Biology – Practical skills

Measuring length (ATa)

Measuring the size of leaves A1

Use a ruler to measure the length of 10 leaves from the same plant.
Use a ruler to measure the width of 10 leaves.
Record your results **on paper**. Only write on **one** side. This will be stuck into your lab book.
Record the uncertainty for each reading (refer to the practical card for help)

Leaf	Length of the leaf /mm	Width of the leaf /mm
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Mean		

Calculate the mean length and mean width.

Measuring the thickness of a leaf A2

Place 10 leaves on top of each other.
Measure the thickness of 10 leaves.
Calculate and record the thickness of one leaf.
Include the uncertainty for this measurement.
Record your results in your lab book.

Measuring time (ATa)
Calculating rate

Measuring breathing rate B1

Count how many times you breathe in 15 seconds. One breath is when you inhale and exhale once.
Repeat this until you have sufficient data to calculate an accurate mean.

Record your results **on paper**. Only write on **one side**. This will be stuck into your lab book.

Test	Number of breaths in 15 seconds	Breathing rate / breaths per minute
1		
2		
3		
4		
5		
Mean		

Calculate the breathing rate for each test.

Record the uncertainty for the values (refer to the practical card for help)

Does holding your breath change your breathing rate? B2

Hold your breath for between 20 and 30 seconds. Stop when you feel uncomfortable.

Measure your breathing rate for 15 seconds and calculate your breathing rate.
Continue until you have sufficient data to calculate an accurate mean.

How to measure length

A ruler is used to measure length.

Unit - millimetres

How to use a ruler

Place the zero end of your ruler at the end of your object. This will usually be on the left side.
Make sure the end of the ruler is flush with your object.

Use the scale to measure the length of the structure.

Uncertainty

When measuring length two uncertainties need to be included.
The uncertainty of the placement of the zero of the ruler and the uncertainty of the point the measurement is taken from.
As both ends of the ruler have a ±0.5 scale division uncertainty. The measurement will have an uncertainty of ±1 division.

For most rulers the uncertainty will be ±1mm

The uncertainty may be larger than 1mm if you are measuring an object eg hair that might have kinks in it. The uncertainty could be reasonably judged to be nearer ±2 or 3mm

How to measure time

How to use a stop watch

A stop watch is used to measure time.

Unit - seconds

How to use a stop watch

Press the right hand button to start the stop watch.
Press the button again to stop the stop watch.

There is a second button which is used to reset stop watch.

If you are taking series of readings over a period of time – do not stop the stop watch between taking the readings.

Uncertainty

The stop watch shown has a resolution of 100th of a second but the uncertainty in the measurement is more likely to be due to the reaction time of the experimenter.
The reading on the stop watch should be recorded ie 12.38.56 minutes and reduce this to 12minutes 39 seconds later.

The uncertainty for a stop watch will be ± 1second
Always record time in seconds.