Summer Block 2

Fractions

Small steps

Step 1	Recognise a half of an object or a shape
Step 2	Find a half of an object or a shape
Step 3	Recognise a half of a quantity
Step 4	Find a half of a quantity
Step 5	Recognise a quarter of an object or a shape
Step 6	Find a quarter of an object or a shape
Step 7	Recognise a quarter of a quantity
Step 8	Find a quarter of a quantity

Recognise a half of an object or a shape

Notes and guidance

In this small step, children explore recognising a half or two halves for the first time, looking at both objects and shapes.

Children need lots of opportunities to practically make halves and identify a half and a whole. They need to be shown various types of representations to develop a full understanding of a half. They also need to be shown half of these shapes and objects in different ways. For example, a square can be split in half vertically, horizontally or diagonally.

It is important that children know that a half means "one of two equal parts" and are able to count them. In this step, they are supported to recognise when a shape or object is or is not a half, in addition to identifying the whole.

At this stage, children do not use the fractional notation of $\frac{1}{2}$

Things to look out for

- Children may talk about a "bigger" or "smaller" half due to prior experiences of sharing, so it is important to reinforce that a half is one of two equal parts.
- Children may struggle to recognise halves when they are shown in non-standard ways.

Key questions

- What is the whole?
- How many parts are there?
- Are the parts equal?
- Is this a half? How do you know?
- How does this show half?
- Is this a half or a whole?

Possible sentence stems

- The whole is split into _____ equal parts.
- There are _____ halves in a whole.
- This is/is not a half because ...

National Curriculum links

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity

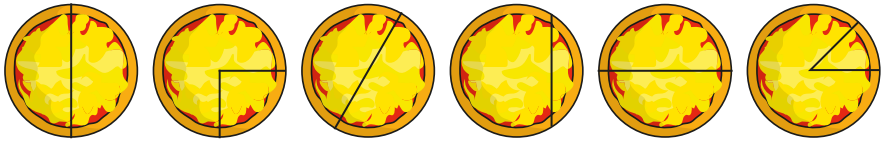
Recognise a half of an object or a shape

Key learning

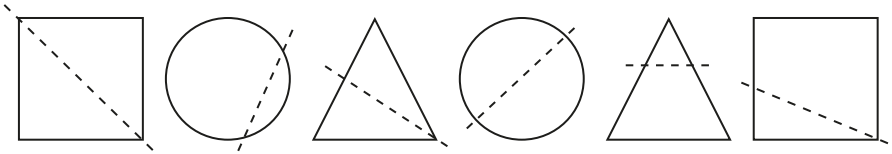
Read *Peg + Cat: The Pizza Problem* by Jennifer Oxley and Billy Aronson. Then show children different images of pizza cut into different size pieces, some showing a half and some not. Can the children identify the half and the whole images of pizza from the story?

Give children cut-out shapes of pizza and ask them to help you sort the pizza into two groups: half and not half. Discuss how they know whether each one is or is not a half.

- Which pizzas have been cut in half?



- Which shapes show half?



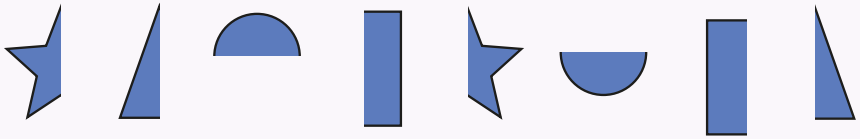
Show children some everyday objects such as an apple, a cake and a biscuit.

Model when something has been cut in half and not in half. Can children identify which objects are cut in half and which are not?

Ask how many equal parts there are when something is cut in half.

Give children a range of different paper shapes that have been cut in half.

Ask them to find the other half to make a whole.



How do they know that they have found the other half? Can they use a mirror to help?

Recognise a half of an object or a shape

Reasoning and problem solving

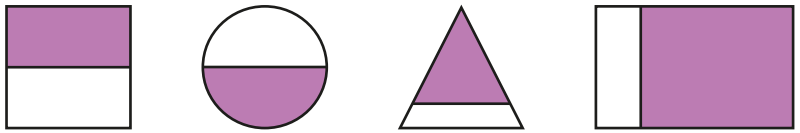
Sam and Mo are eating cookies.

Do you agree with Tiny?

Explain your answer.

No

Jo thinks that she has coloured half of each shape.

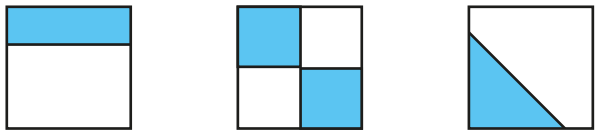


Do you agree with Jo?

Explain your answer.

No

Which shape shows half?



middle shape

Find a half of an object or a shape

Notes and guidance

In this small step, children build on the knowledge from the previous step, where they recognised a half of an object or shape, to now find a half of shapes or objects for themselves.

Give children lots of opportunities to practically find halves and make a half using pictures, objects and shapes. They need to be shown lots of varied examples and experiment with different ways of making a half using a range of resources.

It is important that children know that a half means "one of two equal parts" and can count them. At this stage, they are still only finding half of one object or shape. They will explore finding half of a set of objects in the next steps.

Things to look out for

- Children may think that if they split something into two parts, they have split it in half. They may not remember that the two parts must be equal.
- Children may not recognise that they can split some shapes/objects in half in a number of ways, instead only using horizontal or vertical divisions.

Key questions

- How many halves make a whole?
- Are the parts equal? How do you know?
- How do you know that you have found a half?
- How can you find a half of this object/shape?
- Is there more than one way to show half of this shape?
- How can you tell if an object or shape has not been split in half?

Possible sentence stems

- To find a half, I need to split the whole into _____ equal parts.
- If the whole is split into two equal parts, each part is called a _____
- The shape is/is not split in half because ...

National Curriculum links

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity

Find a half of an object or a shape

Key learning

Set up a cafe role-play area. Provide children with modelling clay and child-friendly knives. Ask them to make doughnuts, muffins, cake slices or pancakes for the cafe.

Children take it in turns to role-play the customer and the cafe owner. The customers order what they would like from the cafe. Would they like half of a bun? Would they like more than one half?

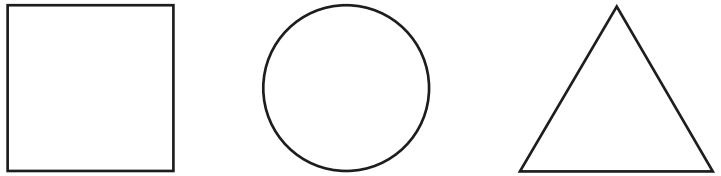
Using the knives, the cafe owners cut the 'food' items.

Give children a range of different paper shapes in a variety of sizes. Ask them to explore which shapes can be folded in half and what they look like when folded in half.

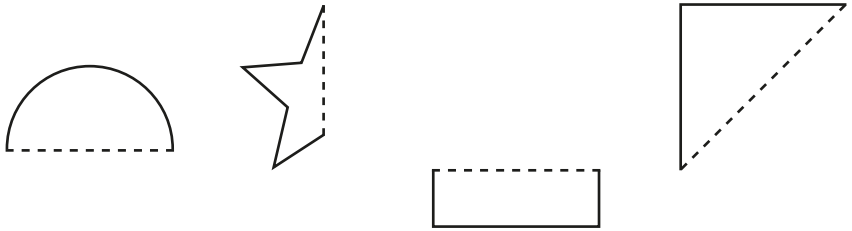
Which shapes can be folded in half in only one way? Which shapes can be folded in half in more than one way?

- Draw a line to split each object in half.

- Find three different ways to split each shape in half.



- Draw the other half of each shape to make the whole.

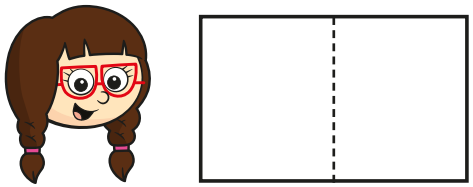


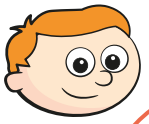
Find a half of an object or a shape

Reasoning and problem solving

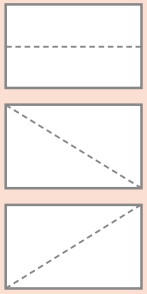
Jo and Ron are splitting a rectangle in half.

Jo splits the rectangle like this.



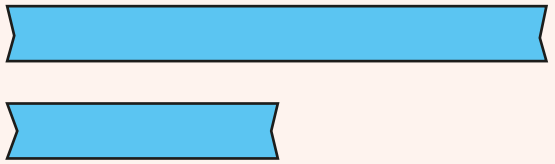


I can find three other ways of splitting the rectangle in half.



Draw Ron's three rectangles.

Make a collection of ribbons or string of different lengths. The ribbons or pieces of string are in pairs where one is twice the length of the other, for example 12 cm and 6 cm.



Give one to each child and ask them to find the person to match the half to the whole.

Encourage children to talk to each other about why one is half the length of the other. Do they always have only one match or can they find another?

Discuss answers as a class.

Recognise a half of a quantity

Notes and guidance

In this small step, children use their previous learning of recognising and finding a half, and apply this to recognising half of a quantity.

Children need to have a good sense of cardinality so that they can find a total and then relate this to finding half the amount of the total. They need to show how the total can be shared equally into two groups, using learning covered in the previous block on multiplication and division. They can use concrete resources such as cubes, beads, counters and other small world objects to support this. Children may also find it helpful to relate finding a half to classroom contexts. For example, they can find half the number of children in a group, so that they see what half of an amount looks like.

Things to look out for

- Children may only recognise a half as half of an object or shape, rather than also referring to a number or quantity.
- Children may not recognise when the two halves appear different visually, for example three apples on a plate close together and three apples on another plate spread out.

Key questions

- What is the total/whole?
- How can you find half?
- How many parts do you need to split them into to find half?
- How many _____ are there in each part?
- Is this still half when I move the _____ around?
- How can you check that this is still half?

Possible sentence stems

- There are _____ altogether.
  They are shared into _____ equal groups.
  There are _____ in each group.
  Each group is _____ of the whole.
- I know that the _____ are/are not split in half because ...

National Curriculum links

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity

Recognise a half of a quantity

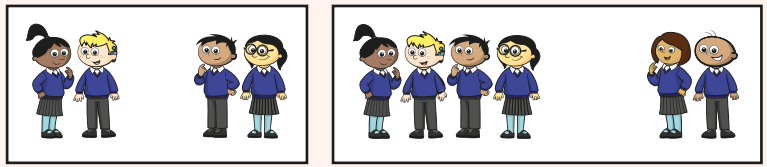
Key learning

Go outside with a bag of balls and three hoops. Take out six balls.

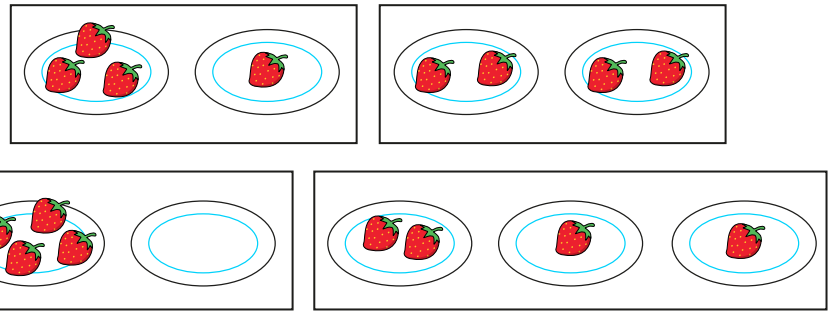
Share the balls equally between two hoops and ask children if the balls have been split in half. Repeat, but sharing the the balls unequally between two hoops. Then share the balls between three hoops and ask if they have been split in half.

Repeat with other totals.

Put children into small groups of up to 10 and ask them to line up. Split the groups in different ways, some in half, some not in half. Ask children to explain which groups have been split in half and which have not. Can they explain why? What happens if there is an odd number of children in total?



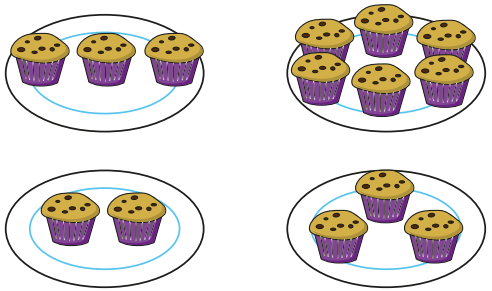
- Which pictures show equal groups?



Which pictures show half?

- Here are 6 muffins.

Which plates show half of the muffins?

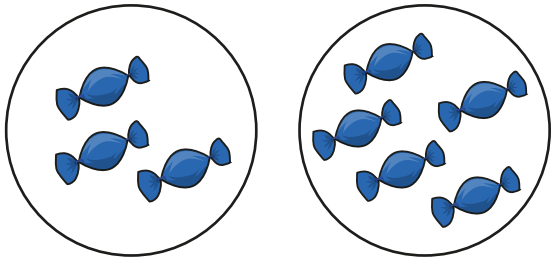


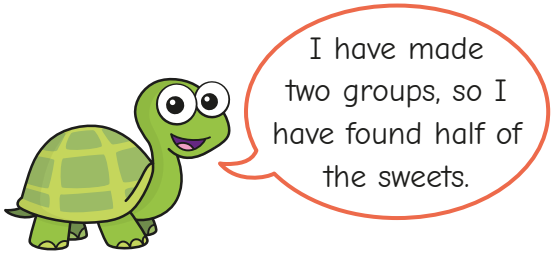
Is there more than one answer?

Recognise a half of a quantity

Reasoning and problem solving

Tiny is finding half of the sweets.





Do you agree with Tiny?

Explain your answer.

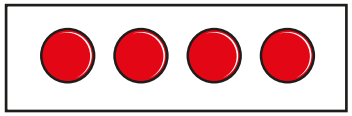
No

Ron and Kim have some counters.

Ron has half of the counters and Kim has half of the counters.

Draw Kim's counters.

Ron



Kim

How many counters are there altogether?

What is half of the total?

8

4

Find a half of a quantity

Notes and guidance

In this small step, children build on the previous step to find half of a quantity.

Children should see that to find a half, they need two equal groups, and should explore practically sharing a given quantity of objects into two groups using skills developed in the previous block on multiplication and division. Encourage children to check the amounts in each group after sharing to ensure that there is an equal amount in each group.

Children then progress to circling or shading half of a given quantity. Understanding that half can mean "one out of every two objects" is important for this. Finally, they may begin to explore finding the whole from a half. For example, if 3 is half, what is the whole? Knowledge of doubles from prior learning can support this.

Things to look out for

- Children may draw lines to halve each shape/object in a set, rather than finding half of the total.
- When finding missing totals, children may halve the amount rather than doubling it. For example, when asked to find the whole if 4 is half, they may give the answer 2

Key questions

- How many are there altogether?
- How many equal groups are there when you are finding half?
- How do you know that the groups are equal?
- How many _____ are there in each group?
  So what is half of _____?
- If 3 is half, how can you find the whole?
- If you know that double 4 is 8, how can you work out half of 8?

Possible sentence stems

- There are _____ altogether.
  To find half, I need to share the total into _____ equal groups.
  There are _____ in each group.
- Half of _____ is _____
- If double _____ is _____, then half of _____ is _____

National Curriculum links

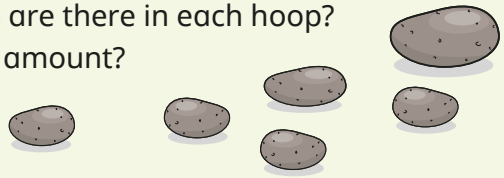
- Recognise, find and name a half as one of two equal parts of an object, shape or quantity

Find a half of a quantity

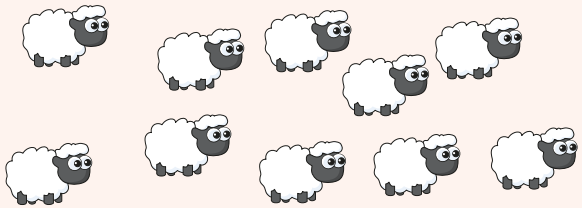
Key learning

Give children an even number of pebbles or sticks. Provide them with two small hoops. Ask children to share the objects equally between the hoops.

How many objects are there in each hoop?
What is half of the amount?



Set up a scene, for example where animals need to be put equally into two fields.



Ask children to complete the sentences to describe the scene.

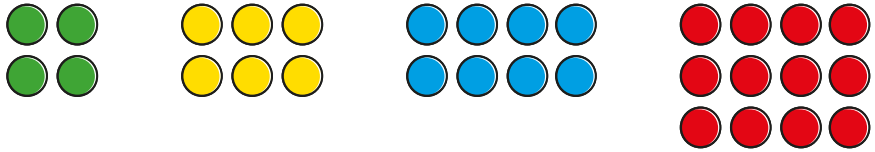
There are _____ animals altogether.

There are _____ animals in each field.

Half of _____ is _____

- Find half of each amount.

  Complete the sentence for each.



  Half of _____ is _____

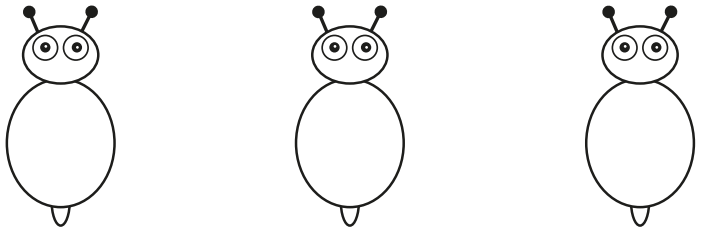
- Shade half of the stars.

  Is there more than one way of shading half?

- The creatures need half the number of legs on each side.

  Draw the correct number of legs on each side.

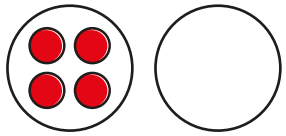
6 legs in total	12 legs in total	10 legs in total



Find a half of a quantity

Reasoning and problem solving

If 4 is half, what is the whole?



If 2 is half, what is the whole?

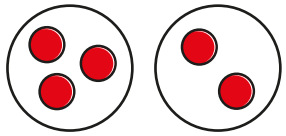
If 8 is half, what is the whole?

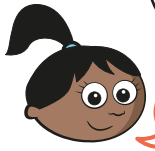
8

4

16

Sam and Max are trying to find half of 5





Half of 5 is 2

Sam

Half of 5 is 3

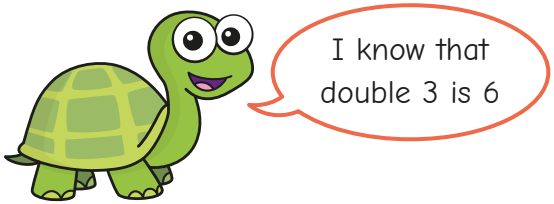
Max

Who do you agree with?

Explain your answer.

They are both incorrect.

Tiny wants to find half of 6



Explain how Tiny can use this fact to find half of 6

Complete the sentences.

Double 5 is 10, so half of 10 is _____

Double 7 is 14, so half of _____ is 7

Double 4 is _____, so half of _____ is 4

Double _____ is 12, so half of 12 is _____

5

14

8, 8

6, 6

Recognise a quarter of an object or a shape

Notes and guidance

In this small step, children are introduced to recognising a quarter of an object or a shape. This is the first time that they explore quarters.

Children develop their understanding of equal parts and non-equal parts and relate this to a shape or object being split into four equal parts. They need to see quarters explicitly being made in lots of different contexts, such as being split horizontally, vertically and diagonally, as well as using a range of different shapes and objects.

Children use the words "quarter" and "parts" at this stage, but do not use the fractional notation of $\frac{1}{4}$

Things to look out for

- It may be necessary to reinforce the idea of equal parts, so that children do not think that a shape split into four unequal parts also represents quarters.
- Children may struggle to recognise quarters when they are shown in non-standard ways.

Key questions

- What is the whole?
- How many parts are there?
- Are the parts equal?
- How many parts are shaded?
- Is this a quarter?
- How do you know that this is/is not a quarter?

Possible sentence stems

- The whole is split into _____ equal parts.

  _____ of the parts is shaded.

  This shows one _____
- There are _____ quarters in a whole.
- This is/is not a quarter because ...

National Curriculum links

- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

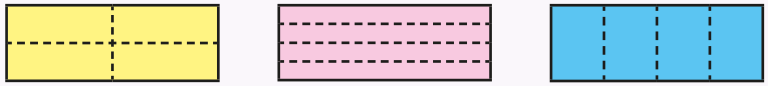
Recognise a quarter of an object or a shape

Key learning

Show children everyday objects such as fruit. Ask how they can be cut into four equal parts.

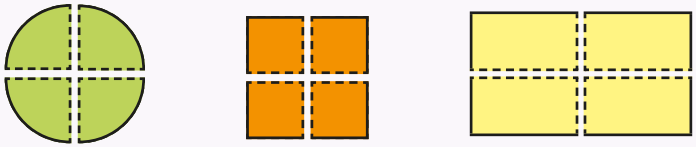
Explain to children that these are quarters, and all four parts need to be equal.

Provide children with a range of paper shapes and ask them to explore folding the shapes into quarters in different ways.

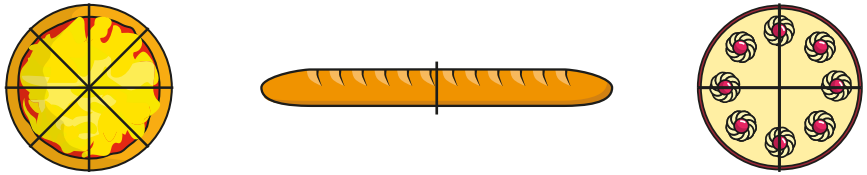


Give children a range of shapes cut into quarters. Ask them to find the group of 4 to make the shape whole.

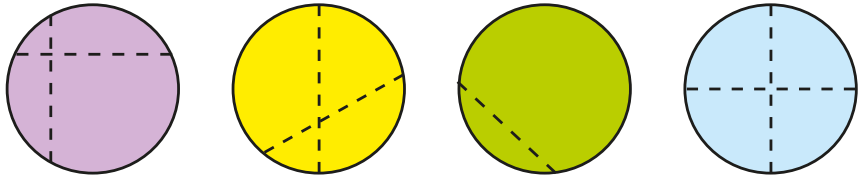
Is there more than one way the parts could be put together to make a whole?



- Which object has been cut into quarters?

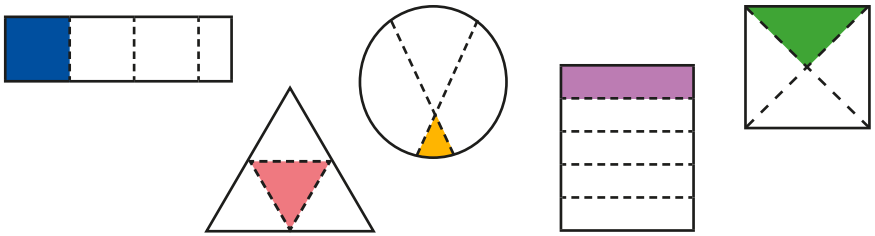


- Which circle has been cut into quarters?



How do you know?

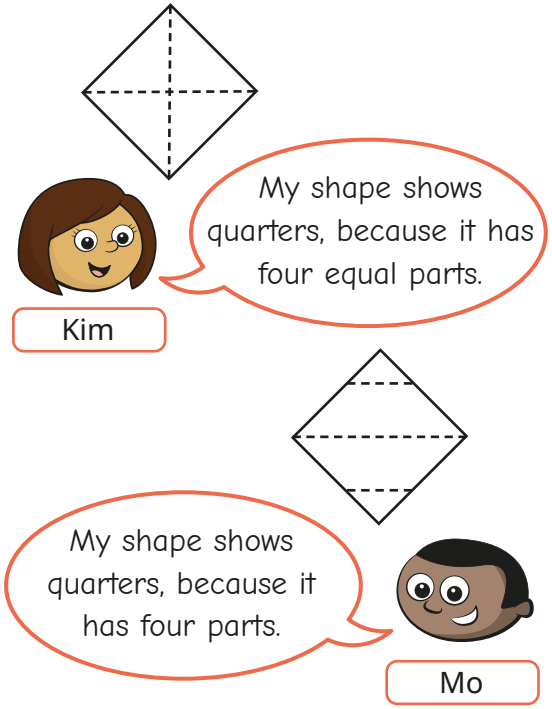
- Which shapes show a quarter?



Recognise a quarter of an object or a shape

Reasoning and problem solving

Kim and Mo are talking about quarters.



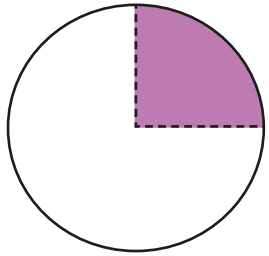
Are Kim and Mo correct?

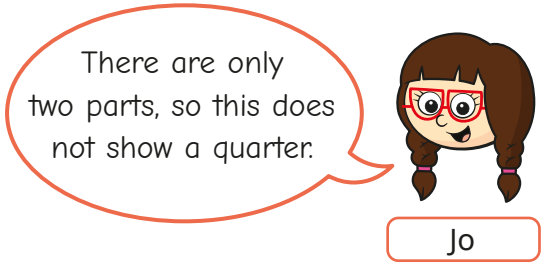
Explain your answer.

Kim is correct.

Mo is incorrect.

Jo draws a circle and colours one part.





Do you agree with Jo?

Explain your answer.

No

Find a quarter of an object or a shape

Notes and guidance

In this small step, children build on the learning in the previous step to find a quarter of an object or a shape.

Children begin by shading a shape that has already been split into four equal parts, before moving on to splitting shapes into four equal parts themselves. They need lots of practice looking at and manipulating shapes and pictures to find the four equal parts. Children also need to see many representations of quarters in different orientations using a range of different shapes and pictures.

At this stage, children are still only finding a quarter of one object. They will explore finding a quarter of a set of objects in the next steps.

Things to look out for

- Children may think that if they split something into four parts, they have split it into quarters. They may not remember that the parts must be equal.
- Children may not recognise that they can split some shapes/objects into quarters in a number of ways, instead using only horizontal or vertical divisions.

Key questions

- How many quarters make a whole?
- How many parts has the whole been split into?
- Are all the parts equal?
- How many parts do you need to colour to show a quarter?
- Can you make a quarter in a different way?

Possible sentence stems

- To make quarters, I need to split the whole into _____ equal parts.
- To show a quarter, I need to colour _____ of the _____ equal parts.
- If the whole is split into four equal parts, each part is called a _____
- The shape is/is not split into quarters because ...

National Curriculum links

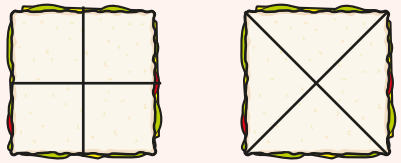
- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Find a quarter of an object or a shape

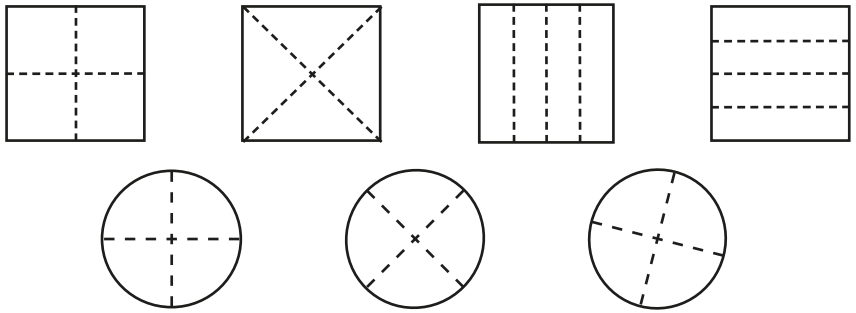
Key learning

Provide children with sliced bread, sandwich fillings and child-friendly knives. In small groups, children make sandwiches for a picnic. All the sandwiches must be cut into quarters.

Explore how children can cut the sandwiches so that the parts are all equal. Can they cut the sandwiches in more than one way?

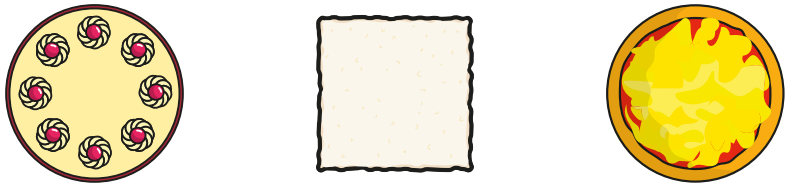


- Colour a quarter of each shape.

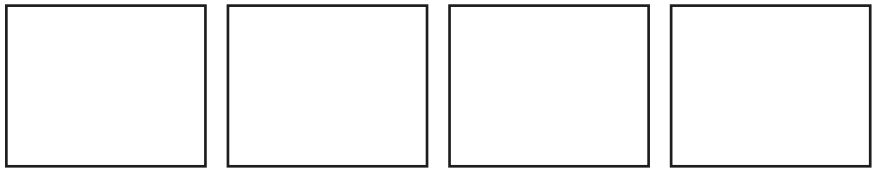


Can you colour the shapes in different ways?

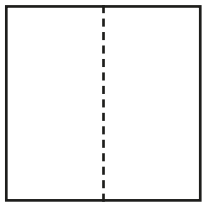
- Draw lines to split the objects into quarters.



- Find four different ways to show a quarter of the rectangle.



- The square shows halves.



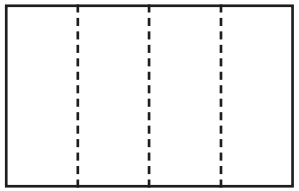
How can you change the square so that it shows quarters?

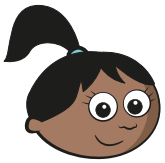
Is there more than one way?

Find a quarter of an object or a shape

Reasoning and problem solving

Sam splits a rectangle into quarters.





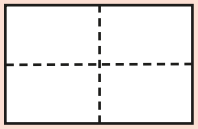
To split the rectangle into quarters, I have to draw three lines.

Do you agree with Sam?

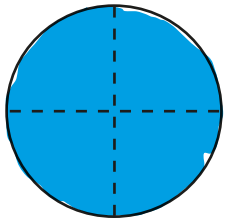
Explain your answer.

No

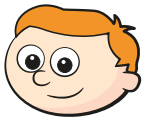
Sam could also draw two lines to split the rectangle into quarters



Ron wants to colour the circle to show a quarter.



There are four equal parts, so I have coloured a quarter.



No

Do you agree with Ron?

Explain your answer.

Recognise a quarter of a quantity

Notes and guidance

In this small step, children build on previous learning of finding a quarter of an object or shape and finding half of a quantity, and relate this to recognising a quarter of a quantity.

Using skills developed in the previous block on multiplication and division, children use their knowledge of how a number can be shared equally into four groups. To decide if a quarter has been found, encourage them firstly to check that there are four groups and then that there is an equal amount in each group. Emphasise that a quarter refers to just one of these groups. They will need to see this in lots of different contexts.

Children can also explore representing the whole when they are given a quarter. For example, if one quarter contains two counters, to show the whole they need to put two counters in each of the remaining three groups.

Things to look out for

- Children may only recognise a quarter as an object or shape split into four parts, rather than as a number or quantity.
- Children may not see that groups are equal if each group is arranged differently.

Key questions

- What is the total/whole?
- How can you find a quarter?
- How many parts do you need to find a quarter?
- How many _____ are there in each part?
- Is this still a quarter when I move the _____ around?
- How can you check that this is still a quarter?

Possible sentence stems

- There are _____ altogether.
  They are shared into _____ equal groups.
  Each group is a _____ of the whole.
  There are _____ in each group.
- I know this shows/does not show a quarter because ...

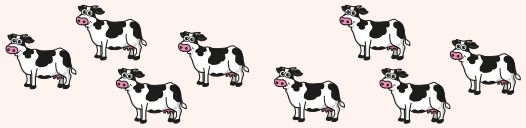
National Curriculum links

- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Recognise a quarter of a quantity

Key learning

Provide children with a range of small world creatures, for example farm or wild animals.



Set up different scenes: some showing the amount split into quarters and others showing it not split into quarters. Encourage children to explain why the scene shows quarters or not quarters, using the word "equal".

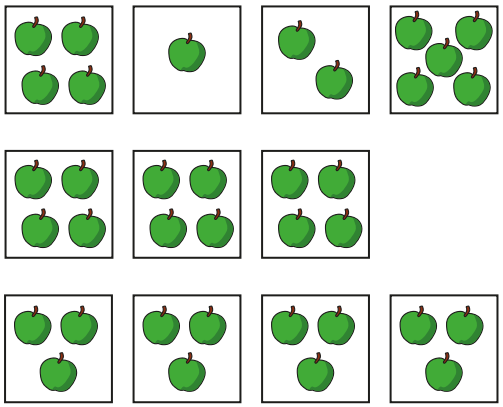
Go outside with a bag of balls and four hoops. Take out four balls.

Demonstrate sharing the balls between the four hoops. Check that each hoop has a quarter, explaining that there must be an equal number in each hoop.

Now take eight balls and share them unequally between the four hoops. Ask if this shows quarters.

Repeat with other examples and non-examples of showing a quarter of a quantity.

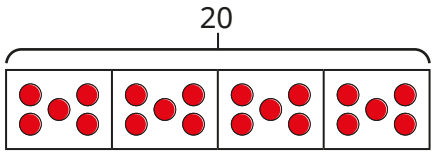
- Which row of pictures shows quarters?



- Complete the sentence.

A quarter of 12 is _____

- Complete the sentence.

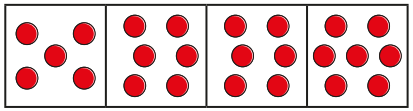


A quarter of 20 is _____

Recognise a quarter of a quantity

Reasoning and problem solving

Tiny is trying to find a quarter of 24

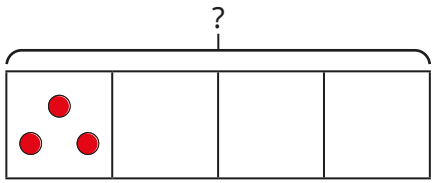


What mistake has Tiny made?

What should Tiny's bar model look like?

bar model with 4 parts and 6 counters in each part

Complete the bar model to work out the whole.

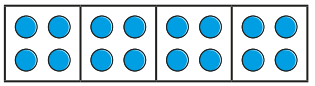


3 counters drawn in each part

The whole is 12

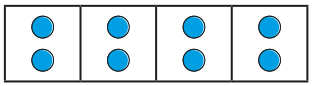
Match the statements to the bar models.

There are 4 apples in a box.
Half of the apples are red.
The rest are green.



There are 8 children in a classroom.
A quarter of the children are wearing glasses.

A quarter of the sweets in a bag are green.
There are 4 green sweets.



top to middle

middle to bottom

bottom to top

Find a quarter of a quantity

Notes and guidance

In this small step, children use all the learning from this block to explore finding a quarter of a quantity.

Children find a quarter of a quantity through their understanding of how to share a set of objects equally. Use of stem sentences supports their understanding that one quarter refers to one of the four equal groups. It is important that children use a wide range of manipulatives to show the groups clearly, drawing around quantities or physically sharing objects.

Encourage children to see the link between finding half of an amount and half again to find a quarter.

At this stage, children do not use the fractional notation of $\frac{1}{4}$

Things to look out for

- Children may not realise that each quarter is equal if objects are arranged differently within each group.
- Children may group objects into 4s rather than sharing them into four groups, which could lead to them giving an incorrect answer of 4

Key questions

- When you find a quarter, how many equal groups are there?
- How many _____ are there in each group?
  So what is a quarter of _____?
- If 3 is a quarter of the whole, how can you find the whole?
- If you know that half of 8 is 4, how can you use this to find a quarter of 8?

Possible sentence stems

- There are _____ altogether.
  To find a quarter, I need to share the total into _____ equal groups.
  There are _____ in each group.
  A quarter of _____ is _____
- If half of _____ is _____, then a quarter of _____ is _____

National Curriculum links

- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Find a quarter of a quantity

Key learning

Ask children to collect eight pebbles. Provide them with four small hoops and ask children to share their pebbles between the hoops. Discuss whether the groups are equal and how many pebbles are in each hoop. Then ask what a quarter of 8 is.

Repeat with other amounts. Are there some totals that could not be shared equally between four hoops?

On different tables, provide children with cut-out fish, where the total is always a multiple of 4, and four boxes to use as tanks.

Ask children to share the fish equally between the four tanks and complete the sentences.

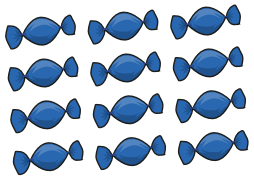
There are _____ fish in total.

There are _____ fish in each of the 4 tanks.

A quarter of _____ is _____

Repeat as they move around the different tables.

- Complete the sentences to find a quarter of each group.

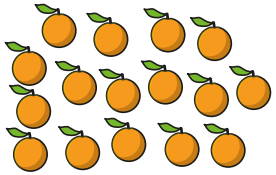


There are _____ sweets altogether.

They are shared into 4 equal groups.

There are _____ sweets in each group.

A quarter of _____ is _____



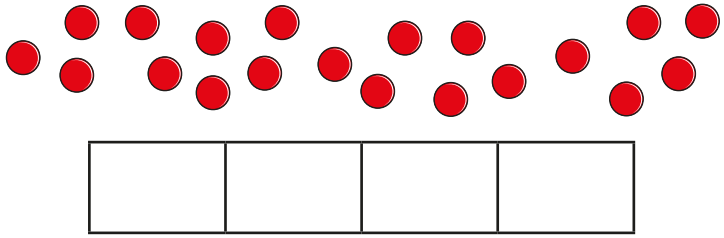
There are _____ oranges altogether.

They are shared into 4 equal groups.

There are _____ oranges in each group.

A quarter of _____ is _____

- Use the bar model to find a quarter of 20



- Tom has 24 stickers.

  He gives a quarter of his stickers to Ann.

  How many stickers does he give to Ann?

Find a quarter of a quantity

Reasoning and problem solving

A quarter of a number is 4

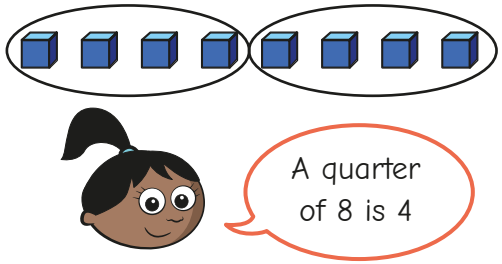
What is the whole?

Do you agree with Ron?

Explain your answer.

No

Sam is finding a quarter of 8



Do you agree with Sam?

Explain your answer.

No

Complete the sentences.

Half of 4 is _____

A quarter of 4 is _____

Half of 8 is _____

A quarter of 8 is _____

Half of 12 is _____

A quarter of 12 is _____

2, 1

4, 2

6, 3

6

What do you notice?

Half of a number is 12

What is a quarter of the number?