

Measurement

NC Link Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places.
Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.

Important Vocabulary Length, millimetres, centimetres, metres, kilometres, mass, grams, kilograms, volume, millilitres, litres, time, seconds, minutes, hours, 24-hour notation.

Key facts to memorise

Measurement conversions

Weight

1 tonne = 1000 kilograms

1 kilogram = 1000 grams

1 gram = 1000 milligrams

t

kg

g

mg

Measurement conversions

Length

1 kilometre = 1000 metres

1 metre = 100 centimetres

1 centimetre = 10 millimetres

km

m

cm

mm

Measurement conversions

Capacity

1 litre = 1000 millilitres

1 centilitre = 10 millilitres

l

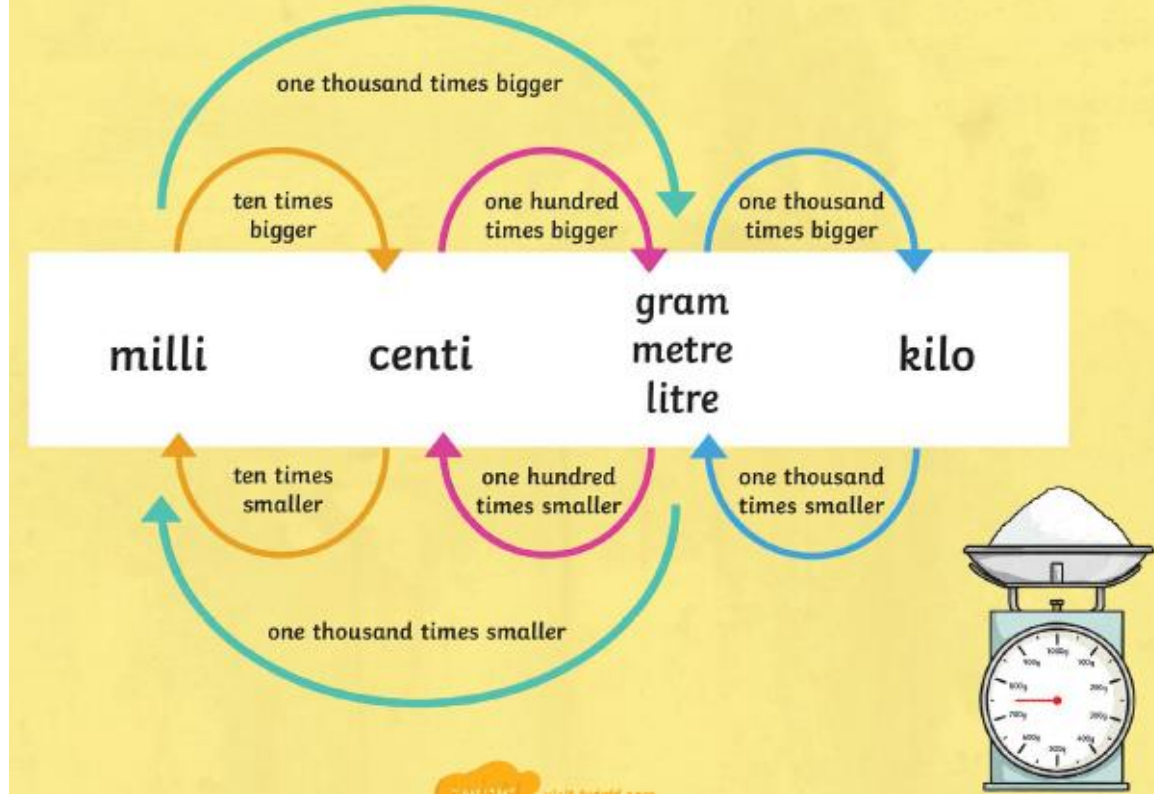
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Metric Measurements

| | | |
|----------------------|------------|---|
| kilo | thousand | one thousand times bigger (than gram/metre/litre) |
| gram / metre / litre | | |
| centi | hundredth | one hundred times smaller (than gram/metre/litre) |
| milli | thousandth | one thousand times smaller (than gram/metre/litre) |

Metric Measurements





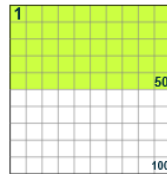
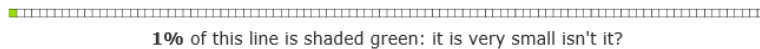
Percentages

NC Link Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison.
Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

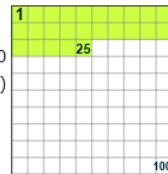
Important Vocabulary Percent, percentage increase, percentage decrease,

Key facts to memorise

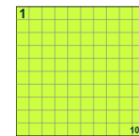
One percent (1%) means 1 per 100.



25% means 25 per 100
(25% of this box is green)



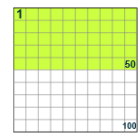
The word percent comes from the Latin words **per** and **cent** meaning 'out of every 100'. The symbol for percent is %.



100% means **all**.

Example:

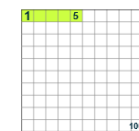
$$100\% \text{ of } 80 \text{ is } \frac{100}{100} \times 80 = 80$$



50% means **half**.

Example:

$$50\% \text{ of } 80 \text{ is } \frac{50}{100} \times 80 = 40$$

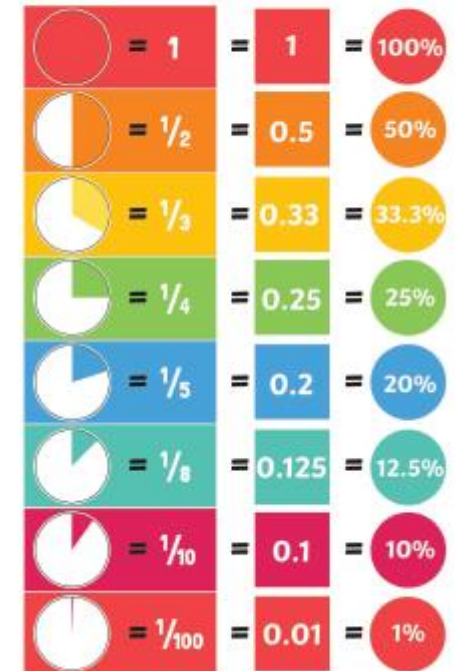


5% means $\frac{5}{100}$ ths.

Example:

$$5\% \text{ of } 80 \text{ is } \frac{5}{100} \times 80 = 4$$

Fractions, Decimals and Percentages



Finding 10%

Find 70% of 60

1. Find 10% by dividing the amount by 10.

$$60 \div 10 = 6$$

2. Multiply this answer by the number of tens in the percentage.

$$6 \times 7 = 42$$

$$70\% \text{ of } 60 = 42$$

Finding 1%

Find 18% of 250

1. Find 1% by dividing the amount by 100.

$$250 \div 100 = 2.5$$

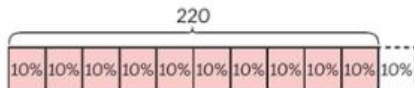
2. Multiply this answer by the number of the percentage.

$$2.5 \times 18 = 45$$

$$18\% \text{ of } 250 = 45$$

The number of pupils in a school has been increasing by about 10% each year since 2010. In 2011, the number of pupils was 220.

1 10% of 220 =



$$220 \div 10 = 22$$

In 2012, the number of pupils was 220 + 22 or 242.

10% of 220 =



A **Percent** can also be expressed as a **Decimal** or a **Fraction**



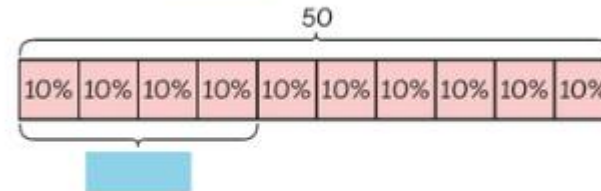
A **Half** can be written...

As a percentage: **50%**

As a decimal: **0.5**

As a fraction: **$\frac{1}{2}$**

1 40% of 50 =



$$10\% \rightarrow 50 \div 10 = 5$$

$$40\% \rightarrow 4 \times 5 = 20$$

Team Alpha can have up to 20 Year 6 pupils.

Ratio

NC Link
 Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
 Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.
 To use ratios and fractions to compare objects; to find the relationship between ratios, percentages and fractions.
 To determine the ratio of a quantity using concrete materials; to simplify ratios using concrete materials in addition to division.

Important Vocabulary


Ratio, fraction, compare, simplify,

Key facts to memorise

A ratio compares values.

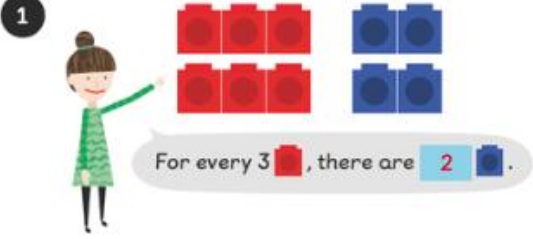
A ratio says how much of one thing there is compared to another thing.



3 : 1



There are 3 blue squares to 1 yellow square


1



For every 3 , there are 2 .

Work out the ratio from the number of sweets

| Blue Sweets | Pink Sweets |
|-------------|-------------|
| 8 | 2 |
| 20 | 5 |
| 48 | 12 |
| 4 | 1 |
| 16 | 4 |
| 80 | 20 |



Ratio: 4 blue sweets to 1 pink sweet (4:1)

Strategies

Example: A Recipe for pancakes uses 3 cups of flour and 2 cups of milk.

So the ratio of flour to milk is **3 : 2**

To make pancakes for a LOT of people we might need 4 times the quantity, so we multiply the numbers by 4:

$3 \times 4 : 2 \times 4 = 12 : 8$

In other words, 12 cups of flour and 8 cups of milk.

The ratio is still the same, so the pancakes should be just as yummy.

Using Ratios

The trick with ratios is to always multiply or divide the numbers **by the same value**.

Example:

$4 : 5$ is the same as $4 \times 2 : 5 \times 2 = 8 : 10$

| | | |
|----------|--------------|--------------|
| $4 : 5$ | $\times 2$ | $\times 2$ |
| $8 : 10$ | \downarrow | \downarrow |

Algebra

NC Link
 Generate and describe linear number sequences.
 Express missing number problems algebraically.
 Use simple formulae.
 Enumerate possibilities of combinations of two variables.
 Find pairs of numbers that satisfy an equation with two unknowns.

Important Vocabulary
 Pattern, sequence, formulae, algebra, equation, variables.

Key facts to memorise

A Puzzle
 What is the missing number?

$$\square - 2 = 4$$

OK, the answer is 6, right? Because $6 - 2 = 4$. Easy stuff.

Well, in Algebra we don't use blank boxes, we use a **letter** (usually an x or y, but any letter is fine). So we write:

$$x - 2 = 4$$

It is really that simple. The letter (in this case an x) just means "we don't know this yet", and is often called the **unknown** or the **variable**.

And when we solve it we write:

$$x = 6$$

Work out what number the shape represents in each calculation:

a) $\blacktriangledown \div 3 = 12 \div 2$ $\blacktriangledown = 18$

Writing Algebra

Write the algebraic expression for each of these explanations:

a) p is 4 more than y $p = y + 4$

b) z is twice k $2k = z$

c) d is half of r $d = r \div 2$

Strategies

How to Solve

Algebra is just like a puzzle where we start with something like "x - 2 = 4" and we want to end up with something like "x = 6".

But instead of saying "obviously x=6", use this neat step-by-step approach:

- Work out **what to remove** to get "x = ..."
- Remove it by **doing the opposite** (adding is the opposite of subtracting)
- Do that to **both sides**

Here is an example:

| | | | | |
|----------------------------|---|---|--------------|---------|
| We want to remove the "-2" | To remove it, do the opposite, in this case add 2 | Do it to both sides | Which is ... | Solved! |
| $x - 2 = 4$ | $x - 2 = 4$ | $x - 2 = 4$ | $x + 0 = 6$ | $x = 6$ |
| | $\begin{array}{r} +2 \\ -2 \\ \hline 0 \end{array}$ | $\begin{array}{r} +2 \quad +2 \\ -2 \quad -2 \\ \hline 0 \quad 6 \end{array}$ | | |

$$x + 5 = 12$$

What we want is an answer like "x = ...", but the +5 is in the way of that!
 We can cancel out the +5 with a -5 (because 5-5=0)

So, let us have a go at subtracting 5 from **both sides**: $x + 5 - 5 = 12 - 5$

A little arithmetic (5-5 = 0 and 12-5 = 7) becomes: $x + 0 = 7$

Which is just: $x = 7$