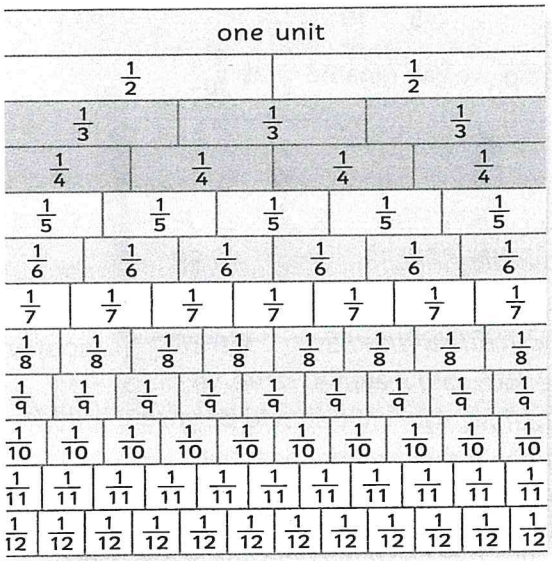
Fractions 1

Your child will be learning about fractions – up to twelfths – over the coming days. Your child needs to know some of the mathematical language associated with fractions, such as: fractions, fraction wall, order, match, multiply, numerator, denominator, equivalent, amount, proper/improper fractions, mixed numbers, number line, express, whole number.

Comparing fractions



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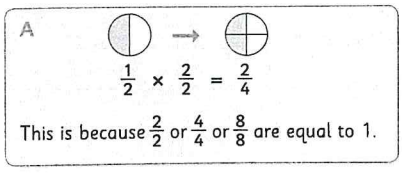
Fraction walls are a very effective way to compare fractions. You could ask your child's teacher for a photocopy of the strips which make up a fraction wall or they could be downloaded off the internet. Alternatively, look at the fraction wall on page 51, *Busy at Maths 5*. Once you have a fraction wall, the different fractions can be compared.

- *Which is bigger, $\frac{1}{2}$ or $\frac{1}{3}$?*
- *How many sixths make up $\frac{2}{3}$?*
- *How many fifths are the same as $\frac{6}{10}$?*
- *Which is smaller, $\frac{3}{11}$ or $\frac{2}{5}$?*
- *How many ninths make up a whole unit?*

Equivalent fractions

Many fractions have more than one name, e.g. $\frac{1}{2}$ is the same as $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$ and so on. We can see this clearly on the fraction wall. In school, your child will be learning that if we multiply any number by 1, it stays the same. Similarly, if we multiply any fraction by one whole (which can be $\frac{2}{2}$, $\frac{3}{3}$, $\frac{4}{4}$, $\frac{5}{5}$ and so on), the fraction will look different, but it will have the same value. This is how we quickly calculate equivalent fractions.



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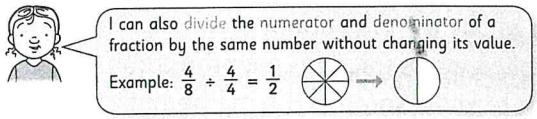
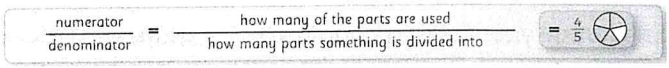


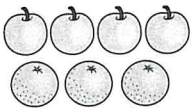
Similarly, dividing by one whole will also give us equivalent fractions.

What is a fraction?

Explain to your child that the figure above the line is called the **numerator** and the figure below the line is called the **denominator**.



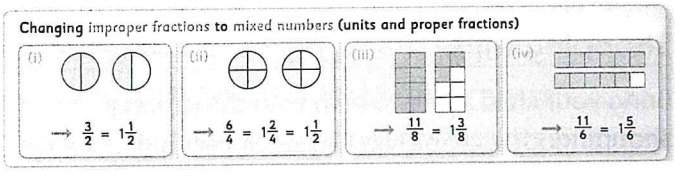
Make a fraction, using this picture:



What fraction of the fruit are apples?

$\frac{4}{7}$ – There are four apples.
7 – There are seven pieces of fruit in total.

Improper fractions to mixed numbers



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Give your child the following improper fractions to convert to mixed numbers: $\frac{5}{2}$, $\frac{7}{3}$, $\frac{6}{4}$, $\frac{10}{5}$, $\frac{12}{5}$.

Find the whole amount

Many children find this concept quite difficult, as they are not starting with the whole amount. For this activity, you will need an A4 sheet of paper divided into eight equal pieces and at least 24 cubes/marbles/pasta shells. Pose a problem to your child such as: *$\frac{5}{8}$ of my cubes is 15. How many cubes do I have altogether?*

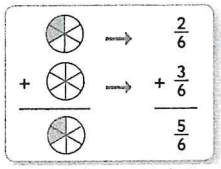
- *How many equal pieces has the paper been divided into? Yes, eight.*
- *How many of the eighths contain cubes? Yes, just five.*
- *Now, divide the 15 cubes among these five sections. How many cubes are there on $\frac{1}{8}$? Yes, $\frac{1}{8} = 3$.*
- *If we know $\frac{1}{8}$, how can we find $\frac{8}{8}$? Yes, we simply multiply the answer by 8. So, $3 \times 8 = 24$. The total is 24.*

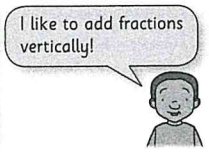
Encourage your child to place three cubes upon each section/eighth to verify the answer.

Your child will be learning about addition, subtraction and multiplication of fractions over the coming days. S/he needs to know some of the mathematical language associated with fractions, such as: adding, subtracting, multiplying, mixed numbers, amount, simplify, different denominations.

Adding and subtracting fractions with the same denominator

Fractions with the same denominator (number on the bottom) are easy to add and subtract.





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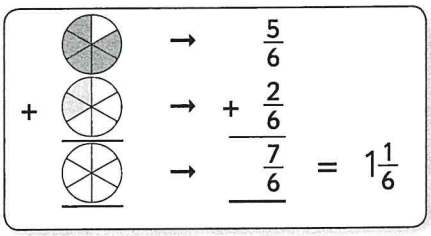
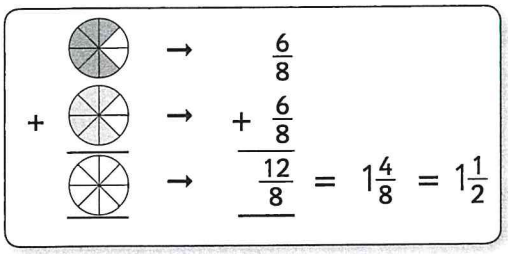
Sometimes the answer will be an improper fraction (the top will be larger than the bottom). In such cases, your child will need to change the answer to a mixed number (a whole number and a fraction).

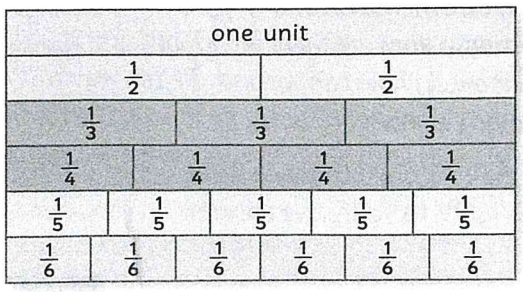


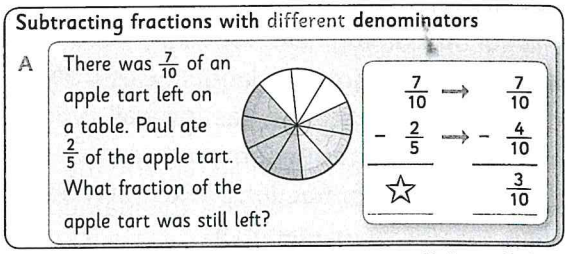
Sometimes the answer can be simplified even further:



Adding and subtracting fractions with different denominators

We cannot add or subtract fractions with different denominators. One of the fractions must be changed to an equivalent fraction (an equivalent fraction has the same value but a different denominator). The fraction wall below makes it easy for your child to change the denominator of a fraction to another denominator.





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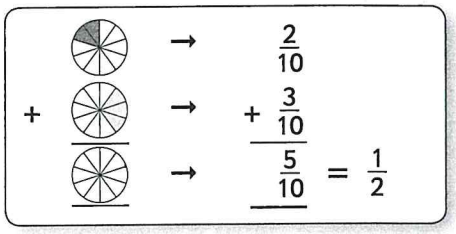
$$\frac{1}{5} + \frac{3}{10} = ?$$

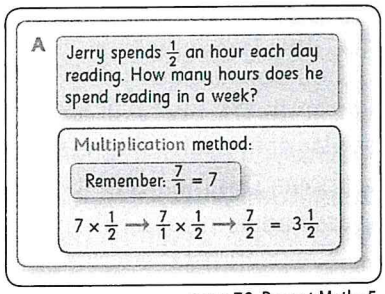
In this example, we can rename $\frac{1}{5}$ as $\frac{2}{10}$:



Once the denominators are the same, we can add or subtract as before. Your child should be encouraged to simplify his/her answers where possible.

Multiplying fractions by a whole number

Your child will learn how to multiply a fraction by a whole number.



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$$\frac{2}{8} \times 3 = \frac{6}{8}$$

We teach the children to change the whole number to a fraction. 3 units can be written as $\frac{3}{1}$. Now, your child can multiply a fraction by a whole number.

$$\frac{2}{8} \times \frac{3}{1} = \frac{6}{8}$$

The simple rule is to 'multiply the top by the top' and the 'bottom by the bottom'.

Decimals

Your child will be learning about decimals involving tenths, hundredths and thousandths over the coming days. S/he will need to know the mathematical language associated with decimals: equals sign, calculator, tenths, hundredths, thousandths, decimals, decimal number, decimal fraction, bigger, smaller, unit, ten, hundred, thousand, equal part, odd one out, whole numbers, decimal point, value of digits, placeholder, rectangles, metre, centimetre, swap, after, before, between, less, more than, groups of, sets of, bundles of, count, match, count forwards, count backwards, hundreds house, tens house, units house, tenths house, hundredths house, divide, kilogramme, gram, litre, millilitre, kilometres.

Definitions

- A **decimal number** is a number that has a decimal part, e.g. 9 is a whole number but 9·**3** is a decimal number.
- A **decimal fraction** is the decimal part of a decimal number, e.g. 9·**345** is a decimal number but $\frac{345}{1000}$ or ·**345** is the decimal fraction as it is less than 1.

The decimal point

Discuss the function of the decimal point with your child. We use a decimal point to separate the units from the fractions. Anything to the left of the decimal point is made up of whole numbers; anything to the right of the decimal point is made up of fractions or pieces of numbers. The decimal point is always placed between the units and the tenths house. Explain that 0·437 in words is: zero point four three seven **or** 437 thousandths **or** four tenths + 3 hundredths + 7 thousandths.

Note: It is important to make the connection between fractions and decimals at all times, where possible.

Calculator fun

Invite your child to enter [0] [·] [1] [+] into his/her calculator. Ask him/her to keep pressing the equals sign ([=]). The display on the calculator will count up in tenths ($\frac{1}{10}$), [0] [·] [1], [0] [·] [2] ... [0] [·] [9], stop your child here, if possible, and ask him/her to suggest what s/he thinks the next decimal number displayed on the calculator will be. Allow him/her to explain his/her reasoning. Then invite your child to offer explanations as to why the calculator displays 1·0 after 0·9 instead of 0·10.

Extension: Proceed as above but this time, invite your child to enter [0] [·] [0] [1] [+] into the calculator. Invite your child to keep pressing the equals sign ([=]). Ask your child why 0·02/0·03/0·04, etc. is displayed on the calculator instead of 0·10/0·20/0·30. Then invite him/her to predict what the screen will display after 0·99.

Making decimal numbers from materials in the environment

Give your child a piece of string/cord measuring 1 metre. Invite him/her to cut the metre into ten equal parts. Allow him/her to discover that the length of $\frac{1}{10}$ or 0·1 of a metre is actually 10cm. Similarly, invite your child to cut up one of the 10cm strips into ten equal parts. Allow him/her to discover that the length of $\frac{1}{100}$ or 0·01 of a metre is actually 1 centimetre (1cm). Finally, invite your child to cut up the 1cm into ten equal parts to get $\frac{1}{1000}$ or 0·001 of a metre which is actually 1 millimetre (1mm).

Extension 1: Get a kilogramme (1,000g) bag of sugar/pasta shells (or anything that you have to hand) and ask your child to divide it into 10 equal parts (100g), 100 equal parts (10g) and 1,000 equal parts (1g). A 1 litre (1,000ml) bottle of water could also be divided into 10 equal parts (100ml), 100 equal parts (10ml) and 1,000 equal parts (1ml).

Extension 2: Discuss $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{4}{5}$, 0·2, 0·4, 0·33, etc. of the amounts above in metres, litres and kilgrammes.

Dice lotto

Materials required: Four different-coloured dice (9-sided dice is ideal but, if not available, 6-sided dice will suffice), digit cards, red counter representing decimal point, cubes

Player A rolls the four dice and makes the biggest decimal number (to three decimal places) possible, e.g. if Player A rolls a 3, 6, 7 and 3, the biggest decimal number Player A can make is 7·633. Player A can write the number on a piece of paper. Player B takes his/her turn to make the biggest decimal number possible with the four dice. If s/he rolls a 4, 3, 6 and 5, the biggest number s/he makes is 6·543. Player B can also write the number on a piece of paper. Whichever player's number is the biggest wins a cube. In the above scenario, Player A wins a cube as 7·633 is bigger than 6·543. Play continues as above until a player wins five cubes.

Percentages 1

Your child will be learning about percentages for the first time over the coming days. Your child needs to know some of the mathematical language associated with percentages: per cent, percentage, fraction, units, hundredths, change, number line, smallest, largest, amounts.

What does 'per cent' mean?

Your child will have heard the word 'per cent' used informally over the past number of years, for example:

- James got 100% in his test.
- Mam's mobile phone battery is down to 40%.
- The television's recording box is 80% full.
- The players gave 100% effort during the game.

Explain to your child that 'per cent' means 'per hundred' or 'out of one hundred'. For example, if there are 100 apples in a crate and 94% of them were sold, then 94 apples were sold.

Research percentages

Look up some interesting percentage facts with your child and discuss them, for example:

- *What percentage of the world is covered by land?*
- *What percentage of a tomato is actually water?*
- *What percentage of the world's population speaks Spanish?*
- *What percentage of the human body is made up of blood?*

Fractions as percentages

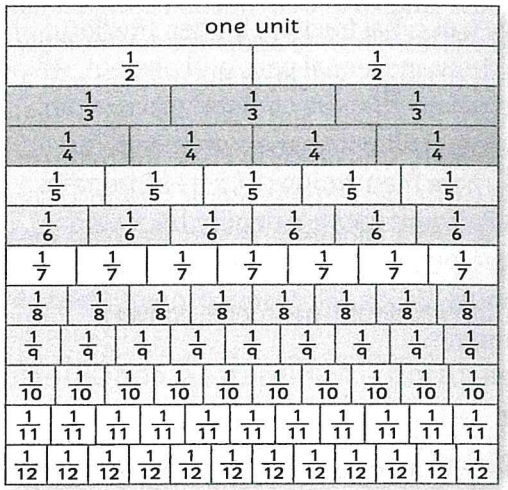
We know that 'per cent' means 'per hundred', so when a fraction is written as hundredths, it is simple to change it to a percentage:

$$\frac{1}{100} = 1\%$$
$$\frac{79}{100} = 79\%$$

Your child has already learned that other fractions can be changed to equivalent fractions (fractions that look different but have the same value) by multiplying by 1 unit (e.g. $\frac{2}{2}$, $\frac{3}{3}$, $\frac{10}{10}$). So by changing a fraction to hundredths, we can easily change them to percentages:

$$\frac{3}{10} \times \frac{10}{10} = \frac{30}{100} = 30\%$$
$$\frac{4}{20} \times \frac{5}{5} = \frac{20}{100} = 20\%$$
$$\frac{3}{4} \times \frac{25}{25} = \frac{75}{100} = 75\%$$

Once the denominators (the numbers on the bottom of a fraction) are the same, we can add or subtract them, as done earlier. The children are always encouraged to simplify their answers where possible.



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Find a percentage of the whole

You will need concrete items for sharing, e.g. cubes/counters/marbles/coins. Explain to your child that you have 20 cubes in your hand and you want to give 30% of them to your friend. Explain that in order to find a percentage of a number, you must change the percentage into a fraction: $30\% = \frac{30}{100}$ or $\frac{3}{10}$. So we must find $\frac{3}{10}$ of the 20 cubes.

Share the cubes equally into 10 piles until they are all gone. Ask your child questions such as:

- *How many cubes are in each pile? Yes, 2!*
- *Have the cubes been shared equally? Yes!*
- *So, what is $\frac{1}{10}$ of 20? Yes, it is 2!*
- *If $\frac{1}{10}$ is 2, what is $\frac{3}{10}$? Yes, $2 \times 3 = 6$!*

Percentages at home

Look at the weights of different food objects in your kitchen. Ask your child to calculate different percentages of each, for example:

- *What weight is 40% of this bag of flour?*

Test percentages

When your child brings home test scores that are written in fraction form, help him/her to convert the scores into percentages, e.g. $\frac{19}{20} = \frac{95}{100} = 95\%$.

Your child will be learning about fractions, decimals and percentages over the coming days. S/he will be shown the direct link between fractions, decimals and percentages. This is a vital link that needs to be made. Your child needs to know some of the mathematical language associated with fractions, decimals and percentages: per cent, percentage, fraction, decimal, units, hundredths, round, whole number, simplify, calculator, horizontal bar-line graph, pie chart, increase, decrease, lowest terms, remainders, extra free, kilogramme, reduced, original price, calculate.

Note: All the activities on Sheets 11, 13, 14 and 19 are relevant here as well.

Fractions as percentages

We know that 'per cent' means 'per hundred', so when a fraction is written as hundredths, it's easy to change it to a percentage:

$\frac{4}{100} = 0{\cdot}04 = 4\%$
$\frac{65}{100} = 0{\cdot}65 = 65\%$
$\frac{94}{100} = 0{\cdot}94 = 94\%$

Your child has already learned that other fractions can be changed to equivalent fractions (fractions that look different but have the same value) by multiplying by 1 unit (e.g. $\frac{2}{3}$, $\frac{3}{3}$, $\frac{10}{10}$). So by changing a fraction to hundredths, we can easily change them to decimals or percentages:

$\frac{4}{10} \times \frac{10}{10} = \frac{40}{100} = 0{\cdot}40 = 40\%$
$\frac{7}{20} \times \frac{5}{5} = \frac{35}{100} = 0{\cdot}35 = 35\%$
$\frac{1}{4} \times \frac{25}{25} = \frac{25}{100} = 0{\cdot}25 = 25\%$

Once the denominators (numbers on the bottom of a fraction) are the same, we can add or subtract them, as done earlier. The children are always encouraged to simplify their answers to the smallest fraction:

$20\% = \frac{20}{100} = \frac{2}{10} = \frac{1}{5}$
$75\% = \frac{75}{100} = \frac{3}{4}$
$35\% = \frac{35}{100} = \frac{7}{10}$
$60\% = \frac{60}{100} = \frac{3}{10}$
$85\% = \frac{85}{100} = \frac{17}{20}$
$35\% = \frac{35}{100} = \frac{7}{20}$
$36\% = \frac{36}{100} = \frac{9}{25}$

Find a percentage of the whole

You will need concrete items for sharing, e.g. cubes, counters, marbles or coins. Explain to your child that you have 40 cubes in your hand and you want to give 60% of them to him/her. Explain that in order to find a percentage of a number, you must change the percentage into a fraction in its lowest possible terms: $60\% = \frac{60}{100}$ or $\frac{6}{10}$ or $\frac{3}{5}$, so we must find $\frac{3}{5}$ of the 40 cubes. Share the cubes equally into 5 piles until they are all gone. Ask your child questions such as:

- *How many cubes are in each pile? Yes, 8!*
- *Have the cubes been shared equally?*
- *So what is $\frac{1}{5}$ of 40? Yes, it's 8!*
- *If $\frac{1}{5}$ is 8, what is $\frac{3}{5}$? Yes, $8 \times 3 = 24$!*

The quick method:

$\frac{5}{5}$ = 40 coins
$\frac{1}{5}$ = 8 coins
$\frac{3}{5}$ = 24 coins

Percentage (%) extra free

When you are out shopping, show your child some of the offers that the shop or supermarket is making and try to get him/her to work out the saving, if any.

The bananas were on sale at four for €1. There is now one banana extra free.

Ask questions such as:

- *How many bananas were on sale at first?*
- *What was the cost of each banana? Yes, 25c.*
- *What is the percentage extra now? Yes, 25%.*
- *What is 25% as a fraction? Yes, $\frac{1}{4}$.*
- *What is $\frac{1}{4}$ of 4? Yes, 1.*
- *How many extra bananas are in the bunch now? Yes, 1.*
- *How many bananas are there now? Yes, 5.*
- *What is the cost of each banana? Yes, 20c.*
- *What is the saving on each banana? Yes, 5c.*

Do this type of exercise with as many items as you can, but make sure the numbers being used aren't too big.

Your child received his/her first formal introduction to percentages in Chapter 19. In this chapter, his/her knowledge and understanding of percentages will be increased. Connections will be made between percentages, fractions and decimals. Your child needs to know some of the mathematical language associated with percentages: per cent, percentage, fraction, decimal, units, hundredths, simplify, calculator, horizontal bar-line graph, pie chart, increase, decrease.

Fractions as percentages

Your child should know by now that the word 'per cent' means 'per hundred', so when a fraction is written as hundredths, it is relatively simple to change it to a percentage:

$$\frac{1}{100} = 1\%$$
$$\frac{79}{100} = 79\%$$

Your child has already learned that other fractions can be changed to equivalent fractions (fractions that look different but have the same value) by multiplying by 1 unit (e.g. $\frac{2}{2}$, $\frac{3}{3}$, $\frac{10}{10}$). So by changing a fraction to hundredths, we can easily change them to percentages:

$$\frac{3}{10} \times \frac{10}{10} = \frac{30}{100} = 30\%$$
$$\frac{4}{20} \times \frac{5}{5} = \frac{20}{100} = 20\%$$
$$\frac{3}{4} \times \frac{25}{25} = \frac{75}{100} = 75\%$$
$$\frac{3}{5} \times \frac{20}{20} = \frac{60}{100} = 60\%$$

We can work backwards to change a percentage into a fraction in its simplest terms:

$$70\% = \frac{70}{100} = \frac{7}{10} \text{ (we divided by } \frac{10}{10})$$
$$80\% = \frac{80}{100} = \frac{4}{5} \text{ (we divided by } \frac{20}{20})$$

Decimals as percentages

Once your child knows how to change a fraction to a percentage, changing a decimal to a percentage is easy! We simply change the decimal to a fraction (into hundredths is easiest). Then we can write it as a percentage:

$$0{\cdot}3 = \frac{3}{10} = \frac{30}{100} = 30\%$$
$$0{\cdot}04 = \frac{4}{100} = 4\%$$
$$0{\cdot}86 = \frac{86}{100} = 86\%$$

Find the whole amount

How do we find the whole amount when we are given a percentage of the whole? Example: *40% = €8. What is the whole amount?* Many children find this concept quite difficult, as they are not starting with the whole amount. For this activity, you will need concrete items for sharing, e.g. cubes, counters, marbles or coins. Explain to your child that you have eight cubes in your hand. These eight cubes represent 40% of the whole amount. Explain that you must first change the percentage into a fraction:

$$40\% = \frac{40}{100} \text{ or } \frac{4}{10} \text{ or } \frac{2}{5}, \text{ so } \frac{2}{5} = €8.$$

Share the 8 cubes/counters into two equal piles (as there are $\frac{2}{5}$):

- *How many cubes are in each pile? (4)*
- *Have the cubes been shared equally?*
- *What does each pile represent? Each pile represents $\frac{1}{5}$. There were $\frac{2}{5}$s, as we have split them into two equal piles!*
- *So what is $\frac{1}{5}$ of the whole? Yes, it's 4!*
- *If $\frac{1}{5}$ is 4, what is $\frac{5}{5}$? Yes, $4 \times 5 = 20$.*
- *So the total amount is €20!*

Percentages while shopping

When you go shopping, help your child look out for discounts, e.g. 40% off all jumpers, 50% off all sale items, 10% off all coats. Help your child calculate the sale prices by changing the percentages to fractions and then decreasing the original price accordingly.

Similarly, while grocery shopping, point out percentage increases, such as 20% extra free, 30% more juice and so on. Help your child calculate the total volume on sale by adding on the percentage increase.