

Biology

Laura Lovelace

I hope this message finds all of you and your families safe and healthy. Stay diligent during this trying time and protect not just yourself but those around you. Put necessities first but don't cast aside your need to become smarter than you were because it is going to take intelligent people to overcome this trial.

I love you all,
Laura Lovelace

My email address is llovelace@chesterfieldschools.org

Assignments for the the Week of March 16, 2020 and the week of March 23, 2020

Complete and Review Cells: Microscopes, Cell Theory, Cell Types, Cell Structures, Cell Functions, and Cell Transport.

Biology

Laura Lovelace

email or text me a picture of your Animal Cell Coloring Sheet and a picture of your Plant Cell Coloring Sheet (just the side that you colored). Use the questions to help you review for the upcoming test.

If you are unable to email or text me the photos of the cell coloring sheets then bring them to the school and have the staff leave them in my school mailbox.

Complete your scientific write up for the Grape Activity and email it to me.

If you are unable to email me your Grape Activity then bring it to the school and have the staff leave it in my school mailbox.

You should include the following in your Grape Activity Write Up (fill in any missing parts and create and complete the indicated data table):

Question: What will happen to the mass of three grapes if one is placed in water, one in sugar water, and one in grape juice for 96 hours?

Hypothesis: If one grape is placed in water, one in sugar water and one in grape juice for 96 hours then the mass of the grape in water will _____, the mass of the grape in sugar water will _____ and the mass of the grape in grape juice will _____.

Create a Data Table for the following information: (I was uncertain of the data for some of the groups so I would like everyone to use my data)

Initial Mass of Grapes: Grape in Water - 13.92g, Grape in Sugar Water - 15.89g, Grape in Grape Juice - 16.26g

Final Mass of Grapes: Grape in Water - 16.05g, Grape in Sugar Water - 12.86g, Grape in Grape Juice - 16.26g

Analyze Data and Answer the Following Questions:

What kind of solution was each grape in (hypertonic, isotonic, or hypotonic)?

Did each grape's mass increase, decrease, or stay the same?

If the mass increased or decreased then by how much?

Explain why the mass of each grape increased, decreased or stayed the same, by describing what happened with the movement of water into and out of the grape's cells.

One observation you might want to include is the final appearance of the grapes. The grape in water was so swollen it burst in a few places, the grape in sugar water looked shriveled, and the grape in grape juice basically looked the same.

Conclusion: When one grape was placed in water, one in sugar water and one in grape juice for 96 hours the mass of the grape in water _____, the mass of the grape in sugar water _____ and the mass of the grape in grape juice _____. Therefore, the hypothesis was _____.

Complete the below quiz after watching the video on the Sodium Potassium Pump using the following URL:

http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter2/animation_how_the_sodium_potassium_pump_works.html

Your answers for this quiz can be submitted using your Gradedcam login information.

If you are unable to use Gradedcam to submit the answers then bring the completed quiz to the school and have the staff leave it in my school mailbox.

1

The sodium-potassium pump functions to pump

- sodium ions out of the cell and potassium ions into the cell.
- A)**
- sodium ions into the cell and potassium ions out of the cell.
- B)**
- sodium and potassium ions into the cell.
- C)**
- sodium and potassium ions out of the cell.
- D)**
- sodium and potassium ions in both directions across the cell membrane.
- E)**

2

What is the source of energy used to power the sodium-potassium pump?

- breakdown of ATP
- A)**
- formation of ATP
- B)**
- transport of ATP by the pump
- C)**
- breakdown of GTP
- D)**
- transport of GTP by the pump
- E)**

3

During one cycle, the sodium-potassium pump binds and moves.

- 1 Na⁺ and 2 K⁺.
- A)**
- 2 Na⁺ and 2 K⁺.
- B)**
- 2 Na⁺ and 3 K⁺.
- C)**
- 3 Na⁺ and 2 K⁺.
- D)**
- 3 Na⁺ and 3 K⁺.
- E)**

4

The sodium-potassium pump is a trans-membrane protein.

- True
- A)**
- False
- B)**

5

The binding and release of sodium or potassium ions are due to conformational changes in the protein.

- True
- A)**
- False
- B)**

Major Upcoming Biology Test on Microscopes, Cell Theory, Cell Types, Cell Structure, Cell Functions, and Cell Transport.

New Videos

Watch the following two videos:

Amoeba Sisters Introduction to Cells: The Grand Cell Tour

<https://www.youtube.com/watch?v=8llzKri08kk>

Amoeba Sisters Homeostasis and Negative/Positive Feedback

<https://www.youtube.com/watch?v=lz0Q9nTZCw4>

Amoeba Sisters Cell Transport

<https://www.youtube.com/watch?v=Ptmlvtei8hw>

Amoeba Sisters Sodium Potassium Pump (Type of Active Transport)

<https://www.youtube.com/watch?v=7NY6XdPBhxo>

Sodium Potassium Pump (This is the video with the sodium potassium pump quiz)

[http://highered.mcgraw-](http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter2/animation_how_the_sodium_potassium_pump_works.html)

[hill.com/sites/0072495855/student_view0/chapter2/animation_how_the_sodium_potassium_pump_works.html](http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter2/animation_how_the_sodium_potassium_pump_works.html)

Previous Videos

If necessary, review the following usa test prep and youtube videos that you should have watched previously.

- Microscope: Safety <https://www.usatestprep.com/movies/984/7034/900>
- Major Tenets of Cell Theory: <https://www.usatestprep.com/movies/984/4936/1092>
- Protists, Fungi, Plants, Animals: Characteristics: <https://www.usatestprep.com/movies/984/4936/1160>
- Cells vs. Viruses <https://www.usatestprep.com/movies/984/4936/1098>
- Biology: Cell Structure Nucleus Medical Media (youtube) <https://www.youtube.com/watch?v=URUJD5NEXC8>
- General Cell Structure (Prokaryotic vs. Eukaryotic): <https://www.usatestprep.com/movies/984/4936/159>
- Organelles 1: <https://www.usatestprep.com/movies/984/4936/145Cell>
- Membrane: <https://www.usatestprep.com/movies/984/4936/160>
- The Nucleus and Ribosomes: <https://www.usatestprep.com/movies/984/4936/163>
- Golgi Apparatus and ER: <https://www.usatestprep.com/movies/984/4936/165>
- Mitochondria: <https://www.usatestprep.com/movies/984/4936/164>
- Organization of Cells: <https://www.usatestprep.com/movies/984/4936/1154>
- Transport Mechanisms: <https://www.usatestprep.com/movies/984/4936/3146>
- Types of Solutions: <https://www.usatestprep.com/movies/984/4936/1235>
- Types of Solutions, Examples: <https://www.usatestprep.com/movies/984/4936/1236>

Name: _____

Animal Cell Coloring

Cell Membrane (light brown)

Nucleolus (black)

Mitochondria (orange)

Cytoplasm (white)

Golgi Apparatus/Complex (pink)

Lysosome (purple)

Nucleoplasm (pink)

Cilia (yellow)

Microtubules (green)

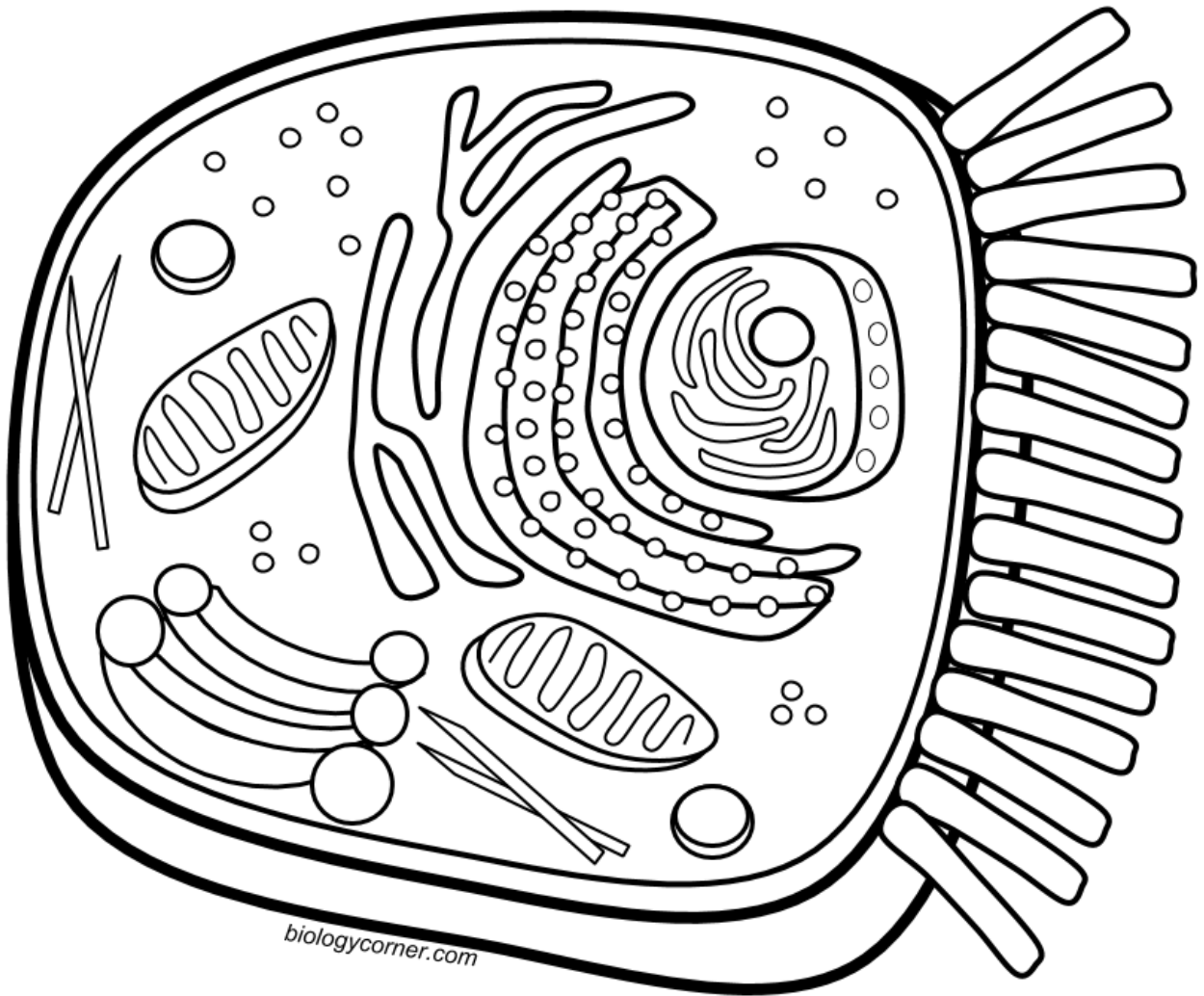
Nuclear Membrane (dark brown)

Rough Endoplasmic Reticulum (dark blue)

Chromosomes (dark green)

Ribosome (red)

Smooth Endoplasmic Reticulum (light blue)



Unit 2 Cells: Cell Structures

Name:

Date:

Briefly describe the function of the cell parts.

1. Cell membrane

2. Rough Endoplasmic Reticulum

3. Smooth Endoplasmic Reticulum

4. Ribosome

5. Golgi Apparatus/Complex

6. Lysosome

7. Cytoskeleton (Microtubules/Microfilaments)

8. Mitochondria

9. Nucleus

10. Nucleolus

11. Cytoplasm

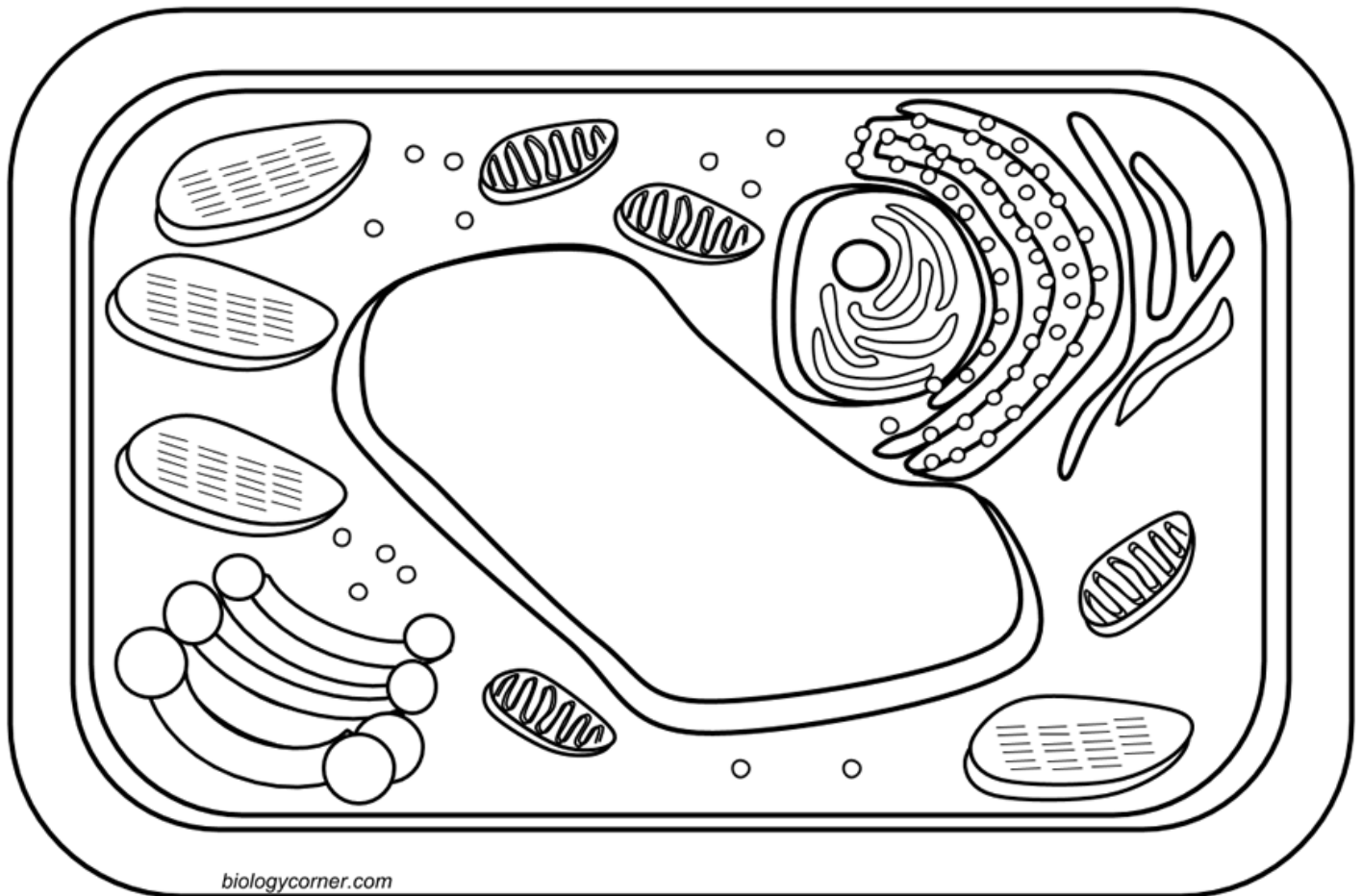
12. Cilia/Flagella

Name: _____ Date: _____

Plant Cell Coloring

- Cell Membrane (orange)
- Nucleoplasm (yellow)
- Mitochondria (red)
- Central Vacuole (light blue)
- Chromosomes (gray)
- Golgi Apparatus (dark blue)
- Ribosome (purple)

- Cell Wall (dark green)
- Nucleolus (brown)
- Chloroplasts (light green)
- Nuclear Membrane (black)
- Smooth Endoplasmic Reticulum (pink)
- Rough Endoplasmic Reticulum (pink)
- Cytoplasm (white)



Unit 2 Cells: Cell Structures

Name:

Date:

Briefly answer the following questions about cells.

1. Name two things found in a plant cell that are not found in an animal cell:

2. How does the shape of a plant cell differ from that of an animal cell?

3. What is the function of the chloroplasts?

4. What is the function of the vacuole?

5. What is the function of the mitochondria?

6. Why do plants need both a chloroplasts and mitochondria?

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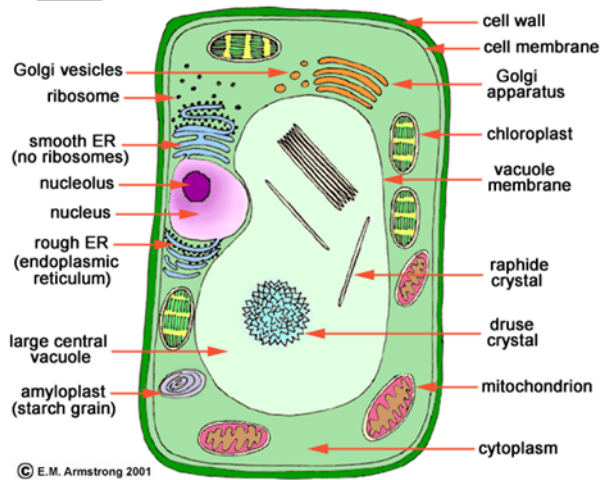
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- 84. (A) (B) (C) (D)

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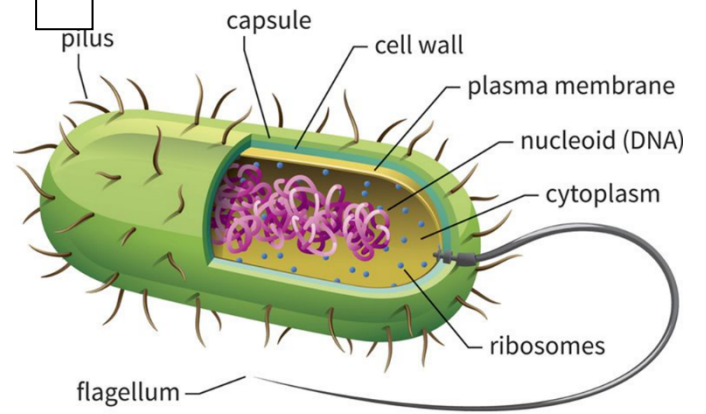
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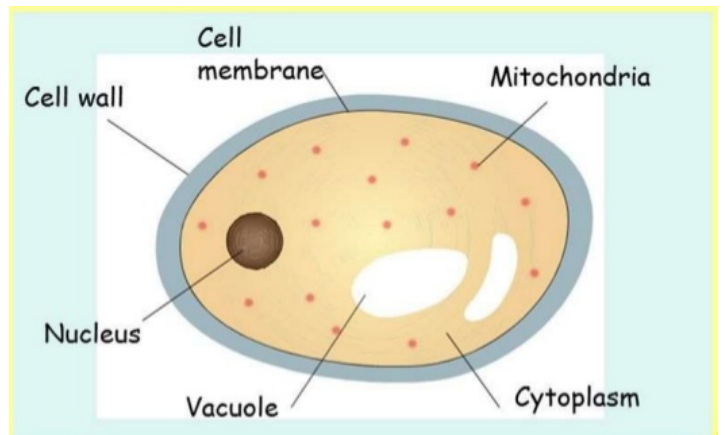
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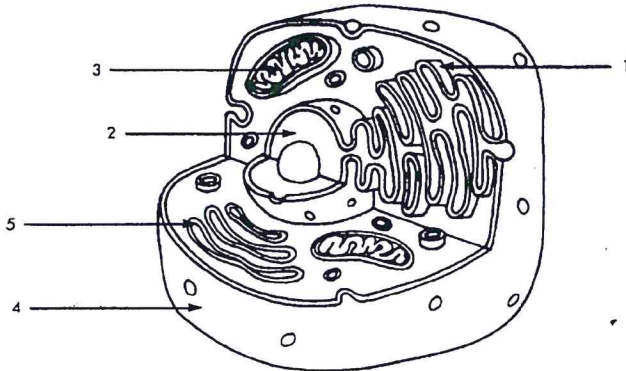
D



Biology Test 3 Cell Types, Structures, and Cell Processes

Multiple Choice

Identify the choice that best completes the statement or answers the question.



- Refer to the illustration above. The cell uses structure 3 to
 - transport material from one part of the cell to another.
 - use light energy to make sugar.
 - package proteins so they can be stored by the cell.
 - use energy from organic compounds to make ATP.
- Refer to the illustration above. Structure 5 is
 - a mitochondrion.
 - a Golgi complex.
 - the nucleus.
 - part of the endoplasmic reticulum.
- Refer to the illustration above. In eukaryotic cells, DNA is found in
 - structure 1.
 - structure 5.
 - structure 4.
 - structure 2.
- Refer to the illustration above. Structure 2 is
 - rough endoplasmic reticulum.
 - a Golgi complex.
 - a mitochondrion.
 - the nucleus.
- Refer to the illustration above. The cell shown is probably an animal cell because it
 - has a cell membrane.
 - does not have a cell wall.
 - does not have a nucleus.
 - has mitochondria.
- Refer to the illustration above. Which structure immediately identifies this cell as a eukaryote?
 - structure 5
 - structure 2
 - structure 4
 - structure 1
- Refer to the illustration above. Which structure acts as a boundary between the outside environment and the inside of the cell?
 - structure 2
 - structure 1
 - structure 4
 - structure 3
- Refer to the illustration above. Which structure produces vesicles filled with proteins?
 - structure 4
 - structure 1
 - structure 2
 - structure 3
- A structure within a eukaryotic cell that carries out specific activities inside the cell is called a(n)
 - membrane.
 - organelle.
 - nucleus.
 - cytoplasm.
- Which of the following best describes the relationship between the nucleus and the cytoplasm?
 - The nucleus is a fluid and it mixes with the fluid cytoplasm.
 - The nucleus is an organelle that is surrounded by the cytoplasm.
 - The cytoplasm is a fluid that fills the inside of the nucleus.
 - The cytoplasm is an organelle that is usually found near the nucleus.

11. What is the function of mitochondria in the cell?
 A) Converts solar energy to chemical energy
 B) Regulates materials entering and exiting the cell
 C) Shapes, supports, and protects the cell
 D) Converts glucose into usable energy for the cell

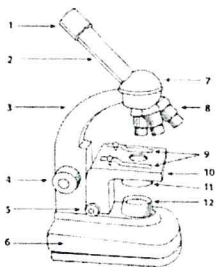
12. The cell theory applies to
 A) bacteria.
 B) plants and animals.
 C) multicellular organisms.
 D) all of the above

13. If a cell is placed in a(n) _____ solution, water will flow out of the cell.
 A) isotonic
 B) hypertonic
 C) hypotonic
 D) semipermeable

14. Molecules that are too large to be moved across a cell membrane can be removed from the cell by
 A) diffusion.
 B) exocytosis.
 C) endocytosis.
 D) osmosis.

15. The primary function of the cell wall is to
 A) direct the activities of the cell.
 B) help the cell move.
 C) store DNA.
 D) support and protect the cell.

16. The organelles associated with plant photosynthesis are the
 A) vacuoles.
 B) mitochondria.
 C) Golgi complex.
 D) chloroplasts.



17. Number 4 above refers to the
 A) lens
 B) fine adjustment
 C) coarse adjustment

D) eyepiece

18. A characteristic common to eukaryotic cells that is not found in prokaryotic cells is the
 A) presence of mitochondria.
 B) use of ribosomes for protein synthesis.
 C) presence of DNA.
 D) cell membrane.
19. Usually, the largest organelle in a cell is the _____.
 A) nucleus
 B) vacuole
 C) chromatin
 D) lysosome
20. The invention of the microscope made it possible for people to discover and learn about
 A) plants.
 B) skin.
 C) animals.
 D) cells.

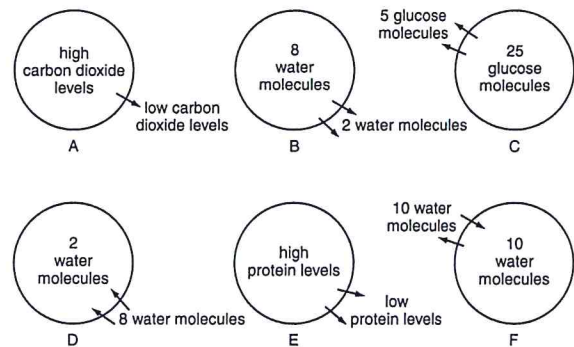


Figure 3-1

21. Only diagram F in Figure 3-1 is an example of _____.
 A) diffusion
 B) active transport
 C) osmosis
 D) equilibrium
22. What would happen to the cell in Diagram B?
 A) The cell would shrink
 B) The cell would stay the same size
 C) The cell would swell
 D) The cell would grow then shrink
23. What would happen to the cell in Diagram F?
 A) The cell would shrink
 B) The cell would stay the same size
 C) The cell would swell
 D) The cell would grow then shrink

24. What would happen to the cell in Diagram D?
 A) The cell would shrink
 B) The cell would stay the same size
 C) The cell would swell
 D) The cell would grow then shrink
25. Diagram A in Figure 3-1 is an example of _____.
 A) diffusion
 B) active transport
 C) osmosis
 D) equilibrium
26. Diagram B in Figure 3-1 is an example of _____.
 A) exocytosis
 B) active transport
 C) osmosis
 D) equilibrium
27. Which of the following organelles is involved in the digestion of other worn-out organelles?
 A) endosome
 B) Golgi complex
 C) lysosome
 D) rough endoplasmic reticulum
28. The size to which a cell can grow is limited by its
 A) type of division.
 B) structure.
 C) function.
 D) surface area.
29. Which of these is selectively permeable?
 A) door
 B) window screen
 C) wall
 D) mirror
30. Microtubules and microfilaments are involved in all of the following EXCEPT _____.
 A) the formation of cilia and flagella.
 B) the attachment of ribosomes to the rough endoplasmic reticulum.
 C) the formation of cytoskeleton.
 D) the formation of mitotic spindle fibers.
31. If a cell is placed in a(n) _____ solution, water will flow into the cell.
 A) isotonic
 B) hypertonic
 C) hypotonic
 D) semipermeable
32. All of the following are true about viruses except _____.
 A) they are made of nucleic acid and a protein coat.
 B) they reproduce on their own.
 C) they are not made of cells.
 D) they are smaller than bacteria.
33. Small sacs that transport materials, such as proteins and lipids.
 A) Vacuoles
 B) Ribosomes
 C) Vesicles
 D) Lysosomes
34. What is the total magnification of a microscope with two lenses when one lens has a magnification of 10, and the other lens has a magnification of 30?
 A) 300
 B) 15
 C) 450
 D) 40
35. In eukaryotic cells, the packaging and assembly of proteins and lipids takes place in which of the following organelles?
 A) Endoplasmic reticulum and Golgi complex
 B) Cell wall and cell membrane
 C) Vacuoles and lysosomes
 D) Nucleus and nuclear membrane
36. Which prefix or root word means nucleus?
 A) Karyon
 B) Eu
 C) Nuclear
 D) Pro
37. The cell membrane is mostly made of?
 A) carbohydrates
 B) lipids
 C) phospholipids
 D) proteins
38. The cell membrane contains organic molecules that are attached to proteins. These organic molecules mainly identify what materials are allowed to pass from one side of the cell to the other. What types of organic molecule are these?
 A) carbohydrates
 B) lipids
 C) phospholipids
 D) proteins
39. A three-dimensional image of an object is produced by a _____.
 A) transmission electron microscope
 B) scanning electron microscope

C) compound light microscope

40. Which of the following is a function of the cytoskeleton?

- A) helps a cell keep its shape
- B) surrounds the cell
- C) contains DNA
- D) helps make proteins

41. This genetic material consists of DNA bound to protein.

- A) Chromatin
- B) Vacuole
- C) Lysosome
- D) Nucleus

42. Which term refers to the movement of water molecules through a selectively permeable membrane?

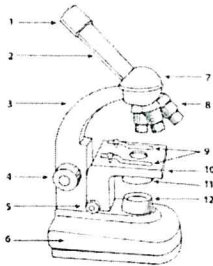
- A) osmosis
- B) engulfing
- C) active transport
- D) passive transport

43. What are the two major parts of the eukaryotic cell?

- A) Nucleus and mitochondria
- B) Cytoplasm with organelles and nucleus
- C) Cytoplasm with organelles and ribosomes
- D) Mitochondria and ribosomes

44. Eukaryotic cells contain an internal membrane system called the endoplasmic reticulum (ER). What is the difference between rough and smooth ER?

- A) Rough ER has surface ribosomes, while smooth ER does not.
- B) Smooth ER synthesizes proteins, while rough ER does not.
- C) Rough ER synthesizes lipids, while smooth ER does not.
- D) Smooth ER has surface ribosomes, while rough ER does not.



45.

Number 12 above refers to the

- A) lens
- B) fine adjustment
- C) coarse adjustment
- D) light

46. Which types of cells do not contain mitochondria and must make their energy, either through, photosynthesis or chemosynthesis?

- A) Viruses
- B) Fungi
- C) Prokaryotes
- D) Eukaryotes

47. What is the function of lysosomes?

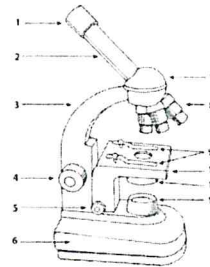
- A) Breaking down nutrients and old organelles
- B) Making energy to fuel the cell
- C) Making DNA
- D) Making lipids, carbohydrates, and proteins

48. Which term refers to the movement of materials through a cell membrane when energy is required?

- A) osmosis
- B) diffusion
- C) active transport
- D) passive transport

49. Which term refers to the movement of materials through a cell membrane without using energy?

- A) concentration
- B) collision
- C) active transport
- D) passive transport



50.

Number 8 above refers to the

- A) eye piece lens
- B) fine adjustment
- C) coarse adjustment
- D) objective lens

51. In a cell, proteins are made by the

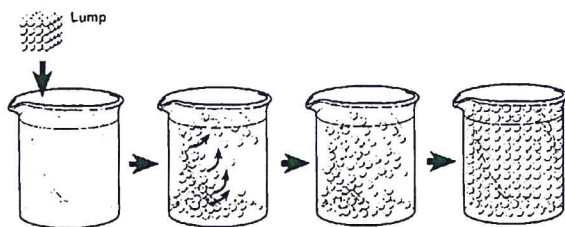
- A) cell membrane.
- B) ribosomes.
- C) mitochondria.
- D) nucleus.

52. The tails of phospholipids are _____.

- A) hydrophilic.

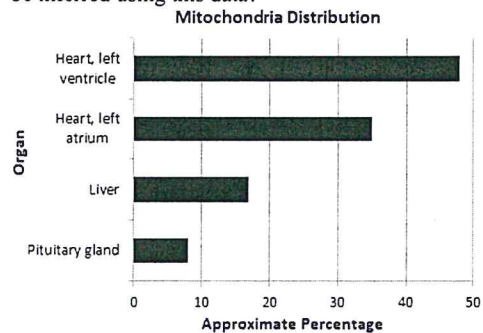
- B) isotonic.
C) polar.
D) hydrophobic.
53. An animal cell that is surrounded by fresh water will burst because the osmotic pressure causes
A) water to move into the cell.
B) water to move out of the cell.
C) solutes to move into the cell.
D) solutes to move out of the cell.
54. Which organelle converts the chemical energy in food into a form that cells can use?
A) Chromosome
B) Mitochondrion
C) Chloroplast
D) Nucleolus
55. The cells that make up cardiac muscle are specialized to do their job by having many
A) mitochondria.
B) chloroplasts.
C) nuclei.
D) lysosomes.
56. What is the main difference between prokaryotes and eukaryotes?
A) Prokaryotes don't have a nucleus, and eukaryotes do.
B) Eukaryotes don't have a nucleus, and prokaryotes do.
C) Eukaryotes don't have a cell membrane, and prokaryotes do.
D) Prokaryotes don't have a cell membrane, and eukaryotes do.
57. Which type of organic molecule forms the cell membrane?
A) phospholipid
B) carbohydrate
C) monosaccharide
D) nucleic acid
58. Proteins are synthesized, packaged, and exported from a cell using all of the following organelles **except**
A) Golgi complex.
B) ribosomes.
C) mitochondria.
D) endoplasmic reticulum.
59. The organelle that modifies, sorts, and packages proteins and lipids is the
A) endoplasmic reticulum.
B) ribosome.
C) Golgi complex.
D) lysosome.
60. Which of the following structures serves as the cell's boundary from its environment?
A) mitochondrion
B) cell membrane
C) chloroplast
D) channel proteins
61. Substances too large to pass through the cell membrane enter the cell in a process called _____.
A) endocytosis
B) passive transport
C) exocytosis
D) active transport
62. If a cell is placed in a(n) _____ solution, water flows into the cell at a rate that is equal to the rate at which water flows out of the cell.
A) isotonic
B) hypertonic
C) hypotonic
D) semipermeable
63. The cells of plants and some protists contain organelles called chloroplasts. The function of chloroplasts is to
A) carry the genetic code from one generation to the next.
B) control the production of proteins in the cell.
C) capture the energy of sunlight and convert it into chemical energy.
D) provide support to the cell.
64. A Sodium-Potassium pump uses energy to move Sodium out of the cell and Potassium into the cell, therefore, it is an example of _____.
A) facilitated diffusion.
B) diffusion.
C) active transport.
D) endocytosis.
65. Which of the following is a function of the cell membrane?
A) breaks down lipids, carbohydrates, and proteins from foods
B) stores water, salt, proteins, and carbohydrates
C) keeps the cell wall in place
D) regulates which materials enter and leave the cell
66. You examine an unknown cell under a microscope and discover that the cell contains chloroplasts. From what type of organism does the cell likely come?
A) Human
B) Animal
C) Plant or organism such as algae
D) Bacteria

67. Glucose requires transport proteins in order to pass through the cell membrane, therefore, glucose moves from one side of the cell to the other through the process of _____.
- facilitated diffusion
 - diffusion
 - active transport
 - endocytosis
68. The cell membrane contains channels and pumps that help move materials from one side to the other. What are these channels and pumps made of?
- carbohydrates
 - lipids
 - bilipids
 - proteins
69. Which term refers to the movement of molecules from an area of higher concentration to an area of lower concentration?
- collision
 - diffusion
 - active transport
 - concentration
70. What is the function of central vacuoles in the cell?
- Storing excess water in the cell
 - Synthesizing proteins
 - Breaking down nutrients and old organelles
 - Breaking down and recycling macromolecules

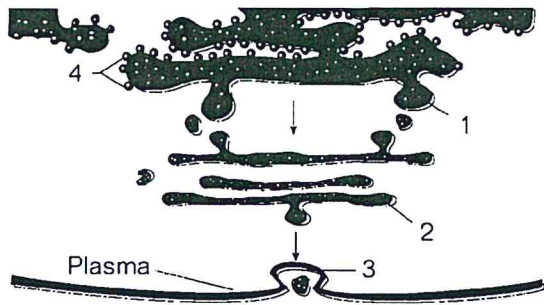


71. Refer to the illustration above. The process shown is called
- osmosis.
 - facilitated diffusion.
 - active transport.
 - diffusion.
72. Proteins that act like passageways in the cell membrane are known as
- marker proteins.
 - transport proteins.
 - receptor proteins.
 - active proteins.

73. A small, dense region found in the control center of the cell, that makes ribosomes.
- Vesicle
 - Endoplasmic reticulum
 - Nucleolus
 - Golgi complex
74. Prokaryotes have all of the following characteristics except
- they are single-celled.
 - they have small ribosomes.
 - they are simple.
 - they are complex.
75. Which organelles are involved in energy conversion?
- smooth and rough endoplasmic reticulum
 - Golgi complex and chloroplasts
 - mitochondria and chloroplasts
 - mitochondria and ribosomes
76. The bar graph compares the percent of cell volume occupied by mitochondria for several kinds of specialized cells. What can be inferred using this data?



- Heart cells produce proteins at a greater rate than liver or pituitary gland cells.
 - Heart cells use more energy than liver or pituitary gland cells.
 - Heart cells need to be much larger than liver or pituitary gland cells.
 - Heart cells are more common than liver or pituitary gland cells.
77. Light microscopes can magnify objects
- up to about 100 times their actual size.
 - up to about 1000 times their actual size.
 - up to about 10,000 times their actual size.
 - up to about 1,000,000 times their actual size.
78. These cell structures are made of either chitin, in fungal cells, or cellulose, in plant cells.
- Cytoskeletons
 - Cell walls
 - Cell membranes
 - Nuclear membranes



79. Refer to the illustration above. The structures labeled 4 are
- ribosomes.
 - chloroplasts.
 - vesicles.
 - lysosomes.
80. Refer to the illustration above. Which structure packages proteins for distribution?
- structure 1
 - structure 2
 - structure 4
 - structure 3
81. Which cell pictured is an animal cell?
- Illustration A
 - Illustration B
 - Illustration C
 - Illustration D
82. Which cell pictured is a plant cell?
- Illustration A
 - Illustration B
 - Illustration C
 - Illustration D
83. Which cell pictured is a fungal cell?
- Illustration A
 - Illustration B
 - Illustration C
 - Illustration D
84. Which cell pictured is a bacterium cell?
- Illustration A
 - Illustration B
 - Illustration C
 - Illustration D