

2 A student investigated the effect of temperature on the rate of respiration in yeast cells.

They used the apparatus shown in Fig. 2.1.

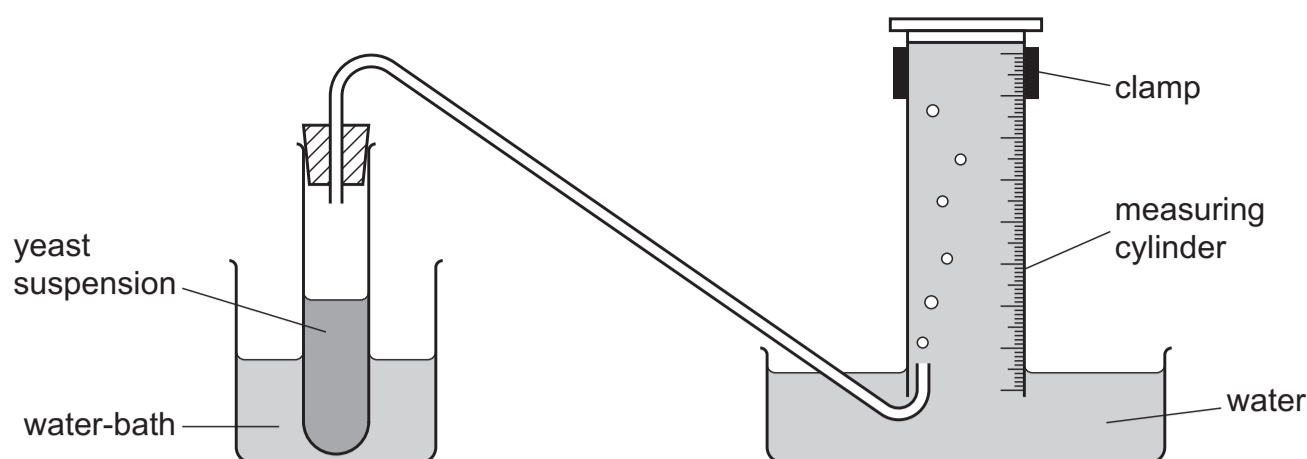


Fig. 2.1

The student used this method:

- Put 25 cm³ of yeast suspension into a test-tube.
- Put the test-tube into a water-bath and add water at 10 °C to the water-bath.
- Leave the apparatus for five minutes before moving on to the next step.
- Start a stop-clock and count the number of bubbles produced by the respiring yeast cells in three minutes.
- Repeat the procedure using a water-bath maintained at different temperatures.

(a) (i) State **two** variables that the student kept constant in this investigation.

1

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2

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[2]

(ii) State **one** possible source of error when measuring the dependent variable **and** suggest an improvement to this method of measuring.

error

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improvement

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[2]

(b) Table 2.1 shows the results of the investigation.

Table 2.1

water-bath temperature / °C	number of bubbles produced in 3 minutes	rate of bubble production / bubbles per minute
10	33	11
20	45	15
30	79	
40	112	37
50	124	41
60	37	12

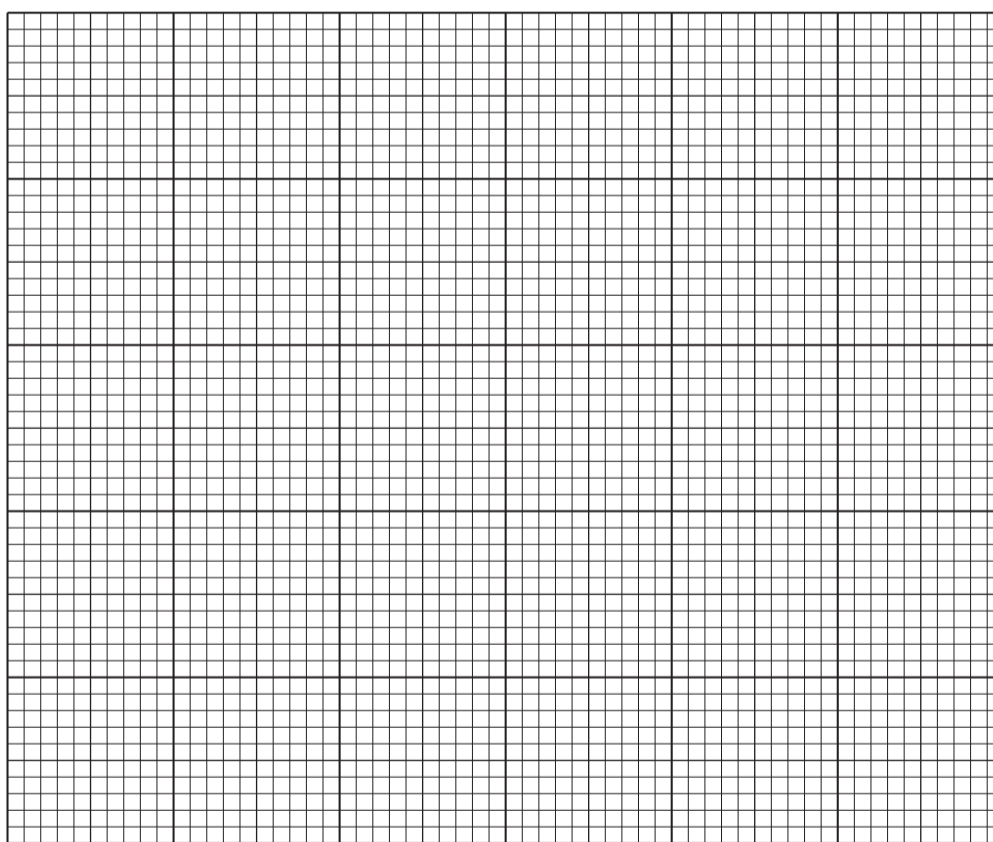
(i) Calculate the rate of bubble production (i) at 30 °C.

Give your answer to an appropriate number of significant figures.

Space for working.

..... bubbles per minute [2]

(ii) Plot the data in Table 2.1 on the grid to show the effect of temperature on the **rate** of bubble production.



[4]

(iii) Describe the results of this investigation.

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[2]

(c) Describe how the student could confirm that the gas produced is carbon dioxide.

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[2]

[Total: 14]