

# Can I solve simple problems involving ratio and proportion?

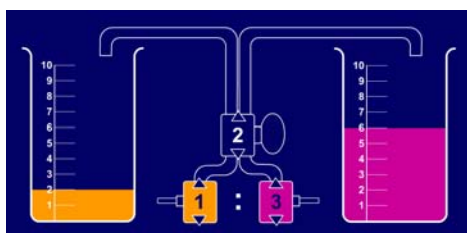
## Teaching guidance

### Key vocabulary

problem, pattern, relationship, ratio, proportion, in every, for every, to every, fraction, equivalent, simplify

### Models, images and resources

#### Ratio and proportion ITP



Use this program to set the a ratio for yellow : pink liquid to provide a visual image for the relationship between the two quantities.

The yellow and pink liquid can be combined in a single measuring cylinder to explore what proportion of the total mixture is each colour.

#### Number lines and scales

Children need to be able to work out the value of each interval on a number line using the proportion that it represents of a known amount.



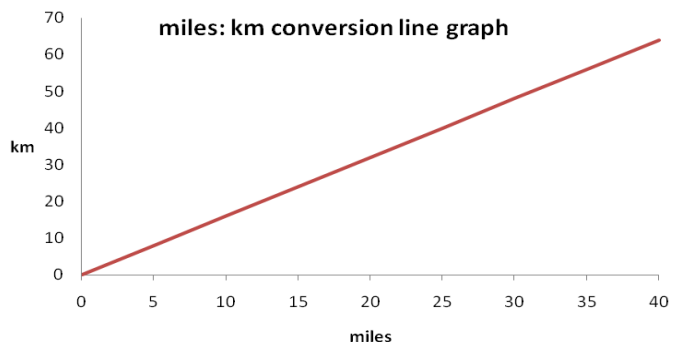
#### Scale drawings, models and scaled maps

The ratio of a length on a drawing, model or map to the equivalent length on the real item is given by the scale.



## Line graphs

Graphs can be used to compare related measurements. Where the measurements are in a constant ratio, for example, in conversions between units of measurement or currencies, the graph formed will be a straight-line graph.



## Teaching tips

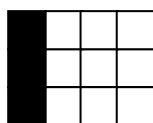
### Proportion

- Proportion describes the relationship between part of a quantity or measure and the whole. For example:
  - What proportion of the class is female? The class contains 25 children and ten out of the 25 are girls. Therefore 10/25, or 2/5, of the class are female.

Make sure children appreciate that where a proportion can be described as, for instance 3 out of 4, this can be written as the fraction  $\frac{3}{4}$ .

- Ensure that children meet proportion described in different ways:
  - Using everyday language: ten out of 25 children are girls; ten in 25 children are girls.
  - In simplified form: two out of every five children are girls; two in every five children are girls.
  - As a fraction:  $\frac{2}{5}$  of the class are female.
  - As a decimal: 0.4 of the class are female.
  - As a percentage: 40% of the class are female.
- Rehearse scaling proportions up and down. This technique can be used to solve problems.

Provide visual images, for example:



one in four tiles is black  
two in eight tiles is black  
three in 12 tiles are black

### Ratio

- Ratio can describe a part to part relationship. For example:

The ratio of girls to boys in a class is two to every three (represented as 2:3).

Ratio can also describe the relationship between two comparable quantities/measures:  
The ratio of a distance on a map to the distance on the ground is 1:10 000.
- Ensure that children understand and can use ratios described in different ways:
  - Using everyday language: there is one black tile to three white tiles; there is one black tile for every three white tiles.
  - Using a colon (use everyday language first, then the colon form):

The ratio of black tiles to white tiles is one to every three.  
The ratio of black tiles to white tiles is 1:3.  
The ratio of white tiles to black tiles is 3:1.

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#### Overcoming barriers level 4-5

- Ensure that children can use and describe ratios in their simplest form, for example 1:3 is the simplest form of the relationship 3:9.
- Rehearse scaling ratios up/down. This technique can be used to solve problems:
  - 5 miles is approximately equal to 8 km
  - 10 miles is approximately equal to 16 km
  - 15 miles is approximately equal to 24 km.

## Ratio and proportion

- Where ratio is describing part to part, this can be linked to the proportion of the whole, for example:

The ratio of black to white tiles on a wall is 1:3. This means that for every one black tile there are three white tiles. Therefore there is one black tile in every four tiles and so  $\frac{1}{4}$  of the tiles are black.