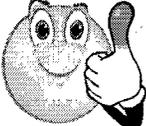


Unit 4 – Photosynthesis and Cellular Respiration

Topic			
Products and Reactants			
Best and Worst Colors for Photosynthesis			
Light Dependent vs. Light Independent Reaction			
Organelles Responsible			
ADP vs. ATP			

<p>Products and Reactants</p>	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center; background-color: black; color: white; margin: 0;">Photosynthesis</p> <div style="border: 1px solid black; padding: 10px; margin: 5px 0;"> $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 + \text{H}_2\text{O}$ </div> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p style="text-align: center; background-color: black; color: white; margin: 0;">Cellular Respiration</p> <div style="border: 1px solid black; padding: 10px; margin: 5px 0;"> <p>Aerobic: $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + 36 \text{ ATP}$</p> </div> <div style="border: 1px solid black; padding: 10px; margin: 5px 0;"> <p>Anaerobic: <i>Human:</i> $\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow \text{CO}_2 + \text{lactic acid} + 4\text{ATP}$ <i>Yeast:</i> $\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow \text{CO}_2 + \text{ethyl alcohol} + 4\text{ATP}$</p> </div> </div> </div>
<p>Best and Worst Colors for Photosynthesis</p>	
<p>Light Dependent vs. Light Independent Reaction</p>	
<p>Organelles Responsible</p>	
<p>ADP vs. ATP</p>	

- 10) In certain bacteria and yeasts, under anaerobic conditions, the oxidation of glucose leads to the production of
- A) oxygen
B) starches
C) ethyl alcohol
D) complex sugars
- 11) The site of aerobic cellular respiration is the
- A) chromosome
B) nucleus
C) mitochondrion
D) ribosome
- 12) For the following statement, choose the biochemical process that is best described by the statement.
- Lactic acid is produced as a result of this process.
- A) chemosynthesis
B) replication
C) fermentation
D) photosynthesis
- 13) What is the net gain in ATP following the completion of aerobic cellular respiration of one molecule of glucose in a brain cell?
- A) 30
B) 4
C) 36
D) 2
- 14) An inorganic molecule required by green plants for the process of photosynthesis is
- A) carbon dioxide
B) oxygen
C) glucose
D) starch
- 15) Which compounds are produced in human muscle cells as a result of oxidation of glucose in the absence of oxygen?
- A) ethyl alcohol and ATP
B) sucrose and carbon dioxide
C) lactic acid and ATP
D) lipase and water
- 16) (A) $\text{glucose} \xrightarrow{\text{enzymes}} 2 \text{ ethyl alcohol} + 2\text{CO}_2 + 2 \text{ ATP}$
(B) $\text{glucose} + 2 \text{ ATP} \xrightarrow{\text{enzymes}} 2 \text{ pyruvic acid} + 4 \text{ ATP}$
(C) $2 \text{ pyruvic acid} + \text{O}_2 \xrightarrow{\text{enzymes}} \text{CO}_2 + \text{H}_2\text{O} + 34 \text{ ATP}$
(D) $2 \text{ pyruvic acid} \xrightarrow{\text{enzymes}} 2 \text{ lactic acid}$
- Which reaction occurs in mitochondria?
- A) C
B) D
C) B
D) A
- 17) Most animals make energy available for cell activity by transferring the potential energy of glucose to ATP. This process occurs during
- A) both aerobic and anaerobic respiration
B) neither aerobic nor anaerobic respiration
C) anaerobic respiration, only
D) aerobic respiration, only
- 18) The raw materials used by green plants for photosynthesis are
- A) oxygen and glucose
B) carbon dioxide and glucose
C) carbon dioxide and water
D) oxygen and water

19) Which equation represents a process that results from a lack of oxygen in human muscle cells?

- A) polypeptide $\xrightarrow{\text{enzymes}}$ dipeptides
 B) sucrose $\xrightarrow{\text{enzymes}}$ simple sugars
 C) glucose $\xrightarrow{\text{enzymes}}$ lactic acid + ATP
 D) glucose $\xrightarrow{\text{enzymes}}$ carbon dioxide + alcohol + ATP

20) Carbon dioxide and water are wastes produced by the process of

- A) photosynthesis
 B) emulsification
 C) aerobic respiration
 D) dehydration synthesis

21) For the given statement, choose the process that is best described by the statement.

Lactic acid accumulates in the muscle tissues of humans during vigorous activity.

- A) anaerobic respiration
 B) aerobic respiration
 C) carbon-fixation reactions of photosynthesis
 D) photochemical reactions of photosynthesis

22) Organic molecules are constructed from inorganic raw materials as a result of

- A) regulation
 B) hydrolysis
 C) photosynthesis
 D) digestion

23) Heterotrophic organisms are characterized by their

- A) ability to convert light energy into chemical energy
 B) ability to convert simple inorganic compounds into organic compounds
 C) dependence on obtaining organic compounds from their environment for nutrition
 D) dependence on the chemical activities of chloroplasts in their cells

24) For the given statement, select the metabolic process, chosen from the list below, that is most closely associated with that statement.

This process occurs in humans only when certain cells do *not* receive an adequate supply of oxygen.

- A) $2\text{ATP} + \text{C}_6\text{H}_{12}\text{O}_6 \xrightarrow{\text{enzymes}} 4\text{ATP} + 2 \text{ lactic acid}$
 B) $\text{C}_{12}\text{H}_{22}\text{O}_{11} + \text{H}_2\text{O} \xrightarrow{\text{enzymes}} \text{C}_6\text{H}_{12}\text{O}_6 + \text{C}_6\text{H}_{12}\text{O}_6$
 C) $6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{chlorophyll}]{\text{light, enzymes}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$

25) For the given statement, choose the process that is best described by the statement.

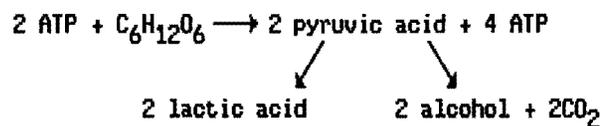
The oxidation of a glucose molecule results in the synthesis of ATP, water, and carbon dioxide.

- A) photochemical reactions of photosynthesis
 B) carbon-fixation reactions of photosynthesis
 C) anaerobic respiration
 D) aerobic respiration

- 26) Which reactions are involved in the process of photosynthesis?
 A) both photochemical and carbon-fixation reactions
 B) photochemical reactions, only
 C) neither photochemical nor carbon-fixation reactions
 D) carbon-fixation reactions, only
- 27) Which compound is formed in the process of photosynthesis?
 A) ammonia B) colchicine C) PGAL D) DNA
- 28) The products of aerobic respiration in green plants are ATP and
 A) lactic acid and oxygen C) carbon dioxide and water
 B) carbon dioxide and ethyl alcohol D) glucose and oxygen

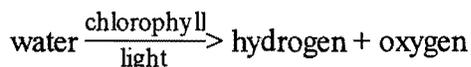
Questions 29 and 30 refer to the following:

The diagram below represents a series of chemical reactions.



- 29) Which end product is of greatest benefit to the organism in which these reactions occur?
 A) alcohol B) pyruvic acid C) ATP D) lactic acid
- 30) These series of reactions includes the process known as
 A) fermentation C) hydrolysis
 B) digestion D) dehydration synthesis
- 31) Based on their pattern of nutrition, most animals are classified as
 A) heterotrophic B) phagocytic C) photosynthetic D) autotrophic
- 32) When does aerobic respiration occur in green plants?
 A) during both daylight and darkness C) only when photosynthesis is occurring
 B) during daylight, only D) during darkness, only
- 33) Which compound is a three-carbon sugar and a product of the dark reactions of photosynthesis?
 A) ATP B) ADP C) PGAL D) DNA
- 34) The main result of aerobic respiration is the
 A) production of ATP from the breakdown of glucose
 B) storage of energy in a polysaccharide
 C) production of lactic acid as an end product
 D) conversion of radiant energy into chemical energy

- 35) The summary word equation shown below represents a set of reactions occurring in photosynthesis.



These reactions are known as

- A) fermentation reactions
 B) carbon fixation reactions
 C) photochemical reactions
 D) dark reactions
- 36) The products produced by yeast cells as a result of anaerobic respiration include ATP and
- A) water and carbon dioxide
 B) water and oxygen
 C) alcohol and carbon dioxide
 D) alcohol and oxygen
- 37) A product of cellular respiration is
- A) ATP
 B) glucose
 C) PCB
 D) oxygen
- 38) In most green plants, which wavelengths of light are most effective in the conversion of radiant energy into the chemical energy of organic compounds?
- A) yellow and green
 B) red and blue
 C) red and green
 D) yellow and blue
- 39) In animals, the organelles in which aerobic cellular respiration occurs are known as
- A) mitochondria
 B) ribosomes
 C) nuclear membranes
 D) chloroplasts
- 40) Anaerobic respiration is considered to be less efficient than aerobic respiration because
- A) the net gain of ATP molecules is less in anaerobic respiration than in aerobic respiration
 B) less lactic acid is formed during anaerobic respiration than aerobic respiration
 C) less energy is required during anaerobic respiration than aerobic respiration
 D) anaerobic respiration requires more oxygen than aerobic respiration
- 41) Which summary equation represents a process that releases the greatest amount of energy from a molecule of glucose?
- A) $\text{glucose} \longrightarrow 2 \text{ ethyl alcohol} + 2 \text{ carbon dioxide}$
 B) $\text{glucose} + \text{fructose} \longrightarrow \text{sucrose} + \text{water}$
 C) $\text{glucose} \longrightarrow 2 \text{ lactic acid}$
 D) $\text{glucose} + 6 \text{ oxygen} \longrightarrow 6 \text{ water} + 6 \text{ carbon dioxide}$

- 1) A 2) A 3) C 4) C 5) C
C 7) C 8) C 9) B 10) C
) C 12) C 13) C 14) A 15) C
16) A 17) A 18) C 19) C 20) C
21) A 22) C 23) C 24) A 25) D
26) A 27) C 28) C 29) C 30) A
31) A 32) A 33) C 34) A 35) C
36) C 37) A 38) B 39) A 40) A
41) D