VIP

# Biology

## Unit 3

Grade 12

# Cellular Metabolism

1. **What is cellular metabolism?**

   A. The process of energy storage

   B. All of the chemical reactions that occur within cells

   C. The breakdown of proteins only

   D. The synthesis of carbohydrates only

   **Answer:** B. All of the chemical reactions that occur within cells

2. **Which of the following is a catabolic pathway?**

   A. Glycogenesis

   B. Photosynthesis

   C. Glycolysis

   D. Protein synthesis

   **Answer:** C. Glycolysis

3. **What is the primary energy currency of the cell?**

   A. Glucose

   B. FADH2

   C. ATP

   D. NADH

   **Answer:** C. ATP

4. **In cellular respiration, glucose is primarily broken down to produce:**

A. Oxygen

B. Lactic acid

C. Carbon dioxide and water

D. Fructose

**Answer:** C. Carbon dioxide and water

5. **Which of the following processes occurs in the mitochondria?**

A. Glycolysis

B. Krebs cycle (Citric acid cycle)

C. Fermentation

D. Calvin cycle

**Answer:** B. Krebs cycle (Citric acid cycle)

## Energy Transformation in Metabolism

6. **Which process converts glucose into pyruvate?**

A. Citric acid cycle

B. Electron transport chain

C. Glycolysis

D. Beta-oxidation

**Answer:** C. Glycolysis

7. **What is the main purpose of fermentation?**

A. To completely oxidize glucose

B. To regenerate NAD+ under anaerobic conditions

C. To produce ATP only

D. To convert ATP into glucose

**Answer:** B. To regenerate NAD+ under anaerobic conditions

8. **Which of the following is NOT an end product of aerobic respiration?**

A. Carbon dioxide

B. Water

C. Ethanol

D. ATP

**Answer:** C. Ethanol

9. **The process of converting energy stored in food into ATP is called:**

A. Photosynthesis

B. Metabolism

C. Cellular respiration

D. Glycolysis

**Answer:** C. Cellular respiration

10. **In the electron transport chain, the final electron acceptor is:**

A. Carbon dioxide

B. Oxygen

C. Glucose

D. NADH

**Answer:** B. Oxygen

## Photosynthesis

11. **What is the primary pigment involved in photosynthesis?**

    A. Chlorophyll a

    B. Carotenoids

    C. Chlorophyll b

    D. Xanthophyll

    **Answer:** A. Chlorophyll a

12. **Where does photosynthesis occur in plant cells?**

    A. Mitochondria

    B. Nucleus

    C. Chloroplasts

    D. Ribosomes

    **Answer:** C. Chloroplasts

13. **What are the two main stages of photosynthesis?**

    A. Glycolysis and Krebs cycle

    B. Light-dependent reactions and light-independent reactions (Calvin cycle)

    C. Fermentation and aerobic respiration

    D. Beta-oxidation and glycolysis

**Answer:** B. Light-dependent reactions and light-independent reactions (Calvin cycle)

14. **During which stage of photosynthesis is oxygen produced?**

A. Light-dependent reactions

B. Calvin cycle

C. Glycolysis

D. Krebs cycle

**Answer:** A. Light-dependent reactions

15. **What is the output of the Calvin cycle?**

A. Glucose

B. Oxygen

C. ATP and NADPH

D. Carbon dioxide

**Answer:** A. Glucose

## Energy Transformation in Photosynthesis

16. **Which molecule absorbs light energy during photosynthesis?**

A. Water

B. Glucose

C. Chlorophyll

D. Carbon dioxide

**Answer:** C. Chlorophyll

17. **What is captured by chlorophyll during photosynthesis?**

A. Thermal energy

B. Light energy

C. Electrons

D. Mechanical energy

**Answer:** B. Light energy

18. **What is produced as a by-product during photosynthesis?**

A. Carbon dioxide

B. Glucose

C. Oxygen

D. Water

**Answer:** C. Oxygen

19. **What is the primary function of the light-dependent reactions?**

A. To convert solar energy into chemical energy

B. To fix carbon dioxide

C. To produce glucose

D. To generate ATP only

**Answer:** A. To convert solar energy into chemical energy

20. **Which of the following factors can influence the rate of photosynthesis?**

A. Light intensity

B. Carbon dioxide concentration

C. Temperature

D. All of the above

**Answer:** D. All of the above

General Questions

21. **The formula for photosynthesis can be summarized as:**

A. $6\ CO_2 + 6\ H_2O + \text{light energy} \rightarrow C_6H_{12}O_6 + 6\ O_2$

B. $C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O + \text{energy}$

C. $C_6H_{12}O_6 + \text{light energy} \rightarrow 6\ CO_2 + 6\ O_2$

D. $6\ H_2O + \text{light energy} \rightarrow C_6H_{12}O_6 + 6\ O_2$

**Answer:** A. $6\ CO_2 + 6\ H_2O + \text{light energy} \rightarrow C_6H_{12}O_6 + 6\ O_2$

22. **In which part of the chloroplast do the light-dependent reactions occur?**

A. Stroma

B. Thylakoid membranes

C. Outer membrane

D. Inner membrane

**Answer:** B. Thylakoid membranes

23. **ATP is generated during photosynthesis through which mechanism?**

A. Photophosphorylation

B. Oxidative phosphorylation

C. Substrate-level phosphorylation

D. Fermentation

**Answer:** A. Photophosphorylation

24. **What type of organisms perform photosynthesis?**

A. Autotrophs

B. Heterotrophs

C. Decomposers

D. None of the above

**Answer:** A. Autotrophs

25. **Which of the following statements is true regarding energy transformation in photosynthesis?**

A. Light energy is converted into thermal energy.

B. Chemical energy is stored in bonds of glucose.

C. Photosynthesis does not produce energy.

D. All of the above.

**Answer:** B. Chemical energy is stored in bonds of glucose.

## Contribution of Photosynthesis

26. **What is one of the primary contributions of photosynthesis to the Earth's atmosphere?**

A. It increases nitrogen levels.

B. It produces oxygen.

C. It reduces carbon dioxide levels only.

D. It generates ammonia.

**Answer:** B. It produces oxygen.

27. **How does photosynthesis affect the carbon cycle?**

A. It releases carbon dioxide into the atmosphere.

B. It converts carbon dioxide into organic compounds.

C. It has no effect on the carbon cycle.

D. It consumes oxygen.

**Answer:** B. It converts carbon dioxide into organic compounds.

28. **Which gas is a byproduct of photosynthesis?**

A. Carbon dioxide

B. Nitrogen

C. Oxygen

D. Methane

**Answer:** C. Oxygen

29. **Photosynthesis plays a crucial role in:**

A. Decreasing biodiversity.

B. Maintaining earth's climate.

C. Reducing atmospheric heat.

D. Eliminating all carbon compounds.

**Answer:** B. Maintaining earth's climate.

30. **What process do plants use to convert sunlight into chemical energy?**

A. Respiration

B. Photosynthesis

C. Fermentation

D. Decomposition

**Answer:** B. Photosynthesis

31. **The balance of oxygen and carbon dioxide in the atmosphere is primarily regulated by:**

A. Photosynthesis and respiration

B. Combustion only

C. Ocean currents

D. Wind patterns

**Answer:** A. Photosynthesis and respiration

32. **Which of the following is an effect of deforestation on global warming?**

A. Increased oxygen production

B. Increased carbon dioxide levels

C. Decreased greenhouse gases

D. Improved air quality

**Answer:** B. Increased carbon dioxide levels

33. **What role do phytoplankton play in photosynthesis?**

A. They consume oxygen.

B. They are primary producers in aquatic ecosystems.

C. They release carbon dioxide.

D. They destroy ozone.

**Answer:** B. They are primary producers in aquatic ecosystems.

34. **Carbon dioxide is absorbed by plants during:**

A. Cellular respiration

B. Photosynthesis

C. Fermentation

D. Transpiration

**Answer:** B. Photosynthesis

35. **The increase in carbon dioxide levels due to human activity is associated with:**

A. Increased photosynthesis rates in all species.

B. Global warming and climate change.

C. More oxygen production.

D. Decreased plant growth.

**Answer:** B. Global warming and climate change.

## Cellular Respiration

36. **What is the main purpose of cellular respiration?**

A. To produce glucose

B. To generate ATP

C. To store energy in plants

D. To decompose organic matter

**Answer:** B. To generate ATP

37. **Cellular respiration occurs in which part of the cell?**

A. Nucleus

B. Mitochondria

C. Chloroplasts

D. Ribosomes

**Answer:** B. Mitochondria

38. **Which of the following is the correct equation for aerobic respiration?**

A. $C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O$ + energy

B. $CO_2 + H_2O$ + light $\rightarrow C_6H_{12}O_6 + O_2$

C. $C_6H_{12}O_6 + O_2 \rightarrow 6\ CO_2 + 6\ H_2O$

D. $C_6H_{12}O_6 + O_2 \rightarrow 6\ CO_2 + 6\ H_2O$ + heat

**Answer:** A. $C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O$ + energy

39. **In which stage of cellular respiration is the most ATP produced?**

A. Glycolysis

B. Krebs cycle

C. Electron transport chain

D. Lactic acid fermentation

**Answer:** C. Electron transport chain

40. **During anaerobic respiration, glucose is partially broken down into:**

A. Carbon dioxide only

B. Ethanol or lactic acid

C. Water

D. Acetyl-CoA

**Answer:** B. Ethanol or lactic acid

41. **What happens during glycolysis?**

A. Glucose is broken down into pyruvate.

B. Oxygen is consumed.

C. ATP is synthesized from ADP.

D. Pyruvate is converted into glucose.

**Answer:** A. Glucose is broken down into pyruvate.

42. **What is produced in the Krebs cycle that is crucial for the electron transport chain?**

A. Glucose

B. NADH and $FADH_2$

C. Oxygen

D. Carbon dioxide

**Answer:** B. NADH and $FADH_2$

43. **The final electron acceptor in aerobic respiration is:**

A. Carbon dioxide

B. Oxygen

C. Nitrogen

D. Glucose

**Answer:** B. Oxygen

44. **In cellular respiration, how is energy stored?**

A. By creating glucose from carbon dioxide

B. By converting ATP to ADP

C. By forming high-energy phosphate bonds in ATP

D. By producing lactic acid

**Answer:** C. By forming high-energy phosphate bonds in ATP

45. **Which process occurs in the absence of oxygen?**

A. Aerobic respiration

B. Photosynthesis

C. Anaerobic respiration

D. Krebs cycle

**Answer:** C. Anaerobic respiration

General Questions

46. **How does cellular respiration relate to photosynthesis?**

A. They are completely independent processes.

B. Products of photosynthesis serve as reactants in cellular respiration.

C. They produce the same end products.

D. Cellular respiration occurs only at night, while photosynthesis occurs during the day.

**Answer:** B. Products of photosynthesis serve as reactants in cellular respiration.

47. **What is the impact of increased atmospheric carbon dioxide due to human activities?**

A. Reduction in photosynthesis

B. Slower plant growth

C. Enhanced greenhouse effect leading to climate change

D. Increased oxygen levels

**Answer:** C. Enhanced greenhouse effect leading to climate change

48. **What role do plants play in the balance of oxygen and carbon dioxide?**

A. They consume oxygen and produce carbon dioxide.

B. They produce oxygen and consume carbon dioxide.

C. They do not participate in the gas exchange.

D. They only produce oxygen at night.

**Answer:** B. They produce oxygen and consume carbon dioxide.

49. **What is the byproduct of cellular respiration?**

A. Glucose

B. Oxygen

C. Carbon dioxide

D. Both B and C

**Answer:** D. Both B and C

50. **Which of the following factors can limit the rate of photosynthesis in plants?**

A. Temperature

B. Light intensity

C. Carbon dioxide concentration

D. All of the above

**Answer:** D. All of the above