



# **GCSE Biology**

## **Respiration**

### **Mark Scheme**

**Time available: 45 minutes**

**Marks available: 40 marks**

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## Mark schemes

- 1.**
- (a)  $C_6H_{12}O_6$  1
- (b) atmospheric air contains less carbon dioxide than exhaled air  
*allow converse* 1
- (flask B goes more cloudy because) carbon dioxide is produced in (aerobic) respiration (by woodlice)  
*do not accept anaerobic respiration* 1
- (c) for comparison / to compare  
*allow answers in the context of the investigation e.g.*
- or**  
to check that no other factor / variable is influencing the results  
*to prove that the results obtained were due to the woodlice respiring and nothing else*
- or**  
*to prove that the woodlice produced the carbon dioxide and nothing else* 1
- (d) (flask **A**) would remain colourless  
*ignore references to clear*  
*allow not cloudy* 1
- (flask **B**) would remain colourless 1
- (e) lactic acid 1
- (f) alcohol / ethanol 1
- [8]
- 2.**
- (a) no oxygen (is used) 1
- (b) muscles become fatigued / stop contracting 1
- because not enough energy is transferred 1
- (c) carbon dioxide 1

- (d) count the bubbles  
or  
measure volume of gas

in a given time

- (e) brewing / bread making

*allow other suitable use of fermentation in food industry*

**3.**

- (a) LHS – glucose

RHS – water

*allow H<sub>2</sub>O / H2O*

- (b) so the earthworms' body temperature would change to 20°C

- (c) (i) 56 or 55 or 54

*if incorrect answer given accept 60 - 5 for 1 mark*

*or 60 – 6 for 1 mark*

*or 60 – 4 for 1 mark*

- (ii) one-tenth of answer to (c)(i) eg 5.5

(at 10°C / lower temperature):

lower rate of respiration

*allow chemical reactions slower or enzymes less active*

*ignore breathing*

*do not allow anaerobic*

worms less active / worms release less energy / worms use less energy

- (d) (i) anomalous result / not in line with other data / does not fit the pattern

1

1

1

[7]

1

1

1

2

1

1

1

1

(ii) ~~more~~ representative / ~~more~~ reliable / can check 'repeatability' / see if get similar values / identify anomalies

*ignore valid / more fair*

*ignore reproducible*

*ignore 'to remove' anomalies*

*do not accept more accurate or more precise*

1

[10]

4.

(a) (i) mitochondrion / mitochondria

*must be phonetically correct*

1

(ii) carbon dioxide / CO<sub>2</sub>

1

water / H<sub>2</sub>O

1

*in either order*

*accept CO<sub>2</sub> but **not** CO<sup>2</sup>*

*accept H<sub>2</sub>O **or** HOH but not H<sup>2</sup>O*

(iii) diffusion

1

high to low concentration

*allow down a concentration gradient*

1

through (cell) membrane **or** through cytoplasm

*do **not** accept cell wall*

1

(b) ribosomes make proteins / enzymes

1

using amino acids

1

part A / mitochondria provide the energy for the process

*allow ATP*

*do **not** accept produce or make energy*

1

[9]

5.

(a) (i) 19 800

*for correct answer ignore working or lack of working*

*165 × 120 but no answer / wrong answer = 1 mark (ignore extras)*

2

(ii) any **two** from:

- for respiration  
*ignore oxygen debt*
- energy released  
*allow energy produced*
- prevents anaerobic respiration
- prevents build-up of lactic acid

2

(b) any **two** from:

- increased breathing rate(\*)
- increased depth of breathing **or** deep breathing(\*)  
*(\*)more breathing is max 1 mark*  
*ignore increase in heart rate*  
*allow heavier breathing*  
*do **not** allow harder breathing*
- dilation of arteries / vasodilation  
*allow blood vessels dilate*  
*do **not** allow veins / capillaries dilate*
- blood diverted from elsewhere  
*ignore name of organ*

2

[6]