Summer
Scheme of learning
Year 2

White Rose MATHS

#MathsEveryoneCan

Summer Block 1

Fractions

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Small steps

Step 1	Introduction to parts and whole
Step 2	Equal and unequal parts
Step 3	Recognise a half
Step 4	Find a half
Step 5	Recognise a quarter
Step 6	Find a quarter
Step 7	Recognise a third
Step 8	Find a third

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Small steps

Step 9	Find the whole
Step 10	Unit fractions
Step 11	Non-unit fractions
Step 12	Recognise the equivalence of a half and two-quarters
Step 13	Recognise three-quarters
Step 14	Find three-quarters
Step 15	Count in fractions up to a whole

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Introduction to parts and whole

Notes and guidance

This small step is the first time that children encounter fractions this year. They begin by learning about parts and wholes.

Children are introduced to a variety of examples showing parts and wholes. It is important that they are secure in identifying the whole and parts of the whole. They can use everyday objects such as bicycles and flowers to identify the whole and parts of the whole. Using an interactive map is a good tool to identify the parts and whole, then zooming in to redefine the parts and whole before comparing.

Children should also consider how many ways they can identify parts and wholes from pictures. They should begin to consider if the part is a large or small part of the whole. This learning will be built upon over the block, as children identify equal parts and begin to formally recognise and find fractions.

Key questions

- What is a part? What is a whole?
- What is the difference between a "hole" and a "whole"?
- Which is larger, the part or the whole?
- If _____ is the whole, what could be part of the whole?
- Is this part a large or a small part of the whole? How do you know?
- How many parts of the whole can you find?

Possible sentence stems

- If the _____ is the whole, _____ is part of the whole.
- If _____ is the whole, _____ is not part of the whole.

Things to look out for

- Children may mix up a part and the whole.
- Children may not realise that a whole can be made up of many parts.

National Curriculum links

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity

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Introduction to parts and whole

Key learning



Tell children to make a simple model using bricks.
Ask them to identify the parts and the whole.

- Complete the sentence for each picture.







If the _____ is the whole, _____ is part of the whole.



As a class, use Google Earth to look at an image of Earth. Identify the whole, then identify different parts of the whole. Zoom in and redefine the whole. Ask children to name parts of the whole now.

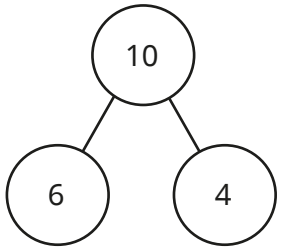
Continue zooming in and redefining the whole and parts of the whole.

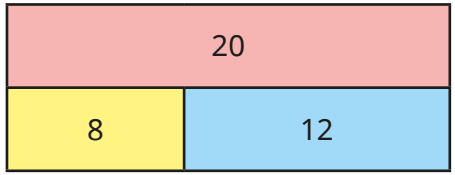
Discuss the relative sizes of the parts and the whole and whether they change as you zoom in.

- Look at each picture.

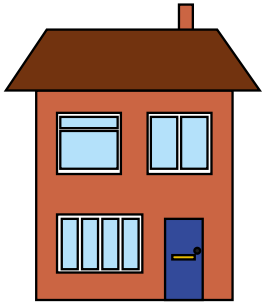
  What is the whole?

  What are the parts?





- Here is a picture.
  - What is the whole?
  - What is a part of the whole?
  - Find a large part of the whole.
  - Find a small part of the whole.



Complete the sentence.

If _____ is the whole, _____ is **not** part of the whole.

How many ways can you complete the sentence?

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Introduction to parts and whole

Reasoning and problem solving

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

Small things are always a part of a whole.

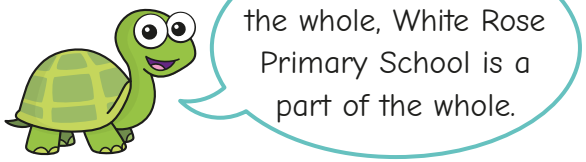
Big things are always a whole.

sometimes true

sometimes true

Discuss examples as a class.

Tiny is thinking about parts and wholes.



Explain Tiny's mistake.

Make up some statements about wholes and parts in your school.

Tiny has mixed up parts and wholes.

Here is a tower made of red, yellow and green cubes.



How many different ways can you describe the parts?

The _____ cubes are a small part of the whole.

The _____ cubes are a large part of the whole.

Build your own tower and describe the parts.

red or yellow

green

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Equal and unequal parts

Notes and guidance

In this small step, children explore equal and unequal parts.

It is important that children have a secure understanding of the whole and parts before moving on to this step. They will already have used many skills required for this step in the multiplication and division block when identifying equal and unequal groups, so it may be useful to recap this.

Children identify whether a shape has been split into equal or unequal parts. This is crucial learning, as it is used throughout the block to identify fractions. They first look at shapes where the equal parts look the same, but are then challenged to prove a shape has been split into equal parts where the parts do not look the same. At this stage, children do not need to describe the parts as fractions of the whole.

Things to look out for

- Children may not know what equal groups/parts mean.
- Children may know how to split a shape into equal parts, but may find it difficult to draw accurately.
- Children may think that all equal parts must be identical.
- Children may think that they can only make equal parts using straight lines.

Key questions

- What does "equal" mean? What does "unequal" mean?
- Which picture shows equal groups? How is this similar to equal parts?
- How do you know that the shape has been split into equal parts?
- How could you split the shape into equal parts?
- Is there more than one way to show equal parts? How do you know?
- Do equal parts always need to look the same?
- Is it possible to make equal parts using curved lines?

Possible sentence stems

- There are _____ equal parts.
- I know the shape has been split into equal/unequal parts because ...

National Curriculum links

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity

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Equal and unequal parts

Key learning

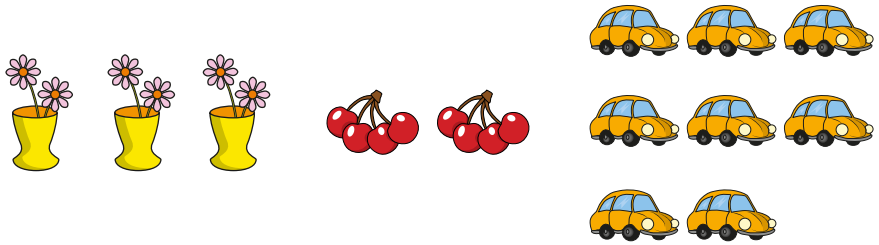


As a class, create definitions of equal and unequal.

Ask children to draw examples of things that are equal and things that are unequal.

- Which pictures show equal groups?

  Which picture shows an unequal group?

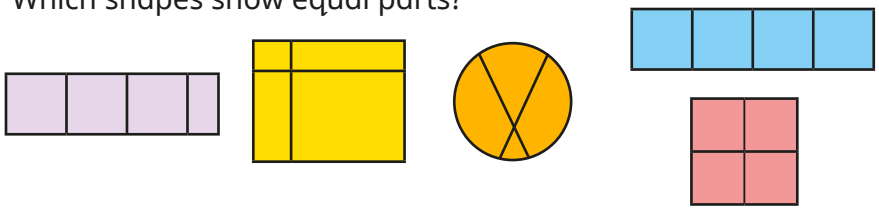




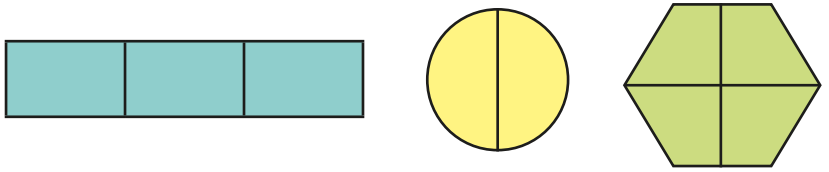
Give children a paper shape. Ask them to cut it into four parts and then put it back together again. What do they notice? Are the parts equal or unequal?

Compare shapes as a class and challenge children to sort shapes into those that have equal or unequal parts.

- Which shapes show equal parts?



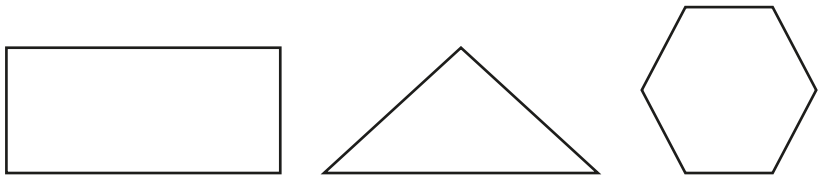
- Complete the sentence for each shape.



There are _____ equal parts.

How can you tell that they are equal parts?

- Split the shapes so that they show equal parts.



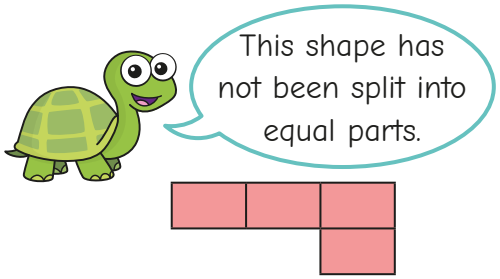
Split the shapes so that they show unequal parts.

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Equal and unequal parts

Reasoning and problem solving

Tiny is finding equal and unequal parts.

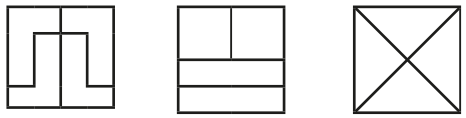


Do you agree with Tiny?

Explain your answer.

No

Ben, Tom and Fay each split a square into parts.



Who has split the square into equal parts?

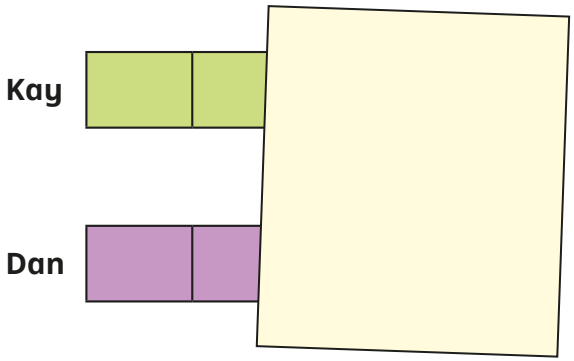
Explain your answer.

They have all split the square into equal parts.

Kay and Dan each have a strip of paper.

Kay splits her paper into four equal parts.

Dan splits his paper into two equal parts.



Whose strip of paper is longer?

How do you know?

Kay's

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Recognise a half

Notes and guidance

Children now begin to focus on specific fractions, starting with a half.

Children were taught this in Year 1 and may be familiar with the word or concept of a half from everyday life. It could be useful to discuss this and identify any misconceptions, such as "the bigger half". Once confident with their understanding of a half, they are introduced to the formal notation for fractions for the first time, in this case $\frac{1}{2}$. It is important to spend time considering what each digit represents to support understanding, not only in this step, but for understanding of fractions moving forwards. Children are also introduced to the terms "numerator" and "denominator" for the first time.

Children need to identify half of a shape, but they should also look at length and sets of objects. In the next step, they will work out half of a number.

Things to look out for

- Children may not recognise that the halves must be equal.
- Children may think that it is impossible to represent $\frac{1}{2}$ when there are more than two parts.
- Children may mix up the numerator and denominator.

Key questions

- What is a half?
- When have you used the word "half" before?
- How do you know that a half is shaded?
- Has the shape been split into equal parts? How do you know?
- How many equal parts is the shape split into?
- How else can you write one half? What does each number represent?
- What does the fraction bar represent?

Possible sentence stems

- The whole has been split into _____ equal parts.

  Each part is worth one _____

  This can be written as $\frac{\square}{\square}$

National Curriculum links

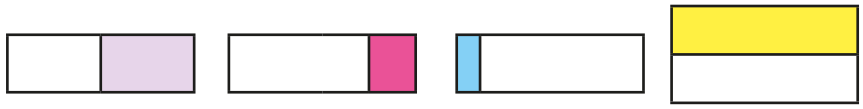
- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity

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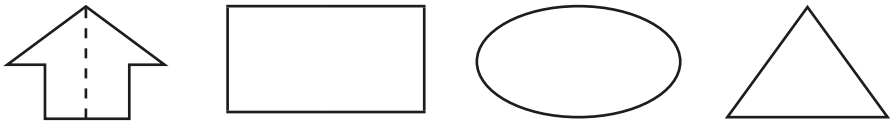
Recognise a half

Key learning

- Which shapes show a half?



- Colour half of each shape.



Is there more than one way to show a half?



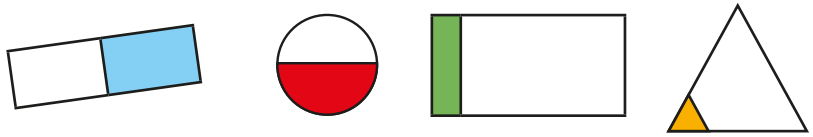
Discuss how Kay remembers how to write $\frac{1}{2}$

	The whole has been divided	Write the fraction bar.	—
	into 2 equal parts.	Write the denominator.	2
	1 part is shaded.	Write the numerator.	1

What do children notice?

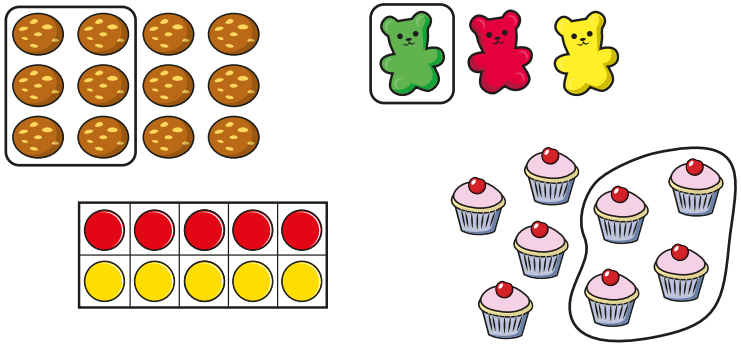
What does each number represent?

- Which pictures show $\frac{1}{2}$?

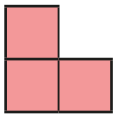


How could you change the other pictures so that they show $\frac{1}{2}$?

- Which pictures show $\frac{1}{2}$?



- Here is $\frac{1}{2}$ of a shape.



What could the whole shape be?

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Recognise a half

Reasoning and problem solving

Jo tries to write one half.

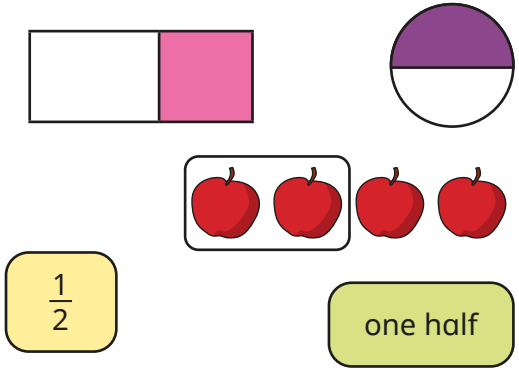
$\frac{2}{1}$

Do you agree with Jo?

Explain your answer.

No

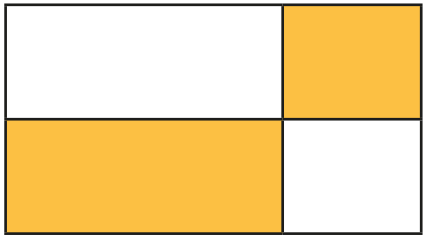
Which is the odd one out?

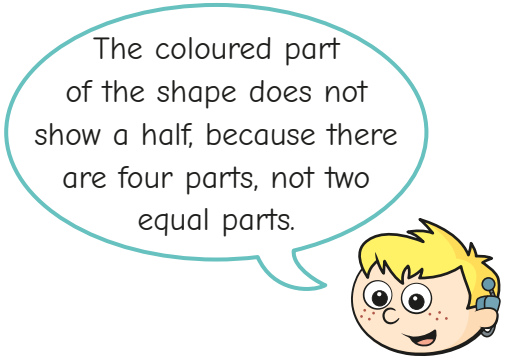


Explain your answer.

rectangle

Max is finding half of a shape.





Do you agree with Max?

Explain your answer.

No

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Find a half

Notes and guidance

In this small step, children use their understanding of $\frac{1}{2}$ to find half of a quantity.

This step should focus on using concrete resources and pictorial representations to support understanding. It may also be useful to recap division skills. Children could start by sharing bean bags or counters into two equal groups. Guide them to make the link that when they find $\frac{1}{2}$ of a number, they need to divide the number by 2, the denominator of the fraction. Children could also use related facts to help them find $\frac{1}{2}$ of greater numbers, for example using $\frac{1}{2}$ of 4 to work out $\frac{1}{2}$ of 40

Things to look out for

- Children may need support splitting objects into two equal groups if they cannot physically share them.
- Children may not make the link between finding $\frac{1}{2}$ and dividing by 2
- Children may not understand why they cannot find $\frac{1}{2}$ of an odd number using counters.

Key questions

- What is a half?
- How can you find half of the number?
- How can you use counters/bar models to help you?
- How is finding half of a number similar to dividing by 2? Why?
- Why can you not split an odd number of counters into two equal groups?
- If you know half of 6, how can you find half of 60?

Possible sentence stems

- The objects have been shared equally between _____ groups.
  There are _____ in each group.
  $\frac{1}{2}$ of _____ is equal to _____
- To find half of a number, I need to divide the number by _____

National Curriculum links

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- Write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$

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Find a half

Key learning

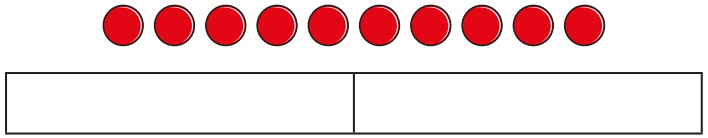


As a class, share 20 bean bags equally between two containers. Then complete the sentences.

The whole is _____ Half of _____ is _____

Repeat with other even numbers of bean bags.

- Share 10 counters between the two groups.



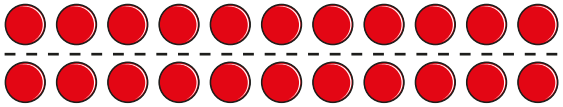
Complete the sentences.

The counters have been shared equally between _____ groups.

There are _____ in each group.

$\frac{1}{2}$ of 10 is equal to _____

- Ann uses an array to find $\frac{1}{2}$ of 22



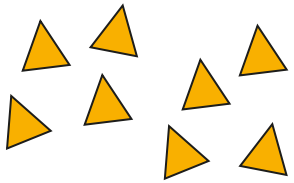
$\frac{1}{2}$ of 22 is equal to 11

Use Ann's method to find $\frac{1}{2}$ of each number.

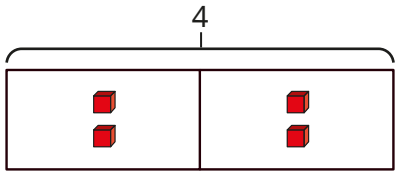
- 12
- 18
- 24

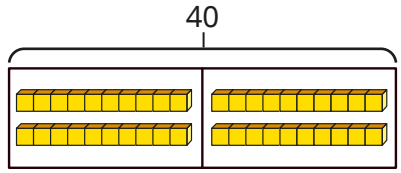
- Find $\frac{1}{2}$ of each set of objects.





- Use base 10 and bar models to work out the calculations.





- $\frac{1}{2}$ of 4 = _____ $\frac{1}{2}$ of 40 = _____
- $\frac{1}{2}$ of 6 = _____ $\frac{1}{2}$ of 60 = _____
- $\frac{1}{2}$ of 8 = _____ $\frac{1}{2}$ of 80 = _____

What do you notice?

- Dan is running a 100 m race.

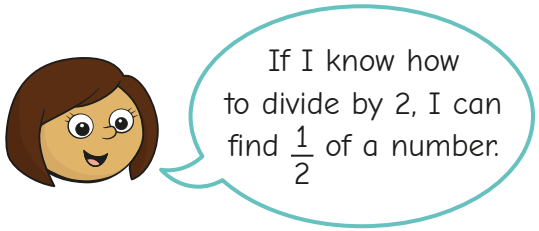
How far will he have run when he has completed $\frac{1}{2}$ of the race?

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Find a half

Reasoning and problem solving

Kim is finding $\frac{1}{2}$ of different numbers.

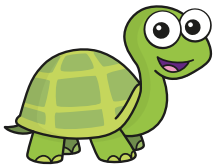


Do you agree with Kim?

Explain your answer.

Yes

Tiny is finding $\frac{1}{2}$ of 10



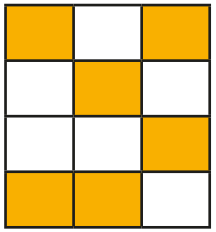
$\frac{1}{2}$ of 10 = 8

Explain Tiny's mistake.

Tiny has subtracted 2 from 10, instead of dividing 10 by 2

Ben is asked to colour half of a shape.

This is his answer.



Is Ben correct?

Explain your answer.

Yes

Fay is thinking of a number.

Half of her number is more than 10 but less than 15

What could her number be?

How many answers can you find?

22, 24, 26, 28

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Recognise a quarter

Notes and guidance

Building on their learning in Year 1, children spend the next two steps deepening their understanding of a quarter. In this small step, they recognise a quarter, focusing mainly on shapes but also considering length and sets of objects.

Children should be able to identify if a shape has been split into equal parts and if each part represents a quarter. They can compare the written notation for $\frac{1}{2}$ and $\frac{1}{4}$ and identify what the digits represent.

Children should see $\frac{1}{4}$ represented in multiple ways and not be limited to just standard examples. They may also begin to compare $\frac{1}{2}$ and $\frac{1}{4}$ in relation to the same object or amount and think about which is greater.

Things to look out for

- Children may think that they must colour the "first" box, not recognising that all parts are worth $\frac{1}{4}$
- Children may think that $\frac{1}{4}$ should be represented by one part shaded/selected and four parts unshaded/unselected.

Key questions

- What is a quarter?
- How do you know that a quarter is shown?
- Has the shape been split into equal parts?
- What is the denominator? How do you know?
- How is the denominator of $\frac{1}{4}$ different from the denominator of $\frac{1}{2}$? Why?
- Does it matter which part you colour/circle?
- What does each digit in the fraction represent? What does the fraction bar represent?

Possible sentence stems

- The whole has been split into _____ equal parts.

  One of the _____ equal parts is called a _____

  This can be written as $\frac{\square}{\square}$

National Curriculum links

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity

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Recognise a quarter

Key learning

- Use a rectangular piece of paper.
  - Fold the piece of paper in half.

    What fraction is shown?
  - Fold the piece of paper in half again.

    How many equal parts do you have now?

    What fraction can you see?

- Which shapes show a quarter?





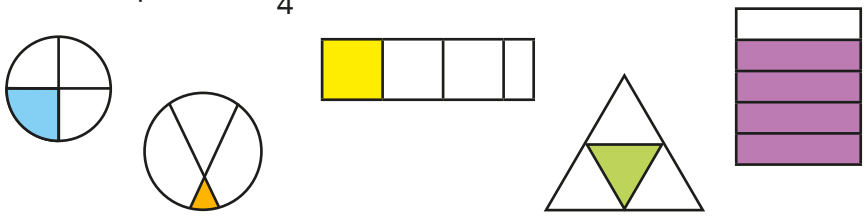
Discuss how Tom remembers how to write $\frac{1}{4}$

	The circle has been divided	Write the fraction bar.	–
	into 4 equal parts.	Write the denominator.	$\frac{}{4}$
	1 part is shaded.	Write the numerator.	$\frac{1}{4}$

What do children notice?

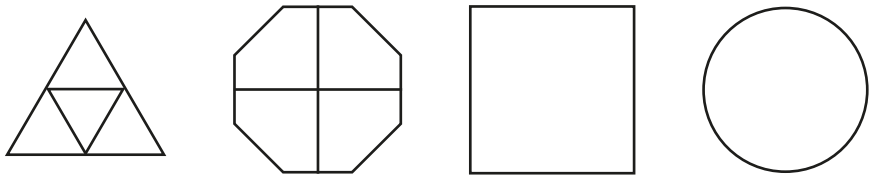
What does each number represent?

- Which shapes show $\frac{1}{4}$?



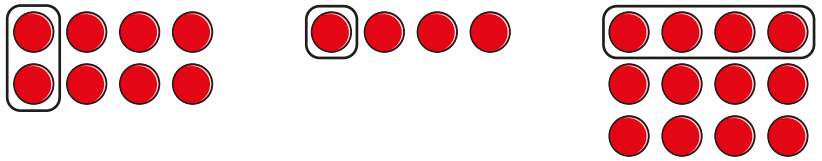
Explain why the others do not show $\frac{1}{4}$

- Colour $\frac{1}{4}$ of each shape.



Is there more than one way to colour $\frac{1}{4}$?

- Which pictures show $\frac{1}{4}$?

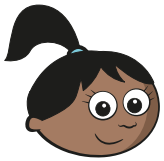


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Recognise a quarter

Reasoning and problem solving

Sam folds two identical paper strips.



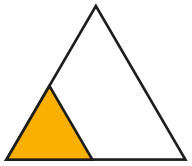
I think that $\frac{1}{4}$ of one strip will be greater than $\frac{1}{2}$ of the other strip, because 4 is greater than 2

Do you agree with Sam?

Explain your answer.

No

Here is a triangle with a fraction shaded.



Is the statement true or false?

$\frac{1}{4}$ of the shape is shaded.

Explain your answer.

True

Ron draws a bar model to show $\frac{1}{4}$



Do you agree with Ron?

Explain your answer.

No

Here is $\frac{1}{4}$ of a shape.



What could the whole shape be?

Compare answers as a class.

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Find a quarter

Notes and guidance

In this small step, children use their understanding of a quarter to find $\frac{1}{4}$ of an amount.

As with Step 4, the focus here should be on using concrete and pictorial resources to support understanding. One of the difficulties with this step is that children are not yet familiar with dividing by 4, so modelling of sharing into four equal groups will be required. They could also approach finding a quarter by recognising that it is half of a half or divide by 2 twice. Encourage children to attempt both strategies and decide which they find more efficient.

Things to look out for

- Children may find it difficult to split pictures into four equal groups.
- Children may not recognise the relationship between finding $\frac{1}{2}$ and $\frac{1}{4}$ of a number.
- Children may confuse finding a quarter of a set of objects with finding four of the objects.

Key questions

- How do you find half of a number? How do you find a quarter of a number? What is the same? What is different?
- How can you use counters/bar models to help?
- How many equal groups do you need to make?
- How many ways can you find a quarter?
- How many quarters are there in a half?
- If you know half of an amount, how can you find a quarter?

Possible sentence stems

- The objects have been shared equally between _____ groups.

  There are _____ in each group.

  $\frac{1}{4}$ of _____ is equal to _____

National Curriculum links

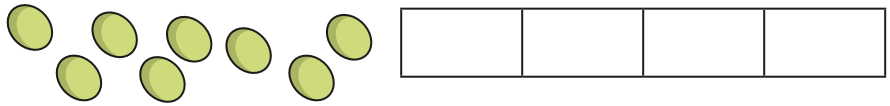
- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- Write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$

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Find a quarter

Key learning

- Use the bar model to help share the 8 grapes equally between four people.

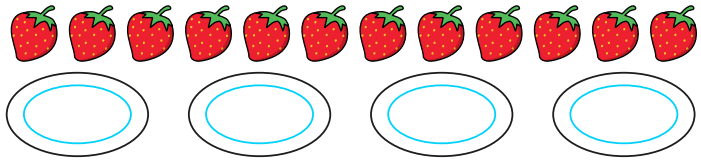


The grapes are split into _____ equal parts.

Each part is worth a _____

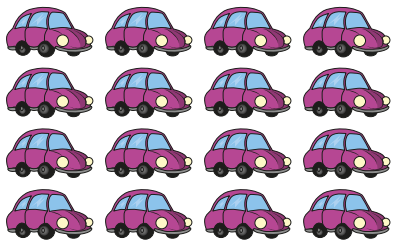
$\frac{1}{4}$ of 8 is equal to _____

- Share the 12 strawberries into four equal groups.



$\frac{1}{4}$ of 12 = _____

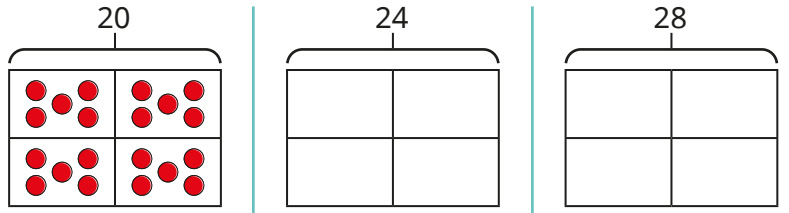
- Circle $\frac{1}{4}$ of the cars.



One quarter of _____ is _____

_____ is $\frac{1}{4}$ of _____

- Use bar models to find $\frac{1}{4}$ of each number.



$\frac{1}{4}$ of 20 = _____ $\frac{1}{4}$ of 24 = _____ $\frac{1}{4}$ of 28 = _____

What do you notice?

- Complete the number sentences.

$\frac{1}{2}$ of 8 = _____	$\frac{1}{4}$ of 8 = _____
$\frac{1}{2}$ of 16 = _____	$\frac{1}{4}$ of 16 = _____
$\frac{1}{2}$ of 20 = _____	$\frac{1}{4}$ of 20 = _____

What do you notice?

- Kay knows that half of 44 is 22

How can Kay use this fact to work out $\frac{1}{4}$ of 44?

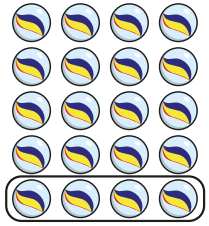
What is $\frac{1}{4}$ of 44?

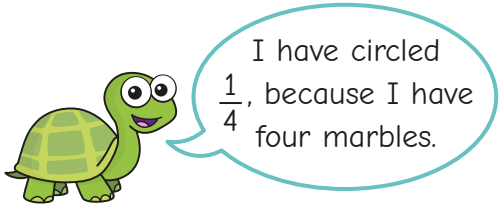
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Find a quarter

Reasoning and problem solving

Tiny is finding a quarter.





Do you agree with Tiny?

Explain your answer.

No

Jo has $\frac{1}{4}$ of £40

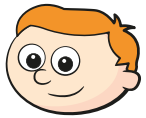
Max has $\frac{1}{2}$ of £20

Who has the most money?

They have the same amount.

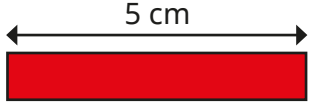
Ron has two ribbons.

He cuts $\frac{1}{4}$ from each ribbon.

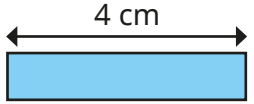


Here are the pieces of ribbon that Ron has cut.

$\frac{1}{4}$ of ribbon A



$\frac{1}{4}$ of ribbon B



How long were Ron's whole pieces of ribbon?

Which ribbon was longer?

How much longer was it?

A 20 cm

B 16 cm

A

4 cm longer

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Recognise a third

Notes and guidance

In this small step, children are introduced to the fraction $\frac{1}{3}$ for the first time.

It is important that time is taken to consider what is the same and what is different about $\frac{1}{3}$ and the other fractions children have learnt. They should recognise that 1 is still the numerator (the importance of which will be covered in more detail in Step 10), but the denominator is 3, so the whole is split into three equal parts. Again, children should consider what each digit represents in the written notation to support understanding.

Children identify a third of a shape, a length and a set of objects and need to consider if they have been split into three equal parts. At this stage, they could also begin to compare $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$ to support and deepen understanding.

Things to look out for

- Children may think that a shape split into three unequal parts shows $\frac{1}{3}$
- Children may think that they can only find $\frac{1}{3}$ when they have exactly three parts.

Key questions

- Has the shape been split into equal parts?
- How many equal parts has the shape been split into?
- What is a third? How is it similar to a half and a quarter? How is it different?
- What does the numerator/denominator represent?
- How can you show $\frac{1}{3}$?
- Why do these shapes not show $\frac{1}{3}$?

Possible sentence stems

- The whole has been split into _____ equal parts.

  Each part is worth a _____

  This is the same as $\frac{\square}{\square}$

National Curriculum links

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity

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Recognise a third

Key learning

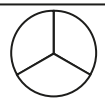
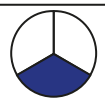
- Which circle shows a third?



Explain why the other circles do not show a third.



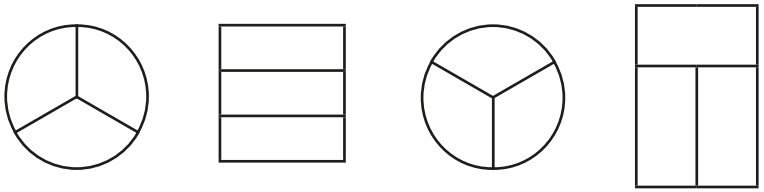
Discuss how Fay remembers how to write $\frac{1}{3}$

	The circle has been divided	Write the fraction bar.	–
	into 3 equal parts.	Write the denominator.	3
	1 part is shaded	Write the numerator.	1

What do children notice?

What does each number represent?

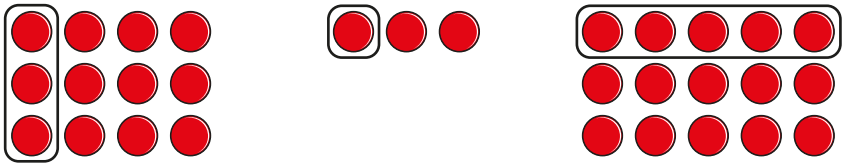
- Colour $\frac{1}{3}$ of each shape.



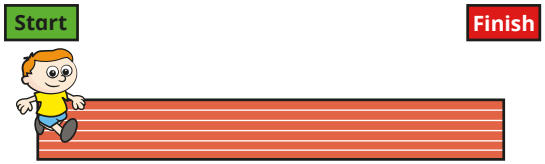
Compare answers with a partner.

Do your shapes look the same?

- Which pictures show $\frac{1}{3}$?



- Estimate where Ron will be when he has run $\frac{1}{3}$ of the race.



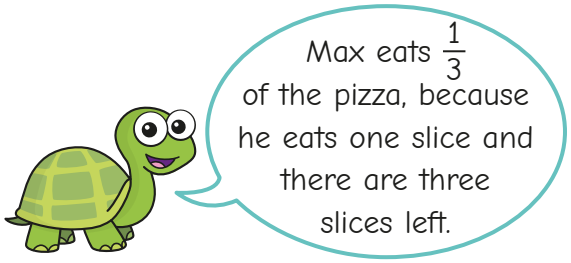
Which is easiest to estimate, $\frac{1}{2}$, $\frac{1}{4}$ or $\frac{1}{3}$? Why?

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Recognise a third

Reasoning and problem solving

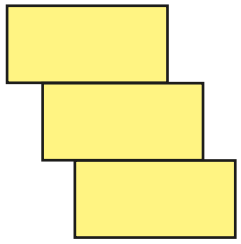
Max is eating pizza.



Do you agree with Tiny?

Explain your answer.

No



Has the shape been split into thirds?

Explain your answer.

Yes

Tom, Sam and Ben each show a piece of ribbon.

Tom shows $\frac{1}{2}$ of his whole ribbon.



Sam shows $\frac{1}{4}$ of her whole ribbon.



Ben shows $\frac{1}{3}$ of his whole ribbon.



Whose whole piece of ribbon is the longest?

Whose is the shortest?

Explain your answers.

Sam's

Tom's

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Find a third

Notes and guidance

In this small step, children use their understanding of a third to find $\frac{1}{3}$ of an amount.

As with previous steps, the focus should be on the use of concrete and pictorial representations to support understanding alongside the abstract calculations. Children should use their understanding of the denominator to realise that they need to share the objects into three equal groups and eventually understand that they need to divide by 3

Children begin to think about the similarities and differences between finding $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ of a number. They may recognise that finding $\frac{1}{3}$ of a number will result in a greater amount than $\frac{1}{4}$, but a smaller amount than $\frac{1}{2}$

Things to look out for

- Children may think that they can use $\frac{1}{2}$ of a number to find $\frac{1}{3}$ of the number, as they could when finding $\frac{1}{4}$ of a number.
- Children may think that a third of a number is always 3

Key questions

- How do you find $\frac{1}{2}$/$\frac{1}{4}$ of a number? How do you find $\frac{1}{3}$ of a number? What is the same? What is different?
- How can you use counters/bar models to help?
- How many equal groups do you need to make?
- Why do you need to make three equal groups?
- Is $\frac{1}{3}$ greater than or less than $\frac{1}{2}$/$\frac{1}{4}$? Why?

Possible sentence stems

- The whole has been split into _____ equal groups.
  There are _____ in each group.
  $\frac{1}{3}$ of _____ is equal to _____

National Curriculum links

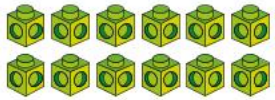
- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- Write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$

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Find a third

Key learning

- Use the cubes to make three equal groups.





There are _____ cubes altogether.

A third of _____ is _____

$\frac{\square}{\square}$ of _____ is _____

- Kay, Jo and Ron share six sweets equally.

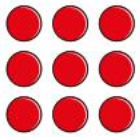
Draw circles to show how they share them.



The whole has been split into _____ equal groups.

There are _____ in each group. $\frac{1}{3}$ of 6 = _____

- Circle $\frac{1}{3}$ of the counters.



$\frac{1}{3}$ of 9 = _____

Is there more than one way to circle $\frac{1}{3}$?

Why? Will this always work?

- Find $\frac{1}{3}$ of each set of objects.



$\frac{1}{3}$ of 15 = _____



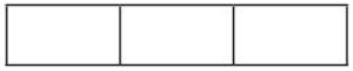
$\frac{1}{3}$ of 18 = _____



$\frac{1}{3}$ of 21 = _____

What do you notice about your answers?

- Use bar models to help you complete the number sentences.

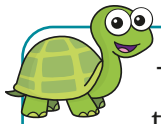


- $\frac{1}{3}$ of 30 = _____
- $\frac{1}{3}$ of 27 = _____
- $\frac{1}{3}$ of 33 = _____
- $\frac{1}{3}$ of 36 = _____

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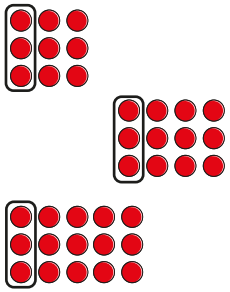
Find a third

Reasoning and problem solving



Tiny uses counters to find a third of some numbers.

Here are Tiny's workings.



$\frac{1}{3}$ of 9 = 3

$\frac{1}{3}$ of 12 = 3

$\frac{1}{3}$ of 15 = 3

Explain Tiny's mistake.

Work out the correct answers.

3

4

5

Tom is thinking of a number.

$\frac{1}{3}$ of his number is greater than 8, but less than 12

What could Tom's number be?

27, 30, 33

Dan, Max and Ann each have a fraction of £12

- Dan has $\frac{1}{2}$ of £12
- Max has $\frac{1}{4}$ of £12
- Ann has $\frac{1}{3}$ of £12

Who has the most money?

Who has the least money?

Explain your answer.

Dan

Max

Kim has a piece of ribbon.



She cuts it into three equal parts.

$\frac{1}{3}$ of the ribbon is 6 cm long.

How long is $\frac{1}{2}$ of the ribbon?

9 cm

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Find the whole

Notes and guidance

In this small step, children use the skills that they have learnt in previous steps to use a fraction of an amount to find the whole. Although this has been explored briefly in previous steps, children now formalise this understanding and start to make comparisons between fractions.

Children may find this difficult to visualise at first, so encourage them to use diagrams and practical resources to ensure accuracy and understanding. Bar models are particularly useful. Encourage children to identify the part and to use the fact that all the parts must be equal to find the whole.

Give children opportunities to use this skill in a range of contexts, including length.

Things to look out for

- Children may find a fraction of the given amount rather than finding the whole.
- Children may not be able to visualise the whole without drawing a diagram.
- Children may know what one part of the diagram should be, but be unsure of the other parts.

Key questions

- Do you know a part or the whole?
- How many equal parts are there?
- If there are _____ in one of the parts, how many need to be in the other parts?
- How can you find the whole?
- If you know what $\frac{1}{2}$ / $\frac{1}{3}$ / $\frac{1}{4}$ is, how can you find the whole?

Possible sentence stems

- The whole has been split into _____ equal parts.
  One part is _____, so the other parts must also be _____
  The whole is _____

National Curriculum links

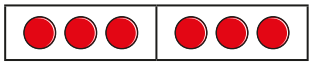
- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- Write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$

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Find the whole

Key learning

- Use the bar model to help you complete the sentences.

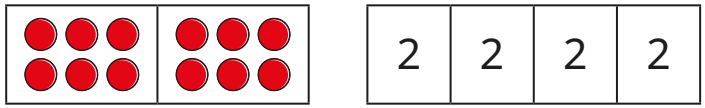


  - $\frac{1}{2}$ of 6 = _____
  - $\frac{1}{2}$ of _____ = 3

  What do you notice?

  Which did you find easier to work out?

- Complete the sentences for each bar model.

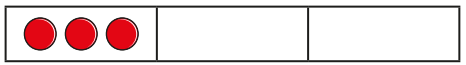


  The whole has been split into _____ equal parts.

  One part is _____, so the other part(s) must be _____

  The whole is _____

- Complete the bar model to find the whole.



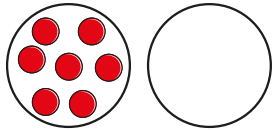
  $\frac{1}{3}$ of _____ = 3

  Use this method to find each whole.

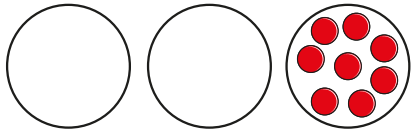
  - $\frac{1}{3}$ of _____ = 6
  - $\frac{1}{2}$ of _____ = 6
  - $\frac{1}{4}$ of _____ = 6

- Find the whole for each picture.

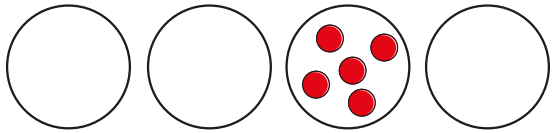
  Here is $\frac{1}{2}$ of a number.



  Here is $\frac{1}{3}$ of a number.



  Here is $\frac{1}{4}$ of a number.



- Find the wholes.

  - $\frac{1}{2}$ of _____ = 5
  - $\frac{1}{3}$ of _____ = 5
  - $\frac{1}{4}$ of _____ = 5
  - $\frac{1}{2}$ of _____ = 10
  - $\frac{1}{3}$ of _____ = 10
  - $\frac{1}{4}$ of _____ = 10

  What patterns can you spot?

- Kay has run 20 m in a race.

  She is $\frac{1}{4}$ of the way through the race.

  How long is the race?

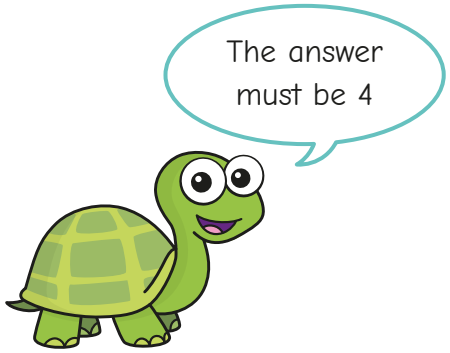
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Find the whole

Reasoning and problem solving

Tiny is trying to find the whole.

$\frac{1}{2}$ of $\square$ = 8



Do you agree with Tiny?

Explain your answer.

No

Which is the greatest total amount of money?

A $\frac{1}{4}$ of _____ = £7

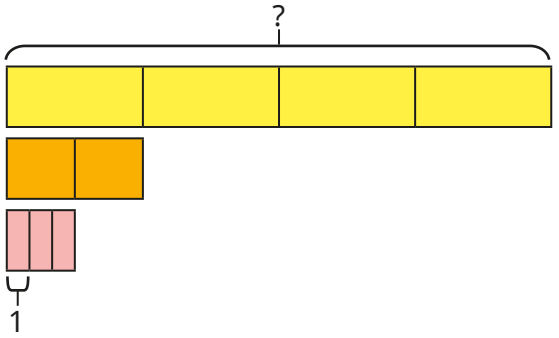
B $\frac{1}{2}$ of _____ = £7

C $\frac{1}{3}$ of _____ = £7

Did you need to work out each whole to decide?

A

Work out the missing number.



24

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Unit fractions

Notes and guidance

In this small step, children bring together the learning so far in this block to understand the concept of unit fractions. They are already familiar with the fractions $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$ and will now use the term "unit fraction" to describe them.

Children should recognise that a unit fraction is one in which the whole has been split into equal parts and one of those parts is shaded or highlighted. They should consider how unit fractions are written in fraction notation, and this will clarify the role of the numerator and denominator. They can begin to generalise that a unit fraction is any fraction with a numerator of 1

Children begin by looking at unit fractions where one equal part of a shape or object is shaded/circled, before exploring unit fractions of a set of objects.

Things to look out for

- Children may think that a unit fraction is always represented by the first box or top left box being shaded.
- Children may struggle to see how a unit fraction can also apply to a set of objects rather than a single object.

Key questions

- What is the same and what is different about the fractions $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$?
- What is a unit fraction?
- What do all unit fractions have in common?
- Has the shape been split into equal parts? How many parts are shaded?
- How can you colour this shape to show a unit fraction?
- Is it possible to show a unit fraction if more than one object is circled?

Possible sentence stems

- There are _____ equal parts.

  There is _____ part shaded.

  $\frac{\square}{\square}$ is shaded.

  This is a _____ fraction.

National Curriculum links

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity

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Unit fractions

Key learning

- Complete the sentences for each bar model.



There are _____ equal parts.

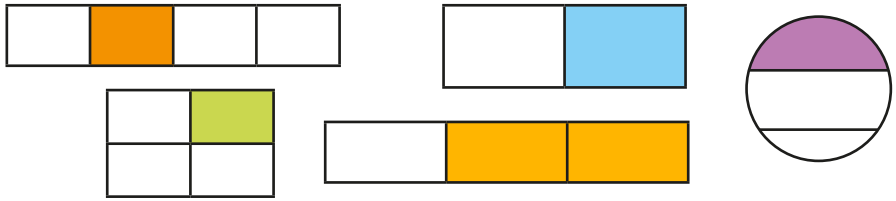
There is _____ part shaded.

$\frac{\square}{\square}$ is shaded.

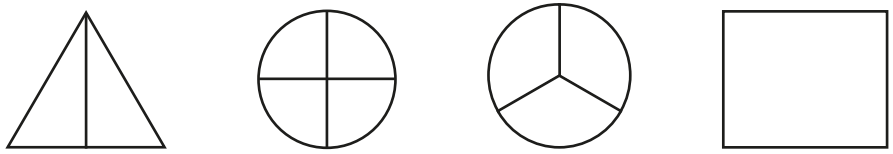
What is the same and what is different about the bar models?

- A unit fraction is always one equal part of a whole.

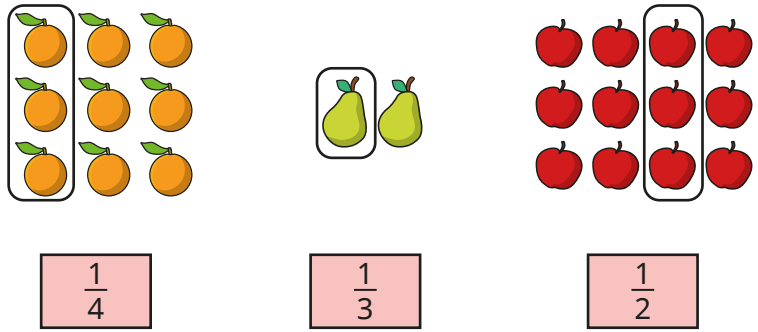
Which shapes show unit fractions?



- Colour the shapes so that they show unit fractions.



- Match the pictures to the unit fractions.



- What fractions are shown?

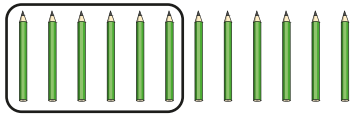


Which fraction is the greatest?

Which fraction is the smallest?

What do you notice about their denominators?

- Ron has circled some pencils to show a unit fraction.



What unit fraction has Ron shown?

What other unit fractions could you show using Ron's pencils?

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Unit fractions

Reasoning and problem solving

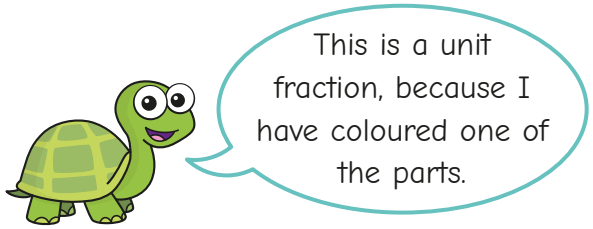
Is the statement always true, sometimes true or never true?

> To show a unit fraction, you need to colour one part.

Explain your answer.

sometimes true

Tiny shows a unit fraction.

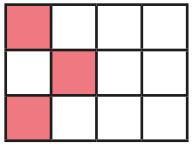


Do you agree with Tiny?

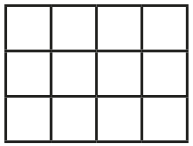
Explain your answer.

No

This shows $\frac{1}{4}$



Colour some squares to show $\frac{1}{3}$



Is there more than one answer?

any four squares coloured

Fay thinks of a number.

$\frac{1}{3}$ of her number is 8

Which will be greater, $\frac{1}{2}$ or $\frac{1}{4}$ of Fay's number?

Explain your answer.

$\frac{1}{2}$

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Non-unit fractions

Notes and guidance

In this small step, children learn about non-unit fractions.

Reference should be made to the previous step, and unit fractions should be constantly used within questioning to ensure that children can differentiate between the two types of fraction. They recognise that a non-unit fraction is a fraction where the numerator is greater than 1. They identify $\frac{2}{3}$, $\frac{2}{4}$ and $\frac{3}{4}$ and also begin to look at fractions equivalent to 1 whole.
It may be useful to identify non-unit fractions as an amount of unit fractions, for example $\frac{2}{3}$ = 2 lots of $\frac{1}{3}$

Children begin to compare unit and non-unit fractions by using diagrams or contexts and are introduced to the concept of equivalence through fractions that are equivalent to a whole.

Things to look out for

- Children may not realise that $\frac{3}{4}$ is made up of 3 lots of $\frac{1}{4}$
- Children may not recognise when a fraction is equal to 1 whole.
- Children may not recognise the equivalence of $\frac{2}{2}$, $\frac{3}{3}$, $\frac{4}{4}$

Key questions

- What is a unit fraction? What is a non-unit fraction?
- What is the difference between a unit fraction and a non-unit fraction?
- How many _____s are there in _____? (for example, $\frac{1}{4}$s in $\frac{3}{4}$)
  How many _____s are there in 1 whole?
- How can you tell if this fraction is the same as 1 whole?
- Will a unit fraction always be smaller than a non-unit fraction? Why?

Possible sentence stems

- There are _____ equal parts.

  There are _____ parts shaded.

  $\frac{\square}{\square}$ is shaded.
- The numerator is greater than _____, so this is a _____ fraction.

National Curriculum links

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity

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Non-unit fractions

Key learning

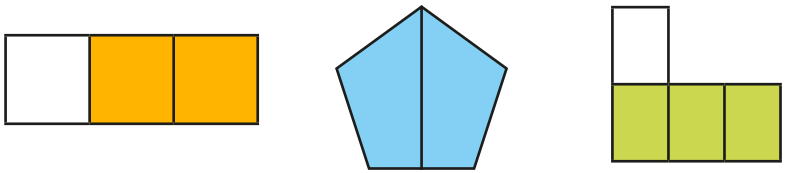
- Here are two bar models showing fractions.



What is the same? What is different?

Which bar model shows a unit fraction? How do you know?

- Complete the sentences for each picture.



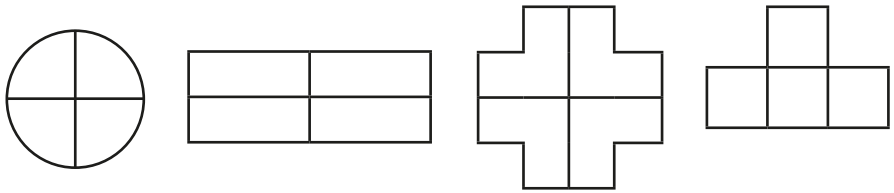
There are _____ equal parts.

There are _____ parts shaded.

$\frac{\square}{\square}$ is shaded.

Are these unit fractions or non-unit fractions?

- Shade a non-unit fraction of each shape.



- Sort the fractions into unit fractions and non-unit fractions.

$\frac{1}{2}$ $\frac{2}{3}$ $\frac{1}{4}$ $\frac{2}{4}$ $\frac{1}{3}$ $\frac{3}{4}$

- Dan labels each part to help find the fractions.



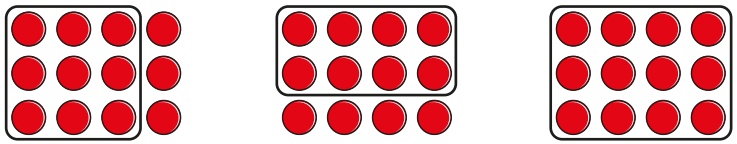
$\frac{1}{3}$ 2 lots of $\frac{1}{3} = \frac{2}{3}$ 3 lots of $\frac{1}{3} = \frac{3}{3}$

Use Dan's method to find the fractions.



What do you notice?

- Match the pictures to the non-unit fractions.



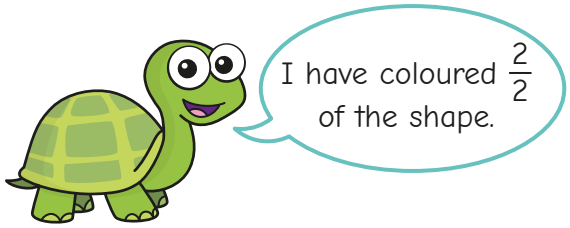
$\frac{2}{3}$ $\frac{4}{4}$ $\frac{3}{4}$

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Non-unit fractions

Reasoning and problem solving

Tiny is colouring non-unit fractions.



Do you agree with Tiny?

Explain your answer.

No

Which is greater, $\frac{1}{4}$ or $\frac{3}{4}$?

Explain your answer.

$\frac{3}{4}$

Sort the fractions into the table.

$\frac{3}{4}$ $\frac{2}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{2}{3}$ $\frac{4}{4}$ $\frac{3}{3}$ $\frac{1}{2}$

	Fractions equal to 1 whole	Fractions less than 1 whole
Unit fractions		
Non-unit fractions		

What do you notice?

Are any boxes in the table empty?

Can you add another fraction to each part of the table?

top right: $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{2}$

bottom left: $\frac{2}{2}$, $\frac{4}{4}$, $\frac{3}{3}$

bottom right: $\frac{3}{4}$, $\frac{2}{3}$

top left: $\frac{1}{1}$

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Recognise the equivalence of a half and two-quarters

Notes and guidance

Children may have thought about equivalence in the previous step, but they now look in detail at $\frac{1}{2}$ and $\frac{2}{4}$ and recognise their equivalence. It is important to discuss the language of equivalence.

Children need to approach this step with practical and pictorial resources to support understanding. When finding a fraction of a shape, they should see that $\frac{1}{2}$ and $\frac{2}{4}$ take up the same amount of space, as long as the wholes are equal in size.

Although finding non-unit fractions of amounts has not been covered yet, this may be explored with support as another way to show the equivalence between $\frac{1}{2}$ and $\frac{2}{4}$

Things to look out for

- Children may find the word "equivalent" difficult.
- Children may not realise that they can use $\frac{1}{2}$ and $\frac{2}{4}$ interchangeably to suit the question.
- If diagrams are not equal in size, children may not be able to see that $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent.

Key questions

- What does "equivalent" mean?
- What do you notice when you colour $\frac{1}{2}$ and $\frac{2}{4}$ of the same shape?
- How can you show that $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent?
- Why do you think some people might think that $\frac{1}{2}$ and $\frac{2}{4}$ are not equivalent?
- How can you colour $\frac{2}{4}$ of a shape if you cannot easily split it into four equal parts?

Possible sentence stems

- $\frac{1}{2}$ is _____ to $\frac{2}{4}$
- $\frac{1}{2} = \frac{\square}{4}$ $\qquad \frac{1}{\square} = \frac{2}{4}$

National Curriculum links

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- Write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$

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Recognise the equivalence of a half and two-quarters

Key learning

- Take two identical strips of paper.

  Fold one strip into two equal pieces.

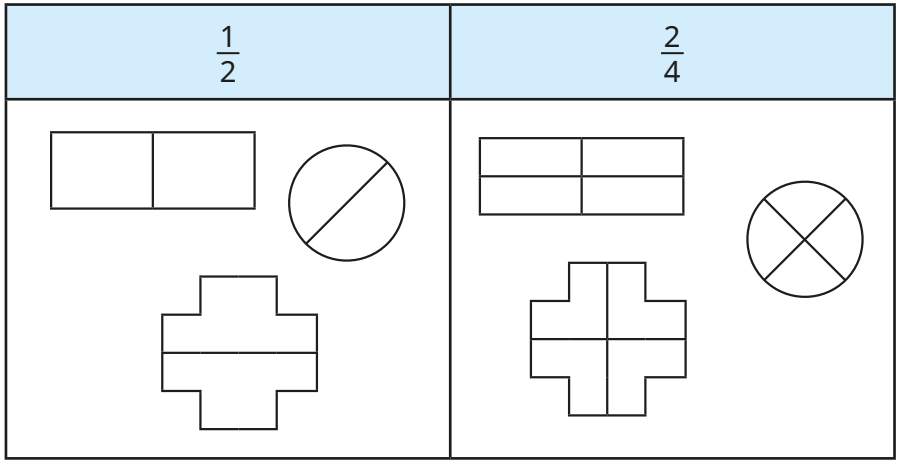
  Fold the other strip into four equal pieces.



  Compare one of the two equal pieces with two of the four equal pieces.

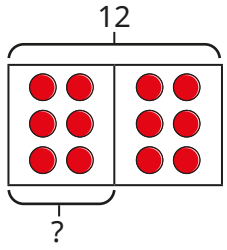
  What do you notice?

- Colour $\frac{1}{2}$ and $\frac{2}{4}$ of each shape.

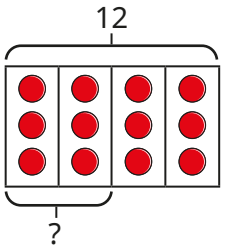


  What do you notice about the coloured parts of similar shapes?

- Use the bar models to find $\frac{1}{2}$ of 12 and $\frac{2}{4}$ of 12



$\frac{1}{2}$ of 12 = _____

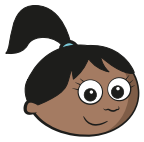


$\frac{2}{4}$ of 12 = _____

  Complete the sentence.

  $\frac{\square}{\square}$ of 12 is equal to $\frac{\square}{\square}$ of 12

- Sam and Max are finding $\frac{2}{4}$ of 20 sweets.



I will split my sweets into four equal groups. Then I will count two of the groups.



I will split my sweets into two equal groups. Then I will count one group.

  Why does each method work?

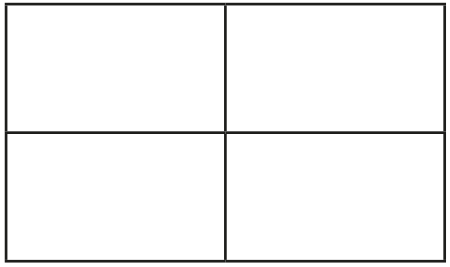
  Choose one of the methods to find $\frac{2}{4}$ of 20

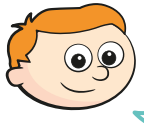
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Recognise the equivalence of a half and two-quarters

Reasoning and problem solving

Ron wants to colour $\frac{1}{2}$ of the shape.



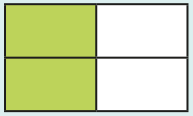


I cannot colour half because the shape has not been split into two parts.

Explain why Ron can colour $\frac{1}{2}$

Colour half of the shape.

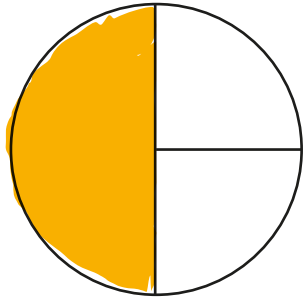
multiple possible answers, e.g.



Jo colours part of a shape.

I have coloured $\frac{1}{3}$ of my shape.





What mistake has Jo made?

What fraction has she coloured?

$\frac{1}{2}$ or $\frac{2}{4}$

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Recognise three-quarters

Notes and guidance

Children have already begun to explore non-unit fractions in the last two steps, and in this small step they focus on recognising $\frac{3}{4}$

Children first look at $\frac{1}{4}$ and $\frac{3}{4}$ and identify the relationship between them, recognising that $\frac{3}{4}$ is made up of 3 lots of $\frac{1}{4}$. They should also be able to identify that $\frac{3}{4}$ represents the whole being split into four equal parts and having three of the equal parts.

Children recognise and represent $\frac{3}{4}$ in a variety of ways, including with shapes, length and sets of objects. They should also be able to recognise $\frac{3}{4}$ when there are more than four equal parts (for example, a set of 20 pencils), using sharing to support this.

Things to look out for

- Children may mix up the role of the numerator and the denominator.
- Children may find it more difficult to recognise $\frac{3}{4}$ when looking at a set of objects, rather than just part of a shape.
- Children may need support to identify the relationship between $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$

Key questions

- How are $\frac{1}{4}$ and $\frac{3}{4}$ similar? How are they different?
- How many quarters are there in three-quarters?
- How can you show three-quarters of this shape?
- How can you show $\frac{3}{4}$ if there are more than four equal parts?
- How do you know that this does not show three-quarters? What would you change?
- Is $\frac{3}{4}$ always greater than $\frac{1}{4}$?

Possible sentence stems

- There are _____ equal parts.

  _____ of the equal parts are shaded.

  This can be written as $\frac{\square}{\square}$
- There are _____ lots of $\frac{1}{4}$ in $\frac{3}{4}$

National Curriculum links

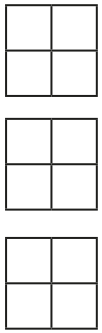
- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity

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Recognise three-quarters

Key learning

- Colour the shapes to match the sentences.
  - There are four equal parts.
    One of the parts is shaded.
  - There are four equal parts.
    Two of the parts are shaded.
  - There are four equal parts.
    Three of the parts are shaded.



Write each of these as a fraction.

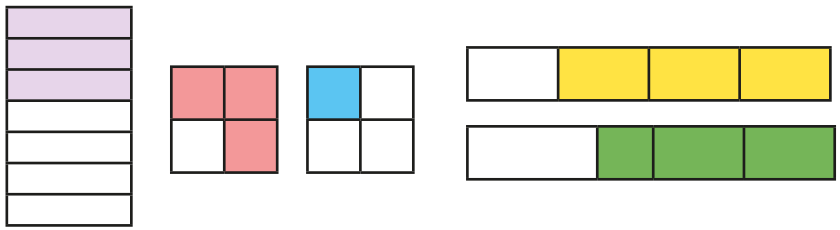
- Here is a fraction.

$\frac{3}{4}$

What does the 3 represent?

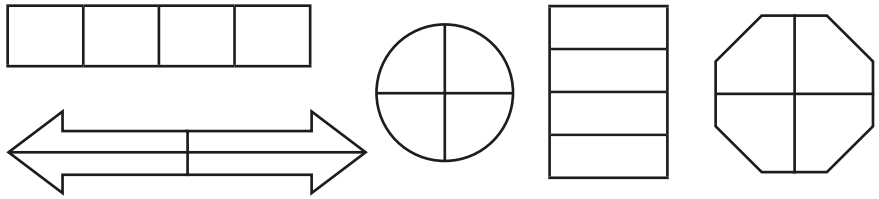
What does the 4 represent?

- Which shapes show $\frac{3}{4}$?

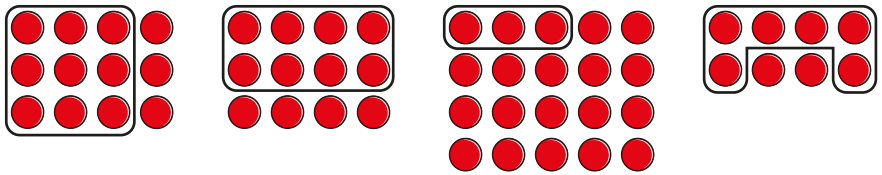


Explain why some of the shapes do **not** show $\frac{3}{4}$

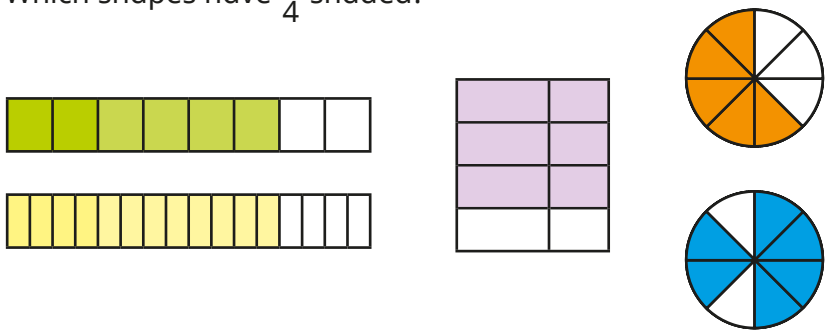
- Colour the shapes to show $\frac{3}{4}$



- Which pictures show $\frac{3}{4}$?



- Which shapes have $\frac{3}{4}$ shaded?



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Recognise three-quarters

Reasoning and problem solving

Tiny is learning about $\frac{3}{4}$



Is Tiny correct?

Explain your answer.

sometimes correct

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

$\frac{3}{4}$ is greater than $\frac{1}{4}$

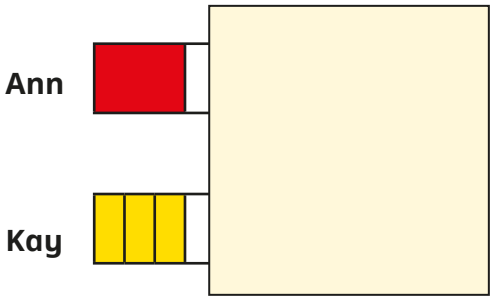
Explain your answer.

sometimes true

Ann and Kay each have a piece of ribbon.

Part of each ribbon is hidden.

- $\frac{1}{4}$ of Ann's ribbon is shown.
- $\frac{3}{4}$ of Kay's ribbon is shown.



Who has the longer piece of ribbon?

How do you know?

Draw estimates of the full ribbons.

Ann

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Find three-quarters

Notes and guidance

In this small step, children find three-quarters of a set of objects or a number.

Children may find this step challenging, as it can involve dividing by 4 and will generally involve more than one step. Use concrete and pictorial resources to support understanding and develop confidence. Some children may need to use these resources throughout the step.

Children start by finding $\frac{1}{4}$ of a set of objects, then explore and discuss methods to find $\frac{3}{4}$. They could consider the suitability and efficiency of these methods. Guide children to identify patterns when finding $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ and $\frac{4}{4}$ of a number. Encourage them to consider which is greater, $\frac{1}{2}$ or $\frac{3}{4}$ of the same number.

Things to look out for

- Children may find it difficult to split pictures into four equal parts.
- Children may find $\frac{1}{4}$ rather than $\frac{3}{4}$
- Children may think that $\frac{3}{4}$ of a number is always 3

Key questions

- How do you find $\frac{1}{4}$ of a number? How could you use this to find $\frac{3}{4}$ of a number?
- How can you use counters/bar models to help?
- How many equal groups do you need to make?
- How many of the equal groups do you need to count to find $\frac{3}{4}$?
- How many ways can you find $\frac{3}{4}$?
- If you know $\frac{1}{4}$ of a number, how can you find $\frac{3}{4}$ of the number?

Possible sentence stems

- The whole is _____

  $\frac{1}{4}$ of _____ is _____

  $\frac{3}{4}$ of _____ is _____

National Curriculum links

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- Write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$

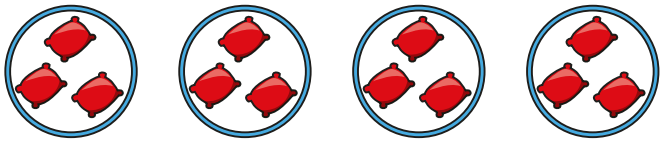
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Find three-quarters

Key learning

- Dan shares 12 bean bags into 4 equal groups.

  Use the picture to complete the sentences.



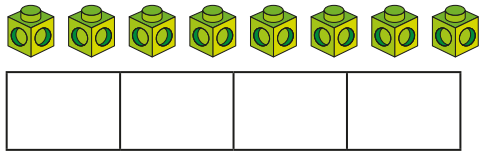
  One-quarter of 12 is equal to _____

  Two-quarters of 12 is equal to _____

  Three-quarters of 12 is equal to _____

  Four-quarters of 12 is equal to _____

- There are 8 cubes.
  - Use the bar model to share the cubes into 4 equal groups.



  - Complete the sentences.

    There are _____ in each group.

    To find $\frac{3}{4}$ I need to count _____ groups.

    $\frac{3}{4}$ of 8 is _____

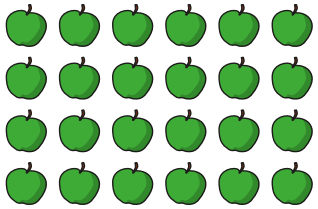
  - Use the same method to help you find $\frac{3}{4}$ of 16 and $\frac{3}{4}$ of 20

- Circle $\frac{1}{4}$ of the marbles. Use a different colour to circle $\frac{3}{4}$

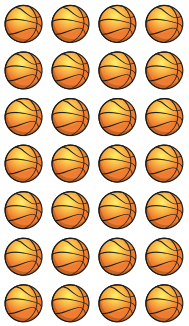


  What is the same? What is different?

- Circle $\frac{3}{4}$ of each set of objects.



$\frac{3}{4}$ of 24 = _____



$\frac{3}{4}$ of 28 = _____

- Use counters, cubes or bar models to help you find the fractions.
  - $\frac{1}{4}$ of 32 = _____
  - $\frac{2}{4}$ of 32 = _____
  - $\frac{3}{4}$ of 32 = _____
  - $\frac{4}{4}$ of 32 = _____
  - $\frac{1}{4}$ of 36 = _____
  - $\frac{2}{4}$ of 36 = _____
  - $\frac{3}{4}$ of 36 = _____
  - $\frac{4}{4}$ of 36 = _____
  - $\frac{1}{4}$ of 40 = _____
  - $\frac{2}{4}$ of 40 = _____
  - $\frac{3}{4}$ of 40 = _____
  - $\frac{4}{4}$ of 40 = _____

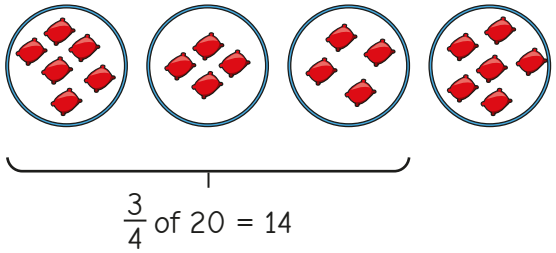
  What do you notice?

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Find three-quarters

Reasoning and problem solving

Tiny uses bean bags and hoops to find $\frac{3}{4}$ of 20



What mistake has Tiny made?

What is the correct answer?

15

Write <, > or = to compare the amounts.

$\frac{3}{4}$ of 40 ◯ $\frac{1}{4}$ of 40

$\frac{1}{2}$ of 32 ◯ $\frac{3}{4}$ of 32

>

<

Tom eats three-quarters of his sweets.

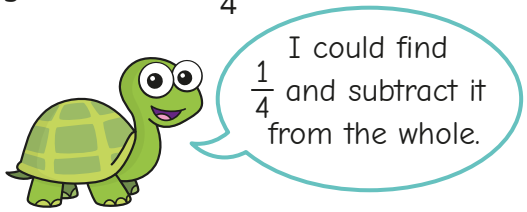
He eats these sweets.



How many sweets does Tom have left?

2

Tiny wants to find $\frac{3}{4}$ of 40



Do you agree with Tiny?

Explain your answer.

Find $\frac{3}{4}$ of 40

Yes

30

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Count in fractions up to a whole

Notes and guidance

In this small step, children use their knowledge of unit fractions and non-unit fractions to count in fractions up to a whole, focusing on halves, thirds and quarters. This step is pictorially based and does not include number lines, which will be introduced in Year 3

Encourage children to recognise and represent fractions, as well as spotting patterns when counting. They should come to realise that the numerator increases, but the denominator stays the same. They should also be aware of examples in which a fraction is equivalent to 1 whole.

Children do not need to count beyond 1 at this stage, but it may be useful to discuss that fractions do not stop at 1 whole.

Things to look out for

- Children may increase the denominator instead of the numerator (for example, $\frac{1}{3}$, $\frac{1}{4}$ ...) or increase both (for example, $\frac{1}{3}$, $\frac{2}{4}$ ...).
- Children may not recognise fractions that are equivalent to 1 whole.
- Children may think that it is impossible to count beyond $\frac{4}{4}$, for example.

Key questions

- What comes next in the pattern?
- How many parts do you need to colour for the next fraction in the pattern?
- What comes after $\frac{\square}{\square}$?
- What do you notice happens to the numerator?
  What happens to the denominator?
- How do you know when a fraction is equivalent to 1 whole?
- How is counting in fractions similar to counting in ones?
  How is it different?

Possible sentence stems

- $\frac{\square}{\square}$ comes after $\frac{\square}{\square}$
- $\frac{\square}{\square}$ is equivalent to 1 whole.

National Curriculum links

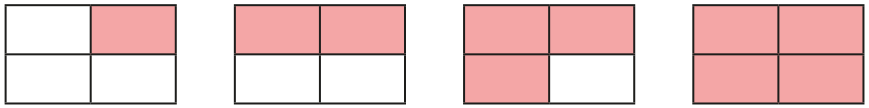
- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity

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Count in fractions up to a whole

Key learning

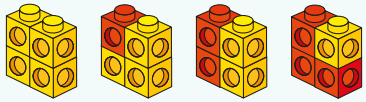
- What fractions are shown?



What do you notice?



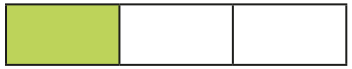
Show children this pattern and ask what the next lot of cubes will look like.



Ask children to write the fraction of red cubes in each picture. Can they tell you what the first picture represents?

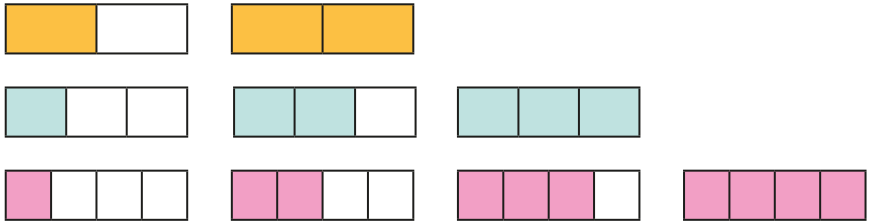
Now ask them to write the fraction of yellow cubes. What is the same? What is different?

- Jo colours part of a shape.



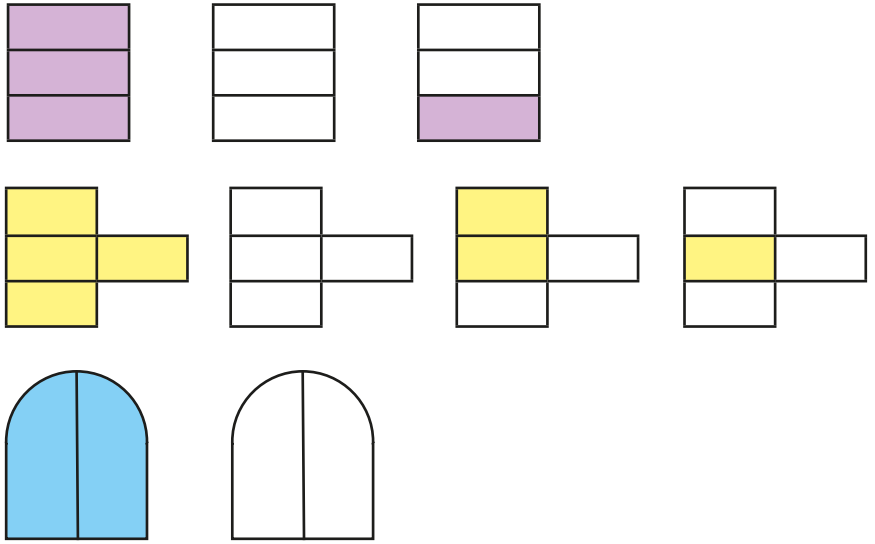
  - What fraction has Jo shown?
  - Colour another part of the shape. What fraction is shown now?
  - Colour another part of the shape. What fraction is shown now?

- Use the bar models to count in fractions up to 1 whole.



Compare the patterns. What do you notice?

- Colour the blank pictures and write the fractions to count back from 1 whole.

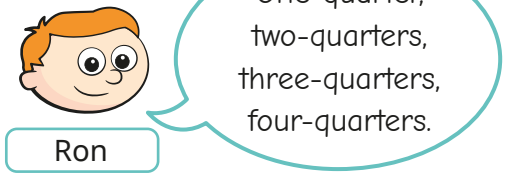


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Count in fractions up to a whole

Reasoning and problem solving

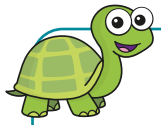
Ron and Kim are counting in quarters.



Who is correct?

Explain your answer.

Both children are correct.



Tiny is trying to count in thirds.

$\frac{1}{3}, \frac{2}{4}, \frac{3}{5}$

What mistake has Tiny made?

Tiny has added 1 to the denominator as well as the numerator.

Max is counting in fractions.



Is there more than one fraction that Max could say next?

Explain your answer.

Yes

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Summer Block 2

Time

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Small steps

Step 1	O'clock and half past
Step 2	Quarter past and quarter to
Step 3	Tell the time past the hour
Step 4	Tell the time to the hour
Step 5	Tell the time to 5 minutes
Step 6	Minutes in an hour
Step 7	Hours in a day

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O’clock and half past

Notes and guidance

In Year 1, children learnt to tell the time to the hour and half past the hour. That learning is revisited in this small step.

Begin by discussing time, finding out what children already know and can remember from Year 1. Recap the two hands of the clock, starting with the minute hand on 12 and the hour hand moving around the clock, showing the different times on the hour. Provide children with clocks and ask them to show a given time, before making a time for a partner to read. Move on to half past the hour, showing the minute hand at 6 and the hour hand halfway between two numbers. Ensure that children know that the time will be half past the last number the hour hand has moved past.

Things to look out for

- Children may keep the hour hand pointing directly at a number for half past an hour, instead of halfway between two numbers.
- Children may confuse the minute and hour hands.
- Children may not use analogue clocks outside school, so this representation may be unfamiliar to them.

Key questions

- Which is the hour hand? Which is the minute hand?
- What is the same and what is different about the hands on a clock?
- What does each hand on a clock show?
- At _____ o’clock, where should the hour/minute hand be?
- What time is shown?
- Where does the hour/minute hand need to be for half past _____?

Possible sentence stems

- When the minute hand points at _____ (12/6), it means that the time is _____ (o’clock/half past).
- The time is _____ o’clock.
- The time is half past _____

National Curriculum links

- Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clockface to show these times

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O’clock and half past

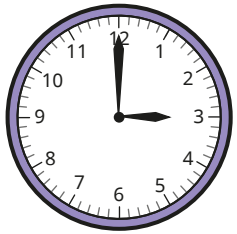
Key learning



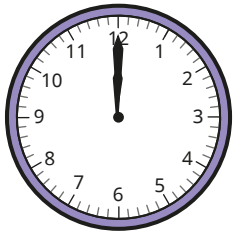
Model telling the time to the hour and half past the hour on a large clock.

Make sure that children see that at half past the hour, the hour hand is halfway between two numbers. Move on to giving the children a time for them to show on clocks.

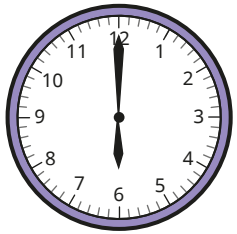
- Write the times shown on the clocks.



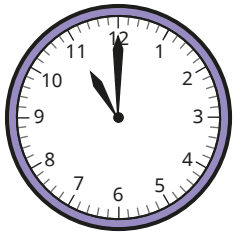
_____ o’clock



_____ o’clock



_____ o’clock



_____ o’clock

- What times are shown on the clocks?



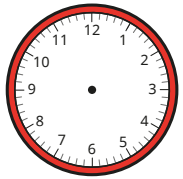




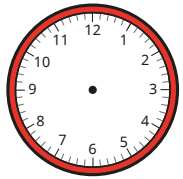


- Complete the sentences.
  - At 5 o’clock, the hour hand points to _____ and the minute hand points to _____
  - At half past 11, the hour hand points between _____ and _____ and the minute hand points to _____

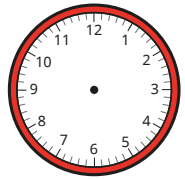
- Draw hands on the clocks to show the times.



3 o’clock



half past 5



half past 12

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O'clock and half past

Reasoning and problem solving



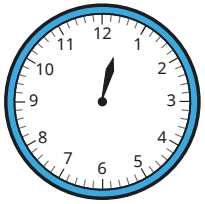
It is half past 11, so the hour hand should point to 11

Is Tiny correct?

Explain your answer.

No

The minute hand has fallen off the classroom clock.



Lunchtime is at 12:00

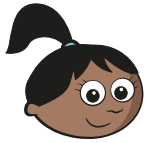
Are the children late for lunch?

Explain your answer.

Yes

Sam, Max and Jo are telling the time.





Sam

The time is half past 6

The time is half past 3



Max



Jo

The time is half past 2

Who is correct?

What mistakes have the other children made?

Jo

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Quarter past and quarter to

Notes and guidance

In this small step, the learning from the previous step is extended to include quarter past and quarter to the hour. This is the first time that children have seen the terms "quarter to" and "quarter past", although they should be familiar with quarters from work on fractions.

Model the four quarters on a clock. Children may see the connection between half past and two quarters past, and it is worth discussing this link. While children will be familiar with the term "past" from the previous step, the term "to" in relation to time is new. Spend some time modelling where the minute hand goes for quarter past and quarter to, as well as where the hour hand needs to be at these times.

Children then read and create times for themselves.

Things to look out for

- Children may confuse "quarter past" and "quarter to".
- Children may keep the hour hand pointing directly at a number for quarter past/to an hour, instead of placing it partway between two numbers.
- Children may confuse the minute and hour hands.

Key questions

- How many quarters are there in one whole?
- How could you show a quarter on a clock?
- What does each hand on a clock represent?
- The minute hand is pointing at 3/9. What do you know about the time?
- Where does the minute hand point for quarter past/to _____?
- What is the same about quarter past _____ and quarter to _____? What is different?

Possible sentence stems

- The time shown is quarter past/to _____
- At quarter past/to _____, the minute hand is pointing to _____ and the hour hand is between the _____ and the _____

National Curriculum links

- Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clockface to show these times

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Quarter past and quarter to

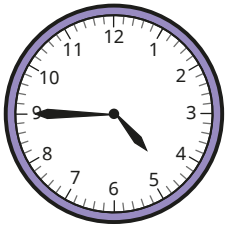
Key learning



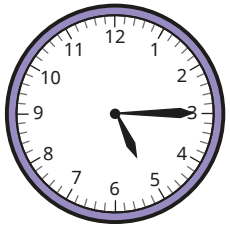
Model telling the times quarter past and quarter to the hour on a large clock.

Discuss where the hour hand should be in each case. Move on to giving children a time to show on clocks.

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

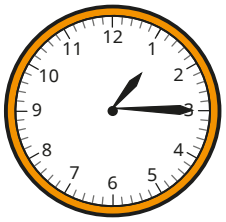


quarter to 5

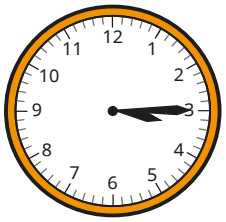


quarter past 5

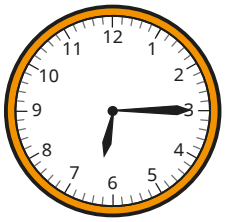
- Match the clocks to the times.



quarter past 3

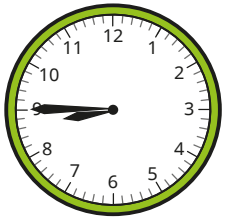


quarter past 6

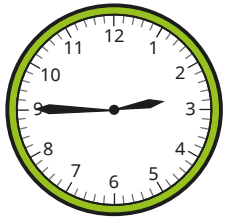


quarter past 1

- Match the clocks to the times.



quarter to 3



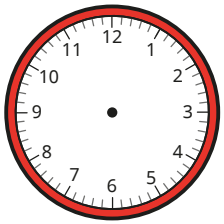
quarter to 9



quarter to 12

- Complete the sentences.
  - At quarter past 7, the hour hand points to less than halfway between _____ and _____
    The minute hand points to _____
  - At quarter to 5, the hour hand points to over halfway between _____ and _____
    The minute hand points to _____

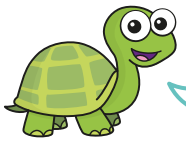
- Draw hands on a clock to show the times.
  - quarter to 9
  - quarter past 11
  - quarter to 11



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Quarter past and quarter to

Reasoning and problem solving



The time is quarter past 2, so the hour hand is closer to the 2 than to the 3

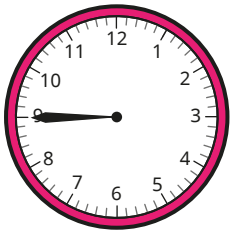
Is Tiny correct?

Explain your answer.

Yes

The hour hand has fallen off the clock.

It was pointing closer to an even number than an odd number.



What time could it be?

quarter to any even number of hours, e.g. quarter to 4

How many quarters of an hour are there between quarter past 7 and quarter to 9?

How did you work it out?

6

Put the times in order, from earliest to latest.

quarter past 7



half past 7

quarter past 7

half past 7

quarter to 8 (clock)

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Tell the time past the hour

Notes and guidance

Children have already seen the term "past" the hour in relation to half past and quarter past. In this small step, that learning is extended to include intervals of 5 minutes past the hour.

Remind children that there are 60 minutes in an hour, and show that each of the twelve sections of a clock corresponds to a 5-minute interval. Use a large clock and model moving the minute hand around the clock to show 5 minutes, 10 minutes and so on, up to 30 minutes. Then discuss how to read times using the hour hand as well, for example 5 past 9, 10 past 9, quarter past 9 and so on. Children then read and create times for themselves.

Times to the next hour will be covered in the next step.

Things to look out for

- Children may say the number that the minute hand is pointing to, for example "1 minute past" instead of "5 minutes past".
- The break in the pattern going from "5 minutes past" and "10 minutes past" to "quarter past" rather than "15 minutes past" may cause confusion.

Key questions

- How many minutes are there in an hour?
- How many numbers are shown on the clock?
- How many minutes are there between each number shown on the clock? How do you know?
- What does each hand on a clock represent?
- If the minute hand is on _____, how many minutes past the hour is it?
- How else do we say "15/30 minutes past" an hour?
- When does the minute hand stop being "past the hour"?

Possible sentence stems

- When the minute hand is pointing to _____, it is _____ minutes past the hour.
- The time shown is _____ minutes past _____

National Curriculum links

- Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clockface to show these times

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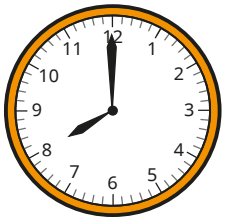
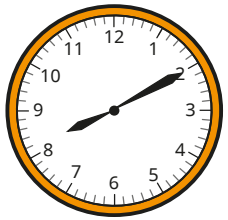
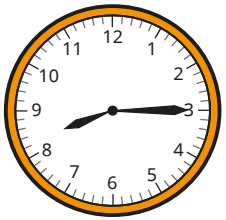
Tell the time past the hour

Key learning

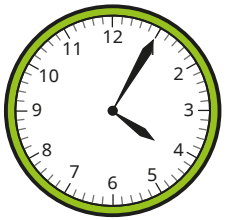
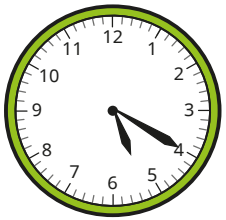


Model telling the times 5 past, 10 past, 20 past and 25 past. Recap quarter and half past and discuss how these also represent 15 minutes and 30 minutes past. Model the movement of the hour hand as well.

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

- Match the clocks to the times.


20 minutes past 5

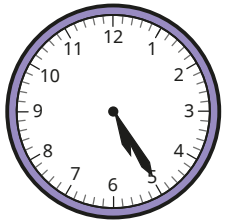
25 minutes past 4

5 minutes past 4

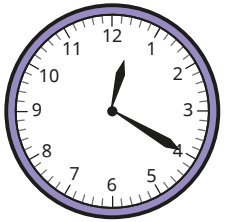
- Write the times shown on the clocks.



_____ minutes past _____



_____ minutes past _____

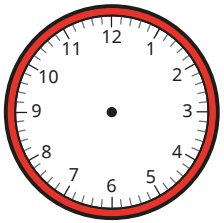


_____ minutes past _____

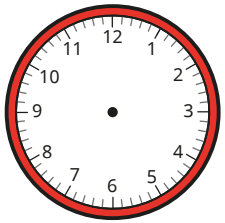


_____ minutes past _____

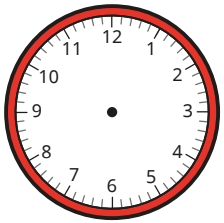
- Draw hands on the clocks to show the times.



10 minutes past 1



20 minutes past 6



25 minutes past 9

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Tell the time past the hour

Reasoning and problem solving

Ron and Sam are telling the time.

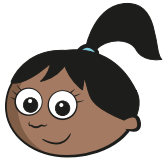




The time is 15 minutes past 5

Ron

It is quarter past 5



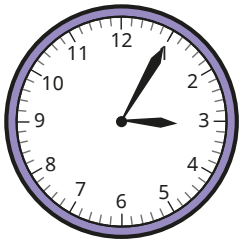
Sam

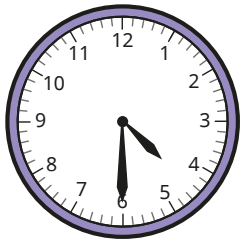
Who do you agree with?

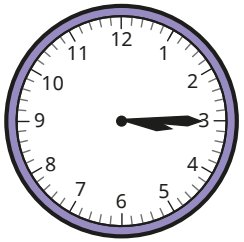
Explain your answer.

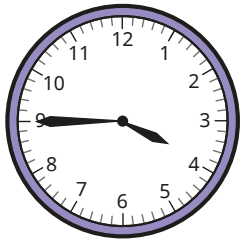
Both children are correct.

Which time is the odd one out?









Is there more than one answer?

multiple possible answers, e.g.

quarter to 4: does not include “past”

5 minutes past 3: only time that uses “minutes”

half past 4: not between the hours of 3 and 4

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Tell the time to the hour

Notes and guidance

At this stage, children have only seen the term "to" in relation to time when referring to quarter to the hour. In this small step, that learning is extended to include intervals of 5 minutes before the hour.

Explain that half past the hour is only ever said as that, and never as "half to" the hour. Then model the times 25, 20, 10 and 5 minutes to the hour, while also reminding children of quarter to the hour. They see that the hour hand is pointing to before the number that is said in the time. For example, at 10 minutes to 2, the hour hand is pointing slightly before 2. Encourage them to see that times after half past are related to the next hour, so times after half past 6, for example, are "_____ minutes to 7". Children then read and create times for themselves.

Things to look out for

- Children may continue the pattern from the previous step and say 35 minutes past, instead of 25 minutes to.
- Children may confuse the terms "past" and "to".
- Children may use the number of intervals before the hour, or the number the minute hand is pointing to, for example "1 minute to" or "11 minutes to".

Key questions

- How many minutes are there between each pair of numbers on a clock?
- When in an hour do you stop saying "past" and start saying "to"?
- How can you tell by looking at a clock if the time is past or to the hour?
- Where does the minute/hour hand need to be for the time _____ minutes to _____?
- What is the same and what is different about the times _____ minutes past _____ and _____ minutes to _____?

Possible sentence stems

- The time is _____ minutes to _____
- At _____ minutes to _____, the hour hand is between _____ and _____ and the minute hand is pointing to _____

National Curriculum links

- Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clockface to show these times

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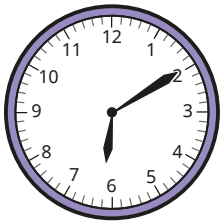
Tell the time to the hour

Key learning



Model telling the time to the hour in 5-minute intervals on a large clock, including quarter to the hour. Draw children's attention to the position of the hour hand, which should be over halfway between the two numbers.

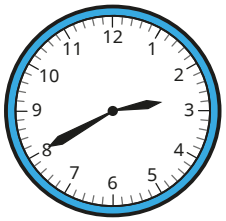
- What is the same and what is different about the times?

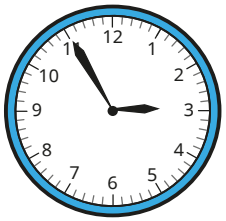




- Match the clocks to the times.

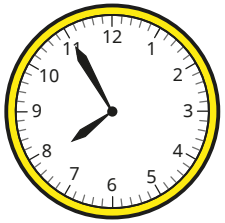




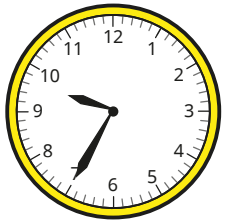


5 minutes to 3	20 minutes to 3	10 minutes to 4

- Write the times shown on the clocks.



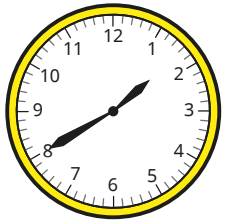
_____ minutes to _____



_____ minutes to _____

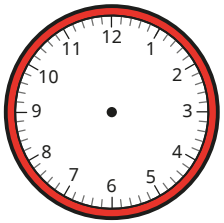


_____ minutes to _____

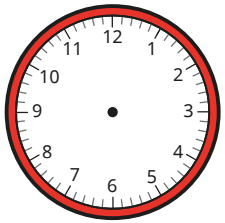


_____ minutes to _____

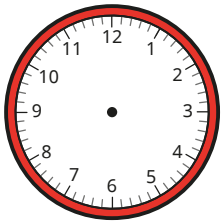
- Draw hands on the clocks to show the times.



10 minutes to 5



10 minutes to 7



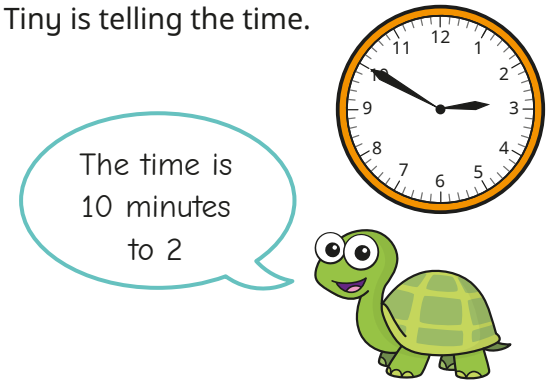
5 minutes to 7

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Tell the time to the hour

Reasoning and problem solving

Tiny is telling the time.



What mistake has Tiny made?

What is the correct time?

10 minutes to 3

Kay is going to the park at 4 o'clock.



How long until Kay goes to the park?

25 minutes

The time is 20 minutes to 5

Are the statements true or false?

The hour hand is closer to the number 4 than to the number 5	False
The hour hand is closer to the number 6 than the minute hand is.	True
In 5 minutes, the time will be quarter past 5	False

Explain your answer.

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Tell the time to 5 minutes

Notes and guidance

In this small step, children combine their learning from the previous two steps to tell the time to 5-minute intervals both past and to the hour.

Recap that the right-hand side of a clock shows times that are "past" the hour, while the left-hand side shows times that are "to" the hour. Remind children that when the minute hand is pointing to 6, this always refers to "half past" and never "half to".

Model where the hour hand should be for a given time, discussing which two numbers it should be between and which one of the numbers it should be closer to. For "past" times, the hour hand should be less than halfway between two numbers, and for "to" times it should be over halfway.

Things to look out for

- Children may confuse "past" and "to".
- Children may confuse the 5-minute intervals with the number shown on the clock, for example saying "2 minutes past" instead of "10 minutes past".
- Children may give all times in terms of minutes, instead of using "half past" and "quarter past/to".

Key questions

- How many minutes are there between each pair of numbers on a clock?
- At what time in an hour do you stop saying "past" and start saying "to"?
- Where does the hour hand point for the time _____?
- What is the same and what is different about the times _____ minutes past _____ and _____ minutes to _____?
- How many minutes past/to the hour is it if the minute hand is pointing to _____?

Possible sentence stems

- When the minute hand is pointing to _____, the time is _____ minutes past/to the hour.
- At _____ minutes past/to _____, the minute hand is pointing to _____ and the hour hand is between _____ and _____

National Curriculum links

- Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clockface to show these times

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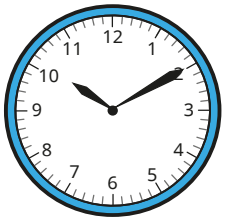
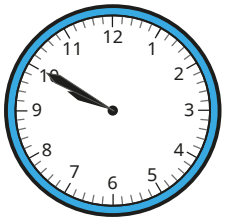
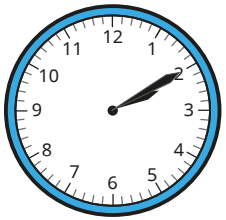
Tell the time to 5 minutes

Key learning



Model telling the time to 5-minute intervals both past and to the hour on a large clock. Then give children a time for them to show on clocks. Make sure that children pay attention to the position of the hour hand for different times.

- Match the clocks to the times.

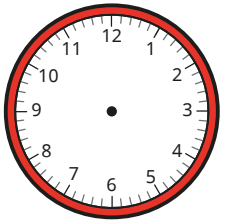
10 minutes past 2	10 minutes to 10	10 minutes past 10

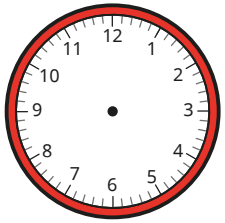
- Write the times shown on the clocks.

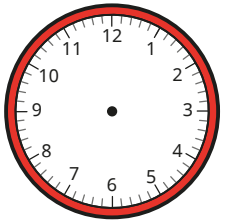




- Draw hands on the clocks to show the times.


10 minutes to 3


5 minutes past 4


25 minutes to 11

- Use the cards to make a time.

5 minutes	10 minutes	quarter
20 minutes	25 minutes	half
past	to	
1	2	3

Ask a partner to make that time on a clock.

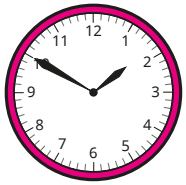
How many different times can you make?

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Tell the time to 5 minutes

Reasoning and problem solving

Kim, Ron and Mo are telling the time.

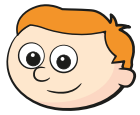




It is 10 minutes to 1

Kim

It is 10 minutes to 2



Ron



It is 10 minutes past 10

Mo

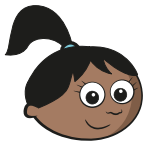
Who is correct?

What mistakes have the other children made?

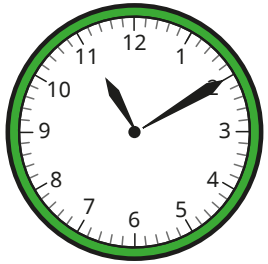
Ron

Sam is wrapping presents for a party.





I will start at 10 minutes past 11



Each present takes Sam 5 minutes to wrap.

She wraps 7 presents.

What time does Sam finish?

Explain how you worked it out.

quarter to 12

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Minutes in an hour

Notes and guidance

Children should be familiar with the fact that there are 60 minutes in an hour from earlier in the block. The focus in this step is on using and applying this fact.

Start by exploring half, quarter and three-quarters of an hour and how many minutes each of these refers to. This is a good opportunity to revisit learning from the previous block on fractions.

Children then focus on using the fact that there are 60 minutes in an hour to work out lengths of time greater than 1 hour. For example, 1 hour and 10 minutes is equal to 70 minutes, and 90 minutes is equal to one and a half hours. They can then use this to compare durations of time written in different ways.

As children are yet to explore numbers beyond 100, durations of time beyond 100 minutes are not covered.

Things to look out for

- Children may need to recap working out fractions of amounts.
- If children are not secure in their understanding of addition and subtraction within 100, they may struggle to interpret durations beyond 1 hour.

Key questions

- How many minutes are there in an hour?
- How can you work out $\frac{1}{2}$/$\frac{1}{4}$/$\frac{3}{4}$ of 60?
- How many minutes are there in half/quarter/three-quarters of an hour?
- How many minutes are there in 1 hour and _____ minutes?
- How many hours and minutes are there in _____ minutes?
- Which length of time is longer, _____ minutes or 1 hour and _____ minutes?

Possible sentence stems

- There are _____ minutes in 1 hour.
- There are _____ minutes in quarter/half/three-quarters of an hour.
- There are _____ minutes in 1 hour and _____ minutes.

National Curriculum links

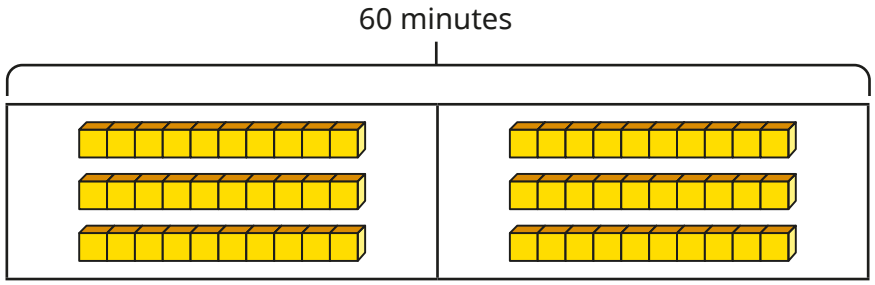
- Know the number of minutes in an hour and the number of hours in a day

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Minutes in an hour

Key learning

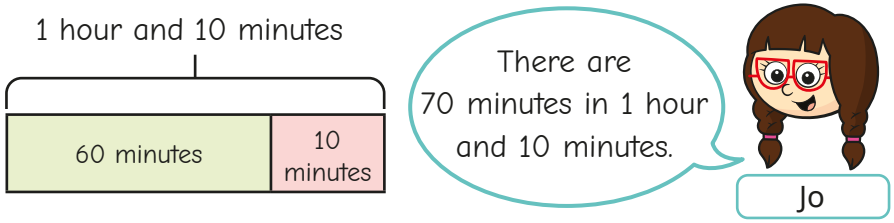
- Use the bar model to work out how many minutes there are in half an hour.



Use a bar model to work out how many minutes there are in:

- quarter of an hour
- three-quarters of an hour

- Jo draws a bar model to work out how many minutes there are in 1 hour and 10 minutes.



Use Jo's method to work out how many minutes there are in:

- 1 hour and 20 minutes
- 1 hour and 35 minutes
- 1 hour and 5 minutes
- 1 hour and 40 minutes

- Sam works out how many hours and minutes there are in 85 minutes.

> 85 minutes – 60 minutes = 25 minutes
>
> So 85 minutes = 1 hour and 25 minutes

Use Sam's method to work out how many hours and minutes there are in:

- 65 minutes
- 95 minutes
- 70 minutes
- 100 minutes

- Write <, > or = to make the statements correct.

half an hour ◯ 40 minutes

1 hour ◯ 100 minutes

50 minutes ◯ 1 hour and 5 minutes

1 hour and 10 minutes ◯ 70 minutes

90 minutes ◯ three-quarters of an hour

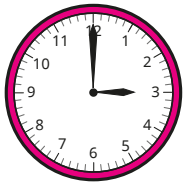
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Minutes in an hour

Reasoning and problem solving

The school day ends at half past 3

Here is the time now.





Do you agree with Tiny?

Explain your answer.

Yes

Fay is washing cars for charity.

She can wash one car in 10 minutes.

How many cars can she wash in one and a half hours?

9

It takes Mo three-quarters of an hour to walk home from school.

It takes Sam 1 hour and 5 minutes.

It takes Kim 70 minutes.

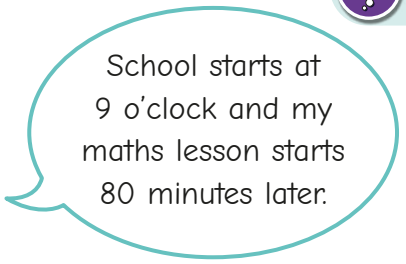
Who takes the longest time to get home?

Who takes the shortest time?

Kim

Mo





Max

What time does Max's maths lesson start?

20 minutes past 10

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Hours in a day

Notes and guidance

This small step extends children's knowledge of the relationships between units of time as they explore the number of hours in a day.

Model how the hour hand moves throughout the day, allowing children to see that each time appears twice in the day, for example 8 o'clock in the morning and 8 o'clock in the evening. Children can then see that there are 24 hours in a day, connecting this to the twelve hours on a clock each happening twice a day. Establish that a full day of 24 hours includes the night-time when they are asleep, as some children may only think of a "day" as the hours in which they are awake.

Discuss the terms midnight and noon, and explain that a new day starts at midnight. Children then solve problems involving time.

The terms "am" and "pm" are not introduced until Year 3

Things to look out for

- Children may be confused by the same numerical time appearing twice in a day.
- Children may think that a new day starts at 1 o'clock rather than 12 midnight.

Key questions

- If the hour hand moves all the way around the clock, how many hours have passed?

  How many times does it do this in one day?
- How many hours are there in a day?
- What time will it be in one hour?
- How many times in a day will it be _____ o'clock?
- What time does a new day start?
- What is the same and what is different about noon and midnight?

Possible sentence stems

- There are _____ hours in a day.
- Each time on a clock happens _____ times every day.
- A new day starts at 12 _____

National Curriculum links

- Know the number of minutes in an hour and the number of hours in a day

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Hours in a day

Key learning



Starting with both hands pointing to 12, model how the minute and hour hand move throughout a day. Pause at each hour to tell the time. What happens at 12? How many times does this repeat during a day? Introduce the terms "midnight" and "noon" to describe when the hour hand is pointing to 12

- Complete the sentences.
  - There are _____ hours in a day
  - 12 o'clock at night is called _____
  - 12 o'clock in the middle of the day is called _____
  - A new day begins at _____

- Use the cards to complete the sentences.

8	1	3

  - Dan is asleep at _____ o'clock in the morning.
  - Kay eats lunch at _____ o'clock in the afternoon.
  - Ben walks to school at _____ o'clock in the morning.

- Write some sentences about your day.

  I _____ at _____ o'clock in the morning/in the afternoon.

- Here is a clock.



  - What time is shown?
  - What time will it be in 6 hours?
  - What time will it be in 12 hours?

  What do you notice?

- Complete the sentences.
  - 1 hour after half past 5, the time is _____
  - 6 hours after 20 minutes to 1, the time is _____
  - _____ hours after 5 minutes to 1, the time is 5 minutes to 4

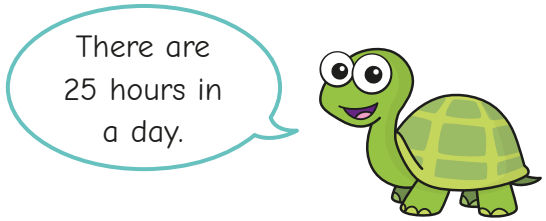
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Hours in a day

Reasoning and problem solving

Here are Tiny's workings for finding out how many hours there are in a day.

12	6	12	6	12
1	7	1	7	
2	8	2	8	
3	9	3	9	
4	10	4	10	
5	11	5	11	



What mistake has Tiny made?

Tiny has counted 12 o'clock three times. The final 12 is the start of the next day.

Sam goes to bed at 8 o'clock every night.

She gets up at 6 o'clock every morning.

How many hours is Sam in bed for?

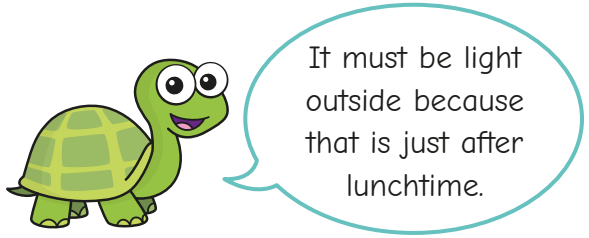
How many hours is Sam not in bed for?

How did you work out the answers?

10 hours

14 hours

The time is 20 minutes past 1



Do you agree with Tiny?

Explain your answer.

It depends if it is 20 past 1 in the morning or the afternoon.

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Summer Block 3

Statistics

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Small steps

Step 1	Make tally charts
Step 2	Tables
Step 3	Block diagrams
Step 4	Draw pictograms (1–1)
Step 5	Interpret pictograms (1–1)
Step 6	Draw pictograms (2, 5 and 10)
Step 7	Interpret pictograms (2, 5 and 10)

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Make tally charts

Notes and guidance

In this block, children are introduced to statistics and different representations of data for the first time. In this small step, they use tally charts to systematically record data.

It is important that children understand how different numbers are represented and when to use a "gate" to represent a group of 5. They should already be confident counting in 5s, and should use this skill when finding the totals represented by tallies. When they are confident in working out totals from tallies, they move on to drawing tallies for themselves to record numbers of objects.

Tallies are used throughout this block, so children must be confident using them before moving on to the next step.

Things to look out for

- Children may draw five individual lines rather than using a "gate".
- Children may count the groups of 5s as 10s or 1s.
- If looking at pictures, children may need efficient strategies to avoid counting an object more than once.
- Children may think that they need to draw something to represent zero.

Key questions

- What is a tally chart?
- How do you show 1, 2, 3, 4 in a tally?
  What happens when you show 5?
  How do you show 15? How do you show 17?
- What number does the tally show? How do you know?
- How do you show zero as a tally?
- Why are tally charts useful? When would you use a tally chart?
- How can you avoid counting an object more than once?

Possible sentence stems

- To show _____ as a tally, I need to draw _____ groups of 5 and _____ single lines.
- The tally chart shows _____ groups of 5 and _____ single lines. The total is _____

National Curriculum links

- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity

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Make tally charts

Key learning

- What do you notice about the tallies?

I	II	III	IIII	𝍸	𝍸 I
1	2	3	4	5	6

Why do you think we group 5 together?

- Draw tallies for the numbers.
  - 7
  - 9
  - 10
  - 15
  - 16

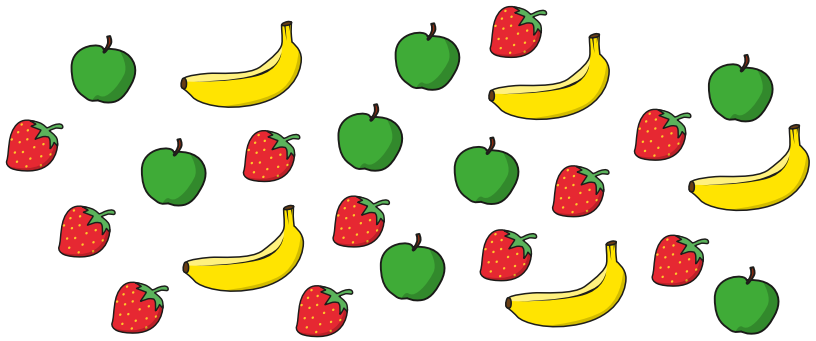
- Complete the tally chart.

Favourite colour	Tally	Total
blue	𝍸 II	
red	𝍸 𝍸	
yellow	𝍸 IIII	

- Complete the tally chart.

Year group	Tally	Total
Year 1	𝍸 𝍸 𝍸	15
Year 2		19
Year 3	𝍸 𝍸 𝍸 𝍸 II	

- Complete the tally chart for the fruit.



Fruit	Tally	Total
apple		
strawberry		
banana		

Ask children to collect their own data and create a tally chart. Possible topics include:

- favourite colour
- favourite sport
- how children travel to school

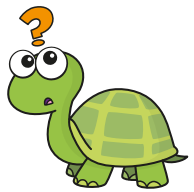
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Make tally charts

Reasoning and problem solving

Tiny draws a tally chart to show how children in Class 2 get to school.

Journey to school	Tally	Total
walk	𝍸	7
cycle	//	2
bus	𝍸	4
car	𝍸 /	6



What mistakes has Tiny made?

Correct Tiny's mistakes.

How many children are there in Class 2?

Tiny has missed the gate from 7

𝍸 //

4 should not have a gate

////

19

Here is a tally chart showing some children's favourite colours.

Favourite colour	Tally
red	𝍸 ||||
green	
blue	𝍸 𝍸 𝍸 𝍸	
yellow	

- Yellow is the least popular colour.
- The number of children who like green is greater than the number who like red, but less than the number who like blue.

Complete the tally chart.

Is there more than one answer?

yellow: any number less than 9

green: any number between 9 and 21

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Tables

Notes and guidance

In this small step, children explore the use of simple tables. Some of these include tallies, but others just show the totals.

Children can compare tally charts and tables and think about when it is more efficient to use each one. They may come to understand that a table is easier to read, but a tally chart is more efficient when collecting data.

Children think about what the data represents and draw pictures to match the information shown in a table, or use a picture to create a table. They should also begin to compare and answer questions about the data shown. This is built upon in the next steps, where they interpret block diagrams and pictograms.

Things to look out for

- Children may use tallies when they are not needed.
- Children may find it difficult to represent data from a table.
- Children may miscount when collecting data to put in a table.
- Children may need support to identify key information when answering comparative questions.

Key questions

- How are tally charts and tables similar?
  How are they different?
- When is it better to use a tally chart?
- When is it better to use a table?
- Which _____ is the most/least popular? How can you tell?
- How can you use tallies to complete a table?

Possible sentence stems

- The tally shows _____ groups of 5 and _____ single lines.
  The total is _____
- _____ people chose _____

National Curriculum links

- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- Ask and answer questions about totalling and comparing categorical data

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Tables

Key learning

- Look at the tally chart and table.

Item	Tally
pencil	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
rubber	𝍸 𝍸 𝍸
ruler	𝍸 𝍸 𝍸 𝍸 I

Item	Total
pencil	30
rubber	15
ruler	21

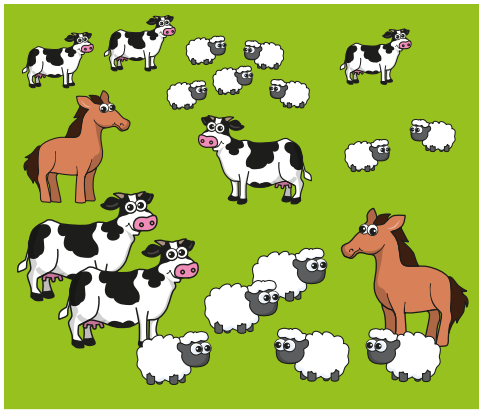
What is the same? What is different?

Which do you find easier to understand?

- Draw a picture to show the information in the table.

Shape	Total
square	4
triangle	8
circle	2

- Use the picture to complete the table.



Animal	Total
cow	
horse	
sheep	

- Here is a table showing the pets owned by children in Class 2

Pet	Total
cat	11
dog	14
hamster	7

  - Which pet is most common? Which pet is least common?
  - How many cats and hamsters do children in Class 2 have?
  - How many pets do children in Class 2 have altogether?
  - How many more dogs than hamsters are there?

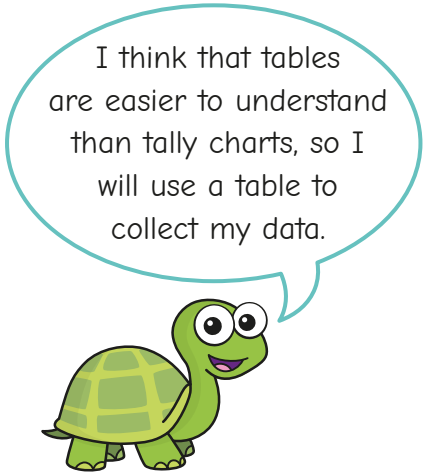
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Tables

Reasoning and problem solving

Tiny wants to record the colours of cars that pass by.





Do you think that this is a good idea?

Why?

No

A tally chart is better for collecting data when all the data cannot be seen at the same time.

The table shows the number of pieces of fruit in a box.

Some of the information is missing.

Fruit	Total
bananas	
apples	12
oranges	
pears	10

- There are 5 fewer bananas than apples.
- The number of oranges is greater than the number of pears but less than the number of apples.

Complete the table.

How many pieces of fruit are there altogether?

7 bananas,
11 oranges

40

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Block diagrams

Notes and guidance

In this small step, children are introduced to block diagrams as a way of representing data. This is a new concept and it may be beneficial to explore the similarities/differences between this and previous representations of data.

Children explore block diagrams that use one-to-one correspondence, where each block represents one item. They will develop this idea when looking at bar charts with scales in later years.

Children identify simple information from a block diagram, for example using the heights/lengths of the bars to identify the most/least popular items. Stem sentences can be used to support interpretation of diagrams. Children can then create their own block diagrams, firstly using concrete resources such as cubes or sticky notes, and then by drawing on paper. Explain that block diagrams can be shown vertically or horizontally.

Things to look out for

- Children may not use/draw blocks of equal size.
- Children may not use the size of the bars to compare totals.
- Children may need support to label their block diagrams.

Key questions

- How is a block diagram similar to a tally chart/table? How is it different?
- What does each block represent?
- What information can you find out from the block diagram?
- How do you know which item is the most popular? How can you tell without counting?
- How could you show this data in a block diagram?

Possible sentence stems

- There are _____ blocks shaded.
  This means that _____ people chose _____
- The most/least popular item is _____ because ...

National Curriculum links

- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- Ask and answer questions about totalling and comparing categorical data

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Block diagrams

Key learning

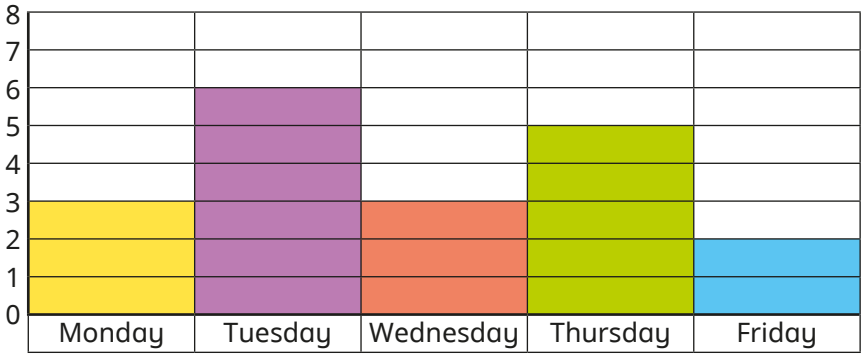


Give every child a sticky note and ask them to write their name on it.

Use the sticky notes to create block diagrams showing:

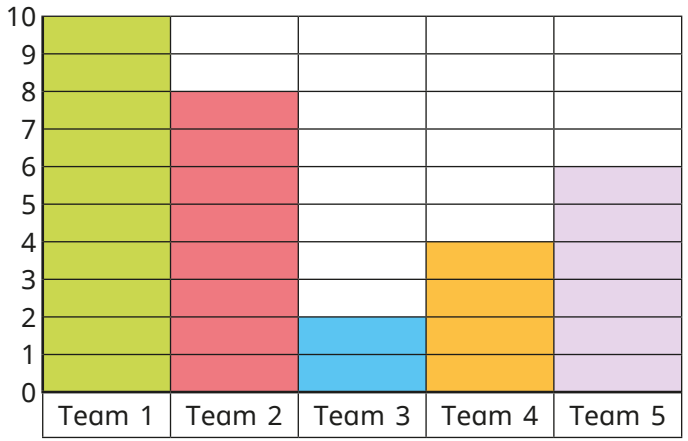
- the month with the most birthdays
- children's favourite sports

- The block diagram shows how many children went to after-school club each day.



  - On Monday, _____ children went to after-school club.
  - The day with the most children was _____
  - The day with the fewest children was _____
  - On _____ and _____, the same number of children went to after-school club.

- The block diagram shows the number of house points each team got.



  - How many more points did team 2 get than team 4?
  - How many fewer points did team 3 get than team 5?
  - How many points did team 2 and team 3 get altogether?

- Year 2 are collecting data about their favourite colours.

Colour	Total
red	5
green	8
blue	7
yellow	2

Make a block diagram, using cubes to show the data.

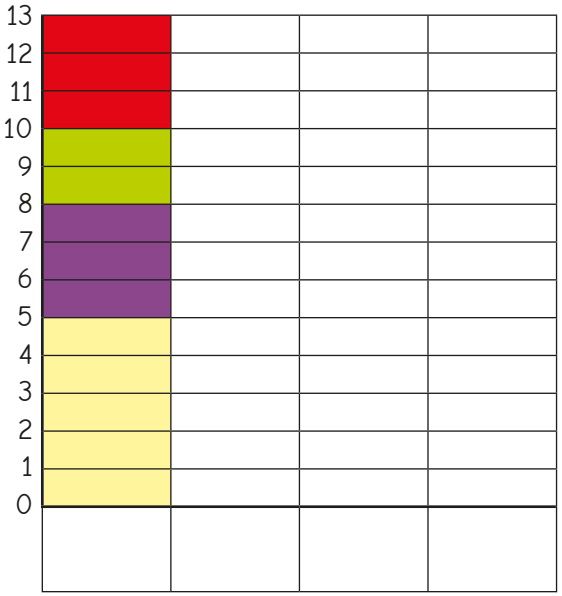
Now draw the block diagram.

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Block diagrams

Reasoning and problem solving

Tiny makes a block diagram to show children's favourite colours.



What mistake has Tiny made?

Why is Tiny's block diagram difficult to understand?

Tiny has not made a separate column for each colour.

Match the tables to the block diagrams.

A

	Total
1	6
2	8
3	10
4	3

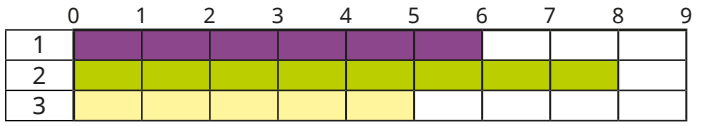
B

	Total
1	6
2	8
3	5

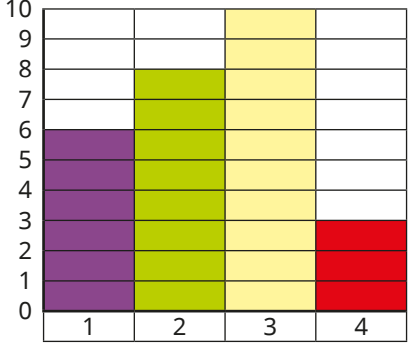
C

	Total
1	3
2	7
3	9
4	10

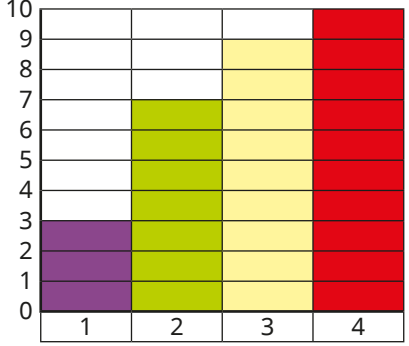
X



Y



Z



A – Y B – X C – Z

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Draw pictograms (1–1)

Notes and guidance

In this small step, children are introduced to pictograms as a way of representing data. The first pictograms they draw use one-to-one correspondence, where each symbol represents one item.

Children could use physical objects to create 3-D pictograms before drawing them. Ensure that they encounter both horizontal and vertical pictograms. Emphasise the need to use the same symbol for every category, and that symbols need to be easy to draw.

Keys are introduced to aid understanding and to avoid potential misconceptions later in the block when one symbol can represent 2, 5 or 10

Things to look out for

- Children may draw different symbols to represent the different categories and may draw symbols inconsistently, for example using different sizes.
- Children may pick symbols that are difficult to replicate consistently.
- Children may think pictograms can only be shown horizontally/vertically.

Key questions

- What does each symbol represent?
- How many symbols do you need to draw in the row/column for _____?
- How can you tell which is the most popular without counting?
- What is a key? Why is it important?
- What would/would not be a sensible symbol to use? Why?
- Why do you use the same symbol for each category?

Possible sentence stems

- The key shows that 1 _____ = 1 _____

  _____ children chose _____, so I need to draw _____ symbols.

National Curriculum links

- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- Ask and answer questions about totalling and comparing categorical data

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Draw pictograms (1–1)

Key learning

- Here is a pictogram showing the number of goals each person scored in a football match.

Key ⚽ = 1 goal

Player	Goals scored
Ann	⚽⚽
Jo	⚽
Mo	⚽⚽⚽⚽
Ron	⚽⚽⚽⚽⚽⚽
Dan	

How are pictograms different from block diagrams?
How are they similar?

Complete the pictogram to show that Dan scored 5 goals.

- Use the tally chart to complete the pictogram.

Key ■ = 1 piece of fruit

Fruit	Tally
banana	𝍸 |
grape	||||
pear	𝍸 |||
apple	|||

Fruit	Number
banana	■■■■■■
grape	
pear	
apple	

- Use the key to complete the pictogram.

Key ▼ = 1 ice cream

Flavour	Total
vanilla	8
chocolate	12
mint	7
strawberry	3

vanilla	chocolate	mint	strawberry

- Complete the pictogram.

Key ● = 1 person

Eye colour	Number	Total
green	●●●●●	5
blue	●●●●●●●	
brown		9
grey	●●●●	

Ask children to collect their own data and to draw a pictogram for it.

Remind them to include a key.

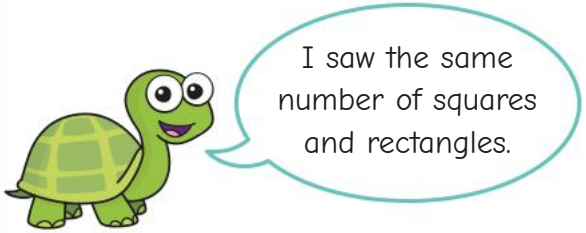
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Draw pictograms (1–1)

Reasoning and problem solving

Tiny goes on a shape hunt and uses the data to make a pictogram.

Shape	Number of shapes
circle	●●●●
rectangle	▬▬▬▬
square	■■■■■■■■
triangle	▲▲▲



Do you agree with Tiny?

Explain your reasons.

No

Use the clues to help you complete the pictogram.

Flavour	Number sold
strawberry	🍦🍦🍦🍦🍦🍦🍦🍦
vanilla	
chocolate	🍦🍦🍦🍦
mint	
caramel	
bubblegum	🍦🍦🍦🍦

Key

🍦 = 1 ice cream

- The number of caramel ice creams sold was more than the number of bubblegum, but less than the number of strawberry.
- There were half as many mint ice creams sold as there were chocolate.
- Fewer vanilla ice creams were sold than mint ice creams.

Is there more than one way to complete the pictogram?

vanilla 1 or 0 mint 2 caramel 5, 6 or 7

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Interpret pictograms (1–1)

Notes and guidance

In this small step, children interpret data from pictograms. Both vertical and horizontal pictograms should be explored.

Children will be aware of the key features of a pictogram and how to interpret a key from the previous step. Each symbol in the pictogram still represents one item.

Children start by identifying totals for different categories before comparing totals. As the numbers used are often small, this offers a good opportunity to revisit number bonds and mental methods of calculation. Children should be encouraged to look for multiple ways to make comparisons that can sometimes be done just by looking, counting the difference and also subtraction. They could think about the "story" the data tells them and infer information that is not directly shown.
In the next steps, children use these skills to draw and interpret pictograms with different keys.

Things to look out for

- Children may need to have strategies modelled for them, particularly when answering multi-step problems.
- Children may think that if there is nothing drawn for a category, then it is unfinished rather than representing zero.

Key questions

- What is a pictogram?
- What do you know? What can you find out?
- Which category was the most/least popular?
- What is a key? Why is it important?
- How many more people chose _____ than _____?
- How many _____ are there in total?

Possible sentence stems

- There are _____ symbols. This stands for _____ people.
- I can find the total by adding together _____ and _____
- _____ more/fewer people chose _____ than _____

National Curriculum links

- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- Ask and answer questions about totalling and comparing categorical data

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Interpret pictograms (1–1)

Key learning

- The pictogram shows the favourite fruit of children in Year 2

apple	●●●●●
banana	●●●●●●●
pear	
strawberry	●●●●

Key
● = 1 child

What do you know? What can you find out?

- The pictogram shows the number of children in each class who ride a bicycle to school.

Class	Number of children
Class 1	🚲🚲🚲🚲🚲🚲
Class 2	🚲🚲
Class 3	🚲🚲🚲🚲🚲🚲
Class 4	🚲
Class 5	🚲🚲🚲

Key
🚲 = 1 child

Complete the sentences.

- In Class 1, _____ children cycle to school.
- In Class 2, _____ children cycle to school.
- In Class 4, _____ child cycles to school.
- In total, _____ children cycle to school.

- The pictogram shows the number of minibeasts that Class 2 see on a bug hunt.

Minibeast	Number of minibeasts
spider	●●●●●●●●
ladybird	●●●●●●
centipede	●●
worm	●●●●

Key
● = 1 minibeast

Complete the sentences.

- There are _____ centipedes and worms altogether.
- There are _____ more spiders than ladybirds.

What else does the pictogram tell you?

- The pictogram shows Class 2's favourite colours of T-shirt.

Colour	Number of children
blue	■■■■■■■■
green	■■
red	■■■■
purple	■■■■■■■

Key
■ = 1 child

- What is the most popular colour of T-shirt?
- How many more children voted for blue than for red?
- How many children are there in Class 2?

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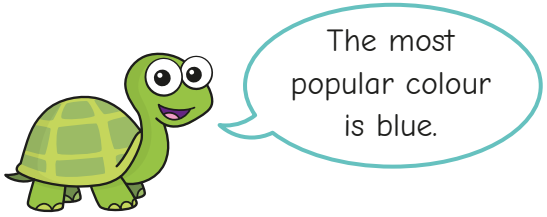
Interpret pictograms (1–1)

Reasoning and problem solving

The children of Class 2 vote for their favourite colour.

Tiny draws a pictogram to show the results.

Colour	Number of children
blue	● ● ● ●
red	● ● ●
yellow	● ● ● ● ●
green	● ● ● ● ● ● ●

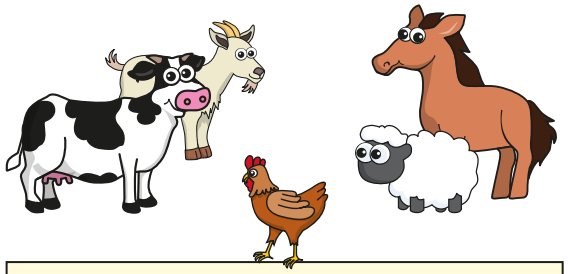


Do you agree with Tiny?

Why?

No

Tom writes these statements about a pictogram.



- There are more cows than sheep.
- There are the same number of sheep and horses.
- There are more chickens than any other animal.
- There are fewer cows than goats.
- There are 8 goats.

Draw the pictogram.

Compare answers with a partner.

multiple possible answers, e.g.

chickens 12

cows 6

sheep 3

goats 8

horses 3

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Draw pictograms (2, 5 and 10)

Notes and guidance

In this small step, children draw pictograms where the symbols represent 2, 5 or 10 items. From the previous steps, children should have a secure understanding of how to draw pictograms and what the key represents. They also need to be confident counting in 2s, 5s and 10s.

Children start this step by considering examples of data where symbols representing one item are not appropriate, as they would take a long time to draw and take up too much space. Initially, children are given keys to use, but they then move on to choosing the most appropriate key depending on the data. They also need to interpret what number is represented by half a symbol.

Things to look out for

- Children may be reluctant to use either 2s, 5s or 10s and prefer to stick to a count they are confident with, even if it is not the most appropriate.
- Children may need support to understand the use of part-symbols, for example if 1 symbol = 10, then half a symbol = 5
- Children may choose symbols that are not easily halved.

Key questions

- What is a key? Why is it important? What does the key show?
- What does each symbol represent? How do you know?
- Why should you use the same symbol for each category?
- Will each symbol in your key represent 1, 2, 5 or 10 items? How will you decide?
- If the key shows that 1 symbol stands for 2/10 people, how will you show 1 person/5 people?

Possible sentence stems

- The key shows that 1 symbol = _____ people.
  To show _____ people, I need to draw _____ symbols.
- The greatest number of items is _____, so I will choose 1 symbol = _____ items.

National Curriculum links

- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

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Draw pictograms (2, 5 and 10)

Key learning

- The pictogram shows the number of children in Year 1 and Year 2

Key ● = 1 child

Year	Children
Year 1	●●●●●●●●●●●●●●●●●●●●
Year 2	●●●●●●●●●●●●●●●●●●

What do you notice?

Is there a better way to show the data?

- Complete the pictograms for the flowers in the garden.



Key ■ = 1 flower

Flower	Flowers in garden
tulip	■■■■■■
crocus	
daffodil	

Key ■ = 2 flowers

Flower	Flowers in garden
tulip	■■■
crocus	
daffodil	

Which pictogram do you prefer? Why?

- Use the tally chart to complete the pictogram showing the number of books read in each class.

Key 📖 = 5 books

Class	Books read
Class 1	𝍸 𝍸
Class 2	𝍸 𝍸 𝍸 𝍸 𝍸
Class 3	𝍸 𝍸 𝍸
Class 4	𝍸

Class	Books read
Class 1	📖📖
Class 2	
Class 3	
Class 4	

- Use the table to complete the pictogram.

Key ● = 10 points

Child	Points
Jo	15
Ron	30
Ann	35
Kay	25

Child	Points
Jo	●◗
Ron	
Ann	
Kay	

- The table shows the different types of cake sold in a week.

Draw a pictogram to show the data.

Cake	chocolate	lemon	fruit	carrot	banana
Total	65	35	20	25	15

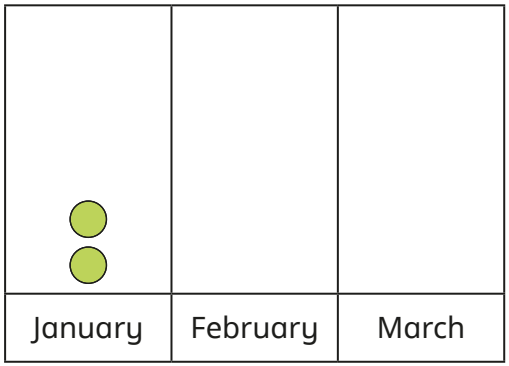
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Draw pictograms (2, 5 and 10)

Reasoning and problem solving

Here is the start of a pictogram showing when some children were born.

Key = 10 children



Use the clues to complete the pictogram.

- 5 fewer children were born in March than in January.
- Twice as many children were born in February as in March.

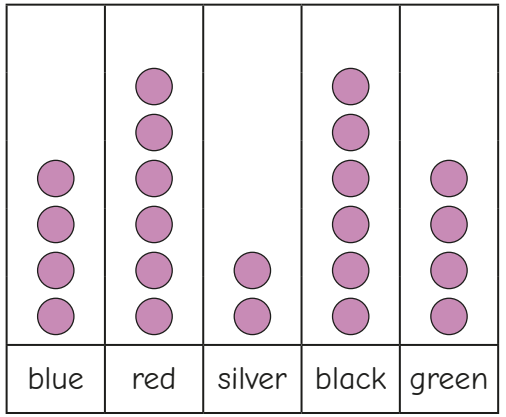
February: 30

March: 15

Mo and Sam draw pictograms to show how many cars they see.

Mo

Key = 5 cars



Sam

Key = 10 cars

Colour	Number of cars
blue	●●
red	●●●
silver	●
black	●●●
green	●●

What is the same? What is different?

Whose pictogram do you prefer?

multiple possible answers, e.g.

same: same information; circle symbols; colours in the same order

different: counting in 5s and 10s; vertical and horizontal

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Interpret pictograms (2, 5 and 10)

Notes and guidance

In this small step, children interpret pictograms where the symbols represent 2, 5 or 10 items. Again, the pictograms may be presented either vertically or horizontally and children should now be familiar with both.

Children encountered how to interpret part symbols in the previous step, but this is challenging and may need some reinforcement. Questions include reading from a single row/ column of a pictogram, making comparative statements and solving simple multi-step problems.

At this point, children may start to make inferences and consider more contextual questions such as "Why do you think that the data shows this?"

Things to look out for

- Children may not use or may misread the key.
- Children may calculate the totals of items rather than using the pictogram to make comparisons.
- Children may need support to interpret part of a symbol.
- Children may think that if there is nothing in a column/ row, then it is unfinished rather than representing zero.

Key questions

- What do you know? What can you find out?
- What is a key? Why is it important? What does the key show?
- Which category is the most popular? Which is the least popular?
- How many more people chose _____ than _____?
- How many _____ are there in total?
- What would change if the key changed?

Possible sentence stems

- The key shows 1 symbol = _____ people.
  So _____ symbols represent _____ people.
- The key shows 1 symbol = _____ people.
  So half of a symbol represents _____ people.

National Curriculum links

- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- Ask and answer questions about totalling and comparing categorical data

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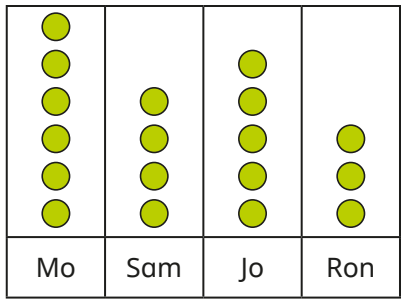
Interpret pictograms (2, 5 and 10)

Key learning

- The pictogram shows how far children run in a game.

  Complete the sentences.

Key ● = 10 metres



Mo	Sam	Jo	Ron

Sam runs _____ metres.

_____ runs the furthest distance.

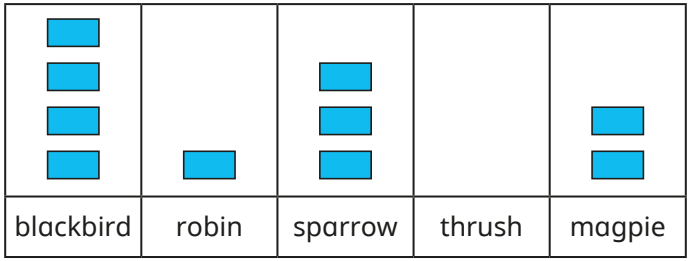
_____ runs the shortest distance.

Altogether they run _____ metres.

What else can you find out?

- The pictogram shows how many birds Ben sees on a walk.

Key ▬ = 5 birds



blackbird	robin	sparrow	thrush	magpie

  - How many more sparrows does he see than robins?
  - How many more blackbirds than magpies does he see?

How did you work these out?

- Here is a pictogram showing children's favourite sports.

Key ▲ = 2 children

Sport	Number of children
football	▲▲▲▲▲
tennis	▲▲
basketball	▲▲▲
hockey	▲▲▲◭
swimming	◭

  - How many children voted for either football or swimming?
  - How many fewer children voted for tennis than for hockey?

- Use the pictogram to decide if the statements are true or false.

Key ★ = 10 animals

Animal	Number on farm
sheep	★★★★◭
horse	★
chicken	★★★◭
cow	★★★★★★★★

There are 8 cows on the farm.

There are 55 sheep and horses in total.

The number of chickens is half the number of cows.

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Interpret pictograms (2, 5 and 10)

Reasoning and problem solving

Max and Kim count the traffic they see.

They draw a pictogram.

Key = 10 vehicles

van	
bus	
bike	
lorry	
car	



Max

The total number of lorries and bikes is equal to the number of cars.

There are 16 and a half vehicles.



Kim

Do you agree with Max and Kim?

Explain your answer.

Max – yes

Kim – no

The pictogram shows the number of ice creams sold in one week.

Key = 2 ice creams

Mon	
Tue	
Wed	
Thur	
Fri	
Sat	
Sun	

Is the statement true or false?

More ice creams were sold at the weekend than during the rest of the week.

Explain your answer.

True

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Summer Block 4

Position and direction

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White Rose MATHS

Small steps

Step 1	Language of position
Step 2	Describe movement
Step 3	Describe turns
Step 4	Describe movement and turns
Step 5	Shape patterns with turns

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Language of position

Notes and guidance

In this small step, children use the language of position, recapping and building upon learning from Year 1

Children start by describing the position of objects using left and right. Discuss methods for remembering which way is left and which way is right. They then think about other language to describe position, such as above, below and between.

Children use their understanding of this language to complete multi-step and more sophisticated problems. This learning will be built upon as they begin to think about describing movement and turns in the next steps.

Things to look out for

- Children may confuse left and right.
- Children may think that there is only one way to describe position.
- Children may not use mathematical language to describe position.
- Children may find it more difficult to describe position using images than they do in practical contexts.

Key questions

- How do you know which way is left/right?
- How would you describe the position of this object?
- Which object is to the left/right of the _____?
- Which object is above/below the _____?
- What does "between" mean?

Possible sentence stems

- The _____ is above/below the _____
- The _____ is to the right/left of the _____
- The _____ is between the _____ and the _____

National Curriculum links

- Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)

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Language of position

Key learning

- Here are some shapes.



  - Which shape is to the left of the square?
  - Which shape is to the right of the square?
  - How can you remember which way is left and which is right?
  - Which shape is between the triangle and the circle?

- Look at the people and things around you in the classroom.

  Complete the table.

In front of me	Behind me	To the left of me	To the right of me



Ask children to walk around school or the playground and complete the sentences.

The _____ is above/below the _____

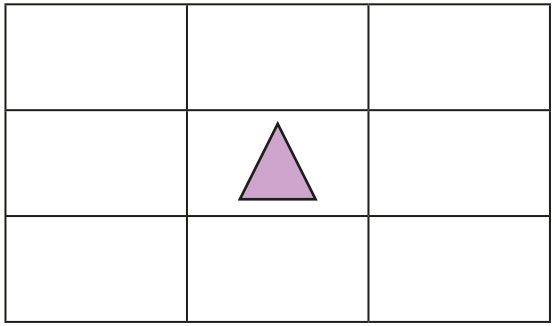
The _____ is to the left/right of the _____

The _____ is in between the _____ and the _____

- Use five cubes. Follow the instructions to make a tower.
  - Start with a yellow cube.
  - Put a blue cube on top of the yellow cube.
  - Put a white cube below the yellow cube.
  - Put a red cube on the top of the tower.
  - Put the green cube in between the yellow and white cube.

  Write your own instructions for a partner.

- Follow the instructions.
  - Draw a square above the triangle.
  - Draw a circle below the triangle.
  - Draw a rectangle to the left of the triangle.
  - Draw another triangle to the right of the square.

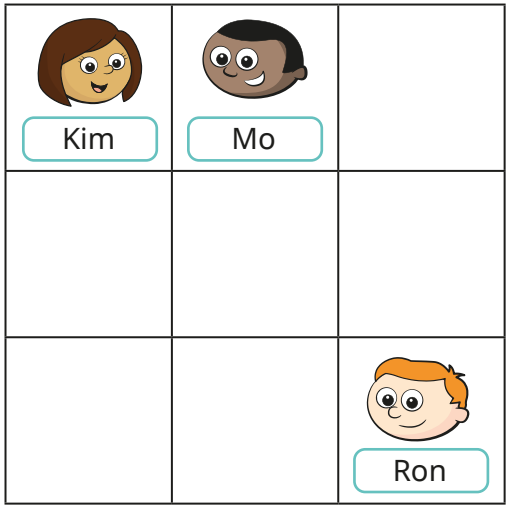


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Language of position

Reasoning and problem solving

Use the clues to write Max, Sam and Jo's names on the grid.



- Mo is directly above Max.
- Sam is directly below Max.
- Jo is to the right of Max.

Complete the sentence.

Sam is to the left of _____

2nd row: empty, Max, Jo

3rd row: empty, Sam

Ron

How many ways can you describe the position of the 2p coin?



below the 50p

above the 10p

in between the 50p and the 10p

in between the 20p and the 5p

to the left of the 5p

to the right of the 20p

Think of a set of clues to describe the positions of some coins.

Tell a partner your clues. Can they work out the position of each coin?

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Describe movement

Notes and guidance

In this small step, children use their understanding of position to describe movement. This could be explored, in the first instance, by following instructions outside to move from one area to another. Children then begin to record and describe movement more formally, in terms of both direction and number of squares. They should first describe movement of an object as up, down, left and right as they look at it on a page. Once they are confident with this, they can begin to think about describing movement using forwards and backwards. This is often difficult for children and will need careful modelling as the direction of forwards or left, for example, changes, depending on which way a person or object is facing. This learning is key and needs to be fully understood as it is used throughout the remainder of this block.

Things to look out for

- Children may confuse left and right.
- Children need to think about which way an object is facing to work out both forwards/backwards and left/right, which can be challenging.
- Children may count the starting square, so miscount the number of squares an object has moved.

Key questions

- Which direction is left/right?
- How many squares has the object moved?
- Do you need to count the square that the object starts in?
- Which direction is forwards/backwards?
- If you move forwards, do you always move in the same direction?
- Which way would left/right be in this question? How do you know?

Possible sentence stems

- The _____ has moved _____ squares up/down/left/right.
- The _____ has moved _____ squares forwards/backwards and _____ squares left/right.

National Curriculum links

- Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)

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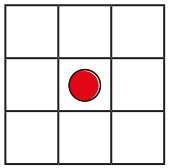
Describe movement

Key learning



Take the children into the playground. In pairs, they take turns to give instructions for their partner to get from one place to another. Tell them that they need to use the words forwards, backwards, left and right, together with the number of steps.

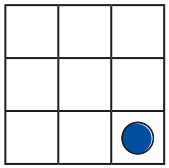
- There is a counter in the middle square of the grid.



  - Draw a triangle to show where the counter will be if it moves 1 square up.
  - Draw a circle to show where the counter will be if it moves 1 square left.

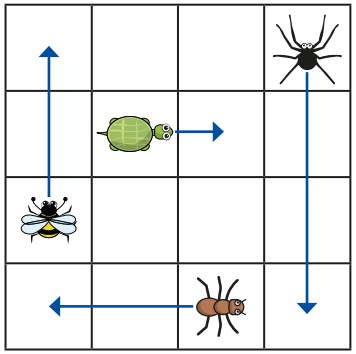
- Ben moves the counter 2 squares left and 2 squares up.

  Where is the counter now?



  Make up instructions for a partner to move the counter.

- Use the words **forwards** and **backwards** to help you complete the sentences.



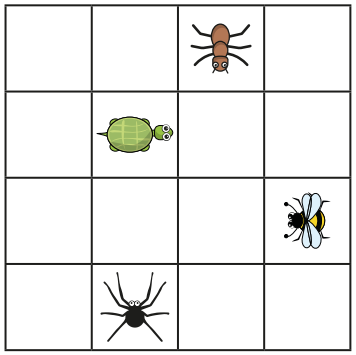
Tiny moves 1 square _____

The bee moves _____ squares _____

The _____ moves 2 squares backwards.

The spider moves _____ squares _____

- Use arrows to show the movement on the grid.



  - Tiny moves 1 square backwards.
  - The ant moves 2 squares forwards.
  - The bee moves 3 squares forwards and then 1 square backwards.
  - The spider moves 2 squares right.

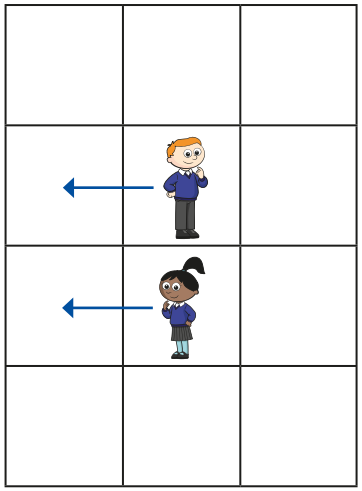
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Describe movement

Reasoning and problem solving

Ron and Sam both move 1 square to their left.

Tiny draws arrows to show where they move to.



Do you agree with Tiny?

Explain your answer.

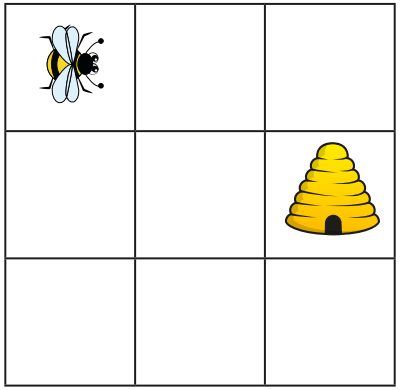
Draw arrows to show where Ron and Sam move to.

No

Both Ron and Sam move in the opposite direction to that shown, into the right-hand column.

Use the words to help the bee get to the beehive.

forwards	backwards
left	right



How many ways can you find?

multiple possible answers, e.g.

2 squares forwards, 1 square right

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Describe turns

Notes and guidance

In this small step, children start to describe turns.

Children learn about quarter, half, three-quarter and full turns, as well as using clockwise and anticlockwise. Links could be made to other areas of the curriculum (time, fractions) to help conceptualise the learning. Children may find it beneficial to complete quarter, half, three-quarter and full turns before they are introduced to clockwise and anticlockwise.

Children should be able to draw what an object would look like after a turn and describe the turn that an object has performed. As with previous steps, there will be plenty of opportunity to explore this step practically, both in the classroom and outside.

Things to look out for

- Children may need a reminder about the fractions used in this step.
- Children may confuse clockwise and anticlockwise.
- Children may find it more difficult to describe a turn than to make it.
- Children may think that an object must change if it completes a full turn.

Key questions

- Where have you heard "half" and "quarter" before? What do they mean?
- Which direction will you be facing if you make a _____ turn?
- Which way do the hands go round a clock?
- What do you think clockwise/anticlockwise means?
- What happens to the way you are facing when you make a half/full turn?
- What type of turn has this object made?

Possible sentence stems

- The _____ has turned a _____ turn _____
- When I make a half turn, I will be facing _____
- When I make a full turn, I will be facing _____

National Curriculum links

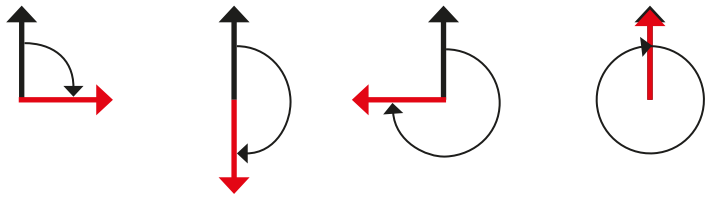
- Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)

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Describe turns

Key learning

- The pictures show a quarter turn, a half turn, a three-quarter turn and a full turn.



How is this similar to fractions?

How is this similar to time?



Ask children to pick an object and take it in turns with a partner to turn the object.

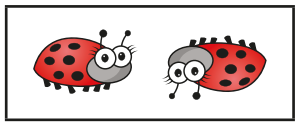
Children should describe the turns using the language full turn, half turn, quarter turn, three-quarter turn.



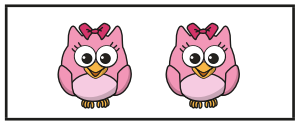
Discuss the terms clockwise and anticlockwise. Use a clock to show children the difference.

Play *Simon says* using quarter, half and three-quarter turns together with clockwise and anticlockwise.

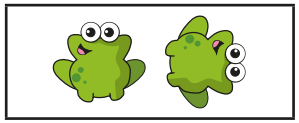
- Match the pictures to the turns.



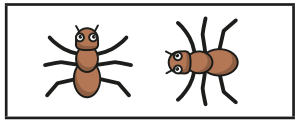
full turn



quarter turn clockwise

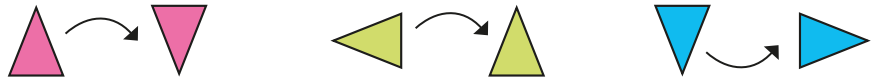


half turn anticlockwise



quarter turn anticlockwise

- Complete the sentence to describe the turn each triangle has made.



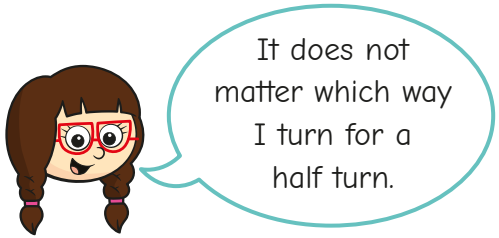
The triangle has turned a _____ turn _____

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Describe turns

Reasoning and problem solving

Jo is describing turns.

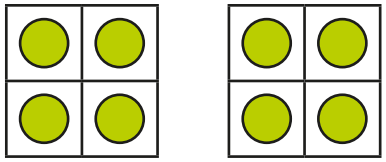


Do you agree with Jo?

Explain your answer.

Yes

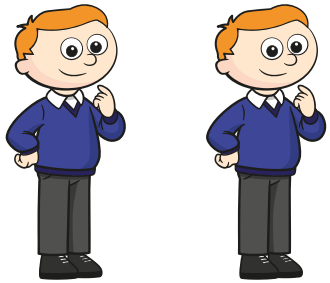
Look at the shapes.

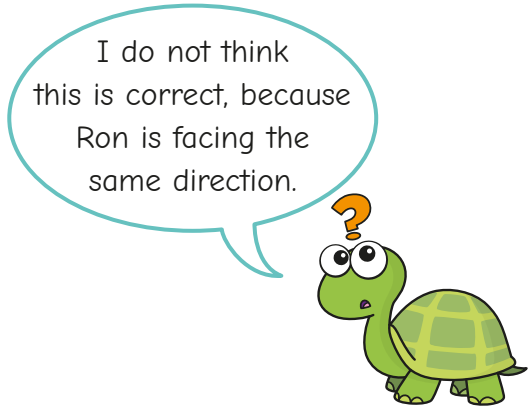


Describe the turns the shape could have made.

quarter, half, three-quarter or full turn, either clockwise or anticlockwise

Ron has made a turn.





Do you agree with Tiny?

Explain your answer.

No

Ron could have completed a full turn.

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Describe movement and turns

Notes and guidance

In this small step, children combine their learning from previous steps to describe movement and turns.

There are many misconceptions that can occur within this step, so it is important to practically complete tasks and discuss any misunderstandings as a class. Children could play games, such as giving each other instructions through a maze. They need to visualise which way an object is facing and which way it will be facing if it turns left or right. Once this is secure, they can then think about describing movement and giving instructions to move an object from one place to another.

The use of small, programmable robots could also be used to consolidate this learning.

Things to look out for

- Children may confuse left and right, and clockwise and anticlockwise.
- Taking into account the original direction that an object is facing may need support and modelling.
- When describing movement involving more than one step, especially when a turn is needed, children may leave out some steps or confuse the order.

Key questions

- Which direction is left/right?
  Does it matter which way the object is facing?
- How do you know which direction the object has moved?
- Which direction is clockwise/anticlockwise?
- Which direction does the object need to move after the turn?
- How can you show the movement using arrows on the grid?

Possible sentence stems

- First I move _____ squares forwards.
  Then I turn _____
  Then I move _____ squares forwards.

National Curriculum links

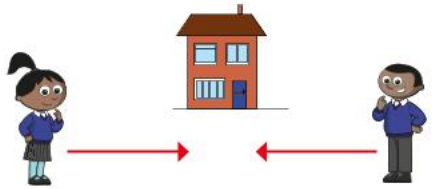
- Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)

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Describe movement and turns

Key learning

- Sam and Mo are walking home.

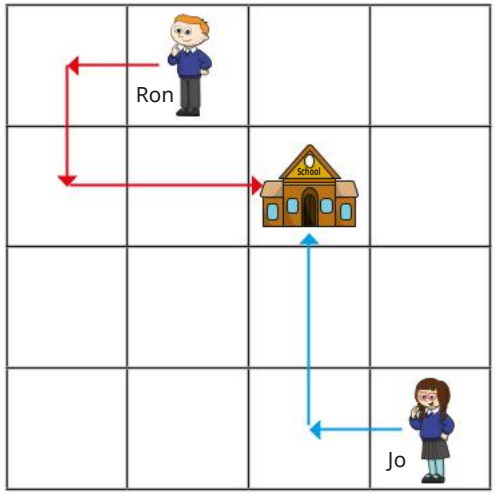


Which way should Sam turn?

Which way should Mo turn?

What do you notice?

- Ron and Jo are walking to school.



  - Complete the sentences to describe how Jo gets to school.

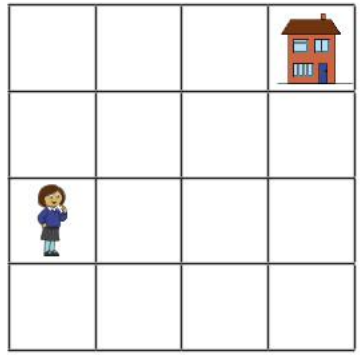
    First she moves _____ square forwards.

    Then she turns _____

    Then she moves _____ squares forwards.

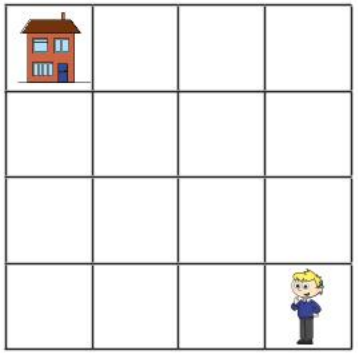
  - Describe Ron's journey to school.

- Follow the instructions to draw Kim's way home.
  - Go forwards 1 square.
  - Turn left.
  - Go forwards 2 squares.
  - Make a quarter turn clockwise.
  - Go forwards 2 squares.



- Draw arrows to show how Max could walk home.

  Describe Max's journey.



Is there more than one answer?

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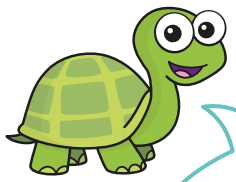
Describe movement and turns

Reasoning and problem solving

Tell children to go on a walk around the school or the playground, recording their journey.

They then describe their journey to a partner and see if they can recreate the route.

They must include the words clockwise and anticlockwise.



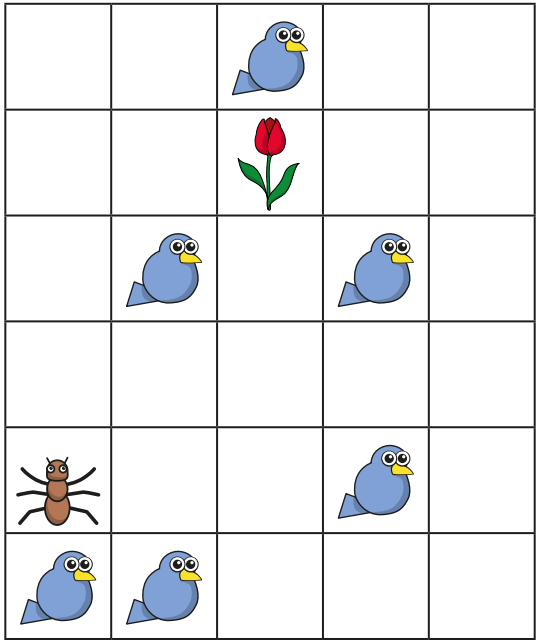
If I make a quarter turn clockwise I will be facing the same direction as if I make a three-quarter turn anticlockwise.

Is Tiny correct?

Explain your answer.

Yes

On this grid, the ant is not allowed to be on the same square as a bird.



How can the ant get to the flower?

How many ways can you find?

multiple possible answers, e.g.

forwards 3 squares, turn right, forwards 2 squares

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Shape patterns with turns

Notes and guidance

In this small step, children explore patterns that involve turns.

Time could be spent recapping patterns that just use different shapes first, including different ways to form patterns, before introducing them to patterns with one or two shapes that include a turn. They should be able to identify what the next shapes in the pattern are and what direction they face. Encourage children to use the language of quarter, half, three-quarter turns as well as clockwise and anticlockwise. Discuss what happens when a shape completes a full turn and why this may not be useful when creating patterns.

Children can cut out shapes and complete some of these tasks practically before describing their patterns.

Things to look out for

- Children may confuse clockwise and anticlockwise.
- Children may struggle to identify the series of shapes that are repeating when a pattern is made up of more than one shape.
- Children may not be able to identify the turn in each pattern.

Key questions

- What are patterns?
- Which shape(s) is/are repeating?
- How can you describe this pattern?
- How can you make a pattern with one shape?
- How can you describe the turn in each pattern?
- What is the next shape?

Possible sentence stems

- In this pattern, the shape turns a _____ turn _____
- The next shape is _____ because ...

National Curriculum links

- Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)

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Shape patterns with turns

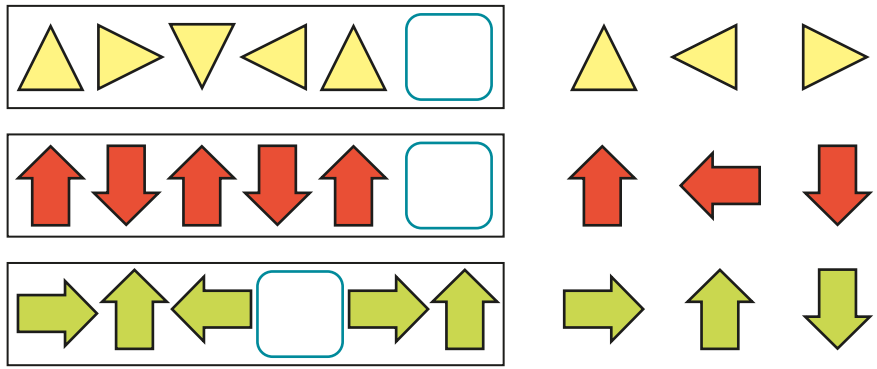
Key learning



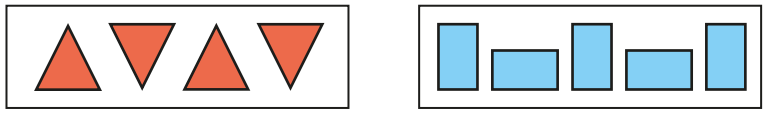
Show children a range of patterns that do not involve turns and ask what they notice. Then ask them to make patterns with different cubes/shapes.

- The patterns are made by turning the shape each time.

  Choose the missing shapes.



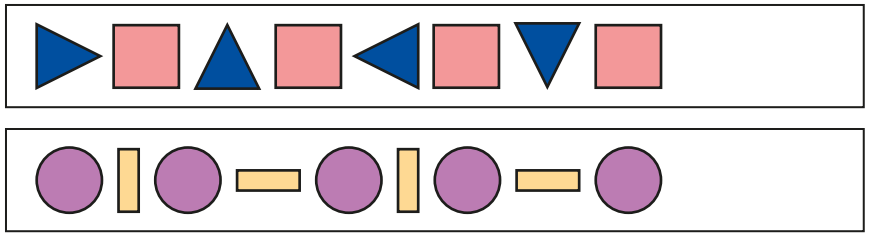
- Complete the sentence to describe the turns between the shapes.



The shape makes a _____ turn _____

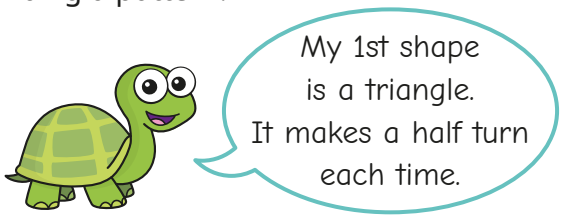
Is there more than one answer?

- Draw the next two shapes in each pattern.



How can you describe the patterns?

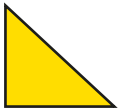
- Tiny is describing a pattern.



  - Draw the first five shapes in Tiny's pattern.

    Have you drawn the same pattern as your partner?
  - Describe a pattern for your partner to draw.

- How many different patterns can you make with this shape?

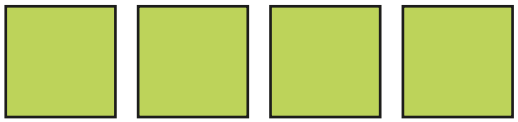


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Shape patterns with turns

Reasoning and problem solving

The pattern is made by turning the square each time.

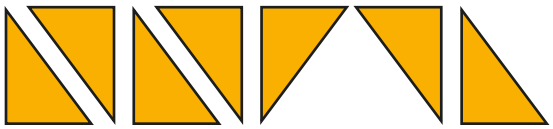


Describe the turns in the pattern.

Compare answers with a partner.

quarter, half, three-quarter or full turn clockwise or anticlockwise

Spot the mistake in the pattern.

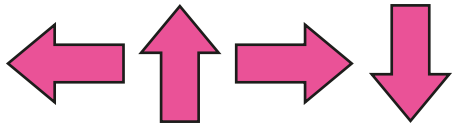


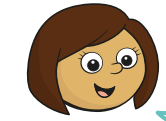
Draw the correct shape.

The 5th shape is incorrect.



Kim and Mo are describing the pattern.





Kim

The arrow makes a quarter turn each time.

The arrow makes a three-quarter turn each time.



Mo

Who is correct?

Explain your answer.

Both children are correct.

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