**Using a potometer STUDENT**

**Introduction**

The rate of transpiration in a plant varies depending on a range of conditions, including light intensity, relative humidity, wind speeds and temperature. The rate of transpiration can be measured using a potometer.

A potometer is a piece of apparatus used to measure the rate of transpiration (water loss from a plant). The rate of transpiration can be estimated in two ways:

1) **Indirectly** - by measuring the distance the water level drops in the graduated tube over a measured length of time. It is assumed that this is due to the cutting taking in water which in turn is necessary to replace an equal volume of water lost by transpiration.

2) **Directly** - by measuring the reduction in mass of the potometer over a period of time. Here it is assumed that any loss in mass is due to transpiration.

**Aim**

* To use a potometer to measure the rate of transpiration*.*

**Intended class time**

* 1 – 2 hours

**Equipment (per group)**

* Potometer (this has been prepared for you)
* Light source
* Top-pan balance accurate to 0.1 g
* Stopwatch/timer
* Desk fan

**Procedure**

*Note: you will be able to place your potometer in different places around the laboratory to vary an environmental factor, for example: under a strong light, in a dark cupboard, in a warm incubator, enclosed in a polythene bag, under windy conditions on upper surfaces of leaves, under windy conditions on lower surfaces of leaves.*

1. In the open laboratory, place your potometer carefully on the balance. Set the balance to zero.
2. Allow the plant time to adjust to its new environment before starting to take measurements (at least 10 minutes).
3. Start the clock.
4. Using a suitable table, record the mass, the time and the reading on the graduated pipette.
5. Repeat this after intervals of 3, 6, 9, 12 and 15 minutes.
6. Next change the environment of your potometer. Remember to change just one environmental factor at a time. Allow the cut shoot time to get used to its new environment (at least 10 minutes) before starting to take measurements.
7. Repeat steps 3 – 5 to take measurements in the new environment.
8. Try one more new environment. Again, allow the cut shoot time to get used to its new environment (at least 10 minutes) before starting to take measurements.
9. Repeat steps 3 – 5 to take measurements in the new environment.
10. Plot suitable graphs of the data you have collected for each environment and compare the rates of transpiration.

**Extension questions**

1. What is a potometer?
2. Why are the effects of photosynthesis and respiration usually ignored when taking potometer readings?
3. What precautions must be followed when setting up a potometer?
4. If you were comparing transpiration rates of several leaves, what leaf feature should be measured to obtain a fair comparison?

**To submit**

For this piece of work to count towards Practical Activity Group 5 of the Practical Endorsement, you need to have evidence of the raw data you collected for each environment in which you took readings and have the graph(s) you produced. You also need to consider the above questions as the answers to these questions will aid you in preparation for your written examinations.