starting

ALGEBRA/SHAPE AND SPACE

For National Curriculum
levels 1-3

SPECTRUM
MATHS

Dave Kirkby

starting

ALGEBRA/SHAPE AND SPACE

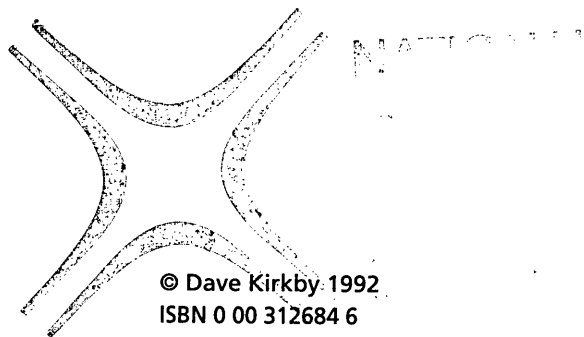# *starting*

ALGEBRA/SHAPE AND SPACE

For National Curriculum levels 1-3

SPECTRUM MATHS

Dave Kirkby

THE SPECTRUM MATHS SERIES

Starting	More	Go Further With
Investigations	Investigations	Investigations
Games	Games	Games
Data Handling	Data Handling	Data Handling
Algebra/Shape and Space	Algebra/Shape and Space	Algebra/Shape and Space
Number Skills	Number Skills	Number Skills

CONTENTS

	SHAPE and SPACE	**Content Focus**
21	Cheeses	Classifying shapes
22	'C' Shapes	Recognising 3-D shapes
23	Dotty Letters	Drawing shapes
24	Cats and Dogs	Direction
25	Clock Turns	Rotation
26	Eating Biscuits	Recognising 2-D shapes
27	NamePlates	Pentagons and hexagons
28	Christmas Cards	Polygons
29	Dotty Shapes	Classifying shapes
30	Symmetry Dairy	Symmetry
31	Traffic Signs	Recognising 2-D shapes
32	Crossroads	Direction
33	Rhian and Cedric	Recognising 2-D shapes
34	Twiddles	Compass points
35	Mazes	Direction
36	Dots	Classifying shapes
37	Shape Embroidery	Drawing shapes
38	Side Count	Classifying shapes
39	Pirate School	Compass points
40	Triangle Fields	Classifying shapes

INTRODUCTION

Most schools use a mathematics scheme, and teachers using these require a range of support material to supplement the scheme. Such material is provided by **Spectrum Maths**.

SPECTRUM MATHS: LESSONS IN ALGEBRA/SHAPE AND SPACE

This is a series of books with activities primarily for Key Stages 1 and 2, though much of it can be used for Key Stage 3.

The books are defined in terms of three levels. Broadly, these levels are:
Starting Lessons in Algebra/Shape and Space (Years 1, 2 and 3)
More Lessons in Algebra/Shape and Space (Years 3, 4 and 5)
Go Further With Lessons in Algebra/Shape and Space (Years 5, 6 and 7).

Each book contains 40 activities for the children in the form of photocopymasters. There are also detailed teacher's notes accompanying each activity and Special Papers in the form of photocopymasters to aid children to record their work.

THE ACTIVITIES

Each activity is presented as a possible starting point for a lesson or series of lessons. 20 focus on Algebra and 20 focus on Shape and Space, though some activities relate to both these aspects, as well as other areas of the mathematics curriculum. They are non-sequential.

USING THE ACTIVITIES

Some preliminary work may be necessary.
Activities can be selected by the teacher to suit particular needs and situations. They can be used in a variety of ways:

► integrated into the school mathematics programme,
► to consolidate other work in the school mathematics scheme,
► as a completely separate supplement to the scheme,
► as a means of introducing a new topic within the scheme,
► to provide enrichment material at appropriate times.

THE TEACHER'S NOTES

The teacher's notes contain for each activity:

► clear indications of the content area,
► details of any necessary apparatus,
► notes outlining possible results of the activity, together with suggestions for consolidation and development,
► extension ideas,
► National Curriculum references by means of a clearly identifiable grid,
► reference to related activities within the book and other books in the Spectrum series.

USING THE TEACHER'S NOTES

LEVEL	UA	N	SSM	HD
1				
2				
3				
4				
5				
6				

KEY UA Using and Applying Mathematics
        N Number
   SSM Shape, Space and Measures
    HD Handling Data

CONTENT

This section summarises the main content area of the activity.

APPARATUS

This section gives details of necessary apparatus or Special Paper photocopymasters, which are included at the back of the book.

EXTENSIONS

This section lists a variety of possible extensions to the activity. They contain useful ideas for stimulating the able child.

NOTES

This section contains comments about the activity. The comments may include solutions to the activity, suggested points for discussion, examples of consolidatory questions, variations on the activity, etc.

The teacher's notes for each activity contain the table on the left. This table refers to the Programmes of Study and Levels 1–6 for the National Curriculum. An attempt has been made to locate, by means of dots in the table, the approximate content level for each activity, but it must be appreciated that many activities can be performed at a variety of levels.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting					
More		This section references related activities available throughout the Spectrum Series. The reference gives the Number and Title of the activity.			
Go Further With					

Face Patterns

LEVEL	UA	N	SSM	HD
1	●	●		
2	●			
3	●			
4				
5				
6				

● Copy and continue repeating
  patterns.
● Devise repeating patterns.

CONTENT

► Continuing sequences of different
  shaped faces.

EXTENSIONS

► Discuss the shapes of the faces.
► Use plastic shapes to create sequences.
  For example, sets of triangles, circles
  and squares. Then record them by
  drawing round the shapes.

NOTES

Each pattern creates a different sequence.
The sequence structures are:

a. 1 2 1 2 1 2

b. 1 2 1 2 1 2

c. 1 1 1 1 1 1

d. 1 2 3 1 2 3

e. 1 2 2 1 2 2

f. 1 2 3 3 1 2 3

Colouring the faces helps to highlight the patterns.

Children can create their own face patterns on sticky coloured shapes.

Another possibility is to draw a set of faces in a grid and photocopy
them onto card for the children to cut out. They can then arrange the
faces to make different sequences.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				3 Behind The Screen 9 Seals 16 Flying Numbers	
More					
Go Further With					

Face Patterns

1. Continue each line by drawing the next two faces.

2. Colour the shapes to show the patterns.

a.

b.

c.

d.

e.

f.

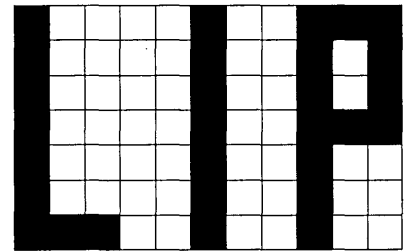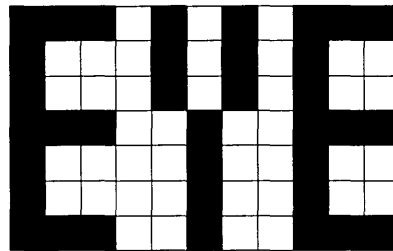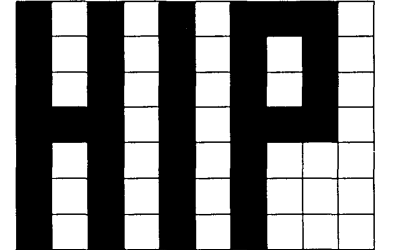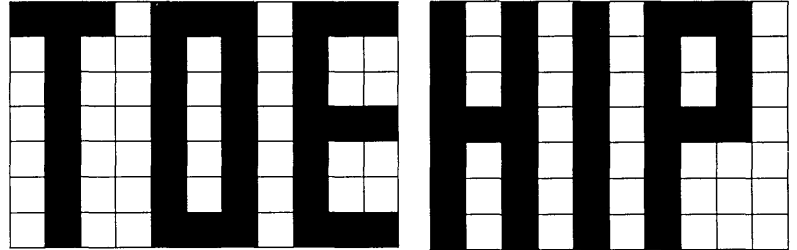3. Make up some face patterns of your own.

Body Parts

LEVEL	UA	N	SSM	HD
1	●			
2	●	●		
3	●			
4				
5				
6				

● Odd and even numbers.

CONTENT

► Distinguishing between odd and even numbers.

EXTENSIONS

► *How many of each odd number appear in each grid?*
► Make shape puzzles. Draw the shape first on squared paper, then fill the shape squares with odd numbers, and the outer squares with even numbers.
► Make puzzles based on different colouring rules e.g. Colour all squares with numbers more than 5. Colour all squares with numbers between 3 and 8.

NOTES

These are the coloured squares:

Ask the children:
Which grid has the most coloured squares?
Which has the least?

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting	16 Odds or Evens	6 Odds and Evens 15 Chase 30 Banko	1 Odds and Evens 23 Dice Sort	11 Jumpers 12 Colouring Puzzle	2 Sweet Wrappers
More				1 Even or Odd? 17 Making Chains	6 Consecutive Trains
Go Further With				1 Odd and Even Patterns 6 Odd Totals	

Body Parts

1. Colour all the **odd numbered** squares on these two grids. The coloured squares will spell parts of the body.

■ Can you find them?
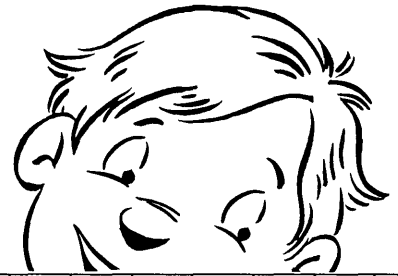
5	7	1	2	3	7	5	2	9	1	3
2	3	6	6	5	10	1	10	7	6	4
4	9	10	4	1	10	9	4	5	8	2
8	5	4	8	3	4	5	6	7	9	1
10	7	4	2	9	8	7	2	1	10	4
6	1	8	6	7	6	3	8	3	6	8
4	3	2	8	1	9	1	2	7	5	9

1	2	3	4	7	2	5	7	3	2
7	6	5	6	9	8	9	10	5	8
3	10	9	2	5	10	7	4	9	6
5	7	1	8	3	4	1	7	3	4
9	8	7	10	1	6	5	6	6	10
7	4	3	6	7	2	3	8	10	6
1	10	3	4	3	8	7	2	4	4

2. Colour all the **even numbered** squares on these grids.

■ Can you find more body parts?

2	4	6	1	6	5	2	7	4	6	10
8	5	3	1	4	3	10	1	2	5	3
4	7	9	3	8	9	10	9	8	5	7
4	6	8	9	7	6	9	1	6	10	4
6	5	7	5	1	2	3	7	2	9	1
2	9	3	1	5	8	7	3	2	5	7
8	6	2	7	3	4	1	9	8	10	10

4	3	5	1	7	4	9	3	2	6	8
2	7	9	3	1	6	3	9	2	1	4
6	1	5	9	3	2	3	5	4	3	6
8	7	3	1	5	10	1	7	6	2	8
10	7	5	1	7	8	5	5	4	3	1
4	9	7	5	5	8	9	5	2	5	7
6	8	4	3	9	4	7	9	10	7	9
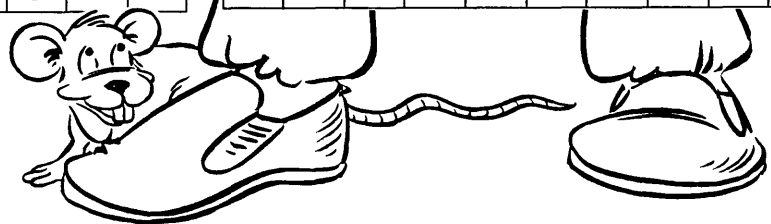
3. Draw your own grids, and invent your own puzzle.

SPECTRUM MATHS ● STARTING ALGEBRA/SHAPE AND SPACE

Behind the Rocks

3

LEVEL	UA	N	SSM	HD
1	●			
2	●	●		
3	●	●		
4				
5				
6				

- ● Odd and even numbers.
- ● Exploring number patterns.
- ● Predicting numbers in sequences.

CONTENT

► Recognising missing numbers in sequences of counting numbers, odd numbers, even numbers, etc.

EXTENSIONS

► Extend the activity to larger numbers.
► Increase the number of hidden numbers.

NOTES

The hidden numbers are:

(4)(5)

(7)(6)(5)

(7)(9)

(10)(8)(6)

(10)(12)(14)

(12)(15)(18)(21)

A variation of this activity is to prepare different sets of number sequences on card. e.g.

(2)(4)(6)(8)(10)(12)(14)(16)(18)(20)

Then cover up some numbers with a cloth, and challenge the children to say the covered numbers, before they are revealed. The sequences can be ascending or descending.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				**1** Face Patterns **9** Seals **16** Flying Numbers	
More					
Go Further With					

Behind the Rocks

Some numbers are hidden behind the rocks.

1. Write in the missing numbers.

1   2   3   6   7   8

10   9   8   4   3   2   1

1   3   5   11   13   15

16   14   12   4   2

2   4   6   8   16   18

3   6   9   24
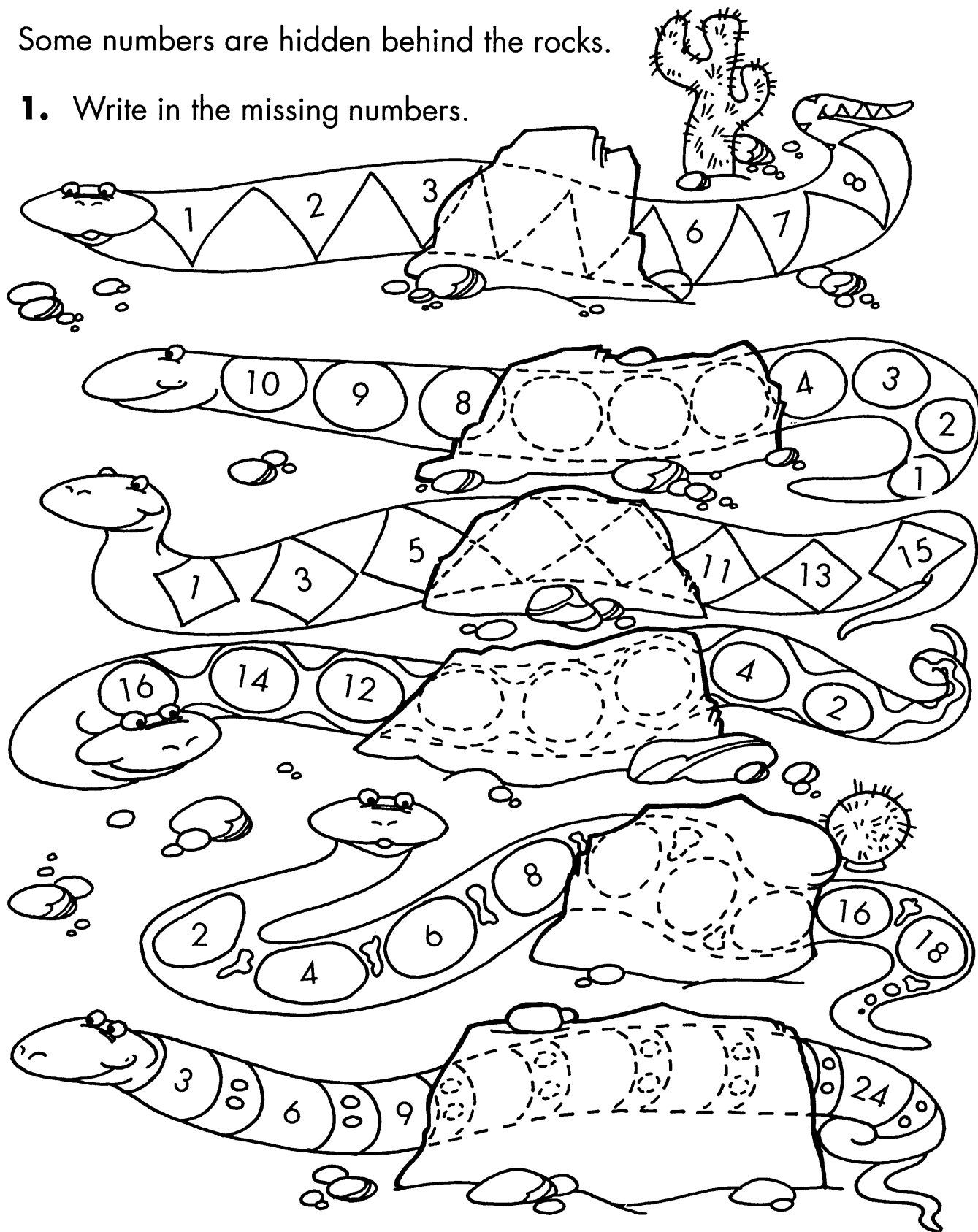
2. Invent some of your own pictures of hidden numbers.

    SPECTRUM MATHS ● **STARTING ALGEBRA/SHAPE AND SPACE**

Fish Tank

4

CONTENT

► Patterns in addition facts.

APPARATUS

Use Special Paper 5 (2 cm. squared paper) from the back of this book, for recording.

EXTENSIONS

► Change the number of fish.
► Add top and bottom sections of the tank, as well as left and right.
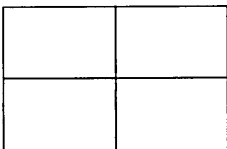
► Look at real fish in a tank. Use sticky tape to divide the tank into sections.

NOTES

With five fish there are 6 possibilities :

(0 , 5), (1 , 4), (2 , 3), (3 , 2), (4 , 1), (5 , 0).

With seven fish there are 8 possibilities :

(0 , 7), (1 , 6), (2 , 5), (3 , 4), (4 , 3), (5 , 2), (6 , 1), (7 , 0).

Follow up questions include:
If there are three on the left, two on the right, how many fish altogether?
If there are nine fish in the tank, three on the left, how many on the right?

The children can make fish by drawing on card, colouring them, then cutting them out.

The fish can swim in a rectangular tank drawn on paper. This can be used for discussion and questions and answers.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		1 Sums or Differences 26 Balloons 34 Nice Dice 36 Pairs	2 Pairs 3 Dot Tot 12 Keep Your Balance	5 Dial Numbers 13 Spot Take Away 14 Lucky Beads 20 Subraction Patterns	4 Giraffe 7 Skittles 8 Train Numbers 17 Adding
More					19 Twenties 39 Grid Pairs
Go Further With					

Fish Tank

1. Put 5 fish in the tank. Use counters for the fish.
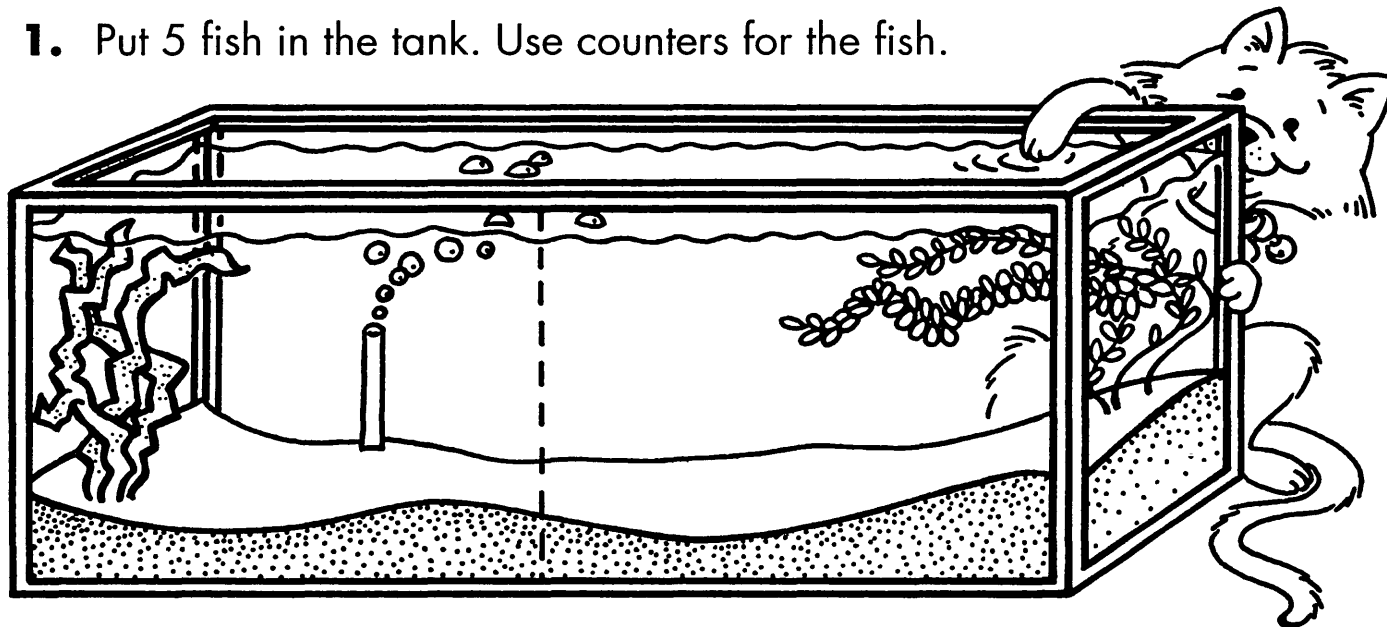
- How many are on the left? ■ How many are on the right?

2. Now move the fish.

- How many are on the left now? How many are on the right?

3. Draw and write them like this:

  0   5   1   4
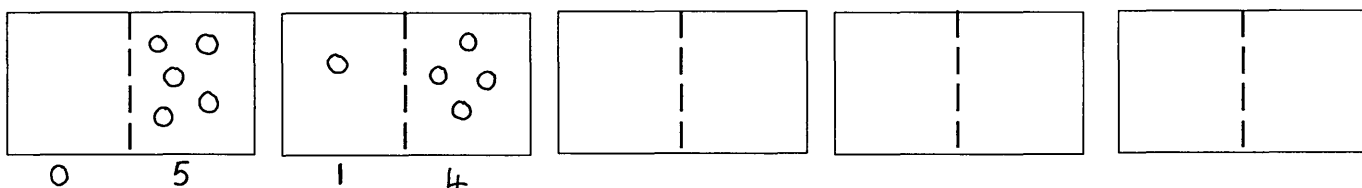
4. Now draw pictures and write numbers when 7 fish are in the tank.
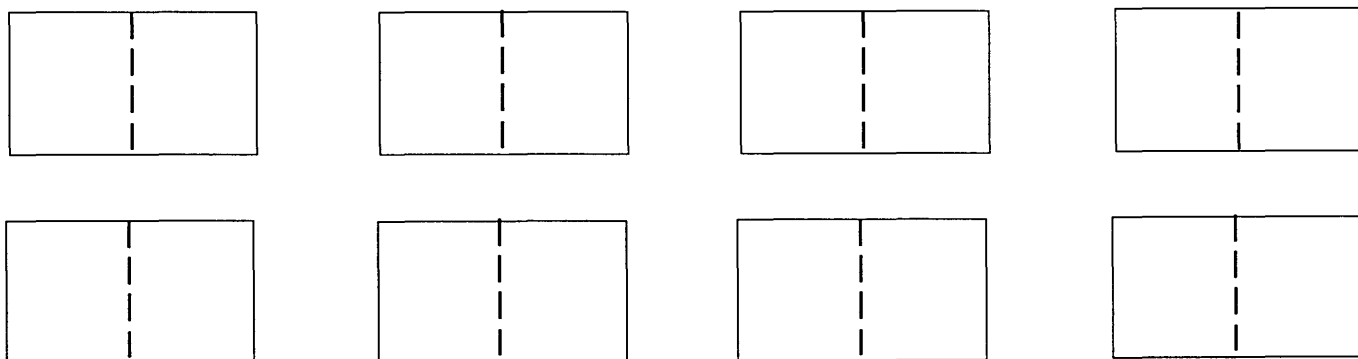
5. Draw pictures for 10 fish in the tank.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Dial Numbers

5

LEVEL	UA	N	SSM	HD
1				
2		●		
3		●		
4				
5				
6				

● Addition patterns.
● Addition facts.

CONTENT

► Exploring addition number bonds to 10, and addition of three single-digit numbers.

EXTENSIONS

► *Can you find ways to make other totals with two dial numbers or three dial numbers?*

NOTES

The different ways of revealing a total of 10 with two dial numbers are:

(1, 9),   (2, 8),   (3, 7),   (4, 6).

Ways of revealing a total of 10 with three dial numbers are:

(0, 9, 1),   (1, 7, 2),
(0, 8, 2),   (1, 6, 3),
(0, 7, 3),   (1, 5, 4),
(0, 6, 4),   (2, 3, 5).

A variant of this activity is to first cover all the dial numbers. Then remove a counter and ask what counter has to be removed to make 10 or another total.

This can be extended to removing two counters.
What has to be removed to make 20?

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		1 Sums or Differences 26 Balloons 34 Nice Dice 36 Pairs	2 Pairs 3 Dot Tot 12 Keep Your Balance 25 Dice Sums	4 Fish Tank 13 Spot Take Away 14 Lucky Beads 20 Subraction Patterns	4 Giraffe 7 Skittles 8 Train Numbers 17 Adding
More					19 Twenties 39 Grid Pairs
Go Further With					

Dial Numbers

1. You need 8 counters.

2. Cover up eight numbers on the dial with the counters.
You must leave two numbers that total 10.
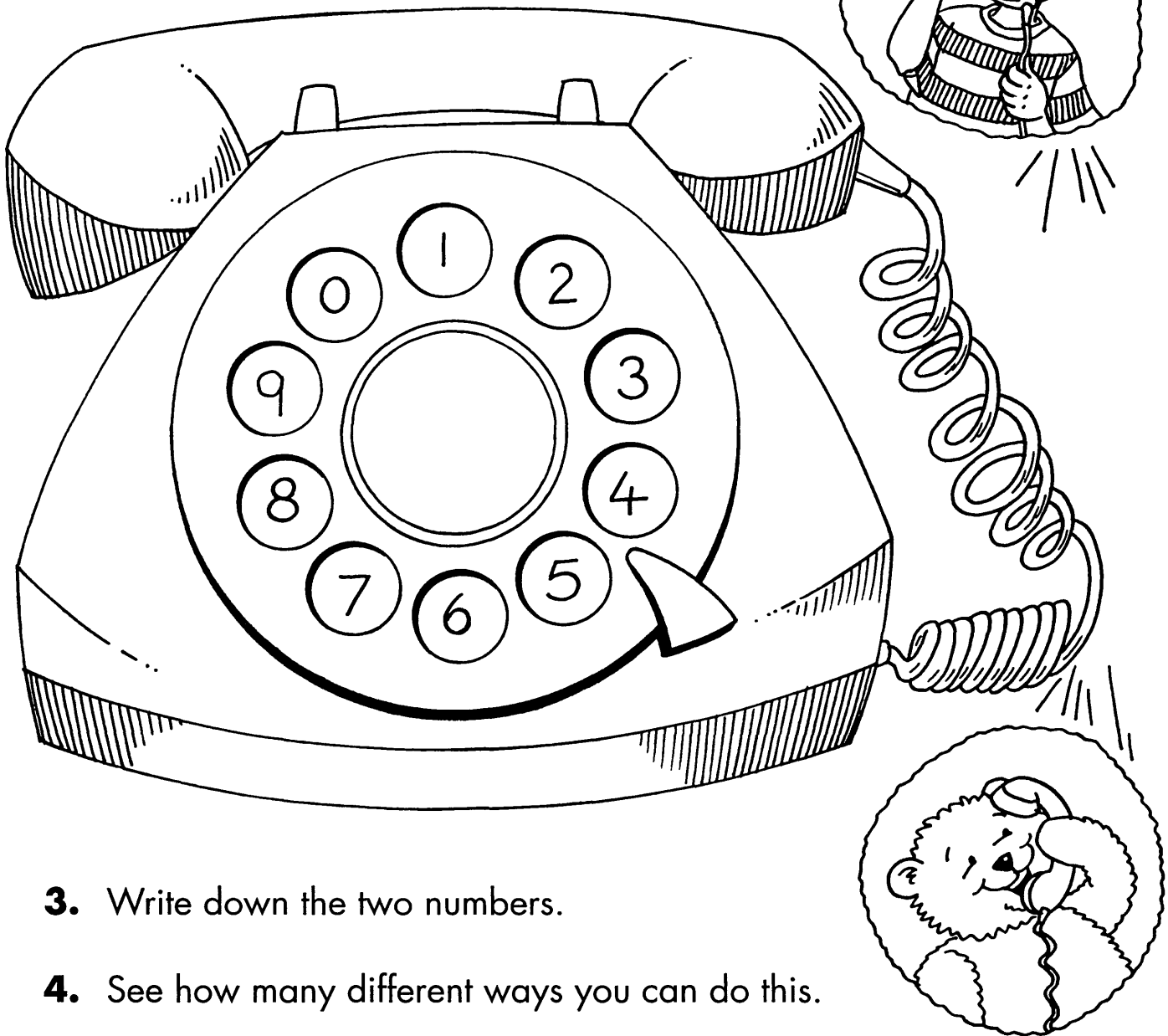
3. Write down the two numbers.

4. See how many different ways you can do this.

5. Now cover up seven numbers so that
you can see three numbers that total 10.

■ How many different ways can you do this?

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Shape Search

LEVEL	UA	N	SSM	HD
1	●			
2	●	●		
3	●			
4				
5				
6				

- ● Use symbols to stand for unknown numbers.
- ● Subtraction facts.

CONTENT

► Find missing numbers in addition statements.

EXTENSIONS

► *Can you name any of the shapes?*
► Invent some equations using this hidden number:

⬢ = 4

NOTES

The order is:

✦ ▲ ◣ ◗ ● ■ ✿ ▌ ⬭ ⬢

Children will probably find the third, sixth and ninth statements the easiest.

Further practice can be provided by writing equations on card, covering up a number, and asking the children which number has been covered, then revealing the hidden number. This enables each of the three numbers to be covered up in each equation.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		13 Big Match 18 Summary 27 Choosy	10 Trios 12 Keep your Balance 14 Card Tricks	10 Stroking Cats 15 Hunt The Numbers	9 Dice Totals
More		3 Boxer 8 Dice Superstars	29 Asking Questions	10 Mystery People 15 Equation People	28 Arch Numbers 31 Target Practice
Go Further With		8 A Mouthful 33 Challenge 38 Switch	16 Number Nine 21 Equations 33 Signs	7 Number Tricks 10 Think of a Number 14 Whodunnit?	6 Countdown 7 Mixed Equations 13 Three Spots
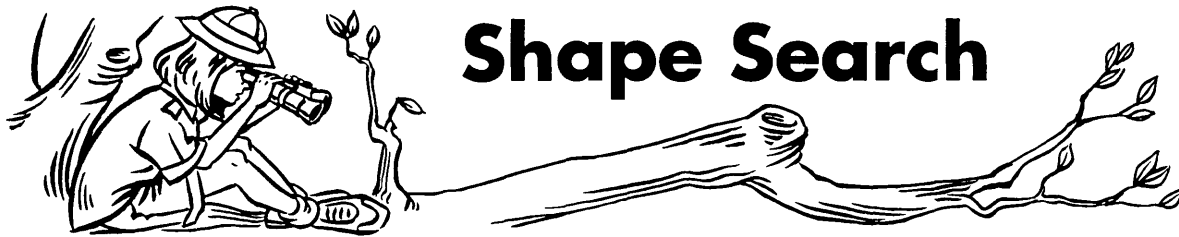
Shape Search

1. Write the correct number for each shape.
The first one has been done for you.

■ +	2	=	8	■ = 6		
3 +	▲	=	5	▲ =		
1 +	4	=	●	● =		
▮ +	2	=	10	▮ =		
5 +	✦	=	6	✦ =		
⬡ =	3	+	7	⬡ =		
9 =	☁	+	2	☁ =		
6 =	3	+	◣	◣ =		
2 + 3 + 4 =	▬			▬ =		
12 =	◠	+ 2 + 6		◠ =		

2. Now carry on drawing the shapes in their number order.

✦ ▲

3. Invent some of your own shapes for numbers.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Fives and Tens

NOTES

LEVEL	UA	N	SSM	HD
1	●			
2	●			
3	●	●		
4				
5				
6				

● Recognise whole numbers divisible by 2, 5 or 10.
● Predicting the next number in a sequence.

CONTENT

► Continuation of sequences based on multiples of 2, 5 and 10.

EXTENSIONS

► *How many times does 25 appear on the sheet?*
► *How many times do other numbers appear?*
► Create sequences which jump in 25s and 50s.
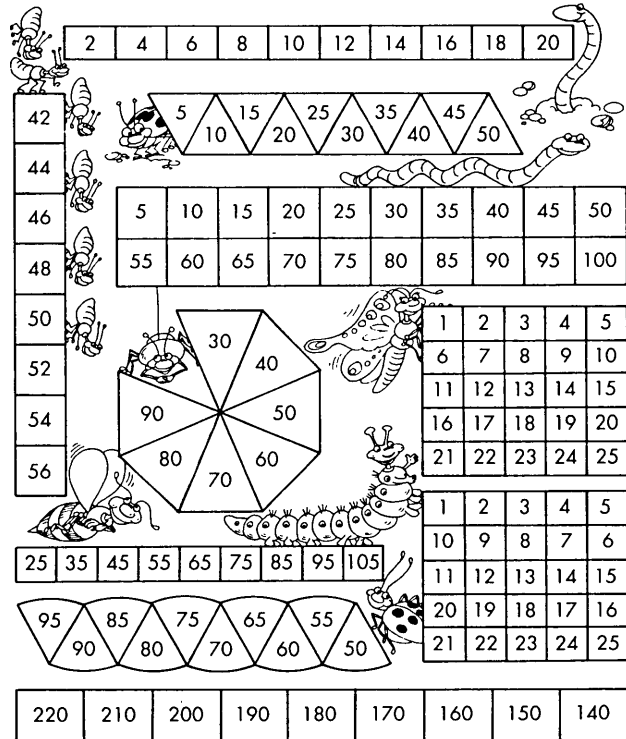
Ask children to recite sentences in:

5s starting at 5
10s starting at 10
10s starting at 5

and reverse sequences starting at 50 and 100.

The multiples of 10 can be coloured in one colour, and the odd multiples of 5 (5, 15, 25, etc.) in another colour.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				**3** Behind The Screen **16** Flying Numbers	
More				**4** Doubling Up **6** Multiple Gaps	
Go Further With				**16** Sequences	

Fives and Tens

7

1. Complete the missing numbers in these sequences:

2	4	6	8							

Vertical column:

42
44
46
56

Triangles: 5, 10, 15, 20, ...

5	10	15	20	25					50
55	60			80			95		

Fan: 30, 40, 50

1	2	3	4	
6	7	8	9	10
11				

25	35	45						

1	2	3	4	
		8	7	6
11	12			
	19			16

Diamonds: 95, 90, 85, 80, ...

220	210	200	190				

2. Make some of your own sequences using fives and tens.

Adding Machines

LEVEL	UA	N	SSM	HD
1				
2		●		
3		●		
4				
5				
6				

● Single function machines.
● Addition and subtraction facts.

CONTENT

► Using addition function machines to explore addition and subtraction facts.

EXTENSIONS

► Use larger numbers in the machines.
► Extend the machines to **ADD 20**.
► Investigate subtraction machines e.g. **TAKE 5**.

NOTES

The completed tables are:

Add 4

IN	OUT
7	11
2	6
4	8
3	7
6	10

Add 3

IN	OUT
5	8
4	7
8	11
1	4
3	6

Add 6

IN	OUT
2	8
6	12
1	7
9	15
4	10

Add 2

IN	OUT
5	7
6	8
3	5
1	3
9	11

Add 10

IN	OUT
2	12
7	17
3	13
4	14
10	20

Add 5

IN	OUT
3	8
8	13
5	10
11	16
4	9

Add 9

IN	OUT
3	12
8	17
5	14
11	20
4	13

Add 7

IN	OUT
3	10
8	15
5	12
11	18
4	11

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				19 Doubling Machines	11 Addition Wheels
More				5 Taking Machines 16 Twin Machines	
Go Further With				18 Multiplication Machines	

Adding Machines
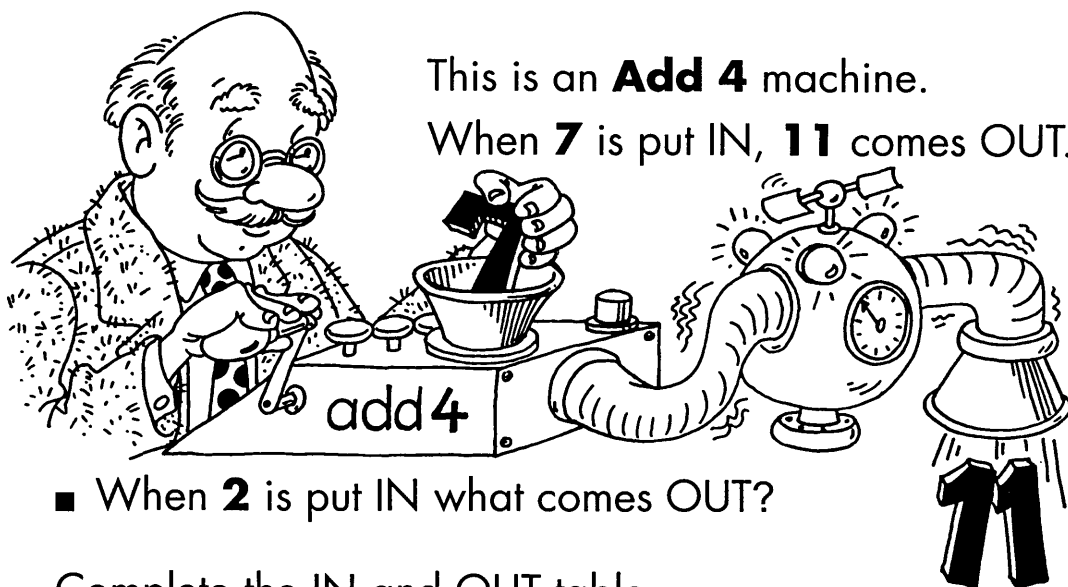
This is an **Add 4** machine.

When **7** is put IN, **11** comes OUT.

IN	OUT
7	11
2	
4	
3	
6	

■ When **2** is put IN what comes OUT?

1. Complete the IN and OUT table.

2. Complete the tables for the other machines.

add 3

add 6

add 2

add 10
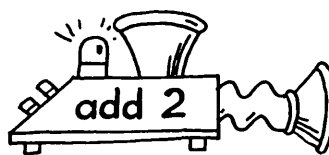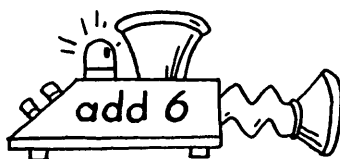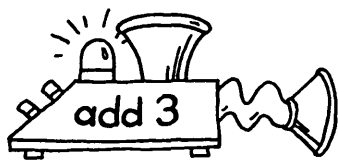
IN	OUT
5	
4	
8	
1	
3	

IN	OUT
2	
6	
1	
9	
4	

IN	OUT
5	
	8
3	
	3
9	

IN	OUT
	12
	17
	13
4	
	20

3. Draw tables to show what happens when **3, 4, 5, 8,** and **11**
are put in these machines:

add 5

add 9

add 7
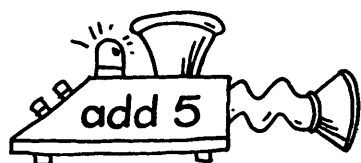
4. Invent your own machines with IN and OUT tables.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Seals

LEVEL	UA	N	SSM	HD
1	●			
2	●			
3	●	●		
4				.
5				
6				

● Patterns in two-digit numbers.

NOTES

There are eight seals, each containing a pattern increasing in tens from one of the digits 2 to 8.

Invite children to choose a seal, then cover up all of the balls except the top one.

Ask questions like:
How many balls do you think are balanced?
Can you say the numbers on the balls below in sequence?
What numbers will be on the next three balls upwards?

CONTENT

► Completing missing values in number sequences which increase in tens.

EXTENSIONS

► Explore how many balls are being balanced by each seal.
► Extend the patterns above 100.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				1 Face Patterns 3 Behind The Screen 16 Flying Numbers	
More					
Go Further With					

Seals

These seals are balancing balls.
The numbers on the balls go up in tens.

1. Write in the missing numbers.

45

56
46

57

24
14
4

33
23
13
3

17

38

8

9

2. Draw some of your own seals balancing balls.

3. Make the numbers go up in twos, threes and fives.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Stroking Cats

LEVEL	UA	N	SSM	HD
1				
2		●		
3				
4				
5				
6				

● Use symbols to stand for unknown numbers.
● Addition and subtraction facts.

CONTENT

► Finding missing numbers in simple addition and subtraction statements.

APPARATUS

Dice, counters.

EXTENSIONS

► Explore the number of throws needed over several attempts.
► *How many different statements can be written for a cat hiding the number 2?*

NOTES

Each game has each of the numbers from 1 to 6 hidden by a cat.

The equations are:

$$1 + \mathbf{2} = 3$$
$$\mathbf{1} + 5 = 6$$
$$2 + 3 = \mathbf{5}$$
$$6 + \mathbf{4} = 10$$
$$\mathbf{3} + 5 = 8$$
$$3 + 3 = \mathbf{6}$$

$$7 - \mathbf{5} = 2$$
$$\mathbf{4} - 1 = 3$$
$$10 - 8 = \mathbf{2}$$
$$9 - \mathbf{3} = 6$$
$$\mathbf{6} - 2 = 4$$
$$5 - 4 = \mathbf{1}$$

The activity can be converted into a game for two players. They each take it in turns to throw a dice and attempt to place a counter.

When all the cats have been stroked, the winner is the player who has stroked the most. This game could be played on both tables at once, or, alternatively, players have one table each, and see who is the first to stroke all six cats.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		13 Big Match 18 Summary 27 Choosy	10 Trios 12 Keep Your Balance 14 Card Tricks	6 Shape Search 15 Hunt The Number	9 Dice Totals
More		3 Boxer 8 Dice Superstars	29 Asking Questions	10 Mystery People 15 Equation People	28 Arch Numbers 31 Target Practice
Go Further With		8 A Mouthful 33 Challenge 38 Switch	16 Number Nine 21 Equations 33 Signs	7 Number Tricks 10 Think of a Number 14 Whodunnit?	6 Countdown 7 Mixed Equations 13 Three Spots

Stroking Cats

Cats like lying on numbers. Each cat is lying on a different number.

■ Do you know which numbers the cats are lying on?

1. You need a dice.

2. Throw the dice and look at the number. If it matches a hidden number, stroke the cat and place a counter on it.

3. Count how many throws you need before you have stroked all the cats.

4. Tick the boxes to keep count.

1	+	🐱	=	3
🐱	+	5	=	6
2	+	3	=	🐱
6	+	🐱	=	10
🐱	+	5	=	8
3	+	3	=	🐱

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

5. Now try this one:

7	–	🐱	=	2
🐱	–	1	=	3
10	–	8	=	🐱
9	–	🐱	=	6
🐱	–	2	=	4
5	–	4	=	🐱

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

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Jumpers

11

● Odd and even numbers.
● Number patterns.

NOTES

The activity is designed to increase children's awareness of odd and even numbers, up to 32.

Discuss with them the units digits of the odd numbers and even numbers.

The activity can be extended to jumping in quantities other than two.

Consolidation can be provided by starting at 0, and jumping in the opposite direction, stating the number landed on, at each jump.

Also start at 1, and jump in twos for the odd numbers.

CONTENT

► Distinguishing patterns in odd and even numbers.
► Extending to patterns in multiples of 3, 4 and so on.

APPARATUS

Counters

EXTENSIONS

► *Which numbers do you need to start on to finish on 0 when jumping in fives?*
► Extend to larger numbers. For example, use a 1 – 100 counting square.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting	16 Odds or Evens	6 Odds and Evens 15 Chase 30 Banko	1 Odds and Evens 23 Dice Sort	2 Body Parts 12 Colouring Puzzle	2 Sweet Wrappers
More				1 Even or Odd? 17 Making Chains	6 Consecutive Trains
Go Further With				1 Odd and Even Patterns 6 Odd Totals	

Jumpers

1. Start by placing a counter on **16**.

2. Jump in twos, along the line towards **0**.

■ Do you finish on **0**, YES or NO?

3. Try starting on different numbers, then put the number in the YES or NO column.

YES	NO
16	

Board numbers: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
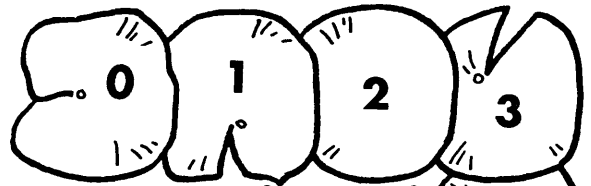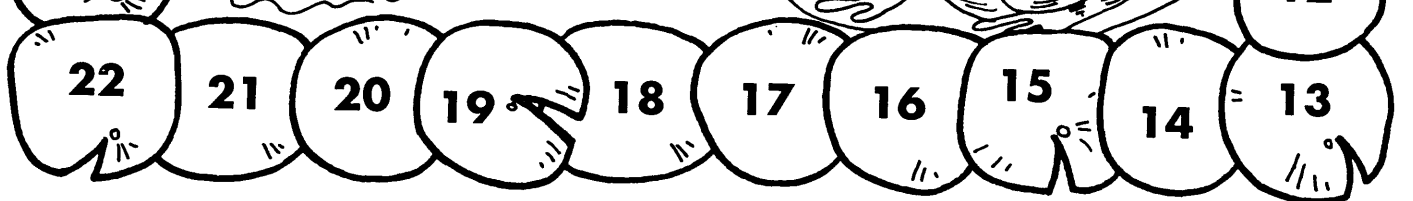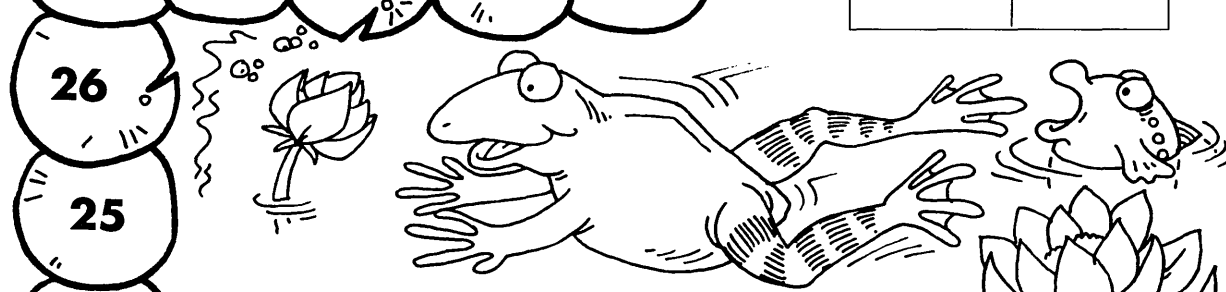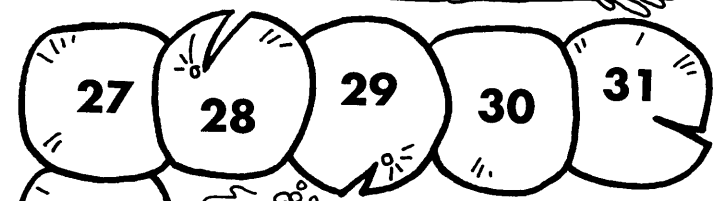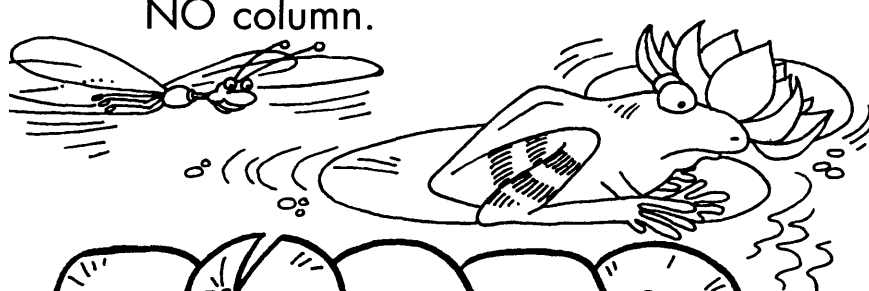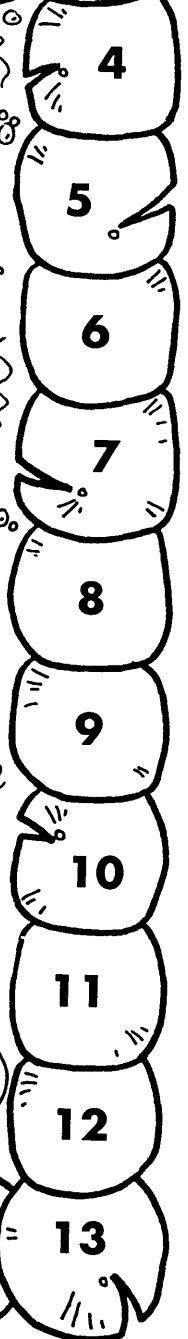
4. Try jumping in threes, in fours, and so on.
Make YES – NO tables.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Colouring Puzzle

LEVEL	UA	N	SSM	HD
1				
2		●		
3		●		
4				
5				
6				

- ● Odd and even numbers.
- ● Explaining number patterns.
- ● Additional facts.

CONTENT

► Consolidating addition patterns, in terms of odd and even numbers.

EXTENSIONS

► Investigate some different additions using 3, 4, 5 and 6 which give odd and even answers.

► *Which subtractions give odd answers? Which subtractions give even answers?*

► Make another puzzle using words and no numbers, so that children colour the results of odd + odd, even + even, even + odd and odd + even.

NOTES

The children are likely to need plenty of help in getting started and in order to understand the task. The coloured patterns and words are:

B	U
C	E

R	F
U	O
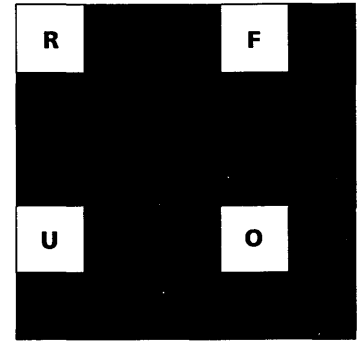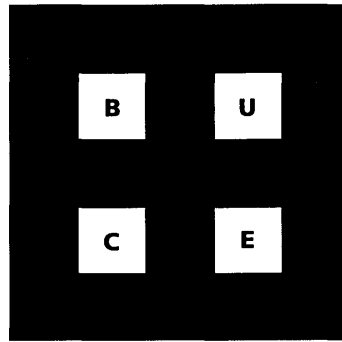
The words which are revealed are:
cube and four.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting	16 Odds or Evens	6 Odds and Evens 15 Chase 30 Banko	1 Odds and Evens 23 Dice Sort	2 Body Parts 11 Jumpers	2 Sweet Wrappers
More				1 Even or Odd 17 Making Chains	6 Consecutive Trains
Go Further With				1 Odd and Even Patterns 6 Odd Totals	

Colouring Puzzle

12

Rows go across. **Columns** go down.

1. Add the numbers at the beginning of the row or column. Decide if it is an **odd** or **even** column.

2. Colour all rows and columns which have an **odd** answer.
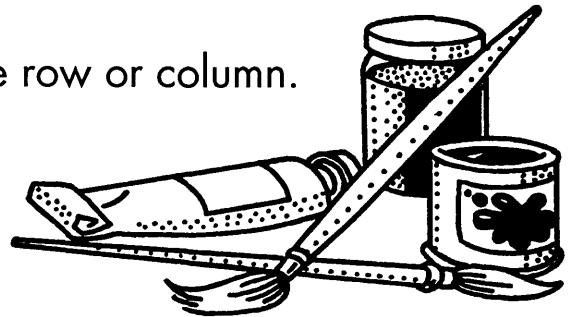
The first row and the first column have been done for you.

Now do the rest.

3. Look at the letters you haven't coloured in and arrange the letters to spell a shape.

— — — —

	1+4	3+5	7+6	4+2	8+3
6+1	A	N	J	V	F
5+3	T	B	Q	U	P
5+6	K	Y	I	H	M
1+7	R	C	O	E	W
4+5	G	X	L	D	S

4. Colour all rows and columns which have an **even** answer.

5. Arrange the letters to spell a number.

— — — —
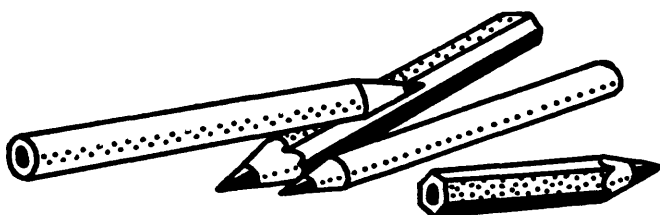
	3+6	2+10	5+7	4+3	1+7
3+6	R	S	H	F	B
7+5	A	E	I	G	N
4+6	D	J	C	U	L
5+4	U	P	K	O	V
8+4	M	X	Q	W	T

Spot Take-Away

LEVEL	UA	N	SSM	HD
1				
2		●		
3				
4				
5				
6				

● Exploring patterns in subtraction facts.
● Subtraction facts.

CONTENT

► Exploring patterns in subtraction facts to 10.

APPARATUS

Counters.

EXTENSIONS

► Make a subtraction table such as this:

BOTTOM NUMBER

	1	2	3	4	5	6
6	5	4	3	2	1	0
5	4	3	2	1	0	X
4	3	2	1	0	X	X
3	2	1	0	X	X	X
2	1	0	X	X	X	X
1	0	X	X	X	X	X

(TOP NUMBER)

NOTES

$$\begin{array}{cccccc} 6 & 6 & 6 & 6 & 6 & 6 \\ -1 & -2 & -3 & -4 & -5 & -6 \\ \hline 5 & 4 & 3 & 2 & 1 & 0 \end{array}$$

These subtractions show increasing and decreasing patterns when subtracting from a constant i.e. 6.

Follow up questions could include:
How many must be taken away to leave 2?

Consolidation activities include providing children with sets of cards with counters missing. From these they can write a subtraction.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		1 Sums or Differences 26 Balloons 34 Nice Dice 36 Pairs	2 Pairs 3 Dot Tot 12 Keep Your Balance 25 Dice Sums	4 Fish Tank 5 Dial Numbers 14 Lucky Beads 20 Subtraction Patterns	4 Giraffe 6 Skittles 8 Train Numbers 17 Adding
More					19 Twenties 39 Grid Pairs
Go Further With					

Spot Take-Away

1. Place 6 counters on the spots and take 1 away. How many are left?

2. Colour the spots, then write down the take-away.

```
  6
- 1
———
  5
```

3. Now try these:

```
  6        6        6        6        6
- 2      - 3      - 4      - 5      - 6
————     ————     ————     ————     ————
```

4. Try these starting with 5 spots:
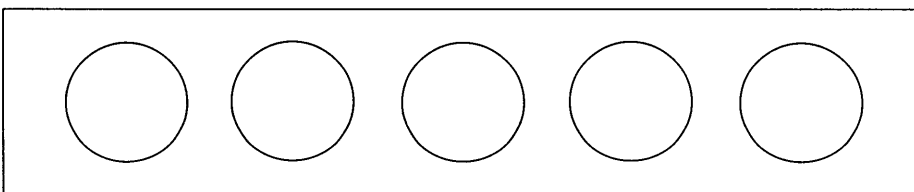
```
  5        5        5        5        5
- 1      - 2      - 3      - 4      - 5
————     ————     ————     ————     ————
```

5. Draw and write your own take-aways with 8 spots.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Lucky Beads

14

LEVEL	UA	N	SSM	HD
1				
2		●		
3				
4				
5				
6				

- ● Exploring patterns in addition facts.
- ● Addition facts.

CONTENT

► Exploring patterns in addition facts to 10.

EXTENSIONS

► Provide children with number beads out of sequence.

► Explore the possibility of predicting the number of pairs for a given LUCKY number.

NOTES

Ask the children to write down the pairs for each necklace.

e.g. **LUCKY 8**
$$1 + 7, \quad 2 + 6, \quad 3 + 5.$$

Discuss why some beads are not part of a pair.

A good follow up question is:
*What number bead will 4 be paired with in a **LUCKY 6** necklace?*
*What about in a **LUCKY 10** necklace?*

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		1 Sums or Differences 26 Balloons 34 Nice Dice 36 Pairs	2 Pairs 3 Dot Tot 12 Keep Your Balance 25 Dice Sums	4 Fish Tank 5 Dial Numbers 13 Spot Take Away 20 Subtraction Patterns	4 Giraffe 7 Skittles 8 Train Numbers 17 Adding
More					19 Twenties 39 Grid Pairs
Go Further With					

Lucky Beads

1 2 3 4 5 6 7
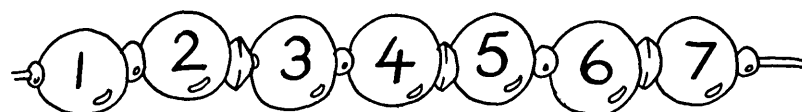
1. Find a pair of beads with a total of 8. Colour them blue.

2. Find another pair with a total of 8. Colour them green.

3. Carry on using different colours for each pair.

4. Colour these lucky necklaces:

Lucky 5 = 1 2 3 4

Lucky 7 = 1 2 3 4 5 6

Lucky 10 = 1 2 3 4 5 6 7 8 9

Lucky 6 = 1 2 3 4 5
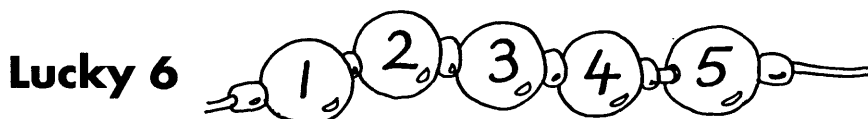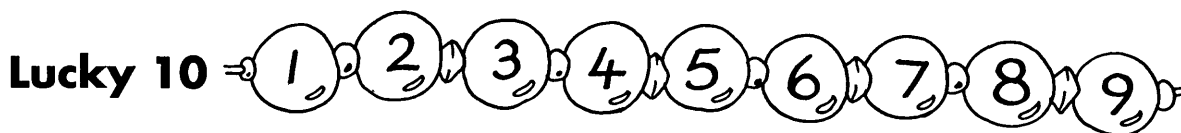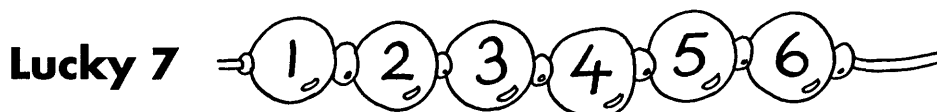
5. Draw and colour some different lucky necklaces.

Hunt The Numbers

LEVEL	UA	N	SSM	HD
1	●			
2	●	●		
3	●			
4				
5				
6				

- ● Use symbols to stand for unknown numbers.
- ● Subtraction facts.

CONTENT

► Finding missing numbers in subtraction statements.

EXTENSIONS

► *Can you name any of the shapes?*
► Invent some equations using the hidden number

■ = 8.
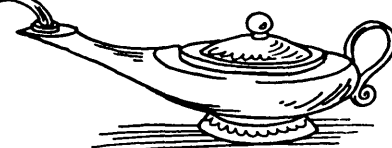
NOTES

The order is:

The tasks are of varying degrees of difficulty.

The first, second, sixth and seventh are relatively easy.

The third, fourth, eighth and ninth the next level of difficulty.

The fifth and tenth are likely to cause the most problems.

Further practice can be provided by writing the equations on card, covering up one of the numbers, and asking children which number has been covered. Then revealing the hidden number. This enables each of the three numbers to be covered up in each equation.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		13 Big Match 18 Summary 27 Choosy	10 Trios 12 Keep Your Balance 14 Card Tricks	6 Shape Search 10 Stroking Cats	
More		3 Boxer 8 Dice Superstars	29 Asking Questions	10 Mystery People 15 Equation People	28 Arch Numbers 32 Equation Puzzles
Go Further With		8 A Mouthful 33 Challenge 38 Switch	16 Number Nine 21 Equations 33 Signs	7 Number Tricks 10 Think of a Number 14 Whodunnit?	6 Countdown 7 Mixed Equations 13 Three Spots

Hunt the Numbers

1. Write the correct number for each shape in the column.
The first one has been done for you.

6 − 4 = ⬛ (trapezoid)	⬛ (trapezoid) = 2		
8 − 3 = ■ (rectangle)	■ (rectangle) =		
9 − ● = 2	● =		
7 − ⬣ = 4	⬣ =		
■ (square) − 7 = 1	■ (square) =		
▲ = 12 − 2	▲ =		
⬬ (ellipse) = 5 − 4	⬬ (ellipse) =		
3 = 9 − ✦	✦ =		
1 = 10 − ⬗ (dome)	⬗ (dome) =		
2 = ☁ (cloud) − 2	☁ (cloud) =		

2. Now carry on drawing the shapes in their number order:

⬬ (ellipse) ⬛ (trapezoid)

3. Invent some of your own shapes for numbers.

Flying Numbers

LEVEL	UA	N	SSM	HD
1	●	●		
2	●			
3	●			
4				
5				
6				

● Copy and continue repeating patterns.
● Devise repeating patterns.

CONTENT

► Continuing repeating patterns in single-digit numbers.

EXTENSIONS

► Discuss the odd and even numbers in each pattern.
► Use numbered cards or plastic number tablets to make repeating patterns.

NOTES

The sequences are:
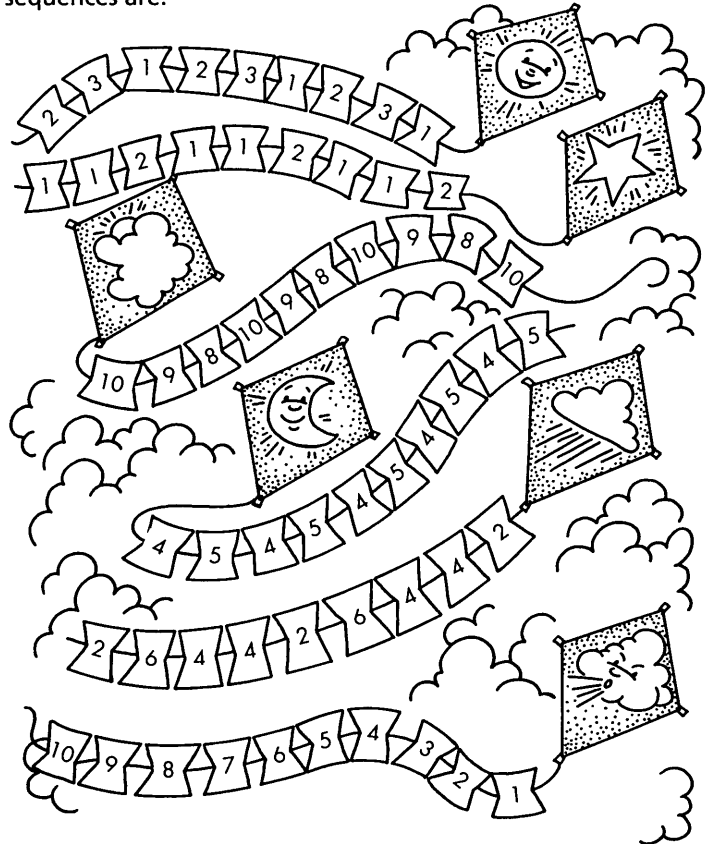
The squares can be coloured by numbers.
For example, 1 – red,
2 – yellow,
and so on.

This will help to emphasise the repeating patterns.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				1 Face Patterns 3 Behind The Screen 9 Seals	
More					
Go Further With					

Flying Numbers

The flying numbers make a pattern.

1. Write in the missing numbers.

2 3 1 1 2 3 1 1 1

1 1 2 1 1 1 2 1 1

10 9 8 10 9 9

10 9 8 7

4 5 4 5 4 4

4 2

2 6 4 4 2

10 9 8 7 3 1

2. Make some flying numbers of your own.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Missing Numbers

Colouring odd and even numbers will produce chequered patterns.

Discuss the number and position of the odd and even numbers in each grid.

The completed grids are:

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

1	2	3	4	5	6
12	11	10	9	8	7
13	14	15	16	17	18
24	23	22	21	20	19
25	26	27	28	29	30
36	35	34	33	32	31

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

32	25	24	17	16	9	8	1
31	26	23	18	15	10	7	2
30	27	22	19	14	11	6	3
29	28	21	20	13	12	5	4

LEVEL	UA	N	SSM	HD
1				
2		●		
3				
4				
5				
6				

● Explaining and recognising patterns.
● Odd and even numbers.

CONTENT

► Explaining number patterns in rectangular grids.
► Recognising patterns.

EXTENSIONS

► Discuss the size and shape of each grid. For example, the grid has 4 rows, 8 columns and 32 numbers.
► Experiment with different rules for colouring.
► Allow the children to create their own grid number patterns.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		6 Odds and Evens			
More			6 Table Patterns 32 Corner Sums		
Go Further With				9 Spirals	

Missing Numbers

1. Look at the patterns in the numbers.

2. Write in the missing numbers.

3. Colour the odd numbers yellow.

4. Colour the even numbers red.

1	11
2	
	13
5	
9	
	20

1	2	3		5	6
	11		9	8	7
13					
				29	
	35				

32			17		
31					
30	27				
29	28		20		

1	2	3	4	5
6	7			10
21				

■ What patterns can you see?

Steps

18

LEVEL	UA	N	SSM	HD
1	●			
2	●	●		
3	●			
4				
5				
6				

● Patterns in addition and subtraction facts.

CONTENT

► Adding a constant to each term in a number sequence.

APPARATUS

Use Special Paper 4. (1cm. squared paper).

EXTENSIONS

► Add a further set of squares to each set of steps at the top of the steps and at the bottom.
► Explore the differences between the heights of different steps.

NOTES

The heights of the steps, when two squares are added, will be:

a. 4, 5, 6, 7, 8
b. 3, 5, 7, 9
c. 4, 6, 8, 10

Discuss the heights of the steps when three squares are added, five squares are added, ten squares are added, and so on.

Discuss, also, the heights when the squares are removed.

What will need to be added to each step so that they will all be level?

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		39 Take Away	8 Staircases		
More					
Go Further With					

Steps

1. Draw the steps on squared paper.
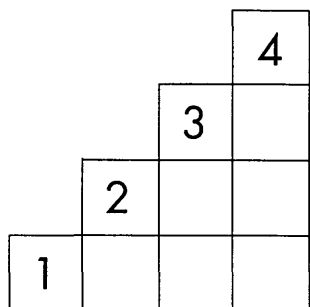
2. Then add 2 squares to each step. Write the heights on the top step.

			4
		3	
	2		
1			

			6
		5	
	4		4
3		3	
	2		
1			
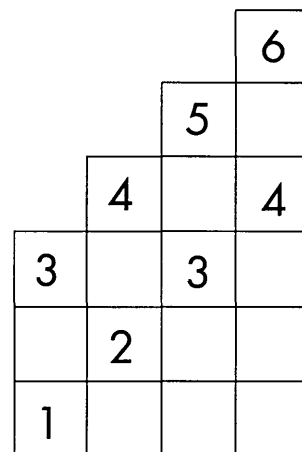
3. Copy the steps below onto squared paper.

4. Then add 2 squares to each step. Write the heights on the top step.

a.

			6
		5	
	4		
3			
2			

b.

		7
	5	
3		
1		

c.

		8
	6	
4		
2		
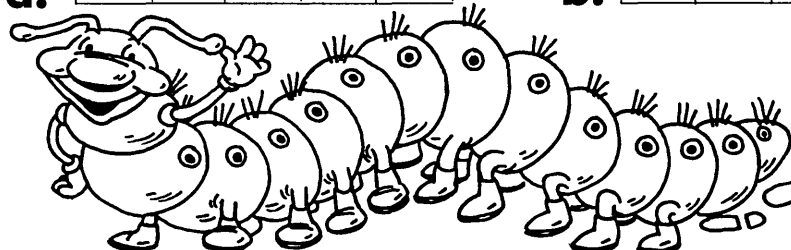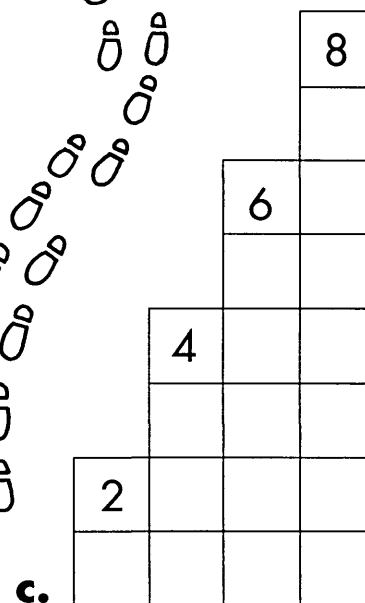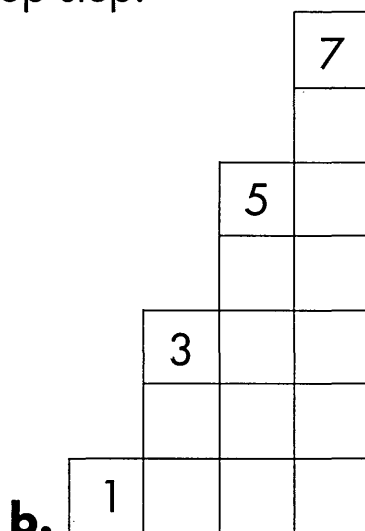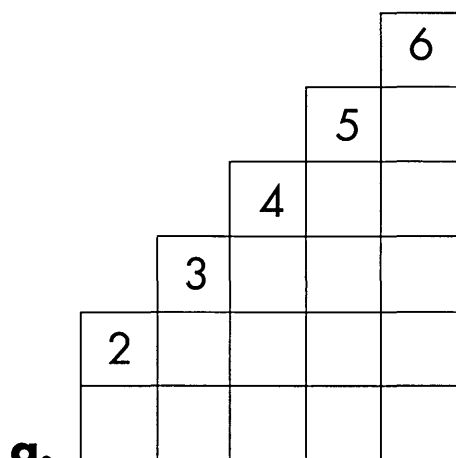
5. Draw pictures to show adding 5 squares to each step.

6. Invent your own steps and add squares to each step.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Doubling Machines

LEVEL	UA	N	SSM	HD
1				
2				
3		●		
4				
5				
6				

● Single function machines.
● Number facts.

CONTENT

► Practising doubling and halving using simple function machines.

EXTENSIONS

► Investigate what happens if coins are put into the machines.
e.g. 2p, 10p,50p etc.
► Consider the results of the HALVING machine on odd number inputs.

NOTES

The completed tables are:

IN	OUT
3	6
5	10
6	12
8	16
9	18
12	24

IN	OUT
1	2
4	8
2	4
10	20
7	14
11	22

Discuss the difference between the tables for the DOUBLING machine and for the HALVING machine.

Discuss which numbers come out odd in both machines.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				**8** Adding Machines	
More				**5** Taking Machines **16** Twin Machines	
Go Further With				**18** Multiplication Machines	

Doubling Machines
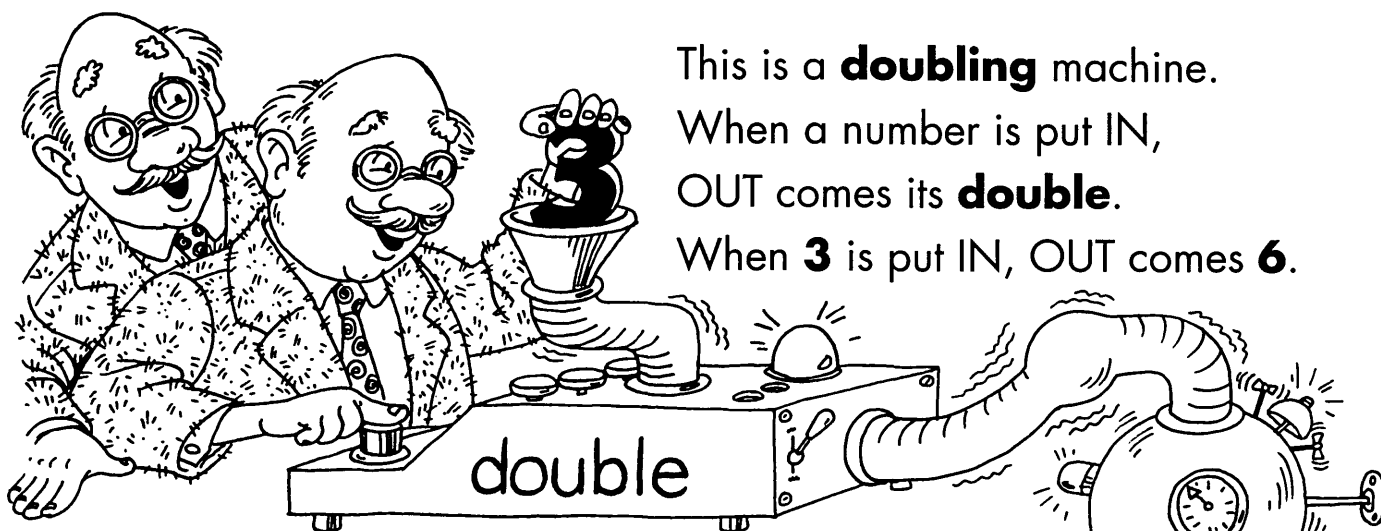
This is a **doubling** machine.
When a number is put IN,
OUT comes its **double**.
When **3** is put IN, OUT comes **6**.

double

1. What comes OUT when **5** is put IN?

2. Complete these tables for the doubling machine.

IN	OUT
3	6
5	
6	
8	
9	
12	

IN	OUT
	2
	8
	4
	20
	14
	22
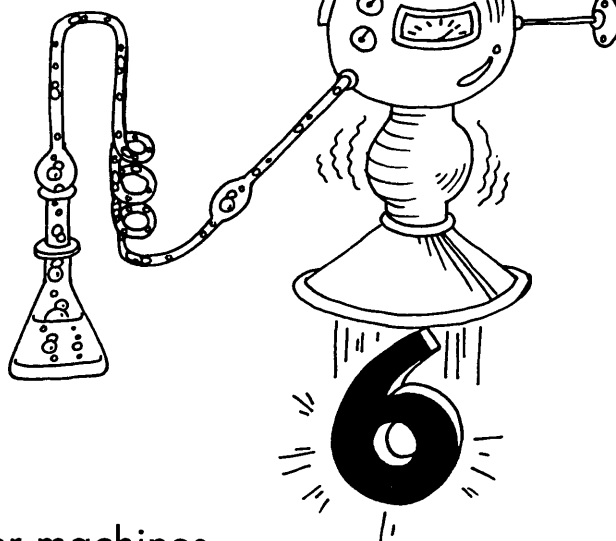
3. Complete some tables for these other machines.

half

IN	OUT

treble
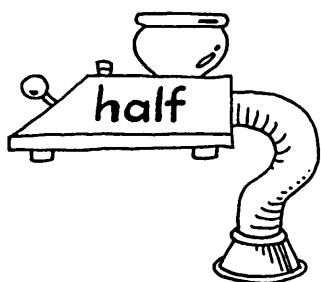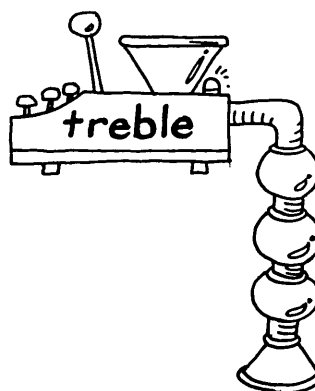
IN	OUT

Subtraction Patterns

LEVEL	UA	N	SSM	HD
1				
2		●		
3		●		
4				
5				
6				

● Subtraction patterns.
● Explaining number patterns.
● Subtraction facts.

CONTENT

► Finding missing numbers in subtraction sums.
► Focusing on patterns in subtraction facts.

EXTENSIONS

► Extend to addition patterns.
► Consider subtraction patterns involving numbers greater than 10.

NOTES

The subtractions are:

$$\begin{array}{cccccc}
10 & 9 & 8 & 7 & 6 & 5 \\
-\ 6 & -\ 5 & -\ 4 & -\ 3 & -\ 2 & -\ 1 \\
\hline
4 & 4 & 4 & 4 & 4 & 4
\end{array}$$

$$\begin{array}{cccc}
10 & 9 & 8 & 7 \\
-\ 4 & -\ 3 & -\ 2 & -\ 1 \\
\hline
6 & 6 & 6 & 6
\end{array}$$

$$\begin{array}{ccccc}
10 & 9 & 8 & 7 & 6 \\
-\ 5 & -\ 4 & -\ 3 & -\ 2 & -\ 1 \\
\hline
5 & 5 & 5 & 5 & 5
\end{array}$$

Children may notice the descending sequences in both top and bottom numbers of the subtraction sums.

The subtraction table is:

		BOTTOM NUMBER			
−	5	4	3	2	1
10	5	6	7	8	9
9	4	5	6	7	8
8	3	4	5	6	7
7	2	3	4	5	6
6	1	2	3	4	5

(TOP NUMBER along left side)

Patterns include:
– diagonal lines of the same digits,
– columns and rows decreasing and increasing in ones,
– diagonal lines of odd numbers and even numbers.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting		1 Sums or Differences 26 Balloons 34 Nice Dice 36 Pairs	2 Pairs 3 Dot Tot 12 Keep Your Balance 25 Dice Sums	4 Fish Tank 5 Dial Numbers 13 Spot Take Away 14 Lucky Beads	
More					
Go Further With					

Subtraction Patterns

1. Fill in the missing numbers in these subtractions:

Making 4

10	9	8	7	6	5
− ☐	− ☐	− ☐	− ☐	− ☐	− ☐
4	4	4	4	4	4

Making 6

10	9	8	7
− ☐	− ☐	− ☐	− ☐
6	6	6	6

Making 5

10	9	8	7	6
− ☐	− ☐	− ☐	− ☐	− ☐
5	5	5	5	5
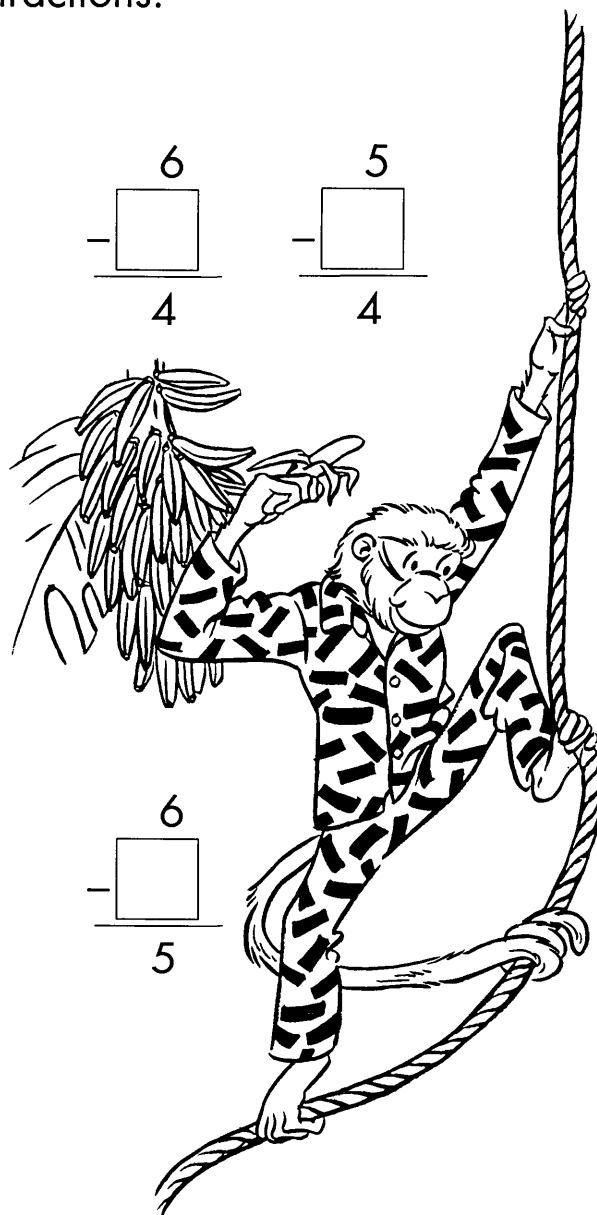
■ Do you see any patterns?

2. Write down some subtractions for:
Making 7,
Making 3,
Making 2.

3. Complete the subtraction table. Some numbers have been done for you.

TOP NUMBER

−	BOTTOM NUMBER				
	5	4	3	2	1
10	5	6			
9					
8		4			
7				5	
6					

4. Write about any patterns you can see.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Cheeses

LEVEL	UA	N	SSM	HD
1			●	
2			●	
3			●	
4				
5				
6				

● Sorting and classifying 3-D shapes.
● Recognising shapes.
● Sorting 3-D shapes.

CONTENT

► Distinguishing between curved and straight edges.

EXTENSIONS

► *Can you buy cheese in other shapes?*
► *What are the other shapes called?*
► *What other foods have different shapes, like cheeses?*
► Extend to investigating packaging e.g. boxes.

NOTES

Extend the mathematical possibilities of this topic to include investigations of shapes, colour, prices, contents, weight, etc.,

Discuss, also, the shapes of the faces of each piece of cheese. Different cheeses can be photographed and carefully described using words such as holey, crumbly, hard, soft, etc.

This activity can be part of a wider study of cheeses, looking at where they come from, how they are made, and so on.

Posters can be obtained from the National Dairy Council, 5-7 John Princes Street, London W1M OAP

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				22 'C' Shapes	
More					
Go Further With					

Cheeses

1. Colour yellow all the cheeses which have some curved edges.

2. Colour orange all the cheeses which have all straight edges.
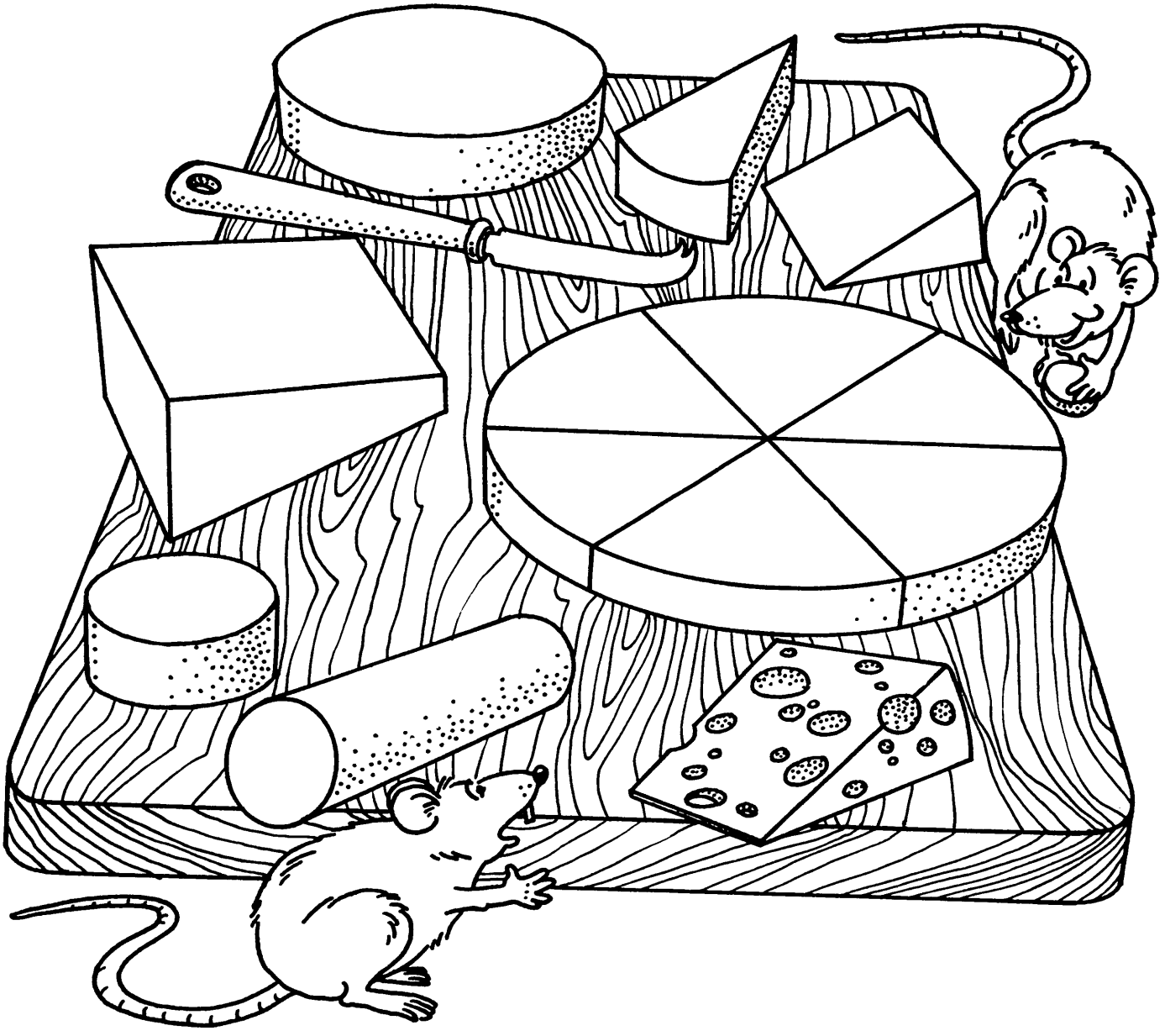
3. Make a collection of objects and put them in two groups:

Objects with curved edges

Objects with straight edges

SPECTRUM MATHS • **STARTING ALGEBRA/SHAPE AND SPACE**

'C' Shapes

LEVEL	UA	N	SSM	HD
1			●	
2			●	
3			●	
4				
5				
6				

● Sorting and classifying 3-D shapes.
● Recognition of 3-D shapes.
● Sorting 3-D shapes.

CONTENT

► Recognition of common 3-D shapes; cube, cuboid, cylinder and cone.

EXTENSIONS

► *Where would you find these shapes in everyday life?*
► Investigate making these shapes by folding paper or card.
► Extend to include spheres or different pyramids.

NOTES

The shapes are cones, cubes, cuboids and cylinders.

Sets of wooden or plastic 3-D shapes can be sorted into these four types.

Discuss and try other ways of sorting them.

The number of faces, edges and corners (vertices) is straightforward for cubes and cuboids.

The cylinder has two circular faces and one curved face which opens out to form a rectangle. It has two circular edges and no corners. The cone has one circular face, one curved face, one corner and one circular edge. Discussion of the properties can be enhanced by making paper models and opening them out to study the curved faces.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				21 Cheeses	
More	– –				
Go Further With					

'C' Shapes

These shapes all have names beginning with C.

1. Write their names on the sheet.

2. Colour shapes with the same name in the same colour.

- ■ How many faces has each shape got?

- ■ What shape are the faces?

3. Count how many corners and how many edges each shape has.

C _ _ _ _

C _ _ _ _ _ _ _

C _ _ _

C _ _ _ _ _ _ _

C _ _ _ _ _

C _ _ _ _ _ _ _

C _ _ _

C _ _ _ _
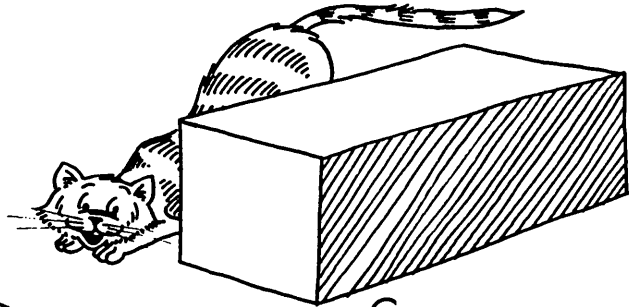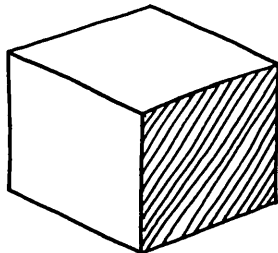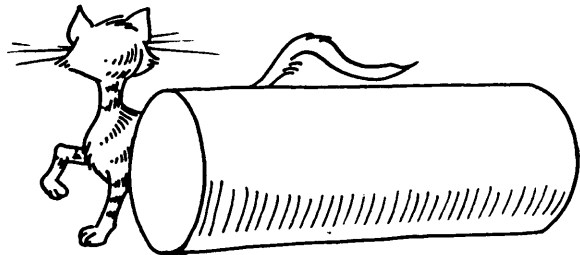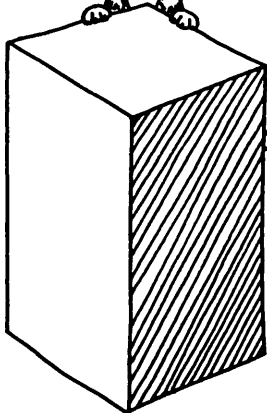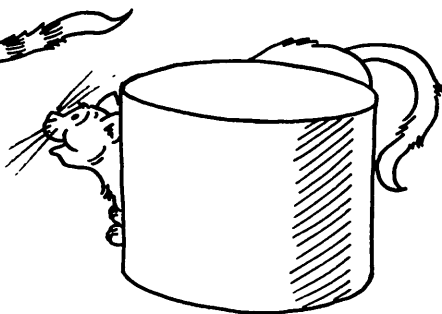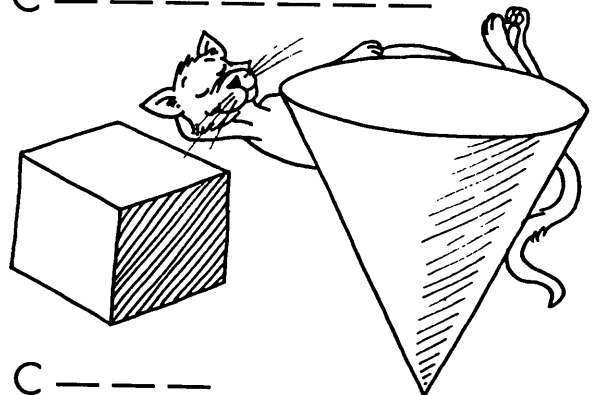
4. Find some objects in the classroom which are like each shape.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Dotty Letters

LEVEL	UA	N	SSM	HD
1	●		●	
2	●			
3	●			
4				
5				
6				

● Understanding instructions for moving along a line.

CONTENT

► Following instructions by joining dots with straight lines to produce capital letters. Using a ruler.

APPARATUS

Use Special Paper 6 at the back of this book (1 cm. squared dotty paper).

EXTENSIONS

► Develop dotty numerals.
► Create dotty squares, triangles, rectangles, etc.

NOTES

Children can be encouraged to use a ruler.

Invite them to guess to themselves what letter will appear before they start drawing lines.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting			6 Letters	29 Dotty Shapes 37 Shape Embriodery	
More			30 Dot Spot	30 Picture Gallery 35 Twelve Points 37 Dotty Paths	
Go Further With					

Dotty Letters

1. Join the dots starting at 1. Join 1 to 2, then 2 to 3 and so on until you make a letter.
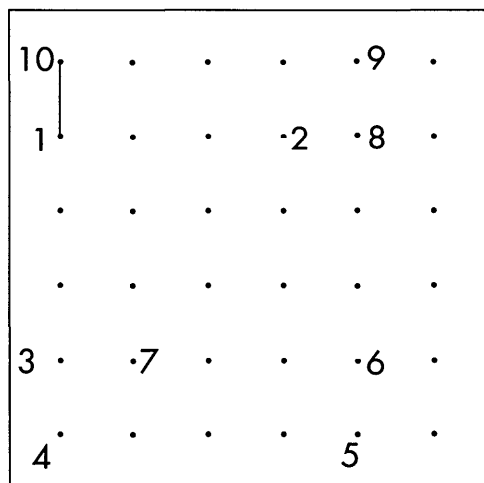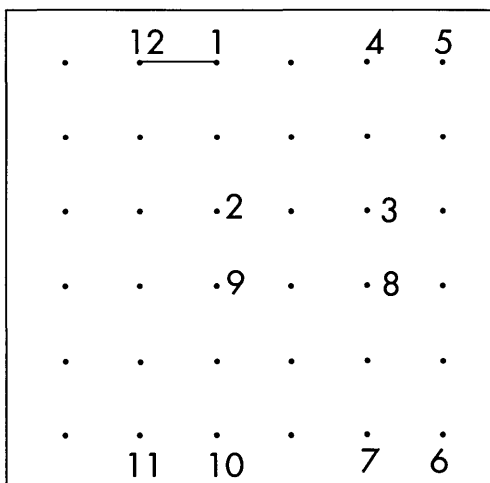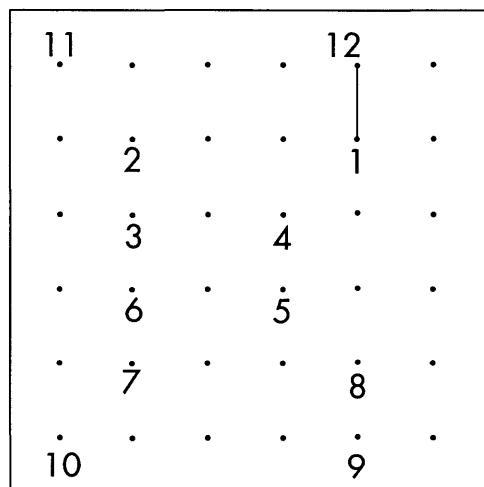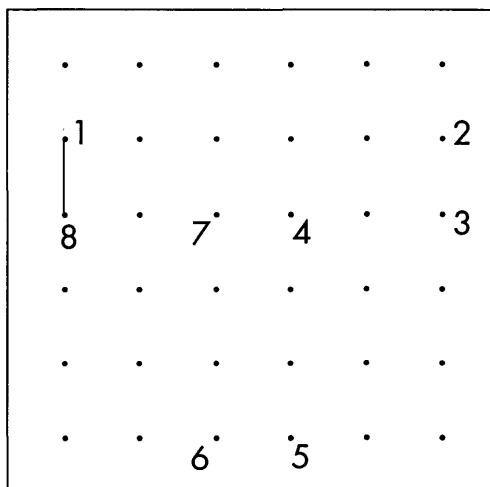
2. Use dotty paper to make some of your own letters.

3. Make a dotty letter to try on your friends.

Cats and Dogs

LEVEL	UA	N	SSM	HD
1	●		●	
2	●		●	
3	●			
4				
5				
6				

● Giving and understanding instructions for moving along a line.
● Recognising types of movement.

NOTES

Children can experiment with routes by using a counter on the gardens. They can use squared paper to record the route, then write the directions alongside.

Possible discussion points include:
How many gardens did Cleo Cat pass through?
Which is the shortest route home? Which is the longest?
How many times did Cleo Cat move UP, DOWN, LEFT, and RIGHT?
Why are there more left movements than right?
Why are there more up movements than down?

CONTENT

► Recording routes through a grid using left and right, up and down directions.
► Exploring the properties of different routes.

EXTENSIONS

► Make a set of cards, each of which contains one of the four words: UP, DOWN, LEFT and RIGHT. Shuffle them, place them in a pile, face down. Turn them over, one at a time to determine Cleo Cat's movement. Will Cleo Cat get home? Will the dog catch Cleo Cat? Experiment with different gardens and different dog positions.
► Mark a set of gardens on the floor. Children can become cats and dogs. Others can give them directions.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				32 Crossroads 35 Mazes 39 Pirate School	10 Climbing Ladders 32 Number Journey
More				23 8-Point Compass	
Go Further With					

Cats and Dogs

Cleo Cat must move through the gardens to get home.

She dare not go through a garden
which has a dog.
She moves quietly through each garden
in one of four directions.

```
        UP
        ↑
LEFT ←——○——→ RIGHT
        ↓
       DOWN
```
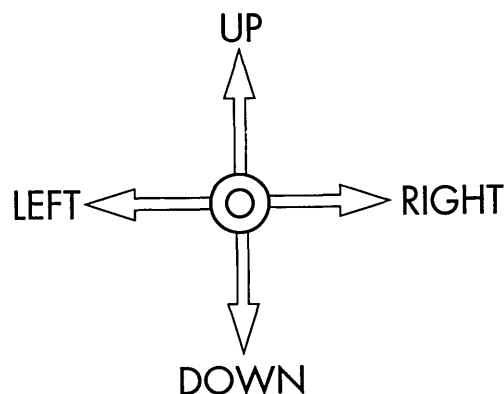
Here is yesterday's route home:

UP   LEFT   DOWN   LEFT   LEFT   UP   UP   UP
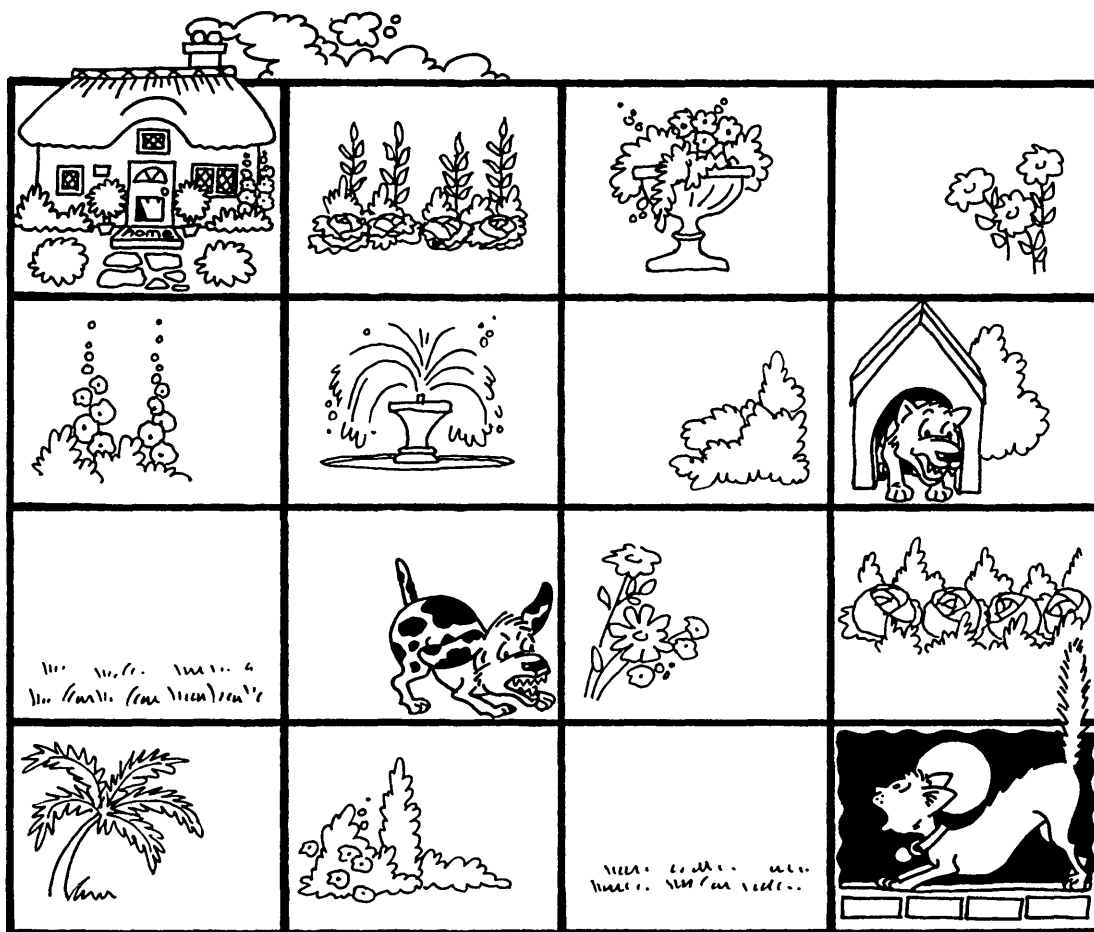
1. Write down some different routes home.

2. Invent your own gardens with cats and dogs.

3. Find some new routes for Cleo Cat.

SPECTRUM MATHS • **STARTING ALGEBRA/SHAPE AND SPACE**

Clock Turns

25

LEVEL	UA	N	SSM	HD
1	●			
2	●	●	●	
3	●		●	
4				
5				
6				

● Rotation movements.
● Angle as a measure of turn.
● Understand 'clockwise' and 'anticlockwise'.
● Language associated with time.

CONTENT

► Establishing the position of a clock hand when rotated through quarter turns, half-turns and three-quarter turns. Clockwise and anticlockwise movements.

APPARATUS

Use the clockface paper at the back of the book, Special Paper 1.

EXTENSIONS

► Consider positions of the hour hand when turned.
► Extend the minute hand to ⅓ of an hour, ⅔ of an hour.

NOTES

A clock face with movable hands is useful to illustrate the movements. These can be related to 'clockwise' and 'anticlockwise'.
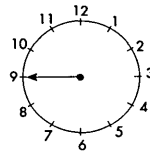
Start at 9 | Forward ½ an hour | Forward ¼ of an hour | Back ½ an hour
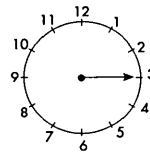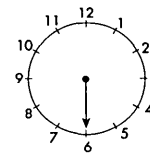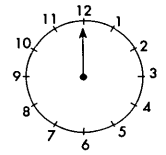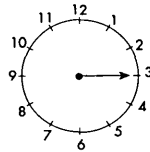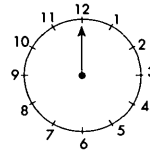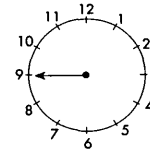
Start at 3 | Forward ¾ of an hour | Back ¼ of an hour | Forward 1 hour
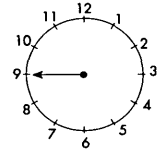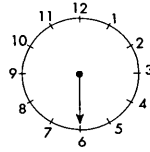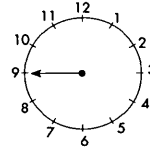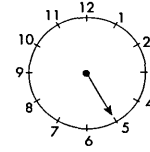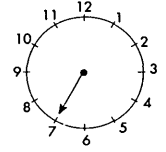
Start at 6 | Forward 15 minutes | Back 20 minutes | Forward 10 minutes

Discussion points:
How many minutes for a quarter turn, half turn, three-quarter turn?
How much turn in 15 minutes, 45 minutes, 30 minutes, 5 minutes?
*What forward turn is the same as a backward turn of 15 minutes?*

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				34 Twiddles	
More					
Go Further With					

Clock Turns
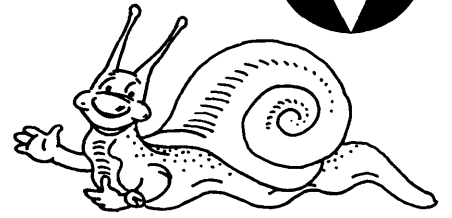
1. Draw the minute hand of a clock as it is turned.
The first is done for you.
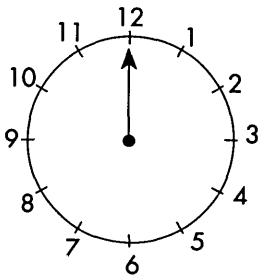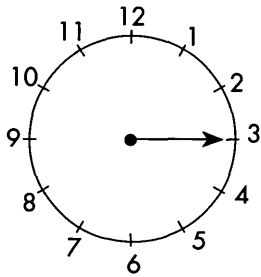
Start at 12	Forward ¼ of an hour	Back ½ an hour	Forward ¾ of an hour
Start at 9	Forward ½ an hour	Forward ¼ an hour	Back ½ an hour
Start at 3	Forward ¾ of an hour	Back ¼ an hour	Forward 1 hour
Start at 6	Forward 15 minutes	Back 20 minutes	Forward 10 minutes
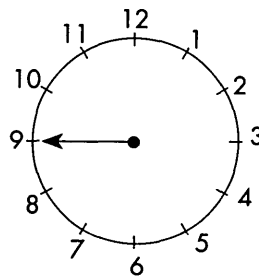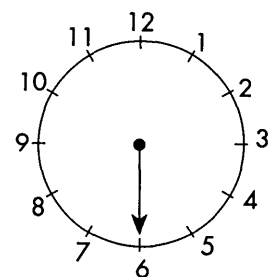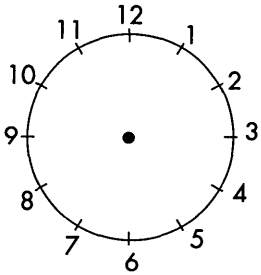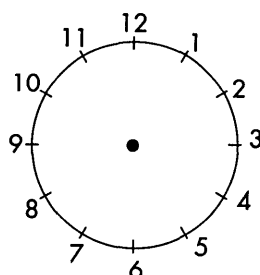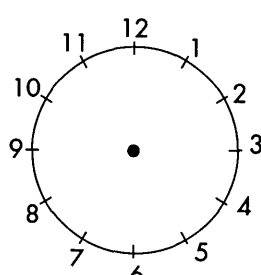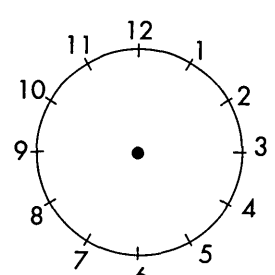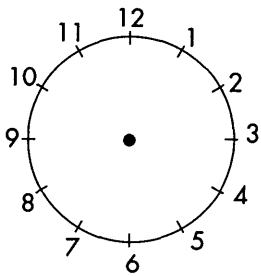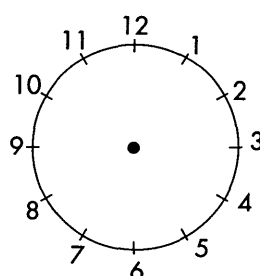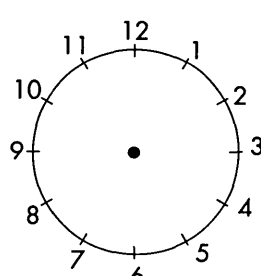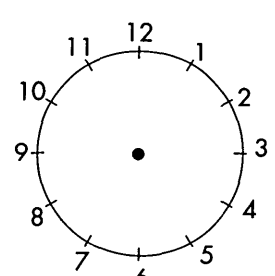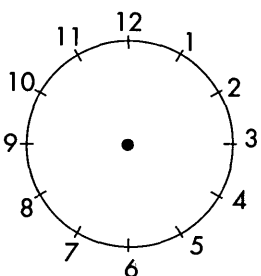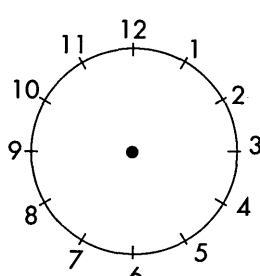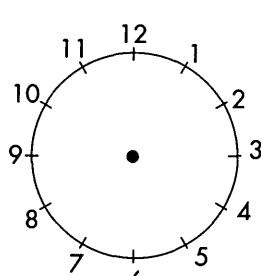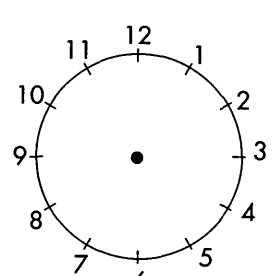
2. Invent some clock turns of your own. Draw the hand positions.

SPECTRUM MATHS ● **STARTING ALGEBRA/SHAPE AND SPACE**

Eating Biscuits

26

LEVEL	UA	N	SSM	HD
1		●	●	
2			●	
3			●	
4				
5				
6				

- Drawing 2-D shapes.
- Recognising triangles, pentagons, squares, rectangles and hexagons.
- Sorting 2-D shapes.
- Counting up to at least 10.

CONTENT

► Recognition of the names of 3, 4, 5 and 6-sided shapes.
► Classifying the shapes according to the number of sides.

APPARATUS

Counters.

EXTENSIONS

► Convert the activity into a game for two players, 'Biscuit Pig'. Each player needs his/her own set of counters. Take turns to throw the dice, and 'eat' a biscuit. When all the biscuits have been eaten, the winner in the player who has eaten the most.

NOTES

Discuss how many 3-sided, 4-sided, 5-sided and 6-sided shaped biscuits there are.

Discuss the name of each shape. (The children can be asked to name the shape of the biscuit after each dice throw.)

Invite children to invent their own 'Eating Biscuits' activity. This involves deciding what numbers to write on the dice, and then drawing biscuits with the appropriate number of sides.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				27 Name Plates 38 Side Count	
More					
Go Further With					

Eating Biscuits

Lots of shape biscuits have fallen out of the jar.

1. You need some counters.

2. Make a dice by writing 3, 4, 5, 6, 3 and 4 on the faces of a cube.

3. Throw the dice.

4. If the number of sides on a biscuit matches the dice number, then you can eat the biscuit by putting a counter on top of it.

For example, if you throw a 3, then you can eat a triangle biscuit, because it has three sides.
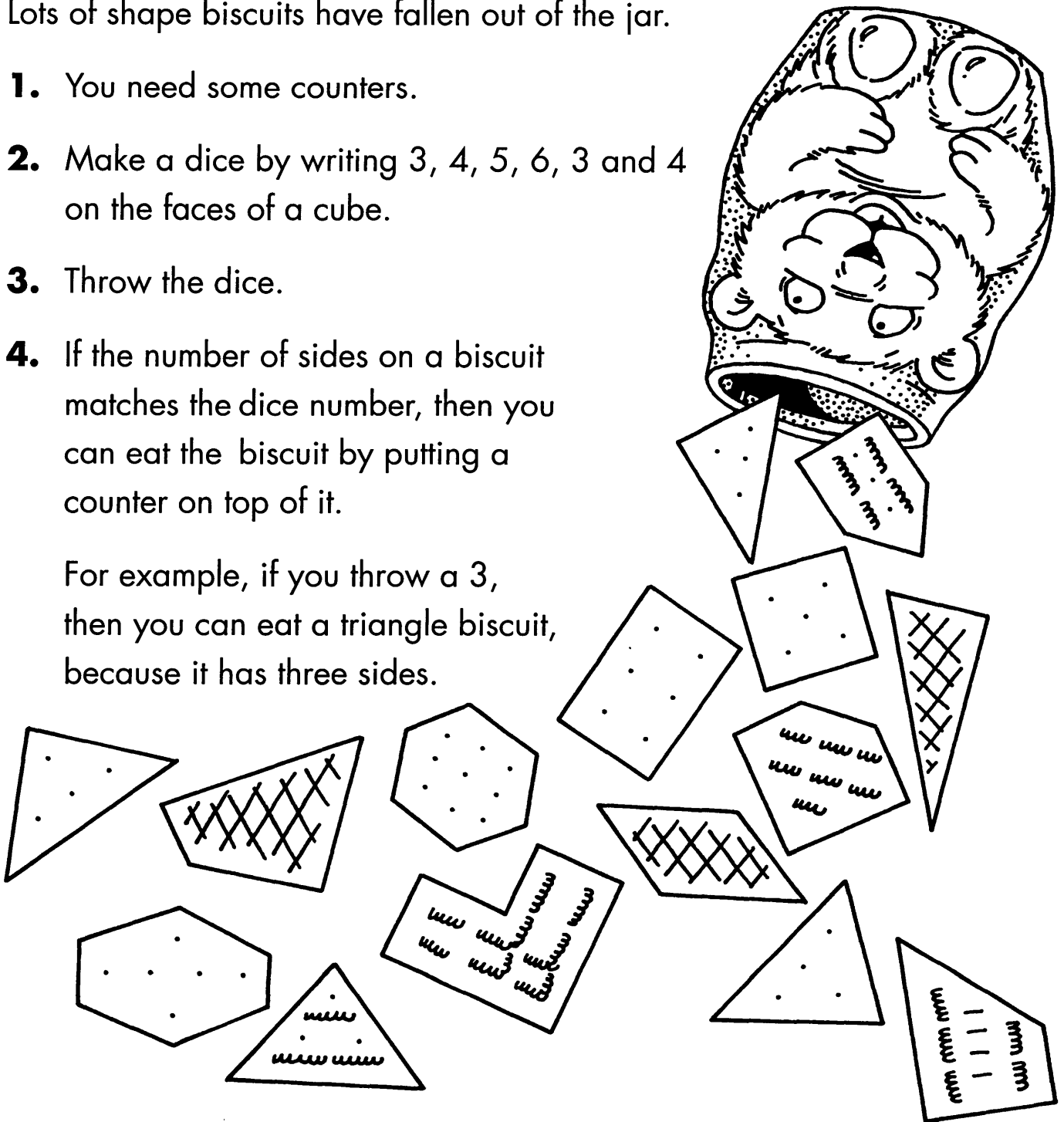
■ How many biscuits can you eat in 15 throws?

5. Tick the numbers in the boxes to record your throws up to 15.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Name-Plates

LEVEL	UA	N	SSM	HD
1				
2		●	●	
3				
4				
5				
6				

● Recognising pentagons and hexagons.
● Collecting and recording data.

CONTENT

► Recognition of pentagons and hexagons.

EXTENSIONS

► Investigate the first letters of the names of the children in the class.
How many names are there beginning with each letter?
What about another class?
Which letters are not often used as a first letter?

► Imagine a shop that sells nameplates.
How many different nameplates would be needed beginning with C?
Which are the most common names beginning with T?

NOTES

Pentagons:
Flo, Iris, Veronica, Eli
(the arranged first letters make FIVE)

Hexagons:
Nancy, Ian, Nina, Errol
(the arranged first letters make NINE).

As a follow-up activity children can invent their own set of name-plates, and also create a puzzle based on the initial letters of the names.

SPECTRUM LINKS

|	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				**26** Eating Biscuits **38** Side Count	
More					
Go Further With					

Name-Plates

These are different shaped name-plates to fix to bedroom doors.

1. Find the pentagon name-plates. Colour them yellow.

2. Find the hexagon name-plates. Colour them red.

■ Whose name-plates are left? What shape are they?

3. Colour them another colour.

Flo   Nancy   Ian   Eli

Nina   Veronica   Iris

Gary   Errol   Sanjit
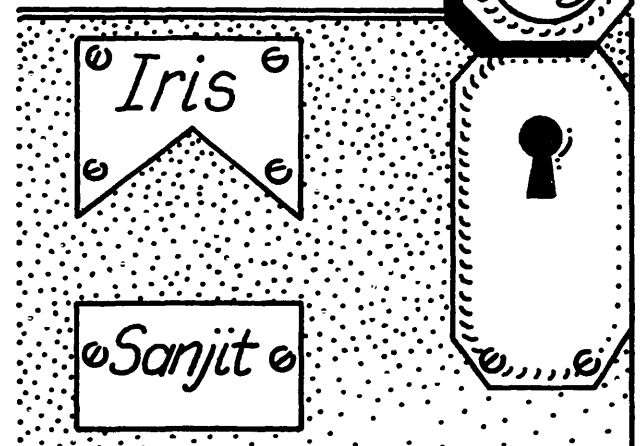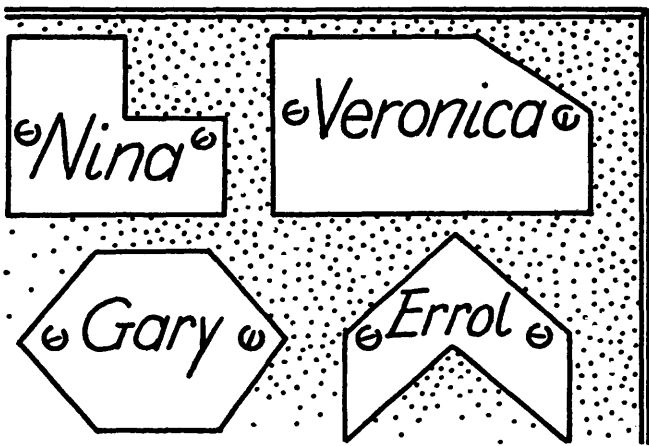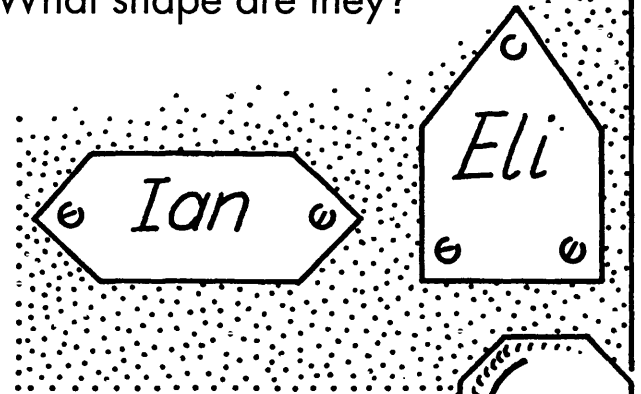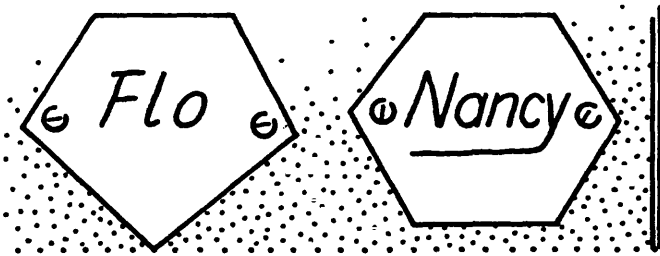
4. Arrange the first letters of the names on the pentagon name-plates to make a number.

5. Do the same with the first letters of the names on the hexagon name-plates.

6. Design a name-plate on card for yourself.

SPECTRUM MATHS ● STARTING ALGEBRA/SHAPE AND SPACE

Christmas Cards

LEVEL	UA	N	SSM	HD
1	●			
2	●		●	
3	●		●	
4				
5				
6				

● Recognising pentagons, etc.
● Constructing 2-D and 3-D shapes.
● Recognising reflective symmetry.

CONTENT

► Constructing Christmas cards in the shape of different polygons.
► Investigate line symmetry.

APPARATUS

Polygon templates, card.

EXTENSIONS

► Design envelopes to hold the different cards.
► Investigate the size and shape of Christmas cards by making a collection of them after Christmas.

NOTES

Pentagon templates are needed to draw the outline of the pentagons.

Alternatively, the outlines can be provided for the children by photocopying onto card. e.g.
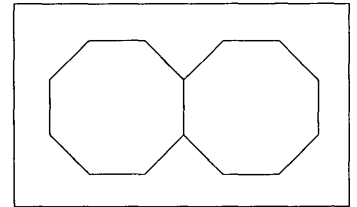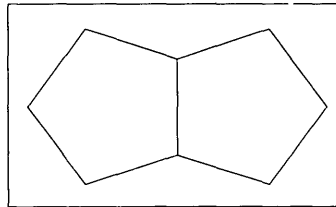
Discuss the symmetry when the cards are opened out.

5-pointed star designs can be drawn on the pentagon cards by drawing all the diagonals and then colouring them.
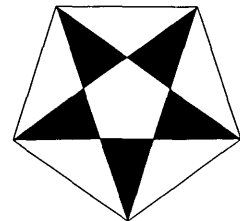
SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				27 Name-Plates	
More					
Go Further With					

Christmas Cards

How to make a Pentagon Christmas Card:

1. Fold a piece of card in two:
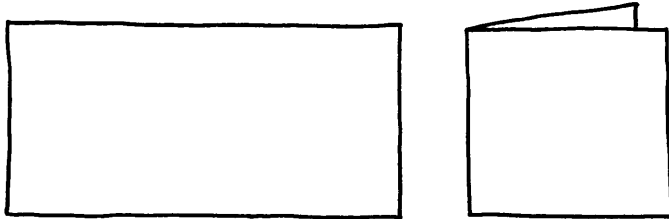
2. Use a regular pentagon template to draw a pentagon with one side on the folded edge.

3. Then cut out the pentagon through both pieces of card to make a Pentagon Card.
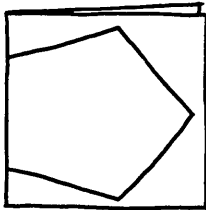
4. Write greetings and messages on the card and it is ready to send.

5. Try making different-shaped Christmas Cards:
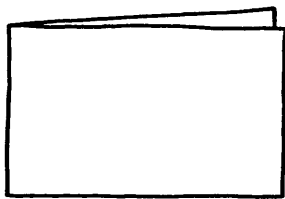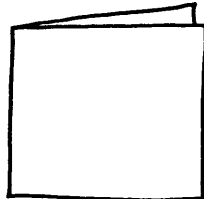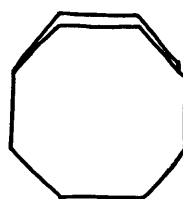
Rectangle   **Square**   **Octagon**   **Triangle**
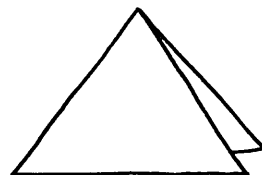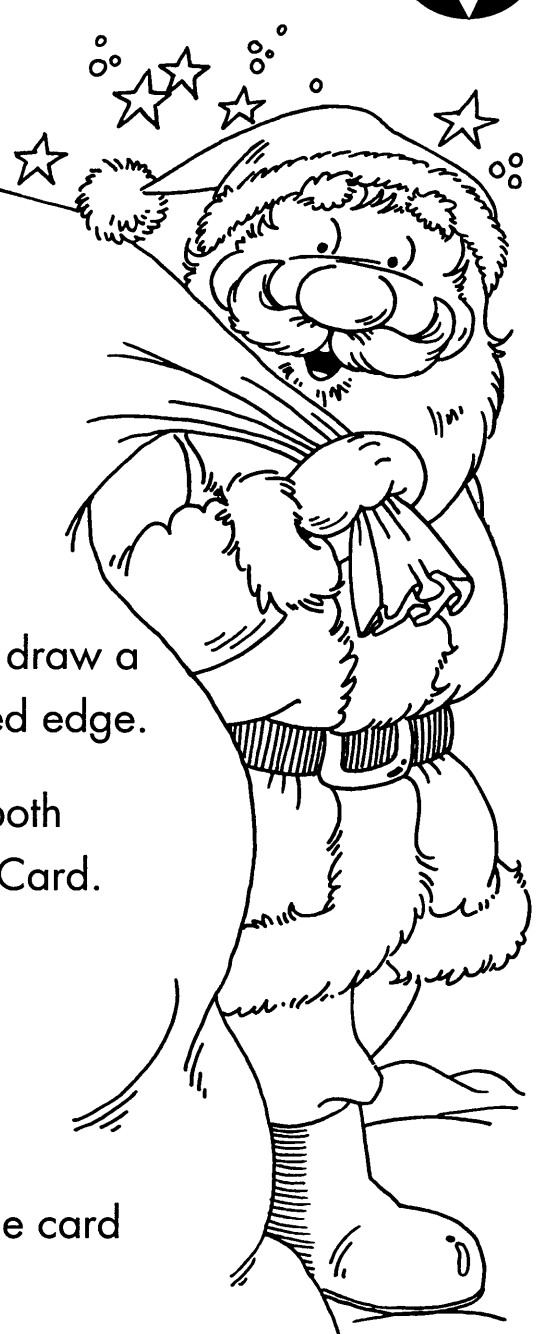
Dotty Shapes

LEVEL	UA	N	SSM	HD
1	●		●	
2	●	●	●	
3	●		●	
4				
5				
6				

- Using words to describe positions.
- Describing shapes.
- Sorting 2-D shapes.
- Tabulating data.

CONTENT

► Recognising different 2-D shapes and classifying them according to dots inside or on the perimeter of the shape.

APPARATUS

Use Special Paper 7 (2 cm. squared dotty paper).

EXTENSIONS

► Investigate drawing different shapes which all have 2 dots inside.
► Investigate drawing different shapes which all have 6 perimeter dots.
► Investigate the dots on different rectangles.

NOTES

There are 2 squares, 3 triangles, 2 rectangles and a hexagon.

Some discussion of the word 'perimeter' is necessary.

Children can tabulate the data on dots.

Shape	Name	Inside Dots	Perimeter Dots
A	Triangle	0	6
B	Hexagon	2	6
C	Square	1	8
D	Rectangle	0	10
E	Square	1	4
F	Triangle	1	8
G	Rectangle	2	10
H	Triangle	0	3

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting	23 Shape Sort			23 Dotty Letters 36 Dots 37 Shape Embroidery	
More			30 Dot Spot	30 Picture Gallery 35 Twelve Points 37 Dotty Paths	
Go Further With					

Dotty Shapes

1. Colour the squares red.

2. Colour the rectangles green.

3. Colour the triangles yellow.

   ■ What is the name of the shape not coloured?
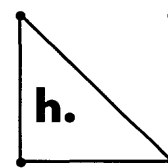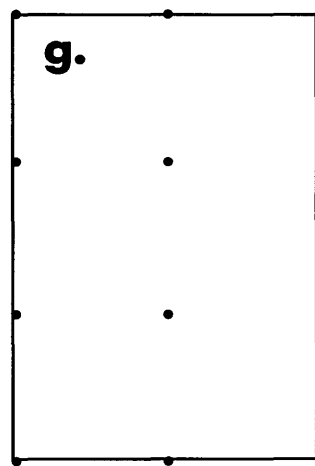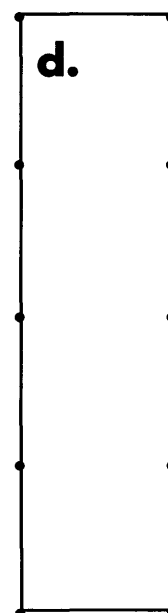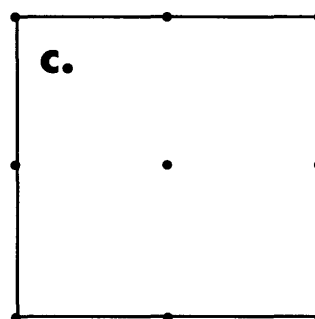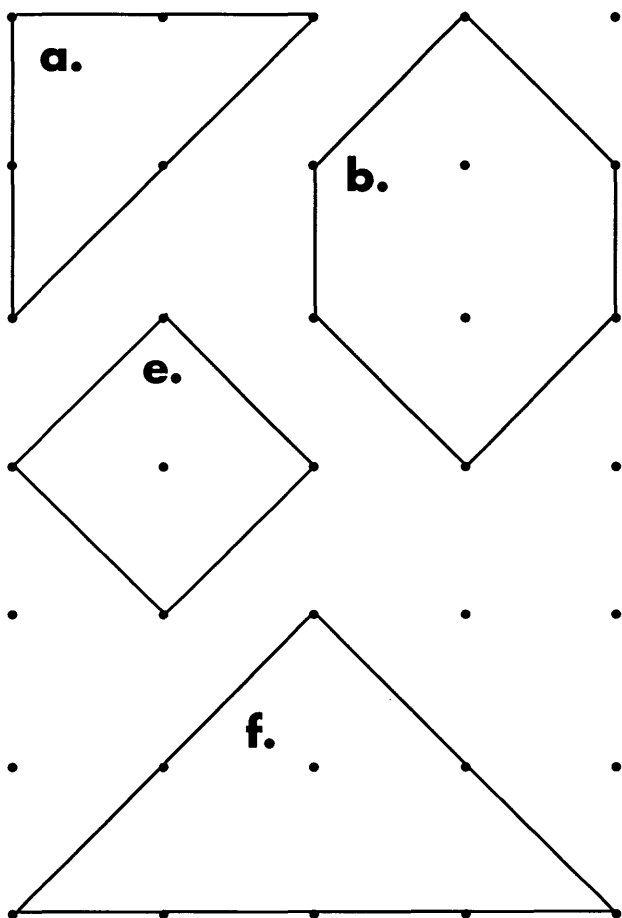
   ■ How many dots inside each shape?

   ■ How many dots on the perimeter of each shape?

4. Draw and colour some of your own shapes on dotty paper.

5. Write down the number of dots inside the shape and on the perimeter.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Symmetry Dairy

LEVEL	UA	N	SSM	HD
1				
2		●		
3			●	
4				
5				
6				

- ● Recognise reflective symmetry.
- ● Addition facts.

CONTENT

► Recognising and constructing symmetrical patterns.

APPARATUS

Use Special Paper 2 at the back of this book, a mirror.

EXTENSIONS

► Explore symmetry arrangements which have more than one line of symmetry.
► Try a different sized milk crate.
► *Can you make a pattern using 7 Gold Tops, 9 Gold Tops and 11 Gold Tops?*
► *What other number of Gold Tops can you have in a symmetry pattern?*

NOTES

Children can place counters on the crate, or use a pegboard. Mirrors can be used to check for symmetry.

Ask the children:
In a full crate, if there are 11 Gold Tops, how many Silver Tops are there?
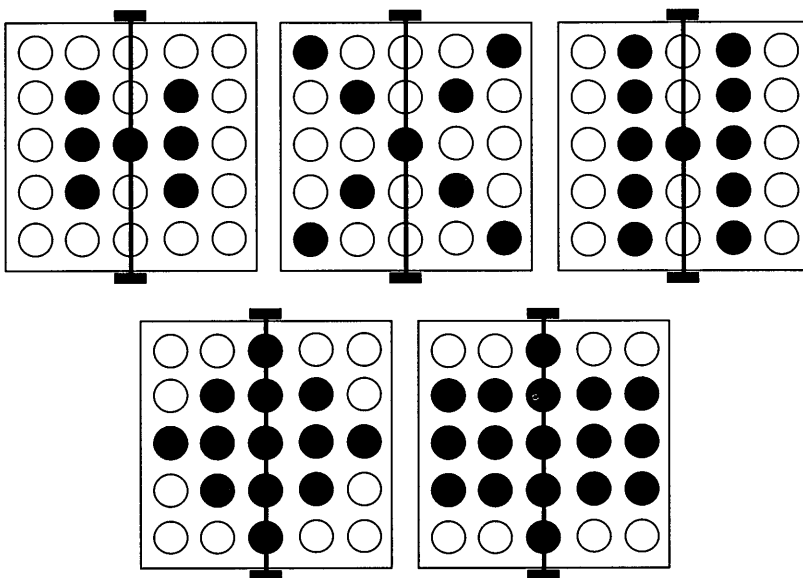
How will the crates look if they are given a half-turn?

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting					
More				27 Symmetry 29 Reflections	
Go Further With					

Symmetry Dairy

Symmetry Dairy always put bottles in their milk crates to make a symmetry pattern.

The bottles are Gold Tops and Silver Tops. The handle of the crate is a line of symmetry.

Here are two full crates. You can test the pattern with a mirror.
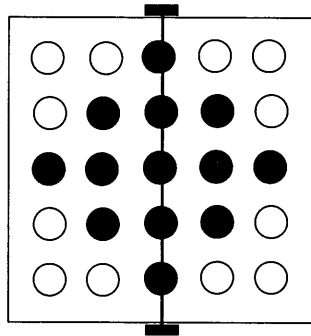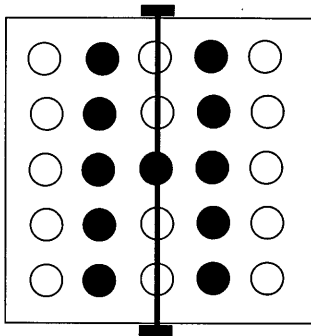
1. Use yellow and white counters for bottle tops, and make some symmetry patterns in this crate.

2. Use some Special Crate Paper to colour your patterns.
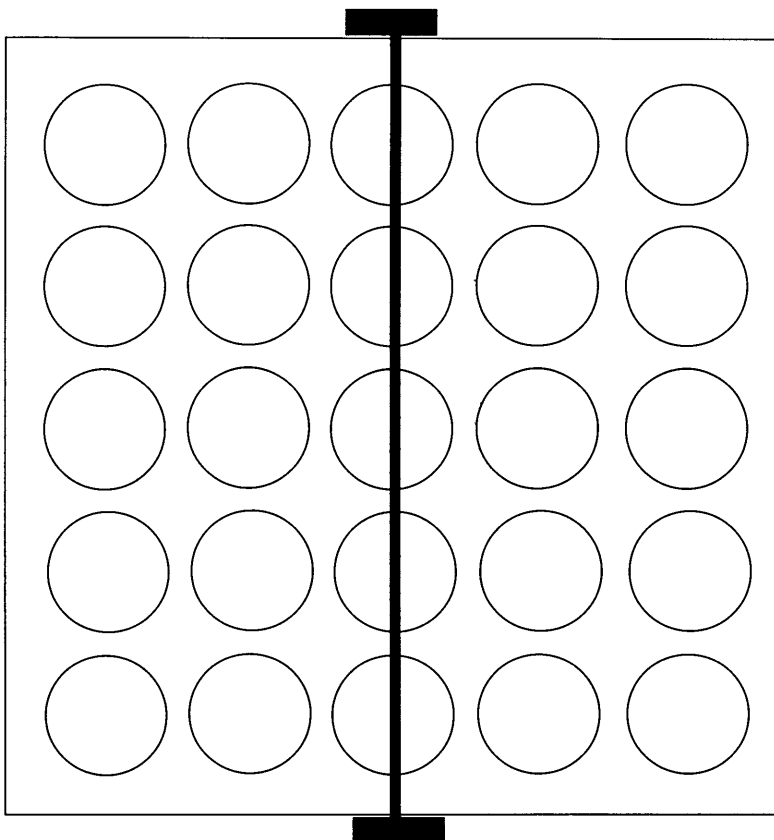
Traffic Signs

LEVEL	UA	N	SSM	HD
1				
2			●	
3				
4				
5				
6				

● Recognising different shapes.

CONTENT

► Recognising of circles, triangles, squares and rectangles by studying different road signs.

APPARATUS

A copy of the Highway Code.

EXTENSIONS

► Investigate signs in school and their shape.
► Investigate signs in the local area e.g. signs on doors, signs on gates, shop signs, house-for-sale signs.
► Design and make some signs.

NOTES

Refer to the Highway Code for further examples.

The signs mean:

Top Row
No right turn, No left turn, No cycling, No pedestrians.

Second Row
Stop and give way, Give way to traffic, School crossing patrol, Slippery road.

Third Row
Roundabout, Hump backed bridge, Roadworks, Maximum speed limit.

Fourth Row
Advisory speed limit, Parking place, Hospital ahead, Cattle.

Possible discussion points are the shape of the signs and their meaning,
i.e. triangles – warning signs,
circles – orders,
others – information.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				33 Rhian and Cedric	
More					
Go Further With					

Traffic Signs

■ What shape is each road sign?

1. How many of these signs are squares? ☐

2. How many are triangles? ☐   How many are circles? ☐

How many are rectangles? ☐

■ Can you say what any of the signs mean?
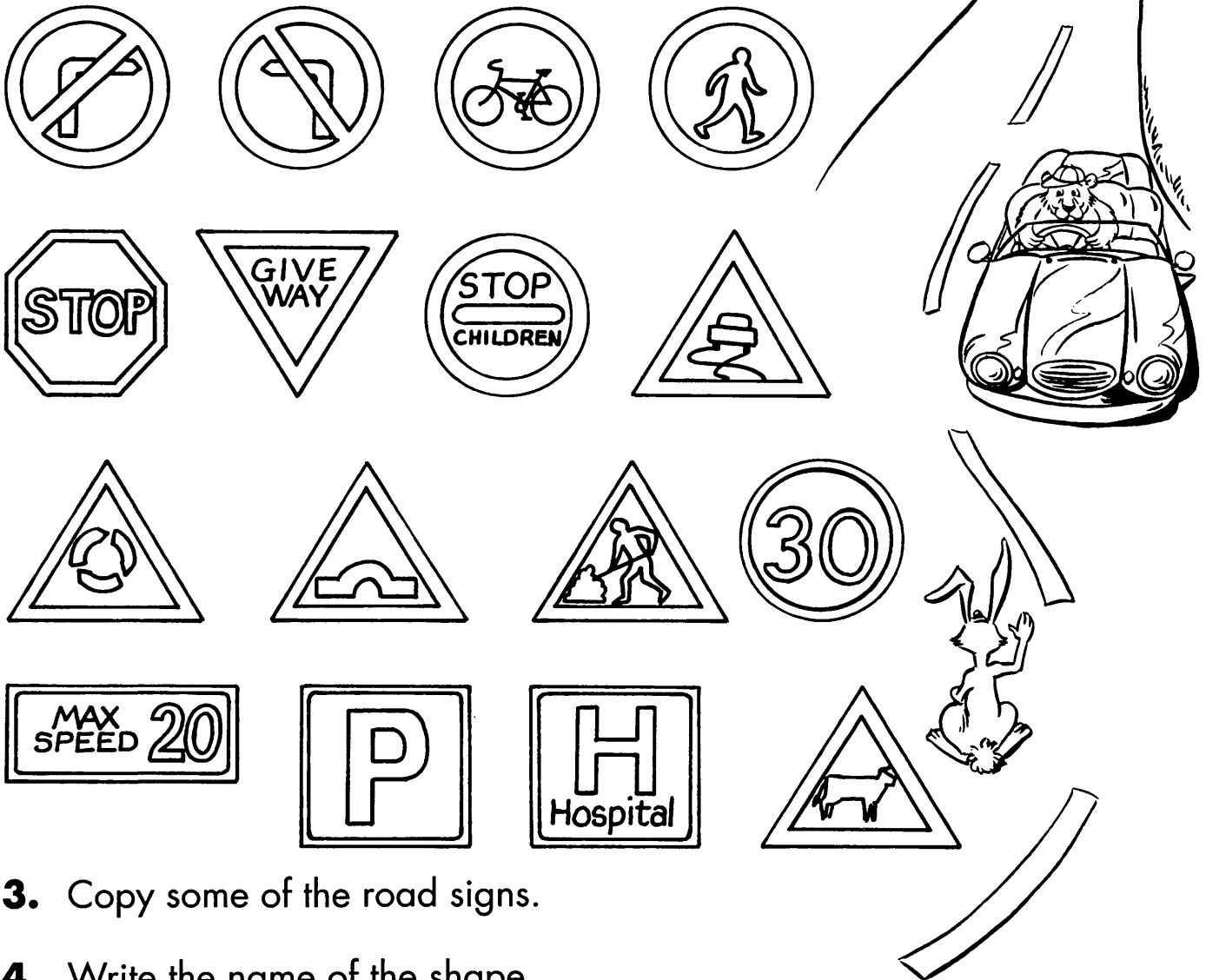
3. Copy some of the road signs.

4. Write the name of the shape,
and write the meaning of the sign.

■ Can you find some different road signs?

SPECTRUM MATHS ● STARTING ALGEBRA/SHAPE AND SPACE

Crossroads

LEVEL	UA	N	SSM	HD
1			●	
2			●	
3				
4				
5				
6				

- ● Giving and understanding instructions for moving along a route.
- ● Types of movement.
- ● Turning through right angles.

CONTENT

► Using left and right directions within the context of crossroads.

EXTENSIONS

► Explore the directions when the number of roads and signposts have been increased. So, for example, travelling from A to E involves two turns.
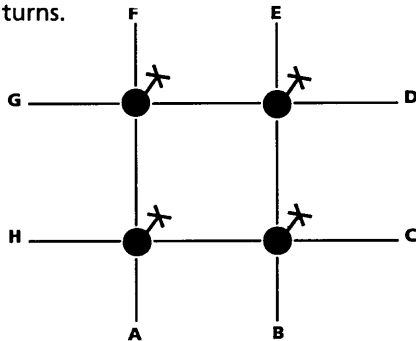
► Relate the activity to turning through a right angle.

NOTES

Children will find the illustrated aerial view useful.

The results are:

a.	Left	**f.**	Straight on.
b.	Right	**g.**	Left
c.	Left	**h.**	Right
d.	Right	**i.**	Right
e.	Left	**j.**	Straight on.

Children can experiment and check by marking the roads on the floor and making a signpost. This can then be extended to a more complex road system.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				24 Cats and Dogs 39 Pirate School	10 Climbing Ladders 32 Number Journey
More				23 8-Point Compass	
Go Further With					

Crossroads

C

D

B

A
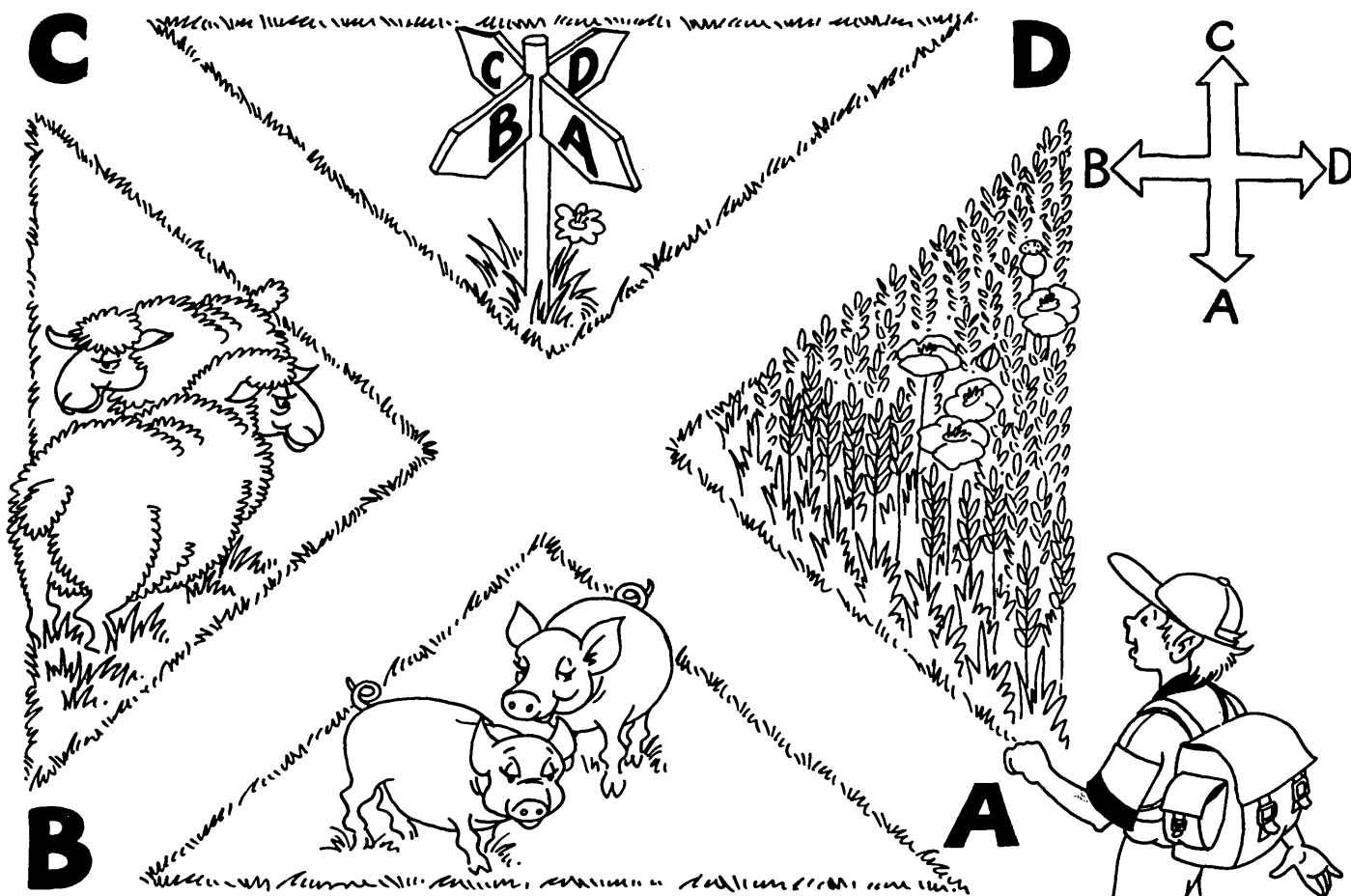
1. Imagine you are travelling from A to B.

2. When you reach the signpost, you turn Left.

3. Write Left, Right, or Straight On for each of these:

a. From A to B

b. From A to D

c. From B to C

d. From B to A

e. From D to A

f. From B to D

g. From C to D

h. From C to B

i. From D to C

j. From C to A

Rhian and Cedric

NOTES

Discussion can focus on:

Rhian has some squares. How many?
What is the difference between a square and a rectangle?
When drawing Sukinder Square and Tricia Triangle, can shapes other than squares and triangles be used?

Logiblocks or other plastic shapes can be used to experiment with designs.

Sticky shapes can be used to record.

LEVEL	UA	N	SSM	HD
1	●		●	
2	●		●	
3	●			
4				
5				
6				

● Building 2-D and 3-D shapes.
● Recognising circles, rectangles, etc.

CONTENT

► Building 'shape people' using, mostly, one set of shapes e.g. squares.
► Naming shapes.

APPARATUS

Plastic shapes.

EXTENSIONS

► Draw :
  Peter Pentagon,
  Hatty Hexagon,
  Marcia Mixture.
► Make three-dimensional Cathy Cube and Cyril Cylinder.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				**33** Traffic Signs	
More					
Go Further With					

Rhian and Cedric

Look at Rhian Rectangle.

■ How many rectangles does she have?

1. Colour her using the same colour
   for rectangles which are the same size.

2. Now colour Cedric Circle using the same colour
   for circles which are the same size.
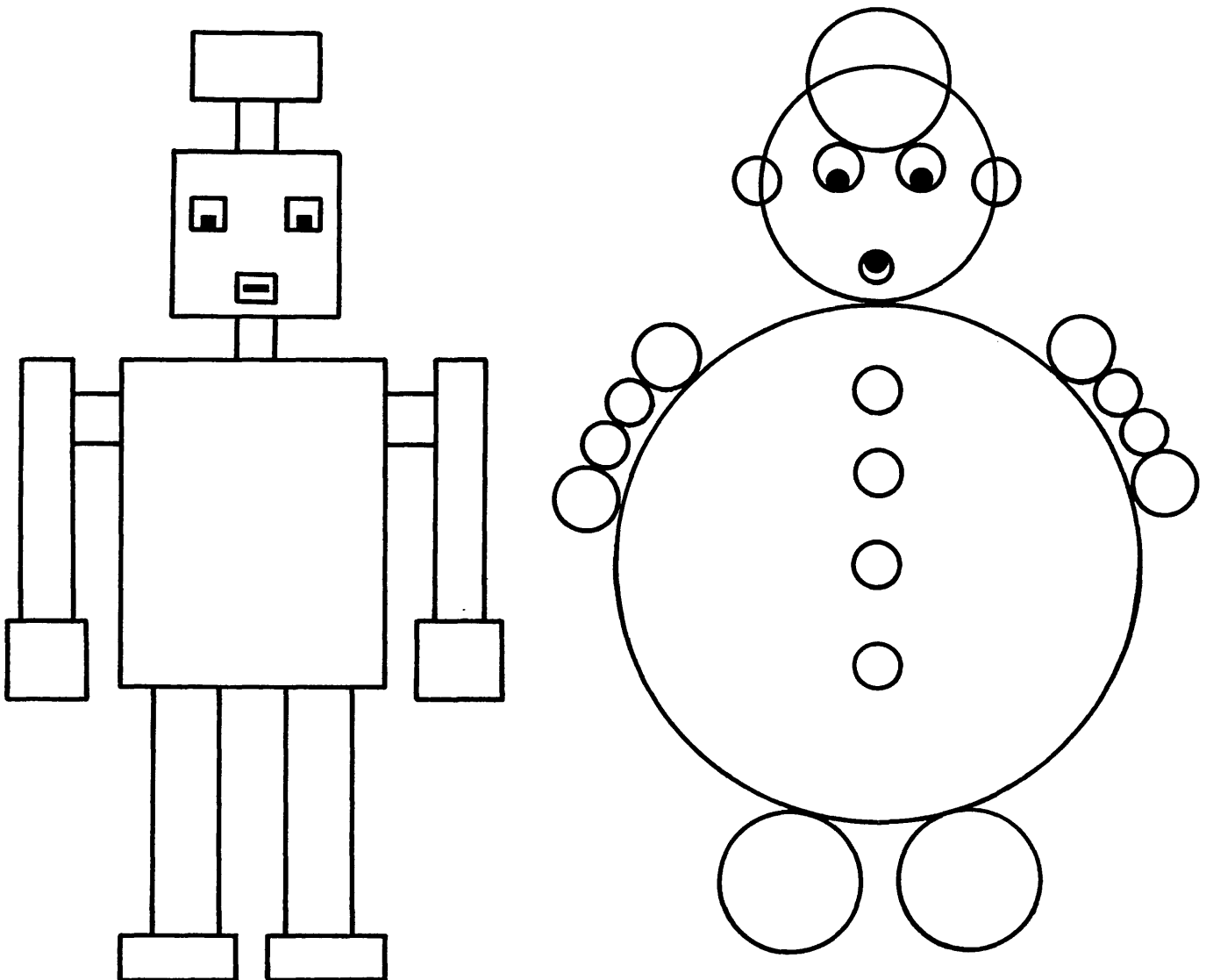
3. Draw your own Sukinder Square and Tricia Triangle.

SPECTRUM MATHS ● *STARTING ALGEBRA/SHAPE AND SPACE*

Twiddles

34

LEVEL	UA	N	SSM	HD
1				
2			●	
3			●	
4				
5				
6				

- Understanding angle as a measure of turn.
- Turning through right angles.
- Using compass bearings.

CONTENT
► Investigating rotation.
► Using 4-point compass directions.
► Looking at angles in terms of quarter turns.

EXTENSIONS
► Extend to **double twiddles,** i.e. one turn followed by another.
► Extend to turns on the clockface.
► Introduce right angles.
► Find other pairs of twiddles which are the same.

NOTES

Discuss **clockwise** and **anticlockwise**.

Ensure children know where N, S, E and W are in the room. They can solve 'twiddles' by standing and turning their bodies.

The directions are:

a. b. c.

d. e. f.
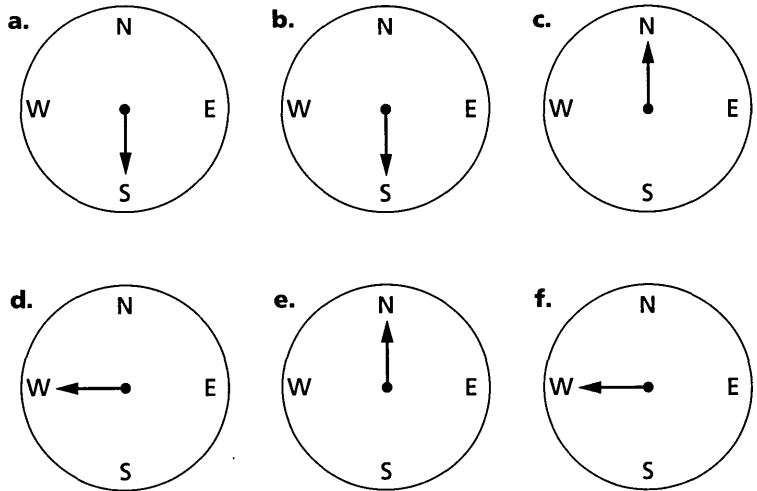
Follow up the work with a mental activity. e.g.
Imagine you are facing W, then twiddle a quarter turn clockwise.

Other possibilities include:
I am now facing W, and I have just twiddled a quarter turn clockwise. What direction was I facing to start with?

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				25 Clock Turns	
More				23 8-Point Compass	
Go Further With					

Twiddles

1. Stand facing North.

2. **Twiddle** your body clockwise through two quarter turns.

   ■ What direction are you facing now?
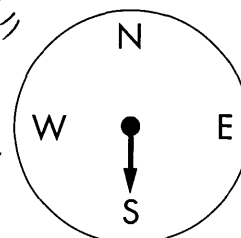
   Face North
   Clockwise
   2 quarter turns

3. Now try these.
   Draw them on the compasses.

a.
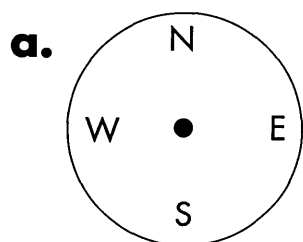
Face East
Clockwise
1 quarter turn

b.
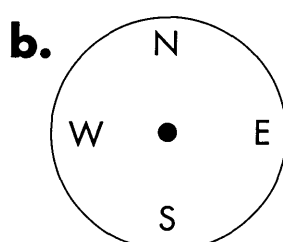
Face West
Anticlockwise
1 quarter turn

c.
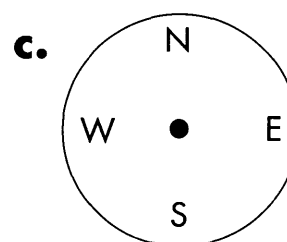
Face South
Clockwise
2 quarter turns

d.
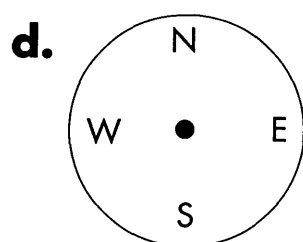
Face East
Clockwise
2 quarter turns

e.
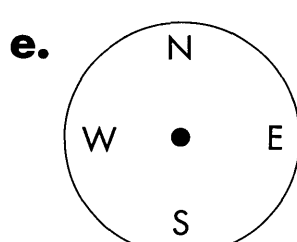
Face West
Anticlockwise
3 quarter turns

f.
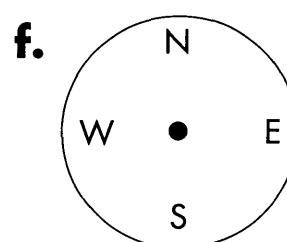
Face South
Clockwise
3 quarter turns

4. Invent some of your own **twiddles**. Write them down.
   Draw the directions.

   ■ What **twiddle** is the same as one quarter turn clockwise?

   ■ What **twiddle** is the same as two quarter turns anticlockwise?

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Mazes

LEVEL	UA	N	SSM	HD
1	●		●	
2	●		●	
3	●			
4				
5				
6				

● Giving and understanding directions for moving along a route.
● Recognising types of movement.

CONTENT

► Recognising of right and left directions within the context of finding a way through a maze.

APPARATUS

Use Special Paper 4 (1 cm. squared paper).

EXTENSIONS

► Describe directions for returning back to where you started.
How do these relate to directions or setting out?

NOTES

Directions through the mazes are:

a. R, L, L, R, R, R, L, R, L, L, OUT.
b. R, L, R, L, L, R, R, L, R, R, L, R, L, OUT

Possible discussion points include:
How many changes of direction to you take to get out of the maze?
How many right turns were there, and how many left?
How many squares did you pass through?
Which was the longest straight run, without turning?

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				24 Cats and Dogs 32 Crossroads 39 Pirate School	10 Climbing Ladders 32 Number Journeys
More				23 8-Point Compass	
Go Further With					

Mazes

1. Here is a way through a maze.
If R is for right, L is for left, then the way out is:
R, L, R, L, L, R, R, R, L, out.
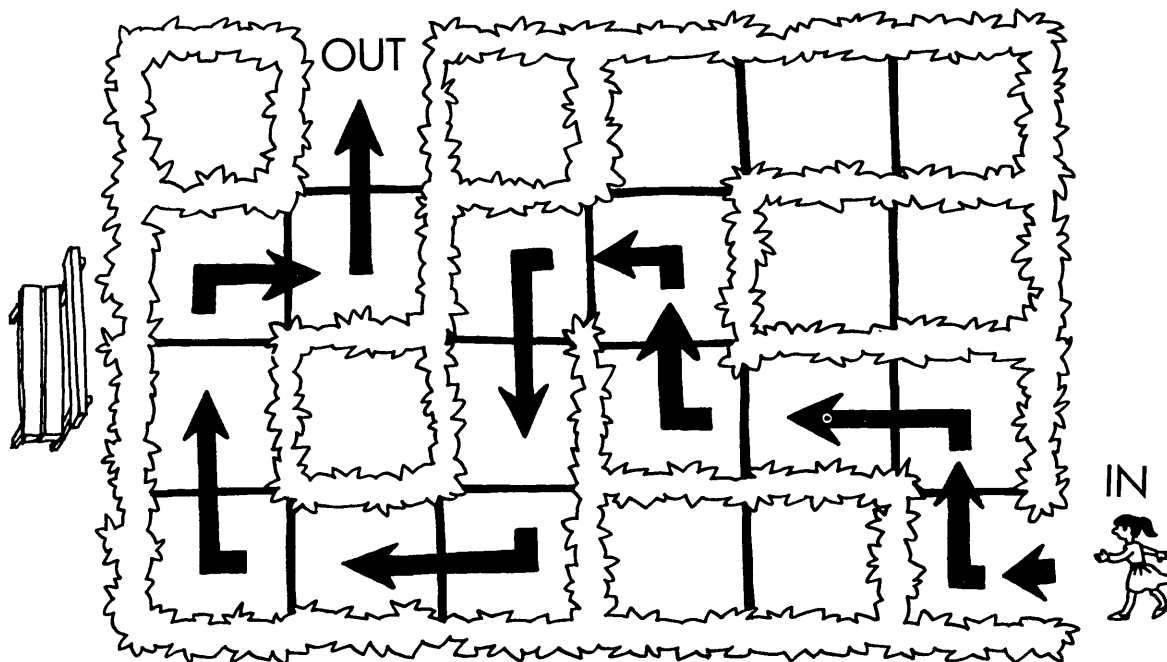
2. Find a way through these mazes and describe them using Rs and Ls.

a.

OUT

IN

b.

OUT

IN
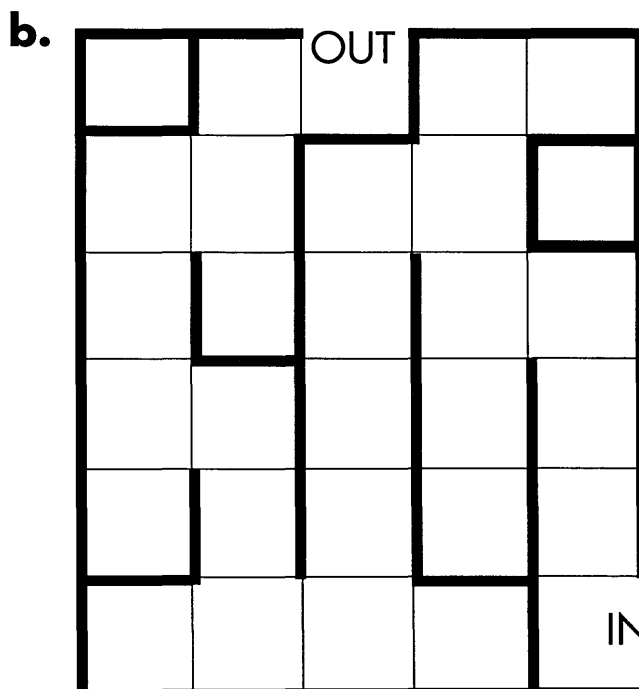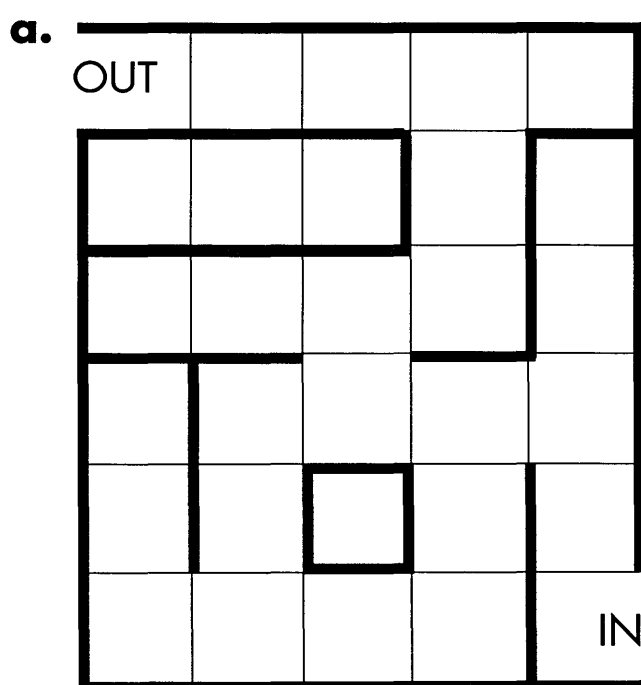
3. Make up your own maze on squared paper,
and describe a pathway through it.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Dots

LEVEL	UA	N	SSM	HD
1	●		●	
2	●		●	
3			●	
4			●	
5				
6				

- ● Drawing 2-D shapes.
- ● Recognising triangles, squares, etc.
- ● Sorting shapes.
- ● Constructing 2-D shapes.

CONTENT

► Counting the number of perimeter dots on shapes drawn on dotty paper.
► Finding names of shapes.

APPARATUS

Use Special Paper 5 (2 cm. squared dotty paper).

EXTENSIONS

► *Can you draw a shape with two inside dots, or 3 inside dots, etc.?*
► *Is it possible to draw a triangle with 3 boundary dots, 4 boundary dots, five boundary dots, etc.?*
What about a square?

NOTES

It is worth discussing the word **boundary** and its meaning. The word **perimeter** can also be introduced.

Shapes with 3 boundary dots: a, f
Shapes with 4 boundary dots: b, c, d, g, h
Shapes with 5 boundary dots: e, i

Triangles are: a, b, d and f
Squares are: c, g
h is a quadrilateral and i is a trapezium.
e is a pentagon.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting	23 Shape Sort			23 Dotty Letters 29 Dotty Shapes 37 Shape Embriodery	
More			31 All About Area	30 Picture Gallery 35 Twelve Points 37 Dotty Paths	
Go Further With					

Dots

1. Count the number of dots on the boundary of each shape.

2. Colour blue the shapes which have three dots on the boundary,
   green the shapes which have 4 dots on the boundary
   and yellow the shapes which have 5 dots on the boundary.

   ■ Which shapes are triangles? Which are squares?

   ■ What are the other shapes called?

a   b   c   d   e   f   g   h   i
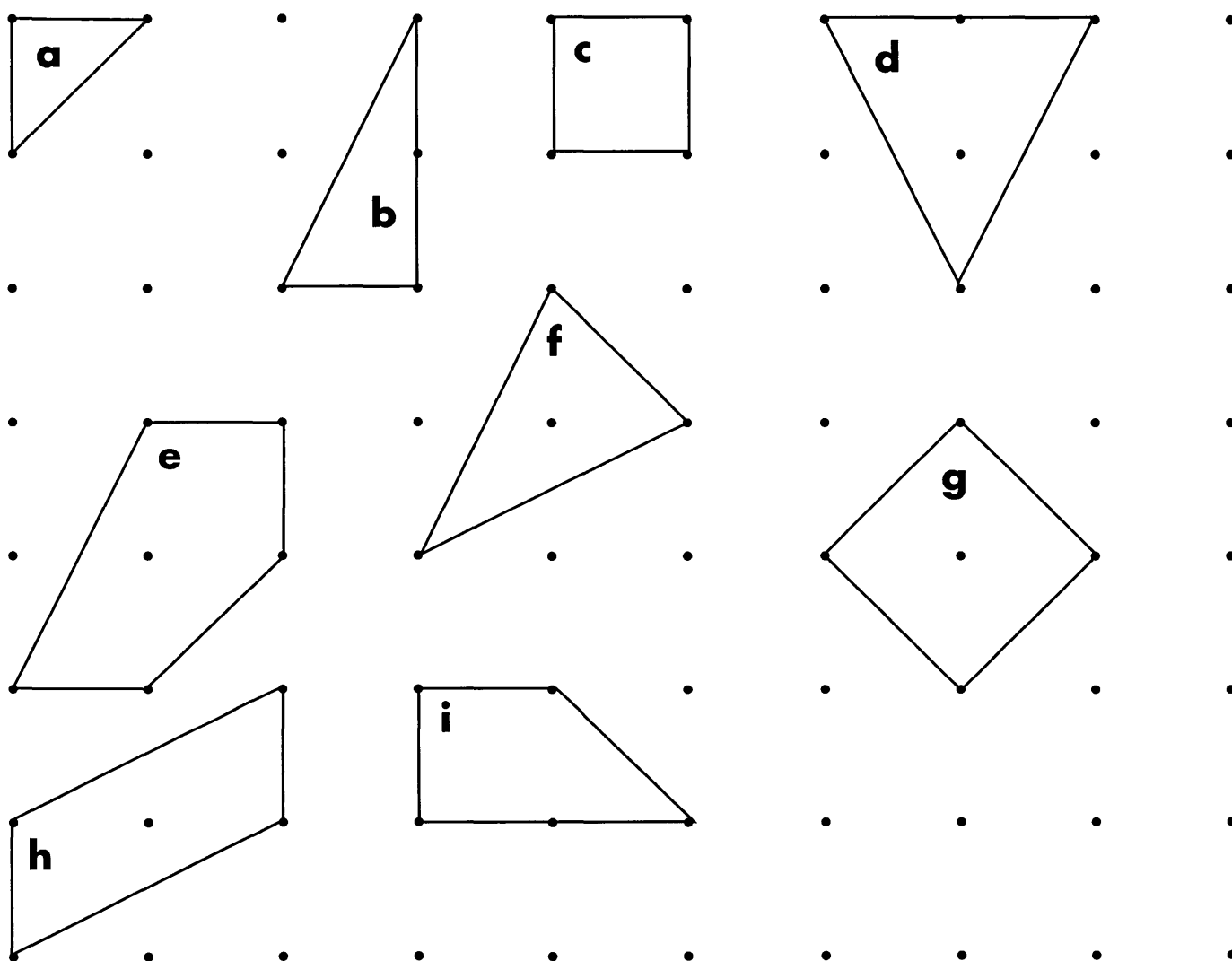
3. Draw some of your own shapes on square dotty paper,
   then count the number of dots. Invent a rule for colouring them.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Shape Embroidery

LEVEL	UA	N	SSM	HD
1	●		●	
2	●	●	●	
3	●	●		
4				
5				
6				

- Understand instructions for movement along a route.
- Recognition of 2-D shapes.
- Number patterns.

CONTENT

► Joining circular arrangements of dots, according to a number sequence, to create 2-D shapes.

APPARATUS

Use Special Paper 3 at the back of this book.

EXTENSIONS

► Extend to circular arrangements of different numbers of dots.

NOTES

The completed patterns are :
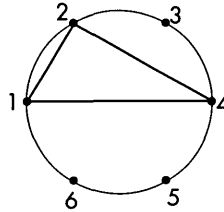
TRIANGLE
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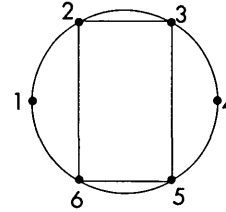
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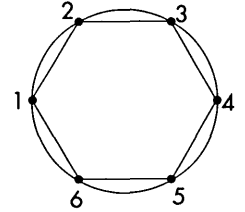
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1 – 2 – 3 – 4 – 5 – 6 – 1
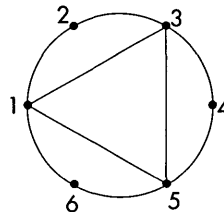
TRIANGLE
1 – 3 – 5 – 1
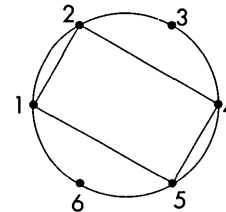
RECTANGLE
1 – 2 – 4 – 5 – 1
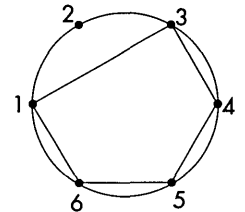
PENTAGON
1 – 3 – 4 – 5 – 6 – 1

Children can be challenged to find some different dot arrangements which produce the same shape.

For example,
1 – 3 – 5 – 1,   1 – 5 – 3 – 1,   3 – 1 – 5 – 3,
3 – 5 – 1 – 3,   5 – 1 – 3 – 5,   5 – 3 – 1 – 5,

all produce the same shape in the same position; and 2 – 6 – 4 – 2, produces the same shape in a different position.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting			6 Letters	29 Dotty Shapes 37 Shape Embroidery	
More			30 Dot Spot	30 Picture Gallery 35 Twelve Points 37 Dotty Path	
Go Further With					

Shape Embroidery

These embroidery patterns make different shapes.

1. Use a ruler to join the dots in order.

2. Then name the shape.

The first has been done for you.
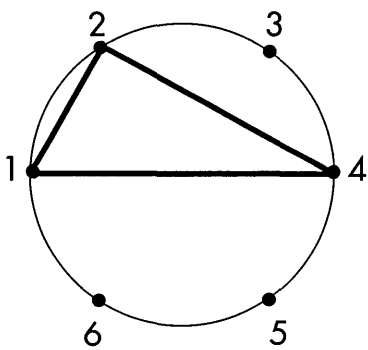
Triangle

1 - 2 - 4 - 1

_____
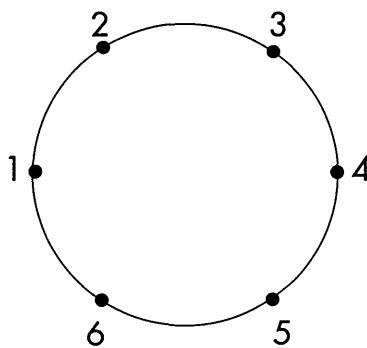
2 - 3 - 5 - 6 - 2

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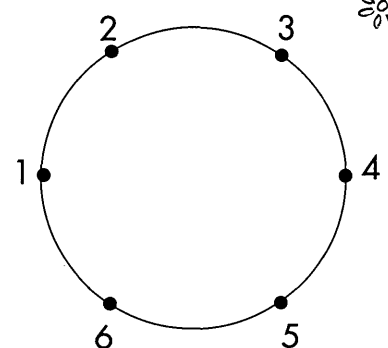
1 - 2 - 3 - 4 - 5 - 6 - 1

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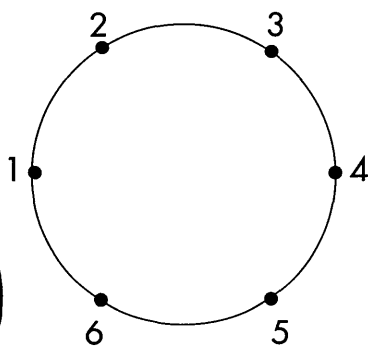
1 - 3 - 5 - 1

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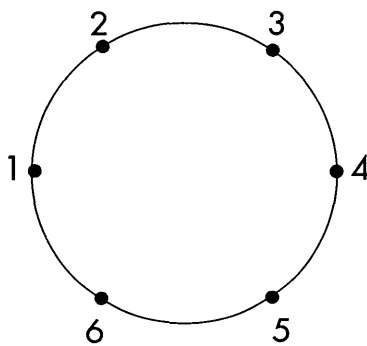
1 - 2 - 4 - 5 - 1

_____
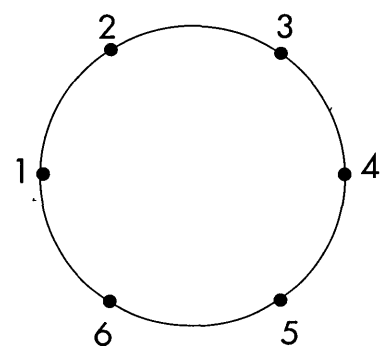
1 - 3 - 4 - 5 - 6 - 1

3. How many sides does each shape have?

4. Invent some embroidery patterns using 8 dots.
Draw them on special 8-dot paper.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Side Count

LEVEL	UA	N	SSM	HD
1		●	●	
2			●	
3				
4				
5				
6				

● Sorting shapes.
● Recognising 2-D shapes.
● Counting to 10.

CONTENT

► Sorting and classifying 2-D shapes according to their number of sides.
► Naming shapes.

EXTENSIONS

► Cut out a selection of different shapes from card. Present them to pupils, one at a time, to discuss the number of sides, their names, etc.

NOTES

The children can write a numeral inside a shape to indicate its number of sides.

The shapes include; triangle, square, rectangle, pentagon and hexagon.

The red shapes are all pentagons.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting	23 Shape Sort			26 Eating Biscuits 27 Name-Plates	
More					
Go Further With					

Side Count

1. Colour **red** all the shapes with 5 sides.

2. Colour **blue** all the shapes with less than 5 sides.

3. Colour **green** all the shapes with more than 5 sides.

   ■ Can you name the shapes?
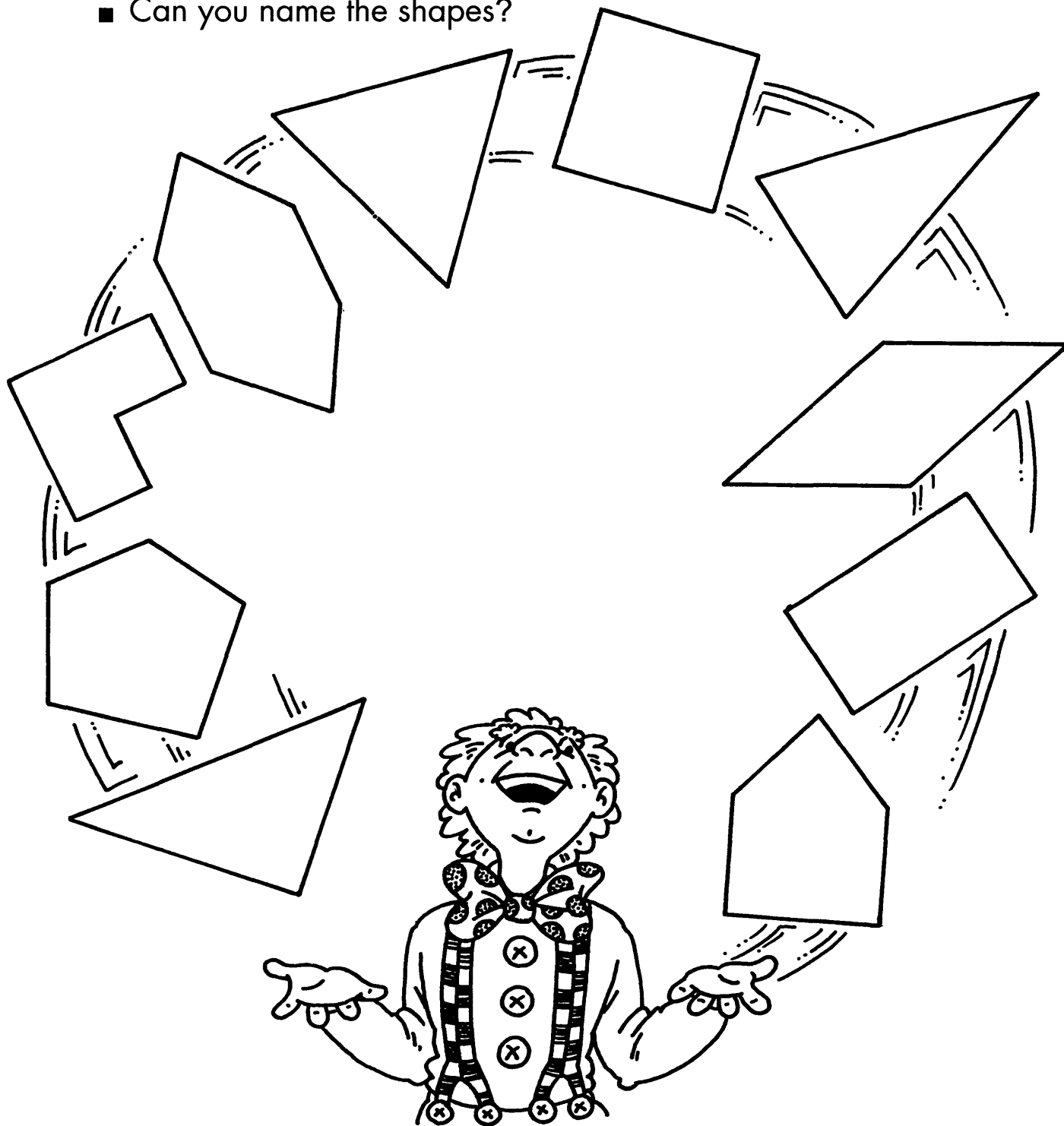
4. Draw some shapes of your own and colour them.

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE

Pirate School

LEVEL	UA	N	SSM	HD
1			●	
2			●	
3			●	
4				
5				
6				

● Giving instructions for moving along a route.
● Recognising types of movement (translation).
● Understanding turning through right angles.
● Understand compass directions.

CONTENT

► Writing and giving oral descriptions of 2-D shapes using 4-point compass directions.

APPARATUS

Use Special Paper 4 (1 cm. squared paper).

EXTENSIONS

► *What is the result of moving S to a different position?*
► Look at the descriptions to find the perimeters of the shapes.
► *How many right angles in each shape?*

NOTES

Discuss the fact that two possible descriptions exist for each shape, depending on the starting directions.
Does it matter where you start?

1. Either

East	3	or	South	2
South	2		East	3
West	3		North	2
North	2		West	3

2. Either

East	2	or	South	2
South	1		East	1
West	1		North	1
South	1		East	1
West	1		West	2
North	2			

Discuss also the number of statements needed to draw a particular shape e.g. a rectangle needs four statements, a hexagon needs six statements.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting				**24** Cats and Dogs **32** Crossroads	
More				**23** 8-Point Compass	
Go Further With				**26** Draw Me **35** Shape Bearings	

Pirate School

Pirates have to learn how to find treasure.

At Pirate School they learn how to draw shapes using compass directions.
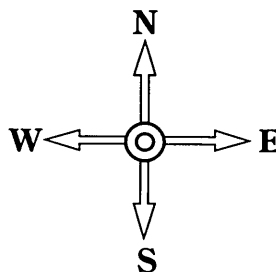
Start at S,

Travel   East 1 line
North 1 line
East 2 lines
South 2 lines
West 3 lines
North 1 line

and the shape is complete.
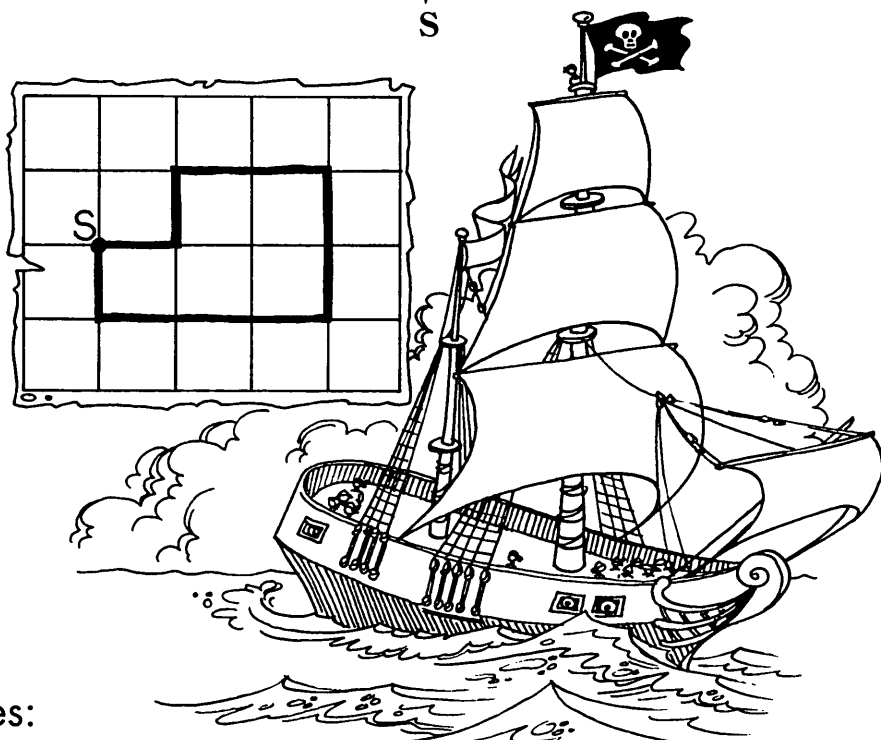
1. Describe these two shapes:
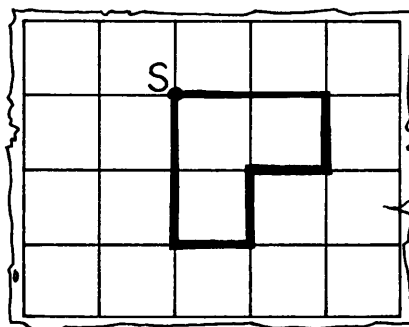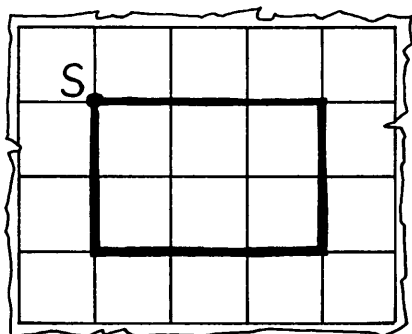
Play the Pirate Practice Game with a partner:

2. Draw a shape unseen by your partner.

3. Describe it using compass directions, so that your partner can draw it.

4. Then compare them to see if the two shapes are the same.

    SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE
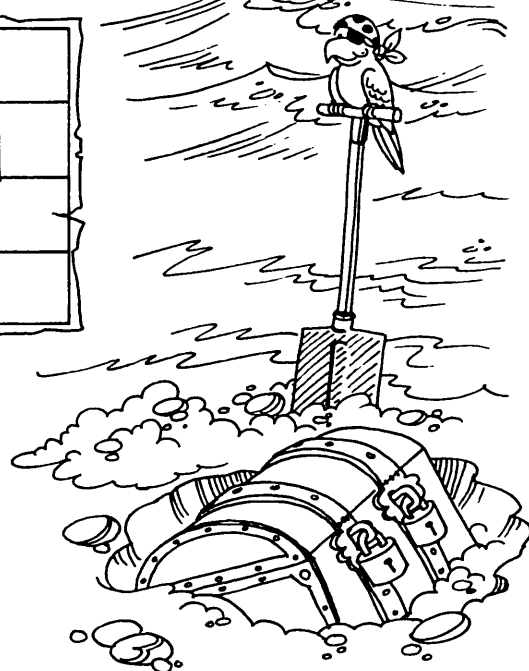
Triangle Fields

LEVEL	UA	N	SSM	HD
1	●		●	
2	●			
3	●		●	
4				
5				
6				

● Sorting and classifying shapes.
● Sorting 2-D shapes.

CONTENT

► Exploring shapes by joining equilateral triangles, in terms of joins, edges and regions.

APPARATUS

Triangle (isometric paper).

EXTENSIONS

► How many different shaped farms can be built with 4 fields, 5 fields, 6 fields?
► Colour the fields.
How many colours do you need for each farm if two joining fields must have different colours?
► What sort of animals live on these farms?
► Investigate farms in FOUR-SHIRE, where all the fields are square shaped.

NOTES

The completed table is:

Farm	Fields Fences	Inside Fences	Outside
TREBLE	4	3	6
TRIO	4	3	6
TRIPLE VIEW	6	6	6
THREE TREES	6	5	8
TRICYCLE	4	3	6

Which farm has the most fields, most inside fences, most outside fences?
Which farm has the least?

Children can use plastic triangles to experiment with additional farms.

SPECTRUM LINKS

	Data Handling	Games	Investigations	Algebra / S&S	Number Skills
Starting			18 Square Count		
More			22 Triangle Turns		
Go Further With			11 Triangles 14 Triangle Search 30 Tri-hard		

Triangle Fields

In Three-shire all the farmers have triangle-shaped fields.

They build a fence along the edge of each field.

This is a picture of the land at Treble Farm.

It has 4 fields with 9 fences
(6 outside fences and 3 inside fences).
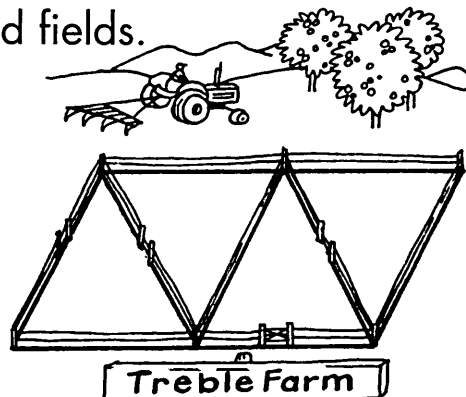
Treble Farm

1. How many fields and fences are there on these farms:

Trio Farm

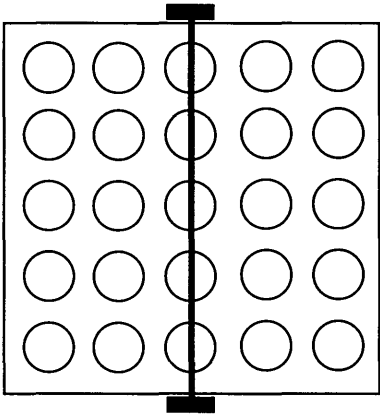**Tricycle Farm**

Triple View Farm
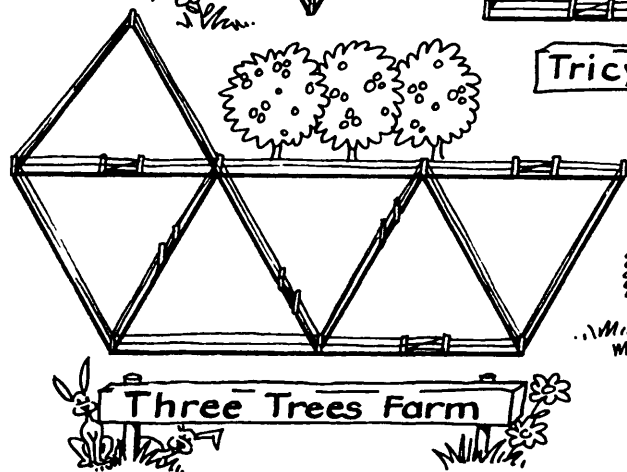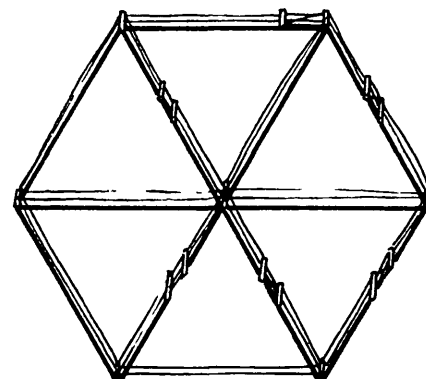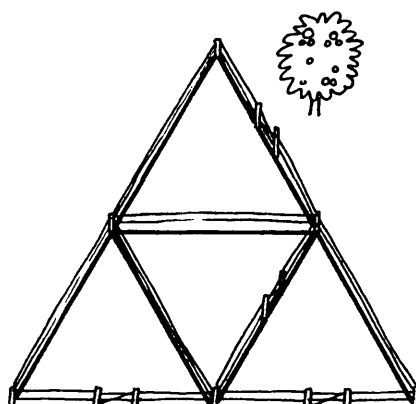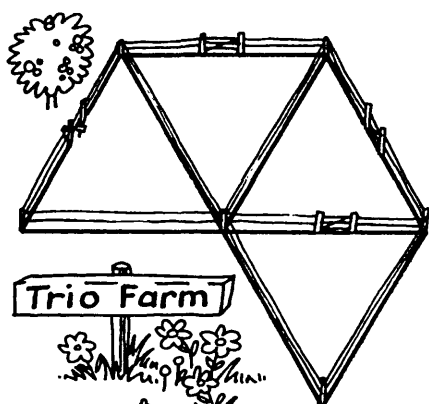
Three Trees Farm

2. Write them in the table.

3. Invent some farms of your own,
   draw them on triangle paper,
   and write down the number of
   fields and fences in each.

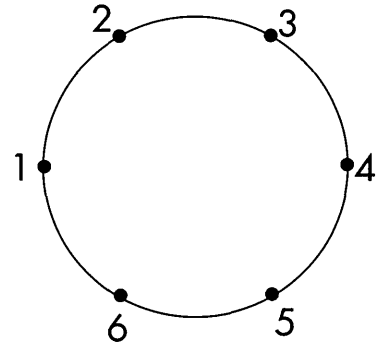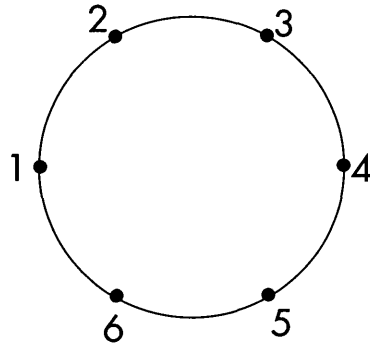| Farm	Fields	Inside fences	Outside fences
Treble	4	3	6
Trio			
Tricycle			
Triple view			
Three Trees			

SPECTRUM MATHS • STARTING ALGEBRA/SHAPE AND SPACE
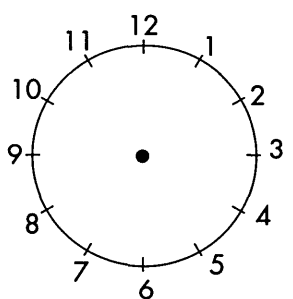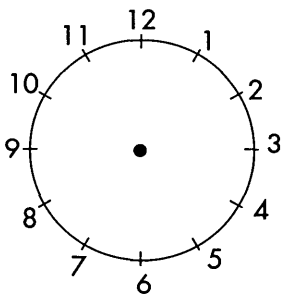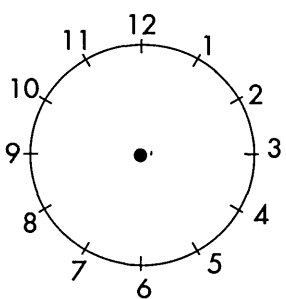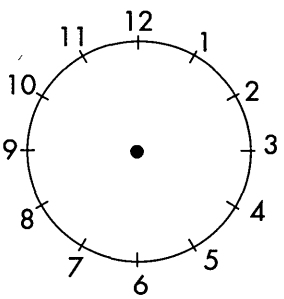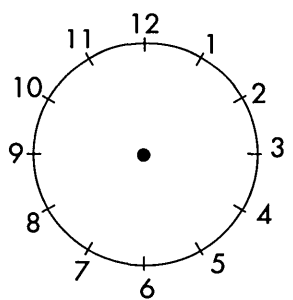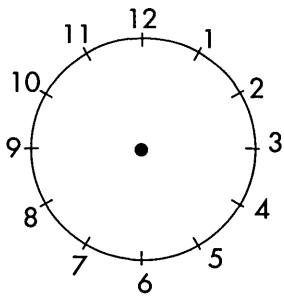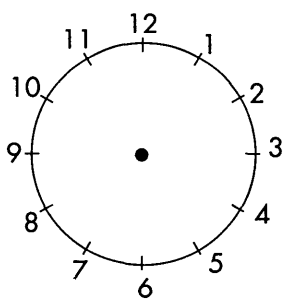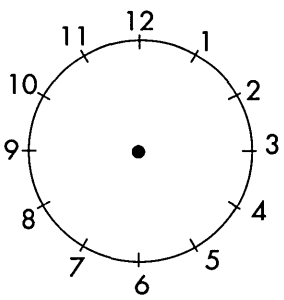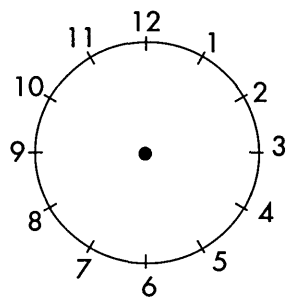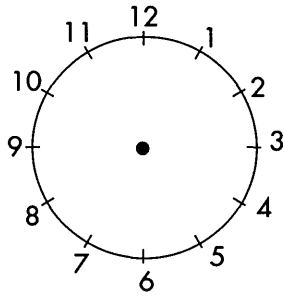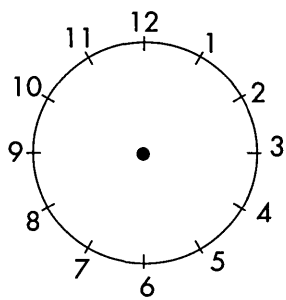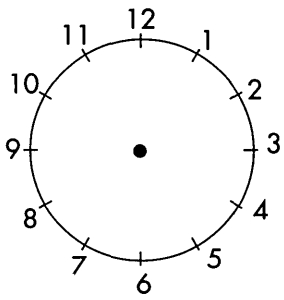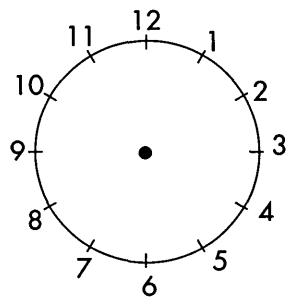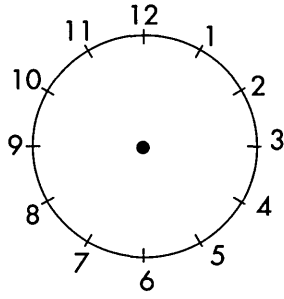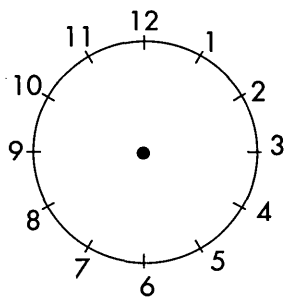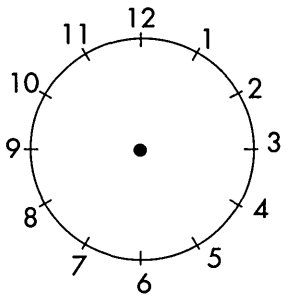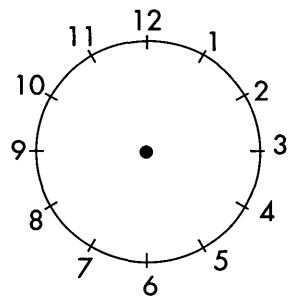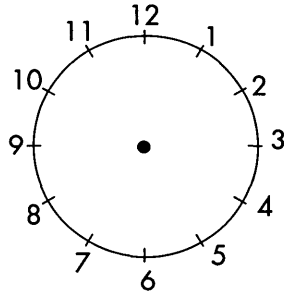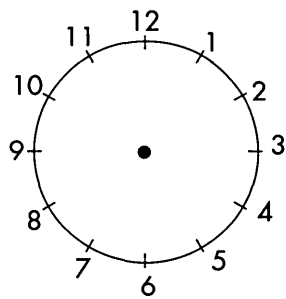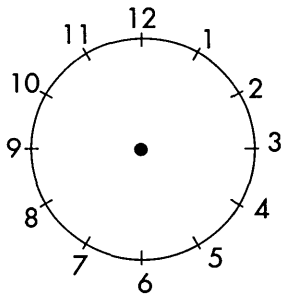
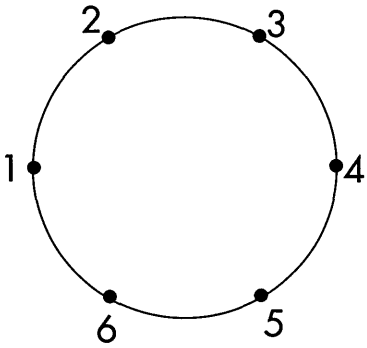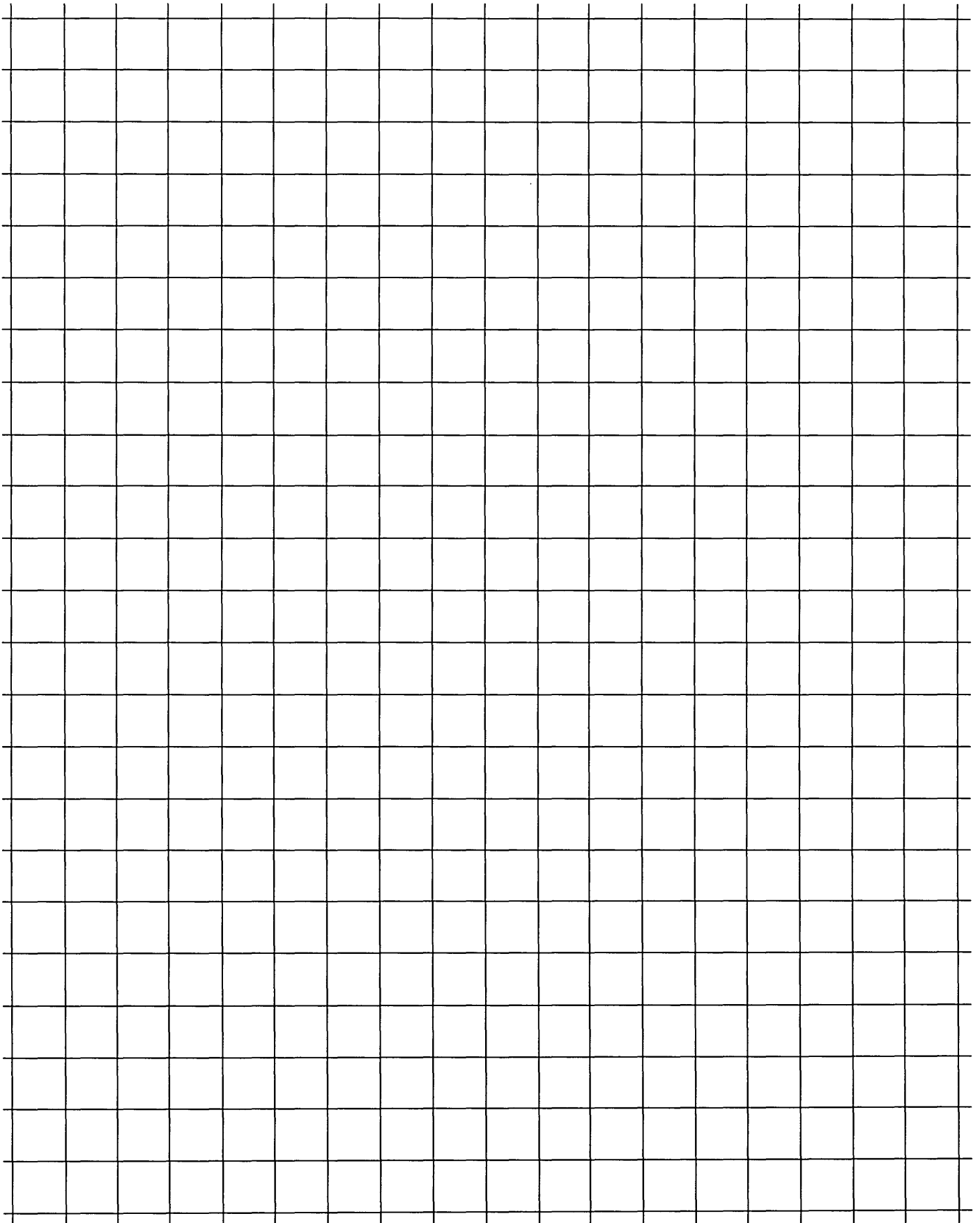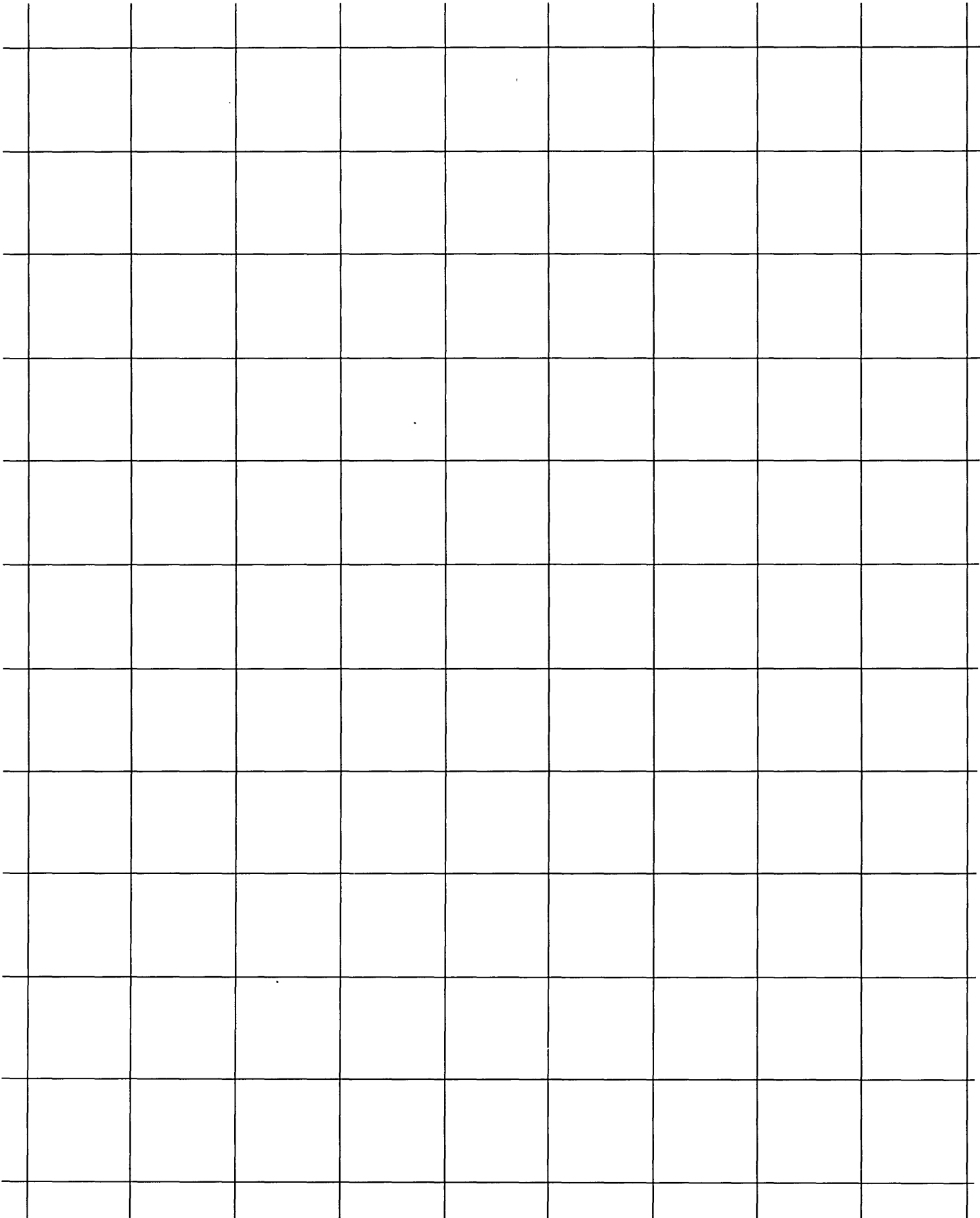# Special Paper 1

Special Paper 2
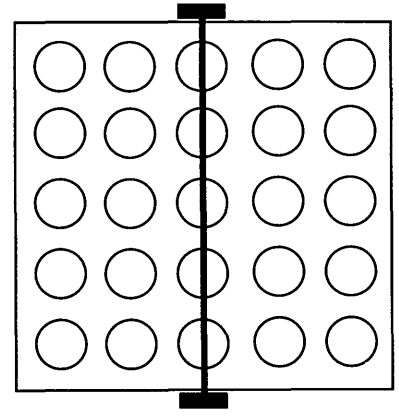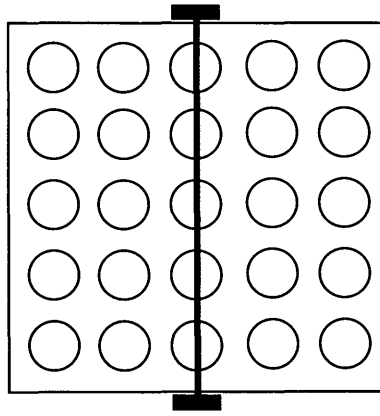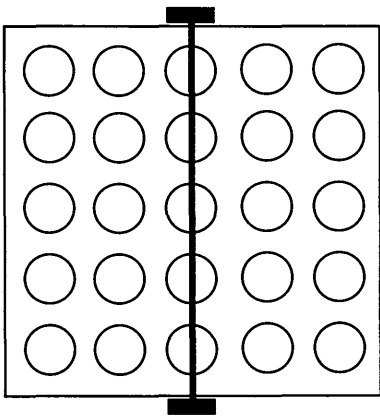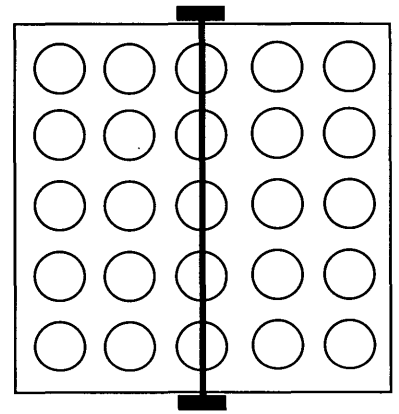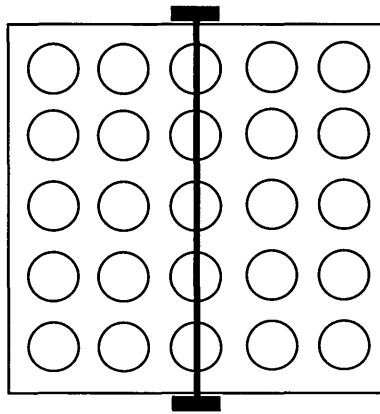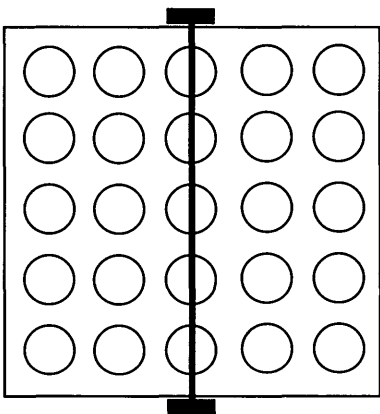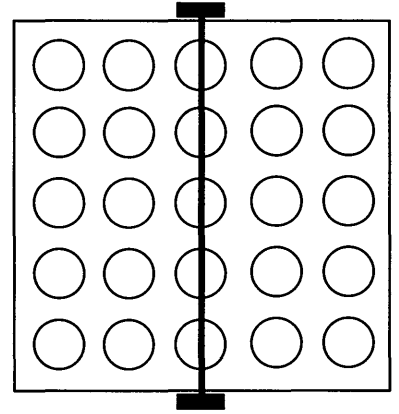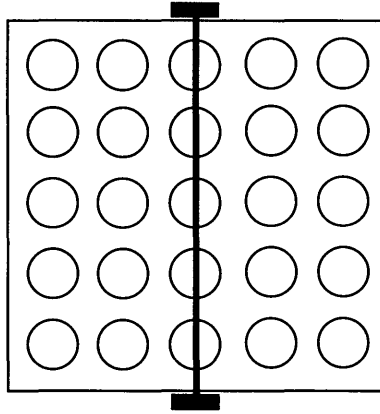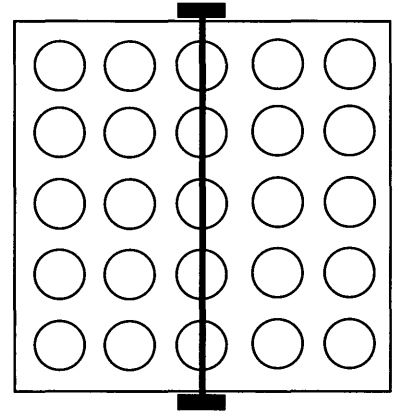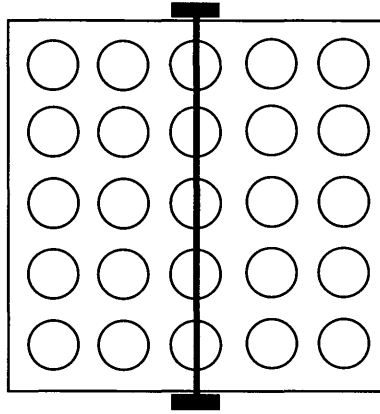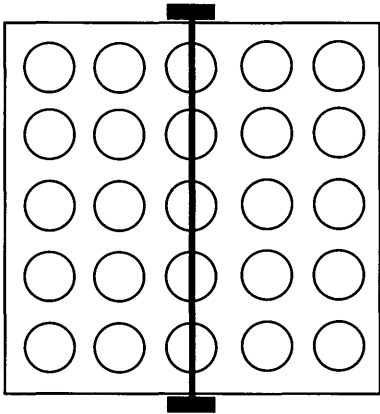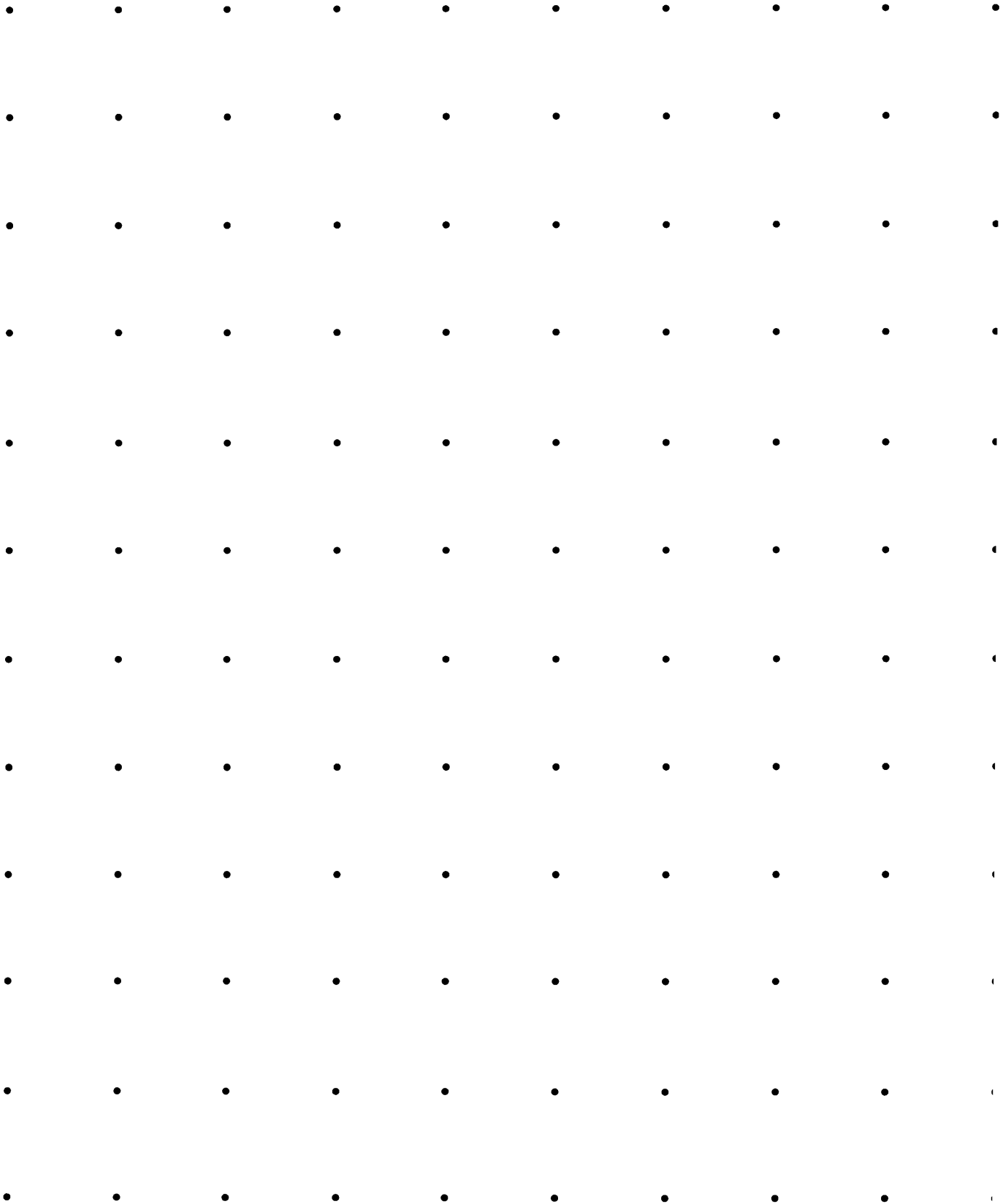
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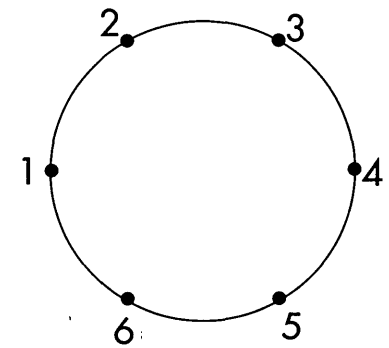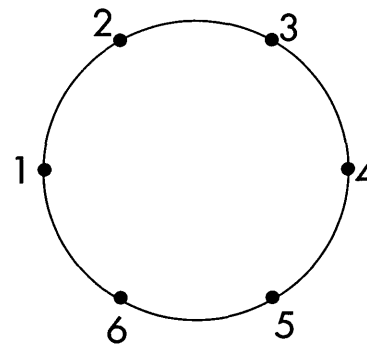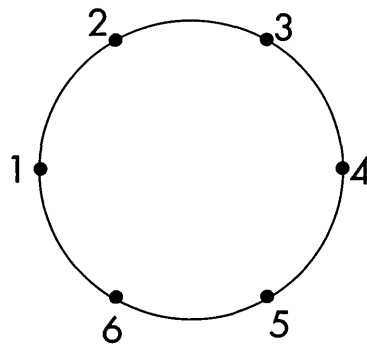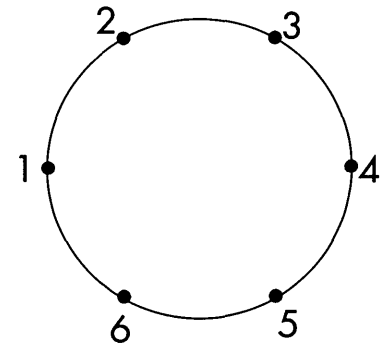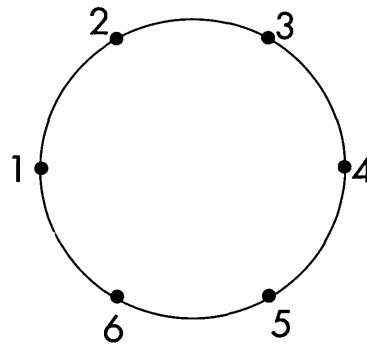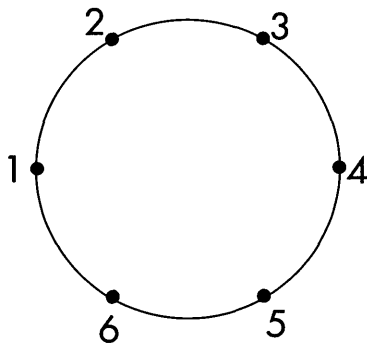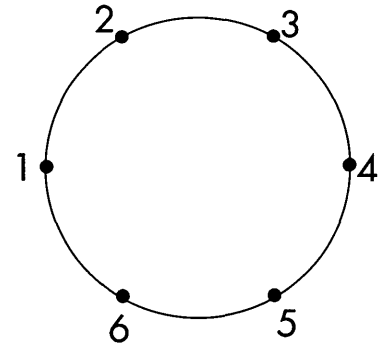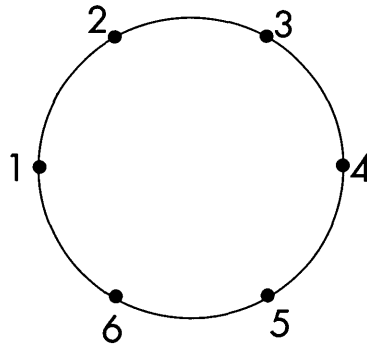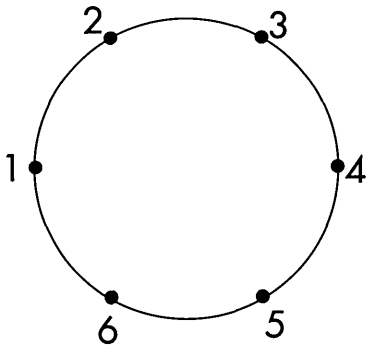
Special Paper 4

Special Paper 5

Special Paper 6

Special Paper 7

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