GCSE and IGCSE Biology: Respiration Worksheet - Mark Scheme

Year 10-11 · GCSE (AQA 4.4) and Cambridge IGCSE 0610 topic 12 · Exam-style questions

Section A: Aerobic respiration [12 marks]

1(a)	energy	**1**
1(b)	mitochondria; oxygen	**2**
1(c)	glucose; carbon dioxide	**2**
2	$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$ (2). 1 mark for correct formulae, 1 mark for balancing.	**2**
3	Breathing is moving air in and out of the lungs (1). Respiration is the chemical reaction in cells that releases energy (1).	**2**
4	Any three: muscle contraction; making proteins / building larger molecules; keeping warm (body temperature); active transport; cell division.	**3**

Section B: Anaerobic respiration [14 marks]

5	Muscles: glucose ⟶ lactic acid; lactic acid; muscle fatigue / cramp. Yeast: glucose ⟶ ethanol + carbon dioxide; ethanol and carbon dioxide; brewing and baking. Guidance: 1 mark for each correct box.	**6**
6	Aerobic respiration releases much more energy (1) because glucose is fully broken down (1).	**2**
7	Muscles need energy faster than blood can supply oxygen (1). Cells respire anaerobically to release energy without oxygen (1) and lactic acid builds up (1).	**3**
8	Extra oxygen needed after exercise to break down lactic acid (1). Heart rate and breathing rate stay high (1) so more oxygen is delivered to the muscles (1). Guidance: Higher tier / Extended.	**3**

Section C: Exercise and investigation [14 marks]

9	Both increase (2). Muscles need more oxygen and need carbon dioxide removed faster (1) so blood is pumped faster to supply oxygen and remove CO_2 (1).	**4**
10	Rest for a few minutes and count pulse for 1 minute (1). Exercise for a set time, e.g. 2 minutes (1). Measure the pulse immediately and every minute until it returns to normal (1). Control: same exercise / same time / same person (1).	**4**
11	Mix yeast with glucose solution in a flask (1). Connect to limewater with a tube / bung (1). Keep in a warm place (1). Limewater turns cloudy (1).	**4**
12	To keep oxygen out (1) so the yeast respires anaerobically (1).	**2**

Section D: Respiration in other organisms [5 marks]

13	Seeds respire to release energy (1) and some energy is released as heat (1).	**2**
14	Oxygen diffuses from the alveoli into the blood (1). Blood carries oxygen to respiring cells (1). Carbon dioxide diffuses from blood into the alveoli to be breathed out (1).	**3**

Total: 45 marks. Accept any scientifically correct alternative wording.