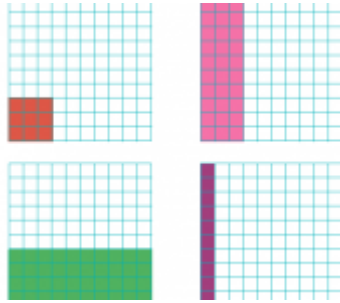


DECIMALS



In school we explain what decimals are and how they relate to money and measurement, the equivalence between fractions and decimals, partitioning, rounding and ordering decimals and adding, subtracting, multiplying and dividing decimals.

What are decimals?

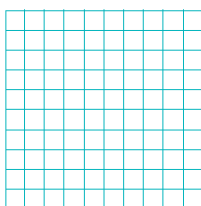
A decimal is a number expressed in the scale of tens. Commonly speaking **we talk about decimals when numbers include a decimal point to represent a whole number plus a fraction of a whole number** (tenths, hundredths, etc.).

A **decimal point** is a point or dot used to separate the whole part of a number from the fractional part of a number.



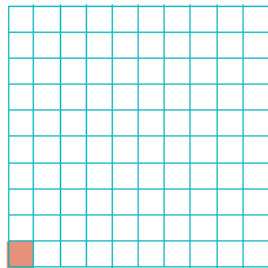
One of the best ways to describe decimals, is to show a child a blank hundred number square or number chart and explain that this represents 'one':

Hundred chart



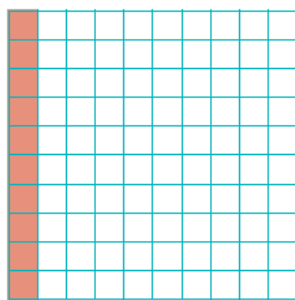
Children need to know that when we talk about decimals, it is as if we were **splitting one whole up into smaller parts**.

If you coloured in one of the squares in the above diagram, this would be represented as the decimal 0.01 (which is one hundredth or $\frac{1}{100}$).



0.01

If you coloured in ten of the squares in the above diagram (therefore colouring in $\frac{10}{100}$ or $\frac{1}{10}$), this would be represented by the decimal 0.1 (children may write 0.10 because they have coloured 10 squares – you need to explain that the zeros after decimal points are always knocked off).

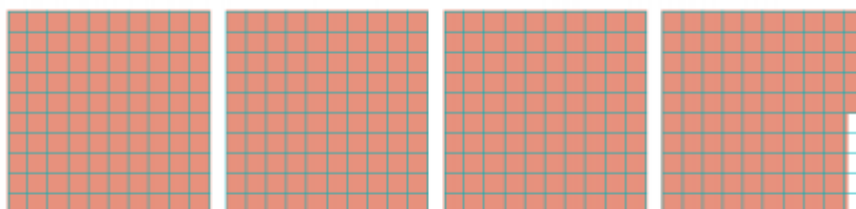


0.1

The place value of decimal numbers can be shown the following table:

3	.	9	5
Units		Tenths	Hundredths

A pictorial representation of this number is:

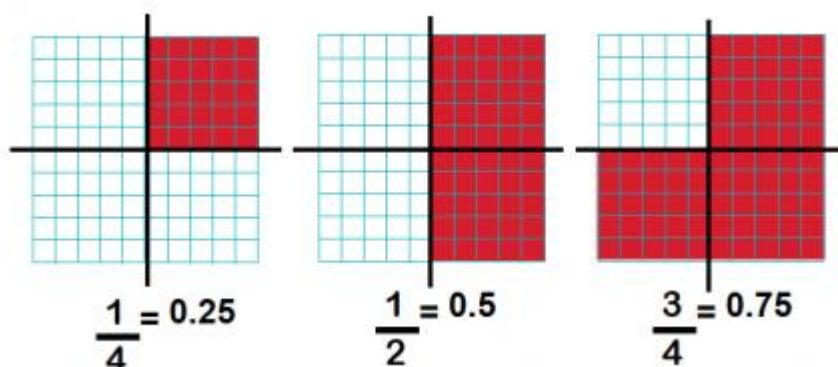


3.95

In Year 4, children need to understand the concept of a 'hundredth' and a 'tenth'.

They need to be able to write decimal equivalents of any number of tenths and hundredths, for example: $3/10 = 0.3$ and $7/100 = 0.07$.

They also need to know decimal equivalents to $1/4$, $1/2$ and $3/4$. This diagram is a good way of making this concept clear to them:



Children in **Year 4** also need to know the effect of **multiplying and dividing numbers one-digit and two-digit numbers by 10 and 100** (teachers will talk about digits sliding to the left and right).

- 5 multiplied by 10 is 50 (the five slides one place to the left)
- 5 divided by 10 is 0.5 (the five slides one place to the right)
- 5 multiplied by 100 is 500 (the five slides two places to the left)
- 5 divided by 100 is 0.05 (the five slides two places to the right)
- Two-digit number examples: $35 \div 10 = 3.5$, $741 \div 100 = 7.41$

<https://corbettmathsprimary.com/2018/07/24/multiplying-and-dividing-by-10-100-and-1000-videos/>

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In **Year 5**, children need to **count from any given number in decimal steps**, so they may be given the following sequence and asked to continue it:

0.3, 0.6, 0.9, ____, ____, ____

(The next decimals would be 1.2, 1.5, 1.8 - it helps to think of counting in 3s here, but instead of 3, 6, 9, 12, 15, 18 you are using decimal numbers.)

They also need to **partition**, **round**, **compare** and **order decimals**, for example:

Partition 8.49

$(8 + 0.4 + 0.09)$

Round 7.4 to the nearest whole number

(7, because the 4 is smaller than 5, so the number gets rounded down)

Round 1.38 to one decimal place

(1.4, because the 3 is rounded up to 4 because the 8 is bigger than 5)

Put these decimals in order: 0.8, 0.14, 1.8, 0.4

(0.14, 0.4, 0.8, 1.8)

Compare these decimal numbers: which is larger, 0.9 or 0.4? Or which is bigger out of 0.12 and 0.82?

(0.9 is larger than 0.4; 0.82 is larger than 0.12)

They may be asked to **position a decimal number on a number line**. For example:

Put 6.178 where you think it should go on this number line:

<https://corbettmathsprimary.com/2018/07/16/ordering-decimals-video/>

They also need to **start calculating with decimals mentally**, for example:

- What is half of 3? (1.5)
- What is double 0.34? (0.68)
- What is 0.4×5 ? (2)
- What is $4.5 + 1.2$? (5.7)
- What is $8 - 3.2$? (4.8)
- What is 6 divided by 1000? (0.006)

They need to learn efficient written methods for **adding and subtracting decimals with up to two places** (for example: $6.29 - 3.84$). They need to know and use a good written method for **multiplying a unit by a decimal** (for example: 4×8.3).

Children need to become more efficient in quickly **converting units of measurement**, for example: $140\text{cm} = 1.4\text{m}$, $2800\text{g} = 2.8\text{kg}$, $3100\text{ml} = 3.1$ litres.

In Year 5, children need to continue to be able to **work out equivalent fractions and decimals** (for example: knowing that $0.71 = 71/100$). They need to learn about thousandths and know that they are represented in the third column after the decimal point ($0.001 =$ one thousandth $= 1/1000$), **be able to round decimals with two decimal places to the nearest whole number and to one decimal place** and be able to put a set of decimals in order from smallest to largest. For example:

0.9 0.19 0.6 0.78 0.412 0.52

Here, many children get confused and think that 0.19 must be bigger than 0.9 (because 19 is bigger than 9). It is a good idea to write 0.9 as 0.90 and then explain that the 0 gets knocked off. You could also show them a **blank hundred number square** and remind them that with 0.9, nine tenths of the 100 number square (so nine columns, each with ten squares) need to be coloured in. They may think that 0.412 is the biggest number, but remind them that because there are only 4 tenths, it is smaller than 0.9, 0.6 and 0.52.

<https://corbettmathsprimary.com/2018/07/15/adding-decimals-video/>

<https://corbettmathsprimary.com/2018/07/31/rounding-video/>

In Year 6, children need to **start multiplying and dividing numbers by 10, 100 and 1000** (for example: $65 \div 100$, $5 \div 1000$, 4.3×100 , etc.). Again, teachers will say that the decimal point stays in the same place, but the numbers move left or right (depending on

whether it is multiplication or division). The number of places they move depends on the number of zeros in the number being calculated with.

Children in Year 6 need to start multiplying numbers such as 3×1.6 or 4×5.9 by short multiplication (where numbers are put in a column).

<https://corbettmathsprimary.com/2018/07/20/multiplying-decimals-video/>

<https://www.theschoolrun.com/best-decimals-apps-for-kids>

<https://www.splashlearn.com/decimal-games>

<https://www.topmarks.co.uk/maths-games/7-11-years/fractions-and-decimals>