

Assessment in IGCSE Biology 0610

Session 3: Handout 3.5(b)

Mark schemes

This handout provides examples of mark schemes and candidates' scripts for Paper 6 June 2003.

Use the mark schemes to mark the answers from two candidates to questions 1 and 4.

The mark schemes are on the next two pages. The candidates' responses are on the following 10 pages.

(13 pages total, including this page)

Assessment in IGCSE Biology 0620

Session 3: Handout 3.5(b)

Mark schemes

This handout provides examples of mark schemes and candidates' scripts from Paper 6.

Use the mark scheme provided to mark the answers from two candidates to Questions 1 and 4

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0610	6

1 (a) Two from:

temperature or warmth or heat/[same type of] [amount of] yeast/type of flour/same size measuring cylinder/same mass or weight of dough/[same quantity of] [type of] sugar [2]

(ignore water [in q], amount of ingredients, pH, light, carbon dioxide, time, humidity, reading at eye level, cold)

(b) (i) Graph:

O orientation of axes and label of axes plus units;

S use of appropriate and even scale to fill half of the grid;

P plotting data A; B; C;

K key for separate date; max [5]

(ii) Line A - rises steadily;

Line B - does not rise/rises slightly/at a constant level;

Line C - rises and flattens; [2 stages] [3]

(iii) 80; [1]

(iv) Two from:

1. comment on **volume difference**, A more;

2. A has yeast [and B has none];

3. correct ref. to production of carbon dioxide; [2]

(v) Two from:

1. comment on **rate difference**/speeding up/faster;

2. substance X present in C [A has no X];

3. reasonable suggestion for role of substance X;

(accept enzyme, catalyst, improver, AW) [2]

Total 15

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0610	6

- 4 (a) (i)** introduce a glowing splint/spill
(do not award for match will burn/candles lighting/splints that are already burning)
- addition of pyrogallol; [1]
- (ii)** photosynthesis; [1]
- (iii)** 10 cm^3 ;
 $10 \div 5 = 2 \text{ cm}^3$; [2]
- (iv) Two from**, for design of experiment:
- method for setting up different light intensities;
(bright light in introduction - so maybe dimmer or less light but must have detail of how this is to be achieved/distances away from light bulb/AW)
 - describe how to control a factor that may alter rate over a certain time
(temperature - heat shield, carbon dioxide by adding hydrogen carbonate/AW)
 - additional feature of design –
(same time period for comparison of results/eliminate background light, carry out investigation in a darkened room/replicates/ repetition/same piece of pondweed/recovery time between sets of measurements AW) max [2]

(b)

	Colour	Explanation
(i)	purple [1]	carbon dioxide used up/ photosynthesis [1]
(ii)	red/orange [1]	balance [between photosynthesis and respiration] [1]
(iii)	yellow [1]	respiration of 3 water shrimps/ produce carbon dioxide [1]

Total: 12

- 1 Three different dough mixtures, samples **A**, **B** and **C** are prepared using the same quantity of flour and water. Each sample of dough is carefully mixed, kneaded, shaped and placed in separate measuring cylinders and kept in a warm place.

Sample **A** contains warm water, sugar, flour and yeast.

Sample **B** contains warm water, sugar and flour.

Sample **C** contains warm water, sugar, flour, yeast, and substance **X**.

The highest level of the dough is marked on the side of each measuring cylinder, as shown in Fig. 1.1.

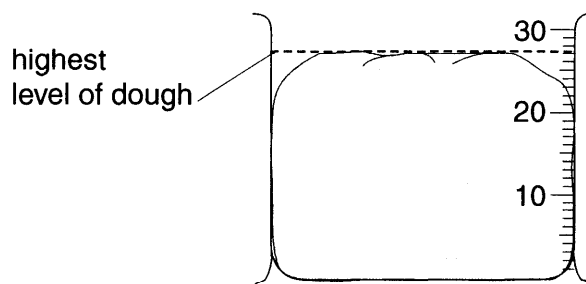


Fig. 1.1

- (a) Suggest **two** other factors which should be kept constant to ensure that the results for the samples can be compared.

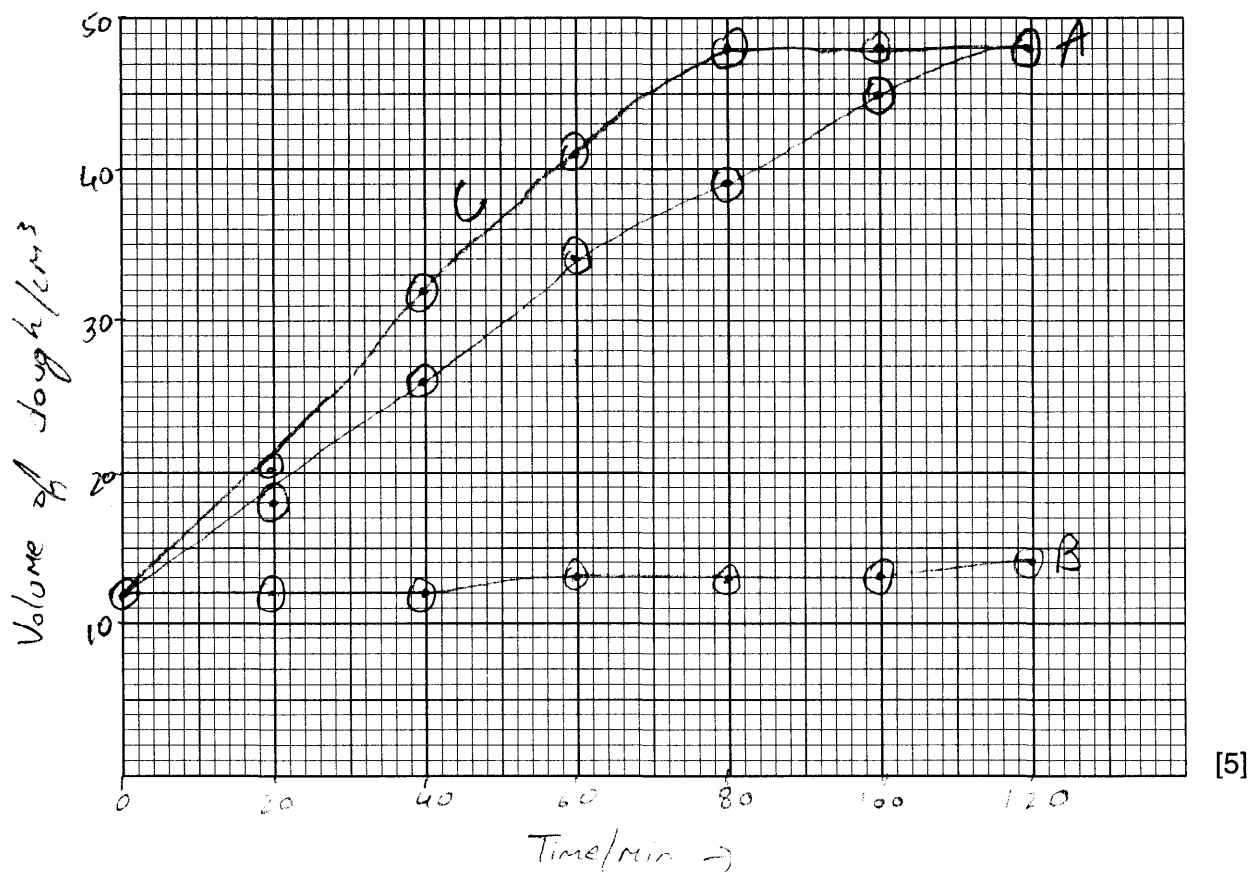
1. The quantity of sugar
 2. The temperature of the water [2]

- (b) At 20 minute intervals, the volume of each dough sample is measured and recorded. The results are shown in Table 1.1.

Table 1.1

time/min	volume of dough / cm ³		
	sample A	sample B	sample C
0	12	12	12
20	18	12	20
40	26	12	32
60	34	13	41
80	39	13	48
100	45	13	48
120	48	14	48

- (i) On the grid opposite, plot the data shown in Table 1.1 for samples **A**, **B** and **C** as three curves on one set of axes.



- (ii) Describe the curves you have drawn for the three samples.

For sample A, the volume of dough increases constantly and after 100 min starts becoming stable.
 For curve B Sample B's volume increases very slowly by 1 cm³ after every three minutes.
 Sample C's volume increases at a very fast rate and eventually becomes stable at 48 cm³ like sample A. [3]

- (iii) Use your graph to find when there is the greatest difference in volume between samples A and C.

On the 80th minute [1]

- (iv) The volume of sample A changed differently to the volume of sample B. Suggest an explanation for this difference.

Yeast was present in ^{sample} substance A and it contains enzymes that can increase the rate of the reaction whereas sample B doesn't contain yeast and therefore its volume increases very slowly. [2]

- (v) The volume of sample A changed differently to the volume of sample C. Suggest an explanation for this difference.

Sample C contained a substance X which is not present in sample A and therefore its sample C's volume increased faster than sample A's. [2]

[Total : 15]

- 4 The apparatus shown in Fig. 4.1 was set up under bright light for a period of five hours. At the start the apparatus was completely full of water. During this time, a gas was collected at the top of the graduated tube.

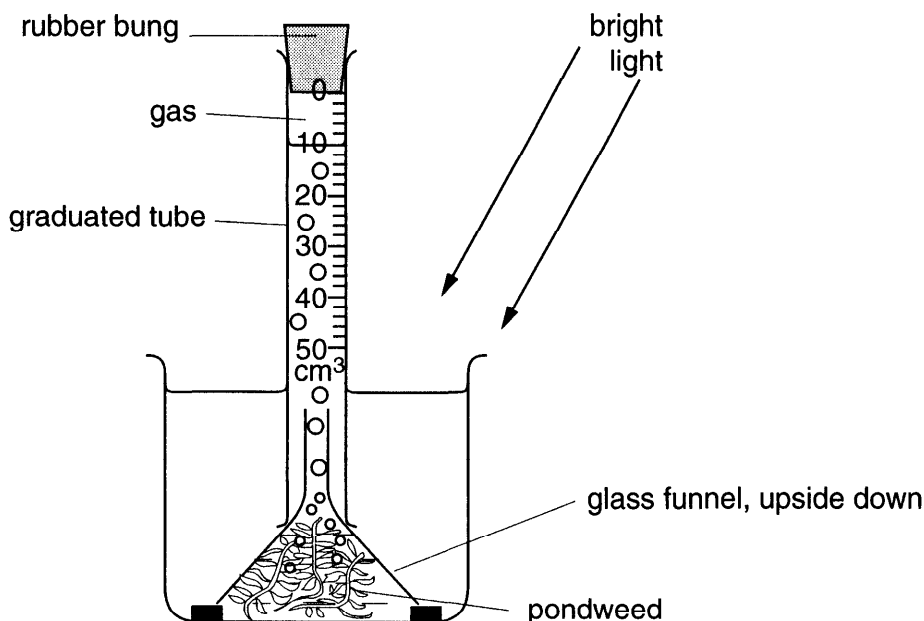


Fig. 4.1

- (a) (i) How would you show this gas was oxygen?

By testing it with a glowing splint which relights in oxygen. [1]

- (ii) Name the process within the plant responsible for the production of oxygen.

Photosynthesis [1]

- (iii) Determine the volume of gas collected in five hours and the rate of gas production per hour.

volume 10 cm³

rate 2 cm³/h [2]

- (iv) How would you use this apparatus to obtain reliable results to show the effect of differing light intensities on the production of oxygen?

Use a similar apparatus but leave it in shade where there is less amount of light for 5 hours. Get the rate of oxygen production and see if it is less or more than 2 cm³/h that was obtained in the bright light. [2]

- (b) The pondweed was placed in hydrogencarbonate indicator solution, which was red in colour when the tube was set up. The tube was left for five hours in bright light, as shown in Fig. 4.2.

(Hydrogencarbonate indicator is purple in alkaline conditions, red in neutral conditions and yellow in acidic conditions.)

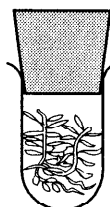


Fig. 4.2

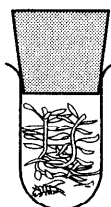


Fig. 4.3

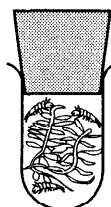


Fig. 4.4

- (i) Suggest what colour you might observe in the tube in Fig. 4.2 after five hours in bright light and give an explanation for this.

colour Purple

explanation This is due to photosynthesis as

..... carbon dioxide from the air is taken and [2]

..... oxygen is produced by the pondweed

- (ii) One water shrimp was introduced into a similar tube with pondweed, Fig. 4.3, and, again, the tube was placed in bright light for five hours.

Suggest what colour you might observe and give an explanation for this.

colour Red

explanation This is because respiration and

..... photosynthesis are taking place at the same time. [2]

- (iii) Three water shrimps were introduced into a similar tube with pondweed, Fig. 4.4, and, again, the tube was placed in bright light for five hours.

Suggest what colour you might observe and give an explanation for this.

colour Yellow

explanation This is because more carbon dioxide

..... will be let out by the shrimps through [2]

..... respiration and most of only a fraction [Total: 12]

..... of it will be utilized by the pondweed for photosynthesis as there are three shrimps in the test-tube

- 1 Three different dough mixtures, samples **A**, **B** and **C** are prepared using the same quantity of flour and water. Each sample of dough is carefully mixed, kneaded, shaped and placed in separate measuring cylinders and kept in a warm place.

Sample **A** contains warm water, sugar, flour and yeast.

Sample **B** contains warm water, sugar and flour.

Sample **C** contains warm water, sugar, flour, yeast, and substance X.

The highest level of the dough is marked on the side of each measuring cylinder, as shown in Fig. 1.1.

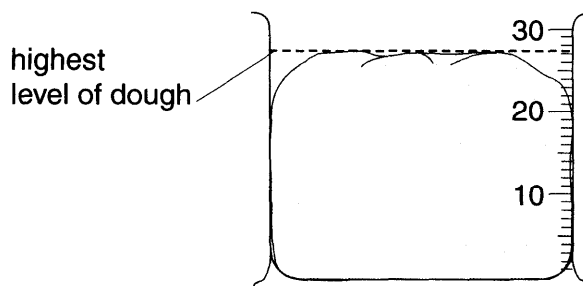


Fig. 1.1

- (a) Suggest **two** other factors which should be kept constant to ensure that the results for the samples can be compared.

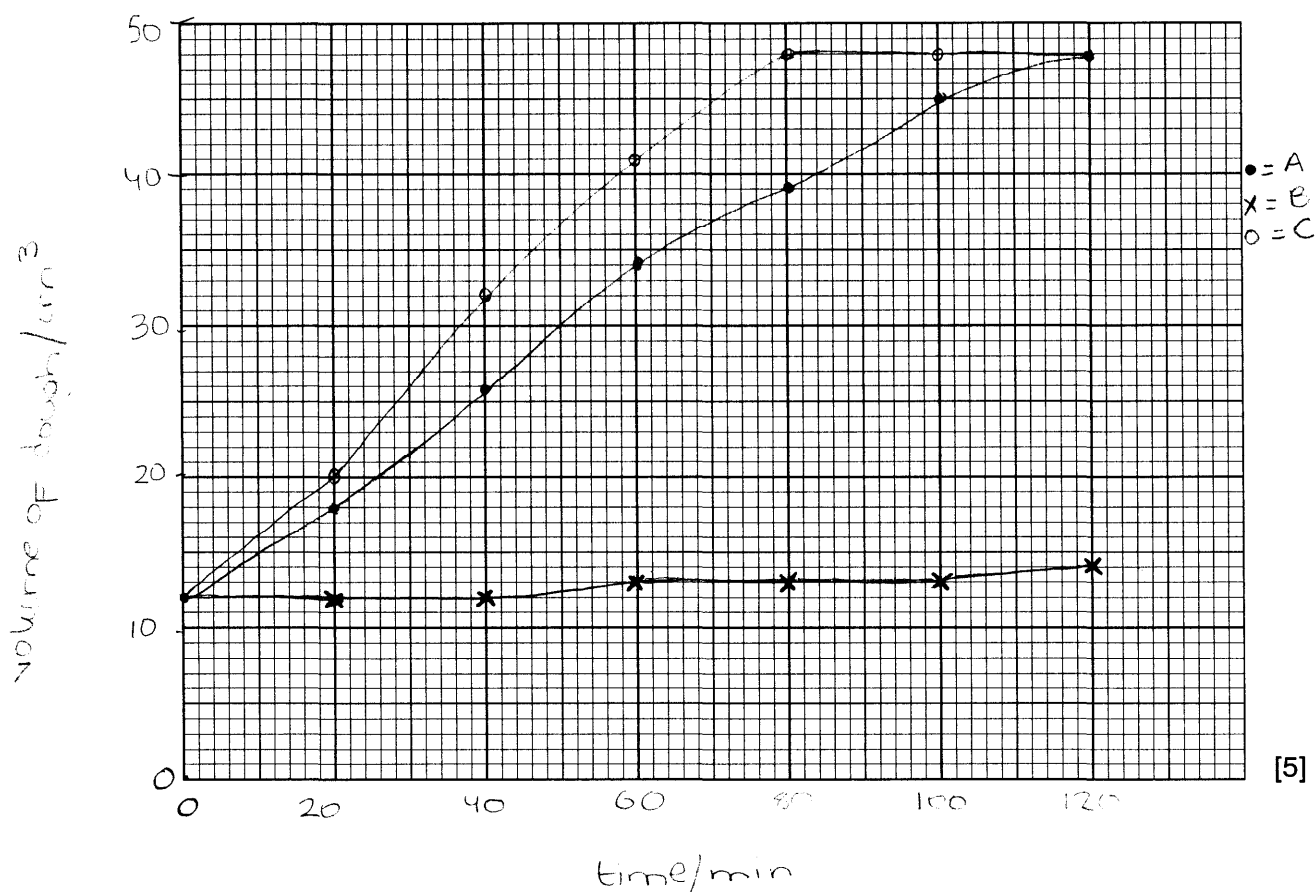
1.The amount and temperature of water.....
2.The amount of sugar.....[2]

- (b) At 20 minute intervals, the volume of each dough sample is measured and recorded. The results are shown in Table 1.1.

Table 1.1

time/min	volume of dough / cm ³		
	sample A	sample B	sample C
0	12	12	12
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100	45	13	48
120	48	14	48

- (i) On the grid opposite, plot the data shown in Table 1.1 for samples **A**, **B** and **C** as three curves on one set of axes.



[5]

- (ii) Describe the curves you have drawn for the three samples.

Curves A and C are higher (the volumes have increases more) because they both contain yeast which makes the dough rise and get bigger. Curve B has less volume of dough because it has no yeast. A and C are similar and B is constant. [3]

- (iii) Use your graph to find when there is the greatest difference in volume between samples A and C.

when C is 48 cm³ and A = 39 cm³ (at 80 mins) [1]

- (iv) The volume of sample **A** changed differently to the volume of sample **B**. Suggest an explanation for this difference.

The samples were the same except that A contained yeast which ~~rise~~ makes the dough rise producing carbon dioxide. The volumes of sample were different because the A also contained yeast and the volume was higher. [2]

- (v) The volume of sample **A** changed differently to the volume of sample **C**. Suggest an explanation for this difference.

because A and C had the same but C also had substance X so the volumes were different as the sample contained more substances another substance more. [2]

[Total : 15]

- 4 The apparatus shown in Fig. 4.1 was set up under bright light for a period of five hours. At the start the apparatus was completely full of water. During this time, a gas was collected at the top of the graduated tube.

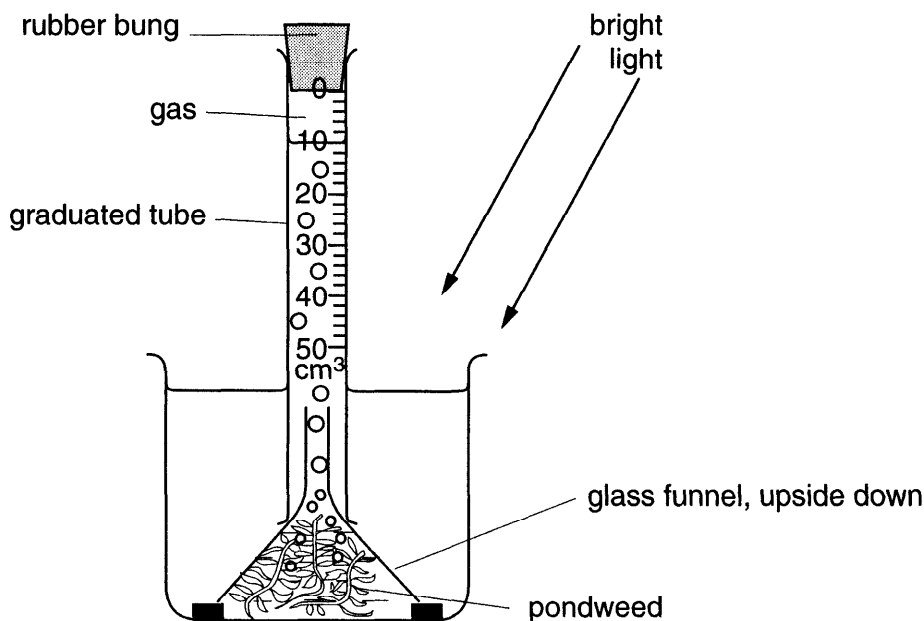


Fig. 4.1

- (a) (i) How would you show this gas was oxygen?

.....it would relight a glowing splint.....[1]

- (ii) Name the process within the plant responsible for the production of oxygen.

.....photosynthesis.....[1]

- (iii) Determine the volume of gas collected in five hours and the rate of gas production per hour.

volume10 cm³.....

rate2 cm³ per hour.....[2]

- (iv) How would you use this apparatus to obtain reliable results to show the effect of differing light intensities on the production of oxygen?

.....Use Put this apparatus in different intensities
of light and see how much oxygen has
been produced in each of the light intensity
The more Oxygen produced the better the
intensity of light for oxygen production. [2]

- (b) The pondweed was placed in hydrogencarbonate indicator solution, which was red in colour when the tube was set up. The tube was left for five hours in bright light, as shown in Fig. 4.2.

(Hydrogencarbonate indicator is purple in alkaline conditions, red in neutral conditions and yellow in acidic conditions.)

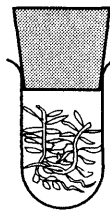


Fig. 4.2

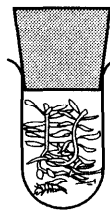


Fig. 4.3

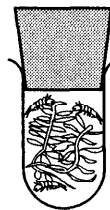


Fig. 4.4

- (i) Suggest what colour you might observe in the tube in **Fig. 4.2** after five hours in bright light and give an explanation for this.

colour purple

explanation because no animal is present so there is not carbon dioxide inside tube. Just the one the plant produces by respiration and no acidity [2]

- (ii) One water shrimp was introduced into a similar tube with pondweed, **Fig. 4.3**, and, again, the tube was placed in bright light for five hours.

Suggest what colour you might observe and give an explanation for this.

colour red

explanation because as there is also an animal respiring inside the tube. The animal uses the O_2 the pondweed produces and pondweed uses CO_2 animal produces. [2]

neutral
conditions →

- (iii) Three water shrimps were introduced into a similar tube with pondweed, **Fig. 4.4**, and, again, the tube was placed in bright light for five hours.

Suggest what colour you might observe and give an explanation for this.

colour yellow

explanation because more carbon dioxide is produced by the animals and it is more acidic. [2]

[Total : 12]