Mathletics

Series B Student

Space and Shape

My name

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First edition printed 2009 in Australia.

A catalogue record for this book is available from 3P Learning Ltd.

ISBN 978-1-921860-15-7

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Series B – Space and Shape

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Series Author:

Rachel Flenley

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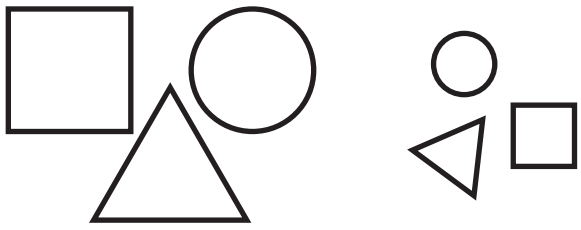
2D space – sorting

We can sort objects in lots of different ways. How do you think we have sorted these shapes?



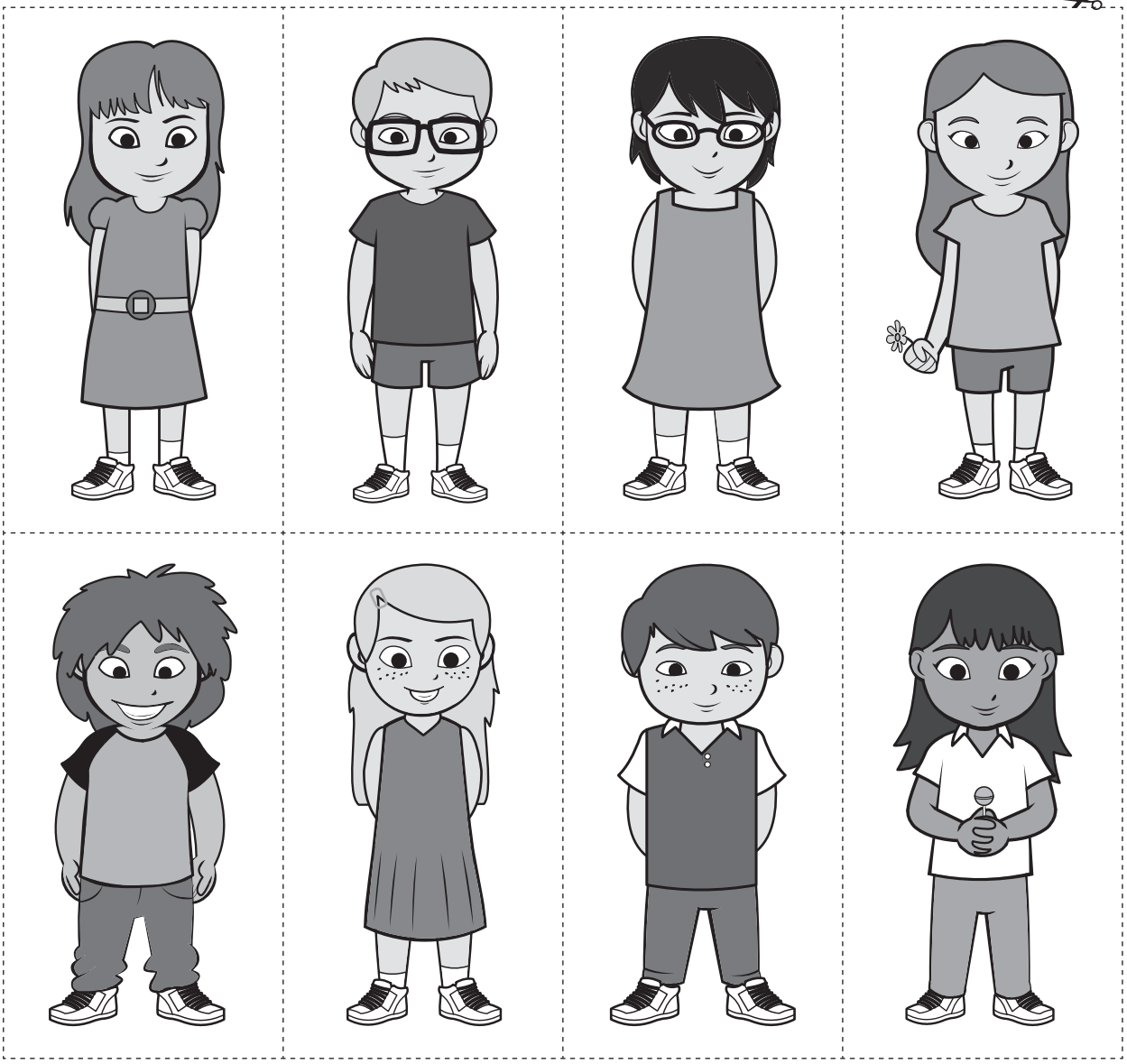
Can you think of another way we could sort them?

C copy

1 Cut out these children and look at them.

a Sort them one way. Tell someone how you did it.

b Sort them another way. Tell someone how you did it.



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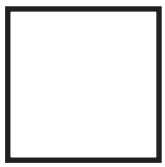
2D space – squares and rectangles

1 Draw some squares.

2 These shapes are confused. They are not sure what they are! Can you help them by answering 'yes' or 'no'?

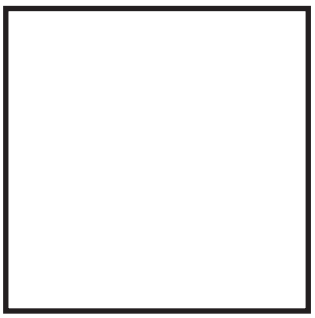


Am I a square?

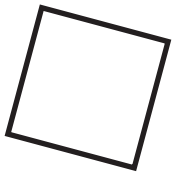
_____

Am I a square?

_____

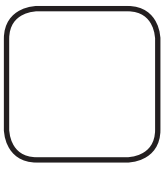


Am I a square? _____



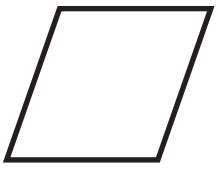
Am I a square?

_____



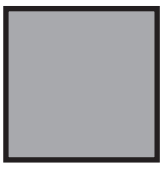
Am I a square?

_____



Am I a square?

_____



Am I a square?

_____

3 What is a square? Write or tell someone.

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2D space – squares and rectangles

You will need: a partner attribute blocks

What to do:

a Trace and name the shapes.

square

rectangle

b How are these shapes **the same**? Use blocks to help you work this out.

c How are they **different**?

What to do next:

One of you will be the rectangle spotter. The other one will be the square spotter. Look around your room – every time you find one, put a tick below.

Are there more squares or rectangles in your classroom?

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2D space – circles and ovals

1 **a** Trace these and say the names out loud.

b Close your eyes and draw them in the air.

c What *feels* **the same** when you draw them?

d What *feels* **different**?

2 Draw a person, using only ◯ and ⬭. Decorate them.

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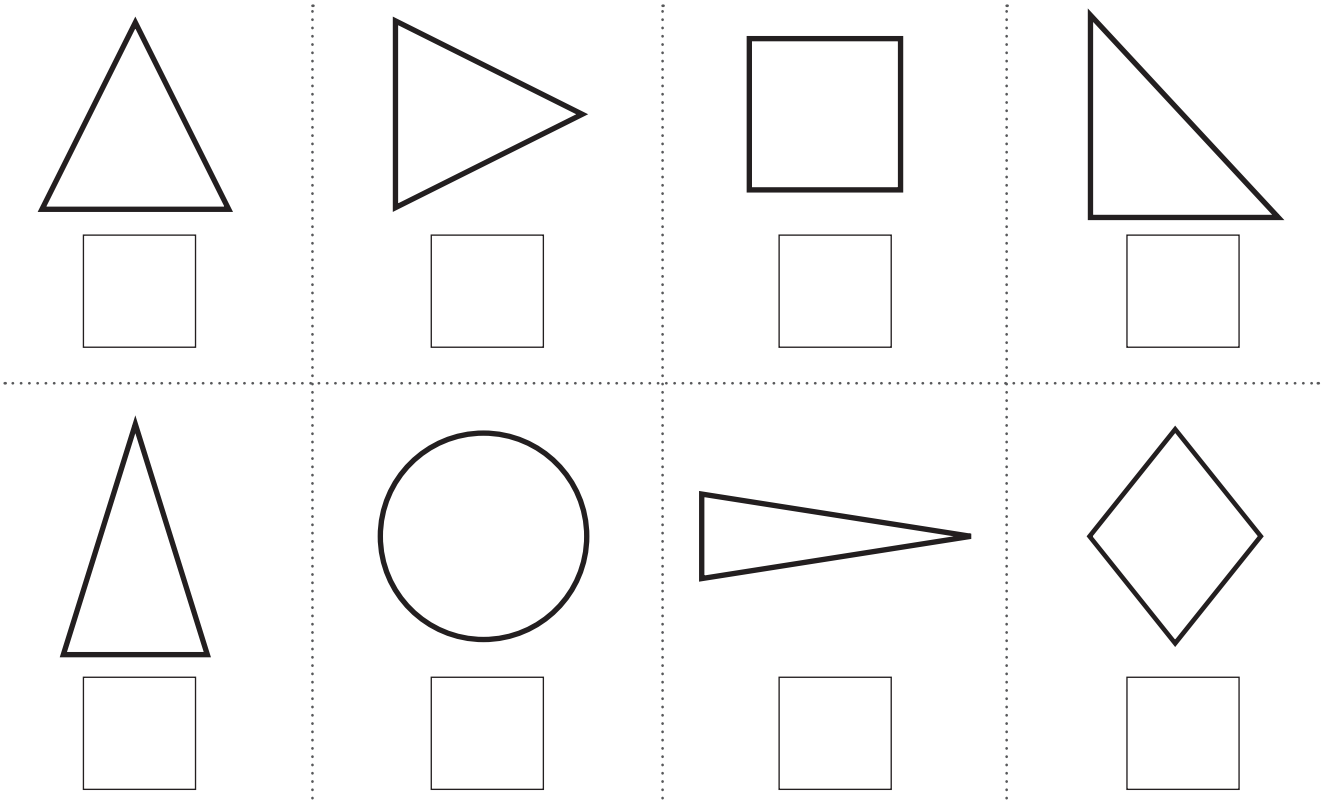
2D space – triangles

1 Pretend you have to describe a triangle to someone who doesn't know what it is. What would you say? Write it here. You can draw some as well if that helps.

2 These shapes all want to join the triangle club. Are they allowed to? ✔ the ones that can. ✘ any that can't.



3 Use masking tape to make 3 different triangles on the carpet. Ask someone to look at them. Do they agree that they are all triangles?

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2D space – triangles

You will need: scissors red and green pencils

C copy

What to do:

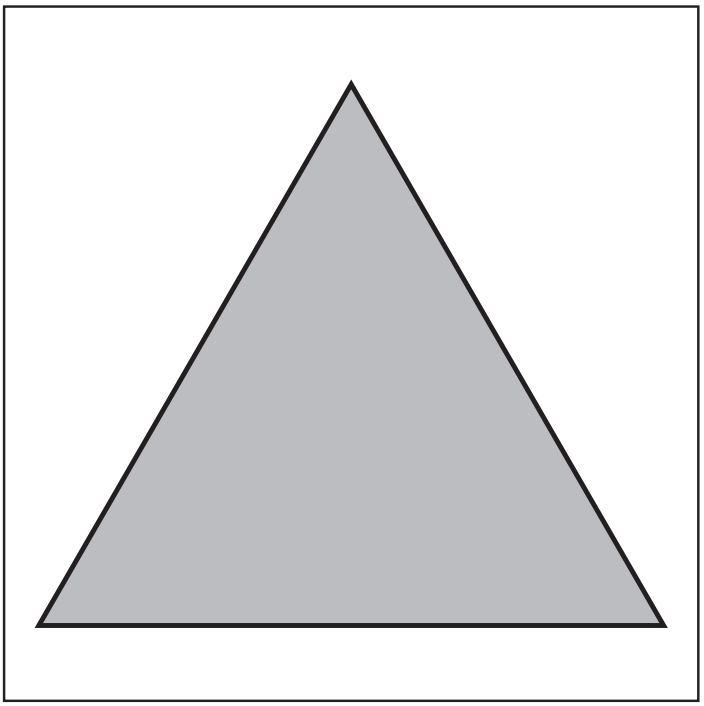
Cut out the . Colour 1 side red and 1 side green.

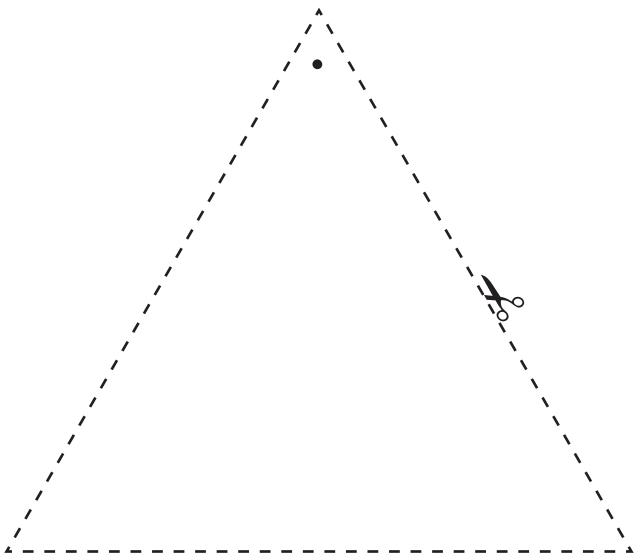
How many different ways can you fit the onto the ?

Use the dot to help you remember where you are up to.

Here is one way g. Here is another r.

How many different ways can you find?





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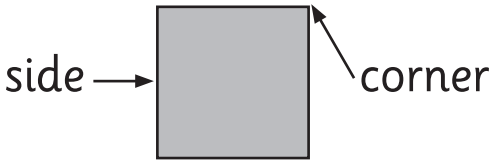
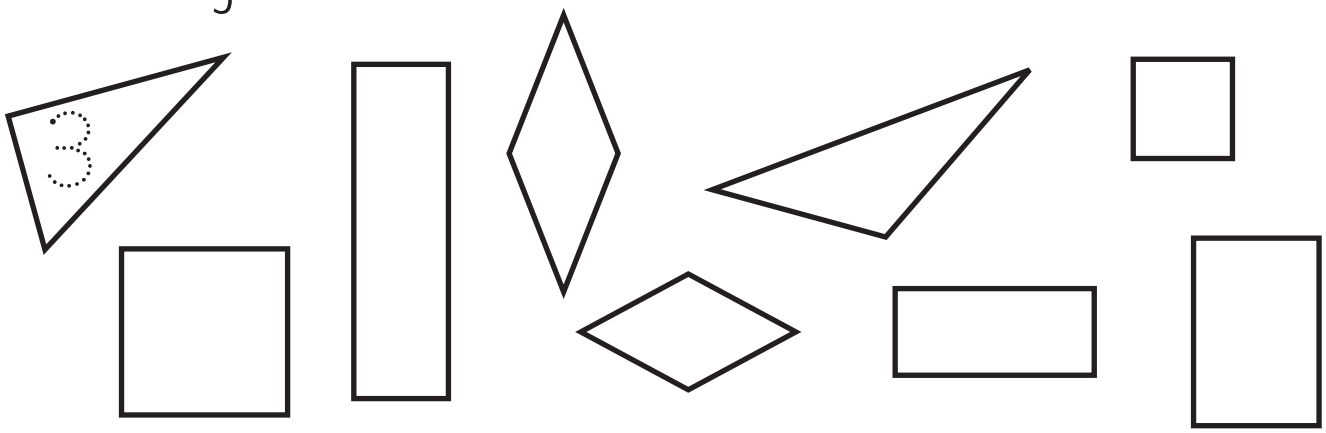
2D space – sides and corners

Shapes can have sides and corners.

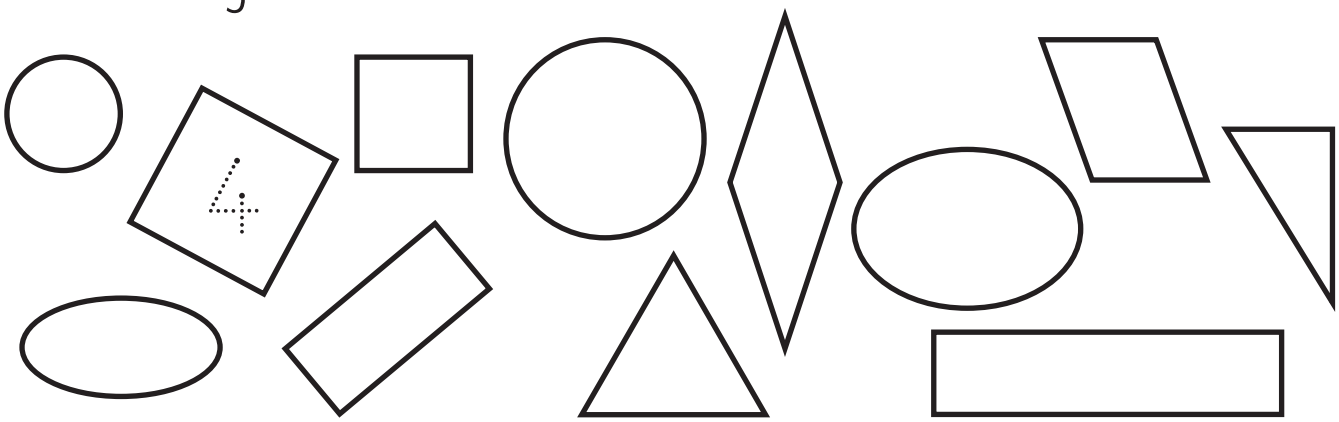
Corners are made when 2 or more sides meet.



1 How many sides?



2 How many corners?



3 How many sides and corners?

	Shape	Sides	Corners
a	triangle		
b	square		
c	rectangle		

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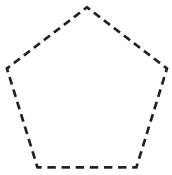
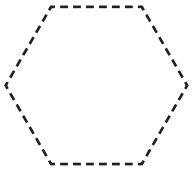
2D space – pentagons and hexagons

1 Trace these and say the names out loud.

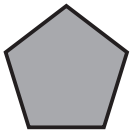
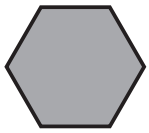


pentagon

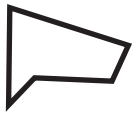


hexagon

2 How many sides and corners?

	Shape	Sides	Corners
a	pentagon 		
b	hexagon 		

Did you know ALL 5 sided shapes are called pentagons and ALL 6 sided shapes are called hexagons? They don't always have to look like or . They just need the right number of straight sides.

This is still a pentagon. 

This is still a hexagon.

3 Draw these shapes.

a 2 different pentagons

b 2 different hexagons

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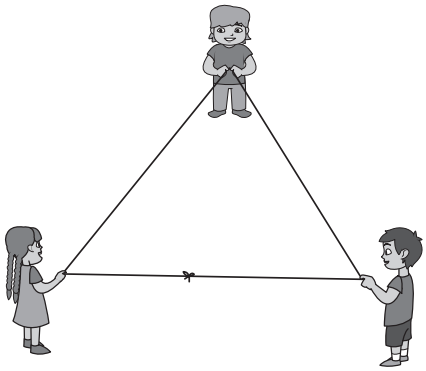
2D space – explore

You will need: 3 partners, scissors, string

What to do:

Cut a long piece of string and tie the 2 ends together. Make a triangle using the string and your group. Will you need all 4 people to do this? Why or why not?

Now make a different triangle.



What to do next:

Make a square. Now turn it into a rectangle. How did you do this?

Can you make a pentagon and then a hexagon? You may need to get some more people to help you.

Is it possible to make a circle this way? Show and explain your results to your teacher and classmates.

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2D space – explore

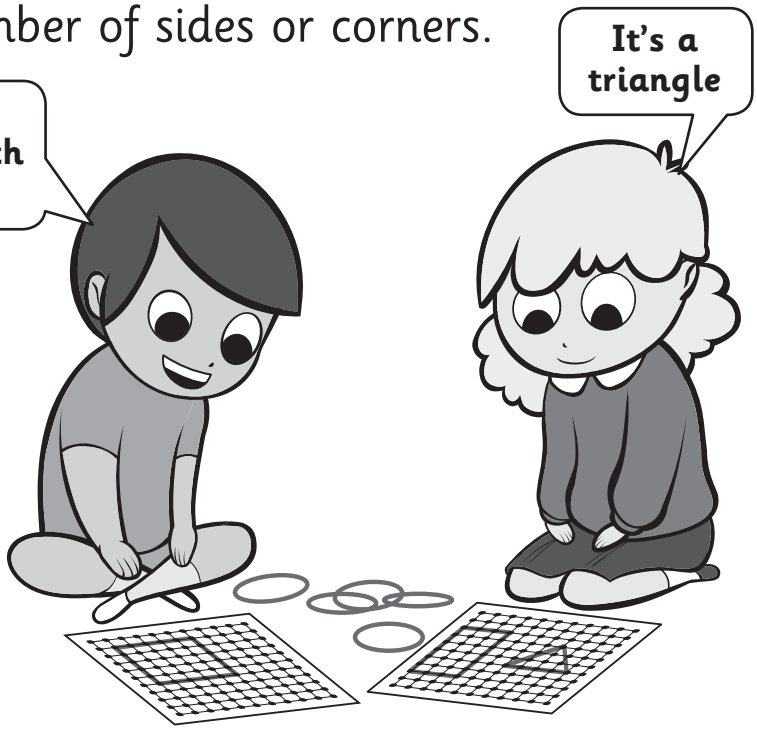
You will need: a partner, 2 geoboards and rubber bands

What to do:

Take turns telling each other to make a shape on their geoboard. The catch is, you can't say the name of the shape, you can only talk about things like the number of sides or corners.

Your partner then names the shape they made. Is it the shape you wanted them to make? Talk through any differences.

Make 3 shapes each.



What to do next:

Now, sit with your backs to each other. Take turns telling each other to make specific shapes such as:

'Let's make a square. Each side has to be 4 nails long' **or**
'Let's make a triangle. All the sides have to be the same length.'

Both of you make the shapes on your geoboards and then compare.

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2D space – explore

You will need: a partner attribute blocks

What to do:

Share the blocks between the 2 of you. Find a way to sort **your** blocks into 2 groups. You could sort by shape, size or colour. Record how you did it here.

Compare your way with your partner's way. Did you sort them differently?

What to do next:

Now sort your blocks into 3 groups. Record how you did it here.

Compare your way with your partner's way.

Find one other way to sort your shapes. Compare. Record how you did it here.

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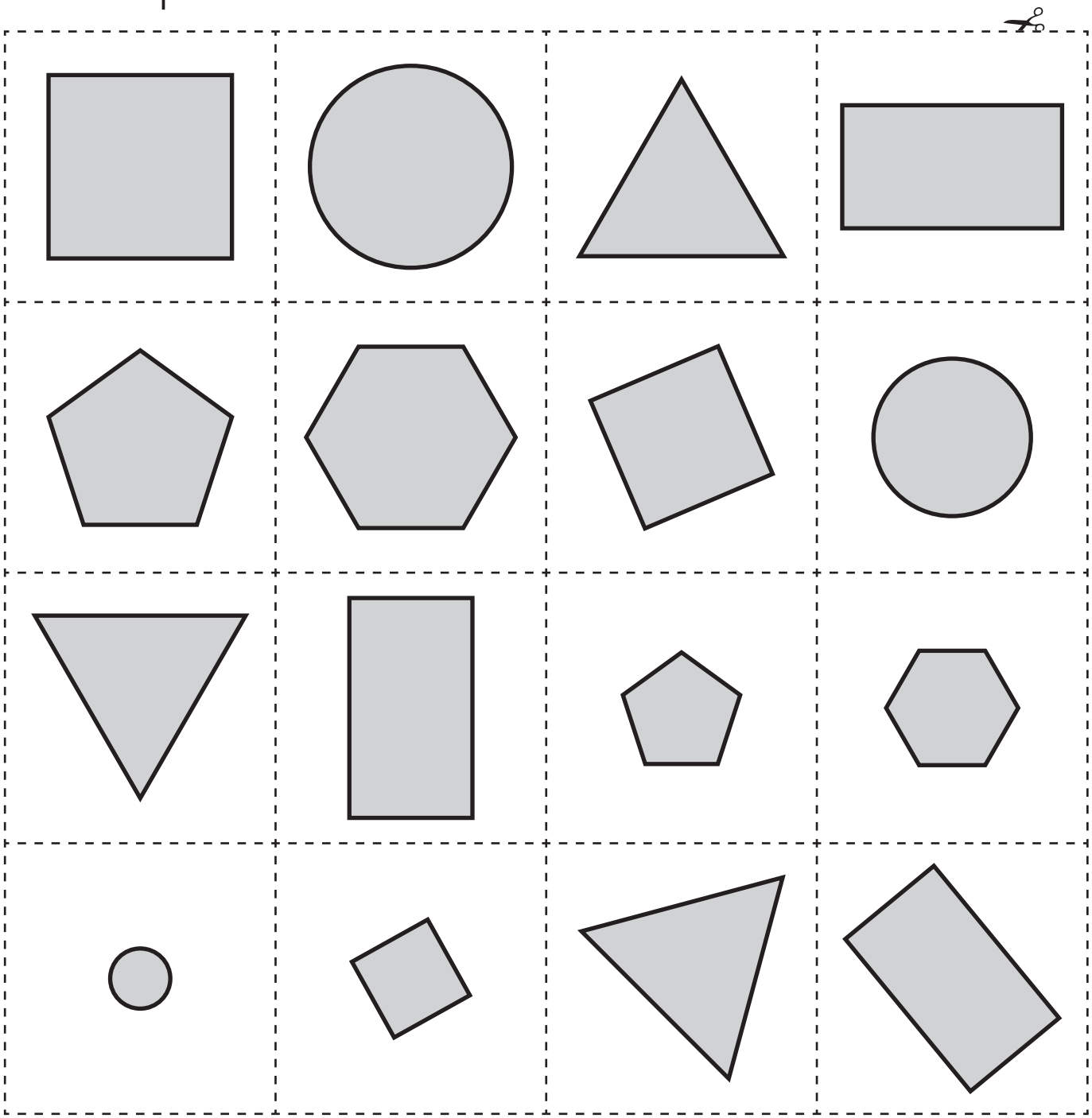
2D space – explore

You will need: a partner scissors

copy

What to do:

Cut out the shape cards. Combine your cards with your partner's cards and play Shape Snap. Watch out – the shapes might be different sizes or in a different position, but they could still be the same shape!



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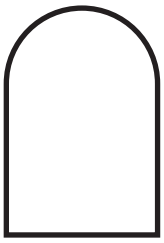
2D space – explore

You will need: a partner these attribute blocks

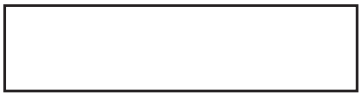
What to do:

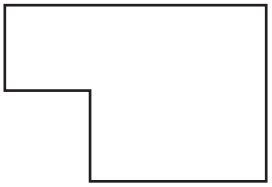
Look at this shape.

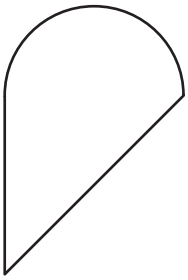


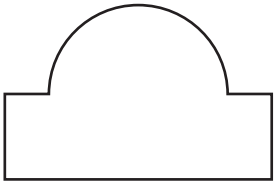
Which 2 shapes have been joined together to make it? Use the shape blocks to help you work it out. Draw them next to it.

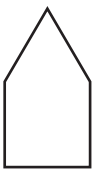
Try these ones. Draw the shapes for each one.

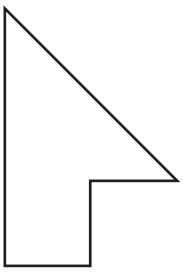












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2D space – explore

You will need: straws or popsticks Blu-tak or tape

What to do:

Choose a shape to make. Make it with your equipment.

Finish the statement:

I made a _____.

I know it is a _____ because ...

What to do next:

Find 2 people who made the same shape as you. What reasons did they give? Do you want to add to or change your reasons?

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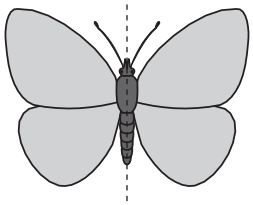
2D space – symmetry

This picture of a butterfly is symmetrical. If we fold it along the dotted line, both sides match exactly.



C copy

1 Look at the pictures. Tick the ones that match if folded along the dotted line. If it helps, cut them out and fold them.

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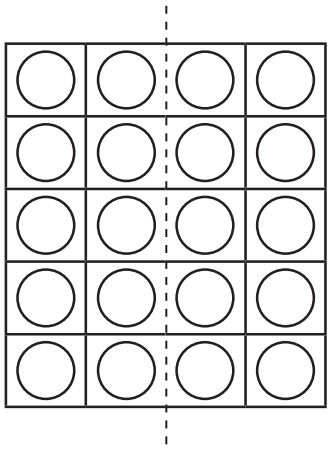
2D space – symmetry

1 Use different coloured pencils to colour 1 side of each picture. Switch with a partner and colour the other side of their picture to make them symmetrical.

a

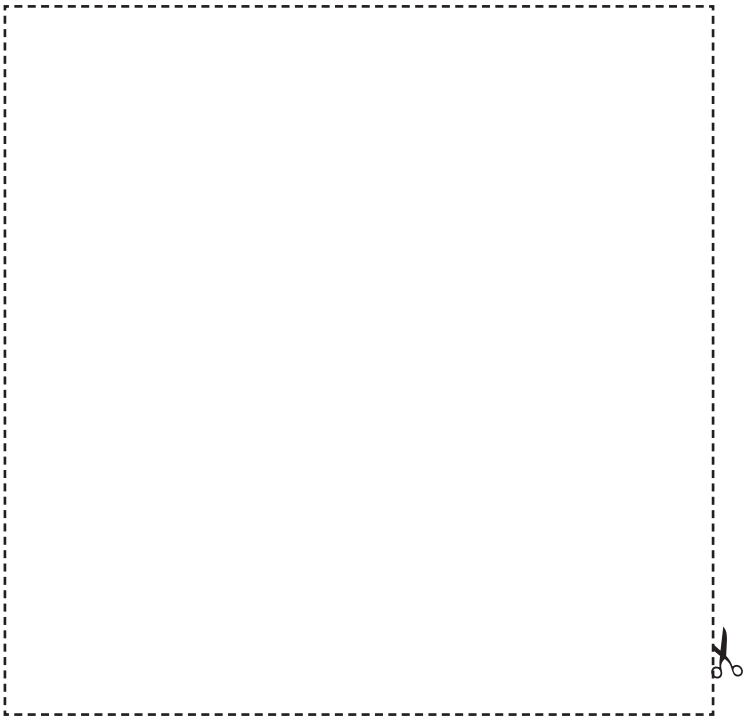
b



2 Cut out the square below and fold it in half.

a Is a square symmetrical? _____

b Is there only 1 way you can do it? How many ways can you fold the square in half and make the sides the same?



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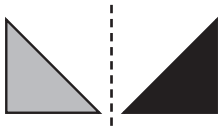
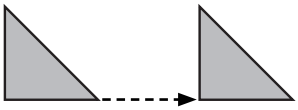
2D space – flip, slide, turn

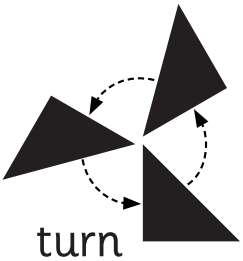
We can flip, slide and turn shapes.



flip



slide

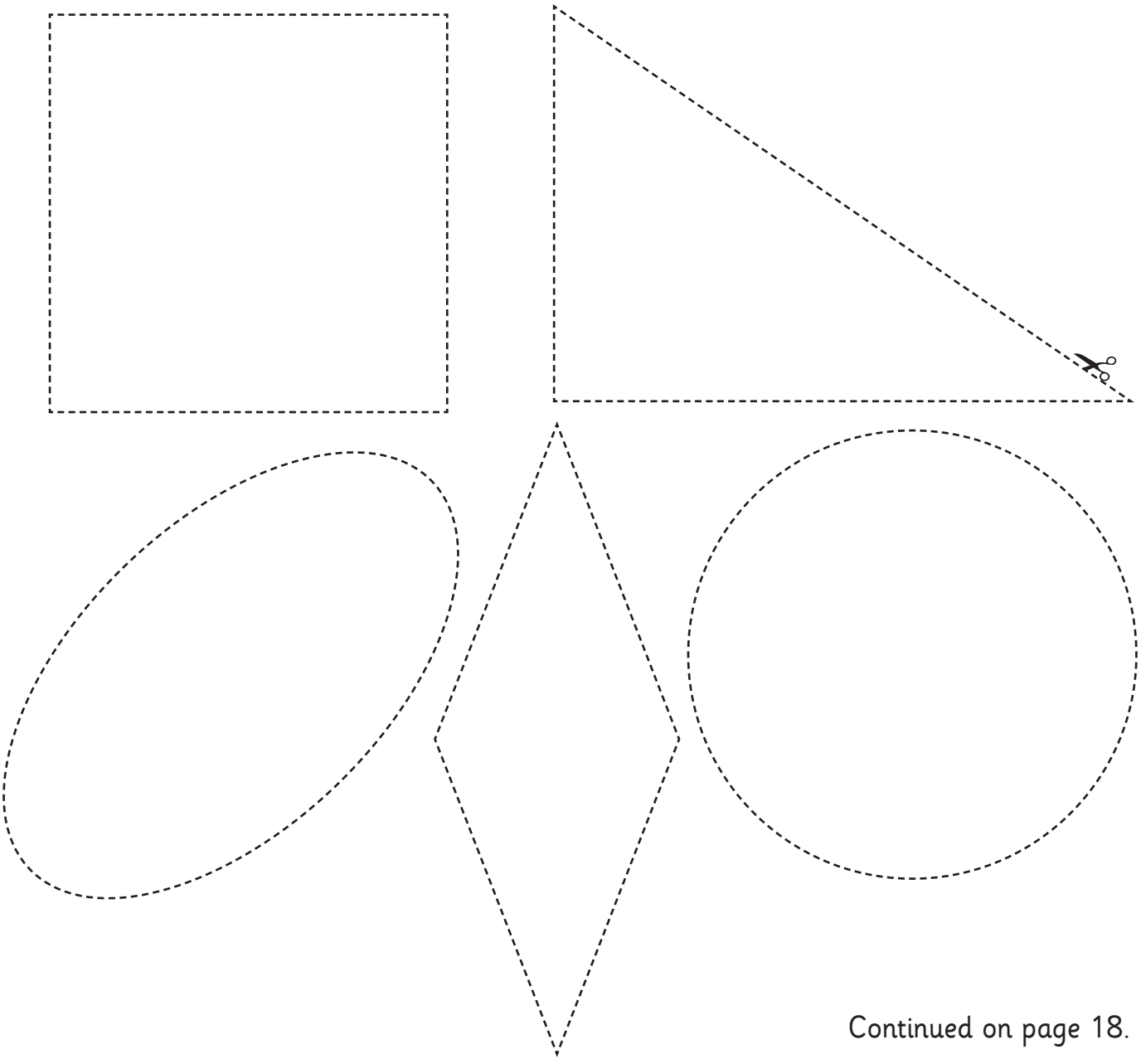


turn

C copy

What to do:

Cut out these shapes. Colour 1 side of each shape grey and the other side black.



Continued on page 18.

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2D space – flip, slide, turn

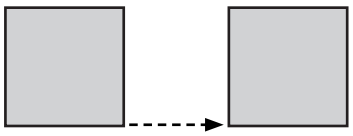
Continued from page 17.

What to do next:

Look at the shape on the left and then in its new position on the right. Did we flip, slide or turn it to make it look like that? Use your shapes to help you find out.

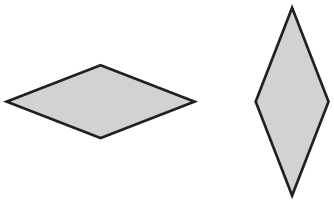
1 Colour the right word.

a



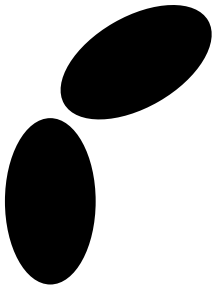
flip
slide
turn

b



flip
slide
turn

c

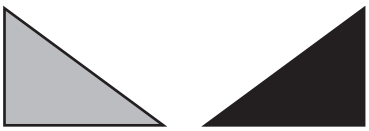


flip
slide
turn

d

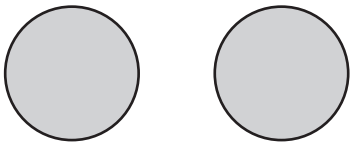
flip
slide
turn

e



flip
slide
turn

f



flip
slide
turn

2 When we make patterns with blocks, we often flip, slide and turn them to make them fit. Get some pattern blocks and create a pattern. Notice what you are doing each time you fit a block. Tell someone about some of your flips, slides and turns.

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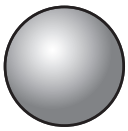
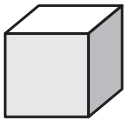
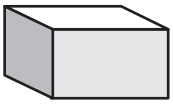
3D space – solids

These are some 3D objects.

They are not flat like △ or □. We often call 3D objects **solids**.

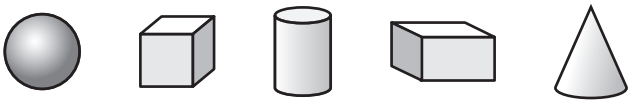
1 What are some everyday objects that are the same shape as these solids? Draw or write something for each solid.

 sphere	 cube	cylinder	 prism	cone

2 Circle the solids:

a that would **roll**

b that would **stack**



c that you have **the most of** in your classroom

d that you have **the least of** in your classroom

If it helps, find examples and test them out.

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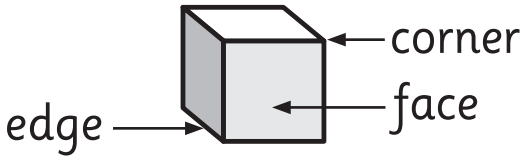
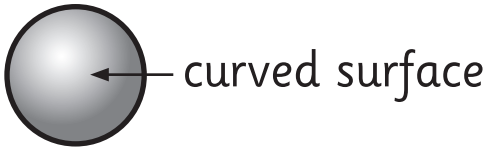
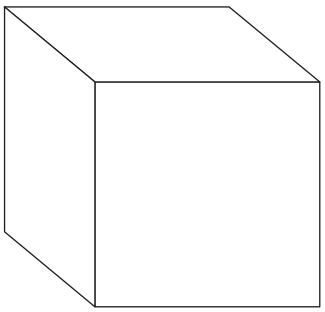
3D space – faces, edges and corners

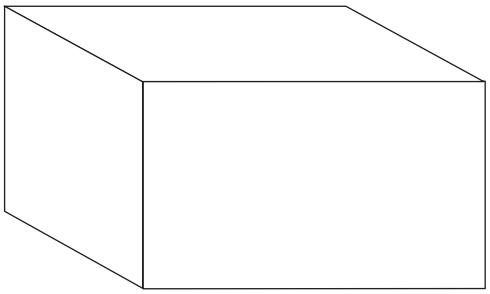
Solids can have faces, edges and corners. Some have lots of them. Some don't have any corners or edges at all.





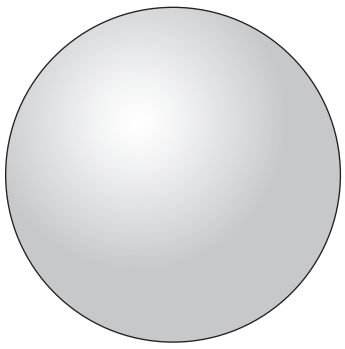
1 What can you see?
Colour the ***faces*** with a blue pencil
Trace the **edges** with a green pencil.
X the **corners** with a yellow pencil

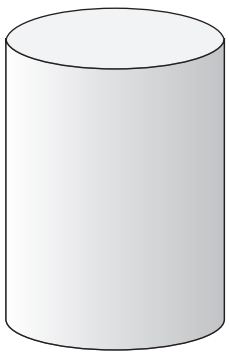




2 What can you see?
Colour the **curved surfaces** with a blue pencil.
Trace the **edges** with a green pencil.

Do these solids have any **corners**? _____





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3D space – faces, edges and corners (big group activity)

You will need: your teacher or a leader solids

What to do:

Each player needs a solid with faces, edges and corners.

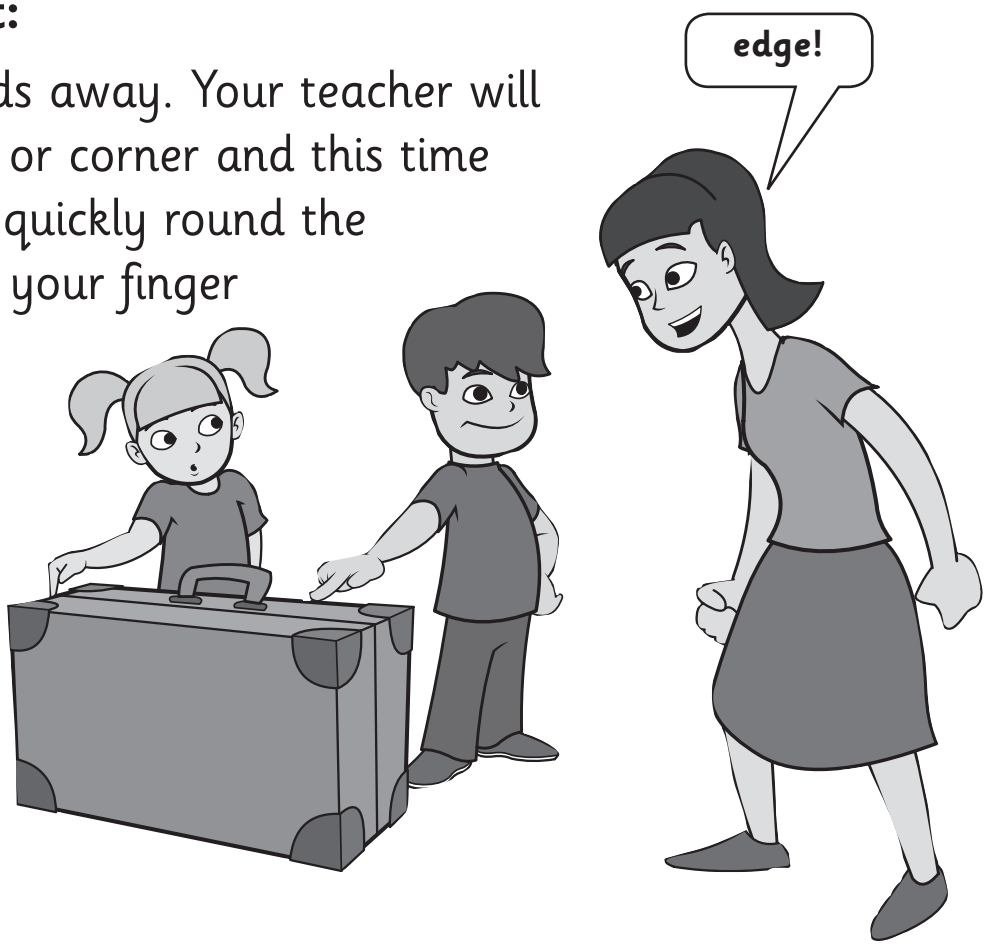
The leader will call out face, edge or corner. Point to the right thing on your solid. If you are wrong, you must sit down. The last player standing, wins.

Watch out, the game will get faster and your leader may switch your solids around!

What to do next:

Now put your solids away. Your teacher will call out face, edge or corner and this time you need to move quickly round the classroom and put your finger on a face, edge or corner.

You must move to a different object every time.



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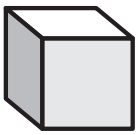
3D space – faces, edges and corners

The faces of solids are 2D shapes.



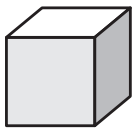
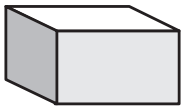
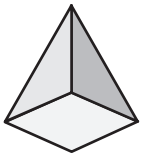
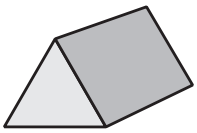
This cube has 6 faces.

All the faces are squares. ☐

You will need: solids

What to do:

Find an example of each of these solids and draw the shapes of their faces.

This solid	has these faces
	☐ ☐ ☐ ☐ ☐ ☐
	
	
	

What to do next:

Find a classroom object such as a book or tissue box. Draw its faces.

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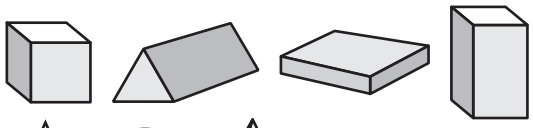
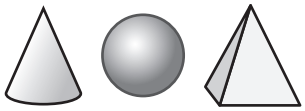
3D space – prisms

Some solids belong to a group called **prisms**.

These are all prisms. 

These are NOT prisms. 

Let's see if we can work out why.

You will need: a partner sticky notes

solids or classroom objects as shown in the box above

What to do:

Find an example of each prism and each 'not prism'. Look at them, touch them and examine their faces very carefully.

Talk with your partner and come up with your reason why you think some of the shapes are prisms and some are not. Write it here.

What to do next:

Get 10 sticky notes and go round the room finding prisms according to your rule. Write **p** on the note and stick it on the prism. Do other teams agree with you? Talk about it with your teacher.

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3D space – prisms

Prisms have 2 matching end faces.

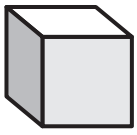
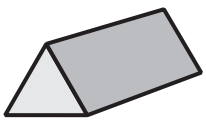
All the other faces are always rectangles or squares.

This is a prism because it has 2 square end faces and 4 rectangular faces.

You will need: a partner solids or objects in the table below

What to do:

Find an example of each solid below and study its faces. Colour the answers to the questions for each solid.

Solid	Do I have 2 end faces that are the same?	Are my other faces either squares or rectangles?	Am I a prism?
	yes no	yes no	yes no
	yes no	yes no	yes no
	yes no	yes no	yes no
	yes no	yes no	yes no

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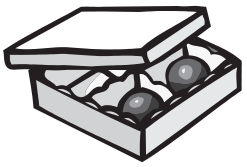
3D space – prisms

Food boxes are usually prisms.



You will need: your kitchen cupboard or a supermarket

What to do:

Look in your cupboards or on the supermarket shelf. How many prisms can you find? Record them below.

What to do next:

Did you find any food boxes or containers that are not prisms? Record them here.

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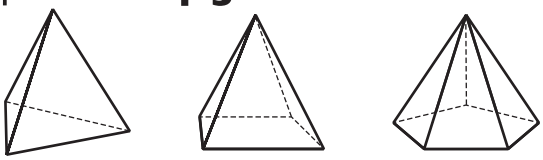
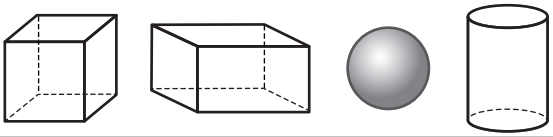
3D space – pyramids

Some solids belong to a group called **pyramids**.

These are all pyramids.



These are NOT pyramids.



You will need: a partner solids

What to do:

Look at the solids above or find examples in your classroom. What makes a solid a member of the pyramid group? Record your thinking here.

What to do next:

Do pyramids stack? Try stacking some and see. If you can do it, explain how. If not, why do you think this is?

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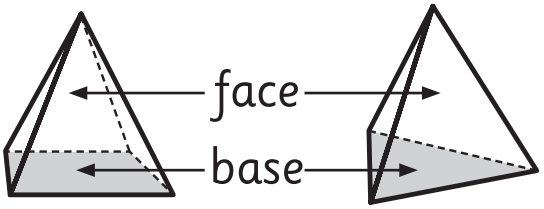
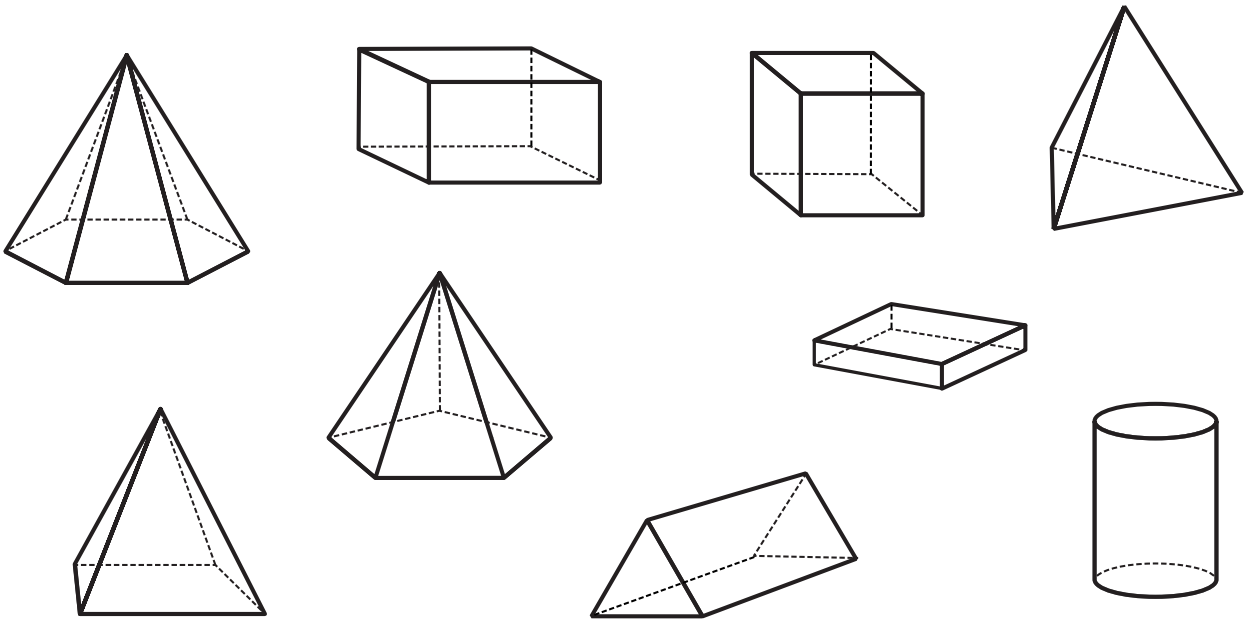
3D space – pyramids

Pyramids have one **base**. The base always has **straight sides**. The other faces are **always** triangles. The triangular faces meet at a point.

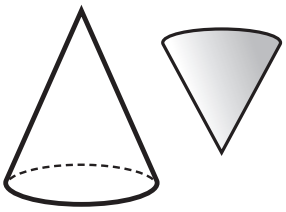


Pyramids can stand on their base or lie on one of their triangular sides. They are still pyramids even if they are lying on their side.

1 Loop the pyramids in this group.



2 These solids are called cones. They are cross because they don't understand why they can't be pyramids. Can you explain it to them?



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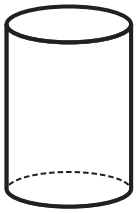
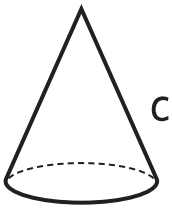
3D space – explore

You will need: a partner solids

What to do:

Find these 2 solids.

cylinder   cone

Look at them carefully and talk with your partner to decide:

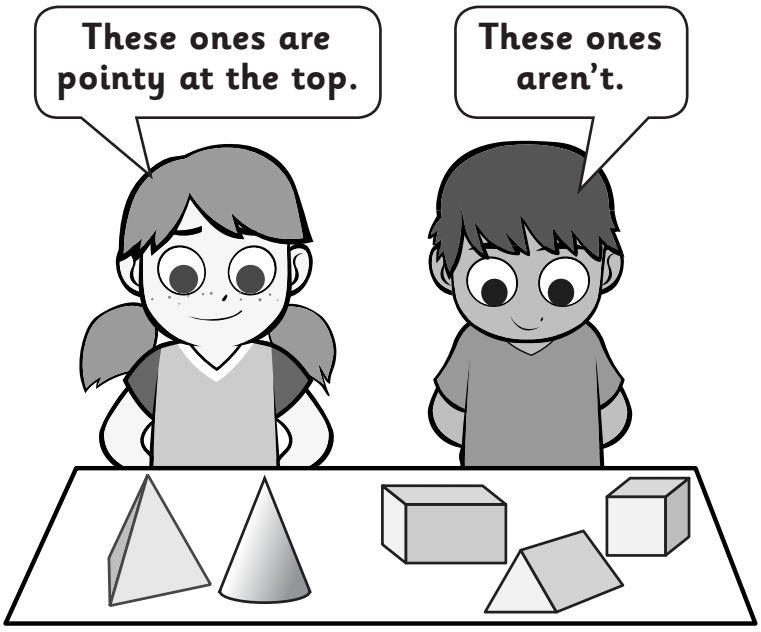
a What is **the same** about them?

b What is **different** about them?

What to do next:

Get a group of solids.
Sort them. Explain to your teacher or another pair why you sorted them that way.

Sort them another way.
Explain to your teacher or another pair why you sorted them that way.



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3D space – explore

You will need: a partner who can read

What to do:

Listen to your partner read this. They will record your answers for you.

Close your eyes. Pretend you are inside a big **cylinder**. Reach up to the top of your cylinder and trace it with your finger. What shape do you draw?

Now trace the bottom of the cylinder with your foot. What shape do you draw?

Feel the 'walls' of your cylinder. Describe how they feel to you.

What to do next:

Now close your eyes again and pretend you are inside a **box**.

What shape is the bottom of your box?

What shape is the top of your box?

How many faces does your box have? What shapes are they?

How many corners does your box have?

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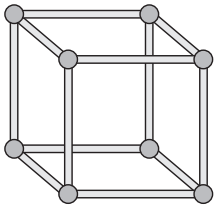
3D space – explore

You will need: a partner match sticks, straws or pop sticks

Blu-tak or tape

What to do:



You are going to build skeleton models using straws and tape. This is an example of one.

a Construct your own cube using your equipment.

b Finish these statements.

Our cube has _____ edges.

Our cube has _____ corners.

What to do next:

a Choose another solid to construct. Work with your partner to build it.

b Finish these statements.

Our _____ has _____ sides.

Our _____ has _____ corners.

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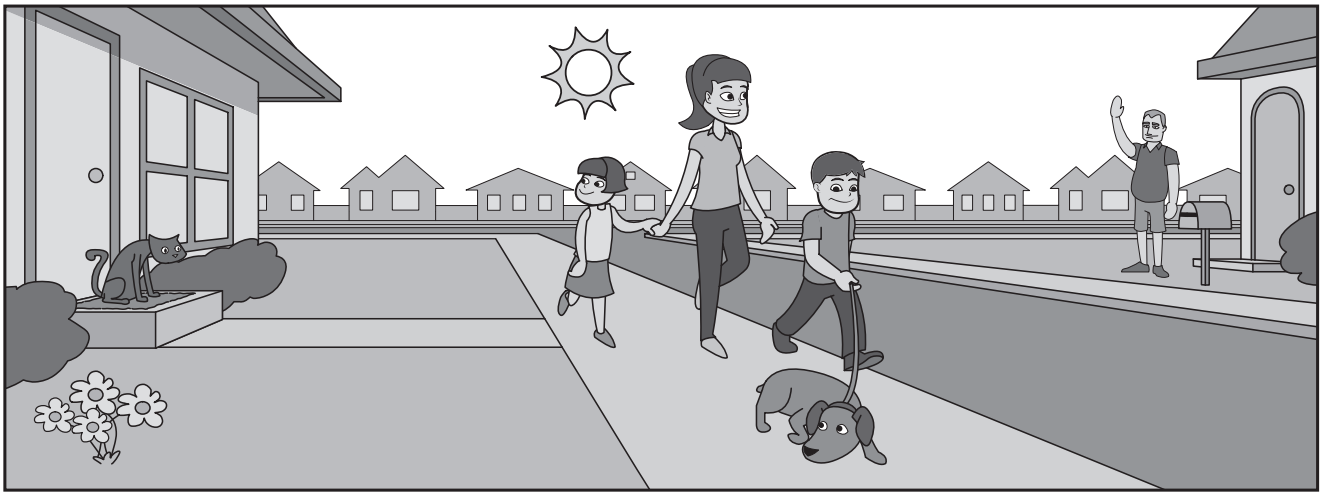
Position – language

1 What are some words you use to tell us where something is? Write them. Share your ideas with someone else and see if you can add to your list.

next to behind

2 Look at the picture and choose the position words to finish the sentences.



a The is _____ the .

b The is _____ the .

c The is _____ the mat.

d The is _____ from the .

e The is _____ the .

f Write your own sentence.

under
next to
far away
on
below
in front of
between

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Position – language

1 Draw some things in your classroom that you can go:

under	**over**	**around**

2 What can you see that is:

in front of your teacher's desk?	**behind** your teacher's desk?	**next to** your teacher's desk?

3 You will need a partner. Take turns giving each other simple instructions like 'I want you to go **over** 2 things and then **under** 1 thing.' The playground is a good place to do this activity.

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Position – language

1 Draw:

a a girl **next to** the sandpit.

b a boy **on** the slide.

c 2 flowers **under** the climbing frame.

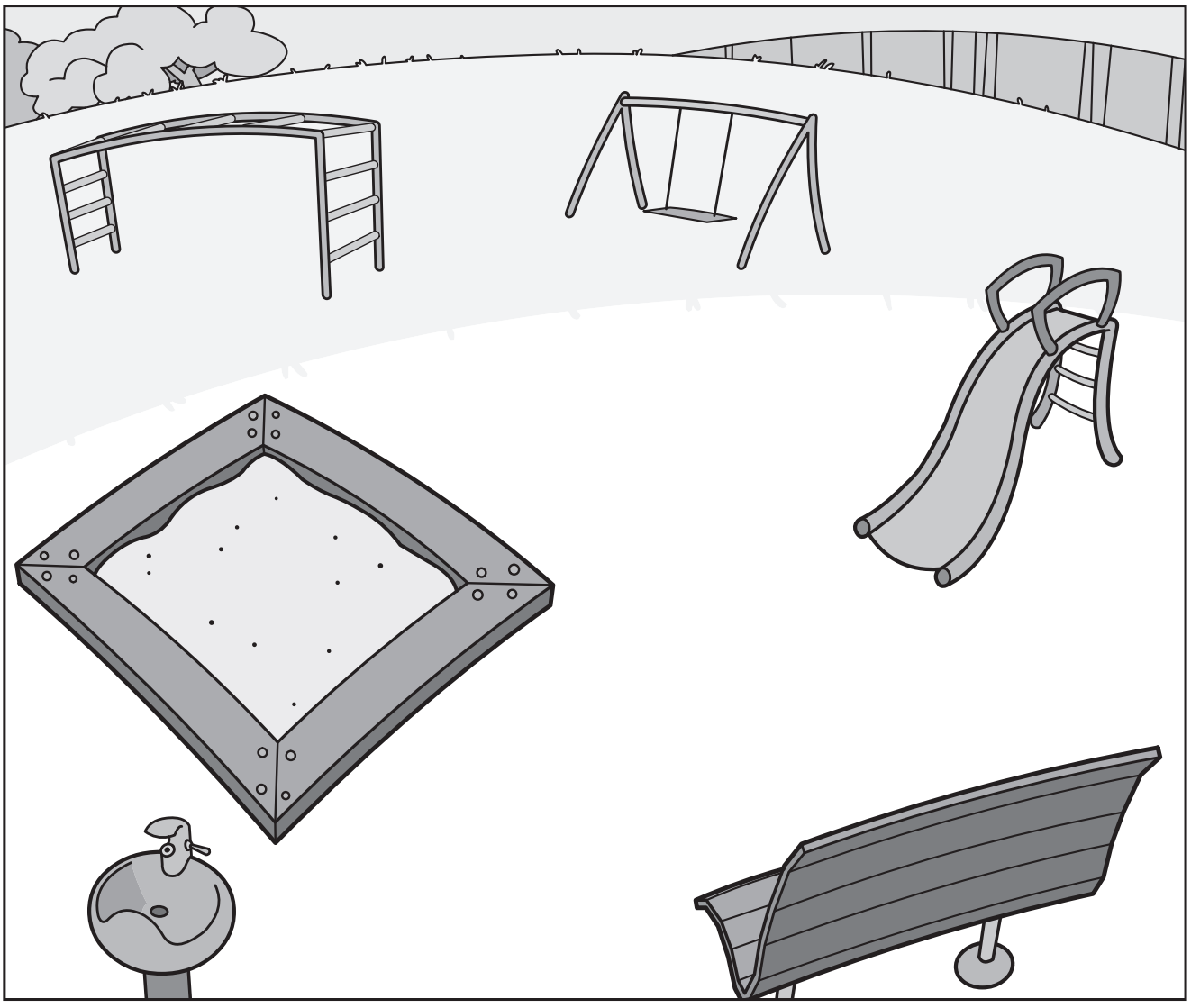
d a boy **beside** the bubbler.

e a bucket and spade **in** the sandpit.

f a girl **behind** the swing.

g yourself. Where are you?

I am _____.



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Position – visual memory

You will need: a tray a tea towel classroom objects

What to do:

Put some objects (stapler, pencil, glue stick, etc) on a tray.

Let your partner look at them for 5 seconds, then cover the tray.

Take 1 object away without letting your partner see what it is.

Show them the tray again.

Can they guess which object is missing?

Swap roles. Play 3 times each.

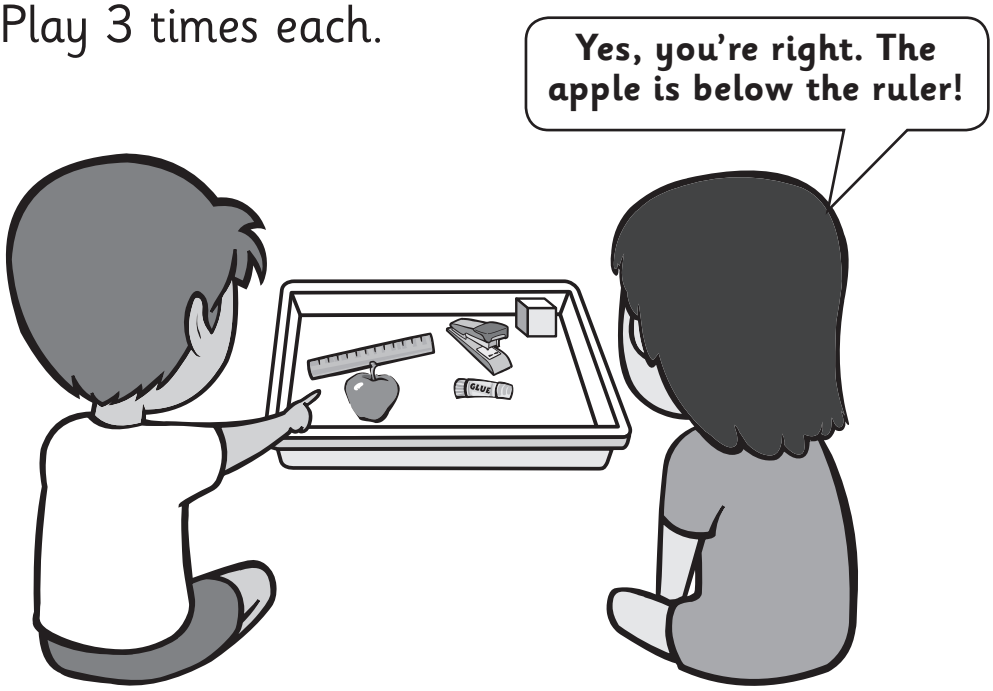
What to do next:

This time, make sure you are sitting side by side.

Show the tray for 5 seconds then cover it.

Ask your partner where something is. Are they right?

Swap roles. Play 3 times each.



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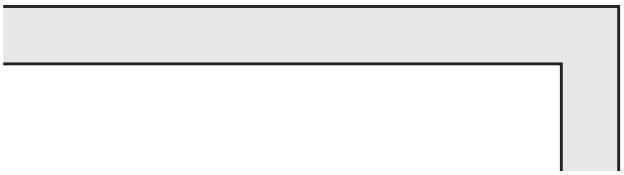
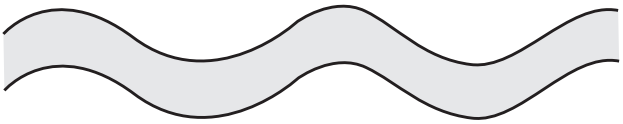
Position – paths and directions

1 **a** If you walked a path that looked like this from above, where could you be going?

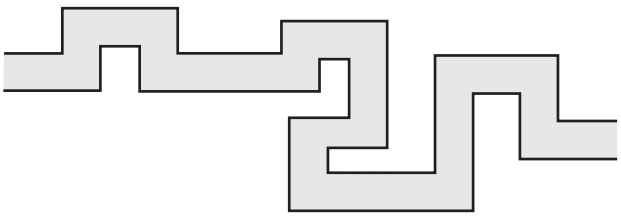


b Make up a story that would fit this walk. Write it here.

2 What about this path? Where could you be walking?



3 Now try this path.



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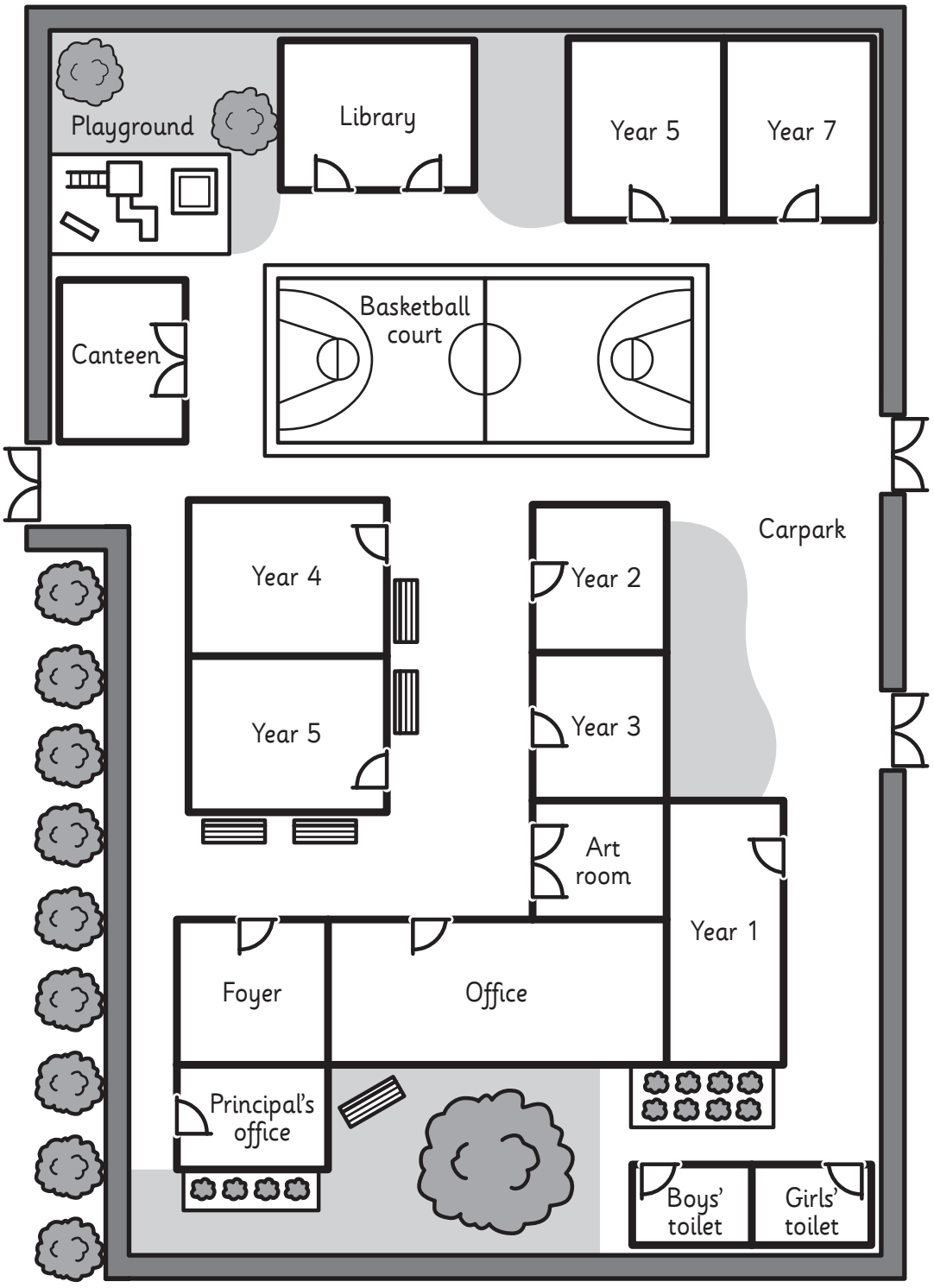
Position – paths and directions

1 Show 1 way from the library to the Year 1 classroom. Explain your way to someone.



2 Show 2 different ways from the library to the Year 1 classroom.

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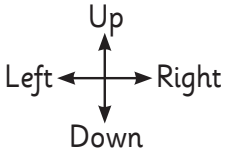
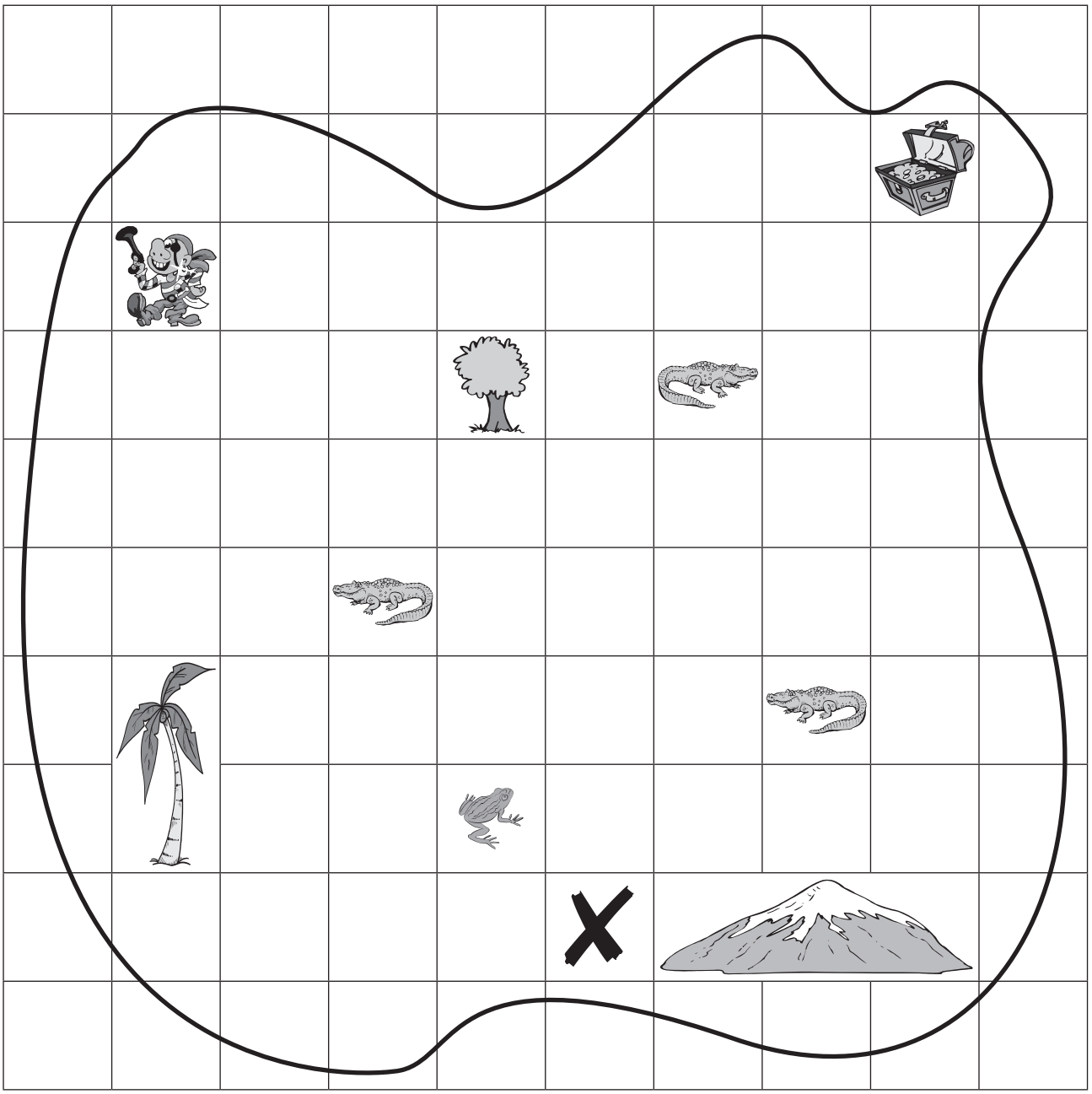
Position – paths and directions

1 Follow the directions to get from the ✕ to the treasure. Colour and count the squares as you go.





Up 3	Left 1	Up 1	Left 2	Up 2	Right 5	Up 1	Right 1

2 Can you find a shorter path? You must go around any obstacles. Colour this path a different colour. Can you write the directions to match?

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Position – mapping

You will need: pencils

What to do:

Draw a map of your bedroom. Sketch it lightly. When you get home, check your map. Did you remember correctly or do you need to make some changes? Once you are happy, colour and label your map.

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