

6.05 Numeracy Tips

This study guide should enable you to:

- Have a stronger visual image of numbers
- Be able to convert between units of different sizes
- Have improved your estimation skills
- Be more fluent in handling quantities between 0 and 1

1. Strengthening your Visual Image of Numbers

Many students struggle with numeracy because they see it as a collection of symbols and rules then forget which one to apply or how to apply it.

If you can see a number or a numerical calculation as a visual image then you have a better chance of working on it in the right way.

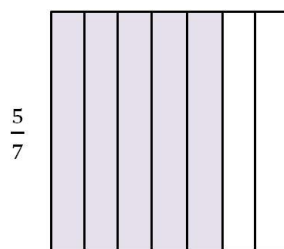
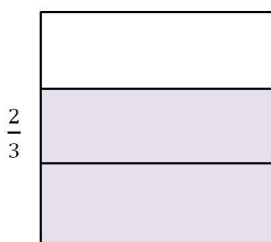
1.1 Fractions

Fractions can be thought of visually as parts of a whole.

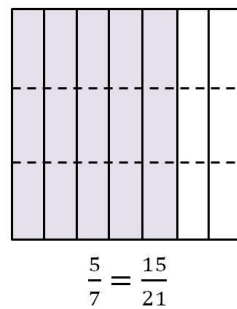
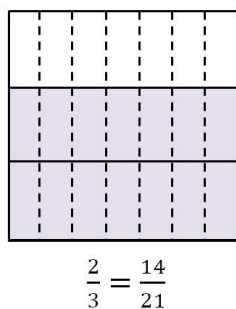
Equivalent fractions can be thought of as splitting up a fraction in another direction. This can help us to compare two fractions or to add and subtract fractions with different denominators.

Example Which is bigger, $\frac{2}{3}$ or $\frac{5}{7}$?

First, we shall represent these fractions visually as parts of a whole:



Next we shall divide them in the other direction and compare the number of shaded cells:



By comparing the number of shaded cells (or the numerators) we can now see that ,
 $\frac{2}{3} < \frac{5}{7}$.

Exercise

1. Write these fractions with the same denominator:

a) $\frac{2}{5}$ b) $\frac{3}{8}$

2. Which is the bigger, $\frac{2}{5}$ or $\frac{3}{8}$?

3. Calculate $\frac{2}{5} - \frac{3}{8}$.

1.2 Unit Conversions

It is easier to visualise unit conversions in terms of everyday objects weighing a unit amount.

Example

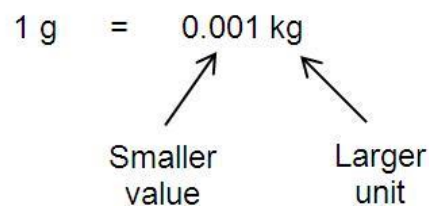
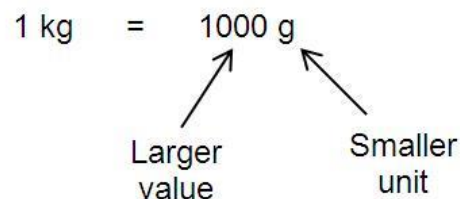
To visualise conversion between grams (g) and kilograms (kg), think about a bag of 1000 peas where each pea weighs 1 g and the whole bag weighs 1 kg:



A bag of peas



One pea



Exercise

4. Draw a visual image for converting litres (l) into millilitres (ml)
5. Covert 250 g into kilograms
6. Convert 0.3 l into millilitres
7. Convert 11.5 cm into metres

2. Estimation

When carrying out a numerical calculation, it is important to have a feel for the size of the answer in order that you can be confident in the answer you produce using your numerical technique. This skill is known as **estimation**.

Example

5 people weigh 78.4 kg, 86.5 kg, 63.2 kg, 87.3 kg and 92 kg. Will they be too heavy for a lift with a maximum weight of 450 kg?

There is no need to add these numbers together to answer this question. Instead we can calculate an average weight per person and compare it with the actual values.

$$450 \text{ kg} \div 5 = 90 \text{ kg}$$

Only one of the people weighs slightly more than 90 kg. Some of the others weigh quite a lot less than 90 kg.

Therefore we can confirm that the passengers will not be too heavy for the lift.

3. Operation on numbers between 0 and 1

Many people struggle with the concept of numbers between 0 and 1, especially when you apply operations to them.

Numbers between 0 and 1 can be represented as fractions, decimals or percentages. You need to be fluent in converting between them. This can be done with a '**fractions wall**' with decimal and percentage scales. The easiest fractions to convert are halves, then tenths, then quarters, then fifths, then eighths, then thirds.

Exercise

Use the fractions wall on the next page to convert:

8. $\frac{1}{4}$ into a decimal
9. 80% into a fraction in its lowest form
10. $\frac{3}{8}$ as a decimal (hint: it is $\frac{1}{4}$ plus half of $\frac{1}{4}$)
11. $\frac{2}{3}$ as a percentage (hint: calculate $\frac{1}{3}$ as a percentage then multiply it by 2).

