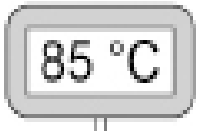
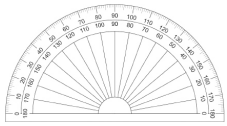
How Science Works...

Resolution

The resolution is the smallest possible change on the measuring device.

Look at the examples. The more decimal place, the higher the resolution.

	 Stopclock	 Protactor	
1 °C	**0.01 s**	**1 °**	**0.01 A**

Accuracy

Accurate results must be as close as possible to the true value.

For example:
Image two students measured the time it takes for someone to run 10m.

The true time was 9.8 seconds
- Student A said the time was 10.1 seconds
- Student B said the time was 9.1 seconds.
- Student A is closer to the true value, making it more accurate.

To make experiments more accurate you should:
- Repeat the experiment 3 times
- Calculate a mean

Precision

Results which are precise are close together.

Look at student A and student B's temperature readings in 3 experiments.
- *Student A*: 20 °C, 21 °C, 19 °C
- *Student B*: 20 °C, 24 °C, 18°C

Student A's results are more precise as they are closer together

Variables

In experiments, you need to make sure you plan your three variables so the results are valid:

- **Independent** Variable – the variable being made **different**
- **Dependent** Variable – the variable being **measured, counted or recorded**
- **Control** Variable – the variable being kept the **same**

Understanding Line Graphs

When your experiment has continuous data with numbers your need to draw a line graph.

Use the table to plot the line graph. Then draw a line of best fit with a ruler.

The right column tells us what goes on the x axis

The left column tells us what goes on the y axis

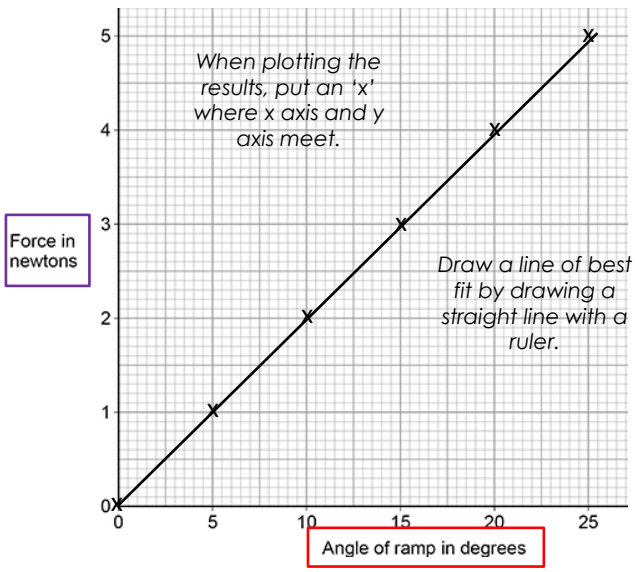
The right column also tells you the independent variable

This is what you change in the experiment

Angle of ramp in degrees	Force in newtons
0	0
5	1
10	2
15	3
20	4
25	5

The left column also tells you the dependent variable

This is what you measure in the experiment



CORE Questions

The following are core questions for this topic. Cover the answer section with a sheet of paper and try and quiz yourself. Only try learning 5 at a time, once you know them move on.

1	A stopwatch reads 52.3s. What is the resolution of the stopwatch?	0.1 s
2	True or false. Precise is when the results are close together	True
3	Why should you repeat an experiment at least 3 times?	
4	True or false. Accuracy is when results are close to the true value.	
5	Which variable is different in an experiment?	
6	Which Variable is measured, recorded or counted during an experiment?	
7	Which value stays the same every time you do the experiment?	
8	Why do you need to ensure all three variables are needed in your experiment?	
9	Which column title goes on the X-axis?	
10	Which column title goes on the Y-axis?	
11	What type of graph/chart is drawn for discontinuous data?	
12	Which type of graph/chart is drawn for continuous data?	
13	Which variable is the represented in the left-hand column of your table?	
14	Which variable is represented by the right-hand column of your table?	
15		
16		