

Equal and unequal parts

CN3L11

Recognising what is not one half or one quarter

Objectives

- Read and write proper fractions, interpreting the denominator as the parts of a whole and the numerator as the number of parts.
- Identify and estimate fractions of shapes.
- Use diagrams to compare fractions and establish equivalents.

Prior knowledge and skills

- Recognising simple fractions of shapes and quantities

Vocabulary

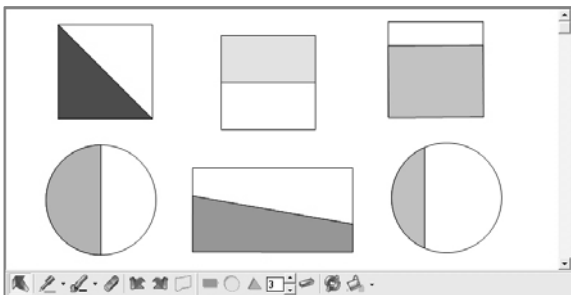
half, halves, half of, quarter, one quarter of, equal, different

Resources

- Resource sheet
- paper squares, circles and rectangles, and scissors for support group

Oral and mental starter

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Practise identifying halves of shapes.

Q Which shapes are divided into halves? How do you know?

Rotate and then drag and drop the coloured part of each shape in turn to show whether it fits into the other 'half' of the shape. To rotate the coloured part of a shape, click on the 'Rotate' button on the toolbar and then on a coloured part to create rotation handles that can be dragged around. To drag the coloured part after a rotation, click on the 'Select' button.

Establish that dividing a shape into 2 pieces does not make these 2 pieces halves. The pieces must be equal in size.

Move to question 2 and repeat the activity for quarters of shapes.

Q Which shapes are divided into quarters? How do you know?

Do you think this part is the same size as each of the other 3 parts?

Which of these shapes are not cut into quarters?

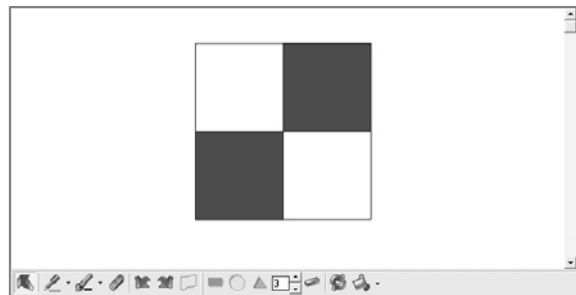
Drag the coloured part of each shape in turn to show whether it fits into another 'quarter' of the shape, rotating if necessary.

Establish that dividing a shape into 4 pieces does not necessarily make those 4 pieces quarters. In order to be quarters, the pieces must be equal in size.

Main teaching activity

Whole class

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Refer to the square divided into quarters.

Q What fraction of this shape is red? (one half, $\frac{1}{2}$)

Establish that you can colour half of a shape by colouring any 2 quarters – they do not have to be next to each other.

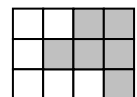
Drag and drop one red square next to the other, to clarify that half of the square is red.

Move to question 2.

Q What fraction of this shape is red? (one half, $\frac{1}{2}$)

Initially, it is clear that half the rectangle is red. Move the red squares around inside the rectangle to see that there are many possible arrangements, emphasising through questioning that the fraction of the shape that is red remains one half, regardless of the arrangement.

Ensure that you include arrangements where the 2 halves are of different shapes so that children see that halves are equal amounts but not necessarily identical shapes.



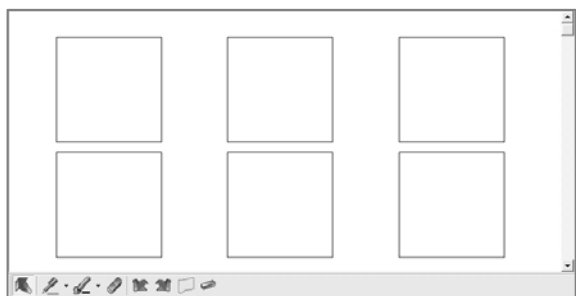
Move to question 3 to reveal a rectangle divided into eighths.

Q What fraction of this shape is red? (one quarter, $\frac{1}{4}$)

Establish that you can colour a quarter of a shape by colouring any 2 eighths – they do not have to be next to each other.

Drag one red square next to the other, to clarify that one quarter of the square is red.

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Click on the 'Pen' button on the toolbar. Invite a child to sketch a line on a square to halve it.

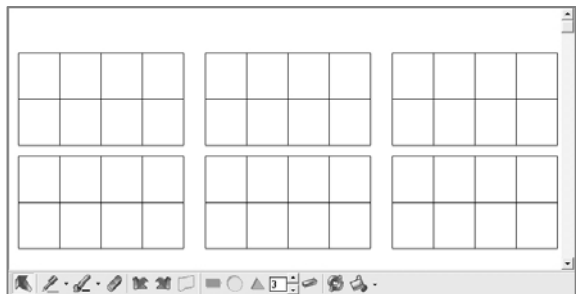
Q Do you agree that this line has halved the square?

Discuss any allowances you have to make for inaccuracies due to sketching. Establish that, to check if the square has been halved, you need to judge whether the 2 parts are the same size. To reinforce the fact that halves means 2 equal parts, you might like to invite a child to split the square into 2 parts that are obviously **not** halves.

Repeat to show different ways of halving the square. Include oblique lines that leave 2 irregular quadrilaterals of equal size and shape. (**Note:** Clicking on the 'Eraser' button on the toolbar and then on any hand-drawn lines will remove them.)

Move onto question 2 and repeat the activity for quarters.

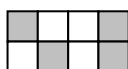
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Select the 'Fill colour' tool and invite suggestions for colouring half of the rectangle. Children click on squares to colour them, to demonstrate suggestions. Clicking on the square again will remove the colour.

Q How many squares do you need to colour so that half the shape is red? How do you know?

Establish that 4 squares need to be coloured. While some may decide by considering the numbers involved (4 is half of 8), many will do it spatially, filling in squares until they can see that half of the shape is coloured, whether by colouring a 'horizontal' half (a row of squares) or a 'vertical' half (the left or right 2 x 2 group of squares). Children who halve the shape spatially may have more difficulty in seeing that half of the shape is shaded in disjointed shading such as:



Move onto question 2 and repeat the activity for one quarter.

Pairs

Read the Resource sheet around the class. Check that children understand what is being asked.

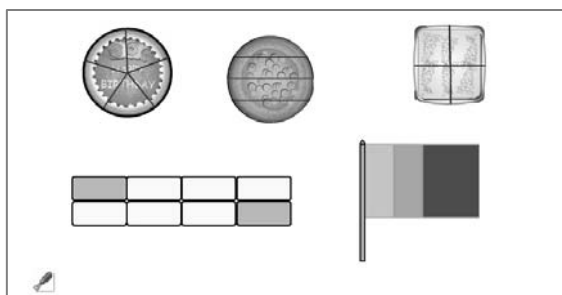
Children work in pairs to discuss and justify their answers to the questions. When they have created their own problems, pairs solve each other's problems. Encourage children to invent problems that show they understand that parts of a shape must be equal in size to be the same fraction.

Support: Give children paper shapes: squares, circles and rectangles. Children create their own fraction parts (halves and quarters) by folding and cutting their shapes, and putting one part on top of the other to check that it is the same.

Extension: Encourage children to invent problems about thirds, fifths, eighths and tenths, showing divisions of shapes into fractions and unequal parts.

Review

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Use the whiteboard to go through the Resource sheet problems. Expect children to explain their reasoning clearly. Help them to show their reasoning by dragging parts of the shapes. Draw a few of children's own problems and discuss the reasoning behind the answers, e.g.

Q Why do you think this is a third and this is not? What is different about them?

Key idea and assessment

A half is 1 of 2 equal parts. A quarter is 1 of 4 equal parts.

Can children ...

- identify what is a half of a shape and what is not?
- identify what is a quarter of a shape and what is not?

Solutions

1. Jo (e.g. The 4 parts are not equal.)
2. Mina (e.g. There are 4 equal parts.)
3. Femi (e.g. The shaded part is not one of 3 equal parts.)
4. Mel (e.g. There are 5 equal parts.)
5. Mo (e.g. 2 is one quarter of 8.)
6. Children's own problem