Bio CP7 Respiration rates

Your teacher may watch to see if you can…

- work carefully with living organisms
- make accurate measurements.

Aim

To investigate the effect of temperature on the rate of **aerobic respiration** in invertebrates.

Method

Apparatus

- boiling tube containing soda lime (and a cotton wool plug)
- capillary tube and bung
- weighing boat
- stop clock
- water baths at different temperatures
- millimetre scale
- small organisms
- coloured liquid

⚠ Safety

Treat living things with care.

Wash your hands after the practical.

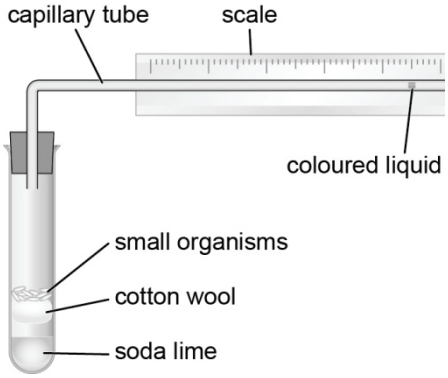
Soda lime is corrosive.

A Collect a boiling tube with some soda lime in it, held in place with cotton wool. The soda lime absorbs carbon dioxide. Soda lime is corrosive, so do not handle it. The cotton wool is to protect you and the organisms.

B Carefully collect some of the small organisms in a weighing boat.

C Gently shake the organisms out of the container and into the boiling tube.

D Insert the bung and capillary tube, as shown in the diagram.



E Set up a control tube (without the organisms).

F Place both tubes into a rack in a water bath at a preset temperature. It is best to tilt the rack slightly so that the capillary tubes hang over the side of the water bath at an angle.

G Wait for five minutes to let the organisms adjust to the temperature of the water bath (maximum 40 °C).

H Hold a beaker of coloured liquid to the ends of the capillary tubes, so that liquid enters.

I Mark the position of the coloured liquid in the tubes and time for five minutes.

J Mark the position of the coloured liquid again, and measure the distance travelled.

K Repeat the experiment at different temperatures. Use the same number of organisms each time.

Recording your results

1 Record your results in a neat table.

Considering your results/conclusions

2 Plot your results on a suitable chart or graph.

3 Use your chart or graph to draw a conclusion. Explain your conclusion.

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Name _____ **Class** _____ **Date** _____

Recording your results

1 Record your results in the table below.

Temperature (°C)	Distance moved by the coloured liquid in the tube containing organisms (mm)	Distance moved by the coloured liquid in the control tube (mm)

Considering your results/conclusions

2 Plot your results on a scatter diagram.

3 **a** What was the independent variable in this investigation? _____

b What was the dependent variable? _____

c State one control variable described in the method. _____

d Explain why the variable you gave in **c** needs to be controlled.

_____

_____

e Describe the relationship between the temperature and rate of aerobic respiration.

_____

_____

f Suggest an explanation for this relationship. (*Hint:* think about the effect of temperature on chemical reactions.)

_____

_____

_____

Evaluation

4 The organisms in the tube are respiring aerobically.

a What gas are they using up? _____

b What gas are they producing? _____

c Explain why the gas you named in **b** does not collect in the tube. _____

_____

_____

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