Lesson - Fractions: thirds, quarters and halves

Year: Year 2

Hello, I am Otto! A fraction is a part of a whole. When you share a pizza fairly between friends, you are using fractions. In Year 2 you learn about halves, thirds and quarters. You find fractions of shapes and fractions of amounts, and you meet fractions that are equal.

Starter activity

Fold a piece of paper in half so that the two parts match exactly. Fold it in half again. How many equal parts do you have now? Open it out and shade one part. You have shaded one quarter of the paper! Now try to share 12 sweets between 3 friends so that everyone gets the same number.

What is a fraction?

Definition: fraction

A **fraction** is a part of a whole. To make a fraction, split a shape or an amount into **equal** parts. The parts must be exactly the same size. If the parts are not equal, they are not fractions.

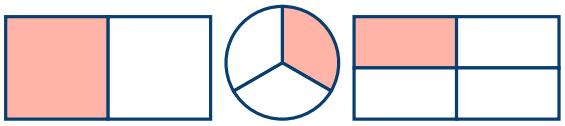
Definition: numerator and denominator

The bottom number is the **denominator**. It tells you how many equal parts there are altogether. The top number is the **numerator**. It tells you how many of those parts you are talking about. In $\frac{3}{4}$, the denominator is 4 and the numerator is 3.

Halves, thirds and quarters

Key fact: unit fractions

- A **half** ($\frac{1}{2}$) is 1 of 2 equal parts.
- A **third** ($\frac{1}{3}$) is 1 of 3 equal parts.
- A **quarter** ($\frac{1}{4}$) is 1 of 4 equal parts.



From left to right: one half, one third and one quarter are shaded.

Worked example 1

A circle is split into 3 equal parts. 1 part is shaded. What fraction is shaded?

There are 3 equal parts, so the denominator is 3. One part is shaded, so the numerator is 1. The fraction is $\frac{1}{3}$.

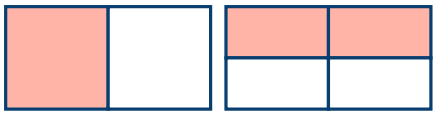
Watch out

The parts must be *equal*. If a rectangle is cut into a big part and a small part, neither part is a half. Always check that the parts are the same size. The more parts there are, the smaller each part is: a quarter is smaller than a half.

Equivalent fractions: two quarters are one half

Definition: equivalent fractions

Equivalent fractions are different fractions that show the same amount. For example, $\frac{2}{4}$ of a shape is the same amount as $\frac{1}{2}$ of the same shape.



Both shapes have the same amount shaded. $\frac{1}{2} = \frac{2}{4}$.

Worked example 2

A pizza is cut into 4 equal slices. Sam eats 2 slices. What fraction of the pizza does Sam eat? Write it as a half too.

2 of the 4 slices: $\frac{2}{4}$. This is the same as $\frac{1}{2}$ of the pizza.

Fractions of an amount

Method: finding a fraction of an amount

1. Look at the denominator. It tells you how many equal groups to share into.
2. Divide the amount by the denominator to find one equal share.
3. If the numerator is more than 1, multiply the share by the numerator.

Rule: unit fractions as division

- Half of an amount: divide by 2.
- A third of an amount: divide by 3.
- A quarter of an amount: divide by 4.

Worked example 3

Find $\frac{1}{3}$ of 12 sweets.

Divide 12 by 3. 12 ÷ 3 = 4. So $\frac{1}{3}$ of 12 is **4 sweets**. Check: 3 groups of 4 make 12.

Worked example 4

Find $\frac{1}{4}$ of 20 pence.

Divide 20 by 4. 20 ÷ 4 = **5**. So a quarter of 20p is 5p.

Non-unit fractions

Definition: non-unit fraction

A **non-unit fraction** has a numerator bigger than 1, for example $\frac{2}{3}$ or $\frac{3}{4}$. It means more than one of the equal parts.

Worked example 5

Find $\frac{3}{4}$ of 12 counters.

First find one quarter: 12 ÷ 4 = 3. Then multiply by 3: 3 × 3 = 9. So $\frac{3}{4}$ of 12 is **9 counters**.

Worked example 6

Find $\frac{2}{3}$ of 15 stickers.

One third of 15 is 15 ÷ 3 = 5. Two thirds is 2 × 5 = **10 stickers**.

Key fact: counting in fractions

You can count in quarters: one quarter, two quarters, three quarters, one whole. Four quarters make a whole. Two halves make a whole. Three thirds make a whole.

Fractions in everyday life

We use fractions all the time. A quarter of an hour is 15 minutes. Half a litre of juice is half of one litre. When you cut a cake into 4 equal slices, each slice is one quarter. When you share a bar of chocolate, you must break it into equal parts to be fair.

Worked example 7

A film lasts 1 hour. It is a quarter of the way through. How many minutes have gone by?

1 hour is 60 minutes. A quarter of 60 is 60 ÷ 4 = **15 minutes**.

Did you know?

The word "quarter" comes from the Latin word for "four". A quarter-hour clock chime rings every 15 minutes. A pound coin is divided into 100 pence, so a quarter of a pound is 25p, which is why we call 25 cents in America a "quarter".

Otto's tip

To check a fraction of an amount, multiply back. If a quarter of 20 is 5, then 4 × 5 should be 20. It is! And remember: the bigger the denominator, the smaller the share. A quarter is smaller than a third, and a third is smaller than a half.