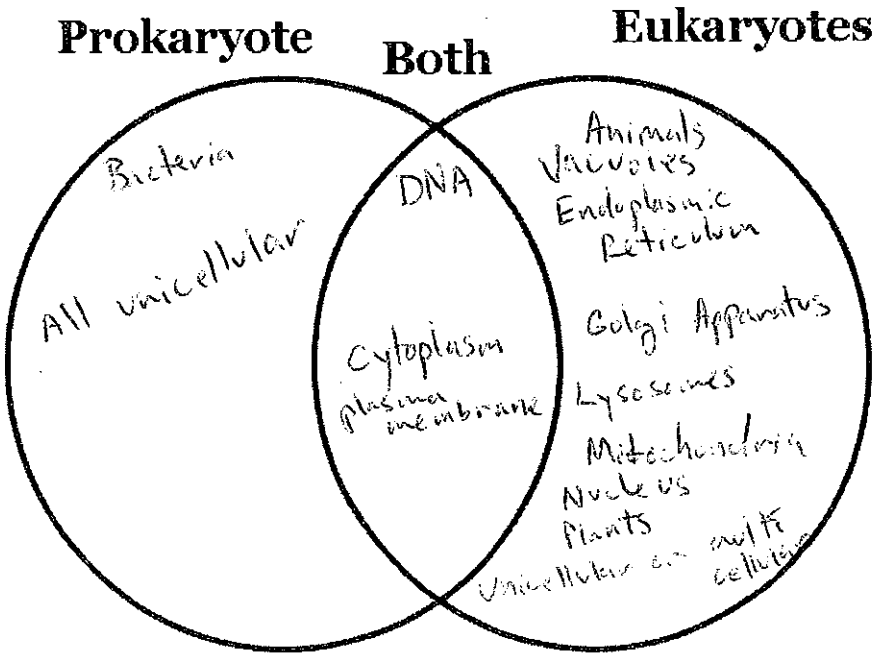
Biology Study Guide

Unit 4: Cellular Structure and Function

The content covered in this unit is found in Chapter 7 of Biology by Miller and Levine.

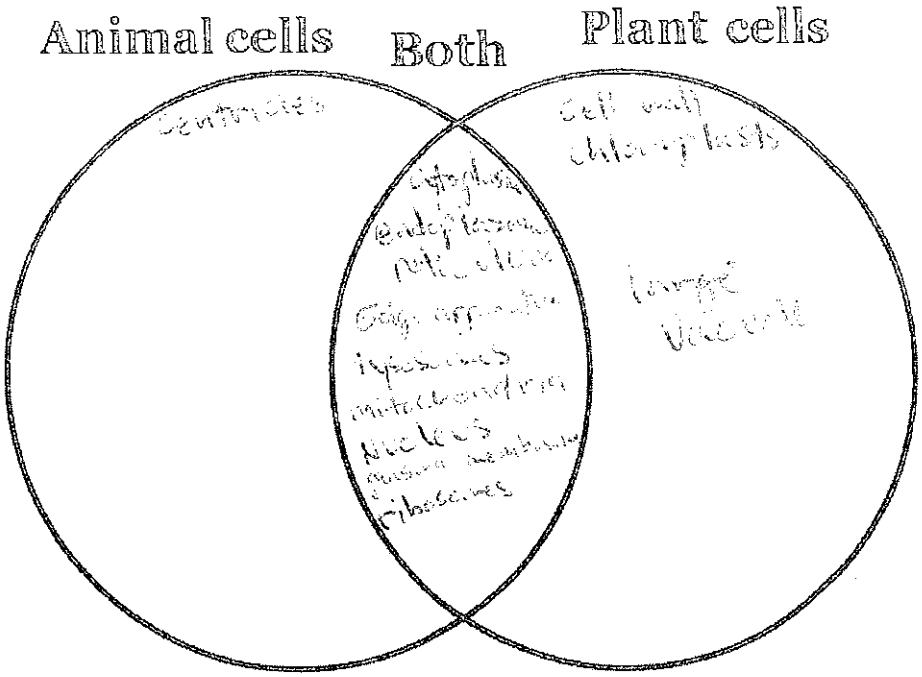
1. In your own words, what are the **three** parts of the cell theory?
   1. Cells are the smallest unit of structure/function in living things
   2. All cells come from cells
   3. All living things are made of cells
2. Which came first, the compound light microscope or the electron microscope? (circle one)
3. How do you find the total magnification of an image formed by a compound light microscope?
   multiply the ocular lens by the objective lens
4. Compare the image you would see when using a compound light microscope with how it is actually mounted on the slide—what happens to the image? the image is reversed
5. All cells on Earth can be divided into two types of cells - prokaryotes and eukaryotes.

   Use all of the terms listed below to fill in the given Venn Diagram.

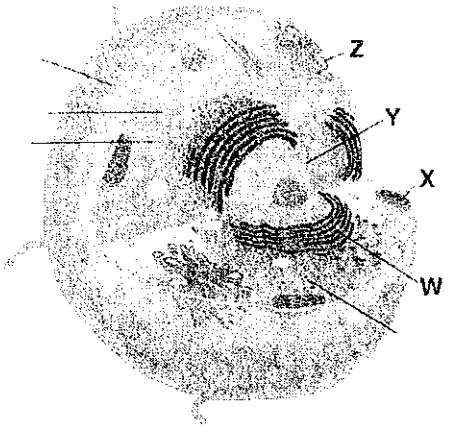


Terms to Use: Animals, Bacteria, Cytoplasm, DNA, Endoplasmic Reticulum, Golgi apparatus, Lysosomes, Mitochondria, Nucleus, Plants, Plasma membrane, Vacuoles, Unicellular or multicellular, All unicellular

7. Many eukaryotic cells are from either plants or animals. Use all of the terms given to fill in the Venn Diagram below.



Terms to Use: Cell wall, Centrioles, Chloroplasts, Cytoplasm, Endoplasmic Reticulum, Golgi apparatus, Lysosomes, Mitochondria, Nucleus, Plasma membrane, Ribosomes, Vacuole (large)



8. Is the diagram above an animal cell or a plant cell? Animal
How can you tell? no cell wall or chloroplasts; has cilia

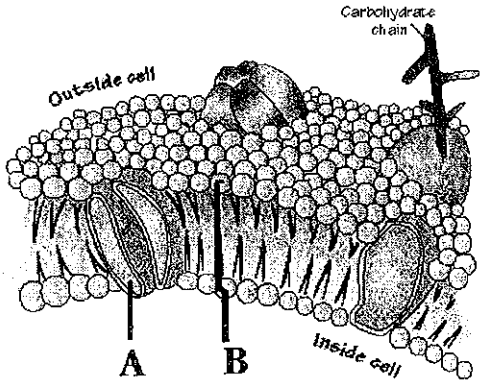
9. The labels represent:
W – Rough ER
X – Mitochondria
Y – Nucleus
Z – Golgi apparatus

10. Match each cell structure with its function:

K	Centrioles	A. Makes ribosomes
F	Cytoplasm	B. Separates the inside of the cell from the outside
J	Endoplasmic Reticulum	C. Digestion/recycling within the cell
C	Lysosome	D. Maintain the shape of the cell
D	Microtubules (in Cytoskeleton)	E. Contains the genetic information of the cell
G	Mitochondria	F. Jelly-like substance
E	Nucleus	G. Energy (ATP) is produced here; "powerhouse"
A	Nucleolus	H. Storage of nutrients and waste
B	Plasma membrane	I. Site of protein synthesis (including enzymes!)
I	Ribosome	J. Transports substances within the cell; site of some synthesis
H	Vacuole	K. Aids in cell division

11. Cells of similar (but not necessarily identical!) structure and function combine to form tissues, which combine to form organs, which combine to form organ systems.

12. Define **Homeostasis:** maintaining a stable internal environment



Plasma (cell) membrane

In the diagram above of the plasma (cell) membrane:

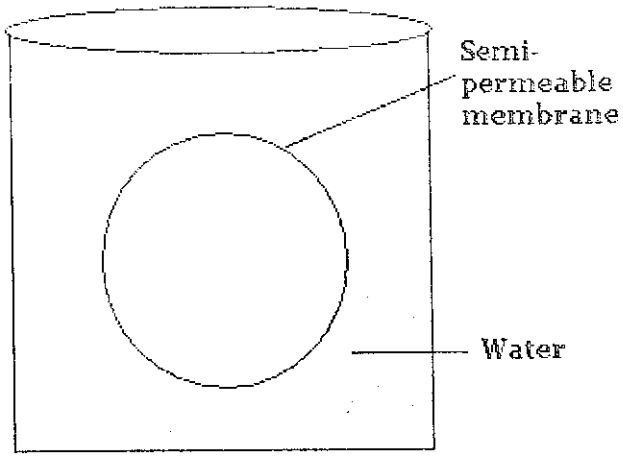
13. What does A represent? integral protein (or protein channel)

14. What does B represent? phospholipid bilayer

15. What is the function of the plasma membrane? regulate what goes in/out of cell

16. What is the difference between *osmosis* and *diffusion*? osmosis is specific to the movement of water (H_2O)

Use the diagram below of a water-filled bag in a beaker for Questions 17-19:



17. If there is a **HIGH** concentration of sugar in the water, and a **LOW** concentration of sugar in the bag, what will happen to the bag?
the bag will shrink

18. If there is a **LOW** concentration of sugar in the water, and a **HIGH** concentration of sugar in the bag, what will happen to the bag?
it will swell / burst

19. If there is the **SAME** concentration of sugar in the water as there is in the bag, what will happen to the bag?
bag will stay the same size

20. The movement of solutes *against* a gradient that requires an expenditure of energy is called
active transport

21. The movement of solutes *with* a gradient that does **not** require an expenditure of energy is called
passive transport

22. Match each scientist with his contribution to science:

D	Hooke	a. observed pond water; built early microscope
A	Leeuenhoek	b. studied plant cells
B	Schleiden	c. studied animal cells
C	Schwann	d. coined the term "cell" from observing cork