Summer Block 4

Shape

Small steps

Step 1	Understand angles as turns
Step 2	Identify angles
Step 3	Compare and order angles
Step 4	Triangles
Step 5	Quadrilaterals
Step 6	Polygons
Step 7	Lines of symmetry
Step 8	Complete a symmetric figure

Understand angles as turns

Notes and guidance

In Year 3, children explored full, half and quarter turns, using the language of clockwise and anticlockwise. This small step is an opportunity for children to revisit that learning.

Begin by recapping full, half and quarter turns. Ask children to stand up and turn as instructed, including a variety of different turns both clockwise and anticlockwise. Discuss the significance of clockwise and anticlockwise in this context, using the hands of a clock to demonstrate if needed. Children explore different turns from different starting points, including using compass directions. They then work out the turn after being given a start and end position. They also consider what a pictorial representation of an angle looks like and how this relates to turns.

Things to look out for

- Children may confuse clockwise and anticlockwise.
- Children may need reminding about the meaning of half, quarter and three-quarters.
- Children may relate angles to the distance between two points on a line rather than the measure of turn between the lines.

Key questions

- What is a full turn?
- What is the difference between a half turn and a quarter turn?
- Which way do the hands move around a clock?
- What does “clockwise”/“anticlockwise” mean?
- What direction will you be facing if you complete a _____ turn clockwise/anticlockwise?
- If you were facing _____ and are now facing _____, what turn have you made? Is there more than one answer?

Possible sentence stems

- I am now facing _____

  If I make a _____ turn clockwise/anticlockwise, I will be facing _____
- To make a three-quarter turn, I could make a _____ turn followed by a _____ turn.
- A _____ turn clockwise is the same as a _____ turn anticlockwise.

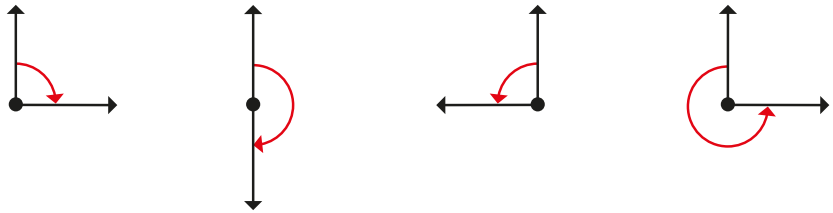
National Curriculum links

- Recognise angles as a property of shape or a description of a turn (Y3)

Understand angles as turns

Key learning

- Match the turns to the labels.



half turn clockwise	quarter turn anticlockwise	quarter turn clockwise	three-quarter turn anticlockwise

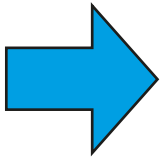
- Teddy is facing north.

  What direction will Teddy be facing if he turns:

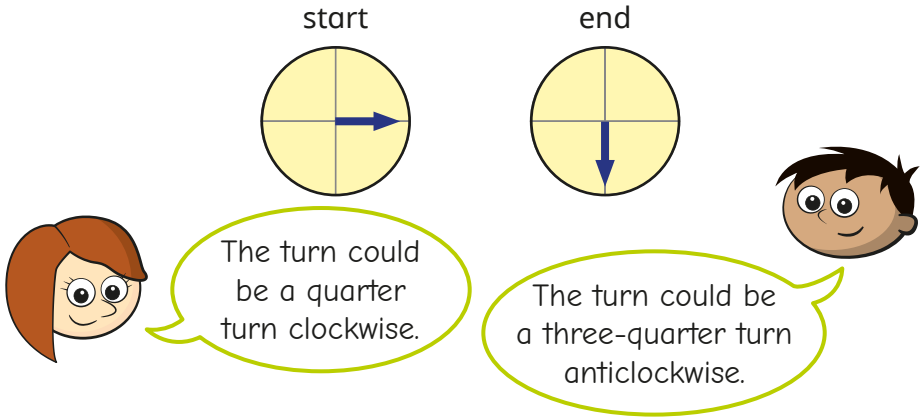
  - a quarter turn clockwise
  - a half turn anticlockwise
  - a three-quarter turn clockwise?

- Draw what this arrow will look like after:

  - a quarter turn clockwise
  - a half turn
  - a three-quarter turn clockwise.

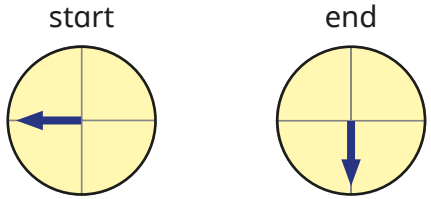


- Rosie and Amir spin an arrow on a spinner.



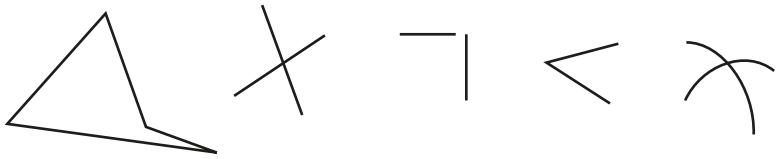
  Why are both children correct?

  Describe this turn.



  Is there more than one way to describe the turn?

- Which pictures show at least one angle?



Understand angles as turns

Reasoning and problem solving

Dani, Nijah and Brett are all facing the same direction.

Dani turns a half turn clockwise three times.

Nijah turns a quarter turn anticlockwise six times.

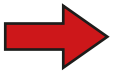
Brett turns two full turns clockwise.

Do you agree with Tiny?

Explain your answer.

No

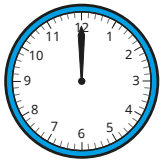
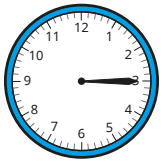
How many different ways can you describe the turn?

start  end 

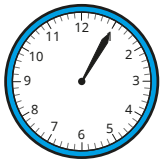
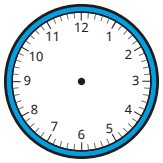
multiple possible answers

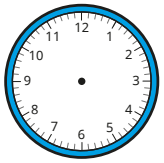
This clock has lost its hour hand.

After a quarter of an hour, the minute hand turns a quarter turn clockwise.

start  quarter of an hour later 

Draw the missing minute hands on the clocks.

start  quarter of an hour later 

start  three-quarters of an hour later 

pointing to 4

pointing to 5

Identify angles

Notes and guidance

Children learnt about right angles being quarter turns in Year 3. In this small step, they also classify angles as acute and obtuse.

This is the first time that children have encountered these words, so time should be spent exploring them fully. Show that when a turn is completed, an angle is created. For a quarter turn, this angle is called a right angle. Explain that any angle that is less than a right angle is called an acute angle. Model different examples of acute angles, the greatest of which is only slightly less than a right angle. Then show that an angle greater than a right angle, but less than a half turn, is called an obtuse angle. A right-angle finder can be a useful support for children in identifying acute and obtuse angles accurately.

At this stage, children do not need to explore reflex angles or use degrees as a measure of turn. This will be covered in Year 5

Things to look out for

- Children may initially think that there is only one acute and one obtuse angle (usually $\frac{1}{8}$ and $\frac{3}{8}$ of a turn) in the same way that there is only one right angle.
- Children may think that any angle greater than a right angle is obtuse.

Key questions

- What is an angle?
- What type of angle is created by a quarter turn?
- What type of angle is created by a turn less than a quarter turn?
- What type of angle is created by a turn that is greater than a quarter turn, but less than a half turn?
- What type of angle is made by this turn?
- Are all right/acute/obtuse angles the same amount of turn?

Possible sentence stems

- A quarter turn is called a _____ angle.
- An angle less than a quarter turn is called an _____ angle.
- An _____ angle is greater than a quarter turn, but less than a half turn.

National Curriculum links

- Identify acute and obtuse angles and compare and order angles up to two right angles by size

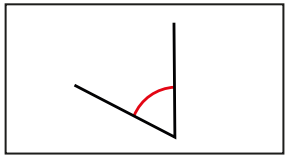
Identify angles

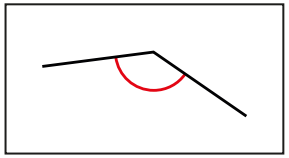
Key learning

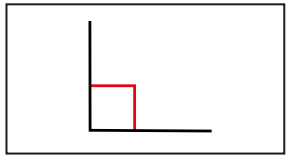
- What fraction of a turn is a right angle?

  How many right angles can you see in your classroom?

- Match the pictures, descriptions and types of angles.







less than a quarter turn	quarter turn	greater than a quarter turn, but less than a half turn
right angle	obtuse angle	acute angle

- Mo and Annie are facing the same direction.

Mo 

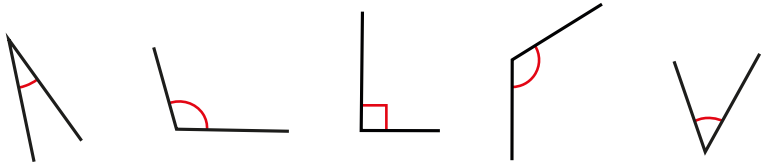
 Annie

Mo turns one-quarter turn clockwise.

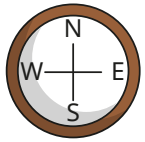
Annie turns less than Mo in the same direction.

What type of angle has each of them turned through?

- Write **acute**, **obtuse** or **right angle** to label each angle.



- cake shop



school

  - Huan is facing east.

    He turns clockwise to face the school.

    What type of angle does he turn through?

  - Esther is facing the cake shop.

    She turns anticlockwise to face south.

    What type of angle does she turn through?

  - Aisha is facing west.

    She turns clockwise to face north.

    What type of angle does she turn through?

Identify angles

Reasoning and problem solving

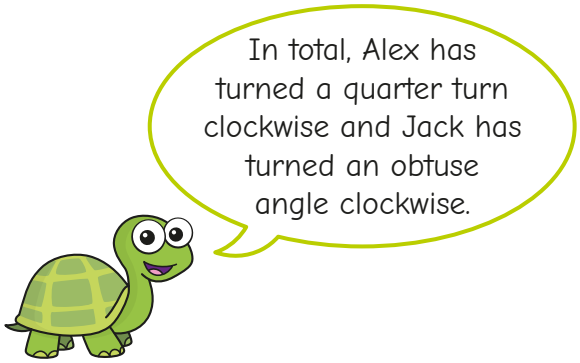
Alex and Jack are both facing the same direction.

Alex

Jack

Alex turns two acute angles clockwise.

Jack turns three acute angles clockwise.



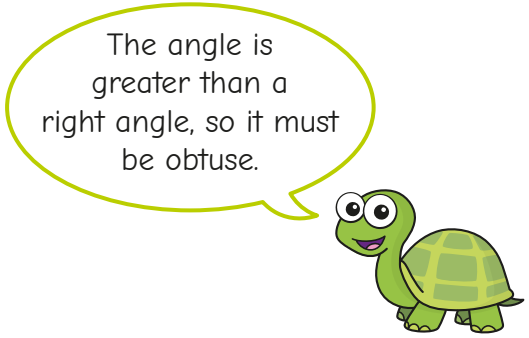
Do you agree with Tiny?

Explain your answer.

No

Both children could have turned small acute angles, still totalling an acute angle.

Tiny is labelling angles.



Do you agree with Tiny?

Explain your answer.

No

Compare and order angles

Notes and guidance

In this small step, children continue to explore angles as a measure of a turn by comparing and ordering angles.

Begin by recapping acute, right and obtuse angles. Children should see that a right angle is a greater angle than any acute angle, and any obtuse angle is greater than a right angle. They identify different types of angles, and use this information to compare and order the angles. They then move on to comparing two angles of the same type. Model how to show which angle between two acute angles is greater. This can be done by inspection, by adding in extra lines or by comparing each angle to a right angle to see which is closer. Children order sets of angles from smallest to greatest; they may choose to group the angles by type before making further comparisons. They also draw angles that are greater or less than given angles.

Key questions

- What is the difference between an acute and an obtuse angle?
- What type of angle is this? How do you know?
- Which of these two angles is greater? How do you know?
- Are all acute angles less than obtuse angles? Why/why not?
- How can you work out which angle is the greatest/smallest?
- Does the length of the arms of the angle make a difference to the amount of turn? Why/why not?

Possible sentence stems

- All _____ angles are greater than _____ angles.
- All _____ angles are less than _____ angles.

Things to look out for

- Children may confuse the terms “acute” and “obtuse”.
- Children may assume that a longer pair of lines always creates a greater angle.

National Curriculum links

- Identify acute and obtuse angles and compare and order angles up to two right angles by size

Compare and order angles

Key learning

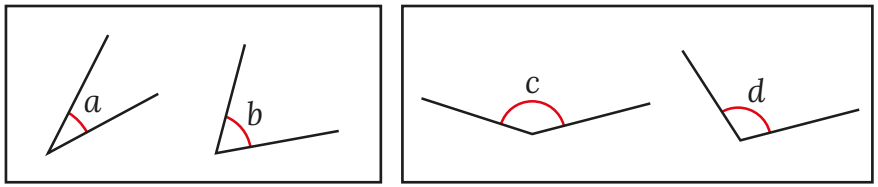
- Here are two angles.

  - What type of angle is each angle?

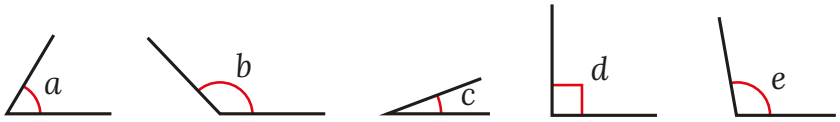
    How do you know?
  - Which angle is greater?

    How do you know?

- Which angle is greater in each pair?



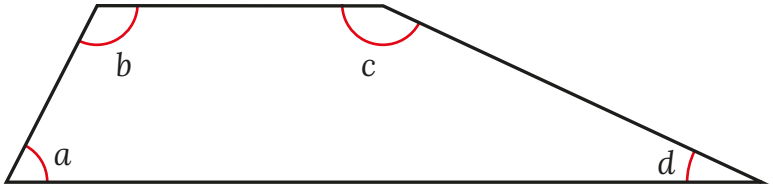
- Write **acute**, **obtuse** or **right angle** to label each angle.



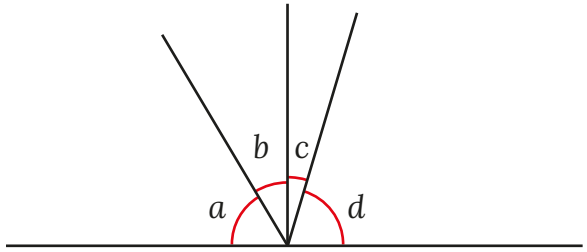
Order the angles from smallest to greatest.

- Four angles are labelled in the quadrilateral.

  Order the angles from smallest to greatest.



- Four angles are drawn on a straight line.



Write the angles in order of size from greatest to smallest.

- Draw an angle that is greater than angle a, but less than angle b.

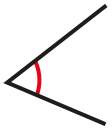
Compare and order angles

Reasoning and problem solving

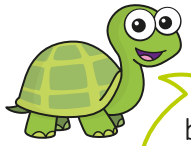
Ron and Rosie each draw an angle.

Max draws an angle that is greater than Ron's angle, but less than Rosie's angle.

Ron



Rosie



Max's angle must be a right angle, because that is greater than an acute angle and less than an obtuse angle.

Do you agree with Tiny?

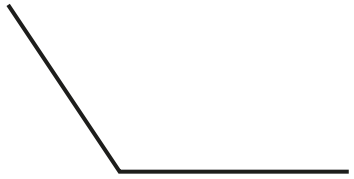
Explain your answer.

Draw what Max's angle could look like.

No

Kim is drawing a pentagon.

She has drawn these two lines.



Draw the rest of the pentagon so that it has:

- one acute angle
- three obtuse angles
- one right angle

Compare answers with a partner.

multiple possible answers

Triangles

Notes and guidance

In this small step, children explore different types of triangles.

Children begin by looking at examples and non-examples of triangles to help them summarise the characteristics of a triangle: a closed, 2-D shape with three straight sides. Children then consider the properties of different types of triangles: if all three sides have different lengths, the triangle is scalene; if two sides are the same length, the triangle is isosceles; if all three sides are equal, the triangle is equilateral. This is the first time that children will have encountered these words, so it is important to revisit them regularly. They could also explore right-angled triangles as another type of triangle. Children also learn that the number of equal angles in a triangle is the same as the number of equal sides.

Things to look out for

- Children may think that shapes with "curved corners" are triangles.
- Children may not identify triangles in different orientations, for example "upside-down" triangles.
- Children may find it hard to sketch equilateral/isosceles triangles before they have learnt how to use a protractor.

Key questions

- What are the properties of a triangle?
- How many equal sides/angles does this triangle have?
- Why is this a triangle?
  Why is this not a triangle?
- What type of triangle is this?
- What is the difference between a(n) _____ triangle and a(n) _____ triangle?
- If one side of an equilateral triangle is _____ long, what is the perimeter of the triangle?

Possible sentence stems

- An equilateral/isosceles/scalene triangle has _____ equal sides and _____ equal angles.
- A _____ triangle has one angle that is a _____

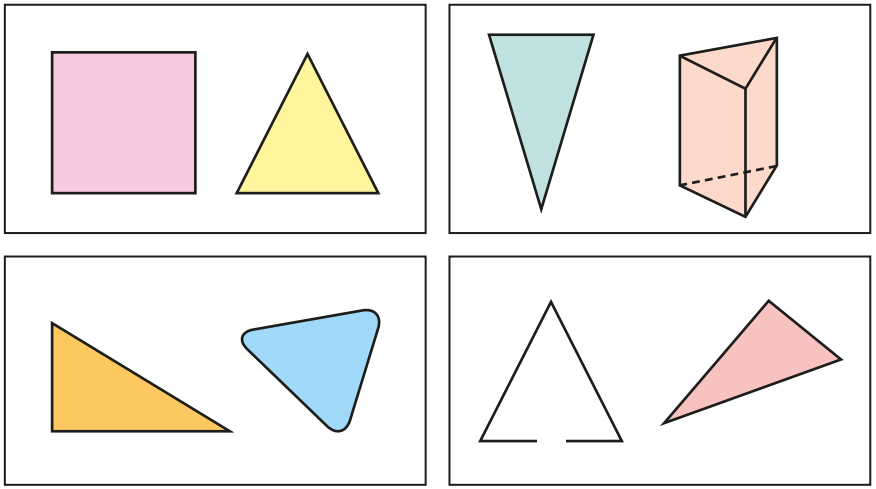
National Curriculum links

- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes

Triangles

Key learning

- For each pair of shapes, decide which is a triangle.



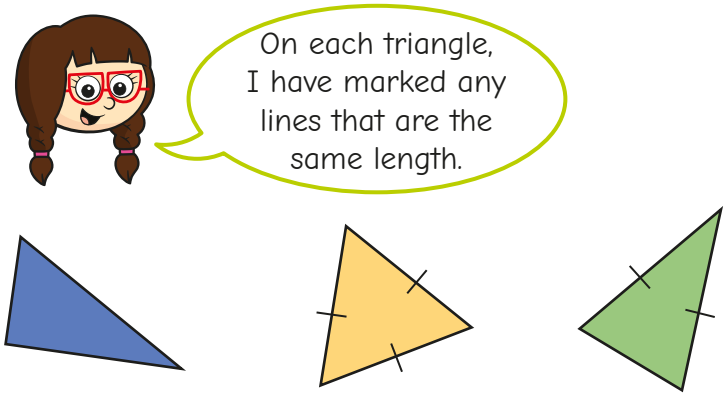
Why are the others not triangles?

- Here are two triangles.

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

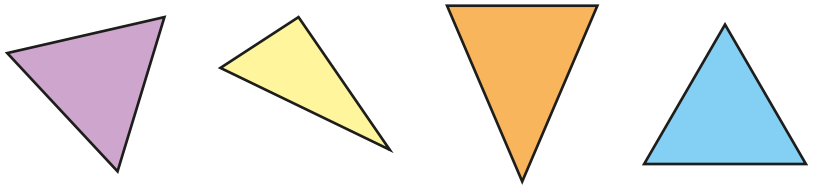
- Draw five different triangles.

Describe your triangles to a partner.

- 

Decide if each triangle is scalene, equilateral or isosceles.

- Measure and label the equal sides on the triangles.



Decide if each triangle is scalene, equilateral or isosceles.

- Tom draws an equilateral triangle.

Each side is 11 cm.

What is the perimeter of Tom's triangle?

Triangles

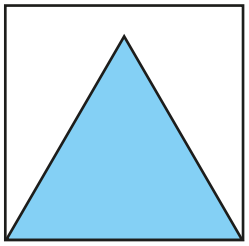
Reasoning and problem solving

Here is a square.

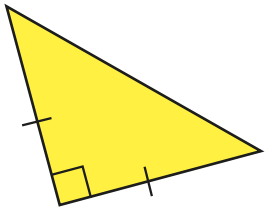
Inside the square is an equilateral triangle.

The perimeter of the square is 60 cm.

Find the perimeter of the **triangle**.



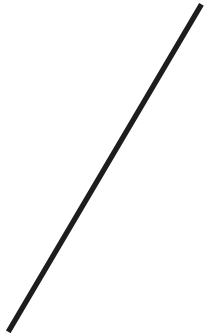
45 cm



Describe the triangle as fully as you can.

right-angled and isosceles

The line is one side of a triangle.



Draw two more sides to create:

- an equilateral triangle
- a scalene triangle
- an isosceles triangle

Which is the hardest to draw?

Compare answers as a class.

Quadrilaterals

Notes and guidance

In this small step, children explore different types of quadrilaterals.

Children identify quadrilaterals from a selection of shapes. Initially, they may only see squares and rectangles as quadrilaterals, so explore a range of different quadrilaterals with different properties.

Children may need to recap Year 3 learning about parallel and perpendicular lines. The names for the different quadrilaterals will need revisiting to become firmly embedded, so whenever possible use them in other areas of the curriculum or in other subjects. By the end of this step, children should be able to distinguish between a trapezium, a rhombus and a parallelogram as well as the familiar square and rectangle. Using geoboards or squared paper and drawing the shapes in different orientations will help children to identify what the shapes have in common and what is different about them.

Things to look out for

- Children may not recognise quadrilaterals in non-standard orientations, for example calling a rotated square a "diamond".
- Children may confuse the mathematical names of different quadrilaterals.

Key questions

- What is a polygon?
- What does "quad" mean? What is a quadrilateral?
- What is the difference between these two quadrilaterals?
- How many right angles are there?
- Does the quadrilateral have any pairs of equal/parallel sides?
- What are the properties of this quadrilateral?
- What is the same/different about a rectangle and a square?
- What is the difference between a rhombus and a parallelogram?

Possible sentence stems

- A quadrilateral is a _____ with _____ sides.
- The shape has _____ pairs of parallel lines and _____ pairs of equal sides.
  It is a _____

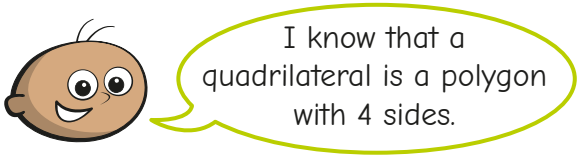
National Curriculum links

- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes

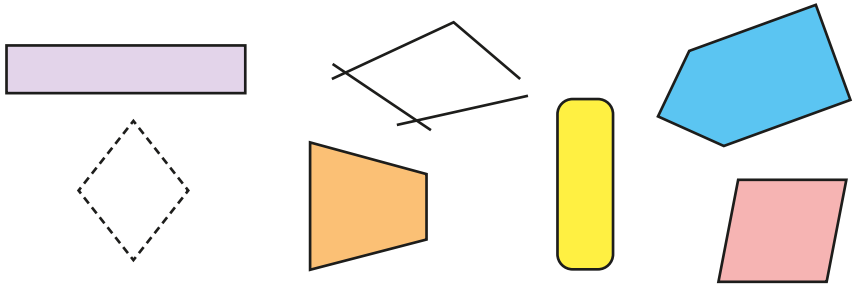
Quadrilaterals

Key learning

- Tommy is sorting these shapes.

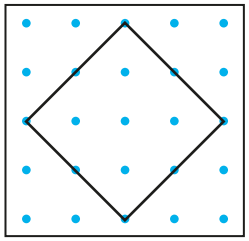


Which of these shapes are quadrilaterals?



- Use a 5 × 5 geoboard or dotted paper.

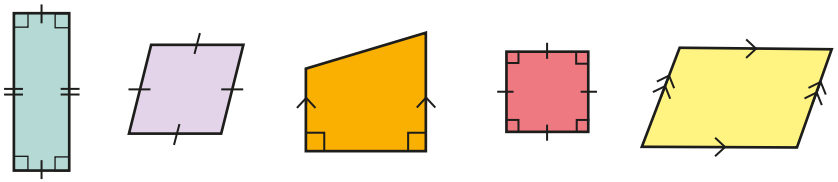
How many different quadrilaterals can you make/draw?



Can you name each quadrilateral?

Compare answers with a partner.

- Use the labels to describe the properties of the shapes.

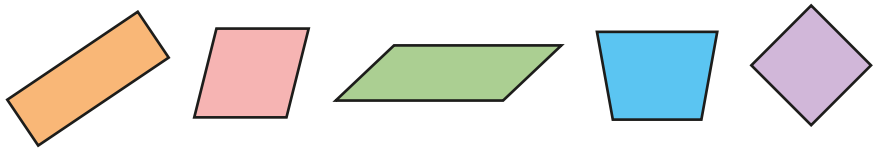


4 sides	2 pairs of parallel sides	4 equal sides
polygon	1 pair of parallel sides	4 right angles

Which labels can be used more than once?

Which shapes have the same properties?

- Use the word bank to label each quadrilateral.



trapezium	square	rhombus
rectangle	parallelogram	

Describe the properties of each shape.

Quadrilaterals

Reasoning and problem solving

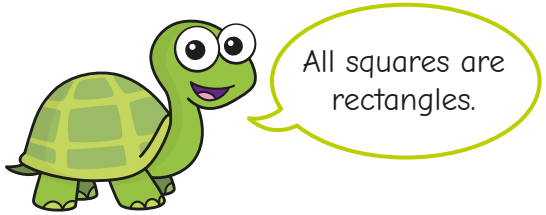
You will need:

- some 4 cm straws
- some 6 cm straws

How many different quadrilaterals can you make using the straws?

Work out the perimeter of each shape.

multiple possible answers, e.g.
parallelogram (20 cm)
trapezium (18 cm)



Tiny is correct.

What other statements can you make describing special quadrilaterals?

multiple possible answers, e.g.
All rhombuses are parallelograms.

Draw a different shape in each section of the table.

	4 equal sides	2 pairs of equal sides	1 pair of parallel sides
4 right angles			
No right angles			

In which section can no quadrilateral be drawn?

Explain why.

top row: square, rectangle, blank

bottom row: rhombus, parallelogram, trapezium

---

4 right angles and 1 pair of parallel sides

Polygons

Notes and guidance

Children first encountered 2-D shapes with more than four sides in Key Stage 1. In this small step, they revisit and extend their knowledge of the names of polygons.

Explain that "gon" means "angled" and the different prefixes relate to the number of angles; for example, "pent" means five, so a pentagon has five angles and therefore five sides. Discuss other words that children can use to help them with the meanings of the prefixes, such as pentathlon and octopus.

Children then explore the meanings of "regular" and "irregular" in the context of polygons, learning that in a regular polygon, the sides are all equal in length and the angles are all equal in size. They are often surprised that, for example, a rectangle is irregular. By making shapes with straws or lolly sticks, children can easily create their own polygons and decide if they are regular or irregular.

Things to look out for

- Children may see a polygon with all equal sides and think that it is regular without considering the angles. They may also think that, for example, a rectangle is regular.
- Children may mix up the meanings of the prefixes.

Key questions

- What is a polygon?
- What is a polygon with _____ sides called?
- How many angles/sides does an octagon have? What other words do you know that start with "oct"?
- What is the same and what is different about these polygons?
- When talking about polygons, what does "regular"/"irregular" mean?
- If one side of a regular _____ is _____ cm, what is its perimeter?

Possible sentence stems

- In a regular polygon, all _____ are equal in length and all _____ are equal in size.
- The shape has _____ sides, so it is a _____
- A regular triangle/quadrilateral is called a(n) _____

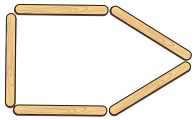
National Curriculum links

- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes

Polygons

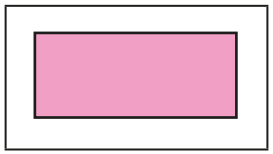
Key learning

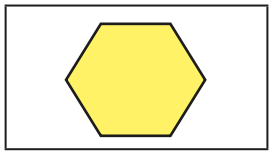
- Use lolly sticks to make polygons with different numbers of sides.

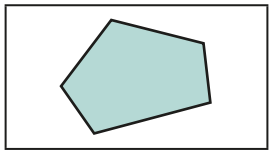


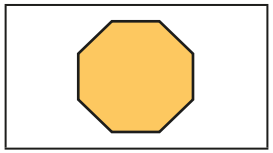
Which polygons do you know the names of already?

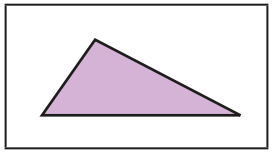
- Match the polygons to the labels.











triangle

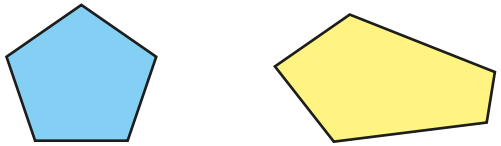
quadrilateral

pentagon

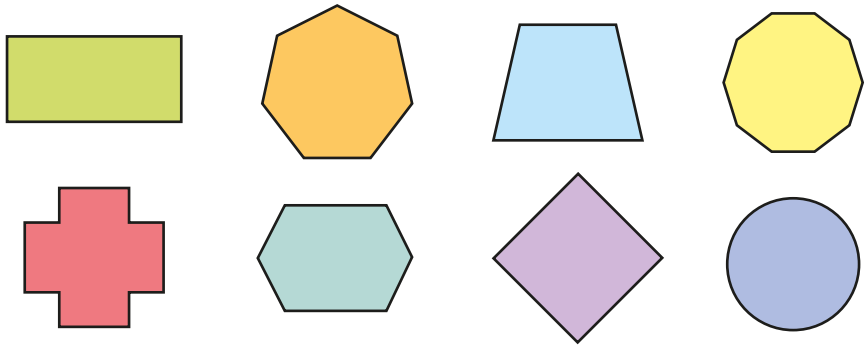
hexagon

octagon

- What is the same and what is different about the polygons?



- Which shapes are regular polygons?



Mark the equal sides on each polygon.

- Each side of a regular pentagon is 9 cm.

  What is the perimeter of the pentagon?

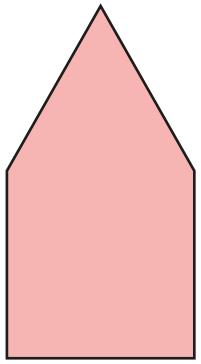
- The perimeter of a regular octagon is 48 m.

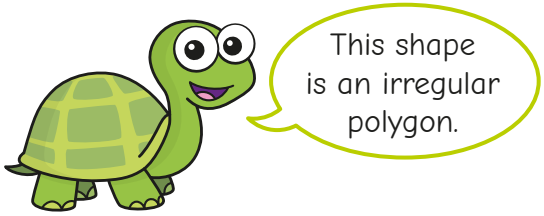
  What is the length of each side of the octagon?

Polygons

Reasoning and problem solving

All sides of the shape are equal in length.





Do you agree with Tiny?

Explain your answer.

Yes

Mo and Filip are making regular polygons with straws.

Each straw is 8 cm long.

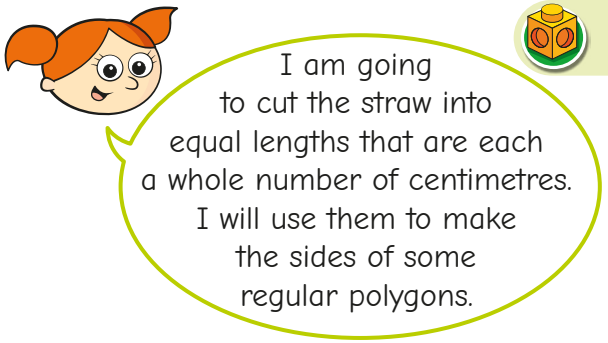
Mo uses 7 straws for his polygon.

Filip uses 10 straws for his polygon.

What is the difference between the perimeters of the shapes?

24 cm

Alex has a straw that is 24 cm long.



Describe the regular polygons that Alex could make.

equilateral triangle: sides 8 cm

square: sides 6 cm

hexagon: sides 4 cm

octagon: sides 3 cm

dodecagon (12 sides): sides 2 cm

Lines of symmetry

Notes and guidance

Children first found vertical lines of symmetry within a shape in Year 2. In Year 3, this was extended to horizontal and vertical lines of symmetry. In this small step, that learning is extended further to include any line of symmetry in any direction.

Begin by recapping what a line of symmetry is. The use of mirrors is helpful to reinforce this understanding, as is cutting out shapes and folding them. Another useful activity is putting two congruent shapes together to form symmetrical shapes.

Children look for lines of symmetry in any orientation within any 2-D shape. They then sort shapes by the number of lines of symmetry. They can also explore regular polygons, discovering that the number of lines of symmetry in a regular polygon is the same as the number of sides.

Things to look out for

- Children may only look for horizontal and vertical lines of symmetry.
- Children may become reliant on the use of mirrors or folding paper.
- Children may think that shapes "look symmetrical" when they are not. For example, a parallelogram has no lines of symmetry.

Key questions

- What is a line of symmetry?
- How can you arrange these two shapes to make a symmetrical image?
- Does this shape have any lines of symmetry? How can you find out?
- Are lines of symmetry always horizontal or vertical?
- How can you use a mirror to check if there is a line of symmetry?
- How many lines of symmetry does this shape have?
- How many lines of symmetry does a regular _____ have? How do you know?

Possible sentence stems

- Shape A has _____ lines of symmetry.
- A regular polygon with _____ sides has _____ lines of symmetry.

National Curriculum links

- Identify lines of symmetry in 2-D shapes presented in different orientations

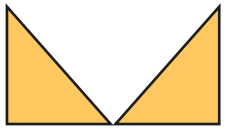
Lines of symmetry

Key learning

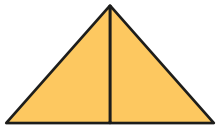
- Eva and Jack each have two identical triangles.

  They are arranging them to create a line of symmetry.

Eva

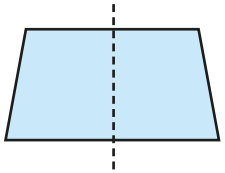


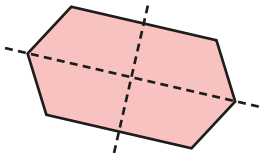
Jack



  Work with a partner to find as many ways as you can of arranging two triangles to create a line of symmetry.

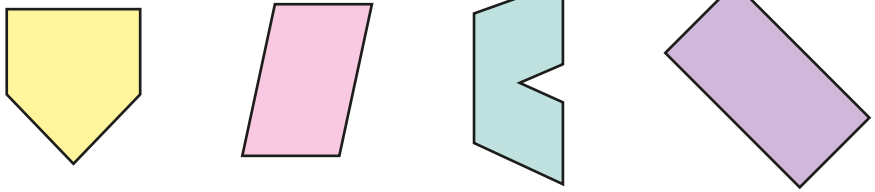
- Dani has found lines of symmetry in these two shapes.



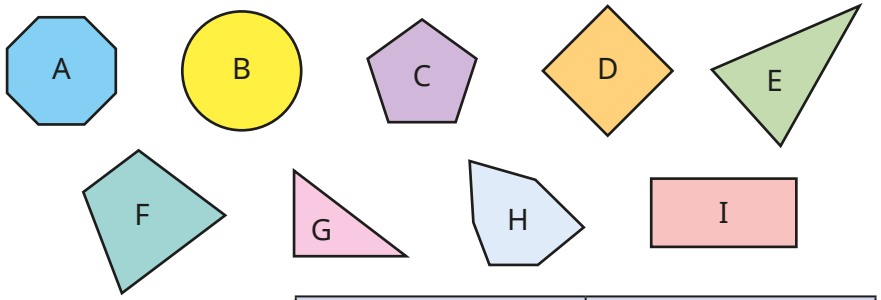


  How many lines of symmetry can you find in these shapes?

  You may wish to use a mirror to help you.



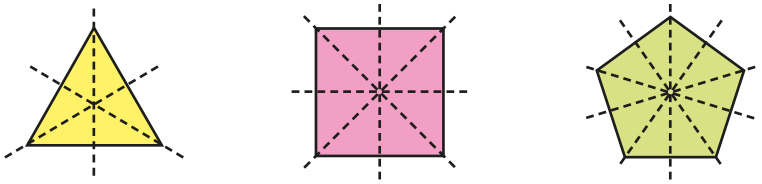
- Sort the shapes into the table.



	1 line of symmetry	More than 1 line of symmetry
Up to 4 sides		
More than 4 sides		

  Are there any shapes that cannot go in the table?

- Annie is finding lines of symmetry in regular shapes.

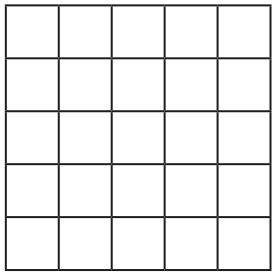


  What do you notice about the number of lines of symmetry compared to the number of sides each shape has?

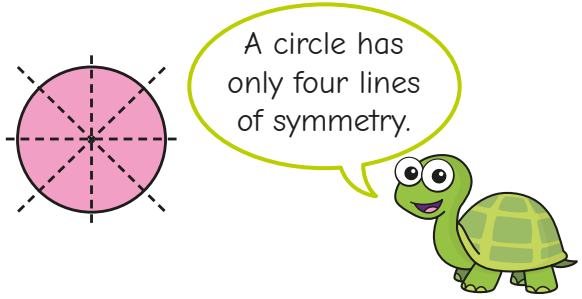
Lines of symmetry

Reasoning and problem solving

Shade up to six squares to make as many symmetrical shapes as you can.



Compare answers as a class.



Do you agree with Tiny?

Explain your answer.

No

Are the statements always true, sometimes true or never true?

Four-sided polygons have four lines of symmetry.	sometimes true
An isosceles triangle has two lines of symmetry.	never true
All regular polygons have at least one line of symmetry.	always true
Irregular pentagons have one line of symmetry.	sometimes true
The number of lines of symmetry in a polygon is equal to the number of sides.	sometimes true

Explain your answers.

Complete a symmetric figure

Notes and guidance

In this small step, children build on their understanding of lines of symmetry from the previous step by completing symmetric figures.

Children begin by considering squares on a grid shaded with a horizontal or vertical line of symmetry. They may choose to use a mirror or to count how far away each square is from the line of symmetry to complete this. When children are secure with vertical and horizontal lines of symmetry, they can look at diagonal lines of symmetry. Model examples where there are squares shaded on both sides of the line of symmetry. Children then move on to completing simple 2-D shapes. Again, they can use a mirror to draw the reflection they see, or reflect one vertex at a time by counting how far it is from the line of symmetry. Finally, they look at examples of grids where there are multiple lines of symmetry.

Things to look out for

- Children may need the support of a mirror when looking at lines that are not horizontal or vertical.
- Children may miscount the lengths of lines or the distance of points/squares from the line of symmetry.

Key questions

- What is a line of symmetry?
- What do you think the shape will look like after it has been reflected?
- How far away from the mirror line is each square/vertex? How far away does the reflected square/vertex need to be?
- Can there be more than one line of symmetry?
- How could turning your paper help you to complete the shape?

Possible sentence stems

- The vertex is _____ squares from the line of symmetry, so the vertex of the reflected image will be _____ squares from the line of symmetry.

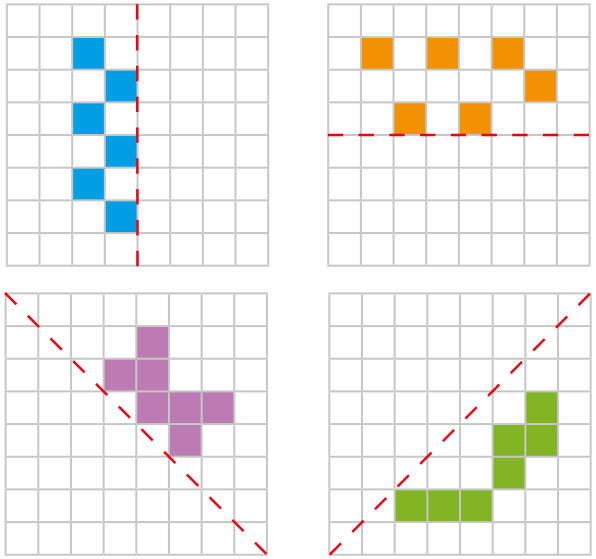
National Curriculum links

- Complete a simple symmetric figure with respect to a specific line of symmetry

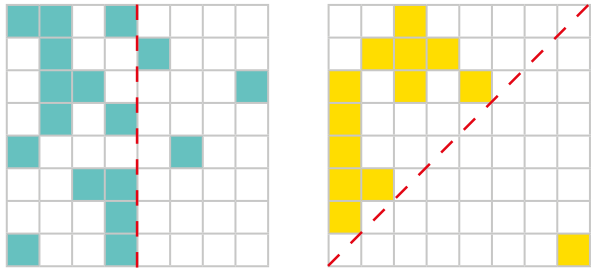
Complete a symmetric figure

Key learning

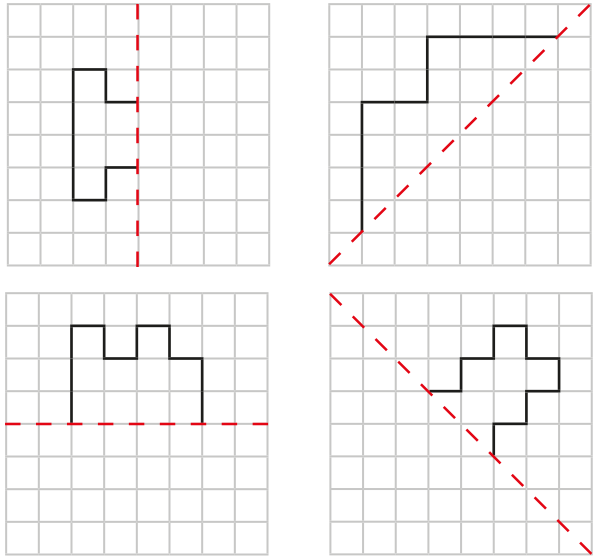
- Shade squares to make the patterns symmetrical.



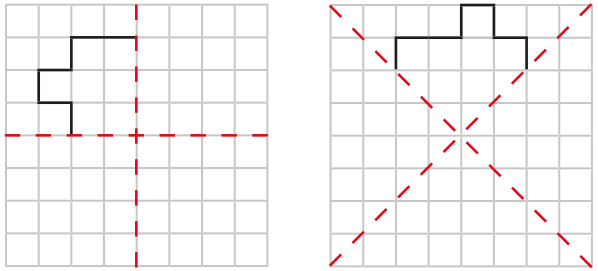
- Shade squares to make the patterns symmetrical.



- Complete the shapes according to the lines of symmetry.

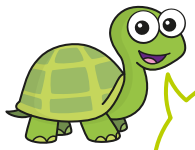


- Complete the symmetric figures.



Complete a symmetric figure

Reasoning and problem solving



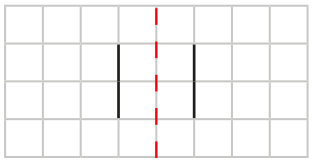
When given half of a symmetric shape, I know that the completed shape will have double the number of sides.

Is Tiny correct?

Explain your answer.

sometimes

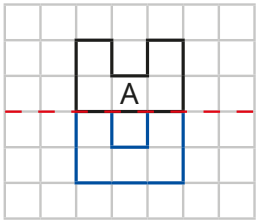
How many different symmetric shapes can you create using the given lines?



Compare answers with a partner.

Compare answers as a class.

Sam completes the shape according to the line of symmetry.

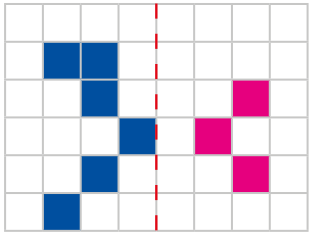


Is Sam correct?

Explain your answer.

No

Dexter starts to complete the symmetrical pattern.



Is Dexter correct so far?

Explain your answer.

No

Summer Block 5

Statistics

Small steps

Step 1	Interpret charts
Step 2	Comparison, sum and difference
Step 3	Interpret line graphs
Step 4	Draw line graphs

Interpret charts

Notes and guidance

In Year 3, children learnt how to interpret and draw pictograms and bar charts to represent discrete data. They also learnt how to collect and represent data in a table. In this small step, they revise this learning before using charts to compare data in the next step.

Give children the opportunity to explore which scale will be the most appropriate when drawing their own bar charts and which key will be the most appropriate for a pictogram. They can also gather their own data and then present it as a bar chart or pictogram. Further questioning about the data should be explored, so that children can demonstrate their ability to interpret the data as well as draw charts. At this stage, they do not need to use the data in calculations to solve problems, as this will be covered in the next step.

Things to look out for

- Children may assume that the scale on a bar chart always goes up in 1s.
- Children may choose symbols that are difficult to work with, either in terms of complexity or their appropriateness for splitting into equal parts.
- Children may make errors when labelling scales.

Key questions

- How could you represent this data?
- What do you notice about the scale of the bar chart?
- What else does the data tell you?
- What is the same/different about the way in which the data has been shown?
- What scale will you use for your bar chart? Why?
- What does each _____ represent in the pictogram? How do you know?
- What symbol will you use for your pictogram? Why?

Possible sentence stems

- The scale of the bar chart is going up in _____ s.
- In the pictogram, 1 _____ represents _____, so there are _____ × _____ = _____

National Curriculum links

- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs

Interpret charts

Key learning

- The pictogram shows the number of children who visited a park last week.

Day	Number of children
Monday	●●●●●
Tuesday	●●
Wednesday	●◗
Thursday	●●●
Friday	

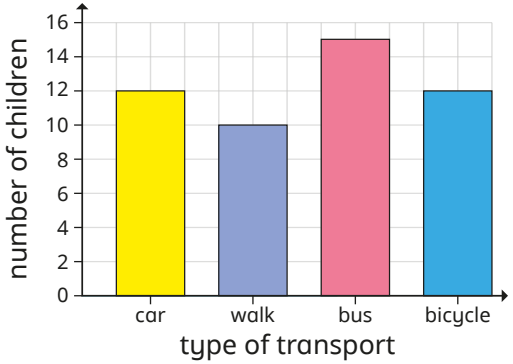
Key
● = 10 children

  - How many children visited the park on Monday?
  - How many children visited the park on Wednesday?

  25 children visited the park on Friday.

  - Complete the pictogram to show this.

- The bar chart shows how Year 4 children travel to school.



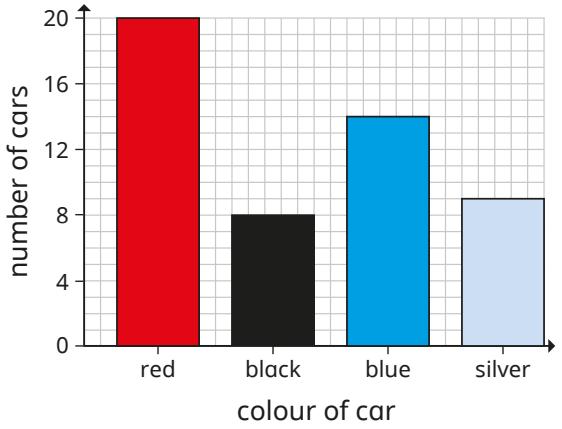
  Draw a table using the information in the bar chart.

- Represent the data shown in the pictogram as a bar chart.

House	Number of points
Sycamore	■■■■■
Oak	■■■■
Beech	■■■■■
Ash	■■■■■

Key
■ = 20 points

- The bar chart shows the number of each colour car parked in a car park.



  Draw a pictogram using the information in the bar chart.

Interpret charts

Reasoning and problem solving

Alex wants to show the favourite drinks of everyone in her class.

She decides to use ● to represent 5 children.

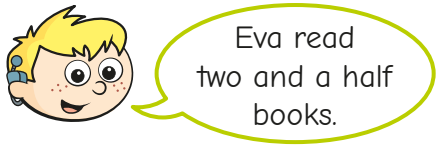
Explain why this is not a good idea.

It will be difficult to show amounts that are not multiples of 5

The pictogram shows how many books the children have read this week.

Key ▲ = 2 books

Child	Number of books
Jack	▲▲▲
Eva	▲▲◢
Whitney	▲

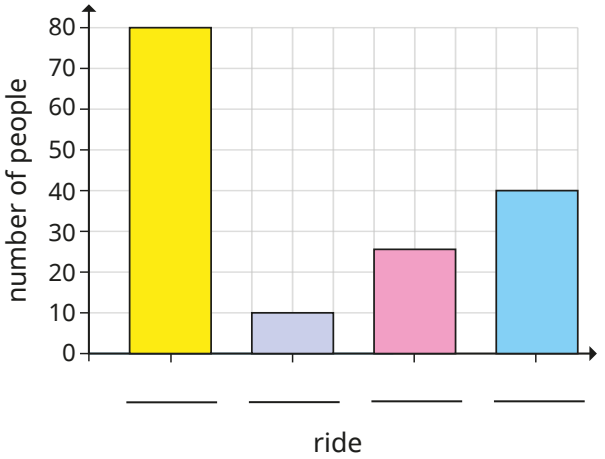


Do you agree with Max?

No

The bar chart shows the number of people who went on each ride at a theme park.

Use the clues to label the bar chart.



- The Wild West had half as many people as Dragonball.
- Fewer people went on The Flipper than on The Lazy River.
- Dragonball was the most popular ride.

Dragonball, The Flipper, The Lazy River, The Wild West

Comparison, sum and difference

Notes and guidance

In this small step, children build on their learning from the previous step to solve comparison, sum and difference problems using discrete data.

Recap key vocabulary, such as "difference", before looking at questions that use this terminology. Children use key skills from the addition and subtraction block in the Autumn term to answer questions.

Give children the opportunity to ask their own questions about the data in pictograms, bar charts and tables. Although examples of data are given in this step, children can also collect their own data and represent it as pictograms, bar charts and tables, and then ask and answer questions relating to their own data.

Things to look out for

- Children may assume that the scale on a bar chart always goes up in 1s.
- Children may see the word "more" and assume that they need to add, even when the question is "How many more ...?"
- Children may assume that the pictures in a pictogram represent 1, instead of looking at the key.

Key questions

- What does each symbol represent on the pictogram? How do you know?
- What questions could you ask about the pictogram?
- What do you notice about the scale of the bar chart?
- What do you know? What can you find out?
- What is the total number of _____?
- How many more/fewer people chose _____ than _____?

Possible sentence stems

- The difference between _____ and _____ is _____
- There are _____ more _____ than _____
- Altogether, there are _____

National Curriculum links

- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and line graphs
- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Comparison, sum and difference

Key learning

- The pictogram shows the points scored by a school's houses.

House	Number of points
Savile	●●●◔
Grange	●●●◕
Heath	●●●◔
Manor	●●◔

Key
● = 20 points

  - How many more points does Savile have than Manor?
  - How many points do Heath and Grange have altogether?
  - How many more points does Manor need to be equal to Grange?
  - How many points do the houses have altogether?

- A group of people were asked to vote for one activity.

  Use the table to complete the sentences.

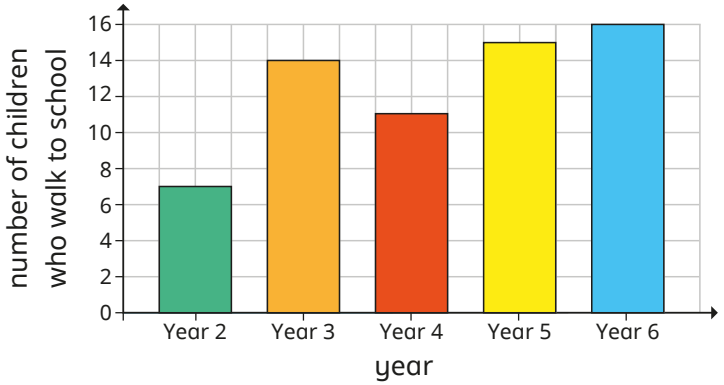
  - _____ people voted in total.
  - $\frac{1}{4}$ of the votes were for _____
  - 7 more people voted for _____ than for _____

  What scale would you use to draw a bar chart using this data? Why?

Activity	Number of votes
boxing	9
cinema	10
swimming	7
ice skating	14

- Children from Years 2 to 6 were asked if they walk to school.

  The bar chart shows the results.



  - How many more children walk to school in Year 5 than in Year 4?
  - How many children walk to school in total?
  - In which year group do twice as many children walk to school compared to Year 2?

  What else do you know? What can you find out?

- As a class, choose some data that you would like to collect, for example favourite books, films or food.

  Collect and record the data in a table.

  Choose a pictogram or a bar chart to represent your data, giving reasons for your choices.

  What questions can you ask about the data?

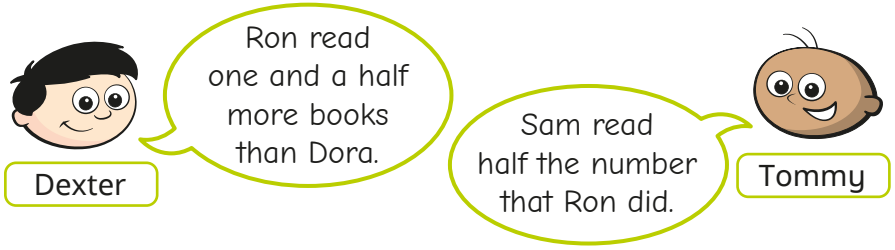
Comparison, sum and difference

Reasoning and problem solving

The pictogram shows the number of books each child read during the holidays.

Key = 4 books

Ron	5 books
Dora	4 books
Sam	3 books

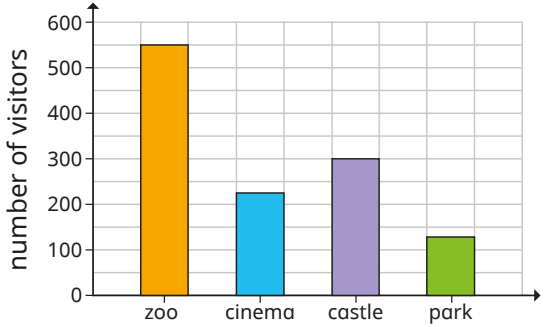


Are Dexter and Tommy correct?

Explain your answers.

Dexter is incorrect. | Tommy is correct.

The bar chart shows the number of visitors at some attractions one weekend.



Are the statements true or false?

- More people went to the zoo than the total of the other three places combined.
- Double the number of people visited the zoo than the castle.
- Less than one quarter of the total visitors went to the park.

Explain your answers.

False

False

True

Interpret line graphs

Notes and guidance

In this small step, children are introduced to line graphs for the first time. Most of the line graphs look at changes of a variable, such as temperature, over time.

Children apply their knowledge of scales on a graph to read a line graph accurately. They learn about continuous data, understanding that temperature can change all the time rather than be counted, and so representing it as a bar chart or pictogram would not be appropriate. They also learn that for many line graphs, the values are only known for specific times and reading off any other values will only give an estimate. Using dashed rather than solid lines is useful, as it emphasises that they show the trend in the change, not the exact values.

Things to look out for

- Children may need support to understand the difference between discrete and continuous data.
- Children may interpret the points between readings as exact values rather than estimates.
- Children may make errors when reading values off the axes, in particular with points that lie between two values that are written on the scale.

Key questions

- How is a line graph different from a bar chart?
- What do the horizontal and vertical axes represent?
- What is the best way to represent the data?
- What times do you know exact values for?
- At what time on the graph is it only possible to estimate the value of _____? Why?
- How would you estimate the time it was when _____?
- What do you know? What can you find out?

Possible sentence stems

- The temperature at _____ is _____ °C.
- The _____ axis represents _____ and the _____ axis represents _____

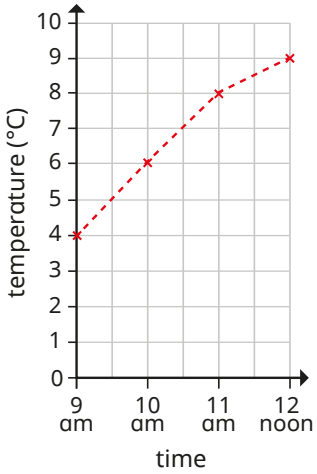
National Curriculum links

- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs
- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Interpret line graphs

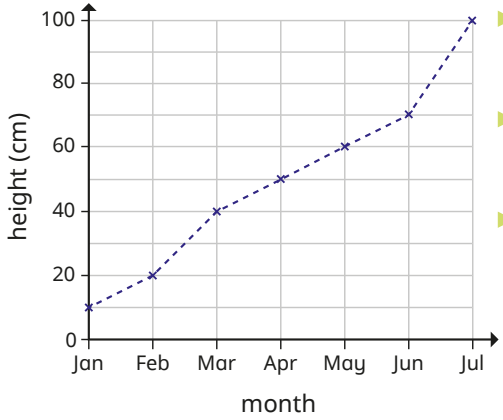
Key learning

- The graph shows the temperature in the playground during a morning in April.



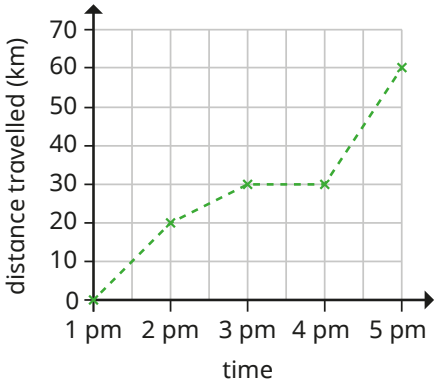
  - What was the temperature at 9 am?
  - At what time was the temperature 6°C?
  - Estimate the temperature at 10:30 am.
  - Estimate the time when the temperature was 5 °C.

- The graph shows the growth of a plant over 7 months.



  - How tall was the plant at the start of May?
  - In what month did the plant reach 40 cm?
  - Estimate the height of the plant on 15 April.

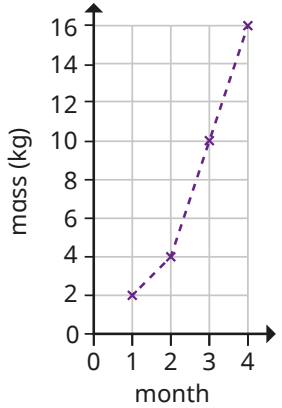
- The graph shows the distance a cyclist travels over 4 hours.



  - How long does it take the cyclist to travel 20 km?
  - How far has the cyclist travelled after 3 hours?
  - What happens between 3 pm and 4 pm?

- The graph shows the mass of a puppy as it grows.

  How many different ways can you complete the sentences?

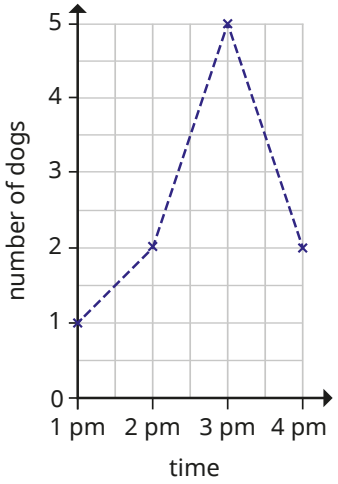


  - When the puppy is _____ months old, its mass is _____ kg.
  - Between month _____ and month _____, the mass increased by _____ kg.

Interpret line graphs

Reasoning and problem solving

Tiny creates a line graph to show the number of dogs in the park one afternoon.



Explain Tiny's mistake.

What would be a better way of presenting the data?

It is not possible to have 1.5 dogs.

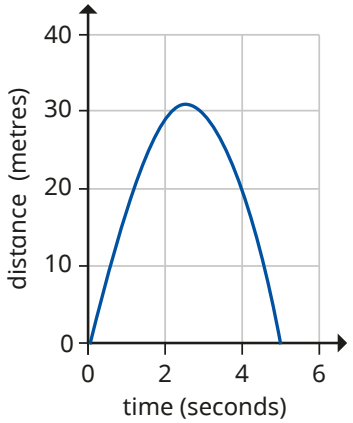
Use a bar chart, pictogram or table.

Jack launched a toy rocket into the sky.

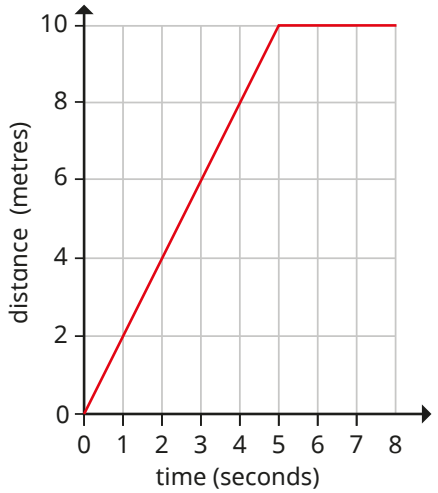
After 5 seconds, the rocket fell to the ground.

Which graph shows this?

A



B



Explain your answer.

Write a possible story to explain the other graph.

A | Discuss possible stories as a class.

Draw line graphs

Notes and guidance

Building on the previous step where children were introduced to line graphs, in this small step they draw their own line graphs to represent continuous data.

Children use their knowledge of scales to accurately draw line graphs, ensuring that they label the axes correctly. It may be useful for children to use pre-drawn axes rather than constructing their own, as this will save time as well as enable them to focus on accurately plotting data and choosing appropriate scales. Children will develop their knowledge of axes by looking formally at coordinates in the next block. Encourage children to use a ruler when drawing the lines between points on a line graph, using dashed lines in most cases and solid lines only when the change between given points is definitely happening at a constant rate.

Things to look out for

- Children may be unsure of which data to plot on which axis.
- When drawing their own line graphs, children may not space the intervals evenly along the axes.
- Children may need further support with plotting points that do not align with labelled points of the axes.

Key questions

- What do the two axes represent?
- What is the best way to show this data?
- What data is going to be shown on the horizontal/ vertical axis?
- What scale will you use for the axes?
- How can you accurately plot this point?
- How are you going to join your points together?
- What questions can you ask about your graph?

Possible sentence stems

- The horizontal axis represents _____ and the vertical axis represents _____
- The scale on the _____ axis goes up in _____s.

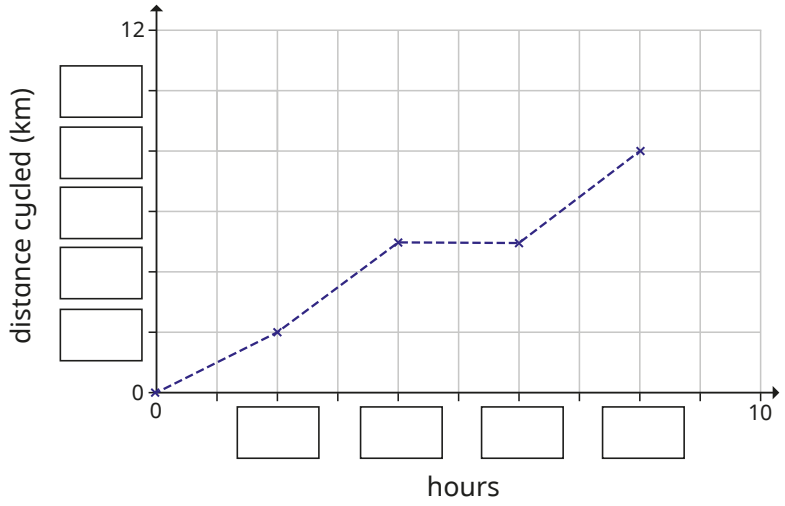
National Curriculum links

- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs
- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Draw line graphs

Key learning

- The line graph shows the number of kilometres that Miss Lee cycled over 10 hours.
  - Fill in the missing labels.



After 10 hours, Miss Lee has cycled 10 km.

- Complete the line graph to show this.
- Use the graph to answer the questions.

How far had Miss Lee cycled after 2 hours?

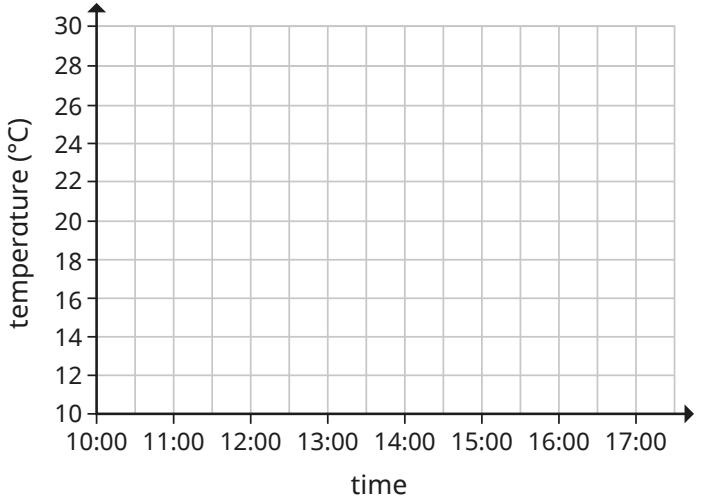
What happened between 4 and 6 hours?

Estimate how far Miss Lee had cycled after 1 hour.

- The table shows the temperature outside on Sunday.

Time	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
Temperature (°C)	12	14	20	24	28	26	24	22

Use the information in the table to complete the graph.



- Class 4 measure the height of a plant every week for 6 weeks.

The table shows their measurements.

Week	1	2	3	4	5	6
Height (cm)	4	7	9	12	14	17

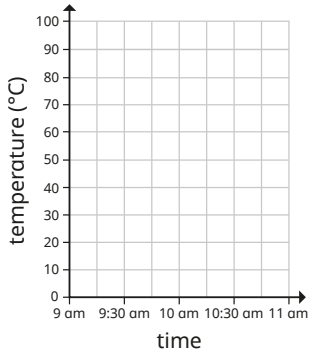
Draw a line graph to show this information.

What scale will you use on the horizontal and vertical axes?

Draw line graphs

Reasoning and problem solving

Sam measures the temperature of a cup of tea every 30 minutes for 2 hours.



Use the clues to complete the line graph.

- The temperature at 9:30 am was half the temperature at 9 am.
- The temperature at 10:30 am was 5 °C warmer than at 11 am.
- The temperature at 9 am was 80 °C.
- The temperature at 10:30 am was 10 °C cooler than at 10 am.
- The coolest temperature recorded was 15 °C.

Graph accurately labelled:

9 am 80 °C

9:30 am 40 °C

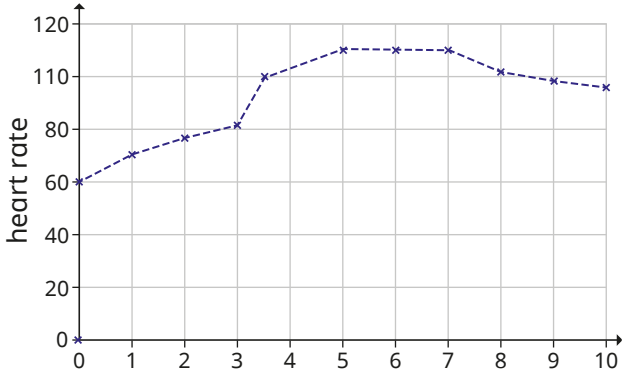
10 am 30 °C

10:30 am 20 °C

11 am 15 °C

Tiny uses the table to draw a line graph.

Time (minutes)	0	1	2	3	4	5	6	7	8	9	10
Heart rate	65	70	77	82	100	110	110	110	102	98	96



What mistakes has Tiny made?

Compare answers with a partner.

horizontal axis not labelled

vertical axis labelled with 110 instead of 100

point for 0 minutes plotted at 60, not 65

point for 4 minutes plotted at 3.5 minutes

Summer Block 6

Position and direction

Small steps

Step 1	Describe position using coordinates
Step 2	Plot coordinates
Step 3	Draw 2-D shapes on a grid
Step 4	Translate on a grid
Step 5	Describe translation on a grid

Describe position using coordinates

Notes and guidance

In this small step, children are introduced to coordinate grids and begin to describe the positions of points on a grid.

Explain that the x-axis is horizontal and the y-axis is vertical. Show that the point where the axes meet has the coordinates (0, 0) and the numbers increase on both axes, like number lines. Model how to describe the positions of points using coordinates, emphasising the importance of reading from the x-axis first. This could be modelled on a large grid in the playground. Repeat with a range of different coordinates, including where one of the numbers is zero. Once confident with giving coordinates of points, children could begin to explore finding the coordinates of the vertices of shapes.

The focus of this step is reading coordinates and children do not plot points on a coordinate grid until the next step.

Things to look out for

- Children may confuse the x- and y-values of the coordinates and read them in the wrong order.
- Children may need support to read coordinates of points on the axes.
- Children may think that coordinates refer to a whole square rather than a point.

Key questions

- What is the name of the horizontal/vertical axis?
- What is the same and what is different about the x-axis and the y-axis?
- Which axis do you look at first when finding the coordinates of a point?
- In what order do you read the coordinates of a point?
- What are the coordinates of the point?
- Why are there two values in a pair of coordinates?

Possible sentence stems

- Look at the _____-axis before the _____-axis.
- The first value in a pair of coordinates is the _____-value and the second value is the _____-value.
- The coordinates of point A are (_____, _____).

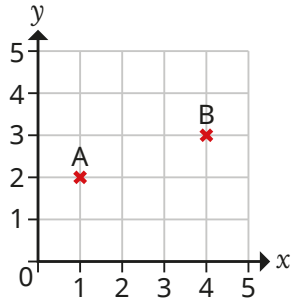
National Curriculum links

- Describe positions on a 2-D grid as coordinates in the first quadrant

Describe position using coordinates

Key learning

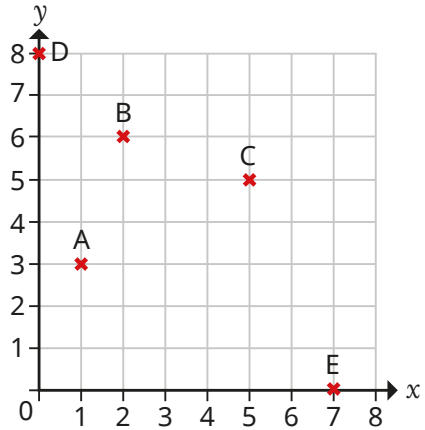
- Here is a coordinate grid.



  - The coordinates of point A are (1, 2).

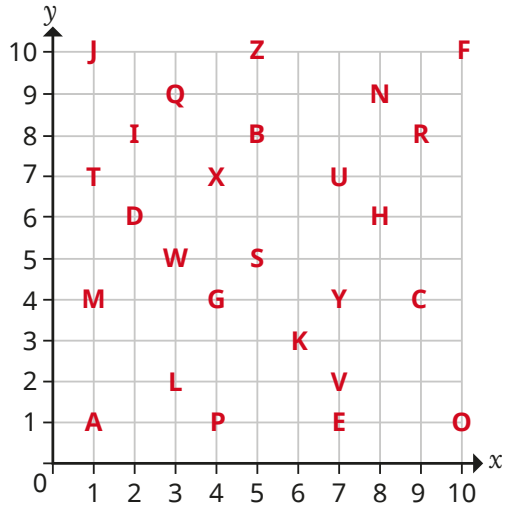
    What do the numbers 1 and 2 represent?
  - What are the coordinates of point B?

- Write the coordinates of each point.



What do you notice about points D and E?

-

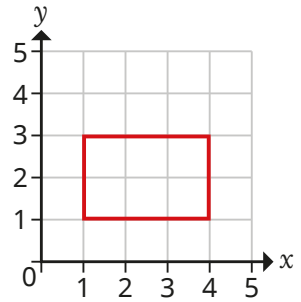


  - What are the coordinates of the letter Y?
  - What word do the letters at these coordinates spell?

(1, 4)	(1, 1)	(1, 7)	(8, 6)	(5, 5)

  - Write the coordinates of the letters that spell your name.

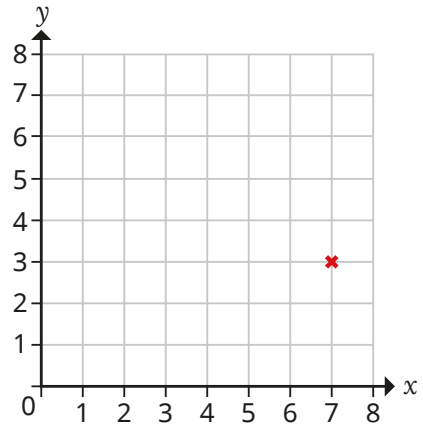
- Write the coordinates of the vertices of the rectangle.

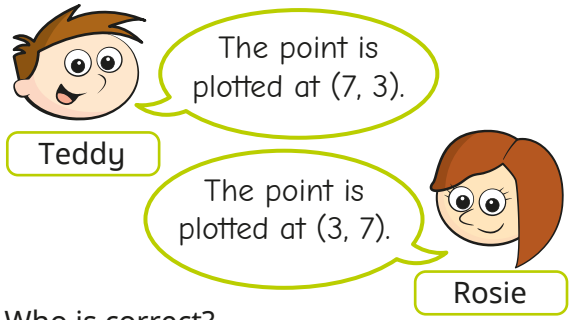


Describe position using coordinates

Reasoning and problem solving

A point is plotted on a coordinate grid.



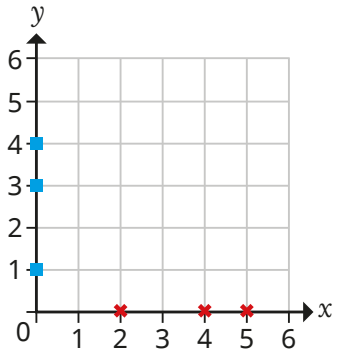


Who is correct?

What mistake has the other person made?

Teddy

Points are plotted on a coordinate grid as crosses or squares.



What do you notice about all the points marked with crosses (✖)?

What do you notice about all the points marked with squares (■)?

If the grid was larger, what could you say about these points?

(12, 0) (0, 12) (9, 0) (42, 0) (0, 17)

They are all on the x-axis, and the y-value of their coordinates is 0

They are all on the y-axis, and the x-value of their coordinates is 0

(12, 0), (9, 0) and (42, 0) on x-axis

(0, 12) and (0, 17) on y-axis

Plot coordinates

Notes and guidance

In this small step, children use their understanding from the previous step to plot points with given coordinates on a grid.

Recap the axes of a coordinate grid and how these relate to the values in a set of coordinates, with the x-value coming first. Then model plotting a point from given coordinates. Ask children how they know which coordinate corresponds to which axis. This could be modelled on a large grid in the playground, asking children to go and stand at points with given coordinates by moving horizontally from (0, 0) and then vertically. Ensure that children see that points are plotted on the lines and not in the spaces between the lines.

Discuss how it can be known where coordinates will go on a grid without plotting them first. For example, if two coordinates have the same x-value, then they are on the same vertical line, or if one of the coordinates is zero, then the point is on one of the axes.

Things to look out for

- Children may confuse the x- and y-values of the coordinates and plot them in the wrong order.
- Children may use coordinates to identify a square rather than a point.

Key questions

- Which value in a pair of coordinates tells you how far horizontally/vertically the point is?
- Do you plot a point on the line or in the space between the lines?
- Does the order of the numbers in a pair of coordinates matter? Why?
- How far along the x-axis is the point (_____, _____)?
- How far up the y-axis is the point (_____, _____)?
- Where does the point (_____, _____) go on the grid?

Possible sentence stems

- The first value in a pair of coordinates tells me how far along the _____-axis the point is.
- The second value in a pair of coordinates tells me how far up the _____-axis the point is.

National Curriculum links

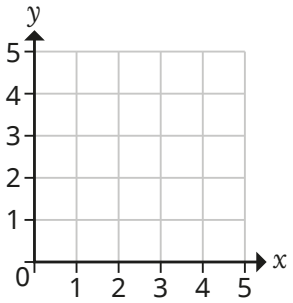
- Describe positions on a 2-D grid as coordinates in the first quadrant
- Plot specified points and draw sides to complete a given polygon

Plot coordinates

Key learning

- Follow Mo's instructions for plotting the point (4, 1) on the grid.

1. Find 4 on the x-axis and draw a vertical line.
2. Find 1 on the y-axis and draw a horizontal line.
3. Where the two lines meet, draw a cross.



How could you plot the point without drawing lines?

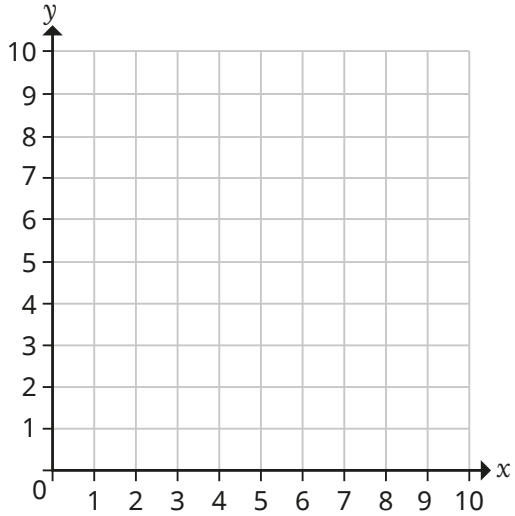
- Plot and label the points on the grid.

A (2, 1)

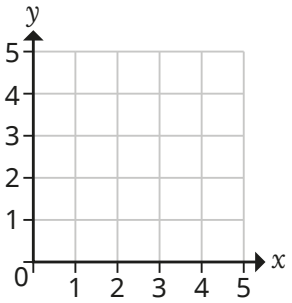
B (6, 5)

C (10, 2)

D (2, 10)



- Plot and label the points on the grid.



A (2, 0)

B (0, 3)

- Plot the points on a coordinate grid.

(0, 5)

(4, 5)

(7, 5)

(10, 5)

Join up the points. What do you notice?

Could you have known this before plotting the points on the grid?

- Plot the points (3, 3) and (7, 3) on a coordinate grid.

Draw a straight line between them.

Plot the points (5, 5) and (5, 1) on the same grid.

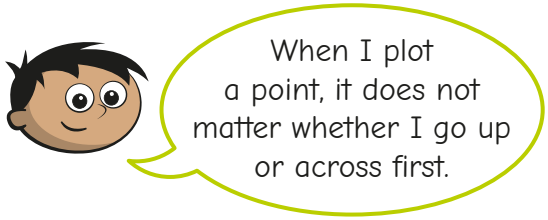
Draw a straight line between them.

What are the coordinates where the lines cross?

Plot coordinates

Reasoning and problem solving

Amir is plotting points on a coordinate grid.



Is Amir correct?

Explain your answer.

No

Sam has plotted the point (4, 5).

Tommy has plotted the point (5, 8).

Eva has plotted the point (4, 8).

Which two children have plotted a point on the same grid line?

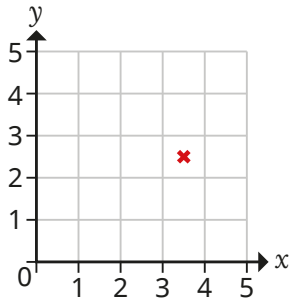
Is there more than one answer?

Is there a way of knowing this without plotting the points on a grid?

Sam and Eva: same vertical line

Tommy and Eva: same horizontal line

Jo is plotting the point (3, 2) on the grid.



What mistake has Jo made?

Explain your answer.

Jo has plotted the point in the square rather than on the grid lines.

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

> If one of the values in a set of coordinates is zero, then the point must be plotted on the x-axis.

Explain your answer to a partner.

sometimes true

Draw 2-D shapes on a grid

Notes and guidance

In this small step, children gain more experience of reading and plotting points by drawing 2-D shapes on a coordinate grid.

Children can begin by plotting given points and joining the points with lines to form a polygon. Then show them examples where three out of four vertices of a rectangle are already on a grid and ask where the fourth vertex will be. Discuss any connections between the coordinates of the missing vertex and the coordinates of the vertices that it shares a side with. Children can also explore more open examples where just two vertices are given and the other vertices could be in multiple positions. Once they have drawn simple squares and rectangles, children draw shapes with specific properties, such as an isosceles triangle or a variety of quadrilaterals.

Things to look out for

- Children may confuse the x- and y-values of the coordinates and read or plot them in the wrong order.
- Children may not recognise shapes drawn on grids in non-standard orientations and/or may think that a shape is impossible to draw, for example a square if the sides are not horizontal and vertical.

Key questions

- Which value in a pair of coordinates tells you how far horizontally/vertically the point is?
- Do you plot a point on the line or in the space between the lines?
- Does the order of the numbers in a pair of coordinates matter? Why?
- What polygon have you made? How can you tell?
- Is there more than one place the vertex could be?
- What does "isosceles" mean?
- How can you tell that the quadrilateral is a _____?
- How many sides have you drawn so far? What do you know about the sides of a _____?

Possible sentence stems

- Read the _____-value before the _____-value.
- Two points on a horizontal/vertical line have the same _____-value.

National Curriculum links

- Plot specified points and draw sides to complete a given polygon

Draw 2-D shapes on a grid

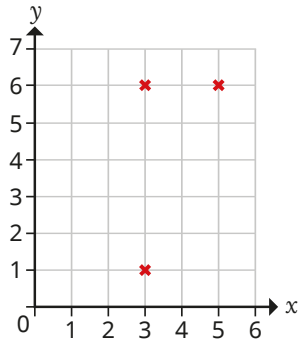
Key learning

- Three vertices of a rectangle have been plotted on a coordinate grid.

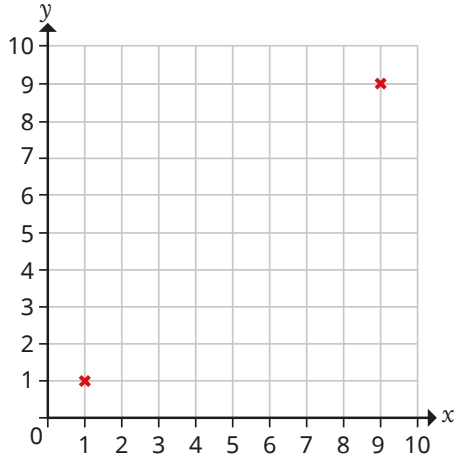
  Draw the fourth vertex.

  What are its coordinates?

  What do you notice about the coordinates of the four vertices?



- Dani plots two vertices of a square on a coordinate grid.



  Draw two more points to complete the square.

  What are the coordinates of your points?

  What do you notice about the coordinates of your points and the ones that Dani plotted?

- Plot the points on a grid and join them up.

(2, 4)	(4, 2)	(5, 8)	(7, 6)

  What shape have you made?

- Draw an isosceles triangle on a grid.

  Write the coordinates of each vertex.

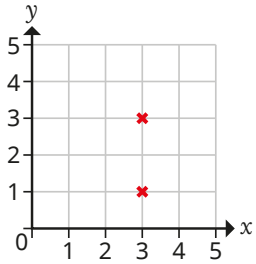
  How do you know that the triangle is isosceles?

- Three vertices of a rectangle have the coordinates (4, 6), (9, 6) and (4, 8).

  Find the coordinates of the fourth vertex of the rectangle.

  Is it possible to work this out without drawing on a grid?

- Two vertices of a square are plotted on the coordinate grid.

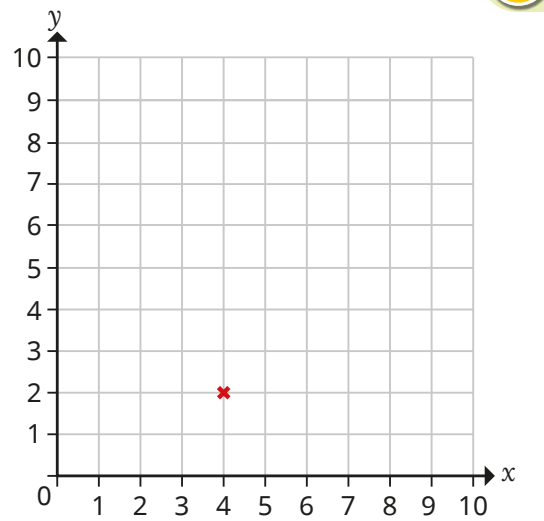


  What could the coordinates of the other two vertices be?

Draw 2-D shapes on a grid

Reasoning and problem solving

Huan plots a point on a coordinate grid.

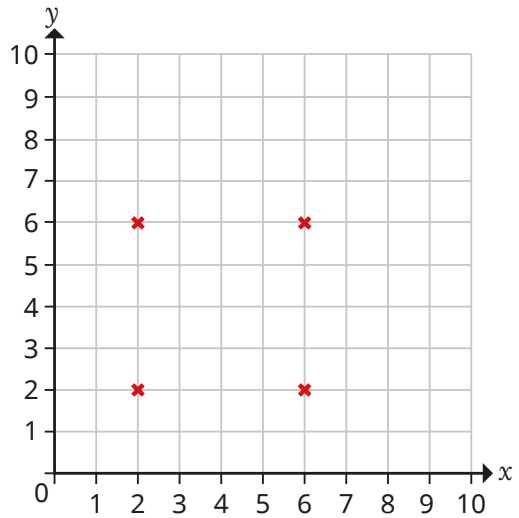


What polygons could Huan make, using the given point and three other points?

Draw the polygons and write the coordinates of their vertices.

Compare answers as a class.

Dora plots four vertices of a pentagon on a coordinate grid.



Where could the coordinates of the fifth vertex be?

Are there some parts of the grid where the vertex could not go?

The fifth vertex could be "inside" or "outside" the other four vertices, but not on the horizontal or vertical lines that the points lie on.

Translate on a grid

Notes and guidance

In this small step, children translate points and shapes on a coordinate grid for the first time.

Children start by translating one point horizontally or vertically. They understand that the word "translate" in this context means "move", but that the points can only move along grid lines. Once they are confident in translating a point either left/right or up/down, introduce the idea of translating a point both left/right and up/down. Model following the first instruction, marking lightly on the grid, then following the second instruction. In this case, they see that both the x- and y-values of the coordinates change. Finally, children translate simple 2-D shapes on a grid. Show that by translating one vertex at a time, the translated shape looks identical to the original shape, but is in a different position.

Things to look out for

- When translating a shape or point, children may count the point it is on as "1" and not translate enough spaces.
- When translating shapes, children may translate just one vertex and then draw the shape, leading to incorrect corresponding vertices.

Key questions

- What are the coordinates of point A?
- What does "translation" mean?
- What will the coordinates of point A be if the point is translated _____ squares to the left/right/up/down?
- What do you notice about the coordinates of a point when it is translated up/down **or** left/right?
- What do you notice about the coordinates of a point when it is translated up/down **and** left/right?
- When translating a shape, do you translate one vertex at a time? How else could you translate the shape?

Possible sentence stems

- When translating a point _____, the _____-value stays the same.
- Point A translates _____ squares to the left/right and _____ squares up/down.
  The new coordinates of point A are _____

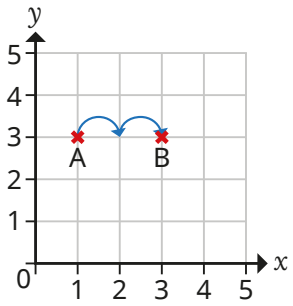
National Curriculum links

- Describe movements between positions as translations of a given unit to the left/right and up/down

Translate on a grid

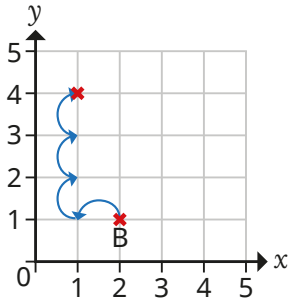
Key learning

- Annie has translated point A 2 squares to the right and labelled it B.



  - What are the coordinates of point B? What do you notice about the coordinates of point A and point B?
  - Translate point A 2 squares down and label it C.
    What do you notice about the coordinates of point C?

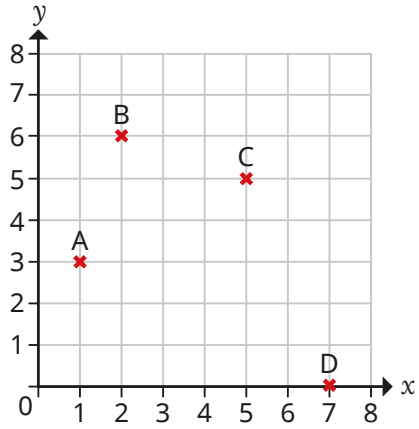
- Max has translated point B 1 square left and 3 squares up.



  What are the coordinates of point B now?

  What do you notice?

- Translate the points.
  - point A 3 squares to the right
  - point B 5 squares down
  - point C 2 squares to the left and 1 square down
  - point D 5 squares to the left and 7 squares up

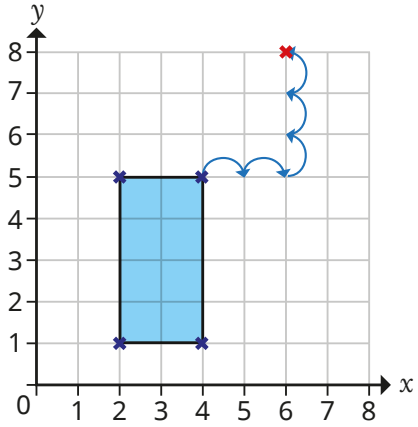


- Whitney is translating the rectangle 2 squares to the right and 3 squares up.

  She translates one vertex at a time.

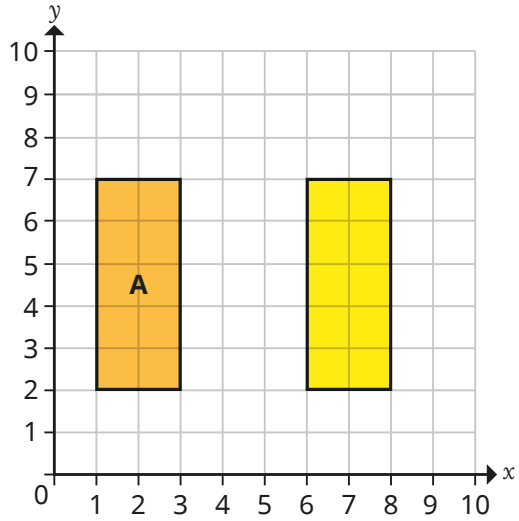
  The first vertex has been done already.

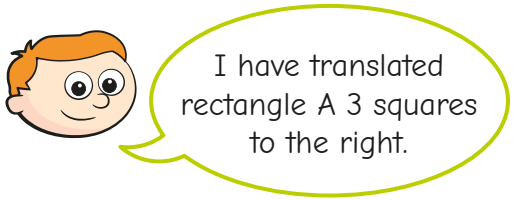
  What are the new coordinates of each vertex of the translated shape?



Translate on a grid

Reasoning and problem solving





What mistake has Ron made?

Draw the correct position of rectangle A after the translation.

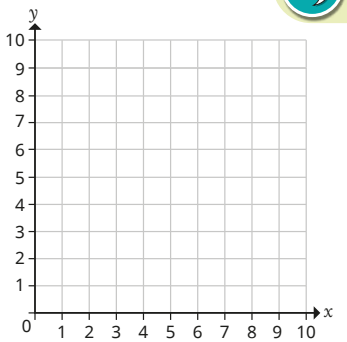
There is a gap of 3 squares between the rectangles, instead of each vertex being translated 3 squares to the right.

The bottom left vertex of the rectangle should be at (4, 2).

Here is a game to play in pairs.

Each player needs:

- one small cube
- one barrier (for example, a mini whiteboard)
- a coordinate grid



Both players hide their grid from each other.

The first player places a cube on a point on their grid. They describe the original position and perform a translation.

The second player listens to the instructions and performs the same translation.

They check to see if they have placed their cube at the same point.

Swap roles and repeat several times.

Translations will vary.

Describe translation on a grid

Notes and guidance

In this small step, children use their understanding from the previous step to describe the translation that has taken place when they are given a pair of points or shapes.

Children begin by looking at a point that has only been translated either up/down or left/right. They see that if it is on the same grid line as the first point, it has only moved in one direction. Encourage children to practise counting how many squares the point has moved, taking care not to count the square the point/shape starts from. Then they move on to points that have moved both left/right and up/down. They should count left/right from the first point, make a small mark on the paper, then count up/down. Finally, children describe translations between shapes, focusing on how one vertex of the shape has been translated to the corresponding vertex on the other shape.

Things to look out for

- Children may count the point a translation starts from as "1".
- When describing the translation of shapes, children may describe the translation between a pair of vertices that are not corresponding.

Key questions

- What does "translation" mean?
- What is the same and what is different about the two shapes?
- How can you describe the translation that has happened from one point to another point?
- Has this point been translated up or down?
  Has it been translated left or right?
  Has it been translated in both directions?
- Which vertex in shape B corresponds to this vertex in shape A?

Possible sentence stems

- Point A has been translated _____ squares to the left/right and _____ squares up/down.
- Shape A has been translated _____ squares to the left/right and _____ squares up/down.

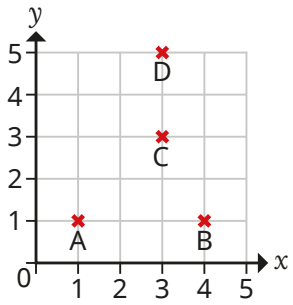
National Curriculum links

- Describe movements between positions as translations of a given unit to the left/right and up/down

Describe translation on a grid

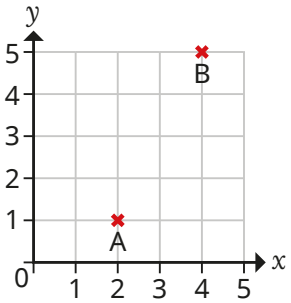
Key learning

- Four points are plotted on a coordinate grid.



  - Describe the translation from point A to point B.
  - Describe the translation from point C to point D.

- Complete the sentence to describe the translation.

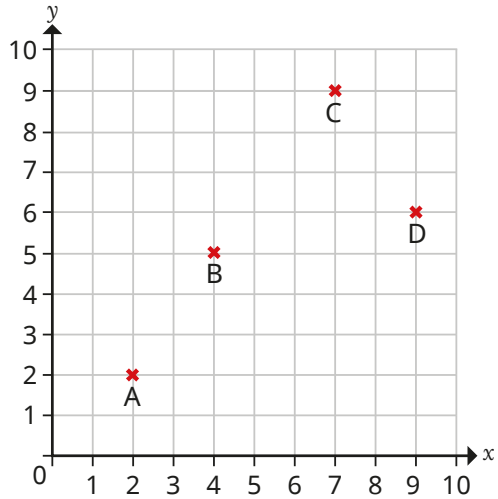


Point A has been translated _____ squares right and _____ squares up.

Is the translation from B to A the same as the translation from A to B?

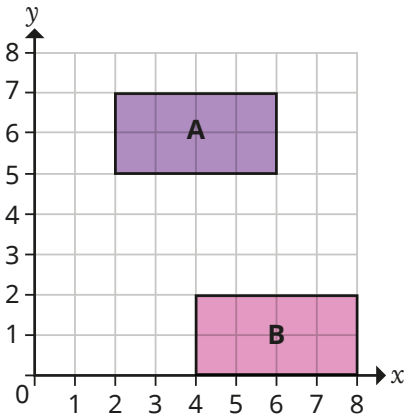
- Describe the translation from:
  - A to D
  - B to C
  - C to D
  - C to B

Plot two new points and describe the translations from point A to the new points.



- Two shapes are drawn on a coordinate grid.
  - Describe the translation of shape A to shape B.
  - Describe the translation of shape B to shape A.

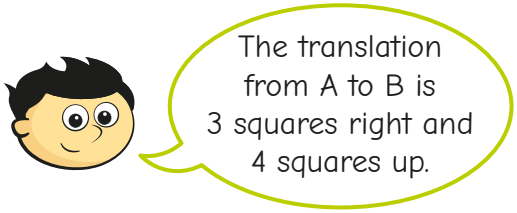
What do you notice?

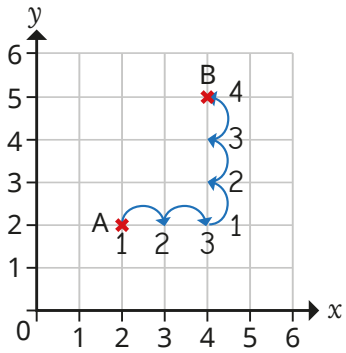


Describe translation on a grid

Reasoning and problem solving

Jack is describing the translation of point A to point B.





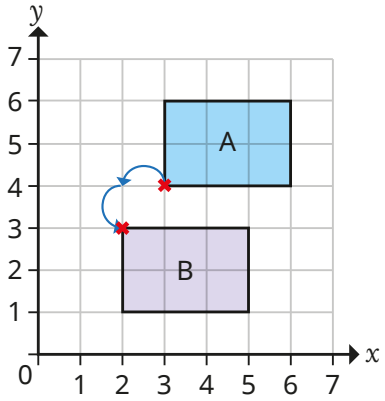
Explain Jack's mistake.

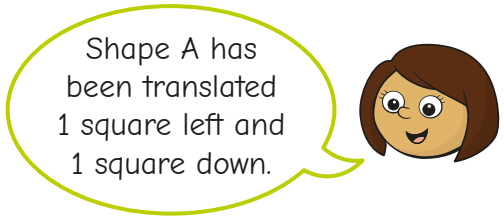
What is the correct translation from A to B?

Jack has included the starting points in his count.

2 squares right and 3 squares up

Kim is describing the translation of the shape.





Explain why Kim is wrong.

What is the correct translation from shape A to shape B?

Kim has not described the translation of corresponding vertices.

1 square to the left and 3 squares down