Independent variable: The variable we change to see if it has an effect.
Dependent variable: The variable we measure to look for an effect.
Control variable: We keep these the same tor a fair test.

Range
The maximum and minimum values of the independent or dependent variables; important in ensuring that any pattern is detected. For example a range of distances may be quoted as either: 'From 10 cm to 50 cm' or 'From 50 cm to 10 cm'.

Interval
The quantity between readings, eg a set of 11 readings equally spaced over a distance of 1 metre would give an interval of 10 centimetres.

Data
Information, either qualitative or quantitative, that has been collected.

Planning
Aim: To investigate whether the amount of bubble bath affects the height of bubbles in a beaker.
Independent variable: The volume of bubble bath used.
Dependent variable: The height of bubbles in the beaker.
Control variables: The beaker size used should be the same (250ml) as this will affect how high the same amount of bubble swill be. The temperature of the water should be the same (30°C) as warmer water may produce more bubbles. The amount of water (100ml) used should be the same as this may affect how many bubbles are produced.
Prediction: The greater the volume of bubble bath used the higher the bubbles produced will be.
Range: We will test from 0 to 10ml of bubble bath.
Intervals: We will go up in 1ml intervals.
Repeats: We will repeat at least three times.

Volume of bubble bath (ml)	Height of bubbles produced (cm)			
	Test 1	Test 2	Test 3	Mean
0	0	0	0	0
1	0.5	0.4	0.6	0.5
2	0.8	0.9	0.7	0.8
3	1.3	1.4	1.2	1.3
4	1.8	1.8	1.8	1.8
5	2.2	2.2	2.3	2.2
6	2.5	2.5	2.4	2.5
7	2.7	2.6	2.8	2.7
8	2.8	0.4	2.8	2.8
9	2.7	2.8	2.8	2.8
10	2.8	2.8	2.7	2.8

Fair test
A fair test is one in which only the independent variable has been allowed to affect the dependent variable.

Prediction
A prediction is a statement suggesting what will happen in the future, based on observation, experience or a hypothesis.
Hypothesis
A proposal intended to explain certain facts or observations.

Don't forget titles and units in a table!

Accuracy
A measurement result is considered accurate if it is judged to be close to the true value.

Evidence
Data which has been shown to be valid.

Precision
Precise measurements are ones in which there is very little spread about the mean value. Precision depends only on the extent of random errors – it gives no indication of how close results are to the true value.

True value
This is the value that would be obtained in an ideal measurement.

Resolution
This is the smallest change in the quantity being measured (input) of a measuring instrument that gives a perceptible change in the reading.

Repeatable
A measurement is repeatable if the original experimenter repeats the investigation using same method and equipment and obtains the same results. Previously known as reliable.

Reproducible
A measurement is reproducible if the investigation is repeated by another person, or by using different equipment or techniques, and the same results are obtained. Previously known as reliable.

Valid conclusion
A conclusion supported by valid data, obtained from an appropriate experimental design and based on sound reasoning. In other words a fair test.

Conclusion

As the volume of bubble bath was increased **from 0 to 8ml** the height of bubbles produced increased **from 0 to 2.8cm.** Adding more than 8ml had no further effect. This correlation can be clearly seen in my graph. This is because more bubble bath will produce more bubbles until there is not enough water to mix with the bubble bath.

Evaluation of Data

Our **range** was big enough to see a clear pattern.
A bigger range would not tell us anything more about the relationship.
The **intervals** were small enough to see the pattern clearly, although smaller intervals could allow us to more accurately work out the maximum amount of bubble bath to use for a set amount of water.
We measured to a **resolution** of 1mm which is small enough to clearly see differences in the results. There would be no point in trying to use a smaller resolution as we would not be able to measure that accurately.
We carried out three **repeats**. This clearly showed that the test is repeatable as we gained similar results each time using the same method. This means further repeats would not be needed.
The data is quite **precise** as each repeat is quite close to the mean. Some results were very precise as the repeats were the same of the mean.
The slight differences between repeats suggest some small **random errors** which could be caused by measurement errors as it is hard to measure bubble height with high **accuracy**. There was an uncertainty of ±0.5mm. We could use a measuring cylinder to improve accuracy.
We had one **anomaly** for the second repeat at 8ml. We circled this and did not use it when calculating the mean.
We do not know if this investigation is **reproducible** as we have not found any **evidence** for this being tested with a different method elsewhere.

Evaluation of Method

We kept the water temperature the same using a water bath, used the same size beaker throughout and measured 100ml of water each time so this was a **fair test** and should produce **valid** results to use for a valid conclusion. There are no other variables that should have affected our results.

Measurement error
The difference between a measured value and the true value.

Anomalies
These are values in a set of results which are judged not to be part of the variation caused by random uncertainty.

Random error
These cause readings to be spread about the true value, due to results varying in an unpredictable way from one measurement to the next. Random errors are present when any measurement is made, and cannot be corrected. The effect of random errors can be reduced by making more measurements and calculating a new mean.

Systematic error
These cause readings to differ from the true value by a consistent amount each time a measurement is made.

Zero error
Any indication that a measuring system gives a false reading when the true value of a measured quantity is zero.

Uncertainty
The interval within which the true value can be expected to lie, with a given level of confidence or probability, eg 'the temperature is 20 °C ± 2 °C, at a level of confidence of 95%'.