

Science key words

Here are some key words that will help you with your Science exams

Precision

Precision is how **small** a measurement is. Look at the picture of a ruler: millimetres are more **precise** than inches because they're smaller. We can say that this side of the ruler is more **precise** than the other side.

Accuracy

Accuracy is how close something is to the **true value**. If you compare your ruler to the picture opposite, you'll find it's **inaccurate**: a centimetre on this picture is not the same as a centimetre on your ruler! Something can be **precise** but not **accurate**. The millimetre side of the ruler is more precise than the inches side, but it still isn't accurate.

Random errors

Random errors can be caused by things we **can't control**, like tiny changes in the temperature of a room. They can also happen if you **make a mistake** in an experiment, like pressing the stopwatch button too early.

Systematic errors

Systematic errors can be caused by **inaccurate equipment** (using the ruler above to measure something would cause a systematic error), or equipment that **doesn't read zero when it should** (this is called a 'zero error'). They can also be caused by **problems in a method**, for example, measuring the temperature change of a chemical reaction in a beaker with no lid.

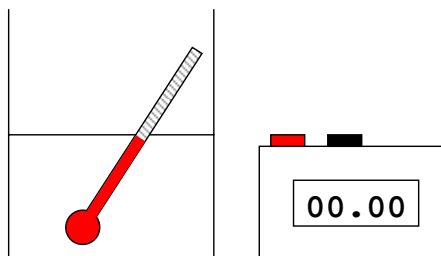
Reliability

If someone else can **repeat your measurements** using their own equipment and **get the same results** as you, you can say your results are reliable. Results are also said to be reliable if you can get the **same result by using a different method**. Carrying out repeat measurements will usually improve the **reliability** of your results.

The independent variable

Is the one **you're changing** to see what happens. For example, in an experiment to see how temperature affects how quickly sugar dissolves, **temperature** is the independent variable. The independent variable can also be time if you're measuring how something changes with time.

Temperature (°C)	Time for sugar to dissolve (seconds)
20	75
30	47
40	21



The dependent variable

Is the one that you're measuring; it's **your result**. In the dissolving sugar example, it would be the **time it takes** for the sugar to dissolve.



Science key words continued...

A fair test

A fair test is one in which only the independent variable has been allowed to affect the dependent variable. This usually means that you have only **changed one thing** and **kept everything else the same**.

Validity

You can only use your results to draw a conclusion if your measurements have **only been affected** by a **single independent variable**. In other words, your results are valid if you have carried out a **fair test**.

A control group

Sometimes, particularly in experiments with living things, it's impossible to keep everything else the same. So instead we compare everything to a **control group**. For example, scientists testing fertilisers might have one group of plants treated with the fertiliser and a **control group** of plants which are not treated so they can see what **difference** the fertiliser made. An experiment that uses a control group is still **valid** so long as the control group has been **properly monitored**.

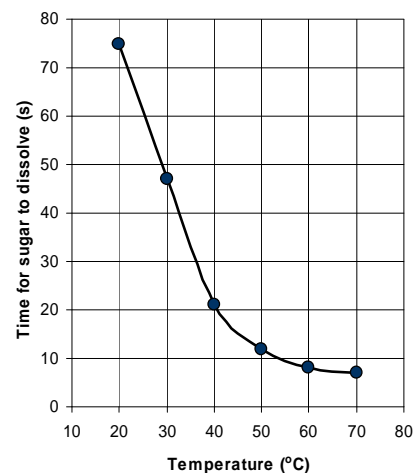
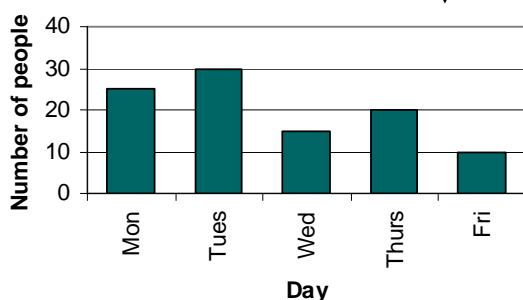
TYPES OF VARIABLE

Continuous variables

Can have **any numerical value**, e.g. heights of pupils in a class, or time taken for something to happen. *You should use a **line graph** for this kind of data.*

Categoric variables

Are described by **labels**, e.g. zinc, iron, copper, lead. **Ordered variables** are a type of **categoric** variable that always fall in a **particular order**, e.g. Monday, Tuesday, Wednesday etc. *You should use a **bar chart** or a **pie chart** for categoric and ordered variables.*



Discrete variables

Are a type of **categoric** variable that can only be **whole numbers**, e.g. number of paperclips picked up by a magnet. *A bar chart is best for discrete variables, but sometimes line graphs are used. If you use a line graph you should connect the points with **straight lines** (not a curve).*