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

Learning focus

In this lesson, children will learn that $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent fractions. Children will prove this using physical resources and different numbers of objects.

Small steps

- Previous step: Understanding other fractions
- **This step: $\frac{1}{2}$ and $\frac{2}{4}$**
- Next step: Finding $\frac{3}{4}$

NATIONAL CURRICULUM LINKS

Year 2 Number – Fractions

Write simple fractions, for example, $\frac{1}{2}$ of 6 = 3, and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.

ASSESSING MASTERY

Children can recognise that $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent in a range of contexts, such as shapes, pieces of paper and counters. Children can draw $\frac{1}{2}$ and $\frac{2}{4}$ using the same whole, can explain the similarities and differences between them and understand why the numerators and denominators are different while having the same value within each context.

COMMON MISCONCEPTIONS

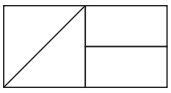
Children may initially think that $\frac{2}{4}$ is more than $\frac{1}{2}$ because both numbers in $\frac{2}{4}$ are bigger. Break down each fraction and model them by folding one piece of paper in half and then folding one of the halves in two, showing that one half is the same as two quarters. This will show children that the only visual difference is that $\frac{2}{4}$ has an additional line through the middle. Ask:

- *Does each side of paper take up more space or less space than the other? Do bigger numbers mean a bigger fraction of the whole?*

STRENGTHENING UNDERSTANDING

There are lots of practical contexts to help children compare these fractions. For example, fractions of length can be modelled by using a metre stick and putting sticky notes at intervals of $\frac{1}{2}$ and $\frac{2}{4}$ and comparing how tall each fraction is.

GOING DEEPER



This picture demonstrates the equivalence between $\frac{1}{2}$ and $\frac{2}{4}$. The shape has been divided into half and then each half split into a different half to show very different-looking quarters. Ask: *If you cut up two of the quarters and placed them on the other half, would they take up the same amount of space as the other two quarters?*

KEY LANGUAGE

In lesson: equivalent, fraction, half, halves, same, quarter, different, bar model

Other language to be used by the teacher: numerator, denominator, split in, into

STRUCTURES AND REPRESENTATIONS

Part-whole model, bar model

RESOURCES

Mandatory: multilink cubes, counters, pieces of paper for folding, colouring pencils

Optional: metre sticks, any objects in the classroom that can be used to demonstrate $\frac{1}{2}$ and $\frac{2}{4}$ such as pencil pots, resource trays, reading book baskets or file dividers.

In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Before you teach

- Have children shown any awareness of equivalence in fractions before this lesson?
- Are children able to find half of a number? Do they understand that this means dividing the number by 2?

Discover

WAYS OF WORKING Pair work

ASK

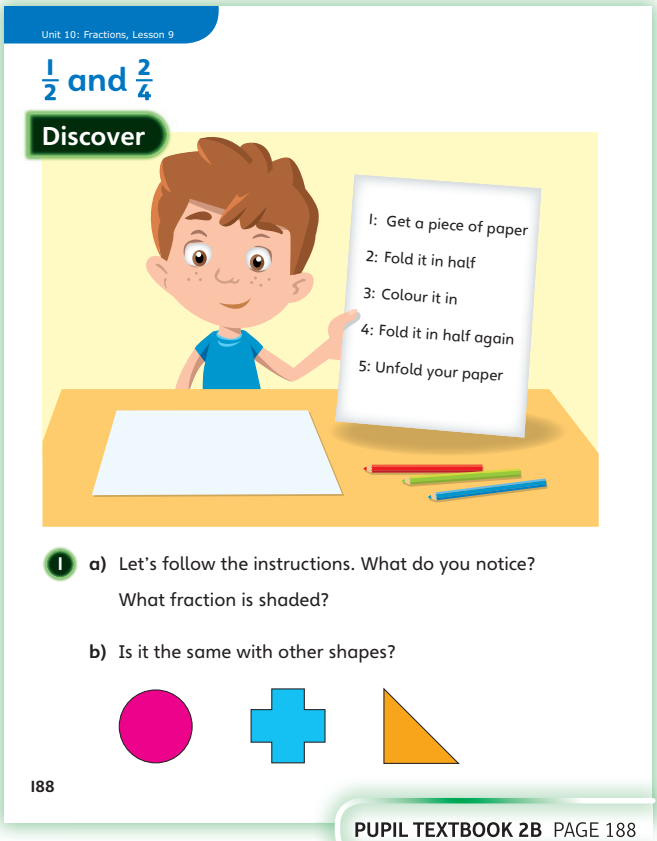
- Question 1 a): *When you fold the paper in half and then in half again, how many parts have you folded it into?*
- Question 1 b): *Do you get the same fraction when folding a different-shaped piece of paper?*

IN FOCUS As children follow the instructions in the picture, ask them to explain what fraction the piece of paper is being split into each time they fold it. Are they aware that you make a quarter by folding a half in half? Ask children to compare the halves and quarters that they have created. Do they spot that the half they have coloured in is the same amount of space as $\frac{2}{4}$? Give children pieces of paper cut into the shapes shown in question 1 b) so that children can investigate this using the same technique.

ANSWERS

Question 1 a): When the paper is folded in half and two quarters are shaded, $\frac{1}{2}$ of the paper is shaded. $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent. Therefore, $\frac{2}{4}$ and $\frac{1}{2}$ are the same size.

Question 1 b): It is the same with other shapes.


Unit 10: Fractions, Lesson 9

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

Discover

1: Get a piece of paper
2: Fold it in half
3: Colour it in
4: Fold it in half again
5: Unfold your paper

1 a) Let's follow the instructions. What do you notice? What fraction is shaded?

b) Is it the same with other shapes?

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Share

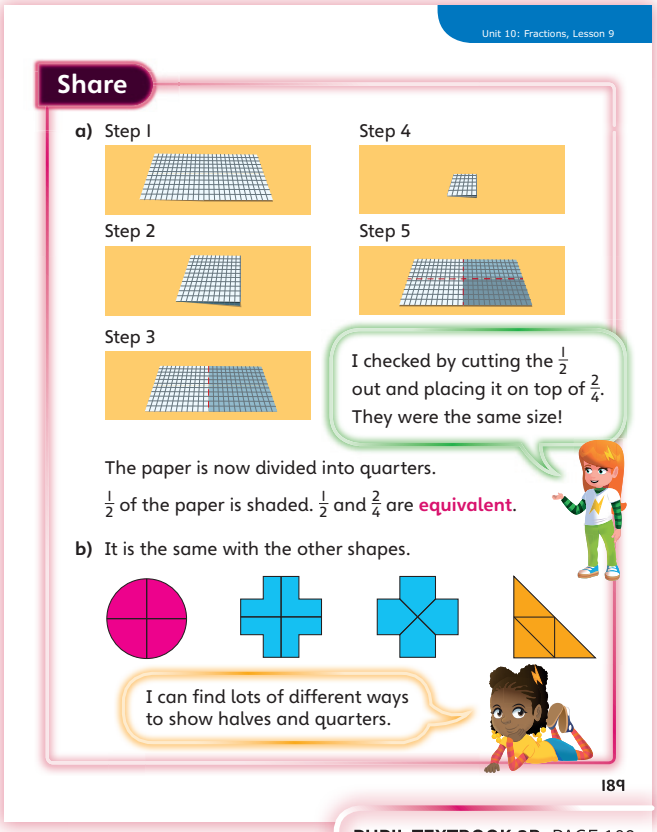
WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): *Do one half and two quarters take up the same amount of space when laid on top of each other?*
- Question 1 b): *There is more than one way to fold the cross. Is there more than one way to fold the piece of paper from question 1 a) into halves and quarters?*
- Question 1 b): *Would $\frac{1}{2}$ of the circle be equivalent to $\frac{2}{4}$ of the cross?*

IN FOCUS Using the pieces of paper that children folded and coloured in question 1 a), introduce the word equivalent. Ask: *Is one half equivalent to one quarter?* Encourage children to check this by cutting out their two quarters and laying them on top of the other half, as Astrid suggests. Ask children to demonstrate that this works for the other shapes. Do children understand that they need to use a circular piece of paper to find a fraction of a whole circle?

Children may not realise that the triangle can be halved twice to make quarters: you have to fold it vertex-to-vertex twice. Can children draw how the triangle looks after two vertex-to-vertex folds?


Unit 10: Fractions, Lesson 9

Share

a) Step 1
Step 2
Step 3
Step 4
Step 5

I checked by cutting the $\frac{1}{2}$ out and placing it on top of $\frac{2}{4}$. They were the same size!

The paper is now divided into quarters.

$\frac{1}{2}$ of the paper is shaded. $\frac{1}{2}$ and $\frac{2}{4}$ are **equivalent**.

b) It is the same with the other shapes.

I can find lots of different ways to show halves and quarters.

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Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1 : *Does each whole have to be the same size to compare?*
- Question 1 : *How many different ways can you show this with the same piece of paper?*

IN FOCUS Once children have had a go at splitting one piece of paper into halves and quarters, give them a different shaped piece of paper to do the same thing. Ask children to show one half and to show two quarters, and encourage them to compare them to show that they are still equal.

Question 2 asks children to model the same concept of equivalence but with counters. Eight counters have been circled into halves and quarters.

STRENGTHEN In questions 2 and 3 , encourage children to recreate what is shown on the page using multilink cubes, showing the different parts by using different coloured cubes or by stacking cubes. Comparing one half of the number of cubes to two quarters of the number of cubes in different colours will show that the amounts are the same but are made of different parts.

DEEPEN Ask children to use the numbers and pictorial representations in questions 2 and 3 to draw their own bar model with labelled parts, showing each half being split in half to make quarters. Demonstrate this first on a part-whole model to structure children's understanding of where each number comes from.

ASSESSMENT CHECKPOINT In question 1 , do children understand that the two wholes have to be the same size to start with?

When comparing a group of counters that has been arranged into halves and quarters in question 2 , do children remember that they are comparing two of the quarters and put another circle around them? Do children have to use a sharing strategy to work out $\frac{1}{2}$ and $\frac{1}{4}$ of 8? Do they use their answer for $\frac{1}{2}$ to fill in question 2 b) or do they work it out afresh?

ANSWERS

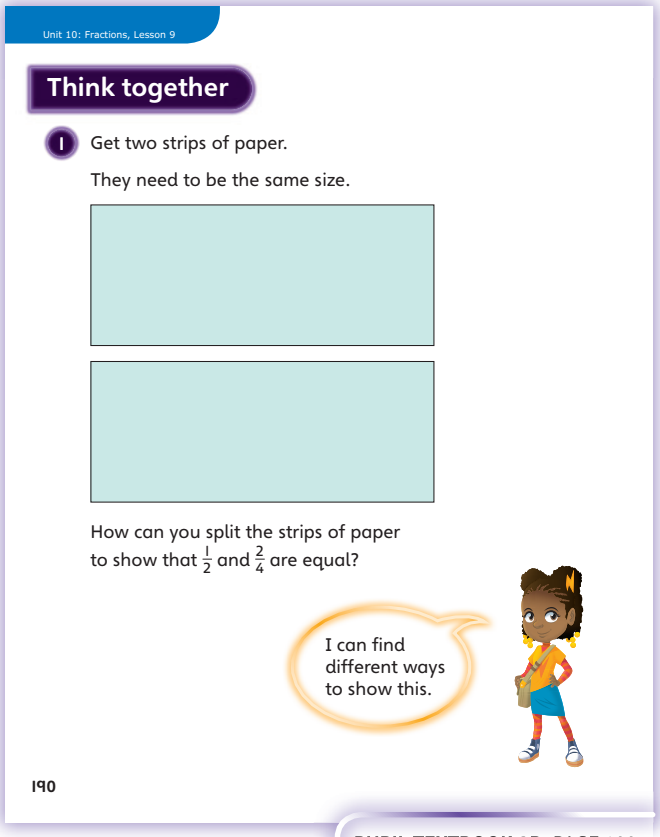
Question 1 : Children can split the strips into equal parts using any sensible strategy.

Question 2 a): $\frac{1}{2}$ of 8 is 4.

Question 2 b): $\frac{1}{4}$ of 8 is 2.

$\frac{2}{4}$ of 8 is 4.

Question 3 : Yes. Tami has split her counters in half, which shows what $\frac{2}{4}$ of 12 is, because $\frac{2}{4}$ is equivalent to $\frac{1}{2}$.



Unit 10: Fractions, Lesson 9

Think together

1 Get two strips of paper.

They need to be the same size.

How can you split the strips of paper to show that $\frac{1}{2}$ and $\frac{2}{4}$ are equal?

I can find different ways to show this.

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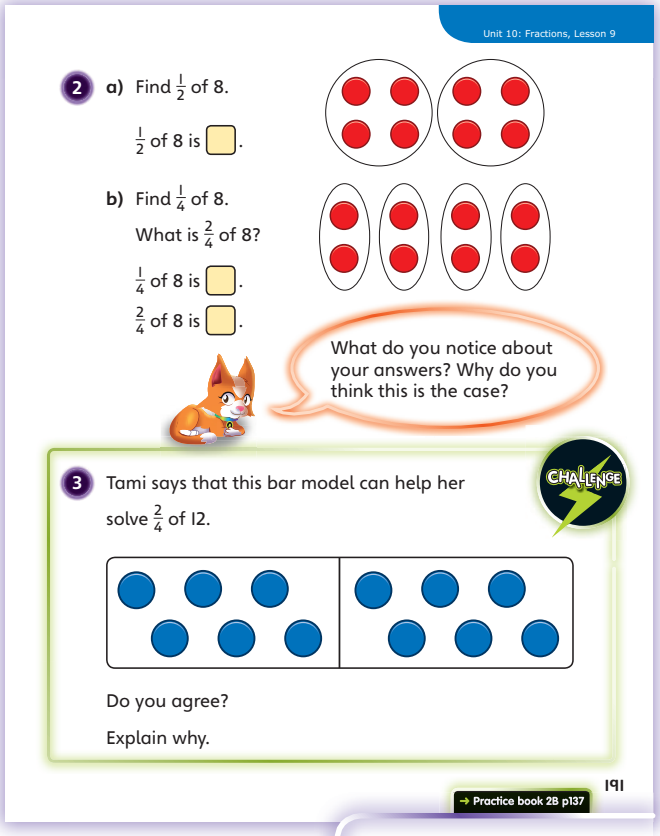

Unit 10: Fractions, Lesson 9

2 a) Find $\frac{1}{2}$ of 8.

$\frac{1}{2}$ of 8 is ☐.

b) Find $\frac{1}{4}$ of 8.

What is $\frac{2}{4}$ of 8?

$\frac{1}{4}$ of 8 is ☐.

$\frac{2}{4}$ of 8 is ☐.

What do you notice about your answers? Why do you think this is the case?

3 Tami says that this bar model can help her solve $\frac{2}{4}$ of 12.

CHALLENGE

Do you agree?

Explain why.

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Practice

WAYS OF WORKING Independent thinking

IN FOCUS Question 3 requires children to reason about the size of different fractions and to work out which ones are equivalent. Encourage children to use the pictures to help them decide. Refer to what Astrid says about using the image of $\frac{1}{2}$ as a benchmark: less than and greater than a $\frac{1}{2}$.

Question 5 asks children to work with fractions of numbers and investigate which numbers can be divided into halves and quarters. Encourage children to model this using cubes. It may help children to put cubes into a large part-whole model.

STRENGTHEN Encourage children to circle one half of the cherries in question 4. They have done this with a shape and this question asks them to practise with a quantity. Do children conclude that, as long as 10 cherries are circled, this is one half of 20?

DEEPEN For children who are confident that $\frac{1}{2}$ is equal to $\frac{2}{4}$ give them a $\frac{1}{4}$ and see if they can work out a half. For example, $\frac{1}{4}$ is 5. What is a $\frac{1}{2}$?

Some children may find the whole first (20), then halve it to get a half (10). Children may then see that they can simply double $\frac{1}{4}$ to get a $\frac{1}{2}$.

ASSESSMENT CHECKPOINT In question 2, do children colour in two cubes for $\frac{1}{2}$ or do they colour in one cube because the numerator is 1? Do they colour in the same cubes as they shaded for $\frac{2}{4}$ or do they use a count one, leave one strategy?

In question 4, how do children work out $\frac{1}{2}$ and $\frac{2}{4}$ of 20? Do they share out cubes; do they use a circle one, leave one strategy; or do they simply know it as a number fact?

Do children spot the link between the 4 times-table and numbers that can be divided into quarters?

ANSWERS Answers for the **Practice** part of the lesson appear in the separate **Practice and Reflect answer guide**.

Reflect

WAYS OF WORKING Whole class

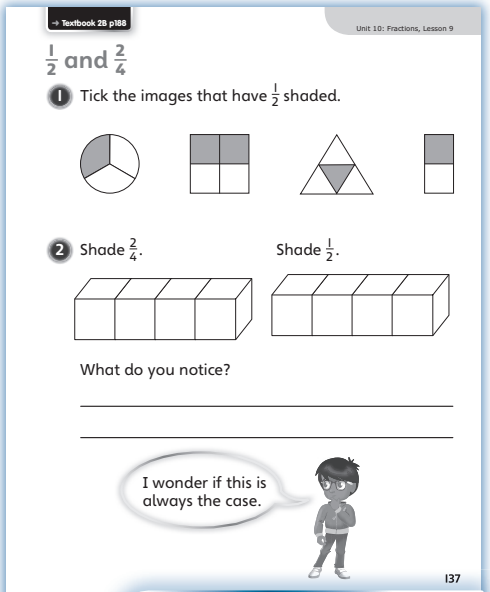
IN FOCUS Children choose their own method to demonstrate equivalence between $\frac{1}{2}$ and $\frac{2}{4}$. They can fold paper, cut paper, stack cubes, and so on. Ensure that, whichever method they choose, children label each part and clearly show how one half has been halved again.

ASSESSMENT CHECKPOINT Listen for the words that children use in their explanation, such as the words 'equivalent' or 'equivalence' or references to the numerator and denominator. Do children understand that the whole has to be the same each time in order to compare the fractions?

ANSWERS Answers for the **Reflect** part of the lesson appear in the separate **Practice and Reflect answer guide**.

After the lesson

- Did children mention the relationship between the numerator and denominator in these equivalent fractions?
- Did children show that they understood one quarter as half of a half? Did children apply this to working out one quarter of a number?
- Did children understand that wholes have to be the same for the fractions to be equivalent?



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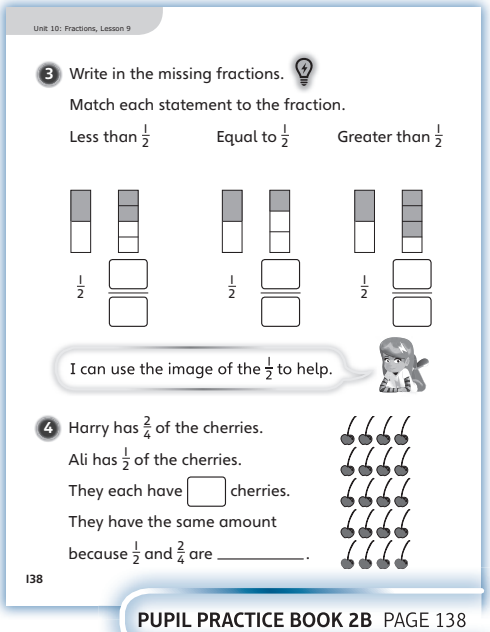

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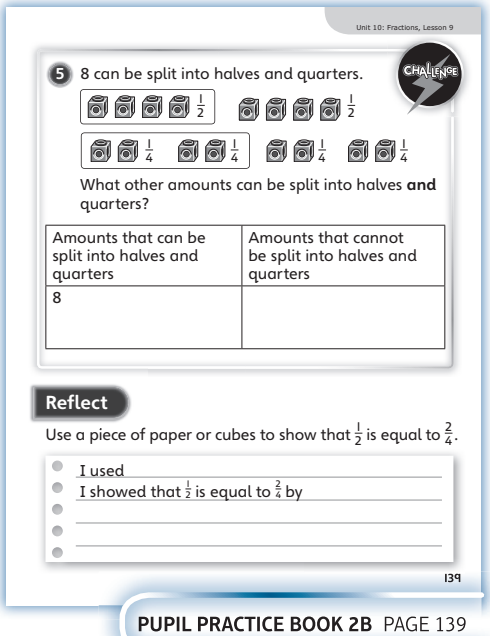

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