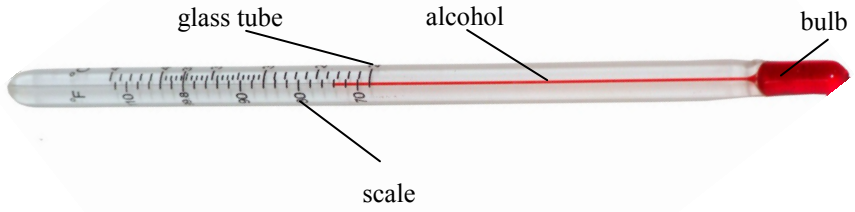
Sometimes temperatures can reach 10,000,000 °C.

In space, temperatures can be as low as -272 °C.

An old style balance.

Temperature

If a doctor wishes to find out if a person has a higher temperature than normal then they will use a thermometer. Temperature is a measure of how hot something is. The unit of temperature is the degree Celsius (^{o}C). The normal human body temperature is 37^{o}C



Our laboratory thermometers are made from a hollow tube of glass. The bulb of the thermometer contains a liquid called alcohol with a red dye to make the alcohol easier to see. When the bulb is heated the alcohol expands (gets bigger)and rises up the tube.

Thermometers are used to measure different temperatures. The temperature of melting ice is 0^{o}C, the temperature of boiling water is 100^{o}C and room temperature is usually about 20^{o}C.

It is possible to get temperatures lower than 0^{o}C. Below this temperatures become negative. A temperature ten degrees below zero is said to be minus 10 degrees Celsius. We write this as -10^{o}C.

The lowest temperature possible is -273^{o}C. This temperature is called absolute zero. It is not possible to reach a lower temperature than absolute zero.

Mass

In Science we do not talk about the weight of a bag of sugar being 1 kilogram. We say that the mass of the bag of sugar is 1 kilogram (kg). To measure mass we use an instrument called a balance .

Old style balances worked by putting an object on one side of a balance and adding masses to the other side until there was ***balance.***

In the lab we use an electronic balance . The balances in the lab can measure the mass of an object in grams. There are 1000 grams in 1 kilogram

To change grams into kilograms, divide by 1000.
So 3500 grams is 3.5 kg.
To convert kilograms into grams, multiply by 1000.
So 2.64kilograms is 2640 grams.

Volume

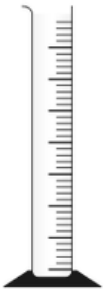
The amount of space taken up by an object is called the volume of an object. You know the volume of a cuboid is found by multiplying the length by the breadth by the height.
If length, breadth and height are all in centimetres then the volume is measured in centimetres cubed.

For example, if a cuboid is 10cm in length, 5cm broad and 15cm high then the volume is:

Volume = Length x Breadth x Height

= 10cm x 5cm x 15cm

= 750 cm^3



You have seen how to use a measuring cylinder to measure the volume of a liquid. The main unit of volume is the litre (l). Other units used are millilitres (ml) and centimetres cubed (cm^3).

There are 1000 millilitres in 1 litre.

1 cm^3 is the same volume as 1 millilitre.

To convert litres into millilitres multiply by 1000, so 3.76 litres is equal to 3760ml.

To convert millilitres to litres divide by 1000, so 150ml is equal to 0.15 litres.

Volume of Irregular Shapes

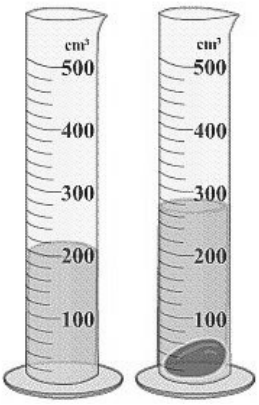
The volume of irregular shapes can be measured by placing the irregular shape into a measuring cylinder filled with liquid. The increase in volume is equal to the volume of the object placed into the liquid.

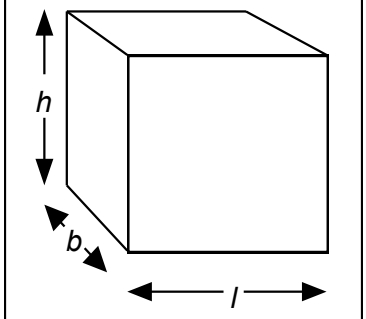
Example:

The reading on the measuring cylinder opposite increases from 200cm^3 to 300cm^3 when the stone is placed into the liquid.

300cm^3 - 200cm^3 = 100cm^3

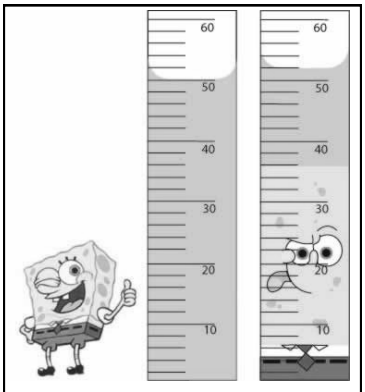
Therefore the volume of the stone is 100cm^3.





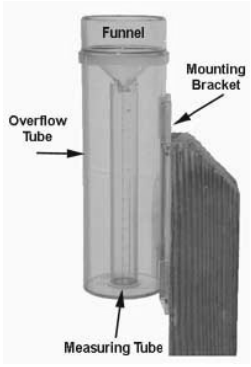
Volume = l x b x h

A standard coke can contains 330ml of coke.



Is Sponge Bob really 2 cm^3?

A micrometer is a device used to make precise measurements.

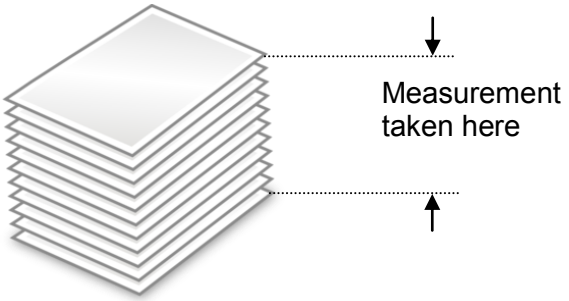


A rain gauge.

Measuring Small Things

It can be difficult to measure small things accurately in science. We could not use a ruler to measure the thickness of a piece of paper. We can overcome this problem by measuring the thickness of 100 sheets of paper.

Stack of 100 sheets of paper.



We found that 100 sheets were 2 centimetres thick.
So one sheet would be 2/100 centimetres thick.
Thus one sheet is 0.02 cm thick.

The same idea can be used to work out the volume of a drop of liquid.
Twenty drops were found to have a volume of 8 cm^3.
So one drop would have a volume of 8/20 cm^3
One drop has a volume of 0.4cm^3.

Calculating the Mean

In science when we want to get an accurate measurement from an experiment we often carry out the experiment many times and then work out the mean of the measurements.

If we measure the time it takes a marble to run down a slope.

To get an accurate measurement we should repeat the experiment at least 5 times. We can then add the 5 times together and divide by 5 to get the mean.

Expt. No.	1	2	3	4	5
Time (seconds)	2.1	2.0	1.9	2.1	1.9

So the mean time $= \frac{(2.1 + 2.0 + 1.9 + 2.1 + 1.9)}{5}$

= 2 seconds