Edexcel Biology GCSE

CP07: Respiration

Practical notes

Respiration

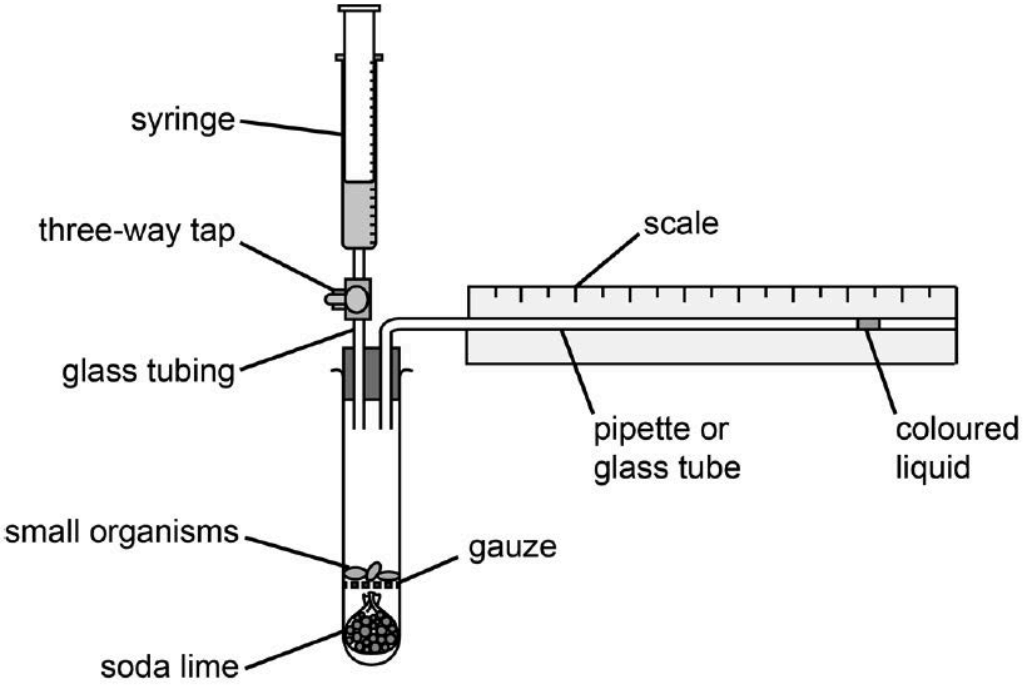
Aim

Investigate the rate of respiration in living organisms using a simple respirometer.

Equipment

- Small animal eg. maggots or germinating pea
- Simple respirometer
- Soda lime
- Ruler
- Marker
- Electronic balance
- Pipette
- Dye
- Forceps
- Water bath

Diagram



Method

1. Set up the respirometer as in the diagram: use forceps to put a known mass of soda lime (carbon dioxide absorbant) into the boiling tube and cover with gauze.
2. Weigh and place the organisms into the boiling tube. Handle animals carefully to avoid harming them.
3. Use a pipette to place a drop of dye at the mouth of the capillary.
4. Open the connection between the syringe and the respirometer. Draw the liquid onto the scale at the end furthest from the respirometer using the syringe.
5. Leave the apparatus in a thermostatically controlled water bath at a set temperature for 5 minutes to allow it to equilibrate.
6. Use a marker to mark the starting point of the fluid.
7. Close the tap to make the apparatus airtight and start the stop clock immediately
8. Record the position of the fluid at one minute intervals for at least five minutes in a suitable table.
9. Calculate the distance travelled by the dye per minute.
10. Repeat the procedure at least 3 times and take a mean.
11. Calculate the rate of respiration = volume of oxygen consumed / mass of organism.

Controlled variables

- Mass of soda lime
- Temperature
- Time allowed for measuring
- Change air in between repeats

Extension

Repeat the set-up over a range of temperatures controlled by a water bath.
Plot the rate of respiration (oxygen uptake per unit time) against temperature to find the effect of temperature on the rate of respiration.

Sources of error

If using animals, the rate of respiration may be affected by stress in captivity.
The time allowed for the animal to acclimatise to its surroundings may not be enough.
Air may leak out of the apparatus which will affect the results.