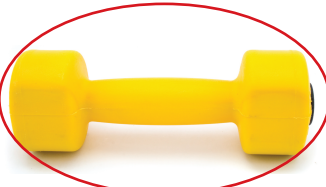


Name 3D objects

- 1 Look at the sports equipment. Circle the objects that look like prisms in **blue**, the cylinders in **red**, spheres in **yellow** and cones in **purple**.

Three-dimensional (3D) objects are also called solid. They have height, width and depth.



- 2 These pyramids have been made with different 3D objects. Can you name them?



soccer balls

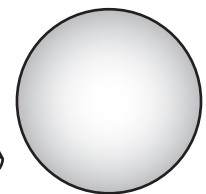
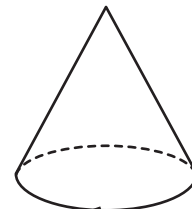
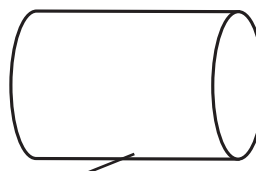
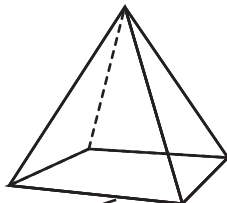
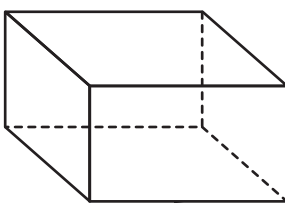


boxes



batteries

- 3 Draw a line to match the 3D object to its name.



pyramid

cylinder

cone

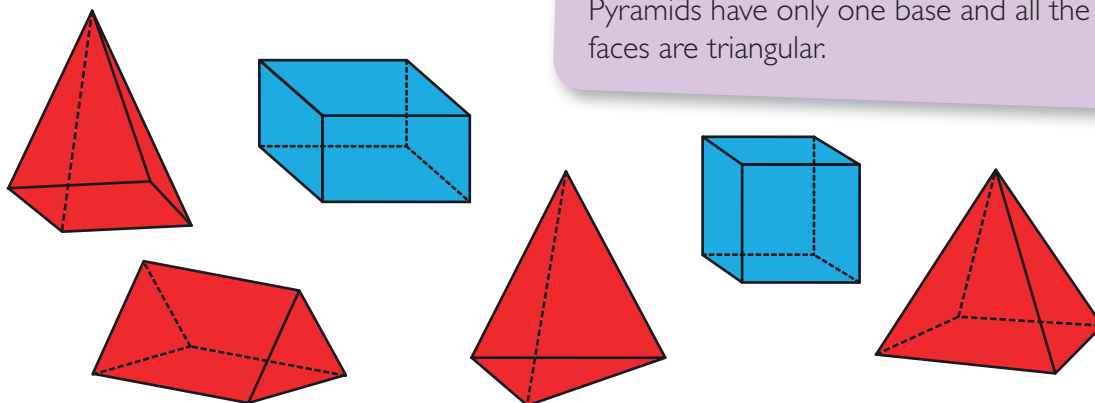
prism

sphere

MIB 2
Card
137

Prisms and pyramids

- 1 Colour the prisms **blue** and the pyramids **red**.



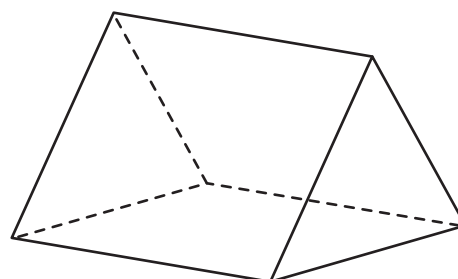
Prisms have two bases that are the same shape and size. All the other faces are rectangular. Pyramids have only one base and all the other faces are triangular.

- 2 Find and draw two items in your classroom that are:

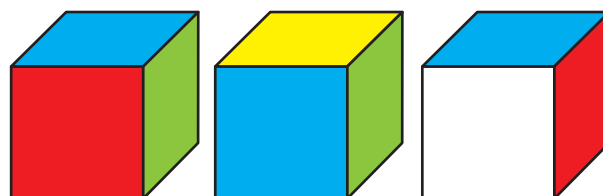
Prisms	Cylinders	Cones	Spheres
Answers will vary			

- 3 Explain why this 3D object is a prism.

It has two triangular bases, and all the other faces
are rectangular

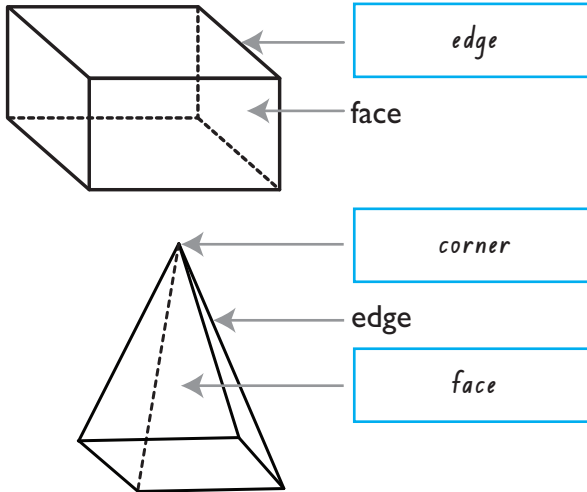


Look at the 3 pictures of a cube from different angles. What colour is opposite red?

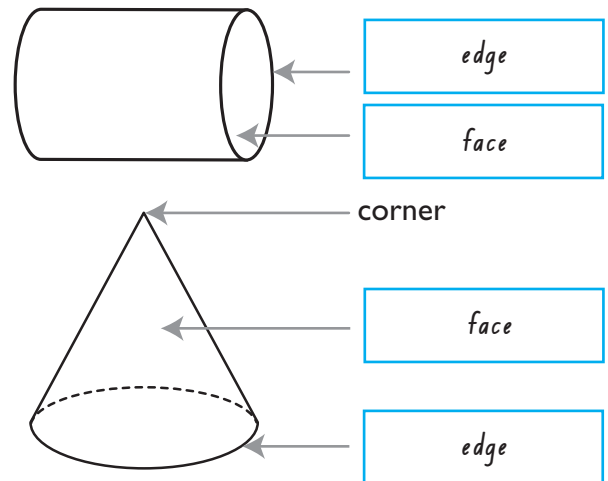


Faces, edges and corners

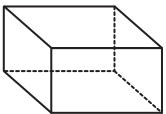
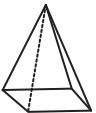


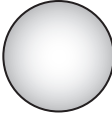
- 1 Use the words **face**, **edge** or **corner** to correctly label the arrows. Some have been done for you.



A **face** is a surface of a solid object.
An **edge** is where two faces meet.
A **corner** is the point where two or more edges meet. It is also called a vertex.



- 2 Complete the table.

Solid	Name	Number of faces	Number of edges	Number of corners
	<i>rectangular prism</i>	6	12	8
	<i>pyramid</i>	5	8	5
	<i>cylinder</i>	2	2	0
	<i>cone</i>	2	1	1
	<i>sphere</i>	1	0	0

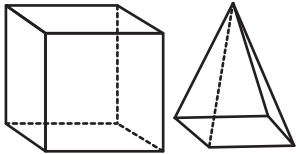
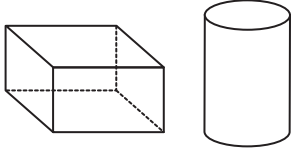
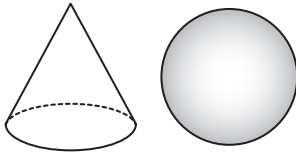

Dice come in many shapes and sizes. An 8-sided die is a type of octahedron. How many edges does it have? What do you call a die with 12 sides? What about 20?



Compare 3D objects

1

Compare the two 3D objects by discussing similarities and differences. The first one has been done for you.

Compare the two 3D objects	Similarities	Differences
	<ul style="list-style-type: none"> Both have flat surfaces. Both have a square base. 	The prism has 6 faces but the pyramid has only 5.
	<ul style="list-style-type: none"> Both have flat surfaces 	The prism has 6 faces but the cylinder has only 3
	<ul style="list-style-type: none"> Both have a curved surface 	The cone has 2 faces but the sphere has only 1
	<ul style="list-style-type: none"> Both have a flat base Both come to a point 	The pyramid has 5 faces but the cone has only 2.

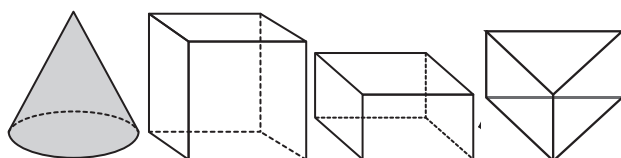


You could think about:

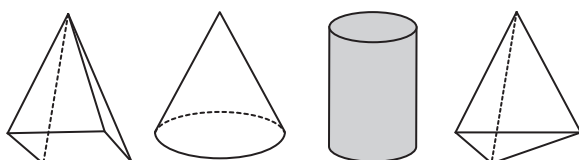
- the number of faces
- the number of edges
- the number of corners
- its ability to stack or roll
- the 2D shapes that make up each face
- whether their faces are flat or curved.

2

In each set colour the 3D object that doesn't belong. Explain your answer.











not a prism



doesn't have any corners

3D objects in the environment

- 1 Michelle loves to travel and send postcards to her friends. Identify and name the 3D object illustrated in each postcard?

prism	pyramid	cylinder	cone	sphere
<p>Greetings from Egypt</p> 	<p>Greetings from Russia</p> 	<p>Greetings from Italy</p> 	<p>Greetings from Australia</p> 	
<i>pyramid</i>	<i>sphere</i>	<i>cylinder</i>	<i>prism</i>	
<p>Greetings from Portugal</p> 	<p>Greetings from England</p> 	<p>Greeting from Mexico</p> 	<p>Greetings from USA</p> 	
<i>prism</i>	<i>cylinder</i>	<i>pyramid</i>	<i>sphere</i>	

- 2 a How many 3D objects are in the model?

25

- b How many cylinders are in the model?

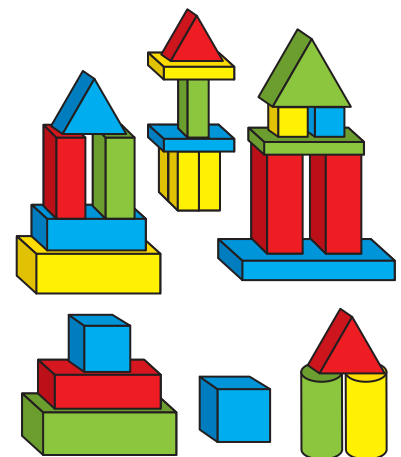
2

- c Are there more rectangular prisms or cubes?

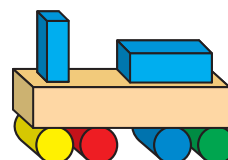
rectangular prisms

- d Why do you think this model has been made out of prisms and cylinders rather than cones, pyramids and spheres?

can stack prisms and cylinders



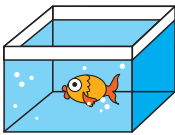

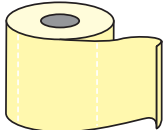

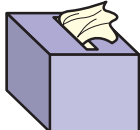




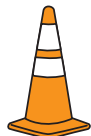


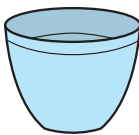



Deniz made this model out of prisms and cylinders. What is the total number of faces on all the solids in his model?

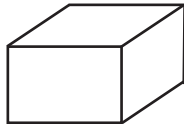




Describe 3D objects

1 Circle the 3D objects in each row that match the description.

6 square faces				
a curved surface				
no corners				
12 edges				

2 Use the clues to name and draw the correct 3D object in the box.

Clue	Name	Drawing
I have 6 faces and 8 corners. All my faces are square in shape. I have 12 edges.	<i>cube</i>	
I have 3 faces. Two of my faces are circles. I have 2 curved edges. I don't have any corners.	<i>cylinder</i>	
I have one curved and one flat surface. I have one corner. I have one curved edge.	<i>cone</i>	

3 Describe a sphere.

round surface, no edges, no corners

3D models

- 1 This photo shows a Sydney skyline. Name some of the 3D objects that you can see in the photo.

rectangular prisms

cylinder



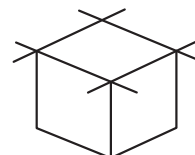
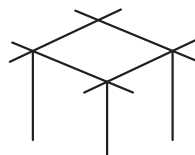
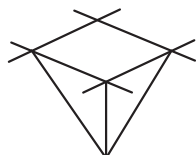
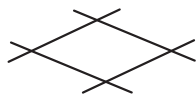
- 2 Make a model of a city skyline using cardboard cartons, toilet rolls, empty boxes and other craft material. Draw and label your model using the names of 3D objects.



MIB 2
Card
136

Sketch 3D objects

1 Pyramids and prisms can be drawn using parallel lines.



Step 1: Draw two pairs of parallel lines that cross.

Step 2a: To draw a pyramid, choose a point in the middle of your drawing (below or above it) and join lines from three of the corners to this point (as shown above).

Step 2b: To draw a prism, draw three lines of equal length straight down from the corners.

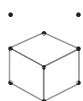
Step 3: Join the ends to get a prism.

Using the steps above, draw 2 pyramids and 2 prisms of different sizes.

Students' answers will vary.

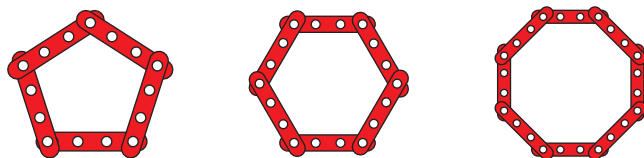


2 Prisms and pyramids can also be drawn on isometric dot paper. Draw some prisms and pyramids of your own. One has been started to help you.



2D shapes

- 1 Using Geostrips make a pentagon, a hexagon and an octagon.



Fill in the table.

Name of shape	Number of sides	Number of angles
Pentagon	5	5
Hexagon	6	6
Octagon	8	8

'Penta-' means 5. A pentagon is a 5-sided shape.

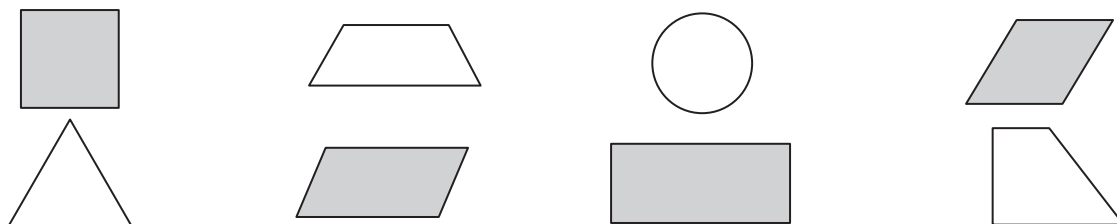
'Octa-' means 8. An octagon is an 8-sided shape.

'Hexa-' means 6. A hexagon is a 6-sided shape.

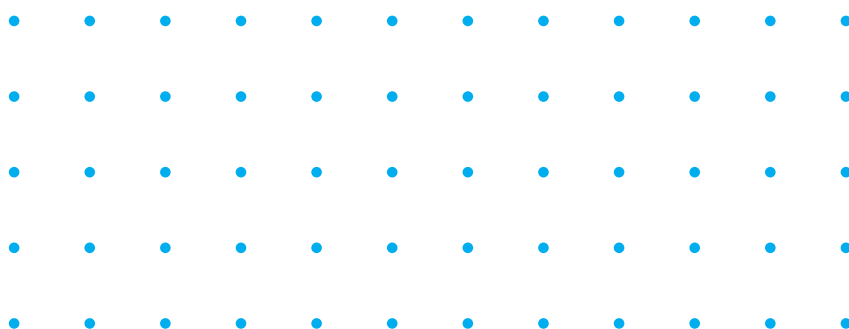
A parallelogram is a 4-sided shape where each pair of opposite sides is parallel and of equal length.



- 2 Colour the shapes below that are parallelograms.



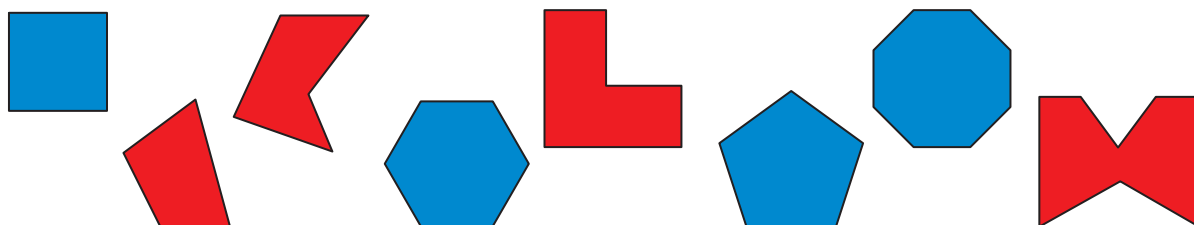
- 3 What shapes do you know that are parallelograms? Using dot paper, draw these different parallelograms and label them.



Students' answers will vary.

A regular polygon has all its sides equal in length and all its angles equal.

- 4 Colour all regular polygons blue and irregular polygons red.



2D shapes in the environment

1 Name the shape and the number of sides on each road sign.



Sign					
Name of shape	triangle	octagon	square	rectangle	circle
Number of sides	3	8	4	4	0

Word Bank

octagon
circle
rectangle
triangle
square

2 Do these signs look like squares or rhombuses?

squares

How do you know? All equal sides and

equal angles



3 Design your own road signs using a pentagon, a hexagon and a rhombus.

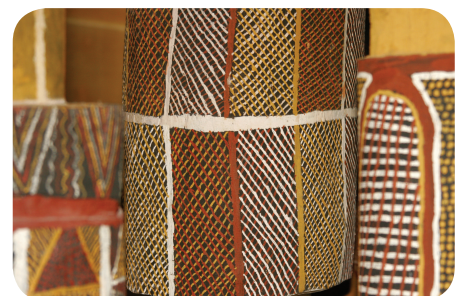
Students' answers will vary.

4 Which 2D shapes can you see in this Aboriginal art?

triangles

rectangles

squares

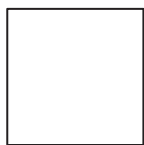


When you draw all the diagonals on a pentagon what shape do you see? How many triangles can you count?

MIB 2
Cards
151 & 152

Quadrilaterals

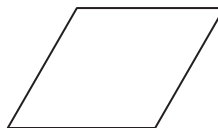
1 Name these quadrilaterals.



square



rectangle



rhombus



parallelogram



trapezium



24

2 Use a Geoboard to make quadrilaterals using these attributes and then draw the quadrilaterals on the Geoboard below.

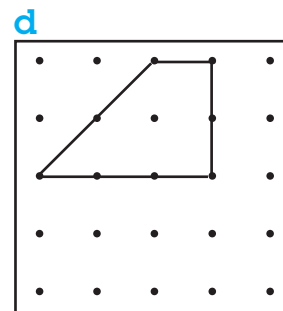
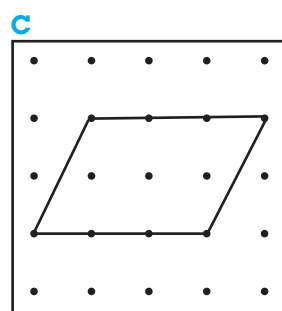
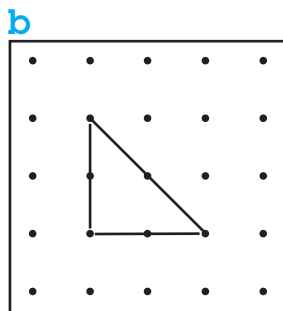
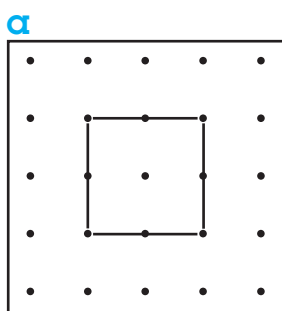
- a Four equal sides and angles
- b Two equal sides and one square angle
- c One pair of opposite sides parallel
- d No equal sides and no equal angles

A quadrilateral is a polygon with four straight sides.

Word Bank

parallelogram
rectangle
rhombus
square
trapezium

Which quadrilateral is a regular shape?



3 This garden is made up of many quadrilaterals. On another piece of paper, design your own garden using parallelograms, rectangles, rhombuses, squares and trapeziums.



How many different sized squares can you make on a 5×5 Geoboard?

MIB 2
Card
154&156

Comparing 2D shapes

1 What shape am I?



a I have 5 equal sides and 5 equal angles. pentagon

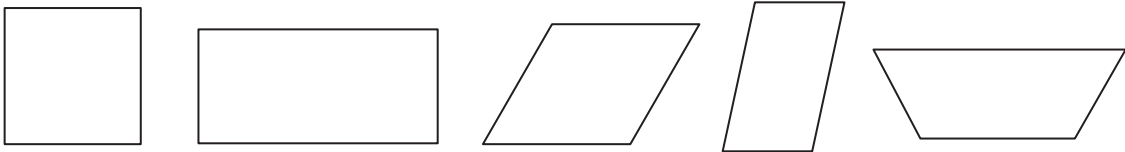
b I have 8 equal sides and 8 equal angles. octagon

c I am a quadrilateral with one pair of opposite sides parallel. trapezium

2 Look at the pictures. What geometric features do they have in common? They both have equal sides and equal angles.



3 Write down 2 features that these shapes have in common.



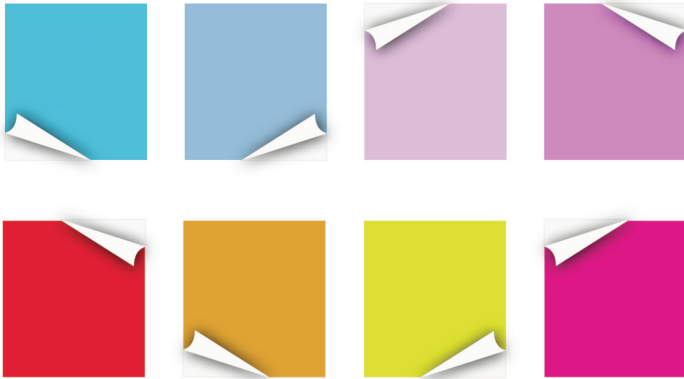
quadrilateral

regular

Complete the matrix by looking for patterns in shape and colour going across and down.

Describe a position

1



The red arrow is pointing to the right and the blue arrow is pointing to the left.
The words 'top', 'bottom', 'left' and 'right' are used to describe position.



Use the words 'top', 'bottom', 'left' and 'right' to describe the position of the fold in each piece of paper. The first one has been done for you.

a bottom left	b bottom right	c top left	d top right
e top right	f bottom left	g bottom right	h top left

2

- Put a tick on the object between the webcam and the headphones.
- Put a square around the object above the computer mouse and 2 below the green mobile phone.
- Put a cross on the object on the right-hand end of the 3rd row from the top.
- Circle the object 2nd from the left on the top row.
- Shade the object that you would most like to own. Describe its position.

Students' answers will vary.



MIB 2
Card
167

Location of an object

- 1 Write down the name of the food that fits the description of its position.

a Top row in the middle

cheese

b 2nd row from the top, 4th from the left

ice-cream

c 4th row from the top far right

carrot

d Last row, 2nd from the right

lolly

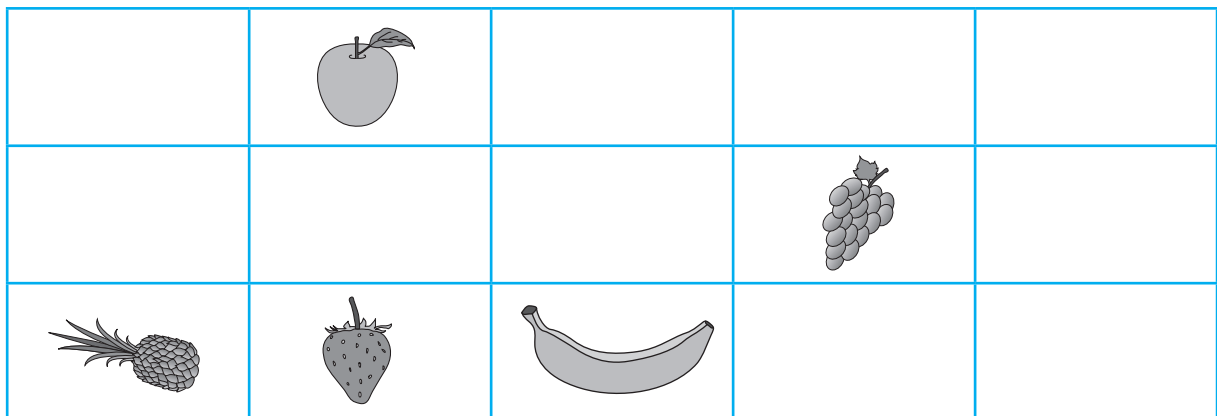


- 2 Look at the picture again. Describe the position of:

a the fish second row, middle

b the eggs fourth row, second from the left

3



a Draw an apple in the 1st row from the top, 2nd from the left.

b Draw a banana in the bottom row in the middle.

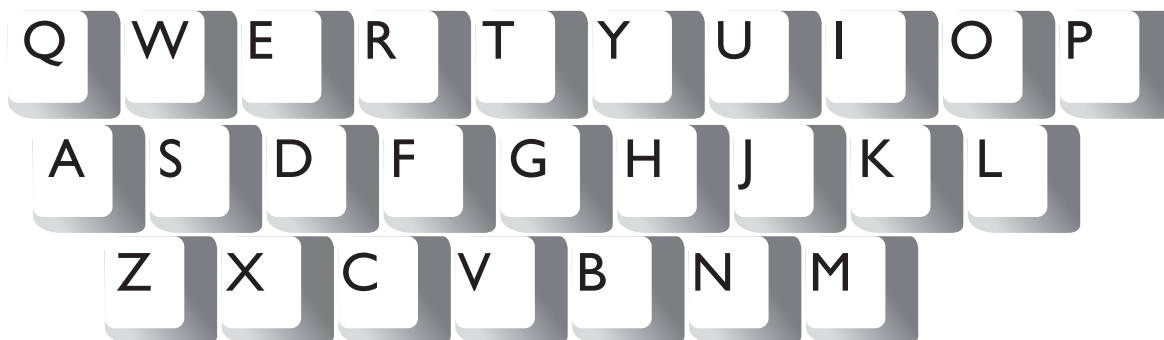
c Draw a bunch of grapes in the 2nd row from the top, 4th from the left.

d Draw a pineapple in the 3rd row from the top on the far left.

e Draw a strawberry between the banana and the pineapple.

f Describe the strawberry's position. 3rd row from top, 2nd from the left

Describe locations



1 Look at the computer keyboard. Write the letter:

- a 3rd from the left on the middle row D
- b 2nd from the right on the bottom row N
- c 4th from the right on the top row U
- d bottom row in the middle V
- e top row, 5th from the right Y

2 Write down your first name. _____

Write down the position of each letter in your name on the keyboard.

Students' answers will vary.

3 Aiden keeps his electronics on a shelf in his room. His Xbox is in front of his iPod. His DVD is on the left side of the Xbox. His mobile phone is in between the iPod and the camera. The camera is behind his laptop. Where is each electronic object? Draw each item in the correct position on the shelf.

Camera	Mobile phone	iPod
Laptop	DVD	Xbox

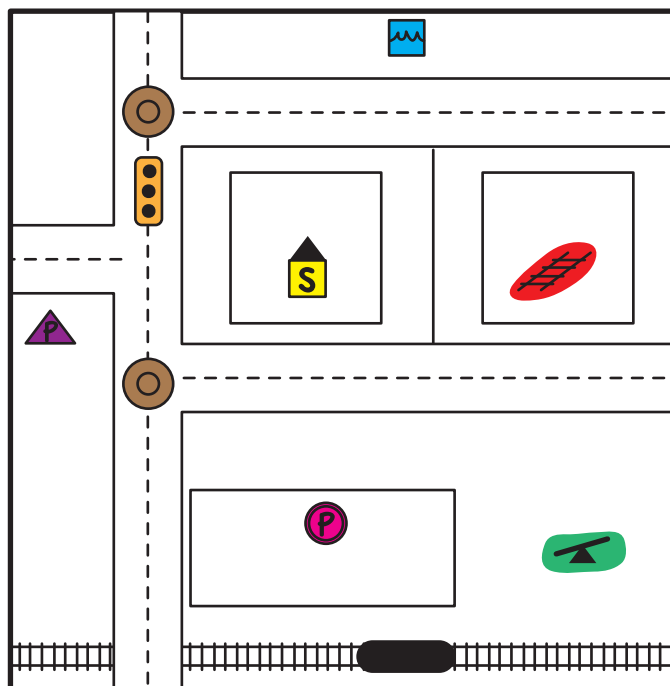
front of shelf

Use a key to a map

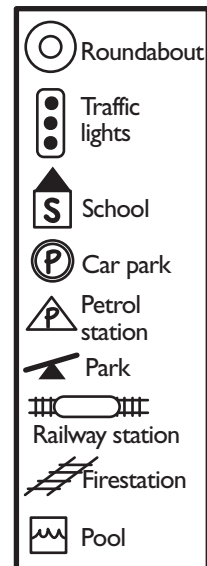
1 Use the key to locate different places on the map.

Colour the

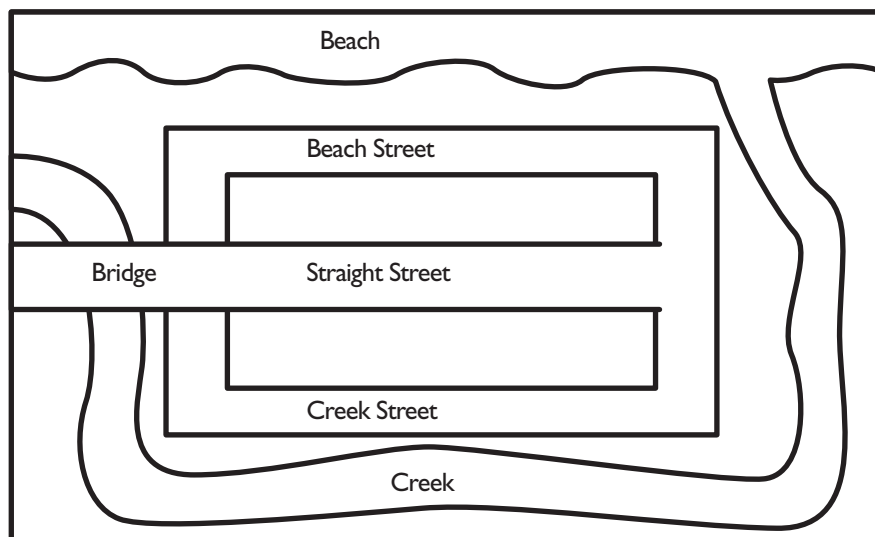
- roundabouts brown.
- pool blue.
- petrol station purple.
- railway station black.
- park green.
- car park pink.
- fire station red.
- school yellow.
- traffic lights orange.



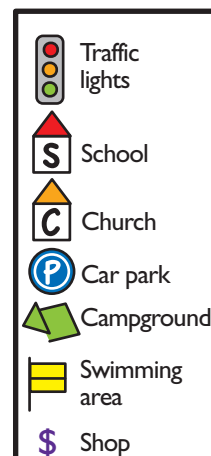
KEY



2



KEY



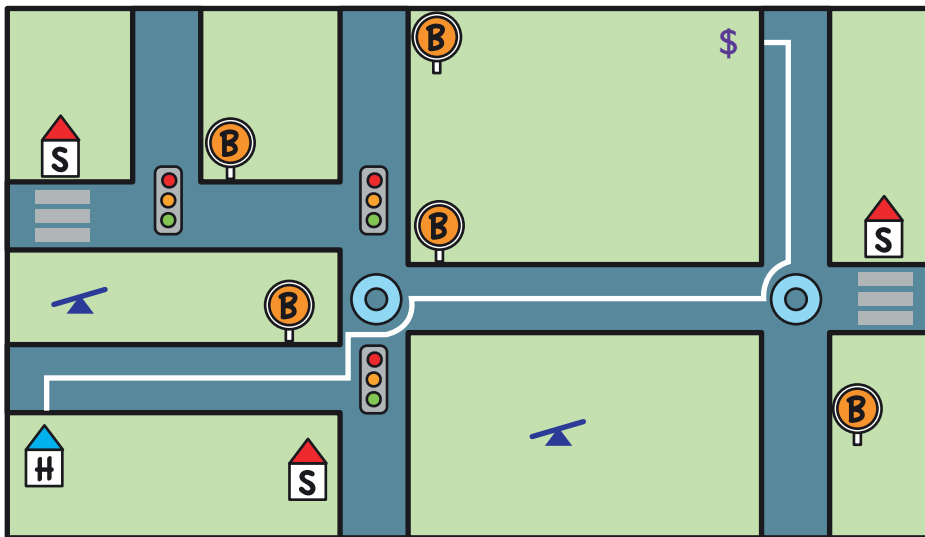
- a On the map above create your own town. Draw symbols used in the key to show where different places are. You must include two sets of traffic lights, two shops, two swimming areas and one school, church, car park and campground.
- b On which street is the school located? Students' answers will vary.
- c Is the church or campground closest to the bridge? _____

Locate places on a map

a On the map, count the number of:

schools 3 hospitals 1 parks 2

bus stops 5 shops 1 traffic lights 3



KEY



 School



\$ Shop



#	Hospital
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
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94	94
95	95
96	96
97	97
98	98
99	99
100	100



 Crossing

b Are there more traffic lights or roundabouts? traffic lights

c Is there a crossing outside each school? yes

d On the map, draw the shortest path from the shops to the hospital.

α Make up a symbol for a police station, a fountain and a mosque.

b Draw a police station between the hospital and the school.

c Draw a fountain in the park on the left.

d Draw a mosque on the opposite side of the road to the shop.



Map your school

- 1 Draw a map of your school. Include a key or legend.

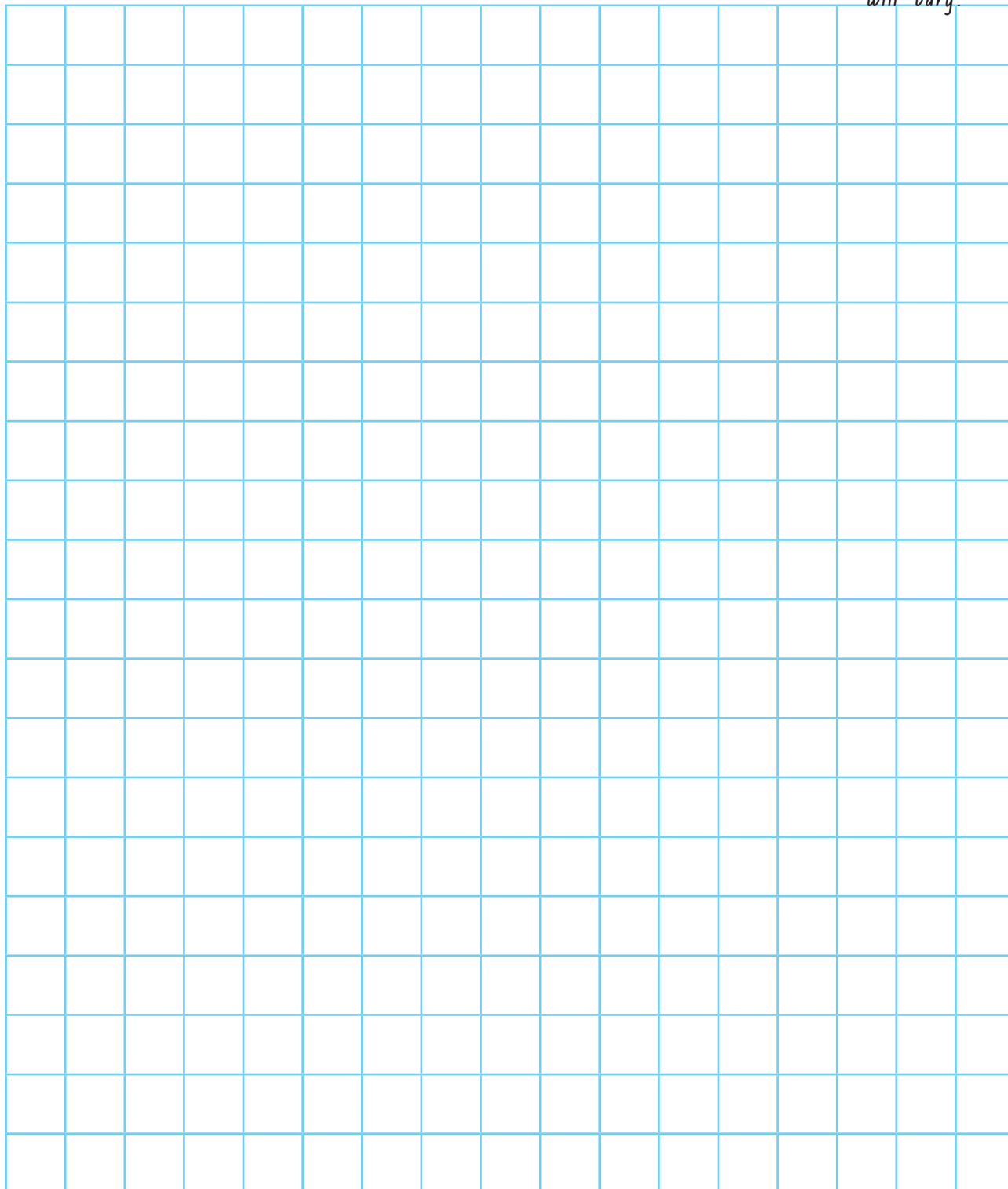
Talk about this with a partner: what 2D shapes might you use for different places around the school? What symbols could you use for your key? Should larger places in real life be bigger on your map?

Students' answers will vary.

Use a red pencil to draw the shortest path from the gate to your classroom.

Map your neighbourhood

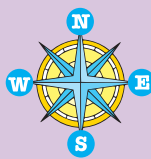
- 1 Construct a simple map of your neighbourhood including houses, roads, shops and traffic lights. Include a key or legend. *Students' answers will vary.*



- 2 Imagine you are a postie. Draw a path on your map to show how you would deliver your mail to all houses on both sides of the road.

Use a compass

A compass is an instrument that tells us direction.
N stands for north.
E stands for east.
S stands for south.
W stands for west.
The needle always points to the north.

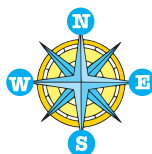


In which direction
does the sun rise?
In which direction
does the sun set?

- Stand in the middle of your classroom. Use a compass to find an object that is located at each compass point and write the name of it on the line. *Students' answers will vary.*

North _____

West _____



East _____

South _____

- Look at the treasure map. Fill in the missing words using north, south, east and west.



- Devil Cove is South of Cutlass Cliffs.
- The ship is East of Cutlass Cliffs.
- Gold Beach is North of Black Hill.
- The treasure is West of Cutlass Cliffs.

- Draw another boat west of Gold Beach. Draw a hut north of the treasure. Draw a tree east of Black Hill but west of Devil Cove.

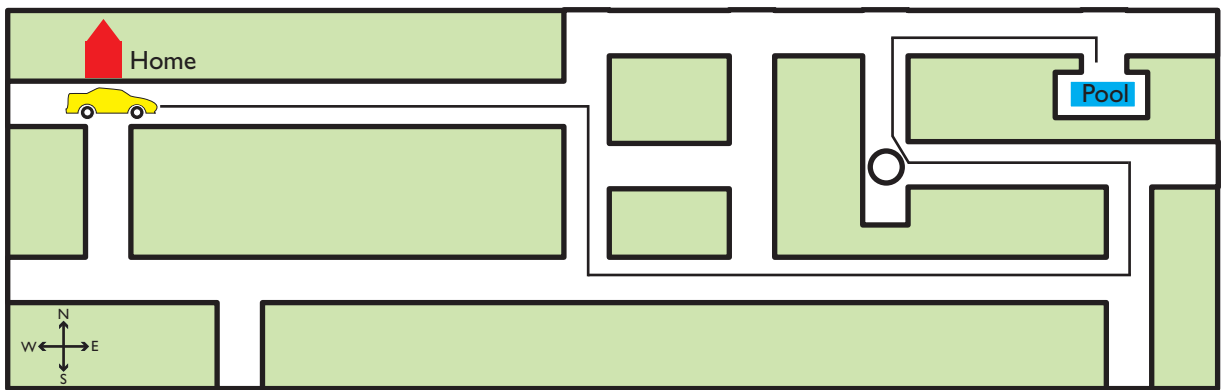
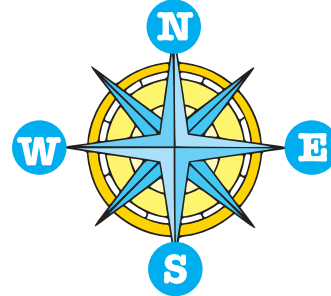


An easy way to remember the directions on a compass is to use the acronym NESW (the directions in a clockwise direction). A sentence to help you remember this is Never Eat Salty Watermelon. Make up some sentences of your own.

Follow directions on a map

1 Start at home. Use the following directions to follow the route on the map to the pool.

- a Travel east and then turn right.
- b Take the 2nd street on the left.
- c Travel east as far as you can go.
- d Travel north.
- e Travel west.
- f Turn right at the roundabout.
- g Travel east and then turn right into the pool.



2 Give directions for a driver to get from the car park near the butcher to the playground. The driver must pass by the school along the way.

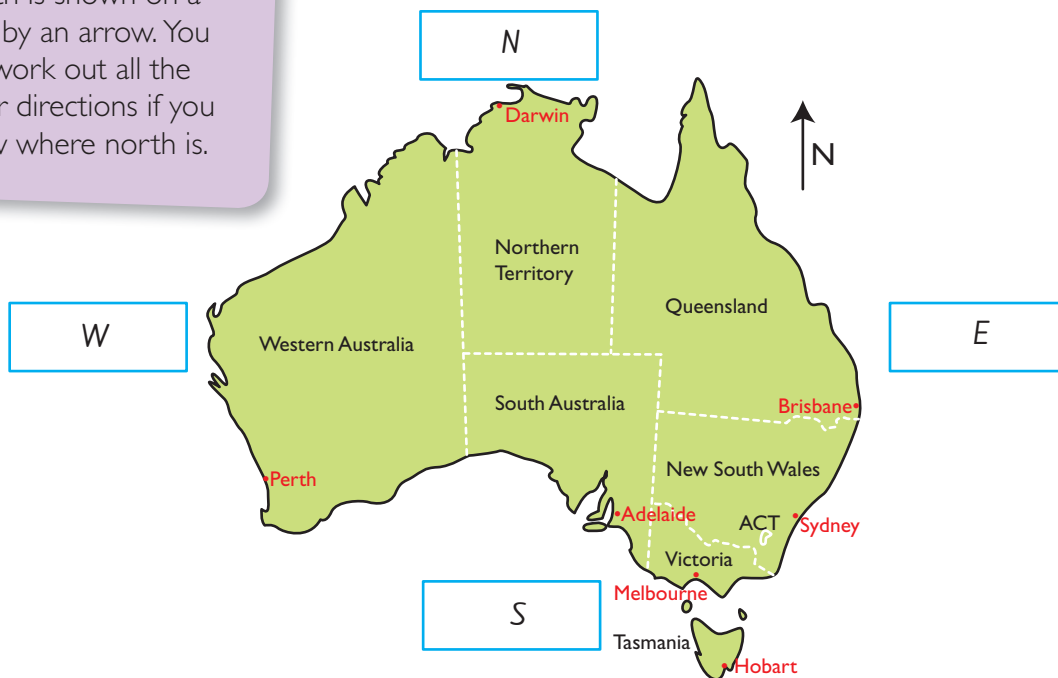


Exit the carpark and turn right. Travel as far as you can then turn right and travel north. Turn right at the school and take the 1st left while travelling east.

MIB 2
Card
172

Use a compass to locate places

North is shown on a map by an arrow. You can work out all the other directions if you know where north is.



1 In the boxes around the map, write the letters N, S, E and W to show where the directions north, south, east and west are.

2 Look at the map and find out which capital city is furthest:

- | | | | |
|----------------|-----------------|----------------|---------------|
| a north | <u>Darwin</u> | b south | <u>Hobart</u> |
| c east | <u>Brisbane</u> | d west | <u>Perth</u> |

3 Write true or false.

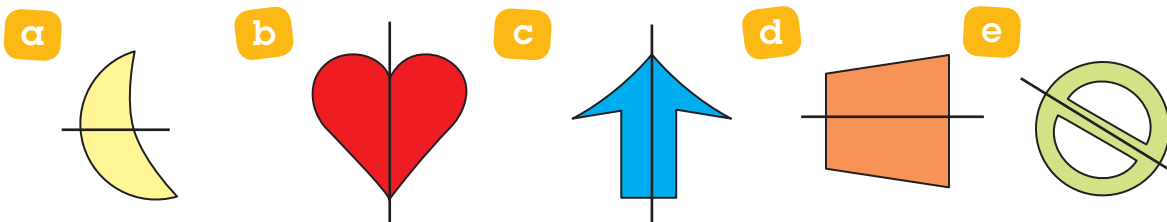
- | | |
|---|--------------|
| a Brisbane is further west than Adelaide. | <u>False</u> |
| b Sydney is further north than Melbourne. | <u>True</u> |
| c Darwin is further south than Perth. | <u>False</u> |
| d Hobart is further east than Brisbane. | <u>False</u> |
| e There are more cities north of Melbourne than east of Melbourne. | <u>True</u> |

My compass points to the north, but no matter what direction I walk I head south. Where am I?

How does the climate change in Australia as you go from north to south?
What about east to west?

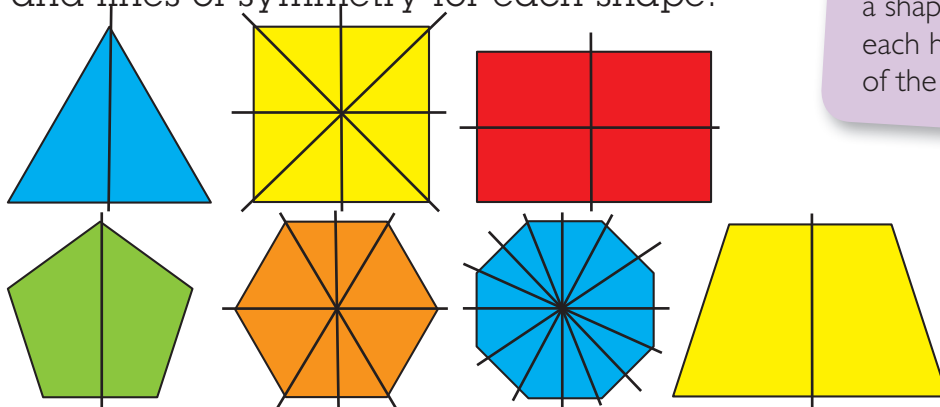
Lines of symmetry

1 Draw a line of symmetry for each of these shapes.



Which shape has two lines of symmetry? _____

2 Draw the lines of symmetry on each shape. Record the number of sides, angles and lines of symmetry for each shape.

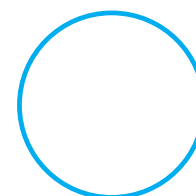


A line of symmetry divides a shape in half so that each half is a mirror image of the other.

Shape	Number of sides	Number of angles	Lines of symmetry
triangle	3	3	1
square	4	4	4
rectangle	4	4	2
trapezium	4	4	1
pentagon	5	5	1
hexagon	6	6	6
octagon	8	8	8

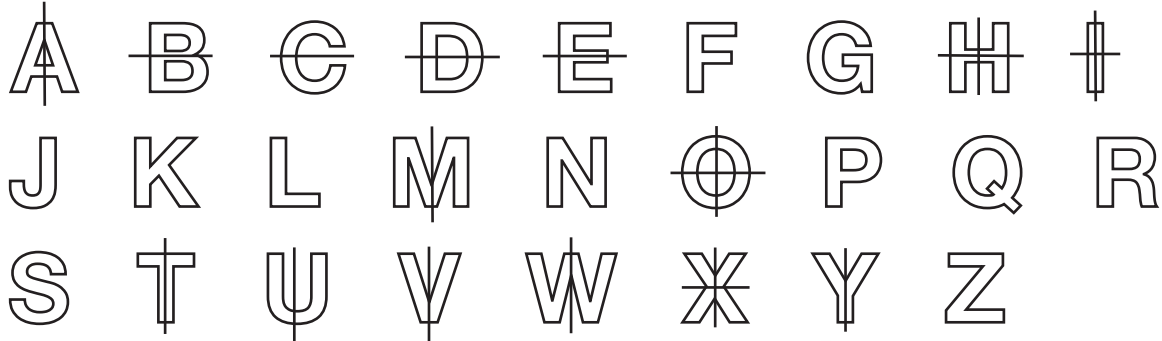
What do you notice about the number of sides, angles and lines of symmetry of all regular shapes?

Try drawing lines of symmetry onto the circle. How many lines of symmetry does a circle have? Would this be the same for an oval?



Symmetrical letters

1 Draw lines of symmetry for each letter of the alphabet.



2 Record the number of lines of symmetry for each letter in the table.

A shape that has no lines of symmetry is **asymmetrical**.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	1	1	1	1	0	0	2	2	0	0	0	1	0	2	0	0	0	0	1	1	1	1	2	1	0

3 Graph your results by shading the number of letters.

Number of lines of symmetry	0																								
1																									
2																									
3																									
4+																									

Number of letters

- a Are there more symmetrical or asymmetrical letters in the alphabet? symmetrical
- b Which letters have a horizontal line of symmetry? B, C, D, E, H, I, O, X
- c Which letters have a vertical line of symmetry? A, H, I, M, O, T, U, V, W, X, Y

Lines of symmetry in the environment

1 Circle the photographs that have a line of symmetry.



2 a Draw the line of symmetry on the following photographs.



b Which photograph has two lines of symmetry? swans

c What produced the line of symmetry in the photograph of the mountains?



Talk about reflections and how a line of symmetry is formed.

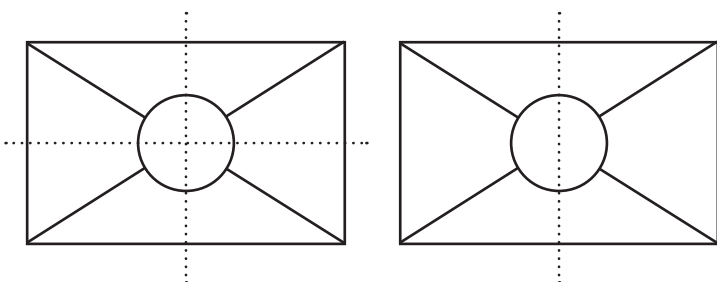
the reflection in the water

3 Think about symmetry. Circle the flag that is the odd one out.



Explain your answer.

the colours are asymmetrical



Colour these flags so that the first one has two lines of symmetry and the second only one.

Colour can change a shape's symmetrical properties.

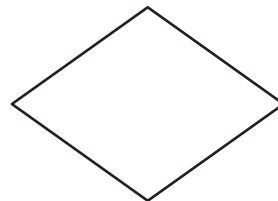
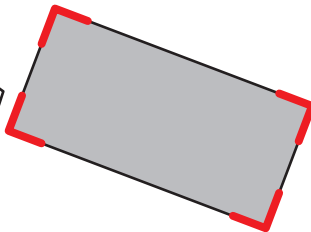
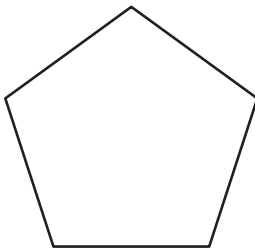
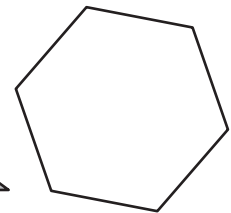
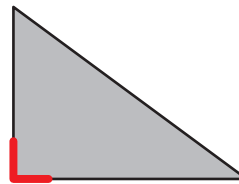
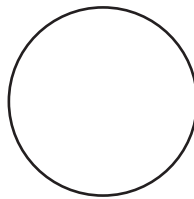
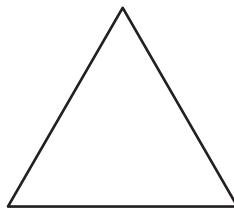
The right angle

- Using a square corner or angle tester, find some right angles in your classroom. Draw and write about your findings.

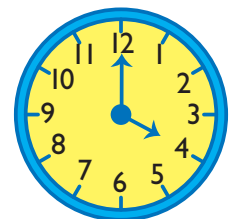
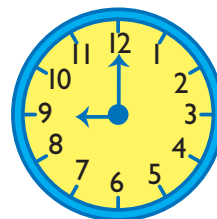
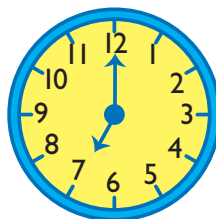
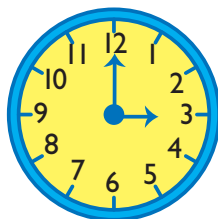
A square corner is called a right angle. The corner of a sheet of paper or a book is a right angle.

Students' answers will vary.

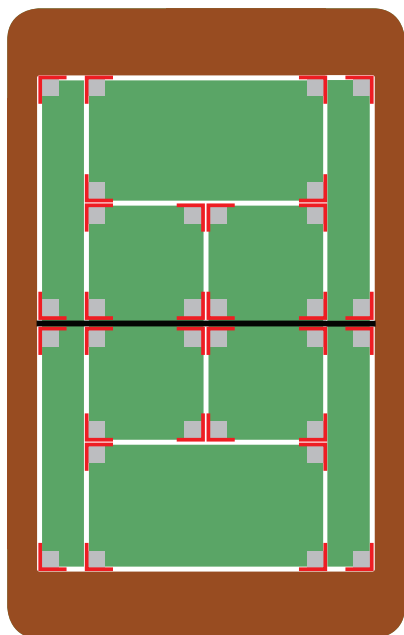
- Colour the shapes that have at least one right angle. Identify each right angle with a red L. The first one has been done for you.



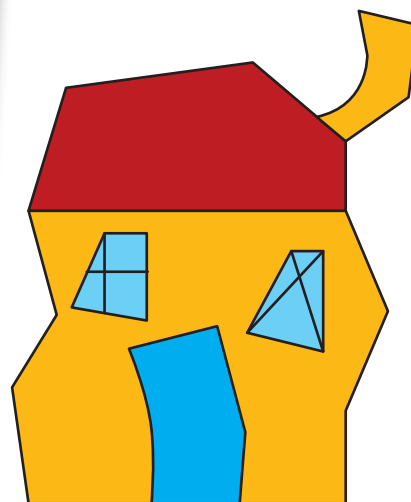
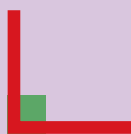
- Which clocks are showing their hands at right angles?



Perpendicular lines



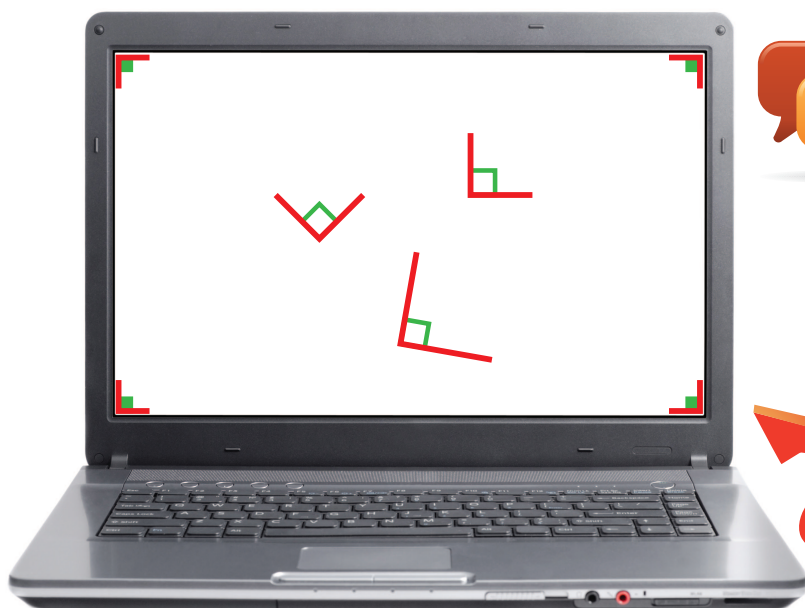
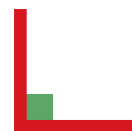
Perpendicular lines meet at right angles. We show perpendicular lines with a



1 Show where perpendicular lines on this tennis court meet.

2 There was a crooked man who lived in a crooked house. Can you find lines that are perpendicular in the drawing above? Trace them.

3 a Show where perpendicular lines meet around this monitor.
b On the screen, draw perpendicular lines in different orientations.



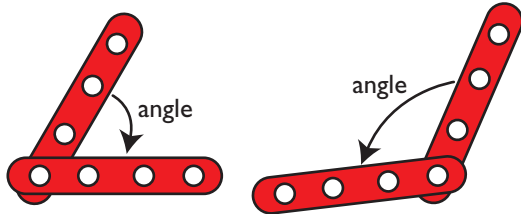
Perpendicular lines don't need to be horizontal and vertical lines. They can be in different orientations, e.g. in this triangle the red lines are perpendicular.

Write your name using capital letters. Circle the letters that are formed using perpendicular lines.

Angles in the environment

1

Using Geostrips, find some angles in your classroom. Draw and write about your findings.



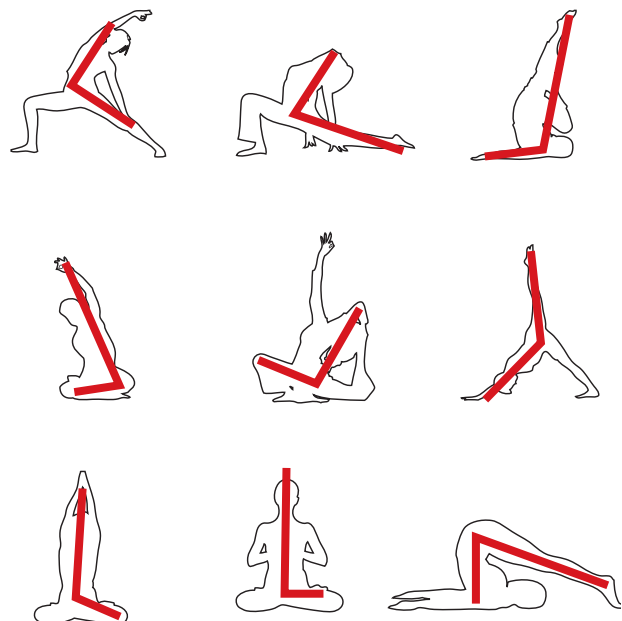
An angle is the amount of turning between two arms. Angles can be different sizes.

These Geostrips show angles of different sizes.

Students' answers will vary.

2

We can use parts of our body to make different sized angles. Look at the 9 pictures and use a coloured pencil to draw an angle onto each of the figures. The first one has been done for you.

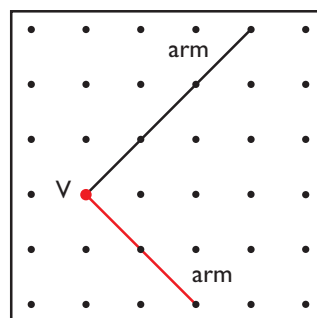
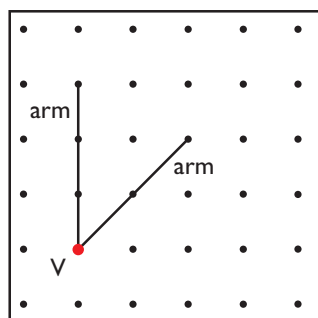
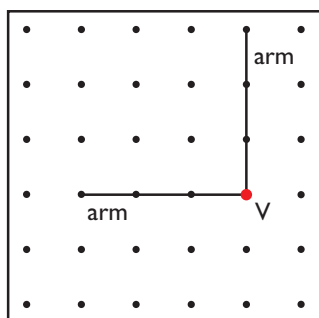
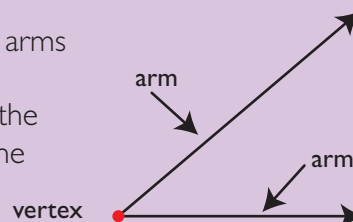


With a partner talk about whether the angle that you drew onto each of the figures is a right angle or not. Are the angles you drew larger than or smaller than a right angle?

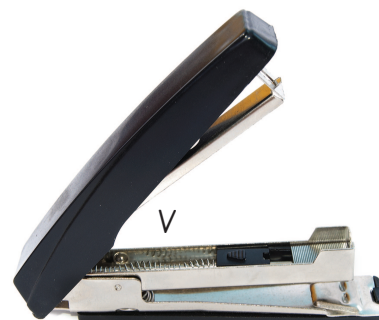
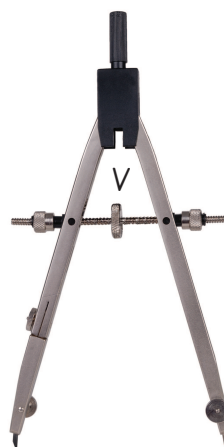
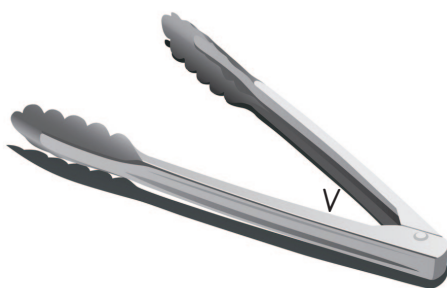
The arms and vertex of an angle

- 1 Make and then draw 3 different-sized angles on Geoboards. Label the vertex and the arms.

Angles have 2 arms and a vertex.
The vertex is the point where the 2 arms meet.



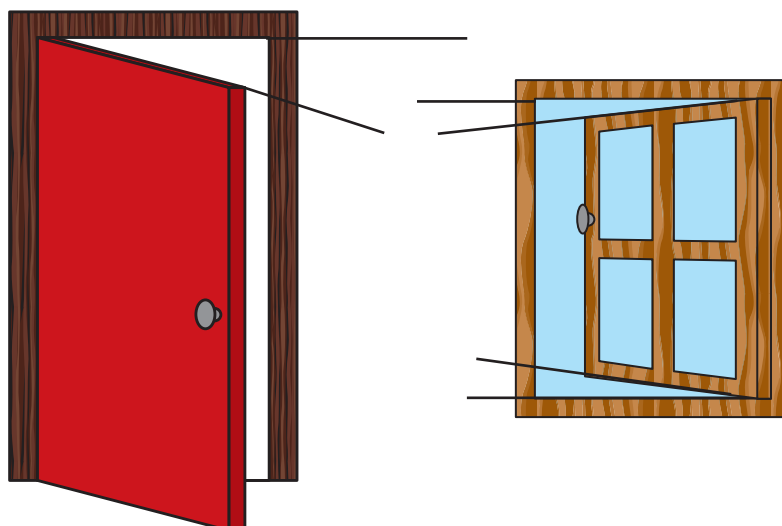
- 2 Label the vertex on each angle in each of the pictures. Trace over both arms using a coloured pencil.



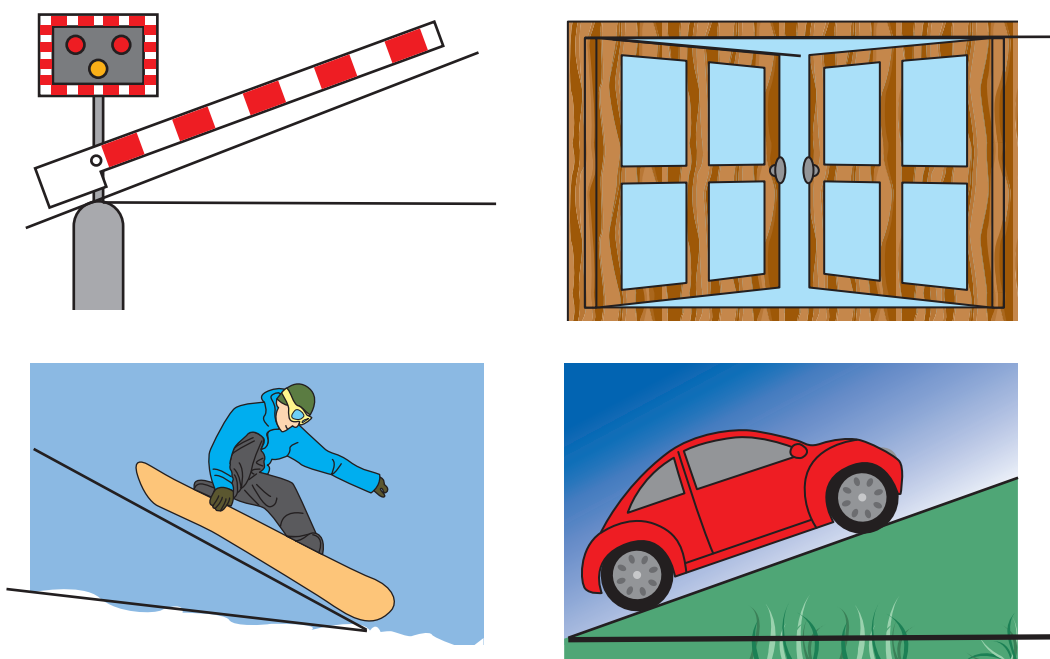
Imaginary arms of an angle

Sometimes when an angle is formed in real life, only one arm of the angle is visible. You need to visualise where the other arm would be.

- 1 Draw a line for the imaginary arms of each angle.



- 2 Draw a line for the imaginary arms of each angle in these pictures.



MiB 2
Card
164

Can you think of more examples of angles with hidden arms in the environment?