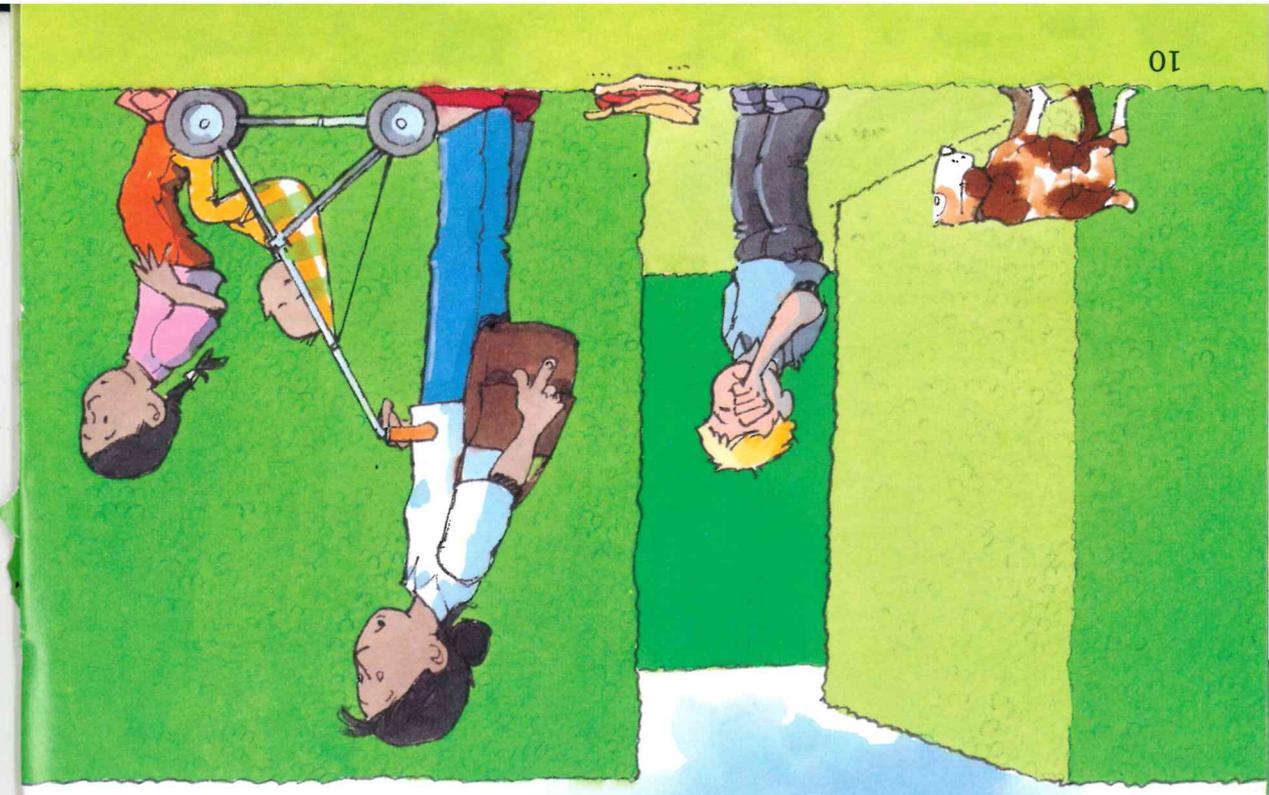


"Well, why don't you come with us?" said Dad. "We're going to the centre. I bet your mum will be waiting for you there." The little boy's face brightened. He jumped off the bench and stood behind the woman with the buggy. We set off again.



We turned right. We turned left, and left again. We passed a bench. A little boy was sitting there, alone. Tears were running down his face. "I've lost my mum!" he sobbed. "Don't worry," said Dad, kindly. "Maybe your mum will be back in a minute." The boy shook his head. "I've been here for ages," he said.

We set off again.
A little dog tagged along too. He seemed to have lost his owner.
Dad led us up and down, left and right. I noticed he had stopped whistling. I began to feel uneasy.
We walked on. My feet were getting sore and my legs were tired.
The woman with the buggy was getting very restless. She pointed at a squashed tomato sandwich lying on the path.
"Haven't we already passed that sandwich?" she said.
"No," said Dad. "We can't have done."
The woman looked cross. The little boy began to cry.
"I want my mum," he wailed.



We got to another junction. Dad hesitated and then we knew.

"We're lost aren't we?" sighed Zoe.

"No, we can't possibly be lost!" said Dad cheerfully.

"Anyway, look, I've got a map which I kept from last

time I was here."

He pulled a crumpled map out of his pocket. He

smoothed it out and we all puzzled over it. It was old

and difficult to tell the paths from the creases.

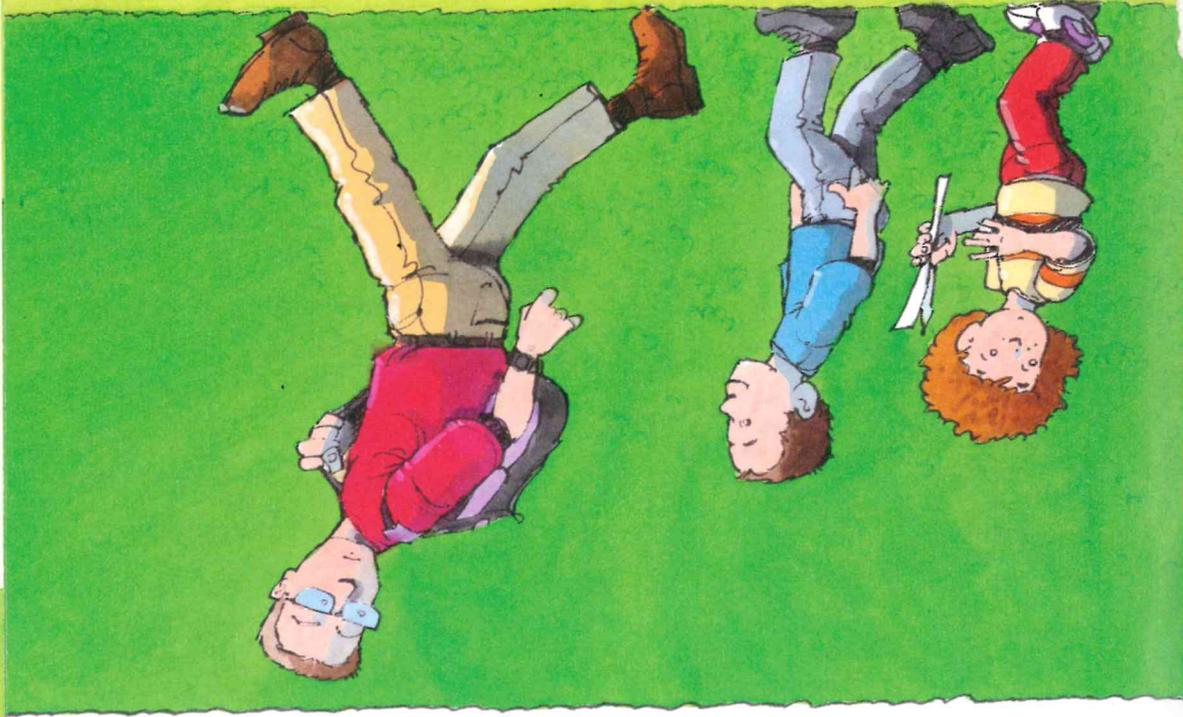
"Here's the centre," said Dad, pointing to the

fountain in the middle.

"Where are we though?" asked Zoe.

"Hmm," said Dad. His finger was hovering over the

map. "That's the only snag," he said.



"Do you mean to tell us, we've been following you around for hours and you haven't a clue where we are?" the woman shouted. She was getting red in the face. "Help!" she shouted. "Someone help us, we're lost!" The little boy's wails grew louder. Things were not going well for Dad. "I've got a plan," I said, boldly. Everyone looked at me. I gulped. I had to think quickly. "Dad - I'll get on your shoulders, so we can see the centre!" It was a brilliant idea. I sat on Dad's shoulders, but still couldn't see anything. So I stood up.



"Yes! I can see the centre!" I yelled.

"Which way?" asked Dad.

"Forward, forward, forward. Now turn right.

"Now turn left. Straight on. Nearly there!"

We turned a corner and there, finally, was the

centre!

"Huray!" we cheered. We rushed towards the

fountain, but in the excitement, I lost my balance.

I fell forwards. Luckily, I had a soft landing.

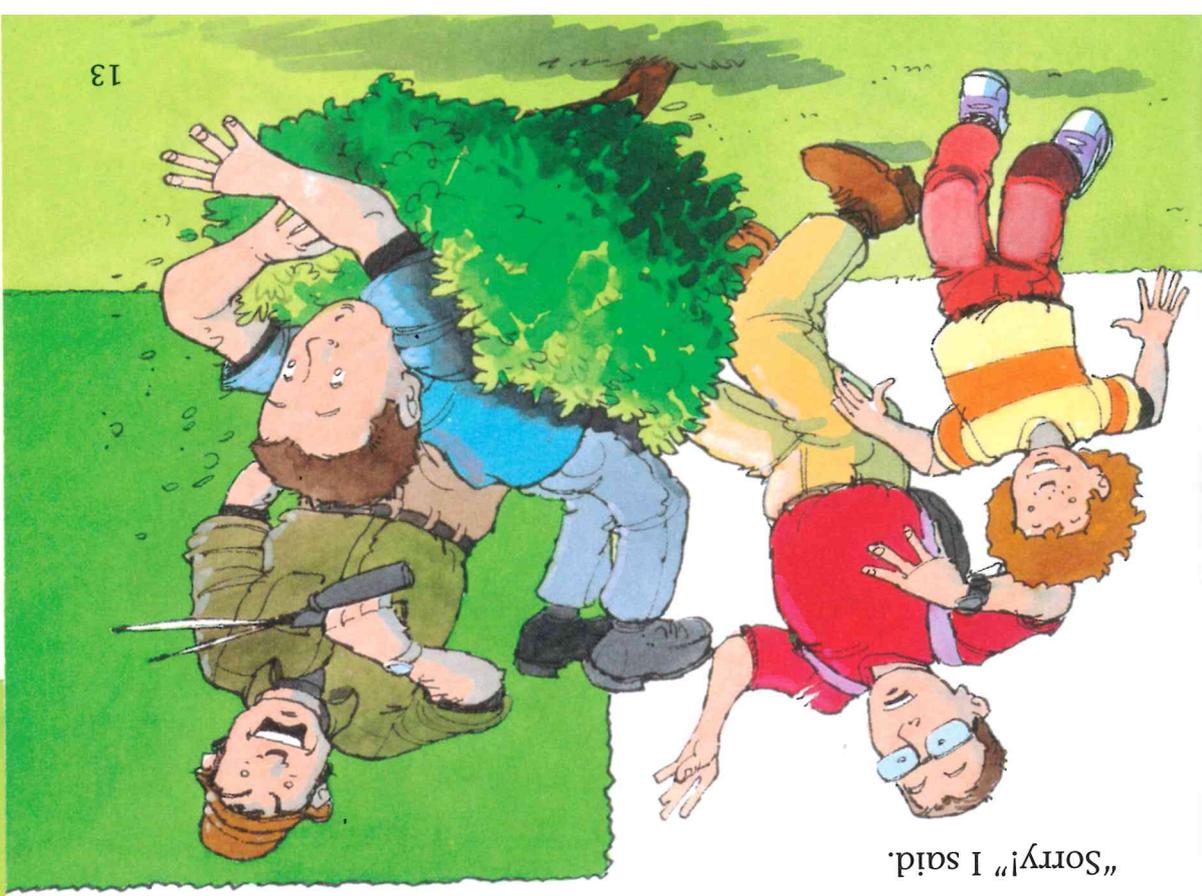
Unluckily, it was a bush that had just been

trimmed into a perfect sphere.

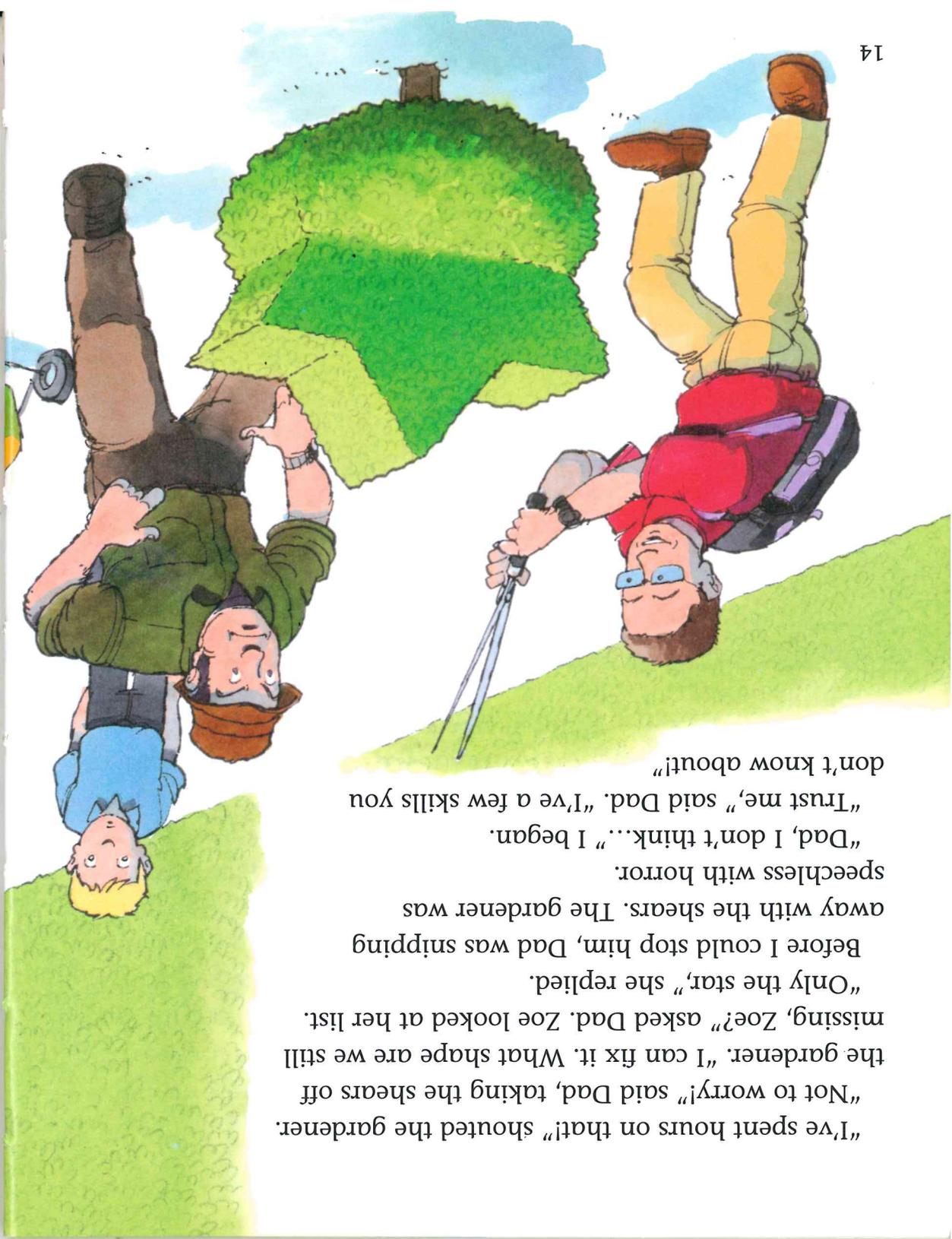
A gardener stood nearby, shears in hand.

He looked furious.

"Sorry!" I said.



"I've spent hours on that!" shouted the gardener. "Not to worry!" said Dad, taking the shears off the gardener. "I can fix it. What shape are we still missing, Zoe?" asked Dad. Zoe looked at her list. "Only the star," she replied. "Before I could stop him, Dad was snipping away with the shears. The gardener was speechless with horror. "Dad, I don't think..." I began. "Trust me," said Dad. "I've a few skills you don't know about!"



"There!" said Dad a few minutes later. "A rather good job, even if I say so myself!" He stepped back to admire his work.

We were all too shocked to speak. Except for the gardener who blurted out a few words "B-b-but the sphere...the perfect sphere..."

"The star is better," said Dad proudly, handing back the shears. "Aim for the stars! That's what people say." The gardener was not impressed. "I'm going to speak to the head gardener about this," he said. He glared at Dad and stomped off. Dad shrugged.

The little boy's mum was at the centre. She was delighted to see him again.

"Well, time to go home," said Dad. "Just follow me everyone, and we'll soon be out. Where's that map?"

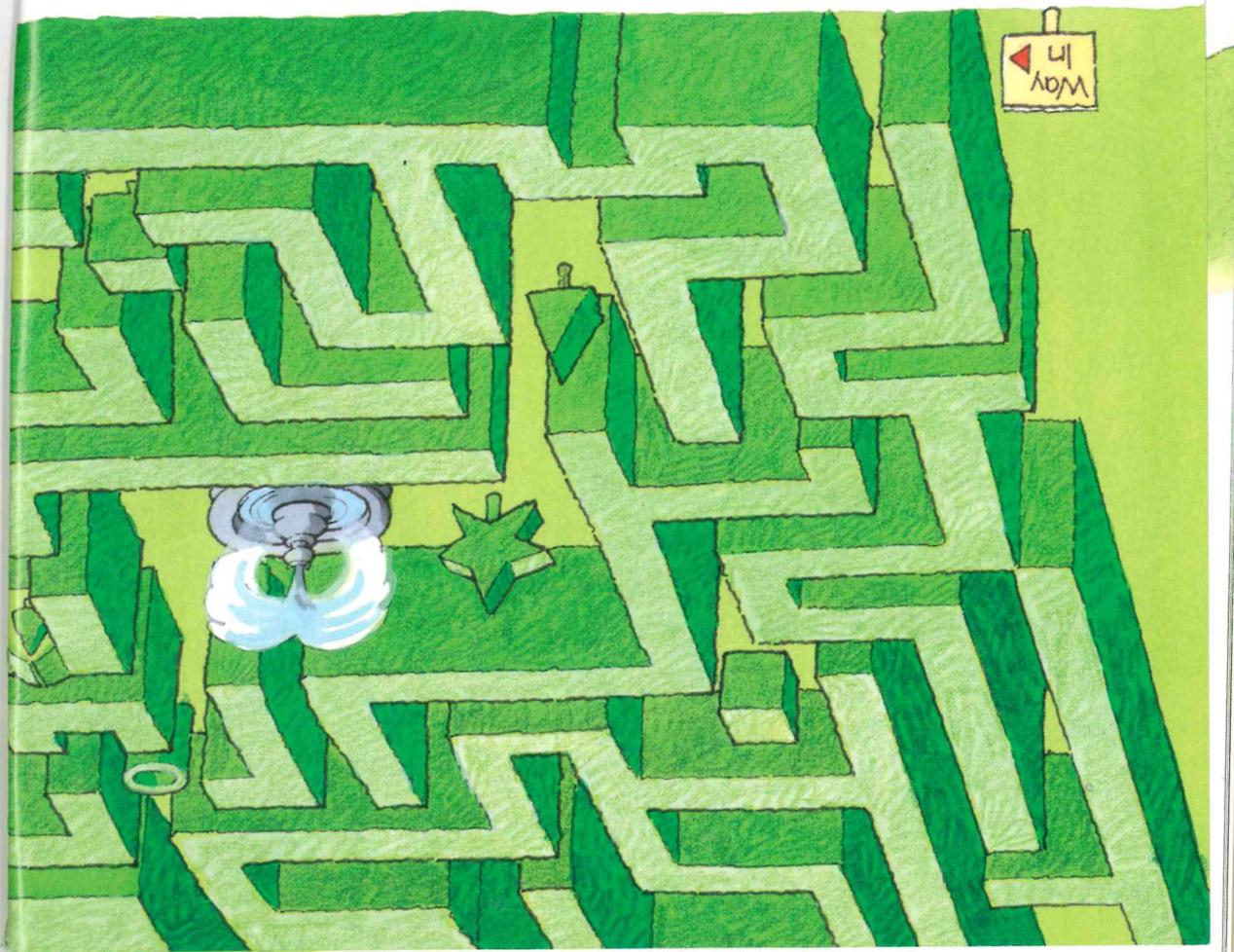
"I've got it," said the woman with the buggy. "And I'm keeping it. Anyone who wants to get home before nightfall should follow me." We all set off again.



After a while we passed the gardener. Then we passed him again. He didn't look angry now, instead he looked worried.

"Come with us," said Dad. "We're on our way out." The gardener looked doubtful, but the woman with the buggy seemed confident, so he tagged along behind the dog.

We were soon back at the entrance. Funny how it seemed such a short way back. Dad said he'd taken us on the 'scenic route'!

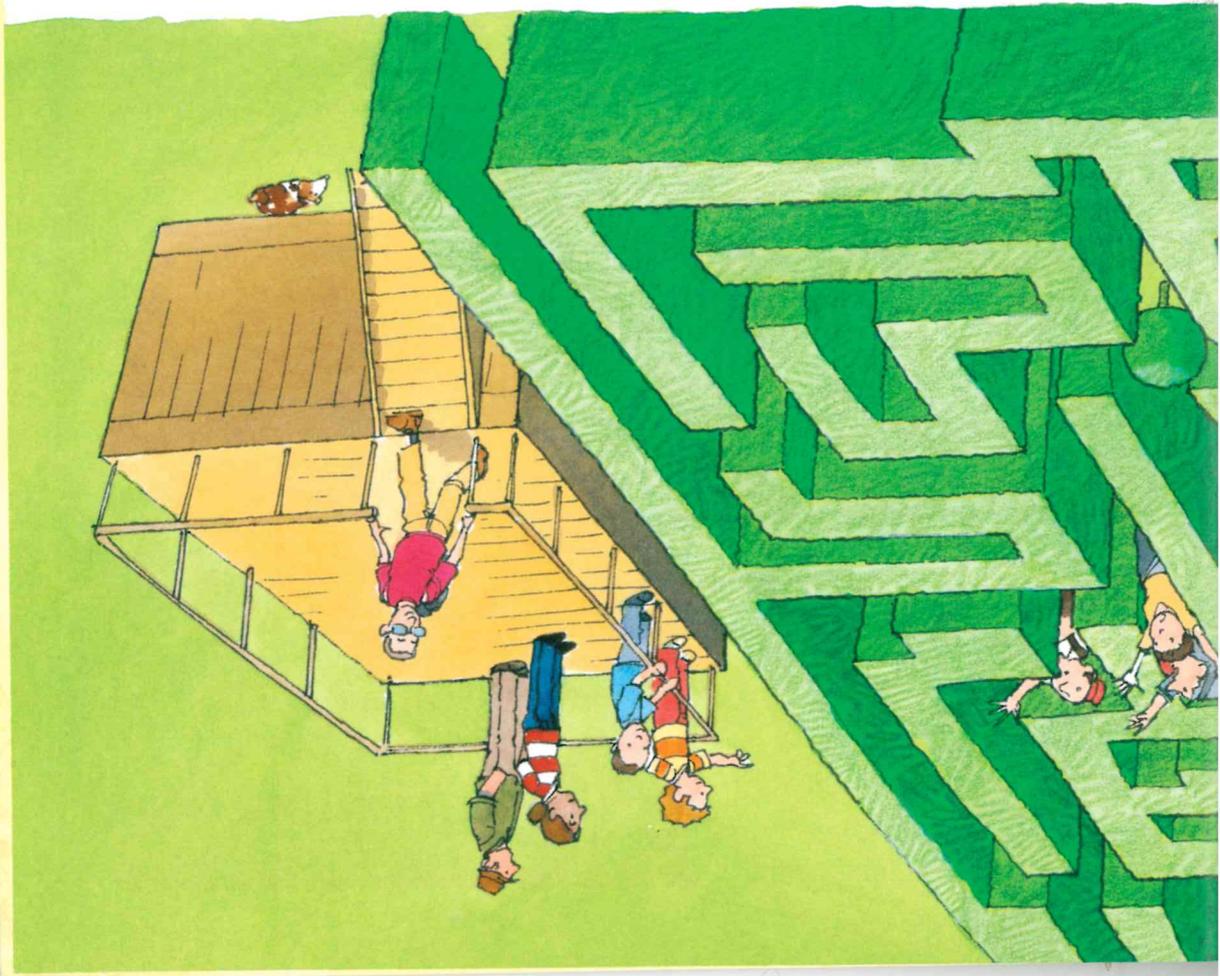


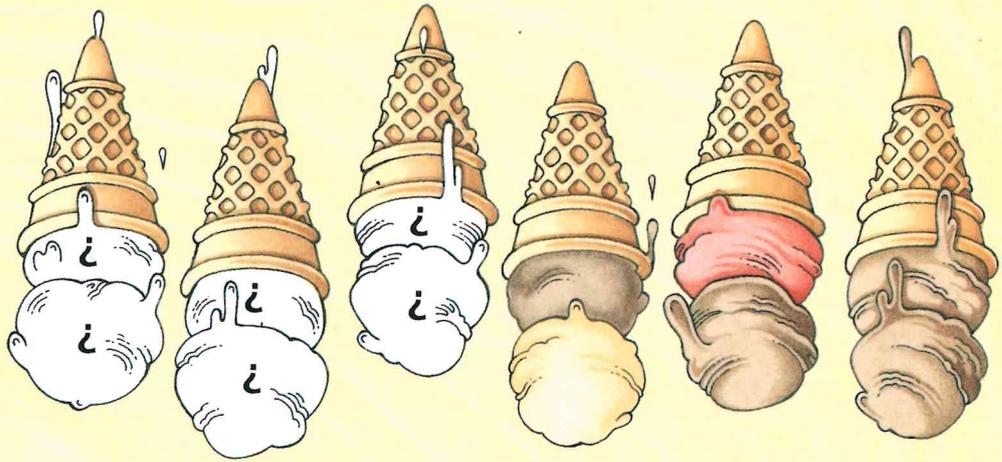
Before we went home we went up on the viewing platform. We could see the whole maze – and lots more shapes.

The head gardener joined us. He liked Dad's star and was not cross at all. He was a bit worried about the other gardeners though. It was time for them to go home, but they were nowhere to be seen.

"Look, there they are!" shouted Zoe, pointing.

"I'll go and help them," said Dad. "Trust me, I know this maze!"





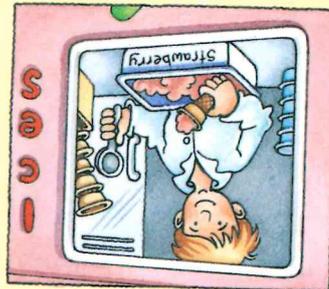
1 Which double-scoop would you choose?

2 What other different combinations could you have?

vanilla



strawberry



chocolate



Imagine you can have a double-scoop ice-cream from this stall. There are three flavours to choose from:

Elspeth Graham

Ice cream quiz

PRICE LIST

Flavours	
Vanilla	30p
Strawberry	30p
Chocolate	30p
Coffee	30p
Butterscotch	30p
Coconut	30p
Lime	50p
Toffee ripple	50p
Tutti Fruiti	50p
Toppings	
Chocolate flake	10p
Chocolate sprinkles	5p
Whipped cream	10p
Sugar cone	10p
Chopped nuts	5p
Hundreds and thousands	5p

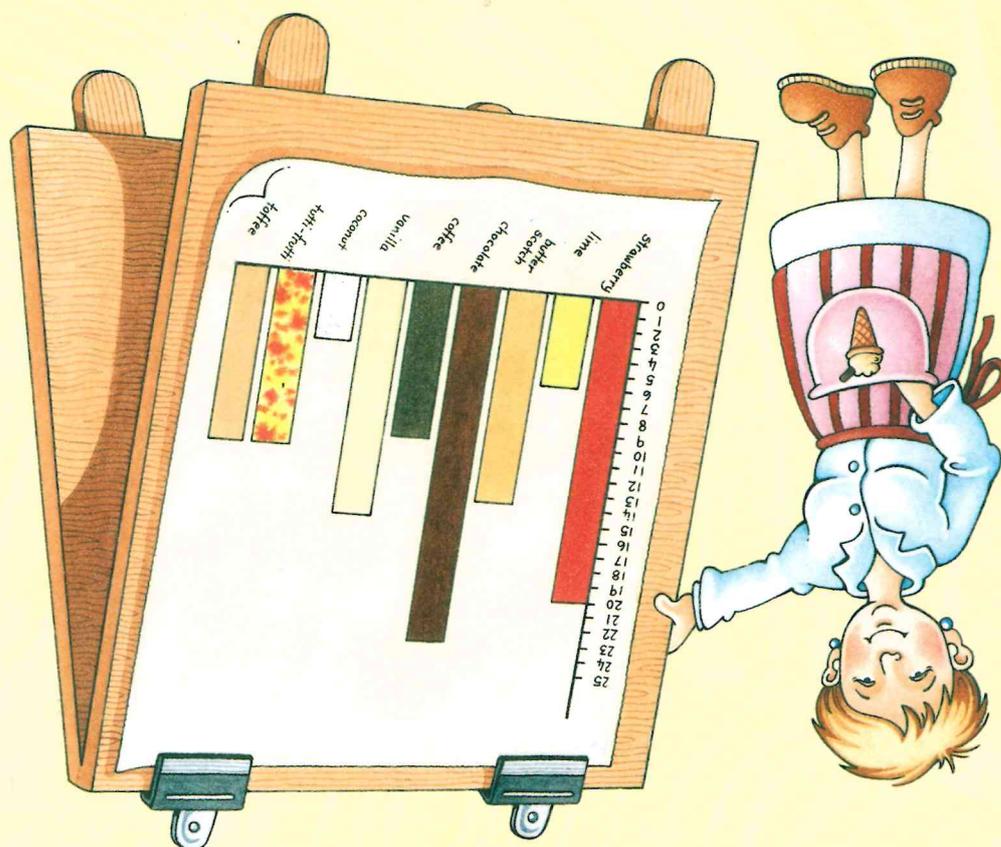
Choose your five favourite ice-cream flavours from the list.

3 How many combinations of double-scoop ice-creams could you make with your five flavours?
4 Are there more than 10?

You have £1.00 to spend.

- 5 What double-scoop ice-cream and topping combination would you buy?
- 6 Would you have any money left over?
- 7 How much would your best ever ice-cream combination cost?

- 1 Which is the most popular ice-cream flavour?
- 2 Which flavour is twice as popular as coffee?
- 3 How many coconut ice-creams were sold?



The ice-cream seller is keeping a record of the flavours she sells on one day in August. Here are the results:

Ice-cream bar chart

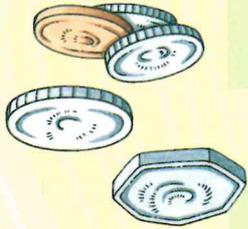
Pocket money

This is a way to get rich in 14 days! Offer to wash the dishes. Say that for the first day you will charge 1p, and then each day after that you will charge twice as much as the day before.

1 How much would you earn in 14 days?

You could use a **calculator** to work it out.

2 How many days of washing-up would it take before you could afford to buy a dishwasher costing £300?



8 March	14 March
7 March	13 March
6 March	12 March
5 March	11 March
4 March	10 March
3 March	9 March
2 March	8 March
1 March	7 March
SUNDAY	SATURDAY

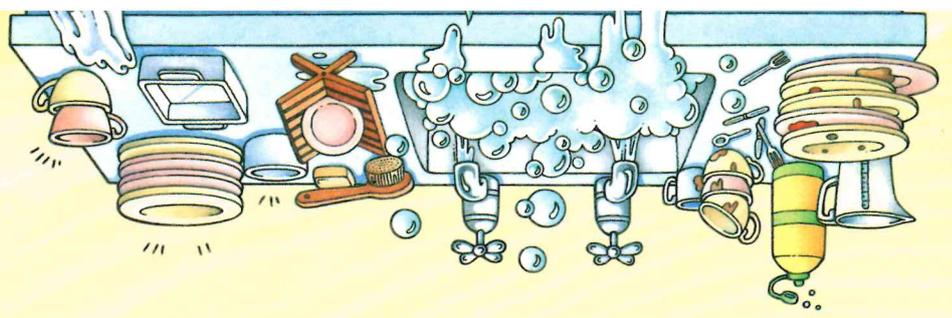
earn 1p

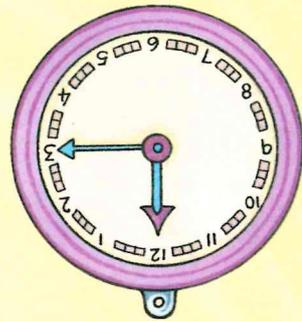
earn 2p
total 3p

earn 4p
total 7p

earn 8p
total 15p

earn 16p
total ?



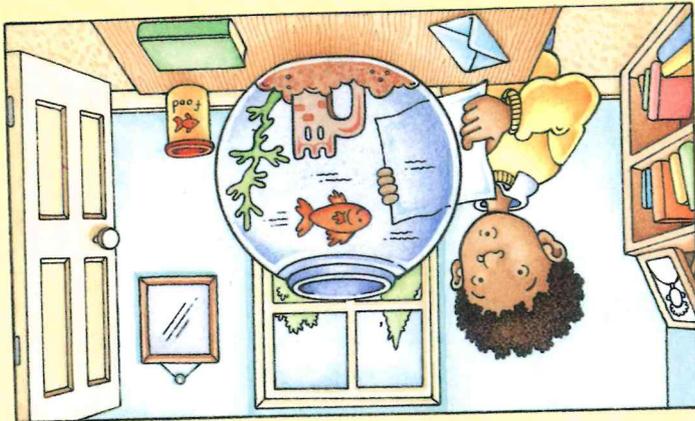


3 Write down three other times of day where the hands make a right angle?

Use your tester to check.

2 Do the hands make a right angle?

Look at the clock.

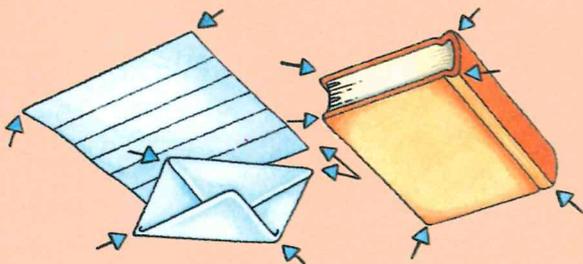


Use your right-angle tester to check.

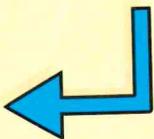
1 How many things with right angles can you see?

Look around the room you are in.

To make a right-angle tester, use the corner of an envelope, a book or a piece of paper.



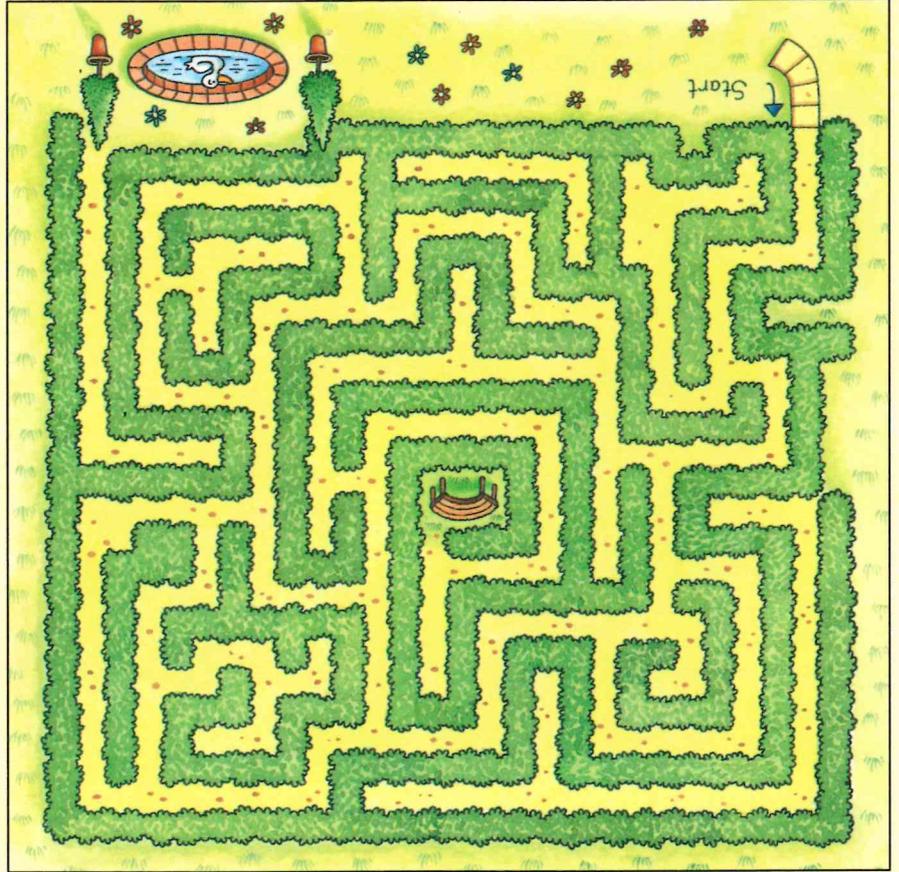
A right angle is a quarter turn.



Right angles

Maze

Find your way into the centre of the maze.
You have to follow the yellow path and you can
only make right-angled turns.



1 How many right-angled turns did you make?

Now find the shortest route from the centre back to the start.

2 How many right-angled turns did you make this time?

her mistress.

She picked up the letter and ran inside to show it to her own name was the only word she could read.

Who ever could have left it there? The girl didn't

and her own name was written on the envelope!

noticed that a letter had been left on top of the heap of rubbish heap on a fine summer's day. Suddenly, she Once a servant girl was sweeping some dust onto the



Rosalind Kerwen

A GERMAN FOLK TALE

The Puzzle of the Hollow Mountain

Her mistress was a kind old lady. She opened the letter and read it to the girl. This is what it said:

Dear Child

Please come to the christening of our new baby. We would also like you to be his godmother.

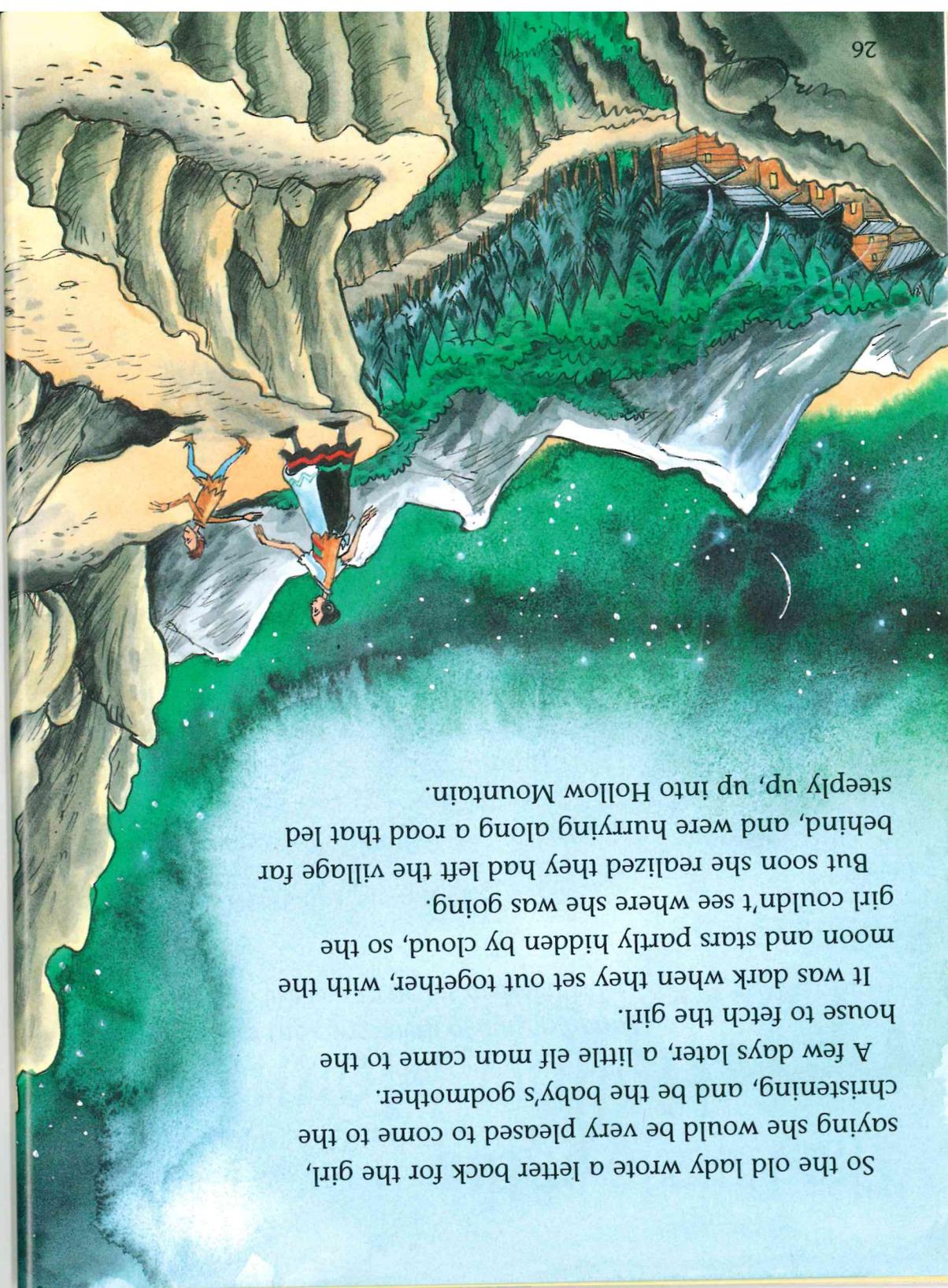
Yours sincerely

The Elves of the Hollow Mountain

"Oh my goodness!" cried the girl. "Elves! What shall I do?"

"You will have to accept their invitation," said her mistress. "The elves are strange creatures. It is foolish and dangerous to say 'no' to them."



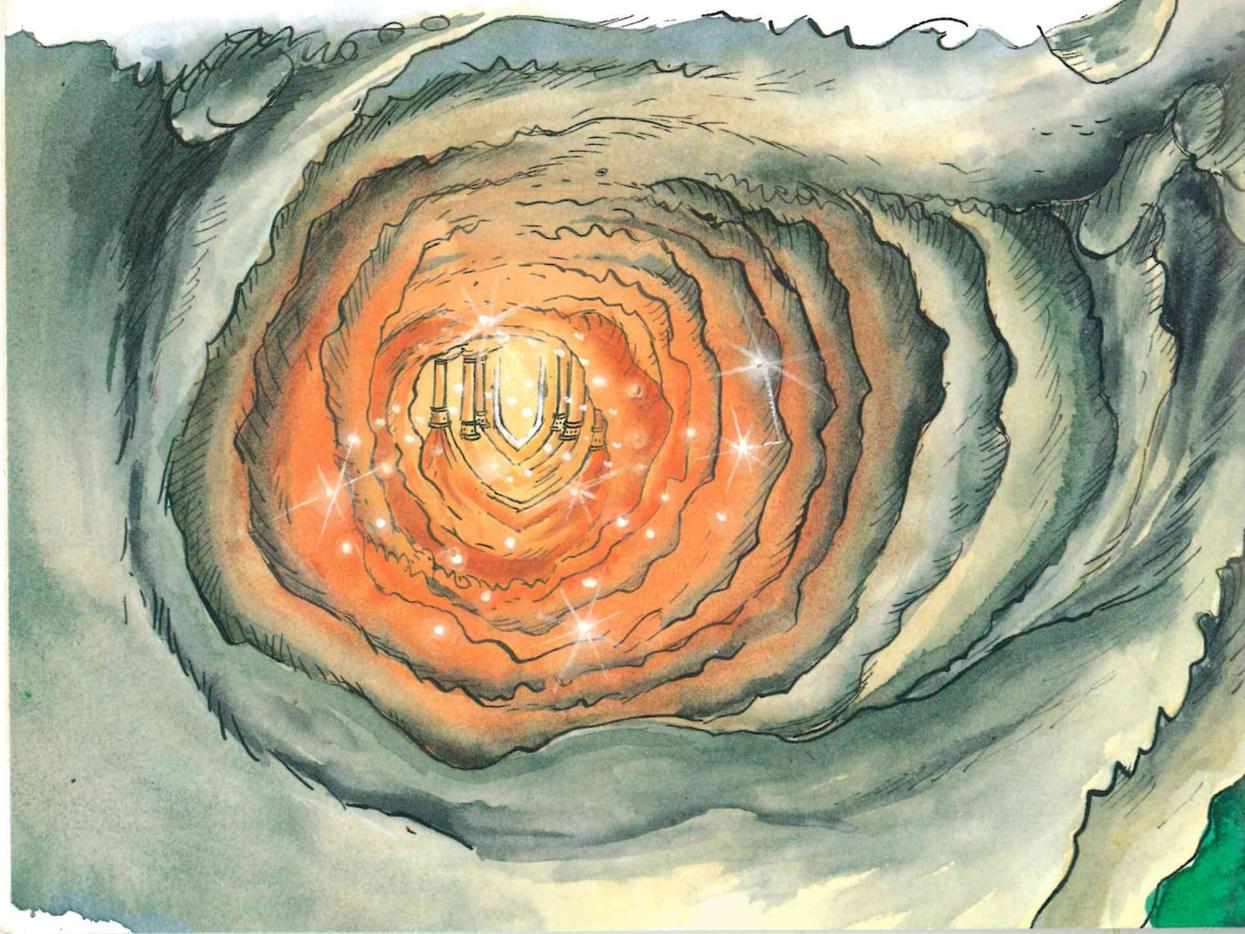


So the old lady wrote a letter back for the girl, saying she would be very pleased to come to the christening, and be the baby's godmother. A few days later, a little elf man came to the house to fetch the girl. It was dark when they set out together, with the moon and stars partly hidden by cloud, so the girl couldn't see where she was going. But soon she realized they had left the village far behind, and were hurrying along a road that led steeply up, up into Hollow Mountain.

He led the girl through an arch to a tiny cradle. It was made of pure white ivory, decorated with pearls, silver and gold. The baby boy who lay inside it was no bigger than the girl's hand!

"Here's the baby who's to be your god-child," said the elf man.

They went into a long tunnel. At last the tunnel opened out into a cave, lit by hundreds of brilliant candles. It seemed to be a wonderful, golden palace! Everything and all the people in it were very, very small.

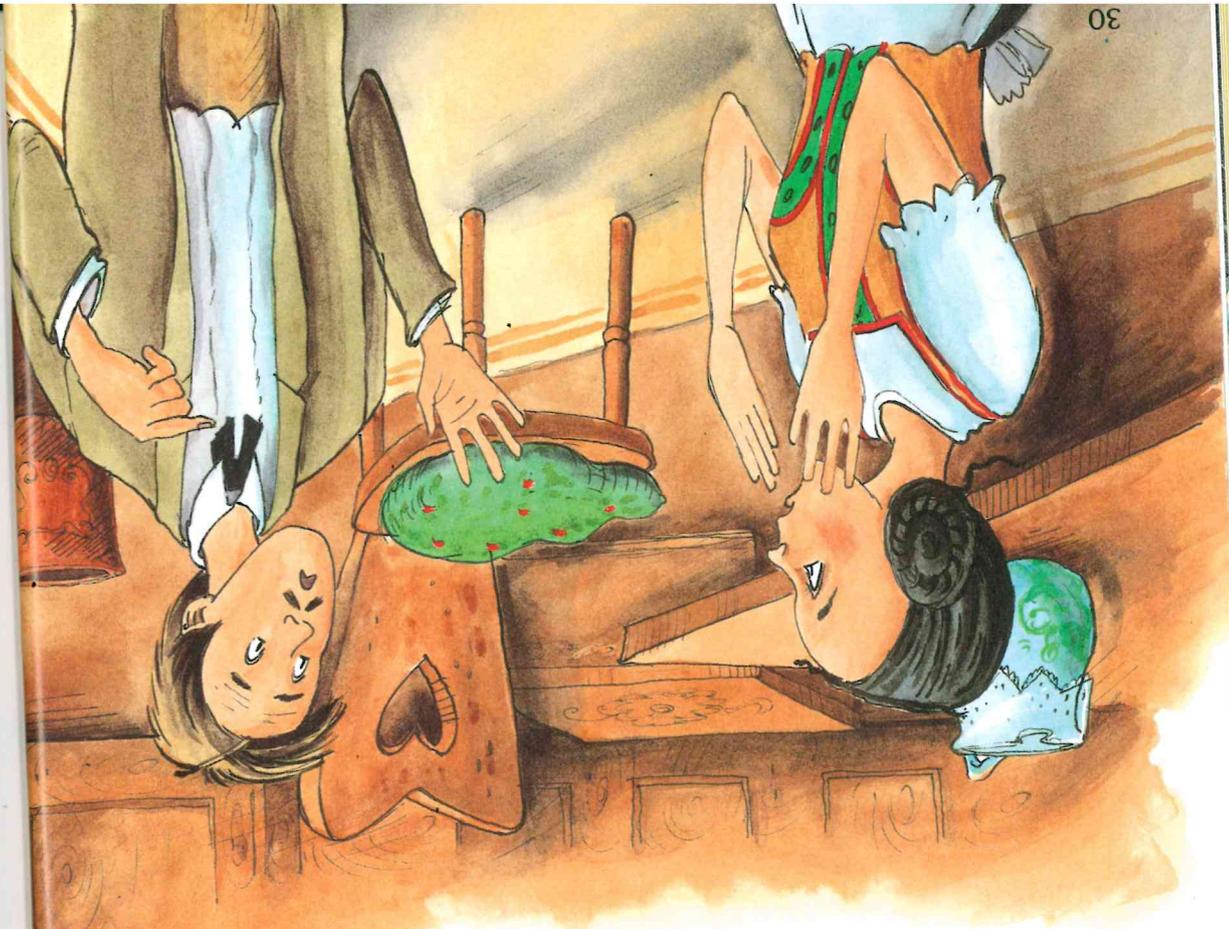


The girl really enjoyed the baby's christening, and it was very exciting being godmother to a young elf. When the ceremony ended, she said she had better go home. "No, no," said the elves, "you must stay with us a bit longer. You don't want to miss the christening party." So she stayed for the party and had a wonderful time. It lasted for three whole days! But at last it was over, and the elves all agreed that she really must go home.





Before she left, they gave the girl a present. It was a big bag full of gold coins! Then the elf man who had brought her back through the tunnel out of Hollow Mountain, and down the path to her own village. The girl ran straight back to the house where she worked. She was worried she might get into trouble for being away so long. As soon as she got back, she picked up her broom and got to work, sweeping the path. Just then, the gate opened and a man she had never seen before came in. He stared at the girl and said, "Who on earth are you?"



"I'm the servant girl of course," she said. "Where's the old lady, my mistress?"
"The old lady?" said the stranger. "Who do you mean?" He thought for a moment. "Oh, I remember, her. Surely you know, girl, the old lady died exactly nine years ago."
"Nine years ago?" cried the girl. "But she was still alive and well when I went away to the Hollow Mountain - and that was only three days ago!"

The man shook his head. "Oh dear," he said, "have you really been to the Hollow Mountain? Have you been mixing with the elves? No wonder you're confused! Don't you know? Time passes in a peculiar way amongst the little people. "You thought you only spent three short days with them, but it was really nine long years here in the real world!"

Well, what a shock and what a puzzle for that poor girl! And here's a puzzle for you.

Can you work out:

- 1 How many real days had passed in those nine years that the girl had been away? (Remember, there are 365 days in a year; but once every four years it's a **Leap Year**, which has one extra day in February. The year that the girl visited the elves was **not** a Leap Year, but the following year was a Leap Year.)
- 2 How many real days are there in one elf day?



Ice cream quiz

2 The combinations are: vanilla + chocolate; vanilla + strawberry; chocolate + strawberry; double chocolate; double strawberry, double vanilla.

15 (10 with different flavours plus 5 with two the same).

Ice cream bar chart

chocolate 2 strawberry 3 4

Pocket money

1 £163.83 2 15 days

Right angles

2 Yes

Maze

2 The shortest route has 14 right angles.

The Puzzle of the Hollow Mountain

1 There are 2556 days in seven years.

2 There are 852 days in one elf day.

ANSWERS

calculator	A calculator is an electronic machine that works out the answers to mathematical sums.
echo	An echo is a sound which can be heard because it bounces back, off a big wall for example.
junction	A junction is a place where paths, roads or railway lines meet.
Leap Year	A Leap Year has an extra day in February, making 366 days instead of 365. A Leap Year occurs once every four years.
scenic route	A scenic route is a path or road that has attractive views and scenery.
shears	A pair of shears is a cutting tool like a large pair of scissors.
sphere	A sphere is a round shape like a ball.

Glossary

"I
the
me
her
nin
]"
oliv
Mo

Activities for Mathematics lessons
including NC objectives from Programme of Study

The Maze

Maz 4a solve problems with money

Read page 4 with the class. Ask the children to: write sums to show all the ways Dad tried to make £1, e.g. $50p + 50p = £1$; write other ways he could he have tried using 50p, 20p, and 10p coins.

Maz 2a/b names and properties of 3-D shapes

Ask the children to: copy the list of shapes from page 5; go through the story and write down the page where they can see each shape; write a few words to describe each shape, e.g. cube page 6 six square sides.

An Ice Cream Quiz and other Puzzles

Maz 1a/b/c/d problem solving with numbers

Page 18: Ask the children to draw the possible combinations of flavours. Ask them how they could check that there are no more possibilities. Ask the children to choose five flavours from page 19. Let them work out the possibilities, then ask if anyone has a system. Show them how to work systematically. Delete any duplicates. Ask them if they can find a quick way to work this out.
Page 20: Work through the questions, asking children to explain how they used the chart to find the answers.

Maz 4a/b money

Page 19: Ask the children to answer questions 5–7 and write down the answers. Page 21: Let the children copy the chart and follow the instructions, then ask if anyone was surprised at the answers.

Maz 4b right angles

Ask the children to follow the instructions on pages 22 and 23. They could draw and write their answers in their class books.

The Puzzle of the Hollow Mountain

Maz 4a standard units of time

Page 31: Talk about the problem and ask the children what they need to do to solve it. They could use either a calculator or mental methods.

Puzzling Shapes

Series Editor: Gill Matthews

- Enjoy the story about the muddle in *The Maze*.

- Work out the *Ice-cream Puzzles*

and look at shapes and angles.

- Discover the traditional story

about *The Puzzle of the*

Hollow Mountain with its

time-travel teaser.



Text types: contemporary story; maths puzzles; traditional story

The six titles in the *Cross-Curricular Jackdaws* series are:

Stage 10

Science: *Fruits and Seeds*

Geography: *The Seaside*

Music: *Bang the Drum*

Stage 11

Maths: *Puzzling Shapes*

History: *Fire! Fire!*

Citizenship: *Emergency*



00896



OXFORD
UNIVERSITY PRESS

Orders and enquiries to
Customer Services: tel. 01536 741171
For further information, phone the
Oxford Literacy Care-line: tel. 01865 353881

www.oup.com/uk/primary