Summer Block 4

Shape

Small steps

Step 1	Turns and angles
Step 2	Right angles
Step 3	Compare angles
Step 4	Measure and draw accurately
Step 5	Horizontal and vertical
Step 6	Parallel and perpendicular
Step 7	Recognise and describe 2-D shapes
Step 8	Draw polygons

Small steps

Step 9	Recognise and describe 3-D shapes
Step 10	Make 3-D shapes

Turns and angles

Notes and guidance

In this small step, children are introduced to the concept of angles for the first time. In Year 2, they described turns as quarter, half, three-quarter and full turns. They will now recognise angles as describing the size of a turn and understand greater angles as having made a greater turn.

Children practise making quarter, half, three-quarter and whole turns in both clockwise and anticlockwise directions and in familiar contexts such as on a clock face or the points of a compass.

Model the correct mathematical language with instructions such as "make a quarter turn anticlockwise". They can then use this mathematical language to give instructions to others.

Help children to visualise the starting and finishing points of the turn as two straight lines that meet at a point and that an angle is created at the point where these lines meet.

Things to look out for

- Children may see the size of an angle as the distance between two lines, rather than a measurement of turn.
- Children may confuse clockwise and anticlockwise.
- Children may not recognise the same angles if they are given different starting points or orientations.

Key questions

- Which direction are you facing to start?
- Which direction is clockwise/anticlockwise?
- What fraction of a turn do you need to do to face ______?
- Which direction do you need to turn?
- Is there more than one possible way?
- Where can you see angles in the classroom?

Possible sentence stems

- If I face ______ and make a ______ turn clockwise/anticlockwise, I am now facing ______
- My starting point is ______
  I turn ______
  My finishing point is ______
- Making a $\frac{1}{4}$ turn followed by another $\frac{1}{4}$ turn is the same as making a ______ turn.

National Curriculum links

- Recognise angles as a property of shape or a description of a turn

Turns and angles

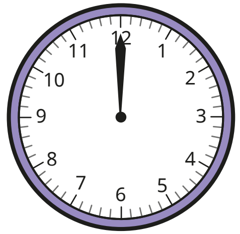
Key learning

Take children outside or into the hall where they can practise making and describing turns. Give children instructions using the mathematical vocabulary quarter, half, three-quarter and whole turns, for example: “Face the tree and make a half turn clockwise.” Ask children to work in pairs or small groups giving each other instructions to follow.

Encourage children to see angles as turns in the world around them. Model the use of mathematical language such as clockwise, anticlockwise, greater turn, smaller turn, as well as quarter, half, three-quarter and whole turns, to describe what they see.

Examples could include a door opening; the hands of a clock moving; opening and closing a jar or bottle; a turn on a skateboard, bike or scooter; turning on a swivel chair.

- Look at this clock.

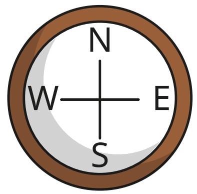
  Turn the minute hand one quarter of a turn clockwise.

  Where is the hand pointing now?

  What time could the clock show now?

  What time could the clock show if the minute hand is turned another half turn?

- Here is a compass showing the four points north, east, south and west.

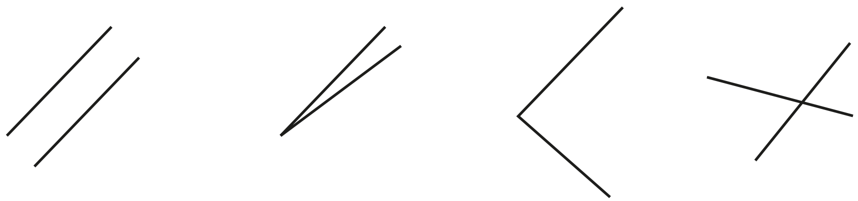
  

  Describe the turns clockwise from:

  - north to south
  - east to south
  - west to north
  - east to north

  How would the descriptions change if the turns were anticlockwise?

- Which pictures show at least one angle?

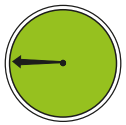
  

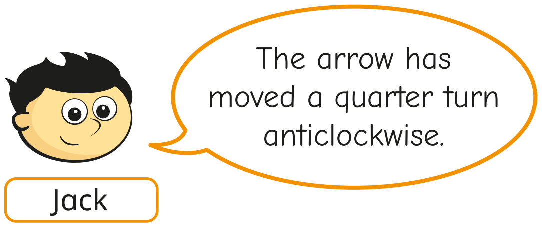
Turns and angles

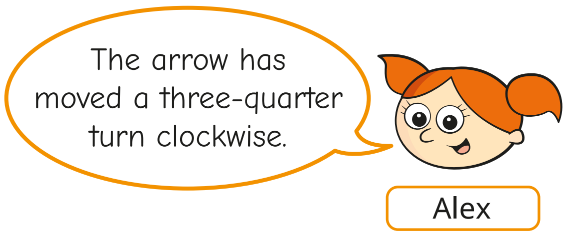
Reasoning and problem solving

The arrow on a spinner starts in this position.

After making a turn, it ends in this position.



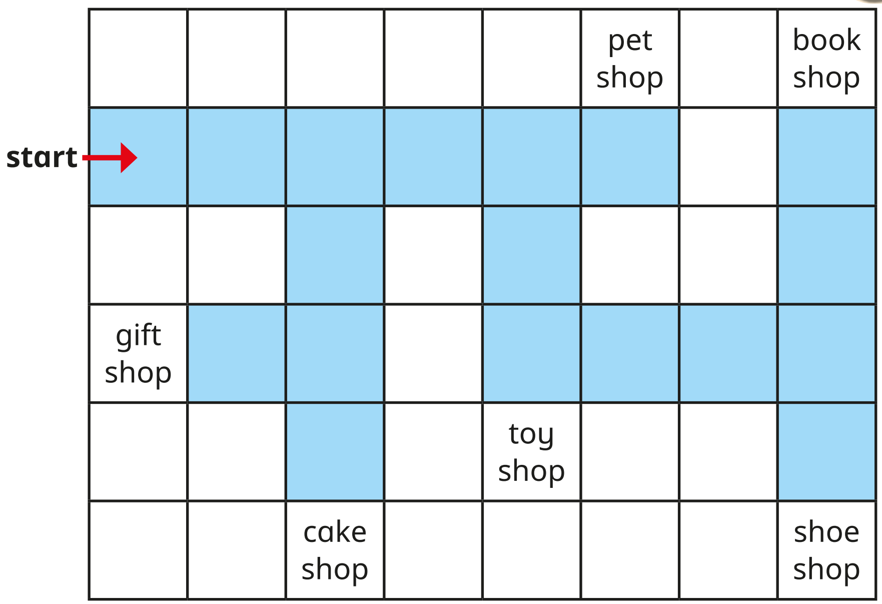




Who do you agree with?

Explain your answer.

Both children are correct.



Write instructions for a partner to follow to get from the start to reach any one of the shops. They are not allowed to walk on the white squares.

Compare answers as a class.

Right angles

Notes and guidance

In this small step, children are introduced to the term "right angle" to describe a quarter turn and learn the symbol for a right angle.

As in the previous step, children make the link between quarter turns and half turns by recognising that two right angles are equal to one half turn, three right angles are equal to three-quarters of a turn and four right angles are equal to a full turn. It is important for them to see examples of right angles in different orientations so that they understand that a right angle is not just made from vertical and horizontal lines.

Children go on to recognise right angles in a range of contexts, including in the world around them and within known 2-D shapes. They use the right-angle symbol to show right angles in shapes.

Things to look out for

- Children may assume that right angles are only constructed from a vertical and horizontal line and not recognise right angles in other orientations.
- Children may need clarification over the term "right" in "right angle" to avoid confusion that all right angles point to the right.

Key questions

- How many right angles are equal to a half turn?
- How many right angles are equal to a three-quarter turn?
- How many right angles are equal to a full turn?
- Where can you see right angles in the classroom/at school?
- What shapes contain right angles?
- How many right angles are there in a ______?
- What shapes can you draw that have right angles?

Possible sentence stems

- ______ right angles = ______ turn
- There are ______ right angles in a ______

National Curriculum links

- Recognise angles as a property of shape or a description of a turn
- Identify right angles, recognise that two right angles make a half turn, three make three-quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle

Right angles

Key learning

- Complete the sentences.

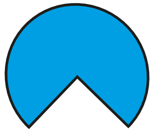
  1 right angle = a ______ turn

  ______ right angles = a half turn

  3 right angles = a ______ turn

  ______ right angles = a full turn

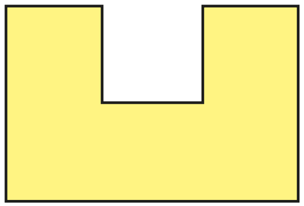
- Create a right-angle checker like this one.



  Use your right-angle checker to find right angles in your classroom or school.

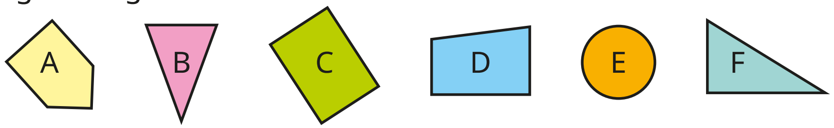
  Draw at least three right angles that you have seen.

- There are six right angles inside this shape.



  Use the symbol for a right angle to show them on the shape.

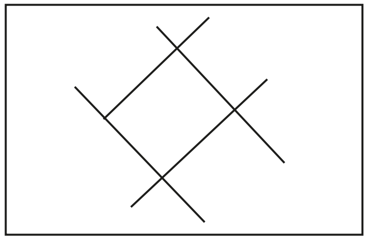
- Sort the shapes into the table based on how many right angles they have.



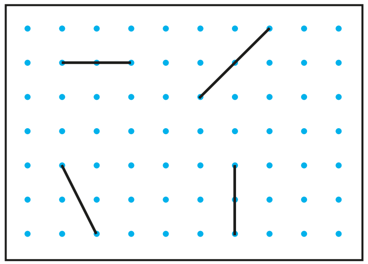
0 right angles	1 right angle	2 right angles	3 right angles	4 right angles

  Draw an extra shape in each column.

- How many right angles are there in this picture?

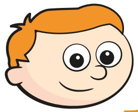


- Draw lines along the dots to make a right angle with each line.

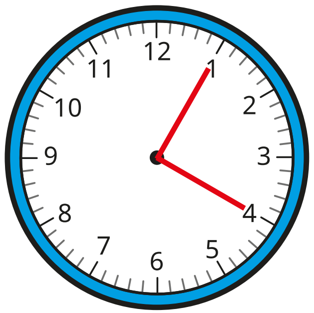


Right angles

Reasoning and problem solving



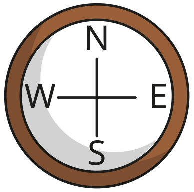
If I draw a line on a clock face from the 1 to the centre and from the 4 to the centre, where they meet will make a right angle.



Investigate how many pairs of numbers on a clock face will make a right angle.

How many possibilities are there?

12 possibilities,
e.g. 12 and 3
5 and 8

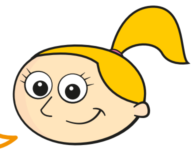


Dani is facing south and turns clockwise through 3 right angles.

Brett is facing west and turns through 2 right angles.

Eva is facing north and turns 1 right angle clockwise.

We are now all facing in the same direction.



Do you agree with Eva?

Explain your answer.

Yes

Compare angles

Notes and guidance

In this small step, children explore angles that are greater than and smaller than a right angle.

Encourage children to continue to think of angles as turns and describe turning less than or more than a right angle/quarter turn. They should also compare angles in shapes and lines by measuring and comparing them to a right angle. The use of a right-angle checker is a great way to support this activity.

Children are introduced to the terms "acute" and "obtuse" to describe the angles. Explain that acute angles are less than a right angle, and obtuse angles are greater than 1 but less than 2 right angles. These terms are in the non-statutory guidance for Year 3 and will be revisited in Year 4

Children use these terms to understand, label and compare angles that are less than two right angles.

Things to look out for

- Children may see the size of an angle as the size of the two lines or the distance between them rather than a measurement of turn.
- Children may not recognise the same angles if they are given different starting points or orientations.

Key questions

- How can you check if this is a right angle?
- Is the angle greater than or less than a right angle?
- Which angle is greater?
- What is an acute angle?
- What is an obtuse angle?
- Where can you see an acute/obtuse angle in the classroom?

Possible sentence stems

- Angle A is ______ than angle B.
- The angle is ______ than a right angle.
- An angle less than a right angle is an ______ angle.
- An angle greater than one right angle but less than two right angles is an ______ angle.

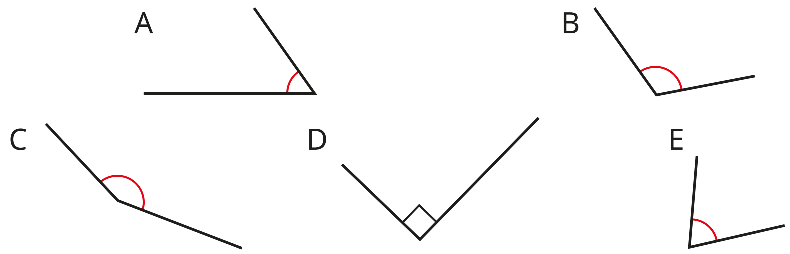
National Curriculum links

- Recognise angles as a property of shape or a description of a turn
- Identify right angles, recognise that two right angles make a half turn, three make three-quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle

Compare angles

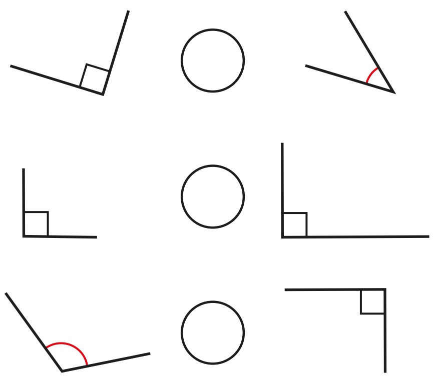
Key learning

- Sort the angles into the table.

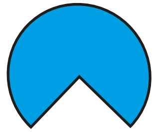


Less than a right angle	Equal to a right angle	Greater than a right angle

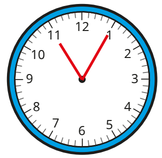
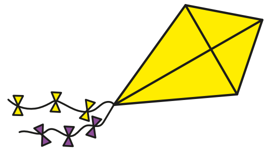
- Write <, > or = to compare the angles.



- Use a right-angle checker to find three acute angles and three obtuse angles in the classroom.



- Label the acute and obtuse angles in these pictures.


- In the table, draw two acute angles, two obtuse angles and two right angles.

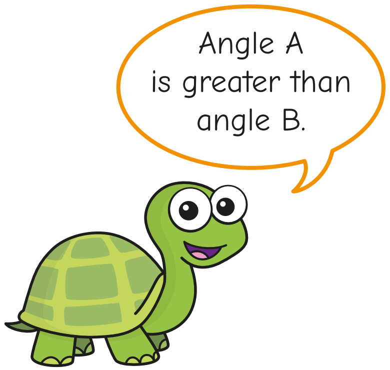
Acute angle	Right angle	Obtuse angle

- Draw a hexagon that has:
  - at least one obtuse angle
  - no acute angles
  - exactly two right angles

Compare angles

Reasoning and problem solving

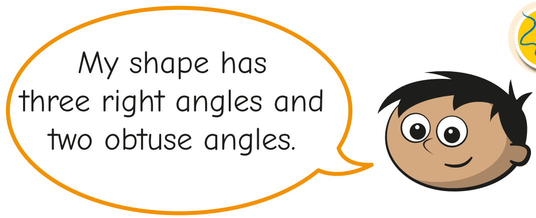
Tiny is comparing angles.



Explain why Tiny is wrong.

Both angles show the same amount of turn.

Amir has drawn a shape.

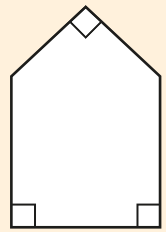


What could Amir's shape look like?

Describe the angles in a shape to a partner.

Can your partner draw the shape?

multiple possible answers, e.g.



Is the statement always true, sometimes true or never true?

A shape with four sides has four right angles.

Explain your answer.

sometimes true

Measure and draw accurately

Notes and guidance

In this small step children measure and draw straight lines accurately in centimetres and millimetres.

Children start by using a ruler to measure lines from zero. Encourage them to spread out their fingers to ensure a secure grip on the ruler when measuring and drawing straight lines. When they are familiar with measuring from zero, they could explore measuring from other numbers and finding the difference between the start and end points.

Children initially measure in whole centimetres before exploring measurements made up of centimetres and millimetres. They may also start to describe lengths to the nearest whole centimetre, for example 8 cm and 3 mm to the nearest whole centimetre is 8 cm.

Children then embed their measuring skills by using a ruler to draw lines and 2-D shapes accurately.

Things to look out for

- Children may need support on to how to hold a ruler.
- When measuring, children may assume that the number on the ruler at the end of the line is equal to the length of the line, without checking that they are measuring from zero each time.

Key questions

- How can you hold the ruler to ensure that it does not slip?
- Where should you start measuring from?
- Where should you measure to?
- How long is the line in centimetres?
- How long is the line in millimetres?
- What is the length to the nearest whole centimetre? How do you know?

Possible sentence stems

- 1 cm = ______ mm, so
  ______ cm = ______ × ______ mm = ______ mm
- The length of the line is ______ cm and ______ mm.

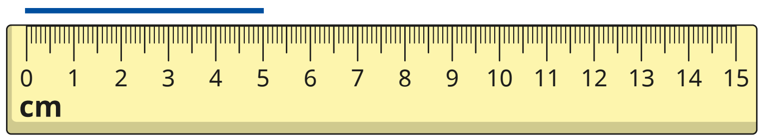
National Curriculum links

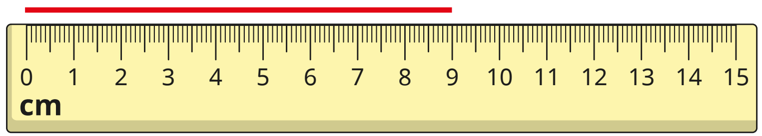
- Measure the perimeter of simple 2-D shapes
- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)

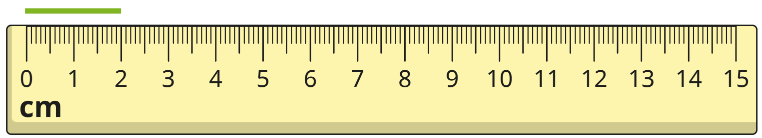
Measure and draw accurately

Key learning

- How long is each line?

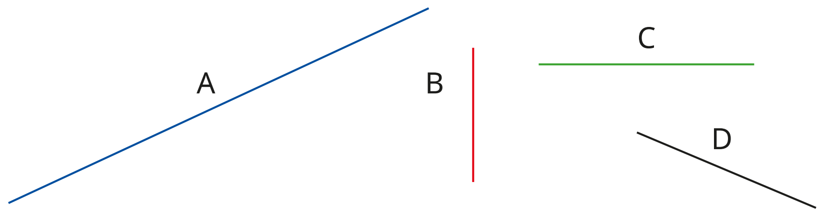






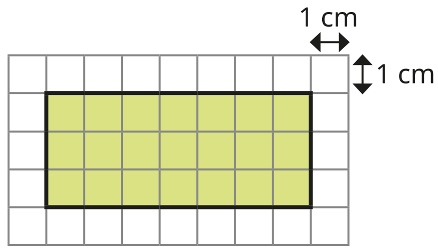
- Measure the lines carefully with a ruler.

  Complete the sentence for each line.



Line ______ is ______ cm ______ mm long.

- Here is a rectangle.

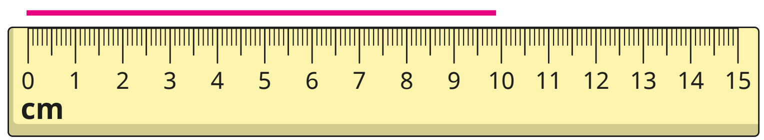


  - What is the length of each side?
  - What is the perimeter of the rectangle?

- Use a ruler to draw lines of these lengths.

5 cm	60 mm	7 cm 5 mm	75 mm

- The line is 9 cm 9 mm long. Complete the sentence.



The line measures ______ cm to the nearest cm.

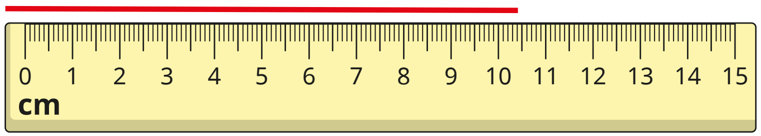
- Draw a line for each measurement.

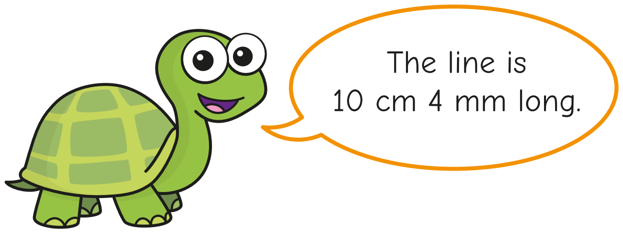
5 cm 2 mm	0 cm 9 mm	13 cm 8 mm	10 cm 3 mm

What does each line measure to the nearest centimetre?

Measure and draw accurately

Reasoning and problem solving





Is Tiny correct?

Explain your answer.

No

The sides of a rectangle are all a whole number of centimetres.

Its perimeter is 16 cm.

What could the rectangle look like?

Use centimetre squared paper.

Draw as many possible rectangles as you can.

1 cm × 7 cm

2 cm × 6 cm

3 cm × 5 cm

4 cm × 4 cm

A shape has 5 sides.

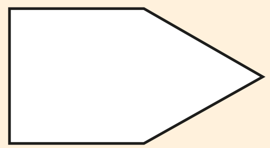
Each side measures 5 cm.

The shape has 2 right angles, 2 obtuse angles and 1 acute angle.

What could the shape look like?

Draw a possible shape on plain paper.

multiple possible answers, e.g.



Horizontal and vertical

Notes and guidance

In this small step, children learn to recognise and draw horizontal and vertical lines in a range of contexts.

Children begin by finding horizontal and vertical lines in the classroom and the world around them. This could be related to the horizon as a means of remembering which term relates to which line. Care should be taken to ensure that all lines have a distinct orientation and could not be perceived as sloping.

Once children are confident recognising horizontal and vertical lines, they can embed this understanding by drawing horizontal and vertical lines. As before, a range of examples can be used, including individual lines and lines within shapes.

Children then build on their knowledge of symmetry from Year 2, by identifying horizontal and vertical lines of symmetry in familiar shapes.

Things to look out for

- Children may mix up the terms “horizontal” and “vertical”.
- Children may not recognise that horizontal and vertical lines are directly related to their orientation, and that a horizontal line does not continue to be horizontal if the line is shown in a different orientation.

Key questions

- What is the same and what is different about horizontal and vertical lines?
- Where can you see horizontal and vertical lines?
- How could you describe a vertical/horizontal line without using the word “vertical”/“horizontal”?
- What could you use to help you remember what the words horizontal and vertical mean?
- What do you call a line that is neither horizontal nor vertical?

Possible sentence stems

- A line drawn across the page is called a ______ line.
- A line drawn down the page is called a ______ line.
- The horizon is a ______ line.

National Curriculum links

- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines

Horizontal and vertical

Key learning

- Complete the sentences.

  A line drawn across the page is called a ______ line.

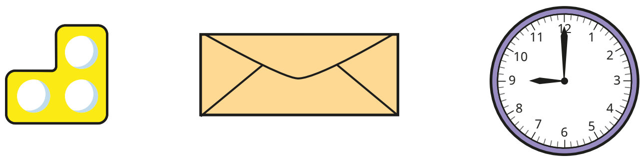
  A line drawn down the page is called a ______ line.

- Find three horizontal lines and three vertical lines in the classroom.

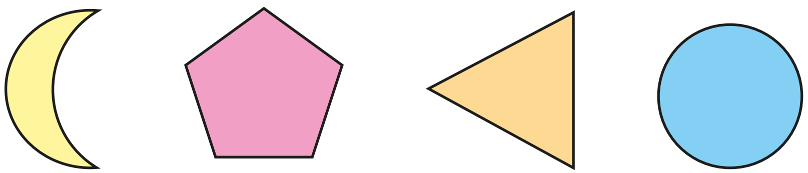
  Record them in the table.

Horizontal	Vertical

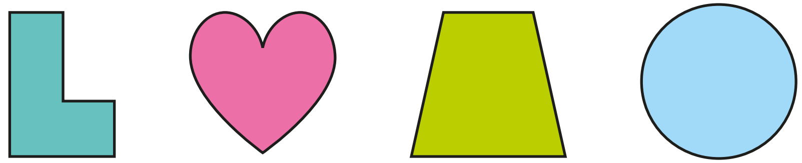
- Label the vertical and horizontal lines in the pictures.



- Draw horizontal lines to show the shapes that have a horizontal line of symmetry.



- Draw vertical lines to show the shapes that have a vertical line of symmetry.



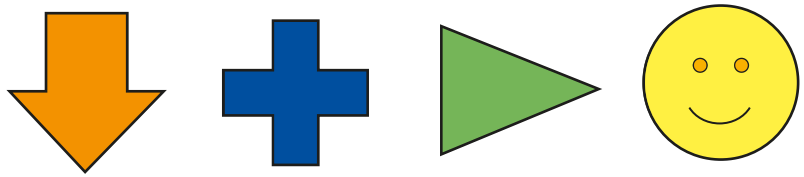
- Draw shapes to match the descriptions.
  - 2 horizontal lines and 2 vertical lines
  - 1 horizontal line and no vertical lines
  - 2 horizontal lines and no vertical lines
  - no horizontal lines and 2 vertical lines

- Draw a horizontal line measuring 70 mm.

  Draw a vertical line measuring 5 cm.

  Draw a line measuring 65 mm that is neither horizontal nor vertical.

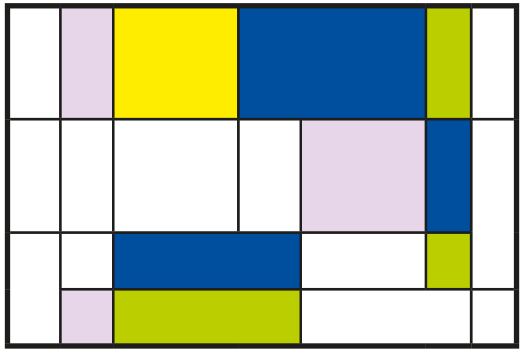
- Draw and label horizontal and/or vertical lines of symmetry on the shapes.



Horizontal and vertical

Reasoning and problem solving

How many horizontal and vertical lines can you see in this picture?



5 horizontal lines

8 vertical lines

Is the statement always true, sometimes true or never true?

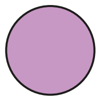
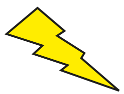
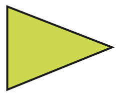
A square has two horizontal lines and two vertical lines.

Explain your answer.

sometimes true

Does each shape have horizontal and/or vertical lines of symmetry?

Write **yes** or **no** to complete the table.

Shape	Horizontal line of symmetry?	Vertical line of symmetry?
		
		
		
		
		

no	yes
yes	yes
yes	yes
no	no
yes	no

Parallel and perpendicular

Notes and guidance

In this small step, children find and identify parallel and perpendicular lines in a range of practical contexts.

Children learn that parallel lines stay the same distance apart and never meet, whereas perpendicular lines meet at a right angle. Give them the opportunity to think about where they may find parallel and perpendicular lines in the world around them.

Children are exposed to examples and non-examples of parallel and perpendicular lines to support their understanding. They learnt about horizontal and vertical lines in the previous step, but ensure that they are also presented with lines that are not horizontal and vertical to avoid any potential misconceptions.

Children are introduced to the arrow notation to represent parallel lines and use the right-angle symbol to show perpendicular lines. They may need to use a right-angle checker to help them decide if lines are perpendicular.

Things to look out for

- Children may assume that parallel lines must be the same length.
- Children may not recognise parallel and perpendicular lines if they are not presented horizontally/vertically.

Key questions

- What are parallel lines?
- Are these pairs of lines parallel? Why/why not?
- What are perpendicular lines?
- Are these pairs of lines perpendicular? Why/why not?
- Where might you see sets of parallel lines in the world around you?
- Where can you see sets of parallel and perpendicular lines in the classroom?

Possible sentence stems

- Lines that stay the same distance apart and never meet are called ______ lines.
- Straight lines that meet at a right angle are called ______ lines.
- These lines are parallel/perpendicular because …

National Curriculum links

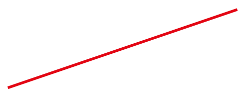
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines

Parallel and perpendicular

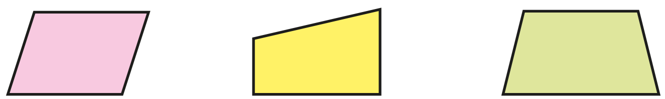
Key learning

- Which pairs of lines are parallel?

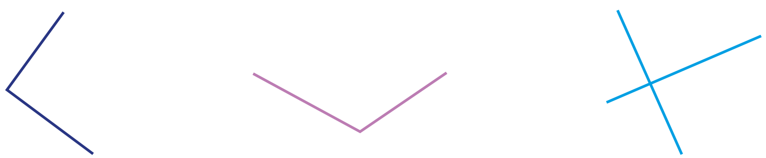
- Draw a line that is parallel to this one.



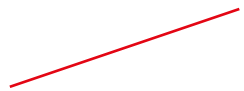
- Use arrows to show the parallel lines in the shapes.



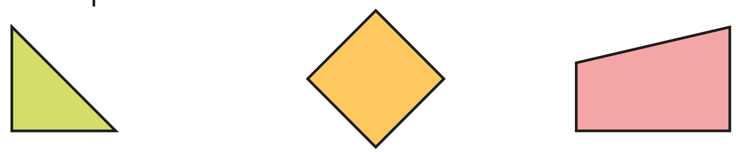
- Which pairs of lines are perpendicular?



- Draw a line that is perpendicular to this one.

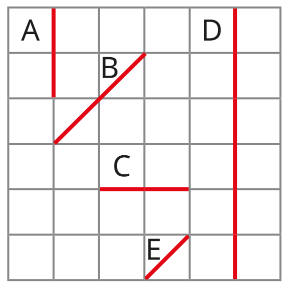


- Draw the right-angle symbol to show the perpendicular lines in the shapes.



- Find three sets of parallel lines and three sets of perpendicular lines in the classroom.

- Some lines are drawn on a squared grid.

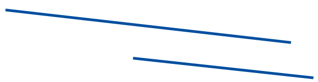


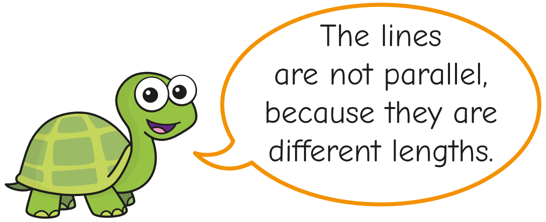
Which two pairs of lines are parallel?

Which two pairs of lines are perpendicular?

Parallel and perpendicular

Reasoning and problem solving



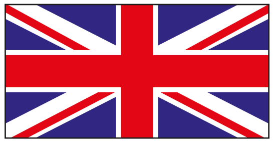


Do you agree with Tiny?

Explain your answer.

No

Here is a flag.

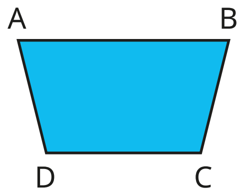


Mark three sets of parallel lines and three sets of perpendicular lines.

Draw your own flag with parallel and perpendicular lines.

Compare answers as a class.

Are the statements about shape ABCD true or false?



The line from A to B is parallel to the line from C to D.

The line from A to C is parallel to the line from B to D.

The line from A to D is perpendicular to the line from C to D.

True

False

False

Recognise and describe 2-D shapes

Notes and guidance

In this small step, children revisit their understanding of 2-D shapes from Year 2, recognising and naming a variety of 2-D shapes before using their knowledge from the previous steps in this block to describe them.

Children describe the properties of shapes, including types of angles, lines, symmetry and lengths of sides. Give them opportunities to identify a shape from a description and to describe a shape for a partner to identify.

It is important for children to recognise that 2-D shapes are flat and that the manipulatives they may handle in class are representations of the shapes.

Ensure that children are exposed to standard and non-standard examples of 2-D shapes to support their understanding that not all shapes with the same number of sides/vertices look the same.

Things to look out for

- Children may make errors when presented with irregular or non-standard variations of shapes.
- There is a large amount of vocabulary and children may mix up the names of 2-D shapes.

Key questions

- What is the name of this shape? How do you know?
- What are the properties of a ______?
- Does a ______ always look like this? Give some examples.
- How many angles does a ______ have?
- How many lines of symmetry does a ______ have?
- What types of lines are in a ______?
- How can you describe this shape?
- What types of angles can you see on the shape?

Possible sentence stems

- A ______ has ______ angles/sides.
- This ______ has ______ lines of symmetry.
- This ______ has ______ pairs of parallel/perpendicular lines.

National Curriculum links

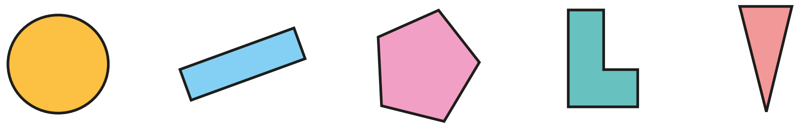
- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them

Recognise and describe 2-D shapes

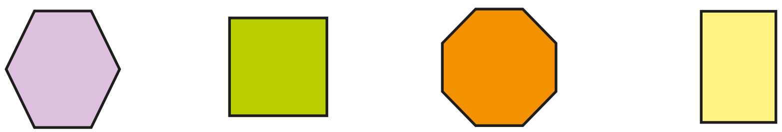
Key learning

- Match the labels to the shapes.

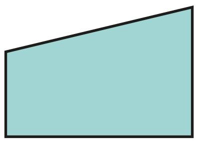
triangle	pentagon	circle	rectangle	hexagon



- Name the shapes.



- Complete the sentences to describe this shape.



It has ______ angles.

It has ______ right angles.

It has ______ obtuse angle.

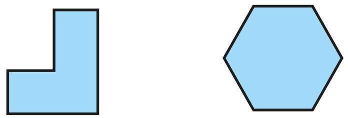
It has ______ acute angle.

It has ______ lines of symmetry.

- Draw the shape that is being described.

> - It is a quadrilateral.
> - It has equal sides.
> - The opposite sides are parallel.
> - There are no sets of perpendicular lines.
> - It has 2 obtuse angles and 2 acute angles.

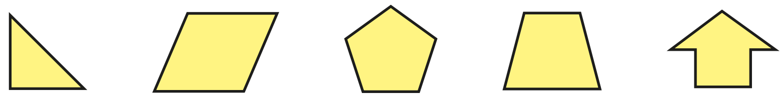
- What is the same and what is different about the two shapes?



- Choose one of the 2-D shapes and describe it to a partner.

  Think about the angles, the types of lines it is made up of and whether it has any lines of symmetry.

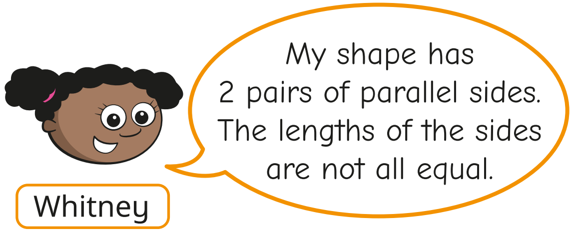
  Can your partner identify the shape from your description?

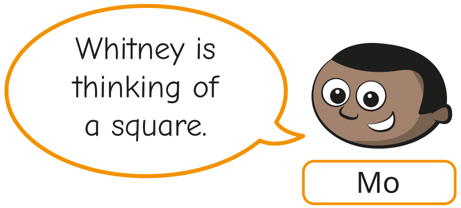


Recognise and describe 2-D shapes

Reasoning and problem solving

Whitney is describing a 2-D shape.





Is Mo correct?

Explain your answer.

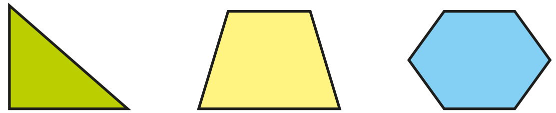
What shape could Whitney be thinking of?

No

The lengths of the sides in a square are equal.

rectangle, parallelogram

What is the same and what is different about the shapes?



Same: at least one line of symmetry
a vertical line of symmetry

Different: different number of angles/sides
triangle has a pair of perpendicular lines

Write the name of at least one shape in each part of the table.

	At least 1 right angle	No right angles
4 sides		
Not 4 sides		

Draw the shapes.

multiple possible answers, e.g. top row: square, rhombus; bottom row: right-angled triangle, pentagon

Draw polygons

Notes and guidance

Building on the previous steps in this block, children use their knowledge of the properties of shapes to accurately create and draw 2-D shapes.

Building on learning from Year 2, children begin by using geoboards and elastic bands to explore how to make shapes, before using dotted paper to draw them using a pencil and a ruler. They then move on to drawing shapes accurately with a ruler when given the measurement for each length. Children should use their knowledge of vertices and sides to ensure that their drawings are accurate.

Children should recognise that there is more than one way to draw a shape, for example a hexagon can be any enclosed shape that has 6 straight sides and 6 vertices.

Things to look out for

- When drawing accurately, children may measure from the very start of the ruler or from 1 cm on the ruler instead of from zero.
- Children may not draw shapes with straight sides.
- Children may not start a new side at a vertex, which could mean that they draw an extra side/vertex.

Key questions

- What equipment do you need to draw a polygon?
- How can you tell if a shape is a polygon or not?
- Where will you draw the final vertex on the dotted paper?
- How can you accurately draw a ______?
- How do you know that you have drawn a ______?
- Is there more than one way to draw a ______?
- Can you draw a polygon without a ruler? Why/why not?

Possible sentence stems

- I know that I have drawn a ______, because it has ______ sides and ______ vertices.

National Curriculum links

- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them

Draw polygons

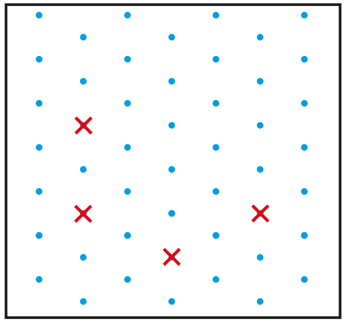
Key learning

- Use a geoboard to make a square, a rectangle and a triangle.

  What other shapes can you make?

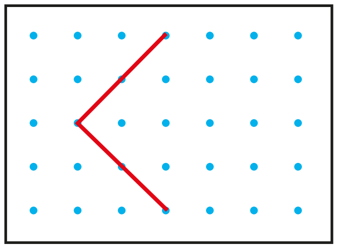
- Here are four vertices of a pentagon.

  Mark the fifth vertex and join the points to draw the pentagon.

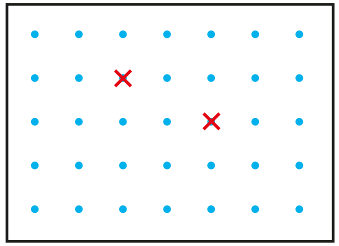


  Compare answers with a partner.

- Here are two sides of a square. Complete the square.



- Mark the missing vertices of this quadrilateral so that there is one set of parallel lines.



  Compare answers with a partner.

  Is there more than one way to do it?

- Draw each shape on dotted paper.
  - a square with sides measuring 2 cm
  - a square that is larger than the one you have just drawn
  - a rectangle with sides measuring 4 cm and 6 cm
  - a triangle with two sides of equal length

- Draw a 6-sided shape.

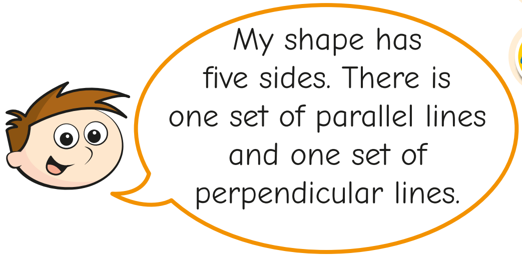
  Compare shapes with a partner.

  What is the same about the shapes? What is different?

Draw polygons

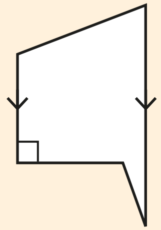
Reasoning and problem solving

Teddy is drawing a 2-D shape.

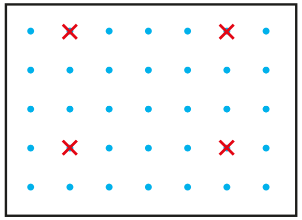


Draw what Teddy's shape could look like.

multiple possible answers, e.g.



Tiny thinks the vertices of a square are marked.



Is Tiny correct?

Explain your answer.

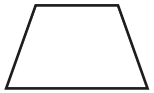
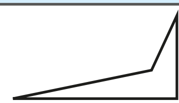
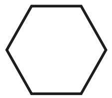
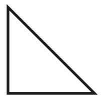
No

Draw at least one shape in each section of the table.

	At least 1 pair of parallel lines	No pairs of parallel lines
4 sides		
Not 4 sides		

Compare answers with a partner.

multiple possible answers, e.g.

	At least 1 pair of parallel lines	No pairs of parallel lines
4 sides		
Not 4 sides		

Recognise and describe 3-D shapes

Notes and guidance

In this small step, children recap their understanding of 3-D shapes from Year 2 and describe shapes in terms of their properties.

Children recognise and name a variety of 3-D shapes in different orientations. They then use mathematical language to describe shapes by identifying the number of faces, edges and vertices. Provide children with the opportunity to handle 3-D shapes to help them identify and remember the shape's properties.

Where a shape has a curved surface, children should know that this is not a face. For example, a cylinder has two flat circular faces and one curved surface.

Give children opportunities to identify a shape from a description and to describe a shape for a partner to identify.

Things to look out for

- Children may not recall the names of all 3-D shapes.
- Children may confuse the names of 3-D shapes with the names of the 2-D faces, for example calling a cube a square.

Key questions

- What is the name of this shape?
- What are the properties of a ______?
- What words could you use to describe 3-D shapes?
- How many edges/faces/vertices/curved surfaces does a ______ have?
- How can you describe this shape?
- What is the same and what is different about the shapes?

Possible sentence stems

- A ______ has ______ flat faces.
- A ______ has a curved surface.
- A ______ has ______ vertices.
- A ______ has ______ edges.

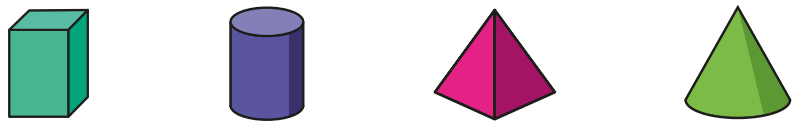
National Curriculum links

- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them

Recognise and describe 3-D shapes

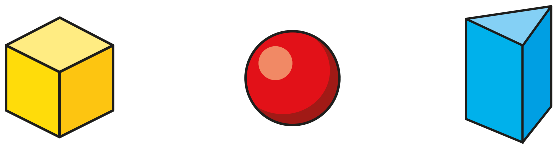
Key learning

- Match the shapes to the labels.

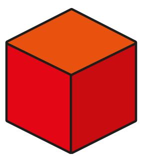


square-based pyramid	cuboid	cone	cylinder

- What is the mathematical name of each shape?



- Complete the sentences to describe the 3-D shape.



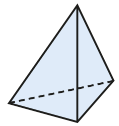
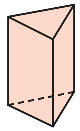
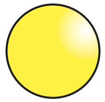
This shape is a ______

It has ______ faces.

It has ______ edges.

It has ______ vertices.

- Complete the table.

3-D shape	Number of edges	Number of faces	Number of vertices	Number of curved surfaces
				
				
				

- Choose one of these 3-D shapes.

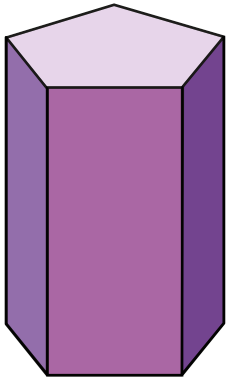
Describe the shape's properties to a partner.

Can they identify the shape from your description?

Recognise and describe 3-D shapes

Reasoning and problem solving

This shape is a pentagonal prism.



Complete the sentences to describe the shape.

It has ______ faces.

______ of the faces are rectangles.

It has ______ edges.

It has ______ vertices.

What do you notice about the face of each end of the prism and the number of rectangular faces?

7

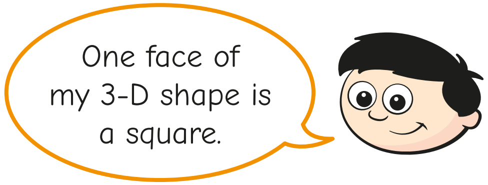
5

15

10

The number of edges on the face of each end of the prism is equal to the number of rectangular faces.

Dexter has a 3-D shape.



What could Dexter's shape be?

multiple possible answers, e.g. cube, cuboid, square-based pyramid

Sort a selection of 3-D shapes into the table.

	At least one triangular face	No triangular faces
Prism		
Not a prism		

Change the headings in the table and sort your shapes again.

Compare answers as a class.

Make 3-D shapes

Notes and guidance

In this small step, children embed the understanding from the previous step by building 3-D shapes from a range of construction materials such as cubes, straws, marshmallows and modelling clay.

Children make shapes such as cubes, cuboids, prisms and pyramids. Cylinders and other shapes with curved surfaces are more challenging, but rolling up rectangular sheets of paper is a good starting point. Nets could be provided for children to cut out and fold up; these are explored formally in upper Key Stage 2

Encourage children to continue to use mathematical language to describe the shapes they have made to help reinforce their earlier learning. Examples of mathematical language should include: edges, faces, vertices, curved surfaces, parallel, perpendicular, horizontal, vertical and the names of 2-D shapes that are faces of 3-D shapes.

Things to look out for

- Children may be familiar with a shape in one orientation and not recognise the same shape in a different orientation.
- There is a large amount of vocabulary and children may confuse the terminology.

Key questions

- How is a 3-D shape different from a 2-D shape?
- How many edges/faces/vertices/curved surfaces does the shape have?
- What is the same and what is different about these shapes?
- Does the shape look the same or different if you look at it from different places?

Possible sentence stems

- The shape has ______ edges.
- The shape has ______ faces.
- The shape has ______ vertices.
- The shape has ______ curved surface.
- The faces of a ______ are the 2-D shapes ______ and ______

National Curriculum links

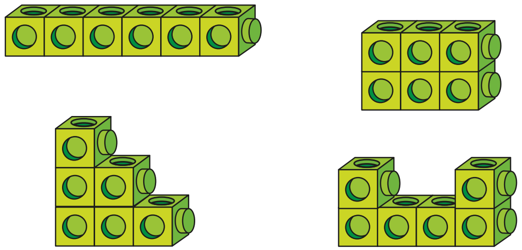
- Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them

Make 3-D shapes

Key learning

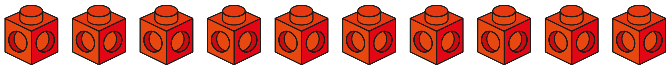
- Take six cubes.

  Make the 3-D shapes.



  What is the same about the shapes? What is different?

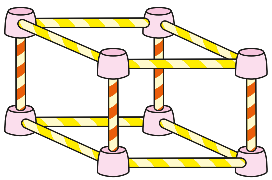
- How many different 3-D shapes can you make using ten cubes?



- Aisha has made a cuboid using straws and marshmallows.
  - What did she use to make the edges of the cuboid?

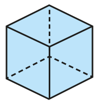
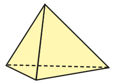
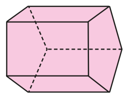
    How many edges does the cuboid have?
  - What did she use to make the vertices of the cuboid?

    How many vertices does the cuboid have?



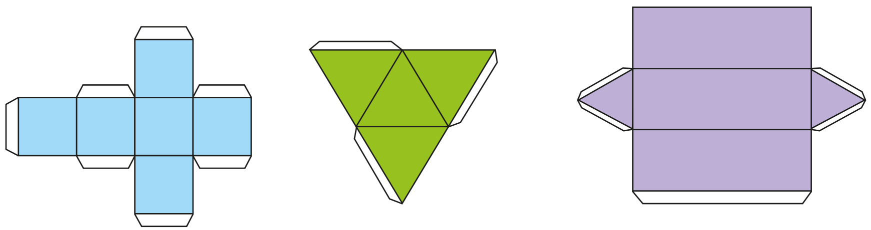
- Use straws and modelling clay to make the shapes.

  How many straws and pieces of clay do you need?

3-D shape	Number of straws (edges)	Number of pieces of clay (vertices)
		
		
		

  What other 3-D shapes can you make?

- Cut and fold the nets to make 3-D shapes.

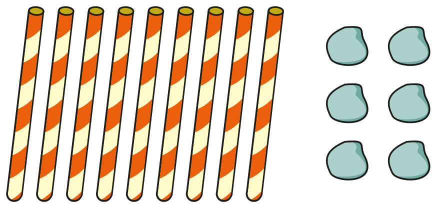


  What 3-D shapes have you made?

Make 3-D shapes

Reasoning and problem solving

Max has 9 straws and 6 balls of clay.

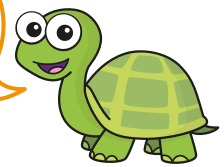


What 3-D shape can Max make using all of the straws and clay?

Use straws and clay to make the shape.

triangular prism

I can make a model of a square-based pyramid using 3 straws and 3 balls of clay.



Explain the mistake that Tiny has made.

How many straws and balls of clay do you need to make a square-based pyramid?

Tiny has only considered one triangular face of the pyramid.

8 straws and 5 balls of clay

Is the statement true or false?

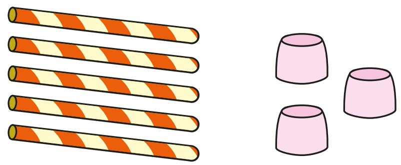
You can cut out some circles and rectangles and make a 3-D shape from them.

Explain your answer.

True

A cylinder can be made.

Is there enough equipment to make a triangular-based pyramid?



Explain your answer.

No