AQA (GCSE Notes)

Chapter 4: Bioenergetics

Q1. What is the word equation for photosynthesis?

Q2. What is the balanced chemical equation for photosynthesis?

Q3. What does it mean when we say photosynthesis is an endothermic reaction?

Q4. What are the main raw materials needed for photosynthesis to take place?

Q5. Where in a plant cell does photosynthesis happen?

Q6. What is the role of chlorophyll in photosynthesis?

Q7. How does light energy affect the process of photosynthesis?

Q8. Why is carbon dioxide necessary for photosynthesis?

Q9. How does temperature affect the rate of photosynthesis?

Q10. What is a limiting factor in photosynthesis?

Q11. Explain why the rate of photosynthesis increases with light intensity up to a certain point.

Q12. What happens to the rate of photosynthesis if a plant has low levels of chlorophyll?

Q13. Describe how the concentration of carbon dioxide can affect photosynthesis.

Q14. What are the products of photosynthesis and how are they used by the plant?

Q15. How would you design an experiment to test the effect of light intensity on the rate of photosynthesis?

Q16. What is the role of water in the photosynthesis reaction?

Q17. What is meant by the term "rate of photosynthesis"?

Q18. Why does photosynthesis slow down at very high temperatures?

Q19. How can you measure the rate of photosynthesis in a lab experiment?

Q20. How would you identify the limiting factor in a given photosynthesis graph?

Q21. Describe how a plant uses the glucose produced in photosynthesis.

Q22. Why is it important for farmers to understand limiting factors of photosynthesis?

Q23. What is the inverse square law and how does it apply to photosynthesis?

Q24. How can graphs be used to interpret the effect of light intensity on photosynthesis?

Q25. Why might a greenhouse be heated artificially during cold weather?

Q26. What is the economic benefit of controlling light, temperature, and carbon dioxide in a greenhouse?

Q27. Why might the rate of photosynthesis not increase even if light intensity is increased further?

Q28. How do you know when a factor is limiting the rate of photosynthesis?

Q29. Why is oxygen released during photosynthesis?

Q30. What is the role of chloroplasts in the process of photosynthesis?

Q31. Why is photosynthesis important for life on Earth?

Q32. How can a plant compensate for low light conditions?

Q33. What type of energy transformation takes place during photosynthesis?

Q34. How does the structure of a leaf help it carry out photosynthesis?

Q35. Explain how stomata are involved in photosynthesis.

Q36. What happens to the rate of photosynthesis when carbon dioxide levels are high but light is low?

Q37. Why does photosynthesis require enzymes?

Q38. How could a scientist test the effect of carbon dioxide on photosynthesis?

Q39. Why might a plant grown in the shade have larger leaves?

Q40. Describe a method to calculate the rate of photosynthesis using pondweed.

Q41. How can artificial lighting be used to increase crop yield in greenhouses?

Q42. What safety precautions should be taken when using lamps to investigate photosynthesis?

Q43. How does increasing chlorophyll concentration affect photosynthesis?

Q44. How can temperature be controlled in an experimental setup for photosynthesis?

Q45. Why is it necessary to control variables when testing photosynthesis rates?

Q46. What conclusions can be drawn from a photosynthesis graph with a plateau?

Q47. How do scientists use mathematical models to describe photosynthesis rates?

Q48. Why do plants need to photosynthesise during the daytime?

Q49. What is meant by the term “optimum temperature” in relation to photosynthesis?

Q50. How can photosynthesis graphs help in deciding how to increase plant growth in different seasons?

Q51. How can you investigate the effect of light intensity on the rate of photosynthesis using pondweed?

Q52. What is the role of a lamp in the pondweed experiment on photosynthesis?

Q53. How can you make sure the temperature stays constant during the photosynthesis practical?

Q54. Why is it important to count the number of oxygen bubbles released in the pondweed experiment?

Q55. What is one way to make the measurement of oxygen more accurate in the light intensity experiment?

Q56. What does AT 1 refer to in the context of the photosynthesis practical?

Q57. What variable should be changed to investigate light intensity in the required practical?

Q58. What are the controlled variables in the light intensity experiment using pondweed?

Q59. What would be the effect of increasing the distance between the lamp and the pondweed?

Q60. Why is it important to repeat the pondweed experiment and take an average?

Q61. How can the rate of photosynthesis be calculated from the experiment with pondweed?

Q62. What is meant by a qualitative reagent?

Q63. How can you test a leaf for the presence of starch?

Q64. Why is the leaf boiled in ethanol during the starch test?

Q65. What reagent is used to test for glucose in plants?

Q66. What colour change would you expect when testing for protein using biuret reagent?

Q67. What is the chemical formula for glucose?

Q68. How is glucose used for respiration in plants?

Q69. Why do plants convert glucose into starch?

Q70. Why is starch stored in an insoluble form in plants?

Q71. How is glucose used to produce fat or oil in plants?

Q72. What is the importance of cellulose made from glucose?

Q73. What extra nutrient do plants need to make amino acids?

Q74. How do plants get nitrate ions from the soil?

Q75. What is the word equation for aerobic respiration?

Q76. Write the balanced chemical equation for aerobic respiration.

Q77. Why is aerobic respiration described as an exothermic reaction?

Q78. In what part of the cell does aerobic respiration mostly take place?

Q79. How is the energy from respiration used in movement?

Q80. Why is respiration important for keeping animals warm?

Q81. What is the word equation for anaerobic respiration in human muscles?

Q82. Why is less energy released in anaerobic respiration compared to aerobic respiration?

Q83. What is the main product of anaerobic respiration in muscles?

Q84. Why does lactic acid cause fatigue in muscles?

Q85. What process breaks down lactic acid after exercise?

Q86. What is the word equation for anaerobic respiration in yeast?

Q87. What are the products of anaerobic respiration in yeast?

Q88. What is fermentation?

Q89. How is fermentation used in bread making?

Q90. How is fermentation used in the production of alcoholic drinks?

Q91. What gas is produced during fermentation that helps dough rise?

Q92. Why do yeast cells switch to anaerobic respiration when oxygen is not available?

Q93. Compare the products of aerobic respiration and anaerobic respiration in humans.

Q94. Compare the amount of energy released in aerobic and anaerobic respiration.

Q95. How does the body respond to increased energy demands during vigorous exercise?

Q96. Why does heart rate increase during aerobic respiration?

Q97. How does anaerobic respiration differ between muscle cells and yeast cells?

Q98. What are the similarities between aerobic and anaerobic respiration?

Q99. What happens to the oxygen supply to muscles during very intense exercise?

Q100. Why is respiration considered a continuous process in all living cells?

Q101. What changes happen in the body during exercise to meet increased energy demands?

Q102. Why does the heart rate increase during physical activity?

Q103. How does an increase in breathing rate help the body during exercise?

Q104. What is meant by an increase in breath volume during exercise?

Q105. Why do muscles need more oxygen during exercise?

Q106. What happens when the body cannot supply enough oxygen to the muscles during exercise?

Q107. What causes a build-up of lactic acid in the muscles?

Q108. What is meant by the term "oxygen debt"?

Q109. How is oxygen debt paid back after exercise ends?

Q110. What effect does lactic acid have on muscle function?

Q111. What does it mean when muscles become fatigued?

Q112. How does the liver help the body recover after anaerobic respiration?

Q113. How is lactic acid removed from muscle cells after exercise?

Q114. Why do athletes need to warm up before vigorous exercise?

Q115. What is the importance of cooling down after exercise?

Q116. What types of data could be collected during an investigation on the effects of exercise?

Q117. How can heart rate be measured accurately before and after exercise?

Q118. What is one method to investigate the effect of exercise on breathing rate?

Q119. Why should results be repeated when measuring the effects of exercise?

Q120. What is metabolism?

Q121. What are the main components involved in the synthesis of carbohydrates, proteins, and lipids?

Q122. What is formed when glucose is converted to starch?

Q123. How are glycogen and cellulose related to glucose?

Q124. What are lipids made from?

Q125. Describe the basic structure of a lipid molecule.

Q126. What molecules are needed to make amino acids in plants?

Q127. How are proteins built from amino acids?

Q128. Why is respiration included in the definition of metabolism?

Q129. What type of reaction is the breakdown of excess proteins into urea?

Q130. What is the role of the liver in protein breakdown?

Q131. How is urea removed from the body?

Q132. What role do enzymes play in metabolic reactions?

Q133. Why is energy needed for metabolic processes?

Q134. How does metabolism support growth in organisms?

Q135. What is the relationship between respiration and metabolism?

Q136. What is the difference between anabolic and catabolic reactions?

Q137. How are glucose molecules used in metabolism?

Q138. What is the importance of metabolic reactions in everyday life?

Q139. How does the body store glucose when it is not immediately needed?

Q140. What happens to glucose during cellular respiration?

Q141. How is excess glucose stored in the liver and muscles?

Q142. How are fatty acids important in metabolism?

Q143. How do metabolic processes affect body temperature?

Q144. What are examples of molecules broken down during metabolism?

Q145. How can a poor diet affect metabolic processes in the body?

Q146. How does exercise influence the rate of metabolism?

Q147. How can hormones affect metabolism?

Q148. Why is the balance of metabolic reactions important for health?

Q149. Why must the body remove excess amino acids?

Q150. What is one way to investigate the effect of physical activity on metabolism in a classroom setting?