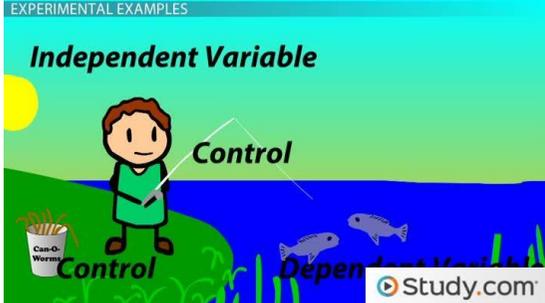
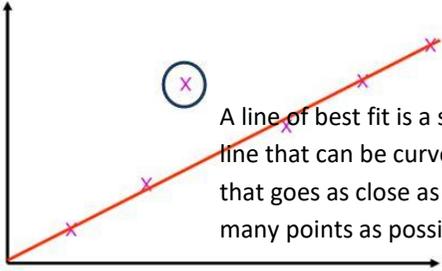


## Knowledge Companion for How Science Works

1. Lab safety	2. Variables	3. Repeatability
<b>Key ideas:</b>		<b>Key ideas</b>
		 <p>A line of best fit is a single, smooth line that goes as close as possible to as many points as possible.</p>
<b>Key words</b>	<b>Key words</b>	<b>Key words</b>
<p><b>Goggles:</b> always wear a pair of goggles completing practicals, this includes setting up and clearing away.</p> <p><b>Aprons:</b> always wear an apron when completing practicals, this includes setting up and clearing away</p> <p><b>Hair:</b> tie any long hair up, ensuring it is out the way of flame and chemicals.</p> <p><b>Bags and blazers:</b> hang these up out the way so are not a trip hazard and get damaged by chemicals or flame</p> <p><b>Spillages:</b> wash your hands and report any spillages to the teacher</p> <p><b>Breakages:</b> report any breakages to your teacher, do not pick up broken glass yourself</p>	<p><b>Independent variable:</b> what you change in the experiment, normally 5 different measurements in equal intervals</p> <p><b>Independent variable:</b> what you measure so the data you will collect</p> <p><b>Control variable:</b> what you will keep the same to make it a fair test and valid</p> <p><b>Fair test:</b> keeping all your control variables the same and making sure it is valid</p> <p><b>Valid:</b> does the data you collected actually answer the original question</p>	<p><b>Anomaly:</b> a result that does not fit the pattern</p> <p><b>Repeatability</b> – allows you to check for anomalies and see if the results are similar.</p> <p><b>Reproducibility</b> - another group complete the practical (maybe using different measurements but the same type of variables) and the pattern is similar.</p>
<b>Action required:</b>	<b>Action required:</b>	<b>Action required:</b>

**4. Calculating means and other averages**

**Key ideas**

Independent variable, including units

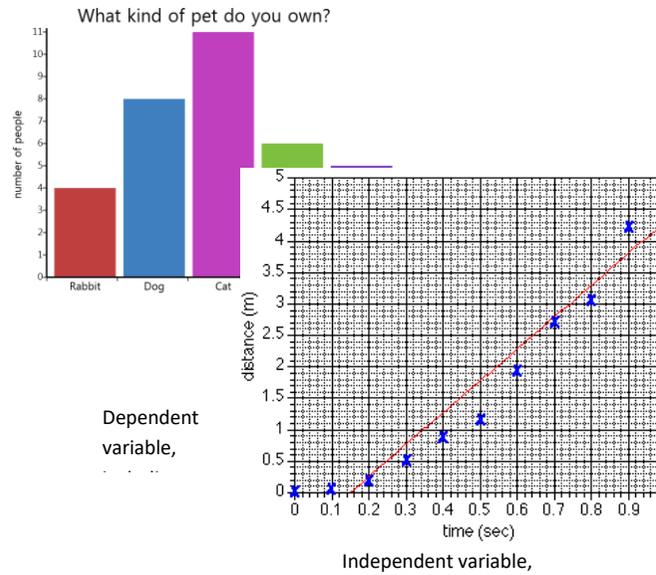
Dependent variable, including units

Concentration of mouthwash (%)	Diameter of clear area around mouthwash disc (mm)			
	1	2	3	Average
0	1	1	1	1
20	2	4	3	3
40	4	6	5	5
60	10	2	12	11

Each interval recorded in ascending order

**5. Tables and graphs**

**Key ideas:**



**Key words**

**Key words**

**Mean** – first check to see any anomalies and ignore these. 2: add each piece of data together for that interval (horizontal on the table), leave out anomalies. 3: Then divide the sum by the number of pieces of data you have (not including the anomalies)

**Median** – order your results into numerical order and then it is the middle value.

**Mode** – This is the most common number in your results

**Range** – the value when you take your largest result and take away the smallest result

**Tables:** always draw a table with your independent variable in the first column. Then your dependent variable on the right hand side include repeats and a mean.

**Bar graph:** used when the independent variable is in categories e.g. eye colour.

**Line graph:** used when the independent variable is continuous e.g. height. The line of best fit does not have to go through 0,0, it should be as close as possible to as many points as possible..

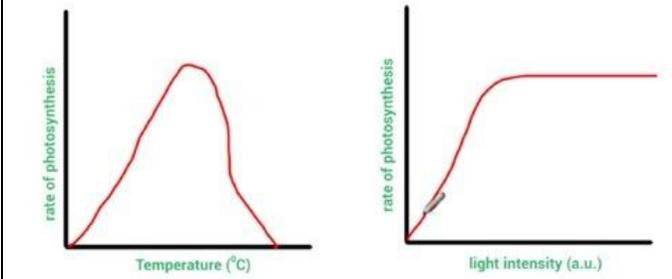
**Draw tables and graphs with a pencil and ruler**

**Action required:**

**Action required**

**6. Analysing results**

**Key ideas:**



Once a certain temperature is reached the rate of photosynthesis starts to drop until at a set temperature photosynthesis can no longer take place.

As you increase the light intensity the rate of photosynthesis increases until you reach a certain level of light where the rate of photosynthesis levels off

**Key words**

**Trend:** what pattern is being shown in the data (graph or table). You need to pick out 2 or 3 bits of data to prove your pattern.

**levels off:** on a graph where the line of best fit becomes horizontal or on a table the data doesn't change much.

**Steady increasing:** the graph appears a straight line with a gradient, on a table the results will go up in roughly equal quantities each time.

Sometimes a graph returns back to the same value as the start, you need to look carefully at the dependent variable for reasons why

**Action required**