

Living Environment Review Packet

Dear Living Environment student,

We hope you all are well at home! While school is shut down, we want to be sure that you are practicing the skills and content knowledge you have gained so far this year. The Living Environment Packet will help you achieve this!

It is organized by topic so that you can review the topics covered in your class so far. The answers are also provided so that you can check your work and make corrections to solidify your knowledge.

Please email your teachers if you have questions.

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NYS Living Environment review packet answers

Topic 1:

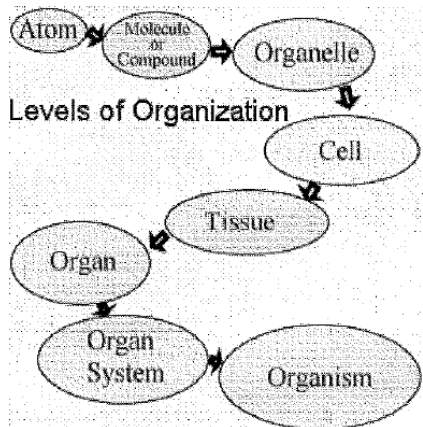
1. 1	2. 2	3. 2
4. 2	5. 3	6. 3
7. 4	8. 3	9. 1
10. 1	11. 3	12. 2
13. 3	14. 2	15. 3

Topic 2:

1. 2	2. 2	3. 2	4. 1	5. 2
6. 4	7. 1	8. 3	9. 3	10. 3
11. 2	12. 2	13. 3	14. 4	15. 3
16. 1	17. 2	18. 1	19. 3	20. 4
21. 1	22. 3	23. 3	24. 3	25. 4
26. 2	27. 4	28. 3	29. 2	

Topic 1: Living Things

Organization of living things:



Cells are the smallest units of life.

Organelles are the structures inside the cell.

Nucleus- Contains DNA (genetic information) that controls the production of proteins

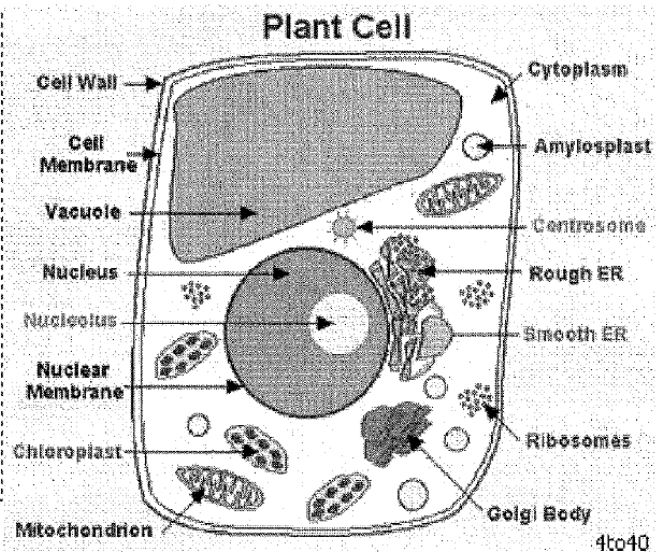
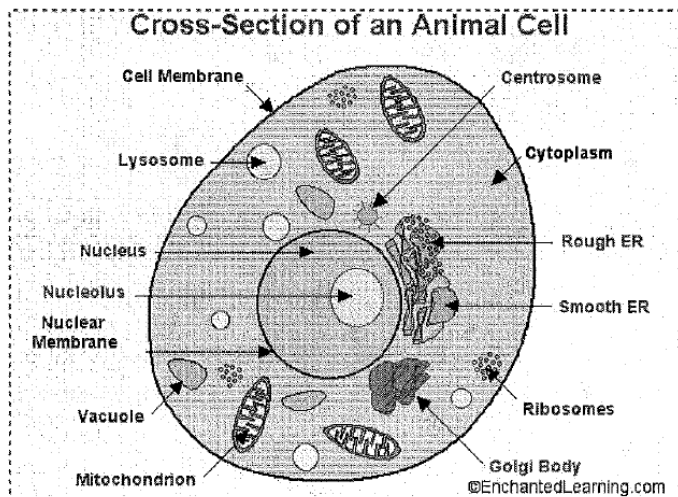
Ribosomes- Read the message sent from DNA and places AA in the correct order to form a protein. (order of AA determines SHAPE and Function of the protein)

Mitochondria- Site of Cellular Aerobic Respiration;

makes ATP other metabolic activities needed to stay alive

Vacuoles- Store food (food vacuoles) or wastes

Cytoplasm- fluid (mostly water) where many chemical reactions take place.



Cell Membrane-controls what goes in (nutrients and O_2) or out (CO_2 and wastes) of the cell.

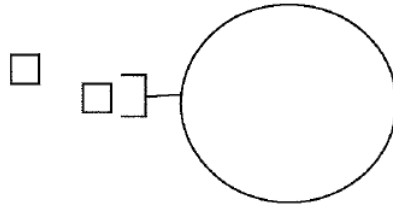
Selectively permeable- only certain substances can pass through the membrane.

Diffusion- molecules move from a high concentration to a low concentration with no energy required. **Osmosis** is the diffusion of water.

Example) A cell has 95% water on the inside and 90% water on the outside. Water will move out of the cell (high to low).

Active Transport- molecules move from a low concentration to a high concentration ENERGY is REQUIRED. The energy used by cells is **ATP**.

Receptor Molecules- on the cell membrane; the shape determines what substances it can attach to and bring into the cell.



Plant Cells have all of this Plus....

Chloroplasts- Site of Photosynthesis

- contains a green pigment called Chlorophyll

Super Large Vacuole- Store water and sugar

Life Functions:

1. **Nutrition**- nutrients are needed for energy (ATP), repair and growth.

Autotrophic Organisms- take in inorganic molecules (CO_2 and H_2O) to form complex organic compounds (like glucose $\text{C}_6\text{H}_{12}\text{O}_6$) Ex.) Plants/Producers do photosynthesis

Heterotrophic Organisms- cannot make their own food and rely on other organisms for food

- Starches \rightarrow simple sugars (glucose is an example)
 - Proteins \rightarrow amino acids
 - Lipids \rightarrow fatty acids and glycerol
2. **Transport**-materials must be distributed throughout the cell or body (nutrients, wastes, hormones, oxygen, antibodies...).
 3. **Respiration** – Energy (ATP) is released from the bonds of glucose; happens in the mitochondria of the cells
 4. **Metabolism**- all chemical reactions in an organism. **Synthesis** is the process of making materials in the body such as using nutrients to make proteins needed by the organism.
 5. **Regulation and Coordination**- to maintain Homeostasis cells must be able to communicate (coordinate actions). Nerves and Hormones carry these messages to the

"target" cells. The target cell recognizes that the message because they have receptors on their membranes.

6. **Excretion**- gets rid of toxic waste products from cellular processes. This is different from elimination (digestive waste = feces)

Topic 1 Homework Questions

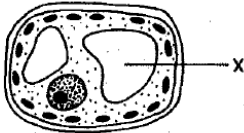
1. Which structures could most likely be observed in cells in the low-power field of a compound light microscope?

- (1) cell walls and chloroplasts
- (2) ribosomes and chromosomes
- (3) vacuoles and oxygen
- (4) carbon dioxide and mitochondria

2. Which organelles must be present within a cell of a geranium leaf for respiration and photosynthesis to occur?

- (1) cell wall and cytoplasm
- (2) mitochondrion and chloroplast
- (3) cell membrane and nucleus
- (4) vacuole and ribosome

3. In the diagram of a cell below, the structure labeled X enables the cell to



- (1) release energy
- (2) store waste products
- (3) control cell activities
- (4) manufacture proteins

4. If the ribosomes of a cell were destroyed, what effect would this most likely have on the cell?

- (1) It would stimulate mitotic cell division.
- (2) The cell would be unable to synthesize proteins.
- (3) Development of abnormal hereditary features would occur in the cell.
- (4) Increased protein absorption would occur through the cell membrane.

5. Which structures carry out life functions within cells?

- (1) tissues
- (2) organ systems
- (3) organelles
- (4) organs

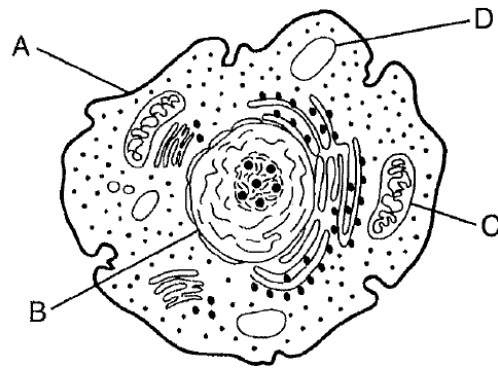
6. Certain poisons are toxic to organisms because they interfere with the function of enzymes in mitochondria. This results directly in the inability of the cell to

- (1) store information
- (2) build proteins
- (3) release energy from nutrients
- (4) dispose of metabolic wastes

7. Which sequence shows a *decreasing* level of complexity?

- (1) organs → organism → cells → tissues
- (2) organism → cells → organs → tissues
- (3) cells → tissues → organs → organism
- (4) organism → organs → tissues → cells

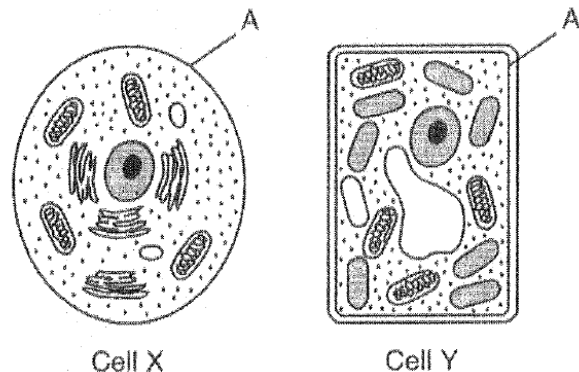
8. The diagram below represents a cell.



Which statement concerning ATP and activity within the cell is correct?

- (1) The absorption of ATP occurs at structure A.
- (2) The synthesis of ATP occurs within structure B.
- (3) ATP is produced most efficiently by structure C.
- (4) The template for ATP is found in structure D.

9. The diagram below represents two cells, X and Y.



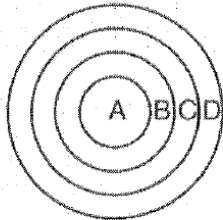
Which statement is correct concerning the structure labeled A?

- (1) It aids in the removal of metabolic wastes in both cell X and cell Y.
- (2) It is involved in cell communication in cell X, but not in cell Y.
- (3) It prevents the absorption of CO₂ in cell X and O₂ in cell Y.
- (4) It represents the cell wall in cell X and the cell membrane in cell Y.

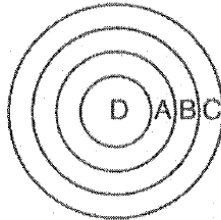
Topic 1

10. Which diagram best represents the relative locations of the structures in the list below?

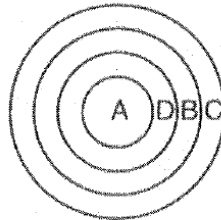
A—chromosome
B—nucleus
C—cell
D—gene



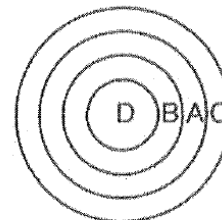
(1)



(2)



(3)



(4)

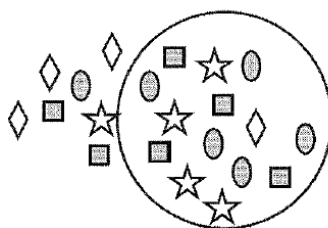
11. Hereditary information is stored inside the

- (1) ribosomes, which have chromosomes that contain many genes
- (2) ribosomes, which have genes that contain many chromosomes
- (3) nucleus, which has chromosomes that contain many genes
- (4) nucleus, which has genes that contain many chromosomes

12. Which statement best explains why some cells in the reproductive system only respond to certain hormones?

- (1) These cells have different DNA than the cells in other body systems.
- (2) These cells have specific types of receptors on their membranes.
- (3) Reproductive system cells could be harmed if they made contact with hormones from other body systems.
- (4) Cells associated with the female reproductive system only respond to the hormone testosterone.

13. The diagram below shows the relative concentration of molecules inside and outside of a cell.

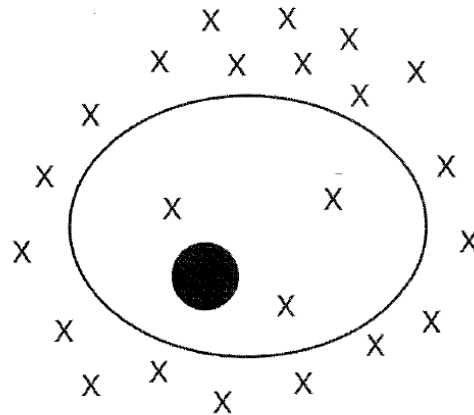


Key	
◇	= Protein
■	= Oxygen
☆	= Glucose
●	= Carbon dioxide

Which statement best describes the general direction of diffusion across the membrane of this cell?

- (1) Glucose would diffuse into the cell.
- (2) Protein would diffuse out of the cell.
- (3) Carbon dioxide would diffuse out of the cell.
- (4) Oxygen would diffuse into the cell.

14. The diagram below shows molecules represented by X both outside and inside of a cell.



A process that would result in the movement of these molecules out of the cell requires the use of

- (1) DNA
- (2) ATP
- (3) antigens
- (4) antibodies

Topic 2: Homeostasis in Living Things

Homeostasis is the internal stability that all organisms maintain. Biochemical processes occur in living things and are essential for their survival.

Energy Storing Process- PHOTOSYNTHESIS

Equation in words: Water + Carbon Dioxide → Glucose + Oxygen

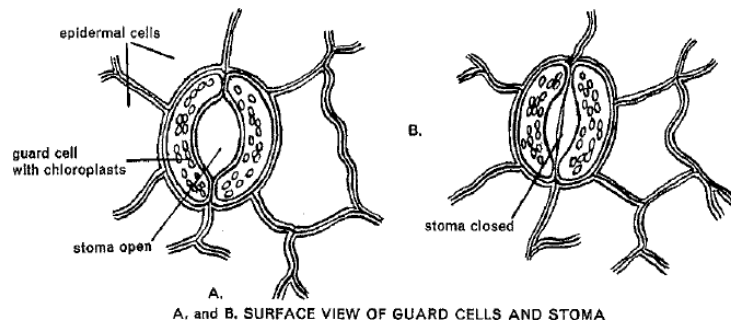
Equation in chemical symbols: $\text{H}_2\text{O} + \text{CO}_2 \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$

*Happens in the chloroplasts of plant cells (chlorophyll is the pigment needed)

*Light energy from the sun is converted into chemical energy

Stomates- holes on the bottoms of leaves that open and close

- let CO_2 in (when open)
- conserve water (when closed)
- special cells called **guard cells** control the opening or closing of the holes.



Energy Releasing Process: CELLULAR RESPIRATION

Equation in words: Glucose + Oxygen → Water + Carbon Dioxide + ATP

Equation in chemical symbols: $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{H}_2\text{O} + \text{CO}_2 + \text{ATP}$

*Happens in the mitochondria of all cells

*Chemical energy from glucose is converted into ATP which is a form of energy used by cells.

Organism- All systems working together to maintain life and homeostasis

- **Digestive system**- digest and absorb nutrients

- **Respiratory System**- Gas exchange (oxygen & carbon dioxide)
- **Immune System**- protects the body from viruses and bacteria (pathogens/antigens)
 - Pathogens- disease causing organisms (virus, bacteria, fungus, microorganisms, protists)
 - Antigens are like protein name tags that have a special shape the white blood cells can recognize the name tags to
 - White Blood Cells- produce antibodies that have a special shape to fit into or recognize the bad pathogens/antigens and destroy them or label them for destruction. (immune response).
 - Vaccines- dead or weakened pathogen injected into your body so the WBC can “practice” making antibodies for it...makes a person IMMUNE to the pathogen.
 - Antibiotics- medications given to fight bacterial infections.
 - Allergy- body makes antibodies to harmless antigens (pollen, dust, peanut butter)
 - AIDS- H.I.V. destroys WBC...no immunity
- **Nervous System**- used for fast communication between cells to maintain homeostasis.
- **Endocrine System**- Hormones (chemical message) is sent through the blood to a target cell/organ that has the correct shaped receptors.
 - **Feedback Mechanisms**-maintain homeostasis by regulating the amount of sugar, water, calcium in your body/blood
 - Ex. If blood sugar is too high, insulin is released from the pancreas to bring it back to normal levels.
- **Excretory System**- removes wastes from the body (kidneys, skin, lungs)
- **Skeletal/muscular System**- Locomotion

Dynamic Equilibrium- the constant small corrections that must occur to maintain homeostasis

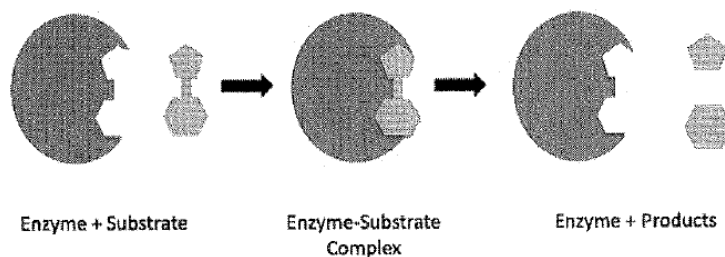
Enzymes-Specially shaped proteins that digest or synthesize large molecules. They are needed for most metabolic activities (homeostasis/equilibrium)

- Enzymes are specific in their action and their substrate (what they digest or synthesize)

Substrate “fits” into the enzyme

Ex.) protease digests proteins,
Lactase digests lactose, Lipase
digests lipids

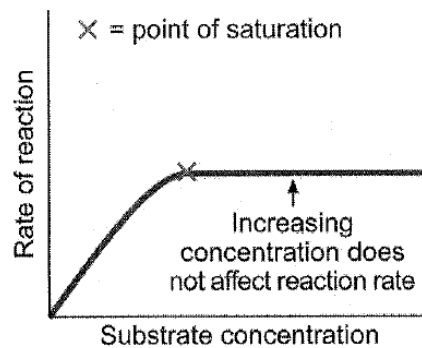
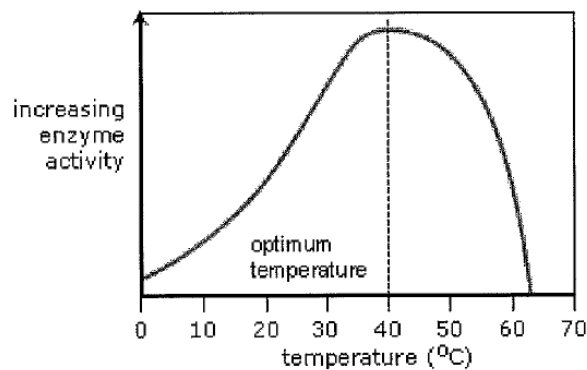
- Enzymes are catalysts (increase
the rate of the reaction)



Ex. Starch will eventually breakdown into simple sugars but...Enzymes make the reaction happen 1000 times faster.

- if you change the shape of an enzyme (denature), you change the speed of it or make it stop functioning.

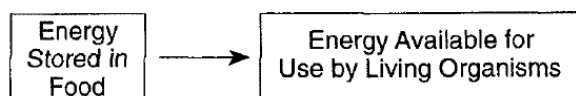
Factors affecting Enzyme Activity- Temperature, pH (acidic/basic) and amount of enzyme or substrate affect the rate at which enzymes work...Every enzyme has an optimal (best) temp and pH that it can work the fastest (highest rate). Temp & pH graphs look similar. Concentration of



enzyme & substrate graphs look similar.

Homework Topic 2

1. Which process is represented by the arrow in the diagram below?



- 1) growth
- 2) respiration
- 3) regulation
- 4) excretion

2. In photosynthesis, chlorophyll functions in changing

- 1) glucose molecules to starch
- 2) water and carbon dioxide to sugar
- 3) light energy to chemical bond energy
- 4) hydrogen bonds to water

3. The basic inorganic materials used during photosynthesis are

- 1) H_2O AND $C_6H_{12}O_6$
- 2) O_2 and CO_2
- 3) H_2O and CO_2
- 4) $C_6H_{12}O_6$ and CO_2

4. Bromthymol blue turns to bromthymol yellow in the presence of carbon dioxide. When the carbon dioxide is removed, the solution will return to a blue color. Two green water plants were placed in separate test tubes, each containing water and bromthymol yellow. Both test tubes were corked. One tube was placed in the light, the other in the dark. After several days, the liquid in the tube exposed to the light turned blue.

This demonstration illustrates that, during photosynthesis, green plants

- 1) take in carbon dioxide
- 2) need bromthymol blue
- 3) give off oxygen gas
- 4) form ATP molecules

5. Most of the oxygen in the atmosphere results from the process of

- 1) fermentation
- 2) photosynthesis
- 3) regulation
- 4) respiration

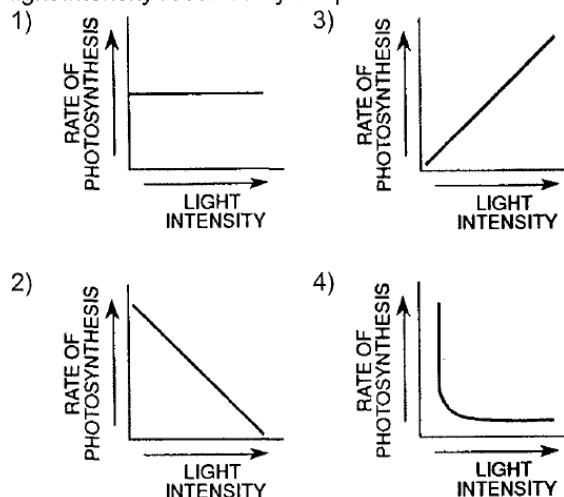
6. Most of the food and oxygen in the environment is produced by the action of

- 1) saprophytic bacteria
- 2) heterotrophic organisms
- 3) aerobic protozoans
- 4) autotrophic organisms

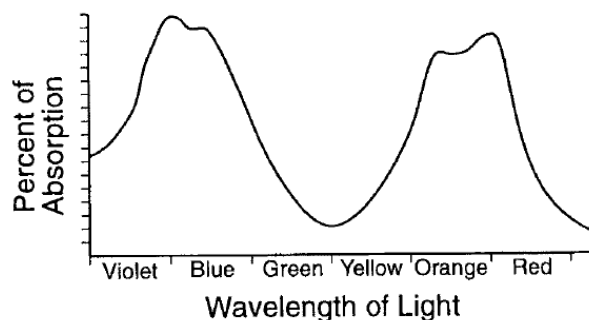
7. Photosynthesis transforms molecules of water and carbon dioxide into molecules of

- 1) carbohydrate and oxygen
- 2) carbohydrate and nitrogen
- 3) polypeptide and oxygen
- 4) polypeptide and nitrogen

8. If the leaves of a geranium plant receive an adequate supply of raw materials, which graph shows how the rate of photosynthesis is related to increasing light intensity received by the plant?



9. The graph below represents the absorption spectrum of chlorophyll.



The graph indicates that the energy used in photosynthesis is most likely obtained from which regions of the spectrum?

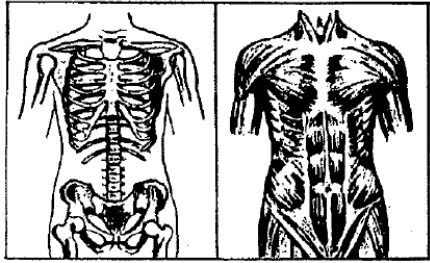
- 1) yellow and orange red
- 2) violet blue and green
- 3) orange red and violet blue
- 4) green and yellow

Homework Topic 2

10. Anaerobic respiration is considered to be less efficient than aerobic respiration because
- 1) less lactic acid is formed during anaerobic respiration than aerobic respiration
 - 2) anaerobic respiration requires more oxygen than aerobic respiration
 - 3) the net gain of ATP molecules is less in anaerobic respiration than in aerobic respiration
 - 4) less energy is required during anaerobic respiration than aerobic respiration
11. Which word equation represents a type of fermentation?
- 1) glucose \rightarrow lactic acid + energy
 - 2) glucose + oxygen \rightarrow carbon dioxide + water + energy
 - 3) starch + water \rightarrow simple sugars
 - 4) carbon dioxide + water \rightarrow glucose + oxygen + water
12. The products produced by yeast cells as a result of anaerobic respiration include ATP and
- 1) alcohol and oxygen
 - 2) alcohol and carbon dioxide
 - 3) water and oxygen
 - 4) water and carbon dioxide
13. In a green plant cell, oxygen is used primarily for the process of
- 1) dehydration synthesis
 - 2) photosynthesis
 - 3) respiration
 - 4) capillary action
14. In animals, the organelles in which aerobic cellular respiration occurs are known as
- 1) ribosomes
 - 2) chloroplasts
 - 3) nuclear membranes
 - 4) mitochondria
15. Which substance is represented by X in the word equation below?
- glucose + X $\xrightarrow{\text{enzymes}}$ water + carbon dioxide + ATP
- 1) alcohol
 - 2) chlorophyll
 - 3) oxygen
 - 4) lactic acid
16. In humans, what happens when the breathing rate increases?
- 1) Additional oxygen will diffuse into the blood as carbon dioxide diffuses out of the blood in the lungs.
 - 2) Additional carbon dioxide will diffuse into the blood as oxygen diffuses out of the blood in the lungs.
 - 3) Oxygen from body cells will diffuse more rapidly into red blood cells.
 - 4) Increased oxygen dissolved in the blood will stimulate the cerebrum to slow the breathing rate.

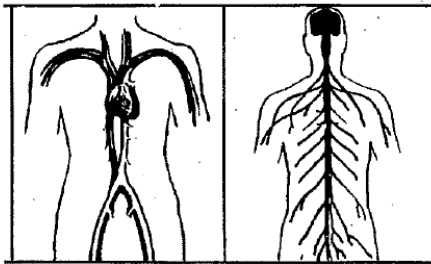
Homework Topic 2

Base your answers to questions 17 through 20 on the diagrams below of organ systems and on your knowledge of biology.



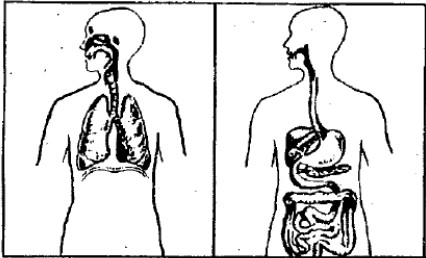
A

B



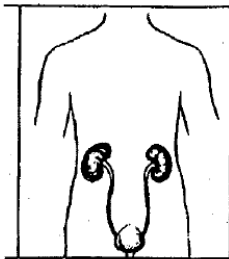
C

D



E

F



G

17. Which disorder would most directly involve an organ in system F?

- 1) anemia
- 2) constipation
- 3) bronchitis
- 4) meningitis

18. Tendonitis is a condition that would most directly involve which two systems?

- 1) A and B
- 2) C and D
- 3) E and F
- 4) A and G

19. Cardiovascular diseases interfere most directly with the normal functioning of system

- 1) E
- 2) G
- 3) C
- 4) D

20. Polio is a disease caused by a virus that directly destroys cells in system

- 1) A
- 2) B
- 3) C
- 4) D

Homework Topic 2

___21. Base your answer to the following question on the reading passage below and on your knowledge of biology.

Polio Vaccines

Polio is a disease that results in the destruction of nerve cells. The first vaccine against polio was developed by Jonas Salk and was made from polio viruses that were killed using the chemical formalin. In 1953, Salk tested the vaccine on himself, his wife, and his three sons. The vaccine was found to be safe and seemed to work. In 1954, more than 1.8 million schoolchildren were part of a trial to test the vaccine, and in April 1955, the vaccine was declared to be safe and effective.

Albert Sabin also developed a vaccine against polio. The vaccine developed by Sabin was made from weakened polio viruses. While the Salk vaccine had to be injected, the Sabin vaccine was administered orally on a cube of sugar.

Both vaccines were found to be effective in protecting people against polio because these vaccines stimulate immune responses involving antibody production. However, the Sabin vaccine is effective over a longer period of time and is easier to administer. Together, these vaccines have nearly eliminated polio in many parts of the world.

Which statement about the Salk vaccine is correct?

- | | |
|-------------------------------|---|
| 1) Dead viruses are injected. | 3) Antibodies are administered orally. |
| 2) Antibodies are injected. | 4) Sugar cubes are administered orally. |

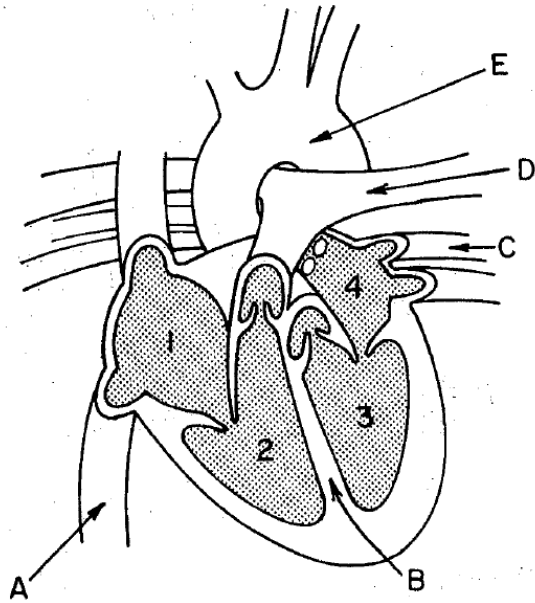
___22. People who receive organ transplants sometimes produce antibodies in response to foreign proteins present in the organ of the donor. This reaction is an example of

- | | |
|-----------------|----------------|
| 1) regeneration | 3) rejection |
| 2) clotting | 4) deamination |

___23. An individual who has had chicken pox rarely gets this disease again. This situation is an example of

- | | |
|-----------------------|---------------------|
| 1) biological control | 3) active immunity |
| 2) negative feedback | 4) passive immunity |

Base your answers to questions 24 through 26 on the diagram of the human heart below and on your knowledge of biology.



___24. Oxygenated blood from the left lung is returned to the heart through a structure labeled

- | | |
|------|------|
| 1) A | 3) C |
| 2) E | 4) D |

___25. Which sequence correctly represents the flow of blood through the heart?

- | | |
|--------------------|--------------------|
| 1) 4 → 3 and 2 → 1 | 3) 1 → 2 and 3 → 4 |
| 2) 2 → 1 and 3 → 4 | 4) 1 → 2 and 4 → 3 |