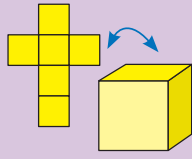


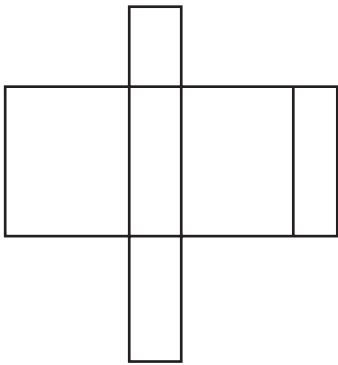
Nets of everyday packages

A net is a flat pattern that can be used to make a 3D model, e.g. a net of a cube.



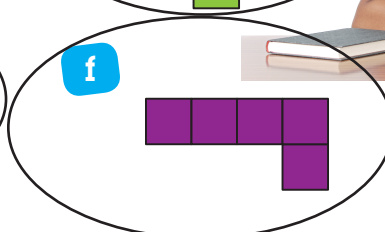
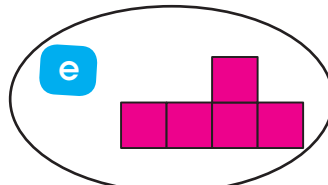
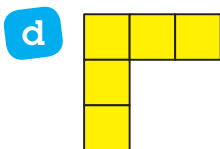
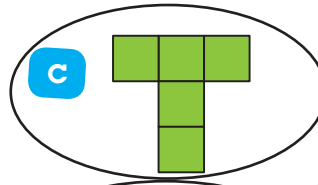
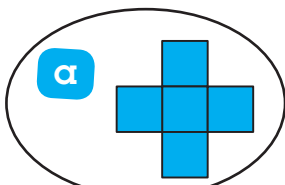
- 1
 - a Collect some everyday packages such as cereal and biscuit boxes.
 - b Carefully break the glue seal so that the package can be flattened out.
 - c Draw the net of the package in the space provided.

Answers will vary



Which 2D shapes make up the net? Discuss with your partner the number of 2D shapes you drew. Is this the same number as the number of faces on your 3D package before you flattened it out?

- 2 Asha wants to make an open-topped box to keep her books in. She drew the following nets. Which of these nets would make an open-topped box? Circle them. You may have to build them with cardboard to find out.

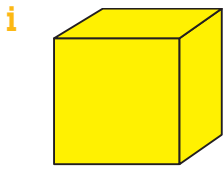


Nets

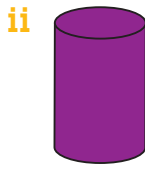
Word bank

cone cube prism
pyramid cylinder

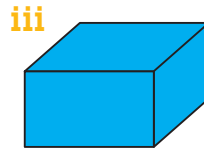
1 a Use the word bank to name each object.



cube



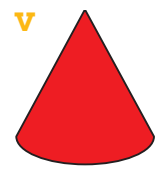
cylinder



prism

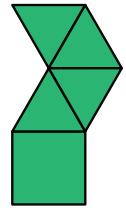
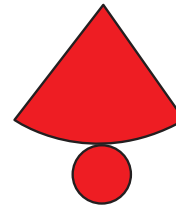
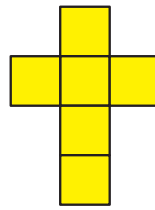
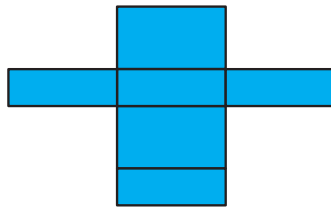
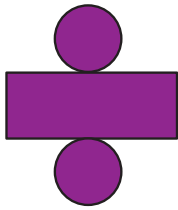


pyramid

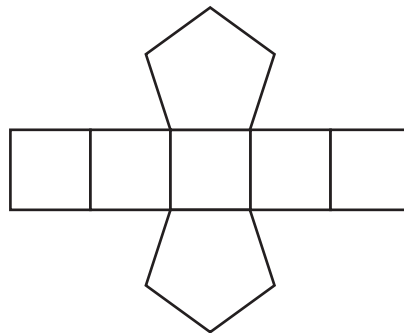
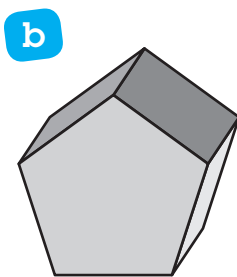
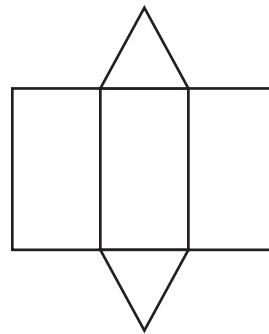
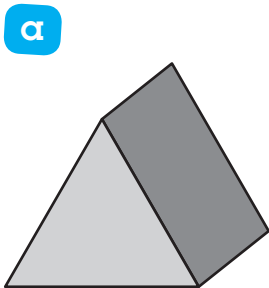


cone

b Colour each object and its net the same colour.



2 Make these 3D objects using polydrons. Open them out to discover their net. Draw the net next to the object.



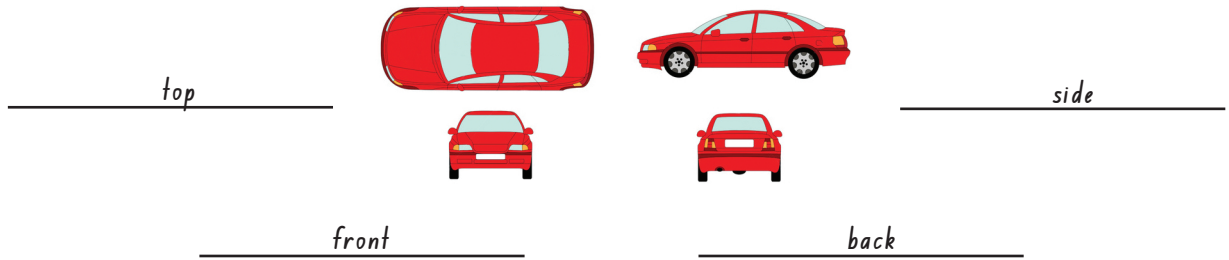
Different views

Top view – what you can see when you look down on an object.

Side view – what you can see when you look at an object from the side.

Front view – what you can see when you look at an object from the front.

1 Label each view of the car as front, side, top or back view.



2 Name each 3D object.

Join a line from the solid to the matching set of views.

	Name	3D object	Top view	Front view	Side view
a	Cylinder				
b	pyramid				
c	triangular prism				

3 Investigate the total of opposite sides of a die.

a If the top view is a 5, what number is on the bottom? 2

b If the front view is a 1, what number is on the back? 6



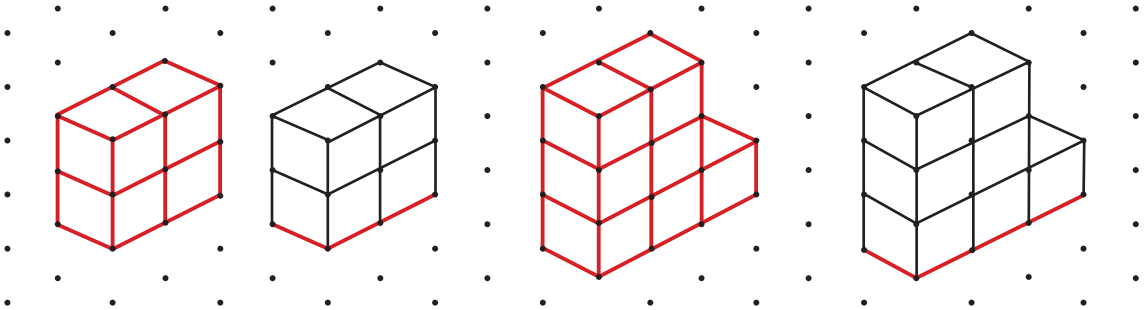
MIB 2
Cards
146 & 147

Views of a model

1

a Use blocks to make these 3D models.

b Sketch each model on the dot paper.



c How many blocks are there in each model?

Model 1 4 Model 2 7

d Draw the front, side and top view for each model.

	Front view	Side view	Top view
Model 1			
Model 2			

2

This is the top view of a bathroom. Imagine that you are sitting on the toilet. Look straight ahead. What do you see? Draw it.



Answers will vary

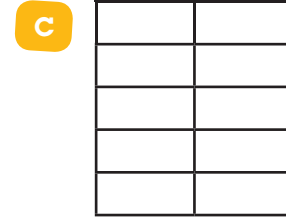
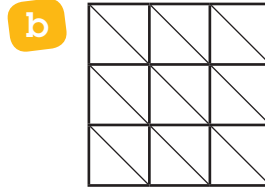
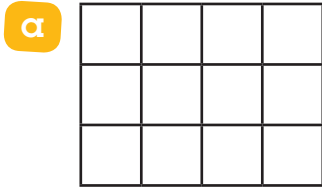
MiB 2
Cards
146 & 147

Informal units

Area is the amount of space inside a boundary.



1 Record the area of each shape.

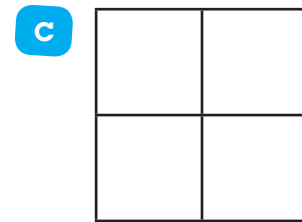
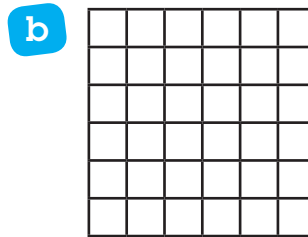
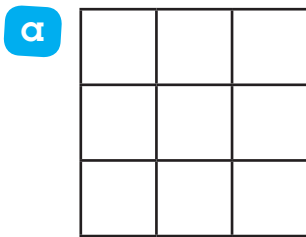


Area = 12 squares Area = 18 triangles Area = 10 rectangles

d Is it easy to compare the area of these shapes? No
Explain your answer.

Different units

2 Record the area of each shape.



Area = 9 squares Area = 36 squares Area = 4 squares

d Is it easy to compare the area of these shapes using different sized squares? No Explain your answer.

Different sized squares cover different areas

Is it easier to compare areas using the same size square? Yes

3 Using Base 10 shorts, cover each of the squares in Question 2 and record the number of shorts used.

	Shape a	Shape b	Shape c
Number of shorts used to cover the shape	9	9	9

What did you notice about the area of each shape when you measured it using the same unit?

The square centimetre

- 1 Using a 10 cm × 10 cm grid or a Base 10 flat, find items in your classroom that are less than, about the same as or more than 100 square centimetres.

Less than 100 cm ²	About the same as 100 cm ²	More than 100 cm ²
	<i>Answers will vary</i>	

The short way to write square centimetres is cm².

There are 100 square centimetres in a 10 cm × 10 cm grid. 100 cm² is read as 'one hundred square centimetres' **not** one hundred centimetres squared'

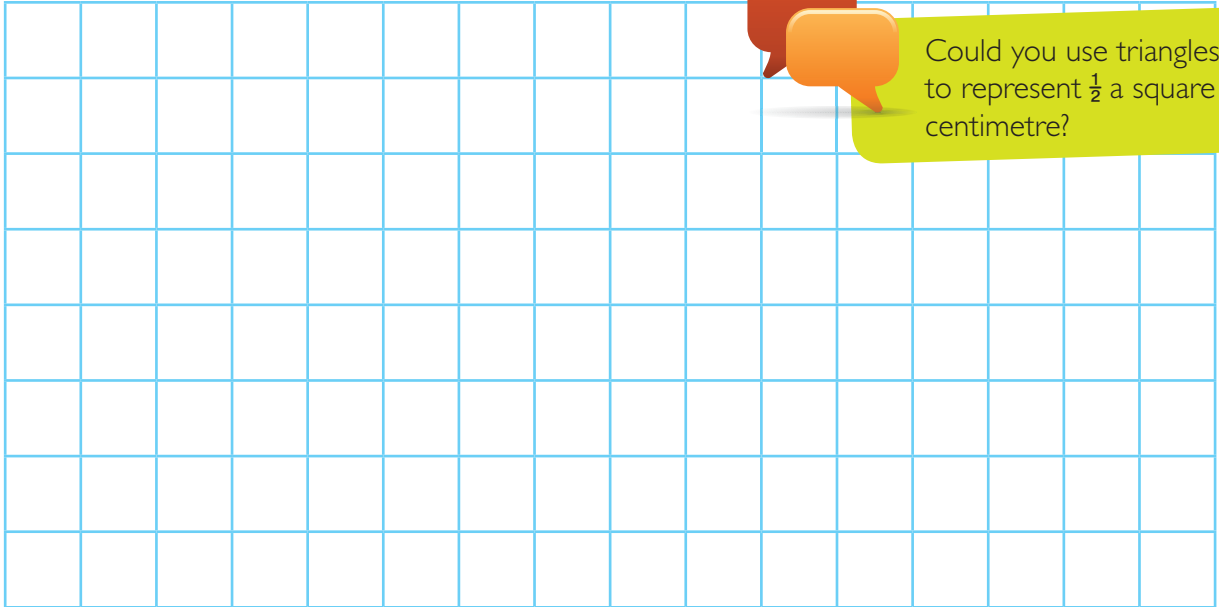
- 2 Estimate objects in your classroom that you think have the following areas. Use a 10 cm × 10 cm grid overlay to find the actual area.

Area	Object	Actual area
8 cm ²	<i>Answers will vary</i>	
20 cm ²		
50 cm ²		
100 cm ²		
200 cm ²		

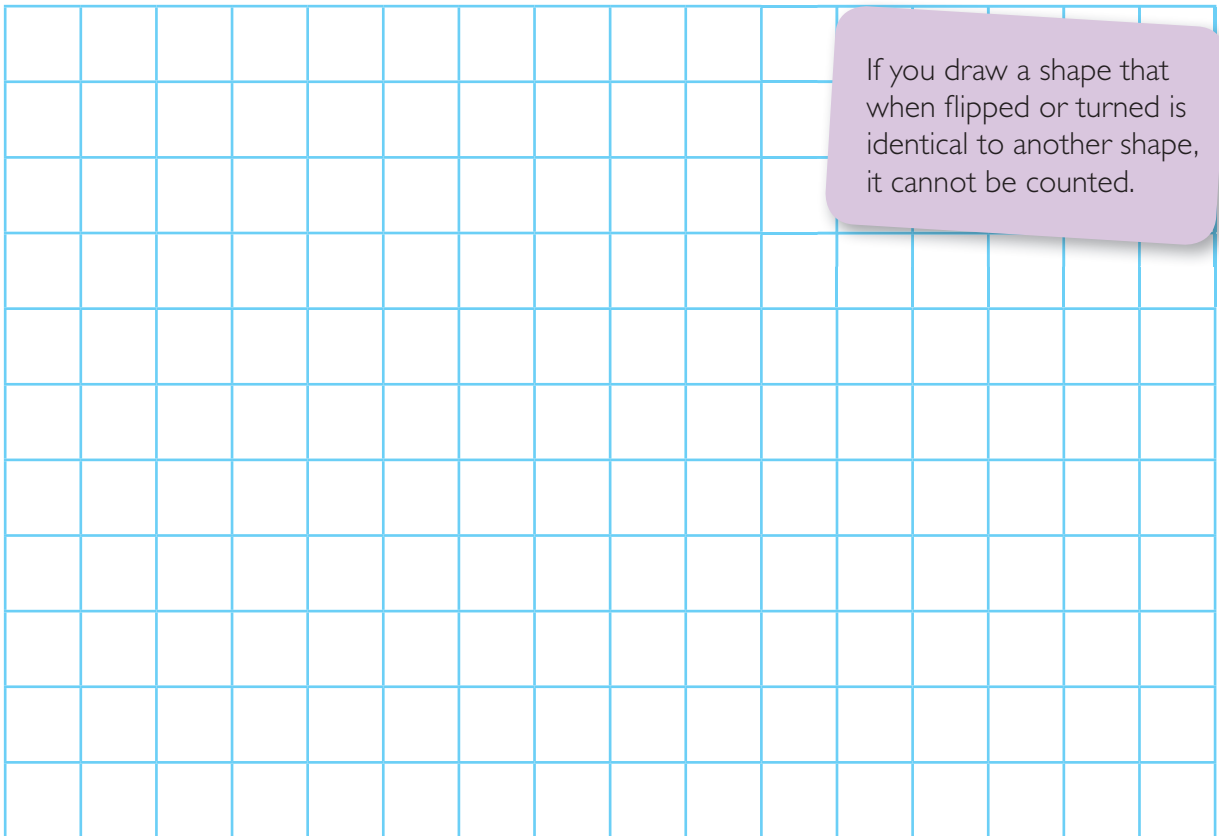
When measuring and comparing area, units must be the same.

Use square centimetres

- 1 Construct different shapes so that each has an area of 10 cm^2 .



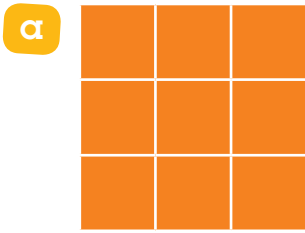
- 2 Pentominoes are 5 squares fitted together so that they touch along at least one side. There are 12 in total. Can you draw all 12?



Can you put all 12 pentominoes together to make a rectangle?

Compare areas of shapes

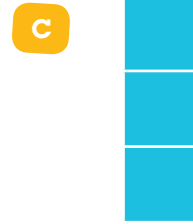
1 Find the area of these shapes by counting the squares.



Area = 9 cm²

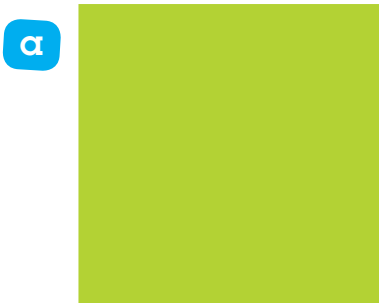


Area = 8 cm²

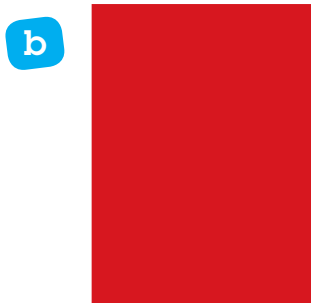


Area = 5 cm²

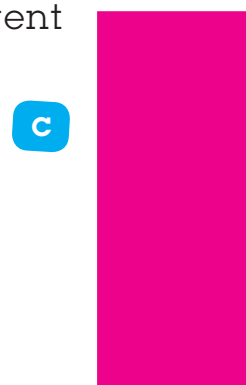
2 Find the area of these shapes by using a transparent 10 cm × 10 cm grid.



Area = 16 cm²

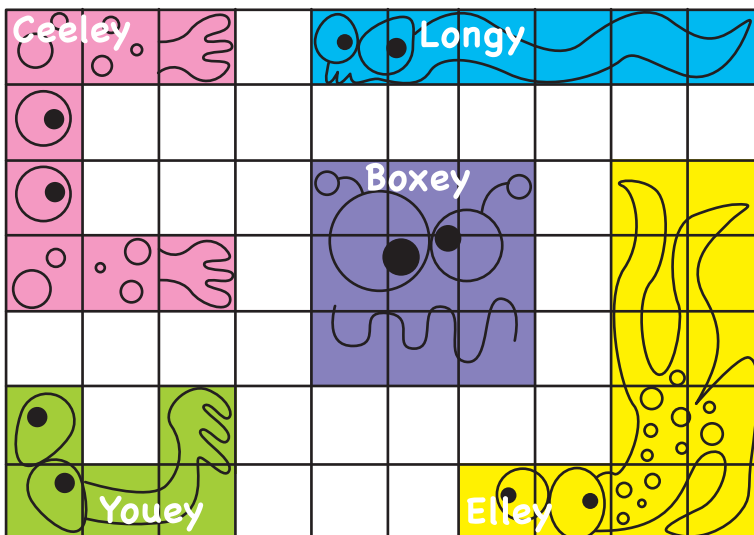


Area = 12 cm²



Area = 10 cm²

3 Squareas are strange shapes that travel through space in UFOs. The bigger their area the older they are. Each square centimetre represents 1 year. How old is each Squarea?



Name	Area (cm ²)	Age
Ceeley	4	4
Boxey	9	9
Youey	4	4
Longy	4	4
Elley	8	8

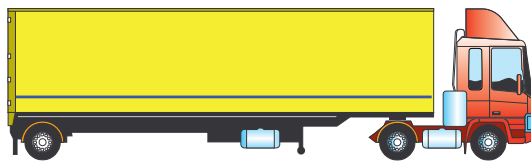
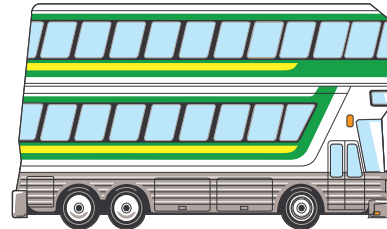
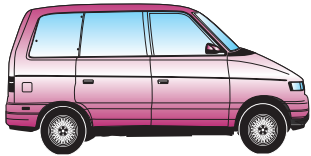
a Who is the oldest Squarea? Elley

b Who is the youngest Squarea? Youey

c What is the total age of this group of Squareas? 40

Measuring in square centimetres

1 Estimate, then measure (using a 10 cm × 10 cm transparent grid) the area of each picture of different vehicles.



	Estimate (cm ²)	Measure (cm ²)
Car		8 cm ²
Bus		15 cm ²
Truck		14 cm ²
Rowboat		3 cm ²
Bicycle		6 cm ²

Order the vehicles in order of area from smallest to largest.

Rowboat, Bicycle, car, truck, bus

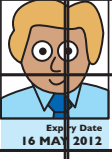


Does the longest vehicle have the biggest area?

No

2 a Can you think of a quicker way of calculating area than counting every square? What method could you use?

$$A = l \times w$$

b Use your method to calculate the area of each licence. Show your working.

Driver Licence WESTERN AUSTRALIA				Driver Licence WESTERN AUSTRALIA			
John James HANSMITH			Card Number	2 220 202 022			
22 SMITH ROAD SMITHYVILLE WA 6630			John James HANSMITH				
Licence No.	Donor		22 SMITH ROAD SMITHYVILLE WA 6630				
1234PR	A		Licence No.	Donor	A		
Licence Class	Conditions		Licence Class			Conditions	
C	S		C			S	
						Date of Birth	Expiry Date
Date of Birth			Date of Birth			29 SEP 1965	16 MAY 2012
29 SEP 1965			16 MAY 2012				

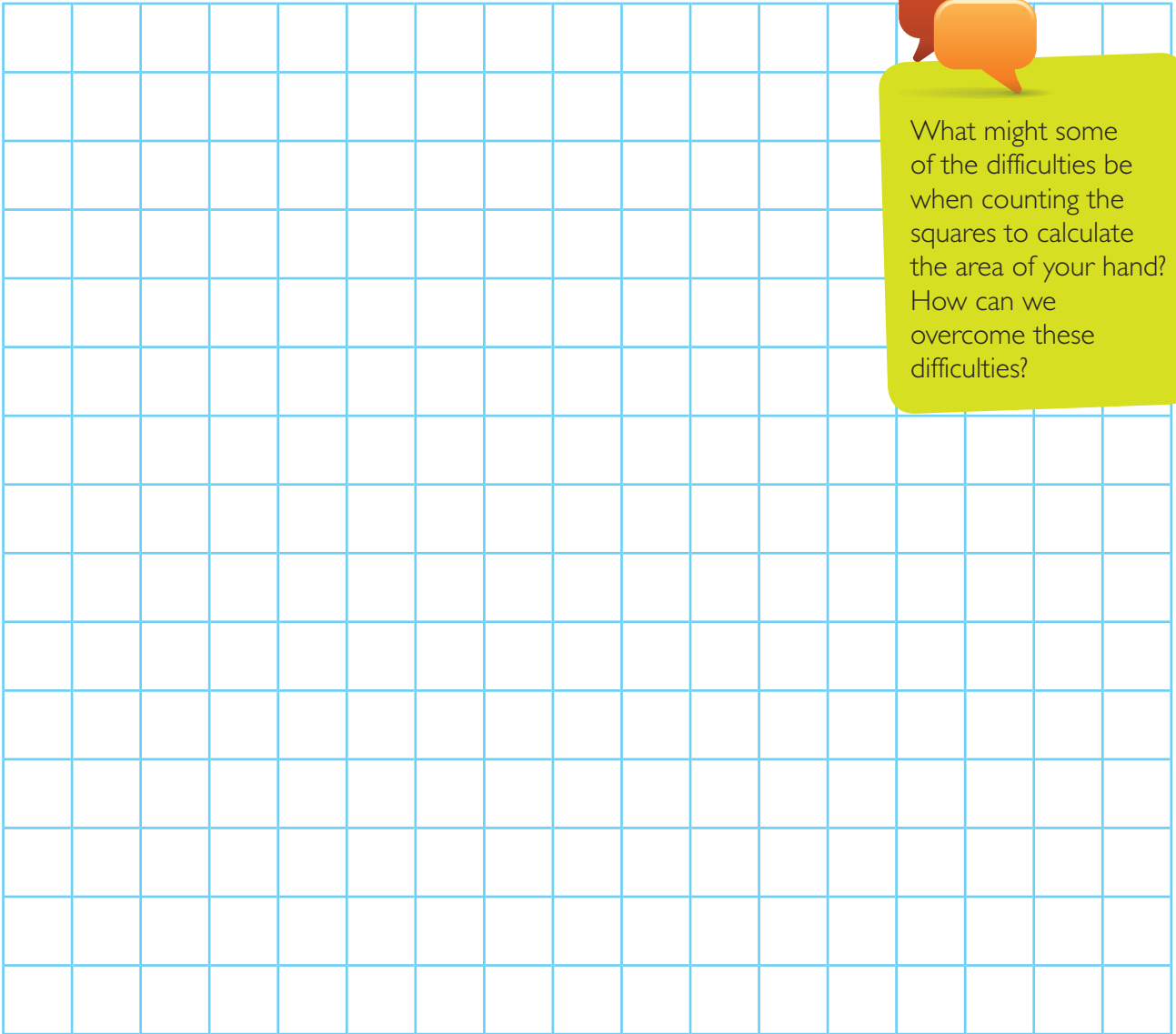
Area = 20 cm²

Area = 18 cm²



Areas of unusual shapes

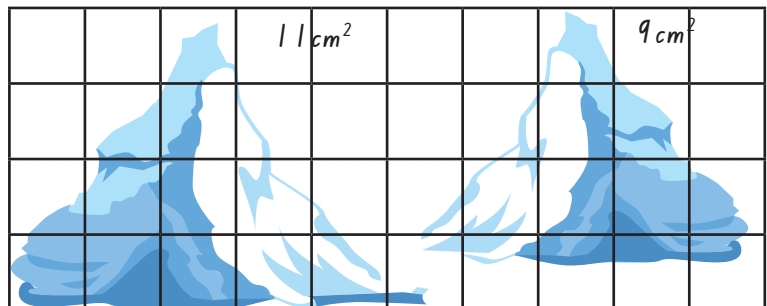
- Trace around one of your hands onto the grid paper. Estimate the area of your hand and then calculate the area.



What might some of the difficulties be when counting the squares to calculate the area of your hand? How can we overcome these difficulties?

Estimate: area of hand = ____ cm^2 Measure: area of hand = ____ cm^2

- These icebergs are floating in the Antarctic Ocean. Find the area of each iceberg and write the area on the iceberg. Can the area of these icebergs be measured accurately? No



Explain your answer. Unusal shape

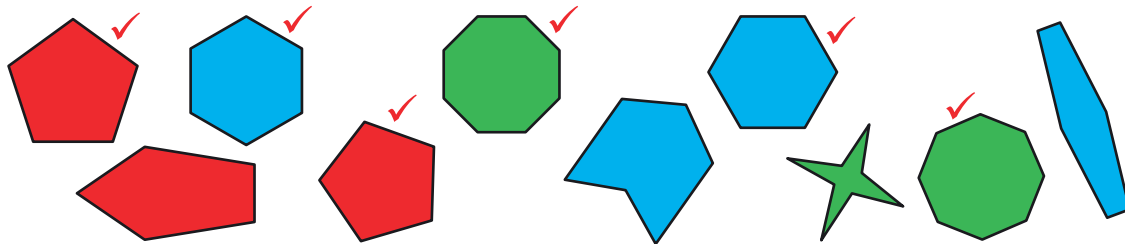
Different orientations

Regular shapes have all sides equal and all angles equal.

1 Draw each shape in a different orientation. The first one has been done for you.

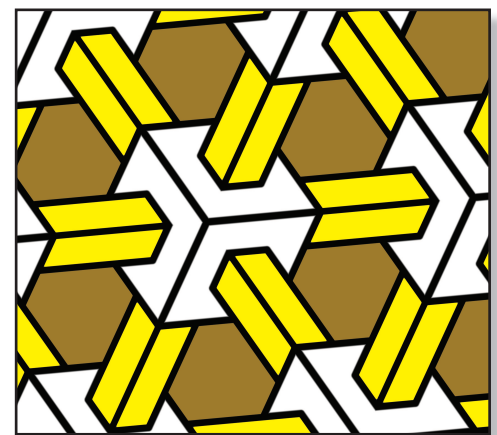
a	b	c	d	e

2 Colour pentagons red, hexagons blue and octagons green. Tick all regular shapes.



3 2D shapes have been used to make this picture look 3D.

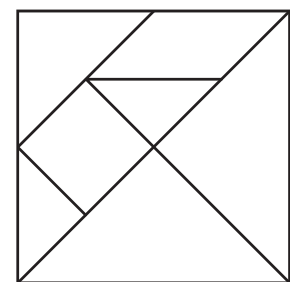
- a** Colour:
- i** the quadrilaterals yellow
 - ii** the hexagons black.
- b** What irregular shapes are the remaining pieces? Octagons



A **tangram** is a classic, ancient Chinese puzzle. Making up the 7 pieces are 2 large triangles, 1 medium triangle, 2 small triangles, 1 square and 1 parallelogram.



Make a 7-piece tangram using coloured paper. Arrange the pieces into an interesting shape.



A tangram

MIB 2
Card 165

Constructing two-dimensional shapes

1 Construct different 2D shapes using a variety of materials.

To construct 2D shapes you could use: strips of cardboard, straws and connectors, toothpicks and connectors, geostrips or a computer drawing program.

2 Draw 6 different shapes you made in the spaces below.

a	b <i>Answers will vary</i>	c
d	e	f

3 Complete the table for the above shapes.

	Number of sides	Number of corners	Name of shape	Is the shape regular or irregular?
a				
b				
c				
d				
e				
f				

4 **a** Can a triangle be constructed from 3 straws if the sum of the lengths of the 2 shortest straws is less than the length of the longest straw? No

b Explain your answer. Use a diagram to support your explanation.

The sides will not meet

Combining and splitting two-dimensional shapes

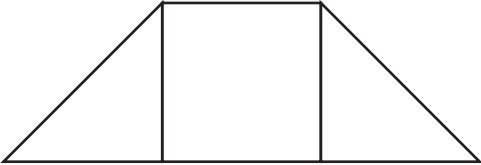
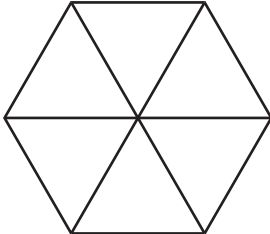
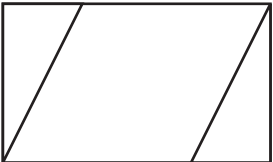
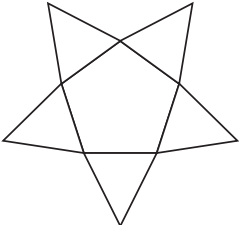
1 Which shapes have been used to make the following composite shapes?

a		b		c		d	
	<u>trapezium</u>		<u>triangle</u>		<u>trapezium</u>		<u>octagon</u>
	<u>square</u>		<u>rectangle</u>		<u>triangle</u>		<u>rhombus</u>

2 Draw a line to split these common 2D shapes into two smaller shapes. Name the smaller shapes that you have formed.

a		b		c		d	
	<u>triangle</u>		<u>rhombus</u>		<u>triangle</u>		<u>trapezium</u>
	<u>triangle</u>		<u>triangle</u>		<u>triangle</u>		<u>triangle</u>

3 Draw:

<p>a a trapezium, using one square and two triangles.</p> 	<p>b a hexagon, using six triangles.</p> 
<p>c a rectangle, using two triangles and one parallelogram.</p> 	<p>d a star, using one pentagon and five triangles.</p> 

Follow the path

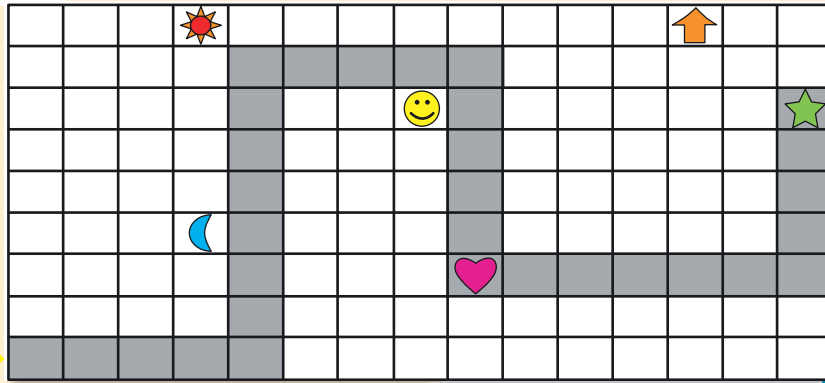
- 1 Read the directions and draw the robot's path on the map. The first one has been done for you.

Directions for the robot

- 1 Walk 5 squares.
- 2 Turn left.
- 3 Walk 7 squares.
- 4 Turn right.
- 5 Walk 4 squares.
- 6 Turn right.
- 7 Walk 5 squares.
- 8 Turn left.
- 9 Walk 6 squares.
- 10 Turn left.
- 11 Walk 4 squares.



Start →

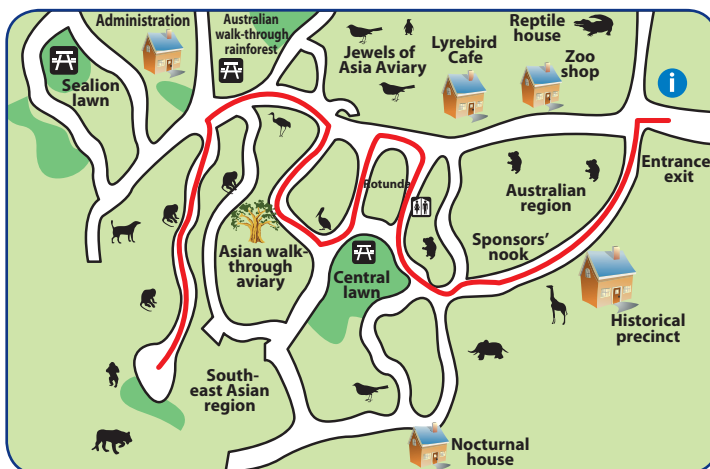


Which object does the robot find? green star

- 2
- a Start again from the start. Use a different colour, and draw a path from the robot to the orange arrow. Make at least 4 turns.
 - b Write down the directions for the robot to follow to get to the orange arrow.

Answers will vary

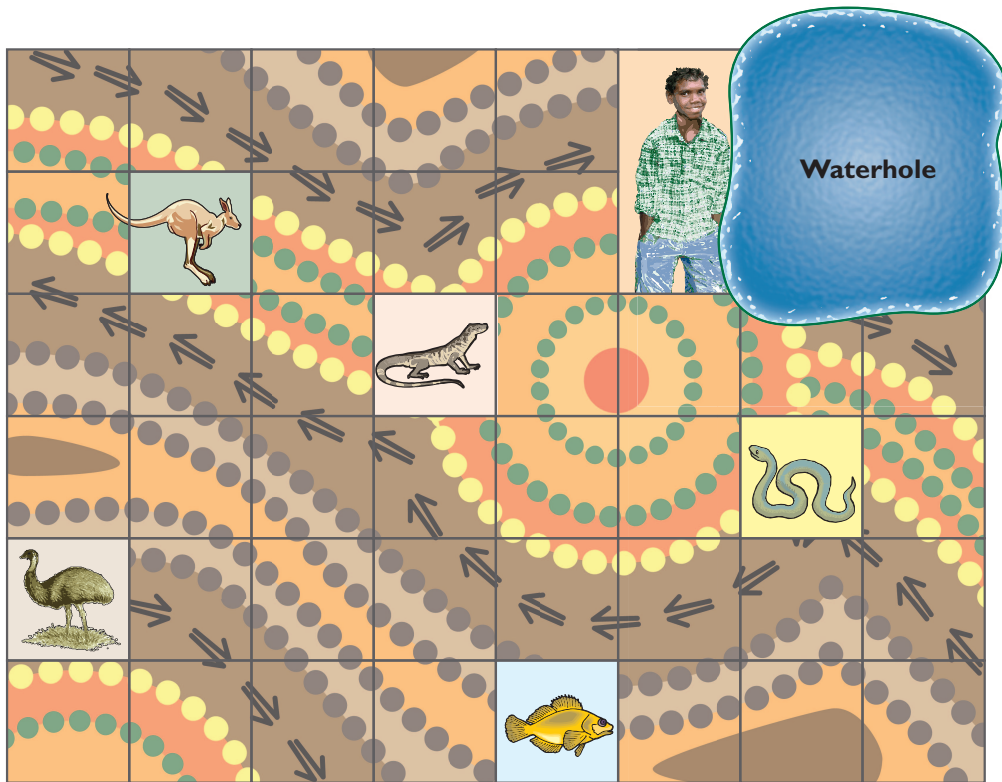
- 3 Todd arrived at the zoo and decided he wanted to see the gibbons. He drew a route on the map from the entrance to the gibbons in red. Write down the directions on the lines below.



- Left at entrance
- Right at Central lawn
- Left at Rotunda
- Right at Rotunda
- Right at aviary
- Left at Jewels of Asia
- Right at rainforest

Explain to a partner how Todd could get from the gibbons to the nocturnal house.

Draw the path



1

Will is hunting for animals in the Simpson Desert. He needs to collect some animals before returning to the waterhole. Describe Will's path if he collects the animals in the following order. Start from where Will is standing.

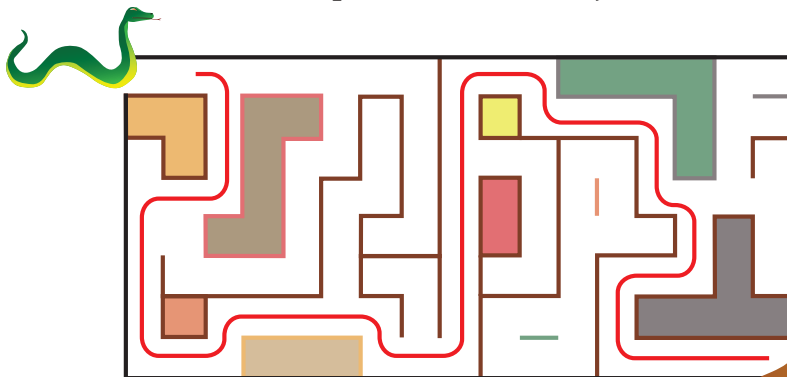
1 kangaroo 2 goanna 3 emu 4 fish 5 snake

walk four squares, turn left, walk one square,
turn left, walk two squares, turn right, walk two
squares, turn right, walk four squares, turn left, walk
one square, turn left, walk four squares, turn left and walk two squares, turn right, walk two
squares, walk two more squares.

Use direction words like 'turn left' or 'turn right'. You might like to use compass directions too.

2

Draw the snake's path to Kata Tjuta.



Create a maze. Ask a friend to draw a path through your maze.

MIB 2
Card 170

Bike track

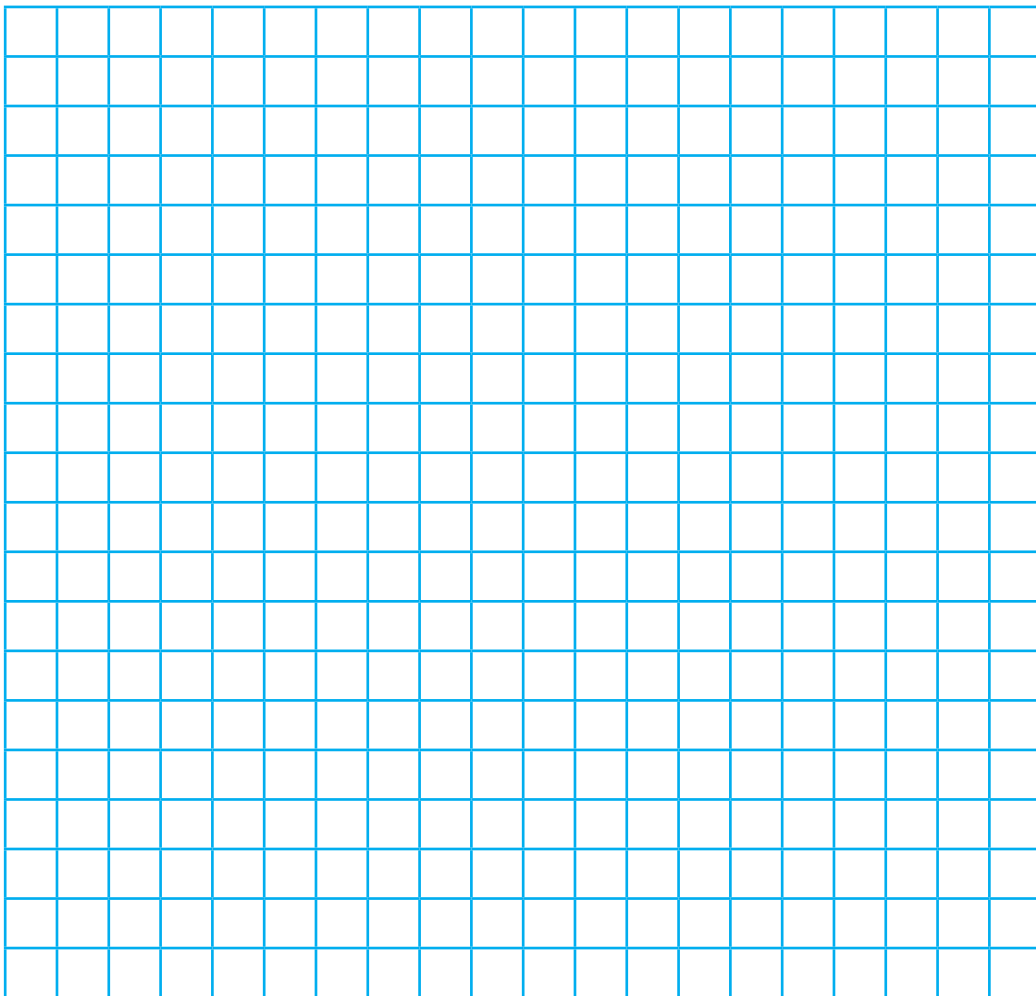
1

Design a bike track for the school playground or the local park. Draw it onto the grid below.

Answers will vary



Make sure that the track does not cross over itself. Include features such as trees, gates, buildings, and seats. Include a compass rose.



2

Describe your bike track in relation to other features on your grid, using positional language.

Answers will vary

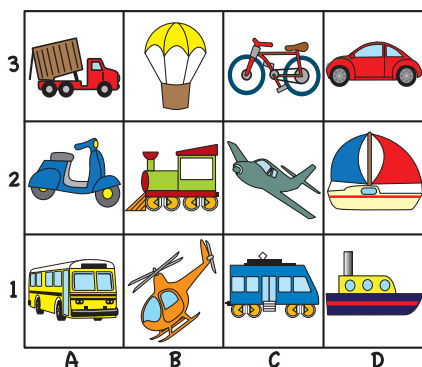
Coordinates

1

- a How many rows are there in this spice box? 3
- b How many columns are there? 4
- c How many spices altogether? 12
- d What colour is the spice in the second column in the middle row? green



2



- a Name the mode of transport at:
- i C3 bicycle
- ii A1 bus
- iii D1 boat
- iv B2 train
- b List the coordinates of the:
- i truck A3
- ii plane C2
- iii helicopter B1
- iv car D3

You should always give the horizontal coordinate first and then the vertical coordinate.

3



- a List the coordinates of the 2 hexagonal chocolates.
D3 C1
- b List the coordinates of the 4 square chocolates.
D1 B1
E2 A3
- c The chocolates with the white lines contain caramel. List the coordinates of the 3 caramel chocolates.
A2 C3 E1
- d The chocolate in A1 is the same as the chocolates in positions E3, B2.

Using coordinates

1

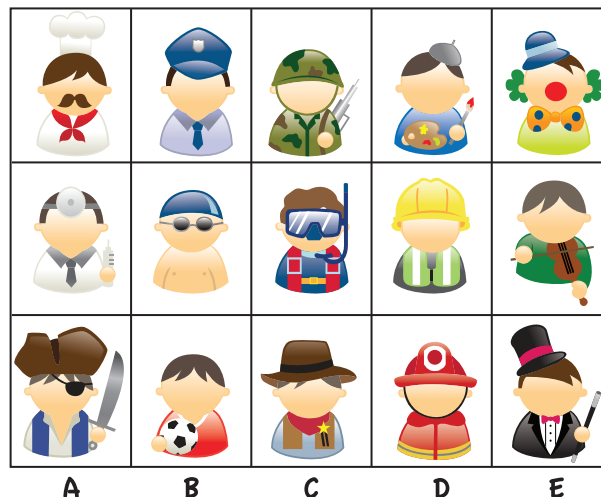
a List the coordinates of the:

i firefighter D1

ii magician E1

iii clown E3

iv pirate A1



b Identify the person at:

i C2 Diver

ii A3 Cook

iii B1 Soccer player

iv B2 Swimmer

c **Guess who?**

1 I am holding something in my hand.

2 I have a white shirt.

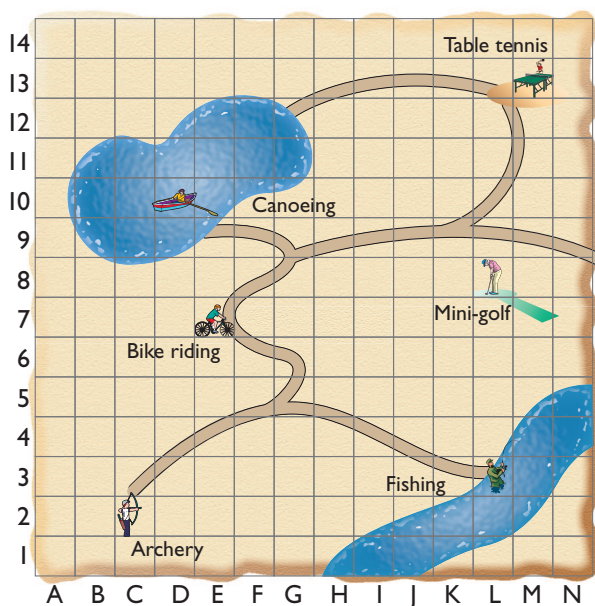
3 I am not in row 1.

I am a doctor

My coordinates are: A2

2

At school camp each child is at a different activity. Complete the table to show which activity each child is doing.



Name	Location	Activity
Cass	E7	Bike riding
Dom	L8	Mini golf
Erika	D10	Canoeing
Taj	C2	Archery
Garv	M13	Table tennis
Bree	L3	Fishing

MiB 2
Card 175

Maps

1

This is a map of Sydney Olympic Park.

What is located at:

- a F1? Tennis Centre
- b D3? Aquatic Centre
- c G7? Brickpit

2

List the coordinates of:

- a Cathy Freeman Park D5
- b the Athletic Centre C3
- c the Ring Walk F7
- d the Sports Centre E2
- e Olympic Park Railway Station D5
- f Hotel Ibis F4

3

a The Hockey Centre can be located by two sets of coordinates.

What are they? D1 E1

b What three sets of coordinates can you use to identify Kevin Coombs Avenue?

B7 C7 D7

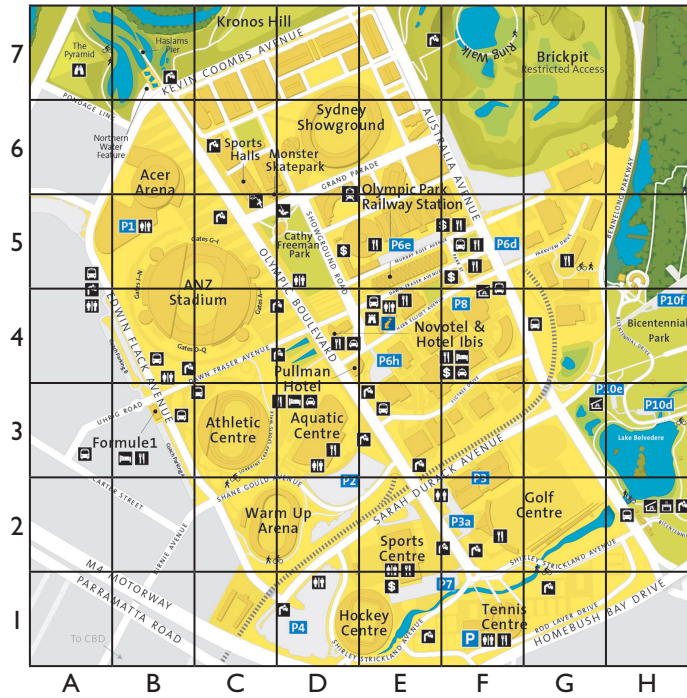
c How many sets of coordinates can you use to locate ANZ Stadium? 4

d Describe how you can get from the Sports Centre to Sydney Showground, using street names and positional language.

Go right up Sarah Durack Avenue

Turn left at Olympic Boulevard

Turn left at Grand Parade



Research Use a street directory to locate your home. What page number is it on? What are the coordinates of your home?

MiB 2
Cards
171 & 172

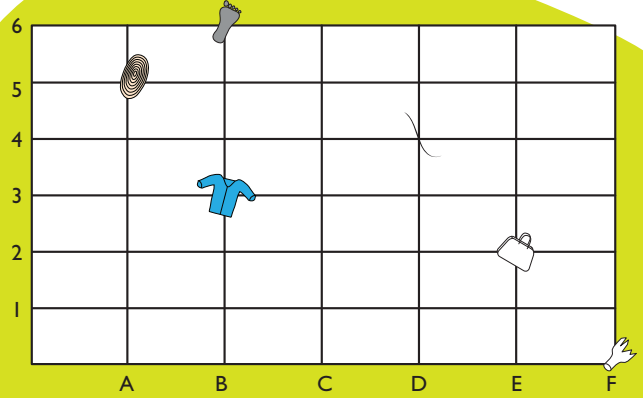
Coordinate points

- 1** A crime scene has just been set up in the backyard of a house. Items have been found at the scene. Draw the pieces of evidence onto the grid.



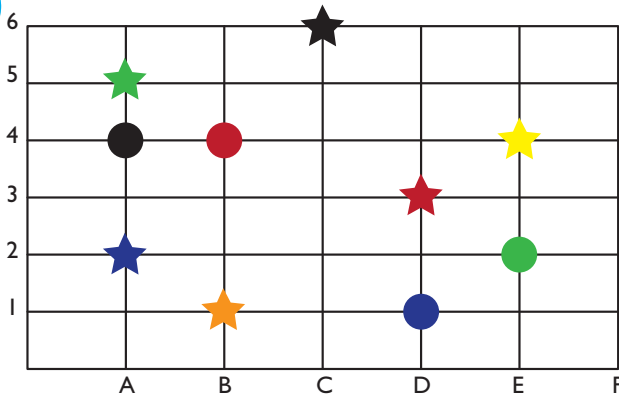
Evidence and their coordinates

- handbag at E2
- fingerprints at A5
- broken bottle at F1
- blue jacket at B3
- footprint at B6
- single hair at D4



Coordinate points on a grid show where 2 lines meet.

2



b Draw: **i** a blue circle at D1.

iii a green circle at E2.

a What colour is the star at:

i D3? Red

ii B1? Orange

iii A5? green

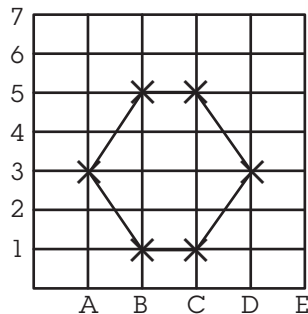
iv C6? black

v E4? yellow

vi A2? blue

3

Draw a hexagon onto the grid.

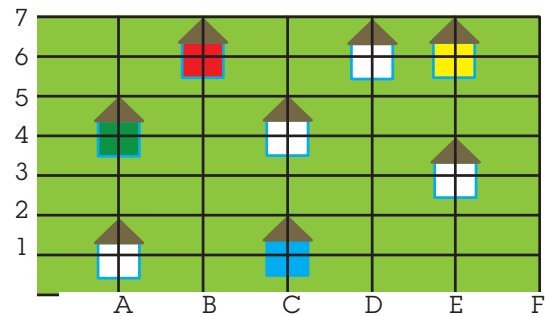


List the coordinates of each corner.

<u>B1</u>	<u>C1</u>
<u>A3</u>	<u>D3</u>
<u>B5</u>	<u>C5</u>

4

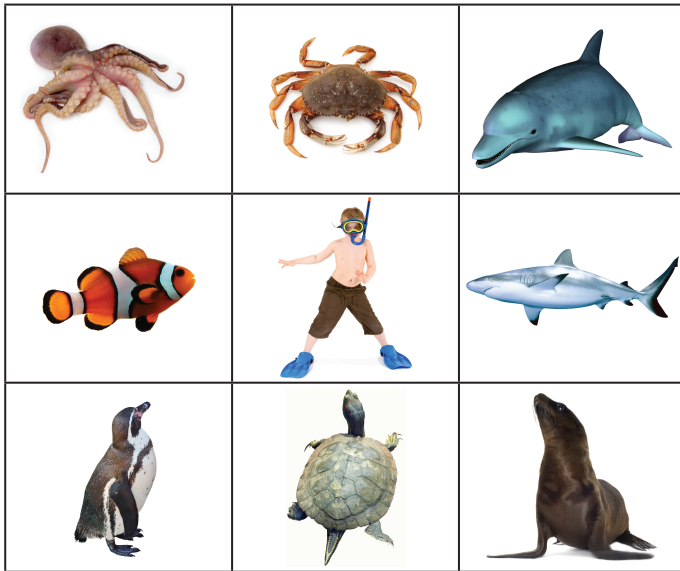
Colour the house at:



a B6 – red **b** C1 – blue

c E6 – yellow **d** A4 – green

Compass points



The compass

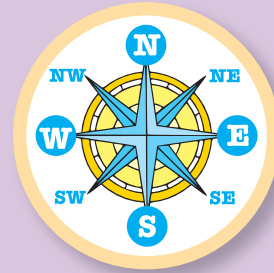
The main points on a compass are north, south, east and west.

Between north and east is north-east.

Between south and east is south-east.

Between north and west is north-west.

Between south and west is south-west.



1 Look at the grid and answer the questions.

What can the boy see if he looks

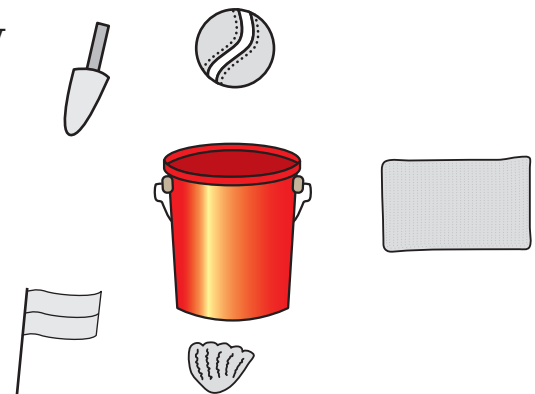
- | | |
|------------------------------|------------------------------|
| a east? <u>Shark</u> | b west? <u>fish</u> |
| c north? <u>crab</u> | d south? <u>turtle</u> |
| e north-east? <u>dolphin</u> | f north-west? <u>octopus</u> |
| g south-east? <u>seal</u> | h south-west? <u>penguin</u> |

2 To see the boy which way does

- | | |
|---------------------------------------|---------------------------------------|
| a the turtle look? <u>North</u> | b the shark look? <u>West</u> |
| c the fish look? <u>East</u> | d the crab look? <u>South</u> |
| e the seal look? <u>North-West</u> | f the penguin look? <u>North-East</u> |
| g the dolphin look? <u>South-West</u> | h the octopus look? <u>South-East</u> |

3 Using the bucket as the centre, draw

- a ball to the N.
- a towel to the E.
- a flag to the SW.
- a spade to the NW.
- a shell to the S.



Compass directions

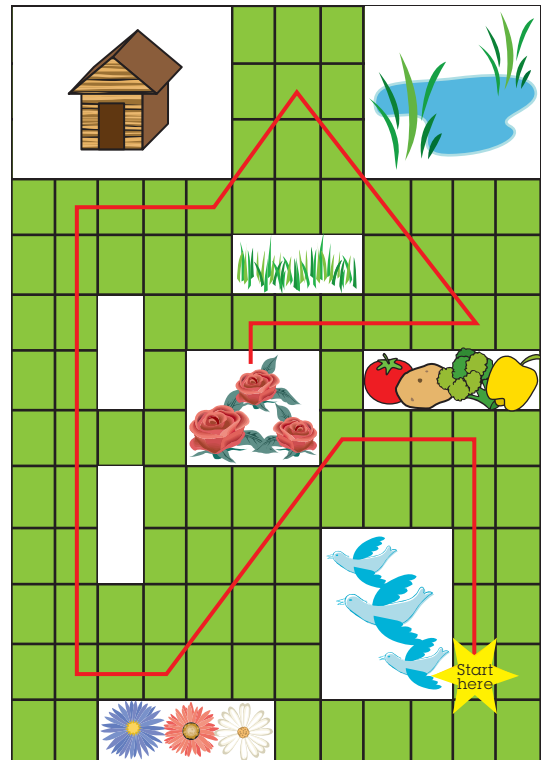
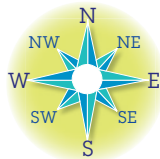
1 You have found a note that gives directions to some buried money.

a Use the map of the garden, the compass and the instructions to find the money.

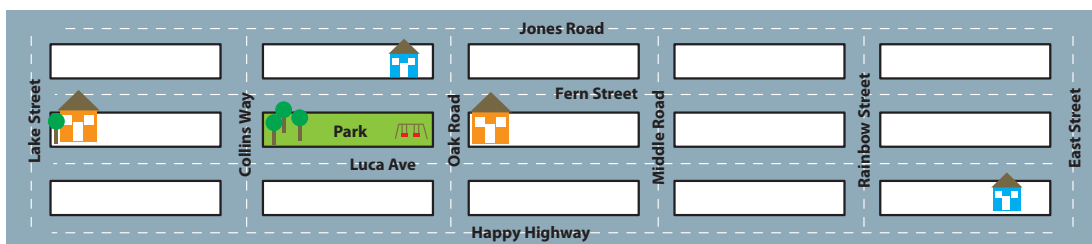
b Show the path you take on the map.

Where's the money?

- 1 Go 4 squares north.
- 2 Go 3 squares west.
- 3 Diagonally go 4 squares south-west.
- 4 Go 2 squares west.
- 5 Go 8 squares north.
- 6 Go 3 squares east.
- 7 Diagonally go 2 squares north-east.
- 8 Diagonally go 4 squares south-east.
- 9 Go 5 squares west.
- 10 Go 1 square south.



c Where is the money hidden? rose bush



2 Work out the address for each child.

Name	Description	Address
Mandy	My house number is half of 100. I live in the most western part of town.	50 Lake Street
Jonas	My house number is double 17. I live 2 streets east of Mandy.	34 Oak Road
Harris	My house number is 2 less than Mandy's. I live north of the park.	48 Fern St
Cody	My house number is 10 higher than Harris's. I live in the south-east part of town.	58 Happy Highway

Directions on a map



1 Fill in the directions on the compass rose.

2 Name the city at:

- a D7 Darwin
- b F3 Adelaide
- c H4 Brisbane
- d G2 Melbourne

3 What are the coordinates of:

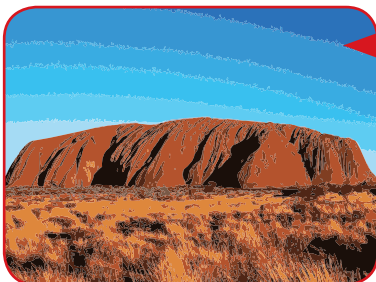
- a Sydney? H3
- b Hobart? G1
- c Townsville? G6
- d Perth? A3



4 Fill in each space with a compass direction.

- a Rockhampton is North of Sydney.
- b Sydney is East of Perth.
- c Hobart is South-East of Adelaide.
- d Canberra is South-West of Sydney, but North-East of Melbourne.

5 Uluru is located in the bottom of D5. Describe the location of other places in Australia in relation to Uluru. One has been done for you.



Uluru is south-west of Alice Springs.

Answers will vary



Have you ever visited other places in Australia? In what direction did you travel to get there?

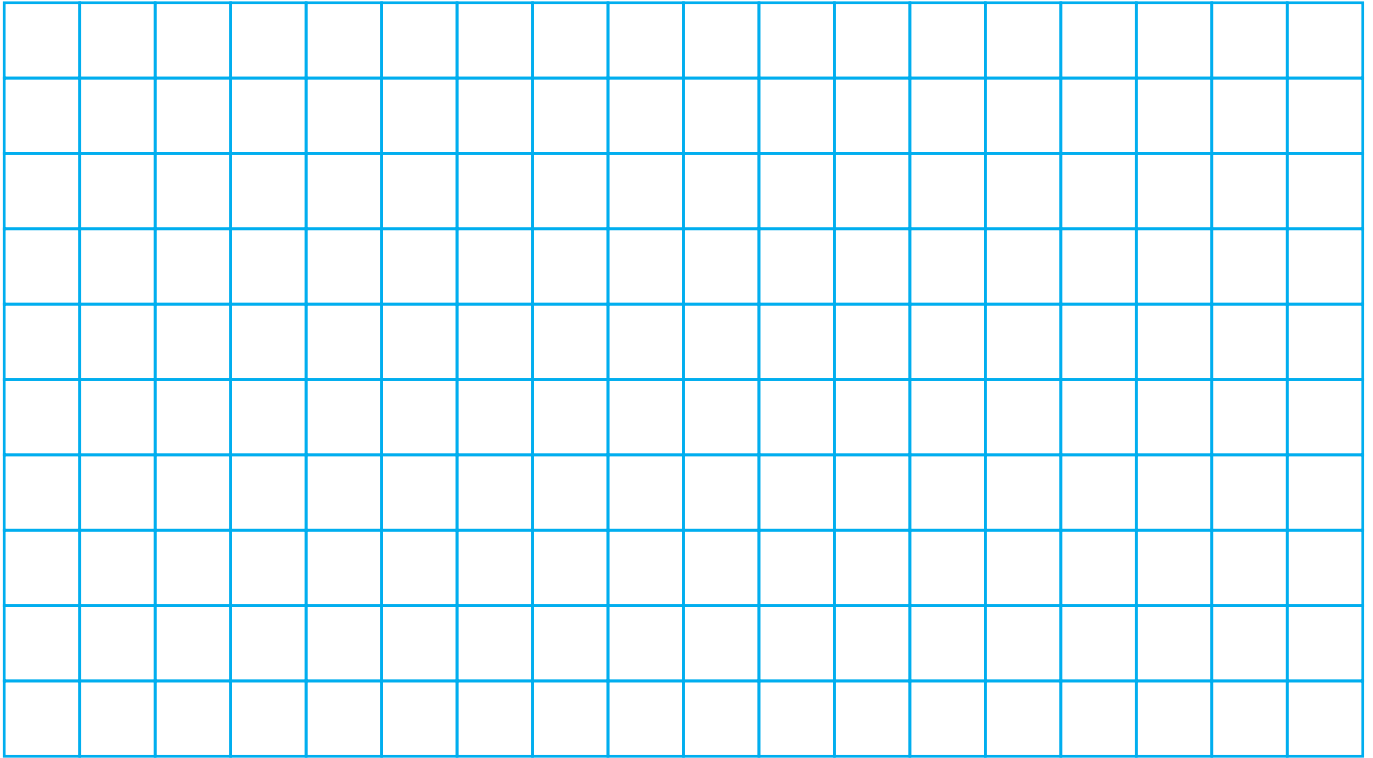


Look at a map of the world. If you fly from Sydney to London in what direction will you be travelling?

Your map

- 1 Draw a plan of your bedroom, classroom or playground. Use coordinates and include a compass.

Answers will vary



- 2 Draw a path from one point to another on your plan.



Describe to a partner how to get from one point to another.

- 3 Describe the location of 1 object on your plan in relation to another.

- 4 Describe the position of 3 objects using coordinates.



Try creating your plan on a computer using drawing tools.

Scale

The scale on a map is a line that is used to indicate the distance in real life.



1 Draw a circle around the scale on this map of Karijini National Park.

2 Use the scale to help you answer true or false for each statement below.

- a Wittenoom is about 25 km from Auski Tourist Village. True False
- b Tom Price is more than 25 km from Paraburdoo. True False
- c Mt Nameless is less than 25 km from Mt Bruce. True False
- d Karijini National Park is about 25 km wide. True False

3 How far do you think Paraburdoo is from its airport?

10km

Explain how you got your answer.

Answers will vary

4 How far do you think Auski Tourist Village is from Mt Meharry?

55km

Explain how you got your answer.

Answers will vary

5 Design a legend for the map in the space provided.

- | | |
|---|---|
|  Town |  Information |
|  Destination |  Park |
|  Airstrip | |

Scales on maps

1 The two islands in the maps shown below look quite similar in size.



a Which feature on these maps can be used to determine which island is larger? the scale

b Which of these two islands is larger in real life?

Tasmania

Explain your answer. Larger scale

c As the crow flies, approximately how far is it from

i Lovina to Singaraja in Bali? 10km

ii Denpasar to Candidasa in Bali? 40km

iii Launceston to St Helens in Tasmania? 70km

iv Queenstown to Bicheno in Tasmania? 240km

'As the crow flies' means in a straight line from one point to another.

2 Look at the map shown below. How is this map different to the maps shown in Question 1?

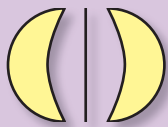
-closer view

-smaller scale

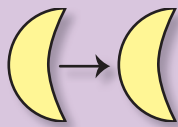
-can see roads



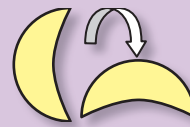
Reflect, translate and rotate



A flip is a reflection.

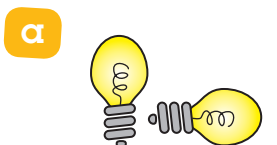


A slide is a translation.



A turn is a rotation.

1 Colour the correct type of transformation. For some examples you may need to colour more than one label.



- reflection
- translation
- rotation



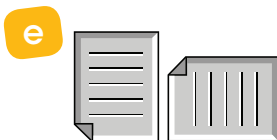
- reflection
- translation
- rotation



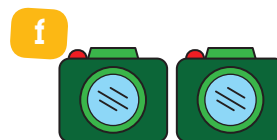
- reflection
- translation
- rotation



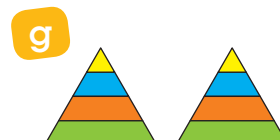
- reflection
- translation
- rotation



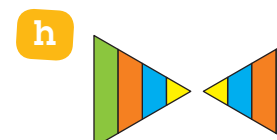
- reflection
- translation
- rotation



- reflection
- translation
- rotation



- reflection
- translation
- rotation



- reflection
- translation
- rotation

2 **a** Reflect (flip) each shape.



b Translate (slide) each shape.



c Rotate (turn) each shape.

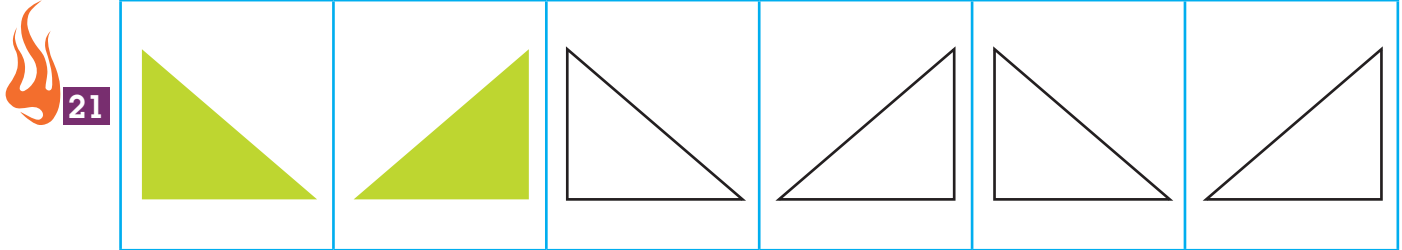


3 Complete the table.

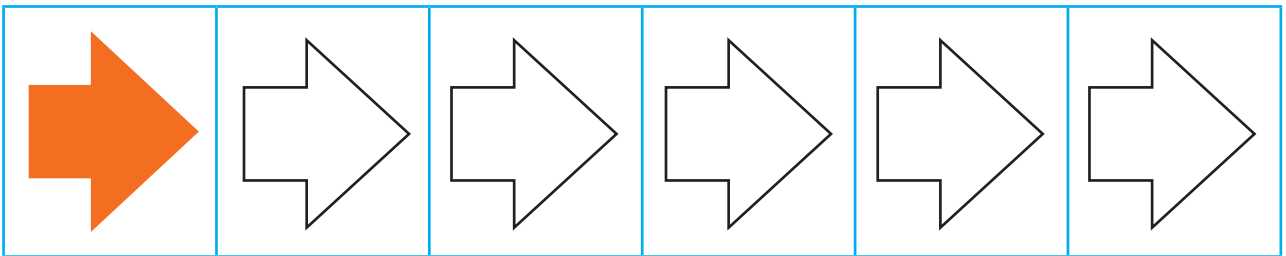
If	Then

Tessellations

1 Continue the pattern by reflecting (flipping) the shape.

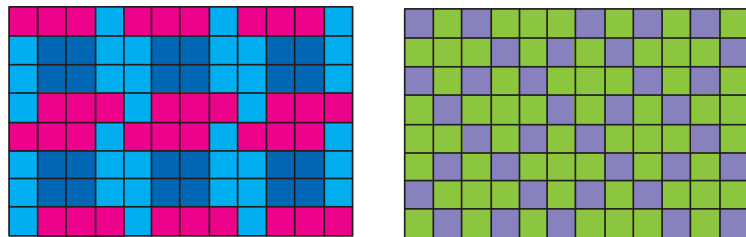


2 Continue the pattern by translating (sliding) the shape.

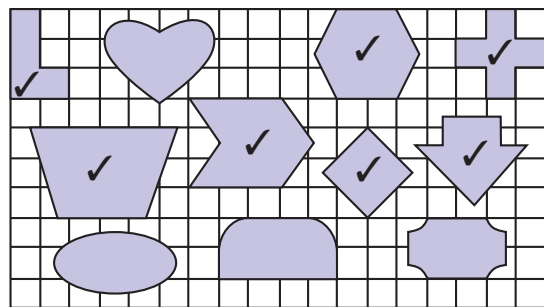


Tessellating designs can be made by reflecting, translating and rotating a 2D shape.

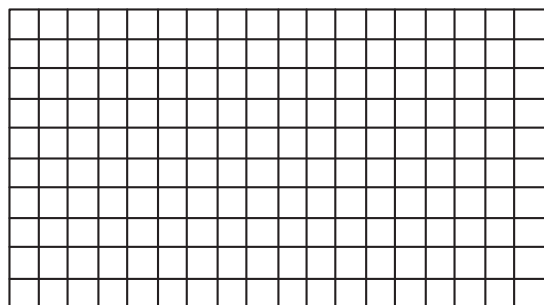
3 Continue these tessellations.



4 Tick the shapes that tessellate with copies of themselves.

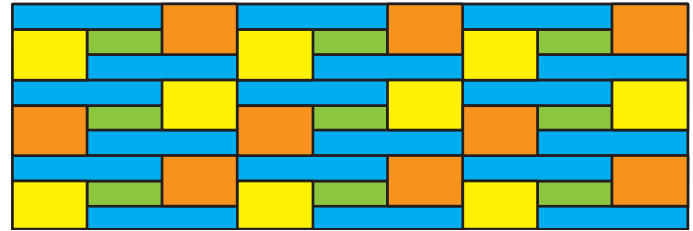


5 Select one of the shapes that you have ticked. Design a tessellating pattern. Make sure that there are no gaps.
Answers will vary



Tessellating designs

1 Con helped his dad tile the bathroom floor using different coloured tiles.



a How many of each tile did they use?

i blue 18

ii yellow 9

iii orange 9

iv green 9

b How much did it cost for all the:

i blue tiles? $18 \times \$10 = \180

ii yellow tiles? $9 \times \$7 = \63

iii orange tiles? $9 \times \$9 = \81

iv green tiles? $9 \times \$3 = \27

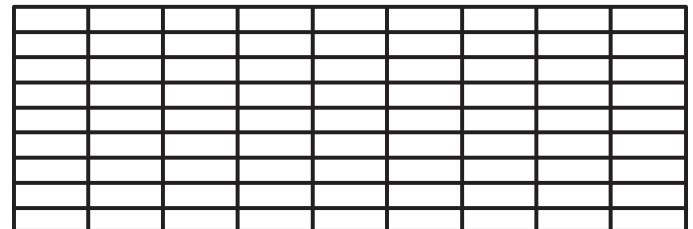
COST OF TILES

Blue	\$10
Yellow	\$7
Orange	\$9
Green	\$3

c Calculate the total cost of this tessellating tile design.

\$351

2 Create your own tessellating design using the same tiles as those above.



a Calculate the cost of your design.

Answers will vary

b Which classmate's design is the cheapest? _____

c By how much is it cheaper than yours? _____

3

a



Do these pencils tessellate? Yes

Explain your answer.

The shapes fit together - no gaps

b



Do these pencils tessellate? No

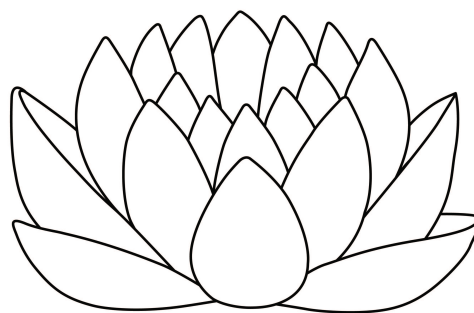
Explain your answer.

There are gaps between the shapes

Symmetry around the world

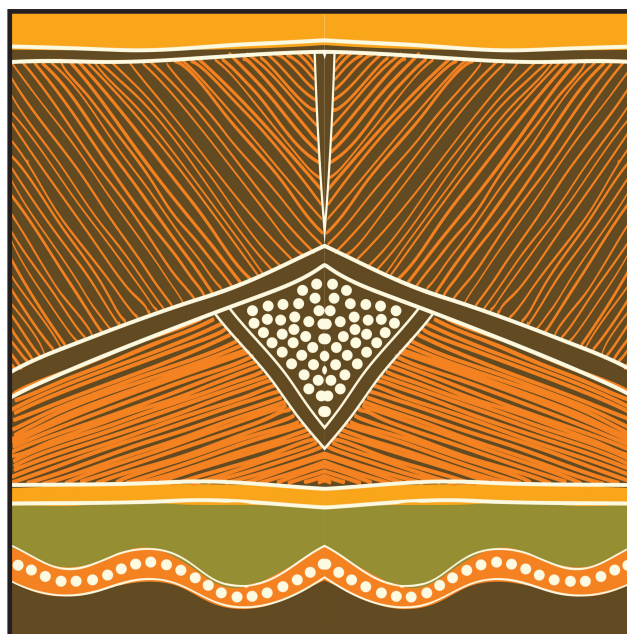
- 1 All around the world, symmetrical patterns appear in nature, as well as in man-made designs.

Using four different coloured pencils, colour in this Indian lotus flower, ensuring that there is symmetry of colour.



- 2 A lot of Indigenous Australian art is symmetrical. Look at the painting on the right, and describe some of the symmetrical patterns that you see.

Answers will vary



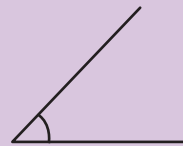
Use the internet to find pictures of symmetrical patterns. Use the following ideas to help with your search: Tibetan mandalas, Central and Western Desert Art, Japanese kamon (family crests) or Central Asian textiles. Draw three symmetrical designs that you have found in the spaces below.

--	--	--

Angles

Openings, slopes, corners of 2D shapes and turns form angles.

An angle can be the amount of turning between two straight lines as shown in this picture.



1 Make, then draw, a different-sized angle on each geoboard.

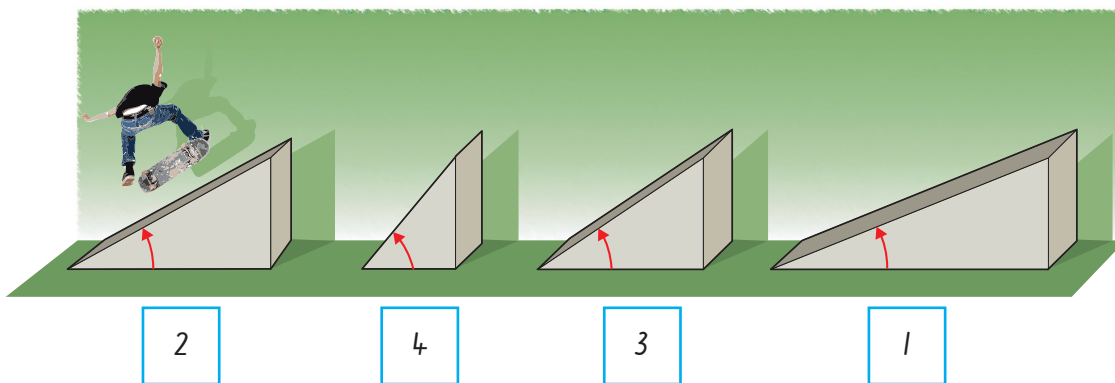
a **b** **c**

Answers will vary

2 a Make an angle tester by joining 2 geostrips with a paper fastener.

b Check that all your angles in Question 1 are different sizes.

c Cam loves skateboarding. Use your angle tester to compare the angle each ramp makes with the ground. Order the ramps from smallest angle to largest angle using the numbers 1-4.

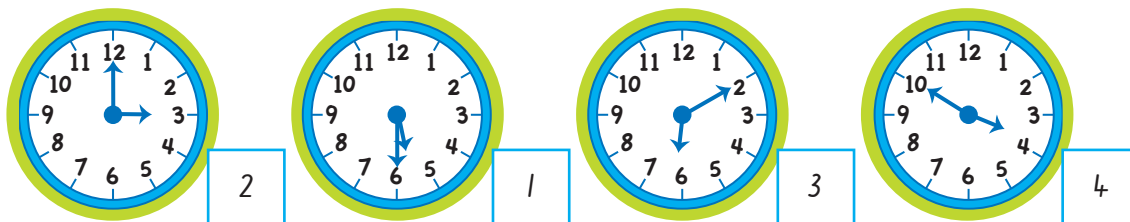


3 a Use your angle tester to compare the angle made on each clock.

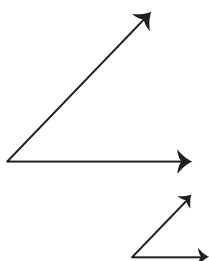
An angle is formed between the hands of a clock.



b Order the clocks from the smallest angle made to largest angle made using the numbers 1-4.



4 Are these 2 angles the same size? Yes



Explain your answer. _____

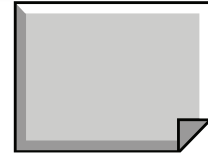
The angle does not change if the lines
become longer or shorter

MIB 2
Card 161

Right angles

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

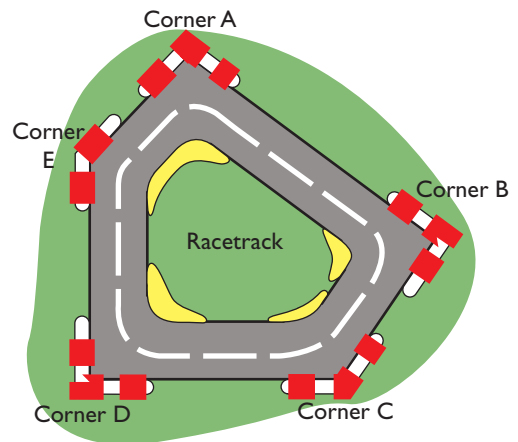
- 1
 - a Use a corner of a sheet of paper to test angles in your room.
 - b Record your results in the table.



Smaller than a right angle	A right angle	Larger than a right angle
	<i>Answers will vary</i>	

Are most angles in your room smaller than a right angle, larger than a right angle or a right angle?

- 2 This is an aerial view of a race track. Use your square corner to determine the size of each angle formed at each corner on the race track.



- a Which corners are larger than a right angle? E, C
- b Which corners are right angles? A, B, D

Right angles can be drawn in different orientations.

- 3 Make three different right angles on a geoboard. Sketch them below.



MiB 2
Card 163

Angles in the environment

Angles are classified according to the amount of their turning.

1 Use the instructions in the boxes to mark one angle on each picture. The first one has been done for you.

Mark angles **smaller** than a right angle **blue**.

Mark right angles **green**.

Mark angles **larger** than a right angle **red**.



What do you notice about the angle formed between north and east? What about south and west?



2 Use a ruler to draw:

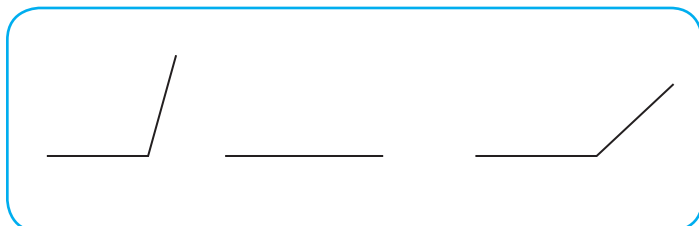
a 3 angles smaller than a right angle.

Answers will vary



b 3 angles larger than a right angle.

Answers will vary



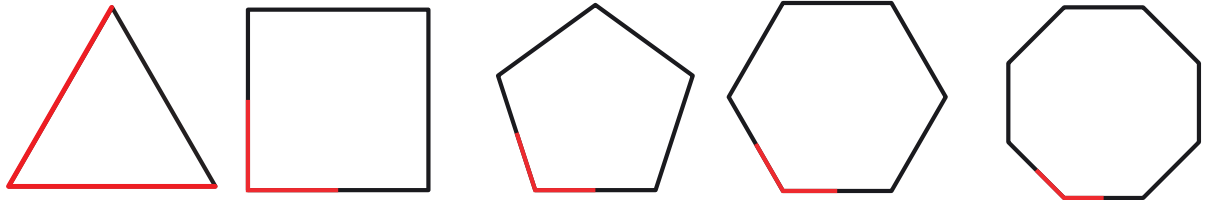
Angles in polygons

Polygons are named according to their number of sides and angles. For example, pentagons have 5 angles, hexagons have 6 angles and octagons have 8 angles.

Adjacent sides are sides which are next to each other.

1

- a** Trace along 2 adjacent sides of each regular polygon to make one angle. The first one has been done for you.



- b** What shape has right angles? square
- c** What shape has angles less than a right angle? triangle
- d** Which 3 shapes have angles more than a right angle?
pentagon, octagon, hexagon

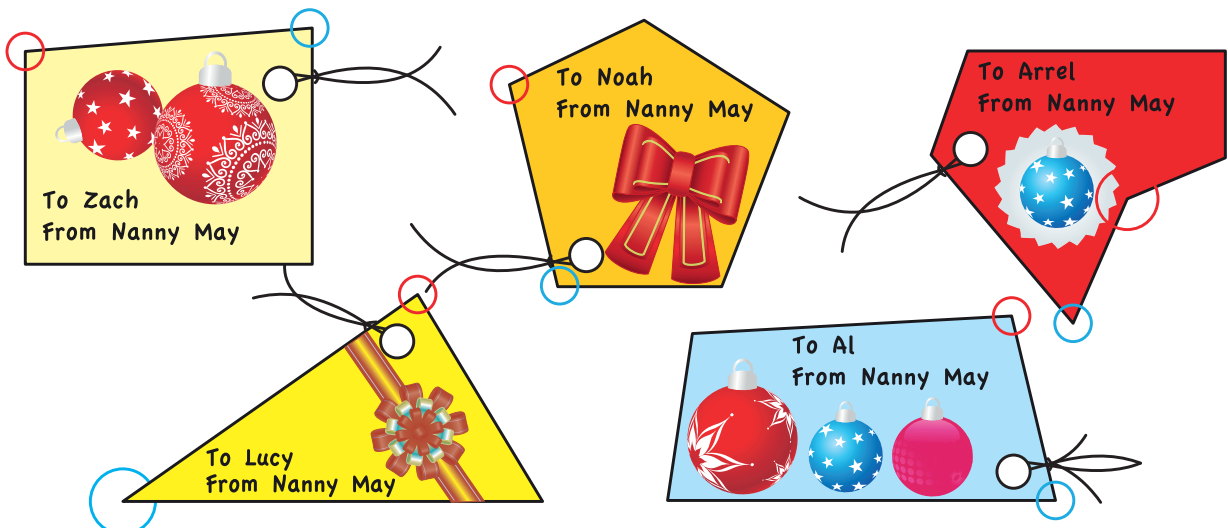


What do you notice about the size of each angle as the number of angles on each regular polygon increases?

2

Nanny May will use these tags to label her Christmas presents this year.

- a** Use an angle tester to compare each angle on each irregular polygon.
- b** Colour the largest angle red and the smallest angle blue.



Reading graphs

1 This picture graph shows where the students in 4W were born.

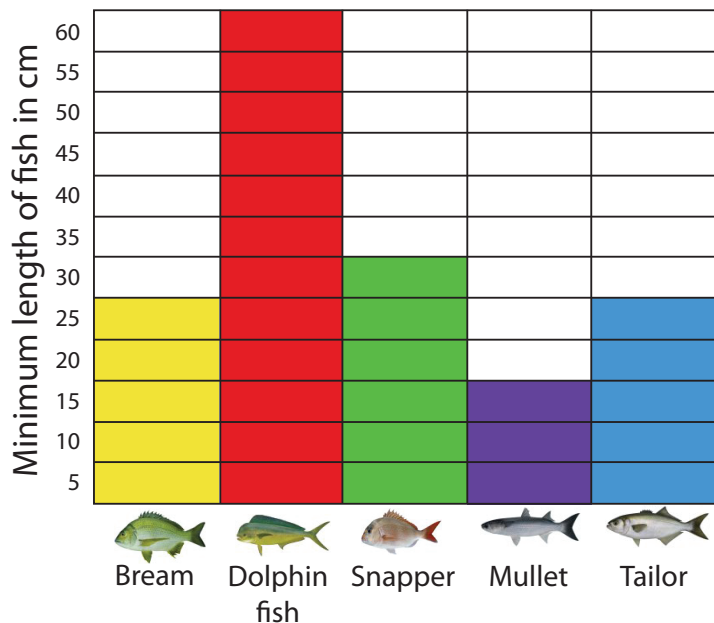
Country	Number of students born									
Australia	★	★	★	★	★	★	★	★	★	★
China	★	★	★	★	★					
India	★	★	★	★	★					
Lebanon	★	★	★	★	★					
Vietnam	★	★	★							
Zimbabwe	★									

Key ★ = 1 student

- a How many students are in 4W? 28 students
- b How many students were born in India? 5
- c Which three countries have the same number of students?
China India Lebanon
- d In which country were the most students born? Australia

2 This graph shows the minimum length different types of fish must be if they are to be kept after being caught.

- a How long must a snapper be to be kept? 30cm
- b How long must a mullet be to be kept?
15cm
- c Which fish must be at least 60 cm to be kept? Dolphin fish



- d Which two fish have the same minimum length? Bream Tailor
- e You catch a fish that is 22 cm long. Can you keep it if it is a bream? No What about if it is a mullet? Yes

Constructing graphs

Flags of the world



23



Tally marks are used to help in counting. They are drawn in bundles of 5

E.g. for the number 17 = 17

1 Make a tally of the colours used on each flag. The Australian flag has been done for you.

2 Construct a horizontal column graph to represent the information you found in Question 1. Include a title and label both axes. Complete the numbers along the bottom axis.

Colour	Tally
Black	
Blue	
Green	
Orange	
Red	
White	
Yellow	

Colours used in flags																				
Black																				
Blue																				
Green																				
Orange																				
Red																				
White																				
Yellow																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

3 Use your graph to write 3 facts about the colours on the flags.

Answers will vary

MiB 2
Card 70

Representing data

4 out of 5 of the fastest land animals live in Africa: the cheetah, wildebeast, lion and gazelle.

Read this fact about wildlife in Africa.

- Count the number of times each vowel is used in the fact and record it in the table. The first one has been done for you.

	a	e	i	o	u
Number of times used	9	10	6	4	1

- Create a picture graph to record the number of times each vowel is used. What picture will you use to represent the data? Remember to include a key and a title for your graph.

<i>Number of times a vowel is used in the fact</i>	
a	☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆
e	☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆
i	☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆
o	☆ ☆ ☆ ☆
u	☆

- Construct a vertical column graph to show the number of times each vowel is used. Remember to include a title and label your axes.

<i>Number of times a vowel is used in the fact</i>					
12					
11					
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					
	a	e	i	o	u

- In what way are the table, picture graph and column graph similar?

They all represent data.

Reading 2-way tables

This 2-way table was filled out by a group of Year 4 students.

Celebration	Girls	Boys
Australia Day	3	8
Chinese New Year	6	6
Diwali	7	4
Easter	3	5
Halloween	1	2

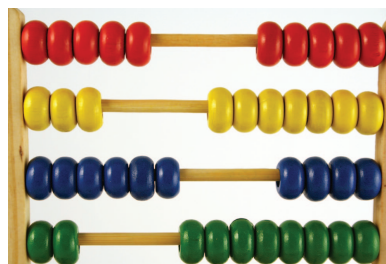


How many days until Easter?
Favourite celebrations
 Favourite numbers

- 1
 - a Circle the best title for the table.
 - b How many girls chose Halloween? 1
 - c How many boys chose Diwali? 4
 - d What was the favourite celebration for girls? Diwali
 - e What was the favourite celebration for boys? Australia Day
 - f How many boys and girls chose Easter? 8
 - g How many boys and girls chose Australia Day? 11
 - h Did more boys or girls choose Halloween? Boys
 - i How many more boys than girls chose Easter? 2
 - j What was the most popular celebration chosen? Chinese New Year
 How do you know this? Add boys and girls
 - k How many children were surveyed altogether? 45

2 Look at the abacus and complete the 2-way table.

Colour	Left	Right
Red	5	5
Yellow	3	7
Blue	6	4
Green	2	8



Creating 2-way tables



- 1 Students in 4K did a survey to find out which season they celebrated their birthday in. Record the information using tally marks on the 2-way table.

Survey			
Summer	Autumn	Winter	Spring
Adam	Con	Jill	Evan
James	Ahmed	Kate	Alan
Tom	Lucy	Mary	Liz
Sue	Tina	Kylie	Julie
Greg	Peggy	Beth	Hannah
Petro	Jim		David
Jane			Lewis
			Ned

Season	Girls	Boys
Summer		
Autumn		
Winter		
Spring		

- a How many students in 4K? 26
- b Are there equal numbers of boys and girls? Yes
 How do you know this? Add the columns for boys and girls
- c Do any boys celebrate their birthday in June? No
 Explain your answer.
June is in winter. No boys have their birthday in winter
- d Work out how many students celebrate their birthday in January? Not possible Explain your answer.
We only know the seasons, not the months of the birthdays
- e What date is your birthday? Answers will vary
 In what season is your birthday?

- 2 Complete the 2-way table based on the following information.

- 3 boys chose milk.
- 2 girls chose water.
- 10 children chose juice.
- 16 boys were surveyed.

Favourite drink	Boys	Girls
Milk	3	8
Water	7	2
Juice	6	4

Collecting data

- 1 4J conducted a survey on their parents' television viewing habits. The mothers' answers are in red and their fathers' answers are in blue.

Survey: Did you watch the news last night?	
Yes	
No	

- a Complete the 2-way table using the data in the table.

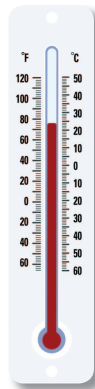
	Watched the news	Did not watch the news
Mothers	15	11
Fathers	11	15

- b How many fathers did not watch the news? 15
- c Did more mothers watch the news than not watch the news?

Yes

2

Use the 2-way table to record the temperature each hour over 2 days.



Time	Temperature (°C)	
	Day 1	Day 2
9 a.m.	<i>Answers will vary</i>	
10 a.m.		
11 a.m.		
12 p.m.		
1 p.m.		
2 p.m.		

Carroll diagrams are grids like 2-way tables. They are named after Lewis Carroll, the author of *Alice in Wonderland*. Carroll was also a mathematician who liked exploring maths problems. Can you sort the numbers into the grid?

In the bus there are:

- 7 boys
- 3 girls
- 15 males
- 21 adults.

	Males	Females
Adults	8	13
Children	7	3

How many people are on the bus? How many females?

Hint: You can't just add up the numbers given in each problem because some people are included in 2 categories, e.g. girls are females, adults are males and females.

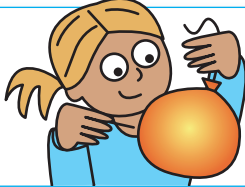
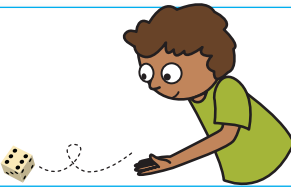
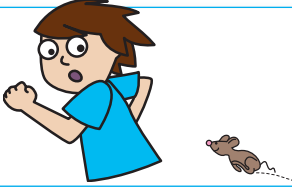
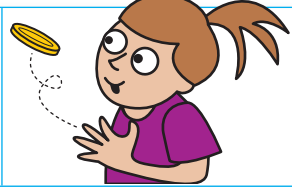
Least likely to most likely

1 Think about what you like to do. Colour in **red** the event you are most likely to do. Use **blue** for the event you are least likely to do.

Answers will vary





a	Eat fruit for a snack	Eat lollies for a snack	Eat a biscuit for a snack
b	Drink water	Drink juice	Drink soft drink
c	Wear blue clothes	Wear red clothes	Wear pink clothes
d	Watch a movie	Watch a cartoon	Watch the news

2 Use the numbers 1–4 to order these events from least likely to most likely.

			
The balloon will pop.	The boy will roll a 4.	The mouse will catch the boy.	The girl will toss a tail.
a <input type="text" value="4"/>	b <input type="text" value="2"/>	c <input type="text" value="1"/>	d <input type="text" value="3"/>

3 To win a prize at the carnival you need to spin blue. Serena decides to have a turn.

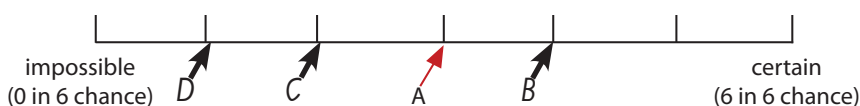
a Order the spinners, by numbering the boxes 1-4, from least likely to win to most likely to win.

A 	B 	C 	D 
<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="2"/>	<input type="text" value="1"/>

b For Spinner A, Serena has a 3 in 6 chance of winning. What chance does she have using:

- i** Spinner B? 5 in 6 chance of winning
- ii** Spinner C? 2 in 6 chance of winning
- iii** Spinner D? 1 in 6 chance of winning

c On the line draw an arrow to show the chance of each spinner winning. The first one has been done for you.



Chance outcomes

When you toss a coin, the chance of throwing a head is 1 in 2, because you can throw either a head or a tail.

1 Jess is playing a game of Snakes and Ladders. It is her turn to roll the die.



- a** How many possible outcomes are there? 6
- b** What is the chance that Jess will roll:
- i** a 3? 1 in 6 **ii** an even number? 3 in 6
- iii** a 5? 1 in 6 **iv** a number less than 5? 4 in 6
- v** a 7? 0

2 Misha got some money from his parents for his 10th birthday. He decided to buy an mp3 player, but did not know which colour player to buy. He decided to choose one at random.



- a** What does 'to choose one at random' mean? _____
They have equal chances of being selected
- b** What chance does Misha have of selecting the blue mp3 player?
1 in 9 chance
- c** Misha decided he didn't want a green or a black mp3 player and took them away. What chance does Misha now have of selecting the blue mp3 player?
1 in 7 chance
- d** Why has the chance of selecting the blue mp3 player changed?
Fewer outcomes

3 Gabi placed all the letters of the alphabet into a bag and chose one at random. What is the chance of her drawing:

- a** the letter p? 1 in 26
- b** a vowel? 5 in 26
- c** a consonant? 21 in 26








How many letters are there in the alphabet?
 What are the vowels?
 What are the consonants?

The language of chance

Language of chance

A 50% or a 50–50 chance means a 1 out of 2 chance, e.g. tossing a head when tossing a coin. A 100% chance means that an event will definitely happen.

1 Match the event to the chance.

 You will roll a 5.	 A baby will be born in May.	 You will toss a tail.	 You will choose a red ice-block.	 The sun will rise in the east.
50–50	1 in 6	100%	1 in 12	1 in 4

2 Ravi's mum is having a baby. What are the chances of the baby being:

- a a boy? 1 in 2
- b born in July? 1 in 12
- c born in summer? 1 in 4
- d born on a Monday? 1 in 7



3 One lolly is chosen at random. Use the *language of chance* to write 4 statements about this collection of 8 lollies.



There is a 1 in 2 chance of choosing a green lolly

There is a 1 in 4 chance of choosing a red lolly

There is a 1 in 4 chance of choosing an orange lolly

There is a 1 in 2 chance of choosing a red or orange lolly

4 List or draw different events which have a 50–50 chance of happening.

Answers will vary

Dependent and independent events

Sometimes an event cannot happen if another event is happening at the same time. For example, the weather cannot be hot and cold at the same time.

1 Fill in the missing words to show that one event cannot happen if the other event happens.

- a The floor cannot be wet and dry at the same time.
- b The classroom cannot be light and dark at the same time.
- c Traffic lights cannot be green and red at the same time.
- d Water cannot be frozen and melted at the same time.



If the outcome of one event affects the outcome of another event, then the events are said to be **dependent events**.
If the outcome of one event does not affect the outcome of another event, then the events are said to be **independent events**.



2 Are the following events dependent or independent?

- a Getting an even number on the first roll of a die and getting an odd number on the second roll. independent
- b Getting an odd number on a die and spinning blue on a spinner. independent
- c Getting a red card when drawing from a pack, then drawing a black card (if the first card is not replaced).
dependent
- d Getting a tail on the first toss of a coin and getting another tail on the second toss. independent

3 Ben's mum is going to have a baby. Is there more chance that his mum will have a baby girl than a baby boy because she has already had a boy? No

Explain your answer. independent event.