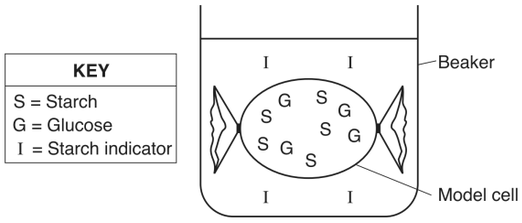
1. Base your answer(s) to the following question(s) on the diagram below and on your knowledge of biology. The diagram represents a model cell setup. The locations of three different substances are indicated in the diagram.



Which row in the chart below best explains the movement of some molecules between the model cell and the solution in the beaker?

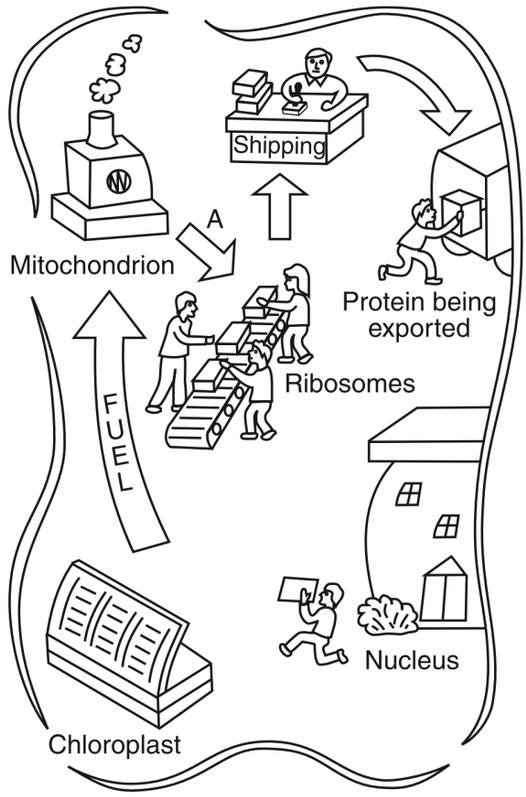
Row	Direction of Flow of Molecules	Energy Use
(1)	from high to low concentration	without using cellular energy
(2)	from high to low concentration	using cellular energy
(3)	from low to high concentration	without using cellular energy
(4)	from low to high concentration	using cellular energy

A. Row (1)
B. Row (2)
C. Row (3)
D. Row (4)

2. Which statement best describes what will most likely happen after several minutes?

A. The contents of the model cell will change color.
B. The liquid outside the model cell will change color.
C. The model cell will shrink.
D. The model cell will rupture.

3. Base your answer(s) to the following question(s) on the diagram below and on your knowledge of biology. The diagram compares cell functions with jobs in a factory.



Which cell structure synthesized the "Protein being exported"?

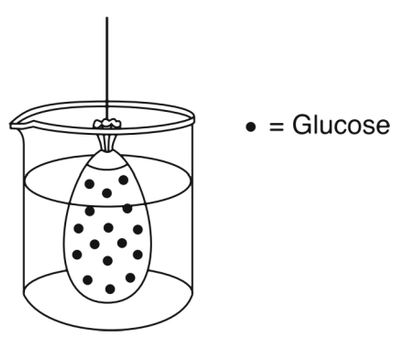
4. What chemical substance produced by the mitochondrion is represented by arrow *A*?

5. Which *two* chemical waste products are most likely represented by the smoke above the mitochondrion?

6. State *one* advantage of using a stain to study frog skin cells with a microscope.

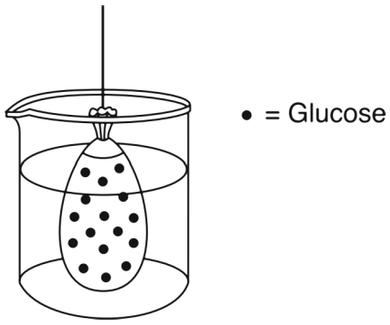
7. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

An artificial cell filled with a glucose solution was placed in a beaker of water, as represented below. The beaker was left undisturbed for 20 minutes.



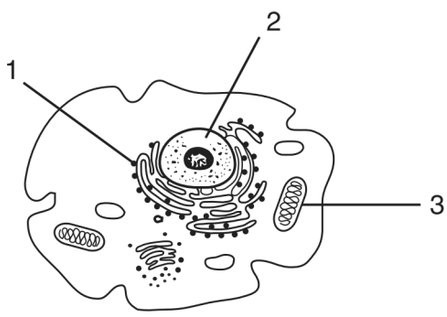
If both glucose and starch were added to the artificial cell, where would the starch be located after 20 minutes?

8. In the diagram below, draw in the expected location of the glucose molecules after 20 minutes.



9. Base your answer to the following question on the diagram below and on your knowledge of biology.

In a cell, a variety of structures perform specific functions and interact to maintain homeostasis. The diagram below represents a typical cell with three cell structures labeled 1, 2, and 3.

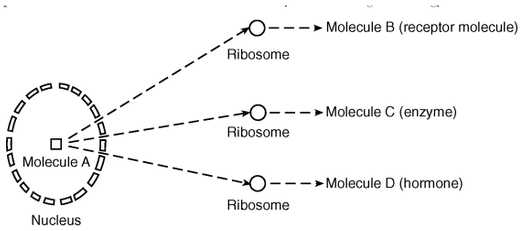


Select *one* cell structure labeled in the diagram and write its number in the space below. Explain how the cell structure you selected helps maintain homeostasis in a cell. In your answer, be sure to:

- identify the cell structure you selected
- state *one* function of this cell structure
- identify *one* substance that is often associated and state how that substance is associated with the cell structure
- identify *one* other cell structure and explain how it interacts with the cell structure you selected to maintain homeostasis in the cell

Cell structure number: _____

10. Base your answer(s) to the following question(s) on the diagram below, which represents a sequence of events in a biological process that occurs within human cells and on your knowledge of biology.



Molecules *B*, *C*, and *D* are similar in that they are usually

A. composed of genetic information

B. involved in the synthesis of antibiotics

C. composed of amino acids

D. involved in the diffusion of oxygen into the cell

11. Molecule *A* contains the

A. starch necessary for ribosome synthesis in the cytoplasm

B. organic substance that is broken down into molecules B, C, and D

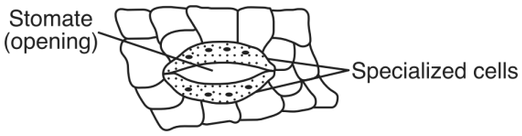
C. proteins that form the ribosome in the cytoplasm

D. directions for the synthesis of molecules B, C, and D

12. Organelles carry out specific processes involving chemical reactions. In the chart below, identify two organelles and, for each, identify a process involving chemical reactions that occurs there. Describe one specific way each process identified is important to the functioning of the organism.

Organelle	Process Involving Chemical Reactions that Occur in the Organelle	How the Process is Important to the Functioning of the Organism
(1) _____	_____	_____
(2) _____	_____	_____

13. The diagram below represents specialized cells in the surface of the leaf of a green plant.



The main function of these cells is to

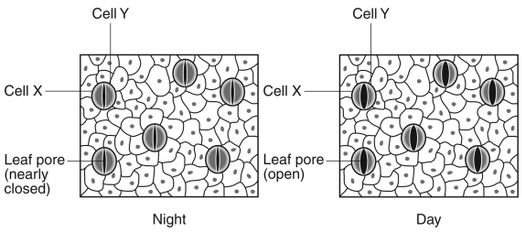
A. change the size of the stomate to regulate water loss

B. close the stomate to keep dust and dirt out of the leaf

C. directly provide leaf cells with the water involved in photosynthesis

D. allow newly formed glucose to be released from the leaf

14. 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

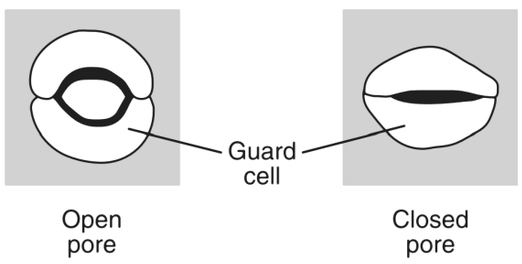
A. maintain homeostasis by controlling water loss

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 environment

15. The diagram below represents a change in guard cells that open and close pores in a plant. Th.is change directly helps to



A. increase heterotrophic nutrition

B. absorb minerals

C. regulate water loss

D. reduce seed production

16. 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

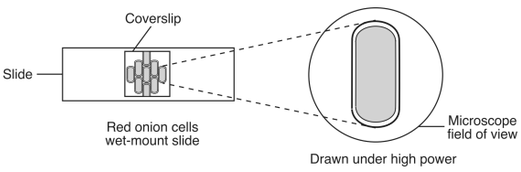
B. cell walls and ribosomes

C. chloroplasts and mitochondria

D. ribosomes and mitochondria

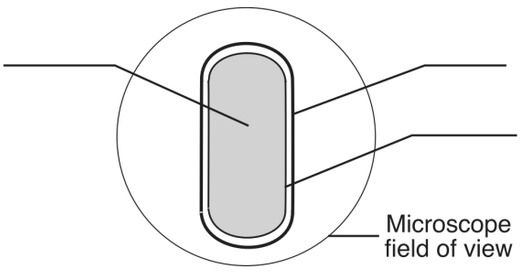
17. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

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.



On the diagram below, label the location of each of the cell structures listed.

cell wall
cytoplasm
cell membrane



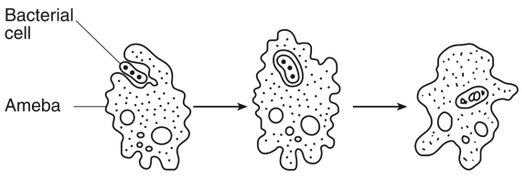
18. Describe the proper way to add a saltwater solution to the cells without removing the coverslip.

19. In a multicellular organism, organs carry out a variety of life functions. In a single-celled organism, these functions are performed by

A. tissues B. organelles

C. organ systems D. organs

20. Base your answer(s) to the following question(s) on the diagram below and your knowledge of biology. The diagram represents an ameba, a single-celled organism, carrying out an essential life process.



This process is essential to the survival of the ameba because it

A. provides materials used in cellular respiration

B. removes pathogens from the environment

C. supplies the raw materials for photosynthesis

D. protects the organism during development

21. This process represents a step in

A. asexual reproduction

B. heterotrophic nutrition

C. photosynthesis

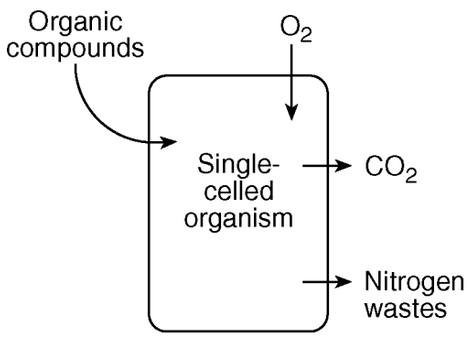
D. diffusion

22. The chart below contains characteristics that can be used to classify organisms *A*, *B*, and *C*.

Characteristics	Organism A	Organism B	Organism C
Number of Cells	single celled	multicellular	single celled
Type of Nutrition	autotrophic	autotrophic	heterotrophic
Nuclear Membrane	absent	present	absent
Ribosomes	present	present	present

State *one* reason why organism *A* and organism *C* might be placed into two different classification groups, even though they are both single celled.

23. The arrows in the diagram below indicate the movement of materials into and out of a single celled organism.



The movements indicated by all the arrows are directly involved in

A. the maintenance of homeostasis

B. respiration, only

C. excretion, only

D. the digestion of proteins

24. Chlorophyll gives plants their green color. Chlorophyll is produced only when plants are exposed to light, so plants kept in darkness have no chlorophyll and appear white. The best explanation for this is that

A. chlorophyll is not needed by green plants at night

B. darkness mutates the chlorophyll genes, causing them to produce a white color

C. light is required for chlorophyll genes to be expressed

D. genetic information in cells is not influenced by the outside environment

25. During the process of photosynthesis, energy from the Sun is converted into

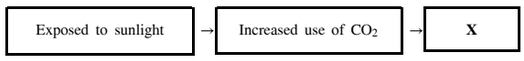
A. chemical energy in the bonds of inorganic molecules

B. chemical energy in the bonds of organic molecules

C. enzymes used to produce inorganic molecules

D. enzymes used to produce organic molecules

26. Which phrase, if placed in box **X**, would correctly complete the flowchart shown below?



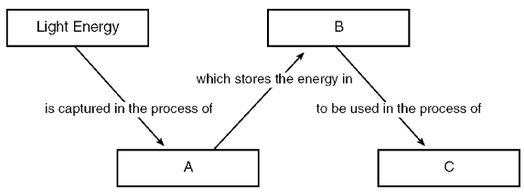
A. Increased use of starch in root cells

B. Increased concentration of glucose in leaf cells

C. Decreased ATP in root cells

D. Decreased concentration of oxygen in leaf cells

27. Which set of terms best identifies the letters in the diagram below?



	A	B	C
(1)	photosynthesis	inorganic molecules	decomposition
(2)	respiration	organic molecules	digestion
(3)	photosynthesis	organic molecules	respiration
(4)	respiration	inorganic molecules	photosynthesis

A. Row (1) B. Row (2)

C. Row (3) D. Row (4)

28. Photosynthesis and respiration are two important processes. Discuss one of these processes and explain its importance to an organism. In your answer, be sure to:

- identify the process being discussed
- identify the organelle where this process occurs
- identify *two* raw materials necessary for this process
- identify *one* energy-rich molecule that is produced by this process
- state how organisms use the energy-rich molecule that is produced
- state how a gas produced by this process is recycled in nature

29. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

A student is opening and closing clothespins as part of a lab activity. The student begins to experience muscle fatigue, and the rate at which the student is opening and closing the clothespins slows.

In order for the muscle fatigue to end, the muscle cells must be provided with

A. oxygen B. nitrogen

C. carbon dioxide D. amino acids

30. The fatigue is due to

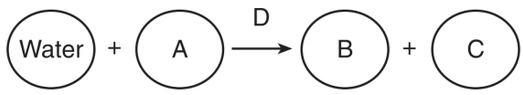
A. an increase of metabolic waste products in the muscles

B. an increase in the pulse rate of the student

C. a decrease of metabolic waste products in the muscles

D. a decrease in the pulse rate of the student

31. A biological process that occurs in plants is represented below.

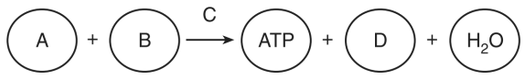


Which row in the chart below identifies the lettered substances in this process?

Row	A	B	C	D
(1)	enzymes	oxygen	carbon dioxide	glucose
(2)	carbon dioxide	glucose	oxygen	enzymes
(3)	glucose	enzymes	oxygen	carbon dioxide
(4)	oxygen	glucose	carbon dioxide	enzymes

A. (1) B. (2) C. (3) D. (4)

32. A biological process that occurs in both plants and animals is shown below.



Which row in the chart below identifies the lettered substances in this process?

Row	A	B	C	D
(1)	O_2	CO_2	glucose	enzymes
(2)	glucose	O_2	enzymes	CO_2
(3)	enzymes	O_2	CO_2	glucose
(4)	glucose	CO_2	enzymes	O_2

A. (1) B. (2) C. (3) D. (4)

Cells: 3 Star 05/27/2014

1.
Answer: A

2.
Answer: A

3.
Answer: Ribosome

4.
Answer: ATP

5.
Answer: Carbon dioxide and water

6.
Answer: A stain makes some organelles more visible.

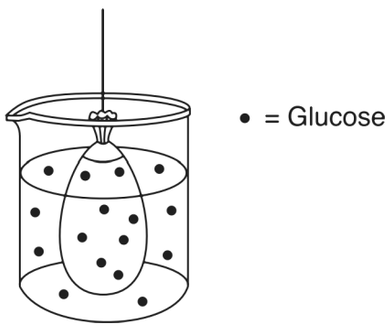
easier to see cell parts.

7.
Answer: All of the starch molecules would be in the artificial cell.

The starch would not move out of the cell.

The starch would stay in the cell.

8.
Answer:



9.
Answer: ribosome; site of protein synthesis; amino acid - used to make proteins; nucleus - the ribosome gets instructions from the nucleus determining which proteins are produced by the cell

10.
Answer: C

11.
Answer: D

12.
Answer:

Organelle	Process Involving Chemical Reactions that Occur in the Organelle	How the Process is Important to the Functioning of the Organism
mitochondrion	respiration	provides energy for life functions
chloroplast	photosynthesis	provides food for plant
ribosome	protein synthesis	makes structural molecules (or chemical messengers which control cell responses)
ucleus	mitosis or meiosis or DNA replication	reproduction

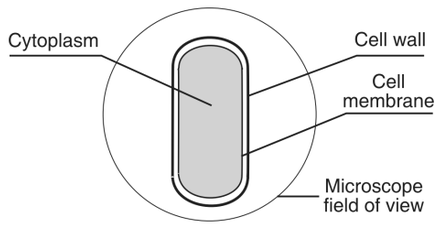
13.
Answer: A

14.
Answer: A

15.
Answer: C

16.
Answer: C

17.
Answer: Credit for labeling the locations of the cell wall and the cell membrane and cytoplasm on the diagram.



Note: All three must be correctly labeled to receive this credit.

18.
Answer: Acceptable responses include, but are not limited to:

– Place saltwater solution on one side of the coverslip. Then draw the saltwater solution under the coverslip by placing a piece of paper towel on the opposite side.

– Place a drop of saltwater solution on one side of a coverslip and a paper towel on the other side.

19.
Answer: B

20.
Answer: A

21.
Answer: B

22.
Answer: – They have different nutritional requirements.

– A is an autotroph and C is a heterotroph.

– They have at least one very different characteristic.

23.
Answer: A

24.
Answer: C

25.
Answer: B

26.
Answer: B

27.
Answer: C

28.
Answer:

- Photosynthesis or Respiration
- chloroplast or mitochondrion
- Photosynthesis: CO_2 and H_2O, Respiration: organic molecules and O_2 OR sugar and oxygen
- Photosynthesis: glucose, Respiration: ATP
- Glucose: to produce ATP or to produce starch, ATP: to provide energy for metabolism
- Photosynthesis: The gas is used for respiration. OR provides O_2 for respiration, Respiration: provides CO_2 for photosynthesis OR The gas is used for photosynthesis.

29.
Answer: A

30.
Answer: A

31.
Answer: B

32.
Answer: B