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SPECA

GCSE Combined Science (AQA Trilogy) · Biology

Bioenergetics · Tiered Worksheet

Section A: Foundation

Photosynthesis

1) State the word equation for photosynthesis. [2]

2) State the chemical formula of glucose, and the chemical formula of oxygen. [2]

3) Explain why photosynthesis is described as an endothermic reaction. [1]

4) State four factors that affect the rate of photosynthesis. [4]

5) In an experiment, a piece of pondweed was placed at different distances from a lamp and the number of oxygen bubbles released per minute was counted at each distance. Predict how the number of bubbles per minute would change as the distance from the lamp increases, and give a reason for your answer. [2]

6) State three of the things a plant can use the glucose produced in photosynthesis for (other than respiration). [3]

Respiration

7) State the word equation for aerobic respiration. [2]

8) Give two differences between aerobic and anaerobic respiration. [2]

9) State the word equation for anaerobic respiration in human muscle cells, and the word equation for anaerobic respiration in plant and yeast cells. [2]

10) Give one economic use of fermentation in yeast. [1]

11) Describe two changes that happen in the body during exercise, and explain why each occurs. [2]

12) A student exercises vigorously. Explain why an oxygen debt might build up in their muscles. [2]

Section B: Higher (in addition to Section A)

Limiting factors in photosynthesis

13) A graph shows the rate of photosynthesis against light intensity, plotted at two different temperatures (15°C and 25°C). At low light intensities the two lines overlap; at high light intensities, the 25°C line is higher than the 15°C line. Explain this pattern in terms of limiting factors. [3]

14) Light intensity is inversely proportional to the square of the distance from a lamp. At a distance of 1 m, the light intensity is 80 arbitrary units. Calculate the light intensity at a distance of 4 m. [2]

15) A grower is deciding whether to install supplementary lighting in a greenhouse to increase the rate of photosynthesis. Using ideas about limiting factors, explain what they should consider before investing in this equipment. [3]

Oxygen debt in depth

16) Explain what happens to lactic acid in the body after exercise has finished. [2]

17) Give the Higher-tier definition of oxygen debt. [1]

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18) At rest, a person consumes oxygen at a rate of 300 cm^3 per minute. During recovery from exercise, they consume a total of 4000 cm^3 of oxygen over 8 minutes. Calculate the mean rate of oxygen consumption during recovery, and hence calculate the extra (debt) oxygen consumption rate compared with the resting rate. **[3]**

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