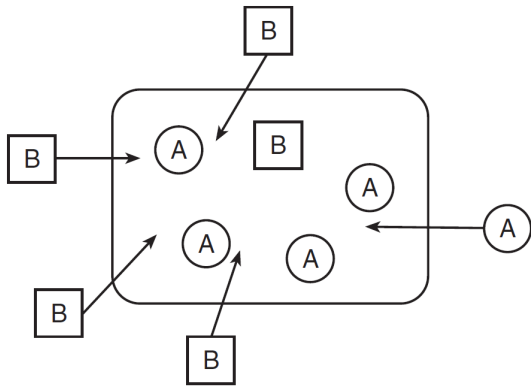


- 
1. In the binomial system of nomenclature, which two classification groups provide the scientific name of an organism?
    - A) kingdom and phylum
    - B) phylum and species
    - C) kingdom and genus
    - D) genus and species
  2. The cell theory states that
    - A) all cells have nuclei that contain genetic information
    - B) living organisms are composed of cells that arise from preexisting cells
    - C) all cells regenerate and contain the same basic structures
    - D) organisms that lack certain organelles reproduce by binary fission
  3. Which cell structures are correctly paired with their functions?
    - A) The mitochondria produce enzymes, and ribosomes transport them.
    - B) The ribosomes make proteins, and the nucleus stores genetic information.
    - C) The cell membrane make enzymes, and cytoplasm transports them.
    - D) The vacuole stores genetic information, and chloroplasts make proteins.
  4. Which cell structure is correctly paired with its primary function?
    - A) ribosome–protein synthesis
    - B) mitochondrion–movement
    - C) vacuole–cell division
    - D) nucleus–storage of nutrients
  5. Muscle cells in athletes often have more mitochondria than muscle cells in nonathletes. Based on this observation, it can be inferred that the muscle cells in athletes
    - A) have a smaller demand for cell proteins than the muscle cells of nonathletes
    - B) reproduce less frequently than the muscle cells of nonathletes
    - C) have nuclei containing more DNA than nuclei in the muscle cells of nonathletes
    - D) have a greater demand for energy than the muscle cells of nonathletes
  6. One difference between plant and animal cells is that animal cells do *not* have
    - A) a nucleus
    - B) chloroplasts
    - C) a cell membrane
    - D) centrioles
  7. A wet-mount slide preparation of a specimen is stained in order to
    - A) eliminate some organelles
    - B) make cell structures more visible
    - C) use the high-power lens
    - D) remove water from the slid
  8. What cellular structure must oxygen cross to get from the outside to the inside of an animal cell?
    - A) The nucleus
    - B) The cytoplasm
    - C) The cell membrane
    - D) The cell wall
  9. A substance is most likely to diffuse into a cell when
    - A) it is a large organic food molecule such as protein or starch
    - B) it is enclosed in an organelle such as a vacuole
    - C) the concentration of the substance is greater outside the cell than inside
    - D) the pH of the substance is greater than the pH of the cell
-

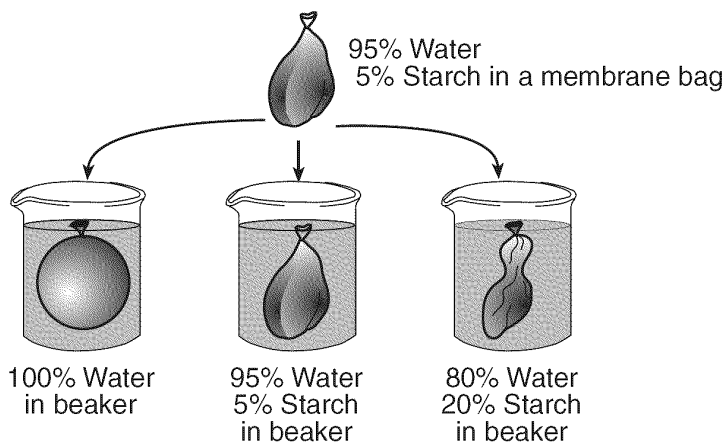
10. The diagram below shows two different kinds of substances, *A* and *B*, entering a cell.



ATP is most likely being used for

- A) substance *A* to enter the cell
- B) substance *B* to enter the cell
- C) both substances to enter the cell
- D) neither substance to enter the cell

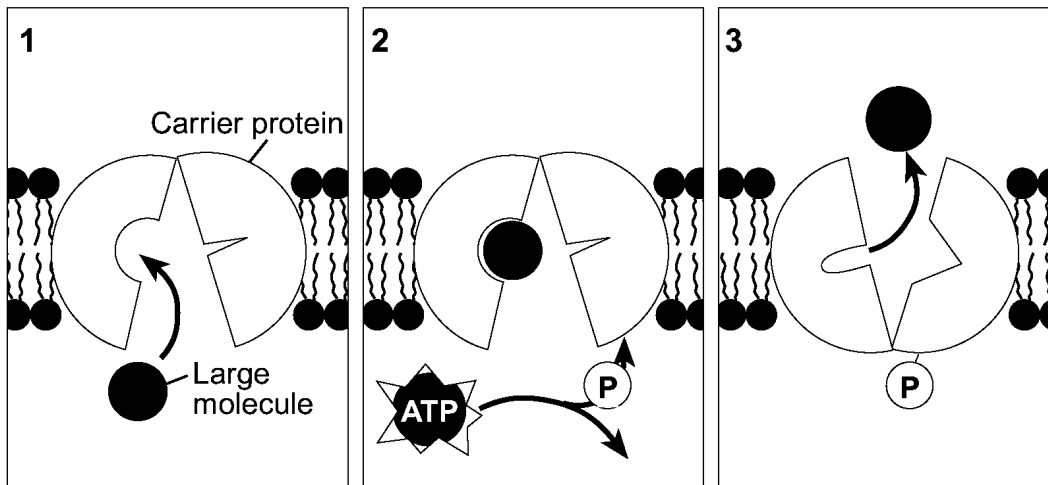
11. Base your answer to the following question on An investigation was set up to study the movement of water through a membrane. The results are shown in the diagram below.



Based on these results, which statement correctly predicts what will happen to red blood cells when they are placed in a beaker containing a water solution in which the salt concentration is much higher than the salt concentration in the red blood cells?

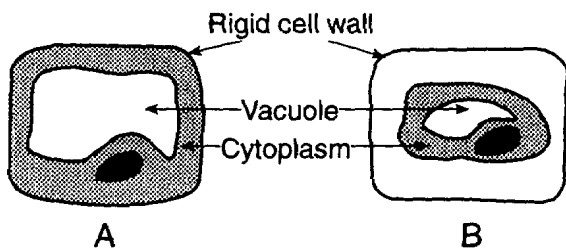
- A) The red blood cells will absorb water and increase in size.
- B) The red blood cells will lose water and decrease in size.
- C) The red blood cells will first absorb water, then lose water and maintain their normal size.
- D) The red blood cells will first lose water, then absorb water, and finally double in size.

12. Base your answer to the following question on The diagram below represents movement of a large molecule across a membrane.



Which process is best represented in this diagram?

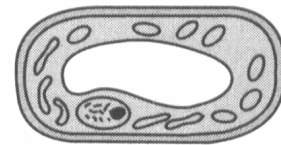
- A) active transport  
B) diffusion  
C) protein building  
D) gene manipulation
13. Base your answer to the following question on A biologist observed a plant cell in a drop of water as shown in diagram *A*. The biologist added a 10% salt solution to the slide and observed the cell as shown in diagram *B*.



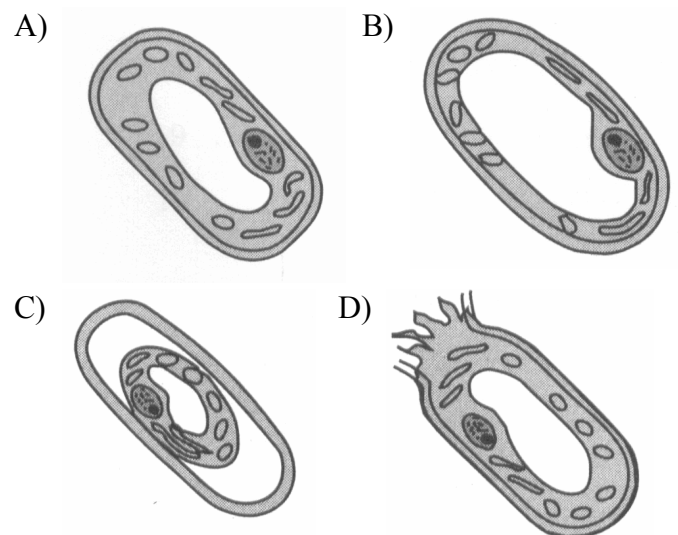
The change in appearance of the cell resulted from

- A) more salt moving out of the cell than into the cell  
B) more salt moving into the cell than out of the cell  
C) more water moving into the cell than out of the cell  
D) more water moving out of the cell than into the cell
14. Which process would include a net movement of sugar molecules through a membrane from a region of lower concentration to a region of higher concentration?
- A) osmosis  
B) cyclosis  
C) active transport  
D) passive transport

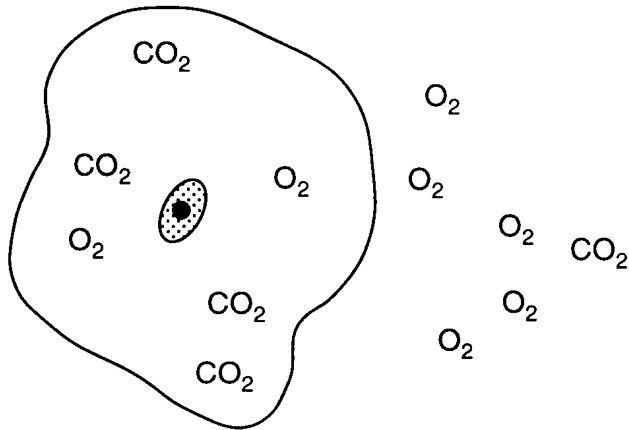
15. Base your answer to the following question on The diagram below represents a plant cell in tap water as seen with a compound light microscope.



Which diagram best represents the appearance of the cell after it has been placed in a 15% salt solution for two minutes?



16. Base your answer to the following question on The diagram below represents a cell in water. Formulas of molecules that can move freely across the cell membrane are shown. Some molecules are located inside the cell and others are in the water outside the cell.



Based on the distribution of these molecules, what would most likely happen after a period of time?

- A) The concentration of  $\text{O}_2$  will increase inside the cell.
  - B) The concentration of  $\text{CO}_2$  will remain the same inside the cell.
  - C) The concentration of  $\text{O}_2$  will remain the same outside the cell.
  - D) The concentration of  $\text{CO}_2$  will decrease outside the cell.
17. Plant cells can synthesize energy-rich organic molecules, and later break them down to extract that energy for performing life processes. These activities require direct interaction between the
- A) chloroplasts and vacuoles
  - B) cell walls and ribosomes
  - C) chloroplasts and mitochondria
  - D) ribosomes and mitochondria

18. Leaves of green plants contain openings known as stomates, which are opened and closed by specialized cells allowing for gas exchange between the leaf and the outside environment. Which phrase best represents the net flow of gases involved in photosynthesis into and out of the leaf through these openings on a sunny day?

- A) carbon dioxide moves in; oxygen moves out
- B) carbon dioxide and oxygen move in; ozone moves out
- C) oxygen moves in; nitrogen moves out
- D) water and ozone move in; carbon dioxide moves out

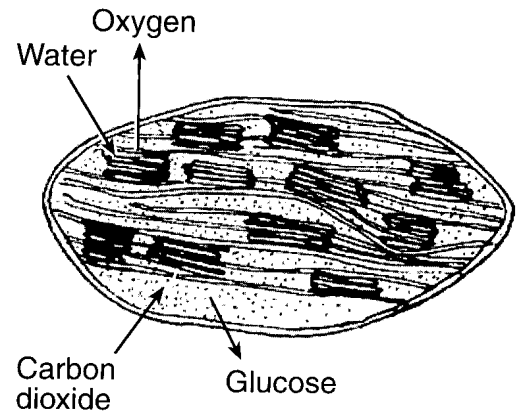
19. What does the process of photosynthesis produce?

- A) starch, which is metabolized into less complex molecules by dehydration synthesis
- B) protein, which is metabolized into less complex molecules by dehydration synthesis
- C) glycerol, which is metabolized into more complex carbohydrates by dehydration synthesis
- D) glucose, which is metabolized into more complex carbohydrates by dehydration synthesis

20. Which substances must a green plant obtain from its environment to carry on photosynthesis?

- A) glucose and water
- B) oxygen and chlorophyll
- C) carbon dioxide and water
- D) carbon dioxide and oxygen

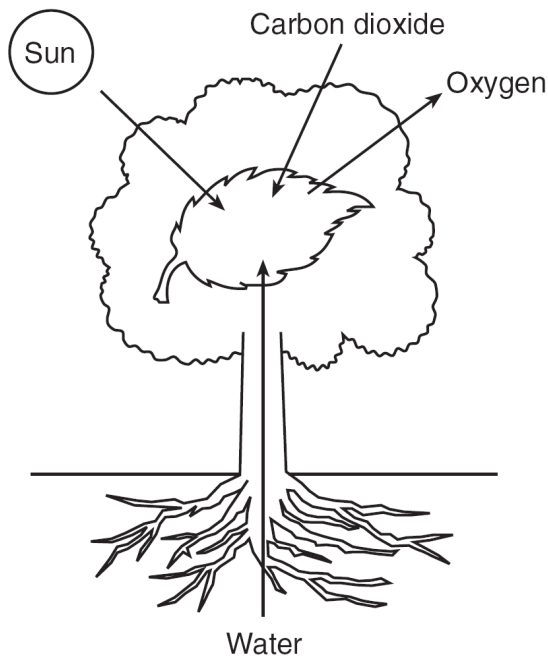
21. Base your answer to the following question on The diagram below illustrates the movement of materials involved in a process that is vital for the energy needs of organisms.



The process illustrated occurs within

- A) chloroplasts
- B) mitochondria
- C) ribosomes
- D) vacuoles

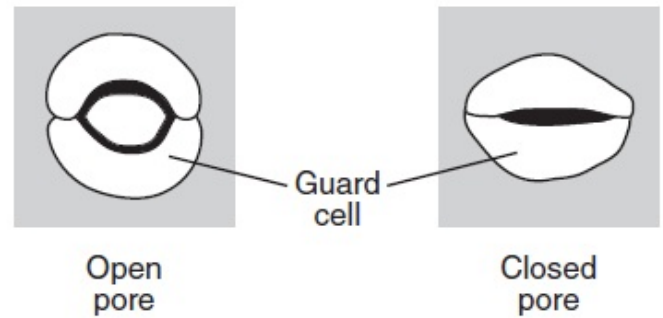
22. Base your answer to the following question on The diagram below represents events associated with a biochemical process that occurs in some organisms.



Which statement concerning this process is correct?

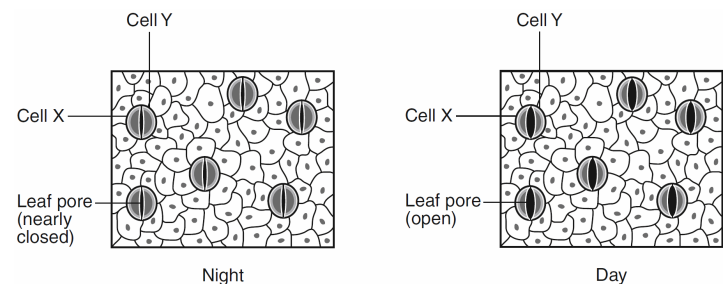
- A) The process represented is respiration and the primary source of energy for the process is the Sun.
  - B) The process represented is photosynthesis and the primary source of energy for the process is the Sun.
  - C) This process converts energy in organic compounds into solar energy which is released into the atmosphere.
  - D) This process uses solar energy to convert oxygen into carbon dioxide.
23. By which process are  $\text{CO}_2$  and  $\text{H}_2\text{O}$  converted to carbohydrates?
- A) transpiration
  - B) respiration
  - C) fermentation
  - D) photosynthesis

24. The diagram below represents a change in guard cells that open and close pores in a plant.



This change directly helps to

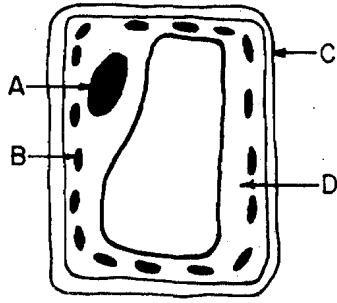
- A) increase heterotrophic nutrition
  - B) absorb minerals
  - C) regulate water loss
  - D) reduce seed production
25. The diagram below represents changes in the sizes of openings present in leaves as a result of the actions of cells *X* and *Y*.



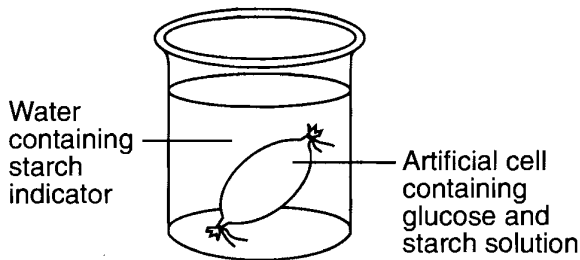
The actions of cells *X* and *Y* help the plant to

- A) maintain homeostasis by controlling water loss
  - B) store excess heat during the day and remove the heat at night
  - C) absorb light energy necessary for cellular respiration
  - D) detect changes in the biotic factors present in the environmen
26. Which organelle is the site of cellular respiration?
- A) endoplasmic reticulum
  - B) mitochondria
  - C) ribosomes
  - D) chloroplast function

27. Which structures in the diagram below enable the observer to identify it as a plant cell?



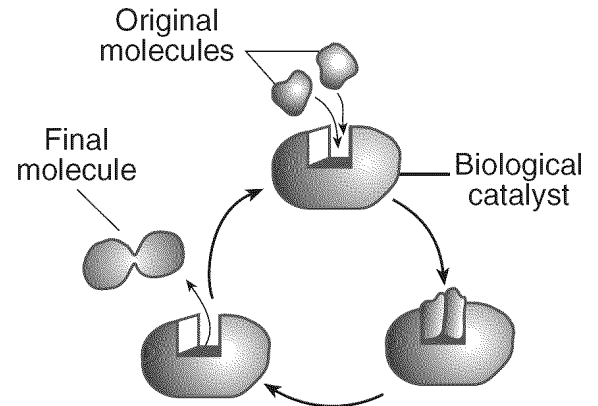
- A) *A* and *B*  
B) *B* and *C*  
C) *A* and *C*  
D) *B* and *D*
28. Base your answer to the following question on the laboratory setup illustrated below and on your knowledge of biology.



This laboratory setup would most likely be used to demonstrate

- A) carbohydrate synthesis  
B) active transport  
C) diffusion  
D) dehydration
29. Which class of molecules is responsible for speeding up chemical reactions?
- A) Sugars  
B) Fats  
C) Genetic material  
D) Enzymes
30. Plants such as the Venus flytrap produce chemical compounds that break down insects into substances that are usable by the plant. The chemical compounds that break down the insects are most likely
- A) fats  
B) minerals  
C) biological catalysts  
D) complex carbohydrates

31. Base your answer to the following question on The diagram below represents a series of reactions that can occur in an organism.



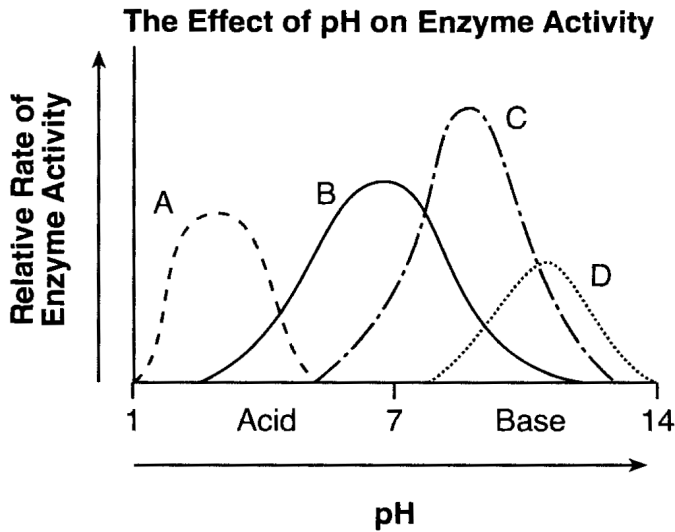
This diagram best illustrates the relationship between

- A) enzymes and synthesis  
B) amino acids and glucose  
C) antigens and immunity  
D) ribosomes and sugars

32. Base your answer to the following question on the information and graph below and on your knowledge of biology.

The pH of the internal environment of lysosomes (organelles that contain digestive enzymes) is approximately 4.5, while the pH of the surrounding cytoplasm is approximately 7. The average pH of the human stomach during digestion is approximately 2.5, while the average pH of the small intestine during digestion is about 8.

The graph below shows how pH affects the enzyme activity of four different enzymes, *A*, *B*, *C*, and *D*.



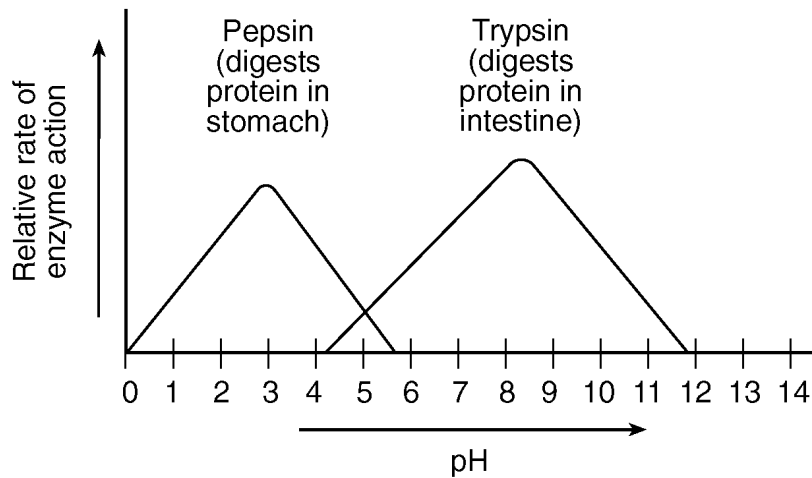
Which enzyme functions best in a pH environment most similar to that of human stomach enzymes?

- A) *A*                      B) *B*                      C) *C*                      D) *D*

33. Meat tenderizer contains an enzyme that interacts with meat. If meat is coated with tenderizer and then placed in a refrigerator for a short time, how would the enzyme be affected?

- A) It would be broken down.  
B) Its activity would slow down.  
C) Its shape would change.  
D) It would no longer act as an enzyme.

34. Base your answer to the following question on the graph below and your knowledge of biology.



Neither enzyme works at a pH of

- A) 1                      B) 5                      C) 3                      D) 13

35. The enzyme amylase will affect the breakdown of carbohydrates, but it will not affect the breakdown of proteins. The ability of an enzyme molecule to interact with specific molecules is most directly determined by the

- A) shapes of the molecules involved  
B) number of molecules involved  
C) sequence of bases present in ATP  
D) amount of glucose present in the cell

36. The energy used to obtain, transfer, and transport materials within an organism comes directly from

- A) ATP                      B) DNA  
C) sunlight                      D) starch

37. A student prepared a test tube containing yeast, glucose, and water. After 24 hours, the test tube was analyzed for the presence of several substances.

What substance would the student expect to find if respiration occurred in the test tube?

- A) a hormone                      B) starch  
C) nitrogen                      D) carbon dioxide

38. Which part of a molecule provides energy for life processes?

- A) carbon atoms                      B) oxygen atoms  
C) chemical bonds                      D) inorganic nitrogen

39. Which process is directly responsible for the synthesis of adenosine triphosphate molecules?

- A) digestion                      B) excretion  
C) respiration                      D) circulation

40. What are possible products of certain types of anaerobic respiration?

- A) water and oxygen  
B) pyruvic acid and glycerol  
C) nitrogen gas and ammonia  
D) alcohol and carbon dioxide

41. Which term best defines a bacteria that can survive without oxygen?

- A) aerobic                      B) anaerobic  
C) heterotrophic                      D) saprophytic

42. What process *may* cause lactic acid to form?

- A) aerobic respiration  
B) anaerobic respiration  
C) photosynthesis  
D) photolysis

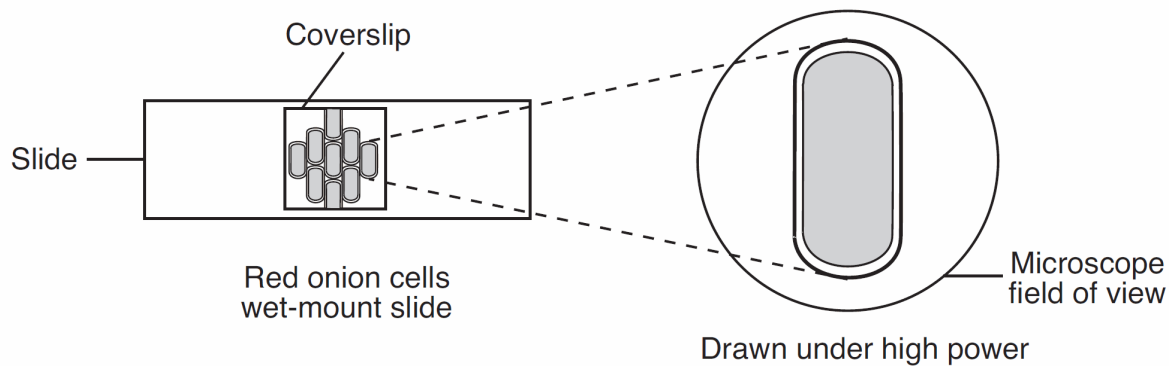


43. The presence of lactic acid in the cells of an animal's muscle tissue is an indication that the

- A) animal is not adapted to the use of glucose
- B) number of mitochondria in the muscle cells has increased
- C) animal carries on a complex form of respiration during daylight hours
- D) muscle cells have been active during a period of oxygen deficiency

44. Base your answer to the following question on the information below and on your knowledge of biology.

A wet-mount slide of red onion cells is studied using a compound light microscope. A drawing of one of the cells as seen under high power is shown below.



Describe the proper way to add a saltwater solution to the cells without removing the coverslip.

45. Base your answer to the following question on the diagrams below and on your knowledge of biology.

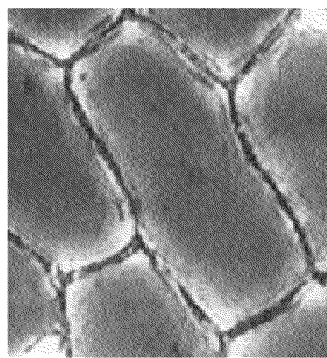
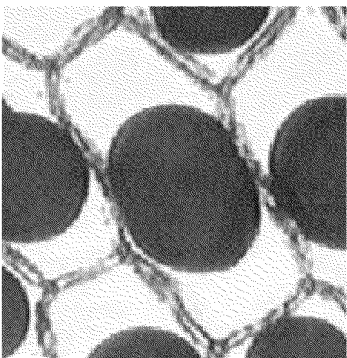


Diagram 1: red onion cells

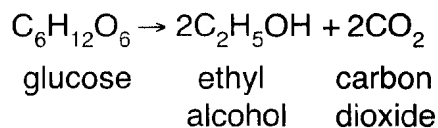
Diagram 2: red onion cells

List the laboratory procedures to follow that would cause the cells in diagram 1 to resemble the cells in diagram 2.

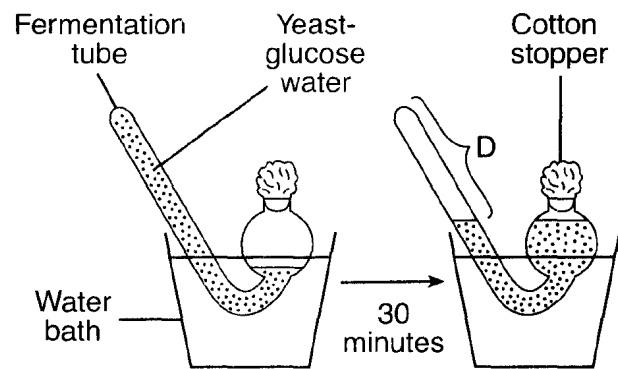
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Base your answers to questions **46** and **47** on the information below and on your knowledge of biology

Yeast cells carry out the process of cellular respiration as shown in the equation below.



An investigation was carried out to determine the effect of temperature on the rate of cellular respiration in yeast. Five experimental groups, each containing five fermentation tubes, were set up. The fermentation tubes all contained the same amounts of water, glucose, and yeast. Each group of five tubes was placed in a water bath at a different temperature. After 30 minutes, the amount of gas produced (*D*) in each fermentation tube was measured in milliliters. The average for each group was calculated. A sample setup and the data collected are shown below.

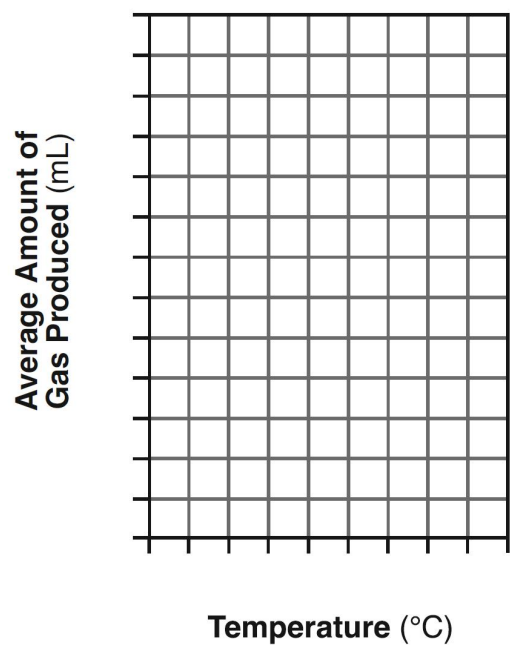


**Average Amount of Gas Produced (D)  
After 30 Minutes at Various Temperatures**

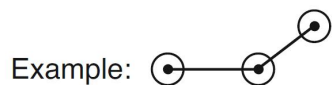
| Group | Temperature (°C) | D (mL) |
|-------|------------------|--------|
| 1     | 5                | 0      |
| 2     | 20               | 5      |
| 3     | 40               | 12     |
| 4     | 60               | 6      |
| 5     | 80               | 3      |

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**Average Amount of Gas Produced  
at Various Temperatures**



46. Plot the data from the data table. Surround each point with a small circle, and connect the points.



47. Mark an appropriate scale on each labeled axis.

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**Biology (Living Environment)**

Name \_\_\_\_\_

Class \_\_\_\_\_

Date \_\_\_\_\_

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