



RESPIROMETER

B218



Instruction Manual

RESPIROMETER

MEASURING THE RATE OF METABOLISM

The purpose of this activity is:

- to measure the rate at which some respiring plant or animal material absorbs oxygen
- to use this as a measure of the rate of metabolism
- to become skilful in the use of a respirometer

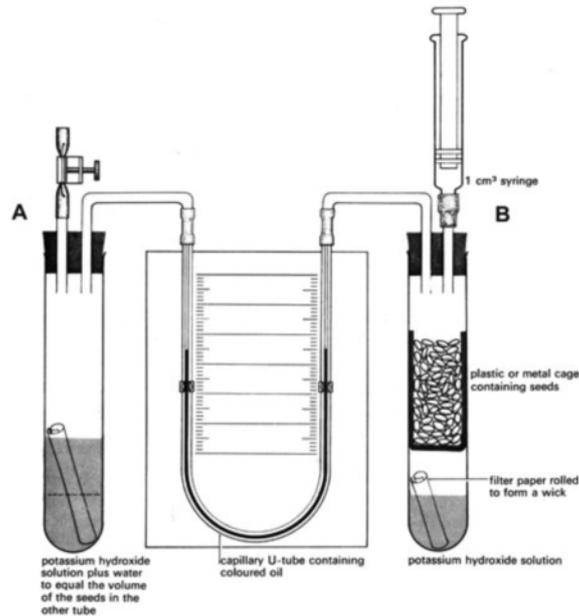
PROCEDURE

SAFETY: Potassium hydroxide and soda lime are corrosive. Wear goggles when handling and seek first aid immediately if any gets in your eyes.

Push the parts of the equipment together firmly but gently to get airtight seals, to reduce the risk of breaking any glass apparatus and injuring yourself.

PREPARATION

- a Use a funnel to pour 5 cm³ of potassium hydroxide solution (corrosive) into each respirometer vessel. Make sure none of the potassium hydroxide touches the sides of the vessels.
- b Add small rolls of filter paper to act as wicks.
- c Fill the basket or cage with respiring material and put it into vessel B. Make sure that the seeds or invertebrates are not touching the potassium hydroxide or the wick. Add water to vessel A to match the volume of respiring material in vessel B (see diagram).



- d** Fit vessel A with a bung holding two connecting tubes – one with a screw clip on flexible tubing. Alternatively fit a bung with a 3-way tap connected to the same items.
- e** Fit vessel B with a bung holding a 1 cm³ syringe and a connecting tube as shown in the diagram. Alternatively fit a bung with a 3-way tap connected to the syringe and tube.
- f** Draw some coloured fluid into the manometer U-tube. The fluid must be free of bubbles and come to about the middle of the scale on each side.
- g** Open the screw clip and remove the syringe, then connect the manometer U-tube. To check that the apparatus is airtight, move the marker fluid in the manometer to one end with the syringe and leave for a few minutes. The fluid should not move.
- h** If using a water bath, put the apparatus in the water now and leave to equilibrate for 5 minutes.
- i** Set the piston of the syringe at about the 0.5 cm³ mark and insert the syringe as shown. Close the screw clip. Use the syringe to adjust the manometer so that the fluid levels are the same on both sides.
- j** Record the exact position of the syringe piston, the position of the meniscuses on both sides of the manometer, and the time.

INVESTIGATION

- k** Record new positions of the manometer fluid at four-minute intervals. When it nears the end of the scale on one side, restore it to its original position and note the new position of the syringe piston.
- l** Plot a graph of meniscus level against time.
- m** Continue to take readings until four consecutive readings lie on the same straight line.
- n** Raise the temperature of the water bath by 10 °C and repeat steps **i** to **m**.
- o** Remove and weigh the seeds or invertebrates.