

Unit 2 – Cells (Part I)

Assignment A

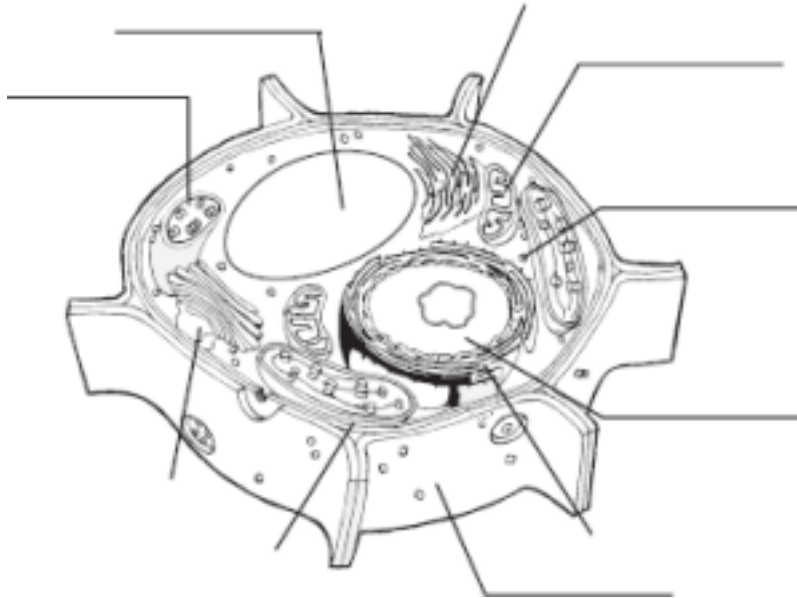
1. What is the main difference between prokaryotes and eukaryotes?
2. How do vacuoles help support plant structures?
3. Draw a cell nucleus. Label and give the function of the following structures: *chromatin*, *nucleolus*, *nuclear envelope*, *nuclear pore*.

Assignment B

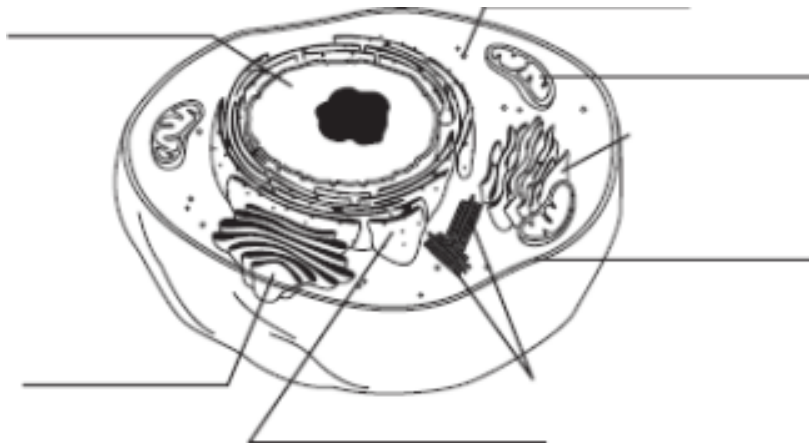
1. How does microfilament-aided cellular movement differ from microtubule-aided movement?
2. How does the rough endoplasmic reticulum differ from the smooth endoplasmic reticulum?
3. What could you infer about a cell that has more than the typical number of ribosomes?

Assignment C

1. Use the following words to label the plant cell below: *Cell wall, chloroplast, mitochondrion, nucleus, ribosome, central vacuole, smooth endoplasmic reticulum, rough endoplasmic reticulum, Golgi apparatus, cell membrane, lysosome, nucleolus.*



2. Use the following words to label the animal cell below: *Cell membrane, Golgi apparatus, mitochondrion, nucleus, rough endoplasmic reticulum, ribosome, smooth endoplasmic reticulum, nucleolus, centrioles.*



3. Create a Venn diagram with the overlapping circles labeled “Prokaryotes” and “Eukaryotes”. Sort the following terms into the appropriate location in the Venn diagram, with terms applicable to both cells in the area where the circles overlap. *Cell membrane, cell wall, centriole, chloroplast, cytoplasm, cytoskeleton, DNA found in cytoplasm, endoplasmic reticulum, Golgi apparatus, lysosome, mitochondria, nucleus containing DNA, ribosome, vacuole.*

Assignment D

1. How do the properties of lipids help explain the structure of a cell membrane?
2. Why do you think it is important that cell membranes are *selectively* permeable?
3. Does osmosis require the cell to use energy? Explain.

Assignment E

1. Match the situation with the result. Write the letter of the correct answer on the line to the right of the situation described.

Situation Result

- | | |
|---|-----------------------------|
| Cells are in an isotonic solution. _____ | a. The cells lose water. |
| Cells are in a hypertonic solution. _____ | b. The cells gain water. |
| Cells are in a hypotonic solution. _____ | c. The cells stay the same. |

2. How does ATP enable transport proteins to move ions across a cell membrane?

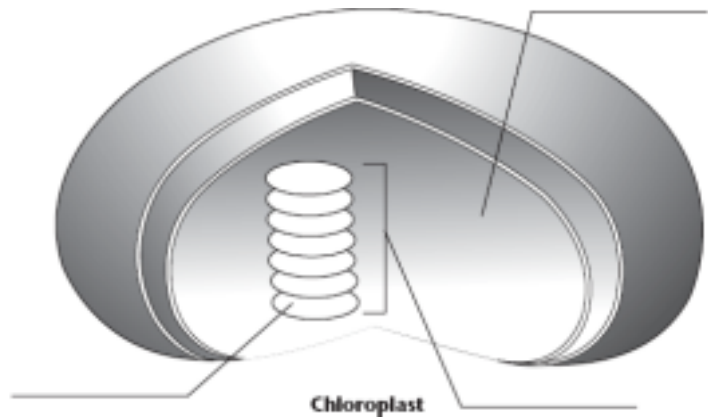
3. What do unicellular organisms do to maintain homeostasis?

Assignment F

1. How do heterotrophs obtain energy? How is this different from how autotrophs obtain energy?

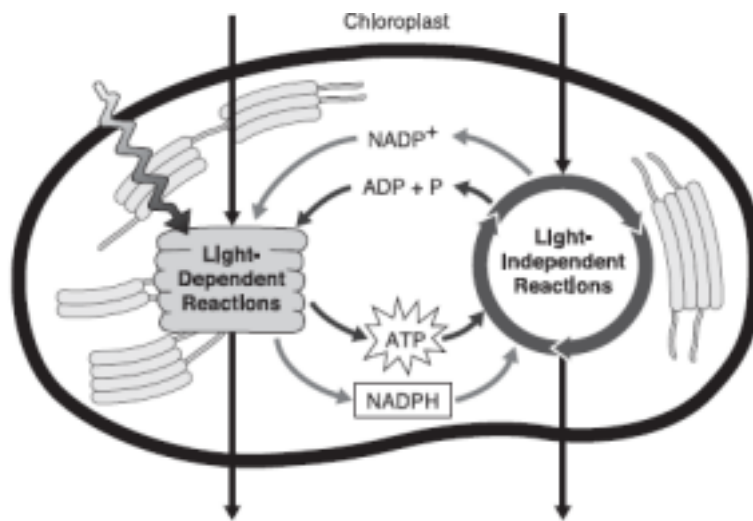
2. Explain why most plants will not grow well if kept under green light only.

3. Label the internal parts of the chloroplast below.



Assignment G

1. Complete the illustration of the summary of photosynthesis by writing the reactants and products of the light-dependent and light-independent reactions using the following terms:
Sunlight, H_2O , CO_2 , O_2 , sugars.



2. How do events in the Calvin cycle depend on the light-dependent reactions of photosynthesis?

3. Is chemiosmosis an example of active transport or passive transport? Explain.

Assignment H

1. What drives the synthesis of ATP in the light-dependent reactions?

2. Summarize what happens in each phase of the light dependent reactions of photosynthesis.

Photosystem II

Electron
Transport Carrier

Photosystem I

ATP Synthase

3. What happens to the NADP^+ and ADP produced in the Calvin cycle?

4. Why is the Calvin cycle also referred to as the light-independent reactions?

5. Why is the Calvin cycle considered a cycle?

Review

1. What features do all cells share?
2. How do contractile vacuoles help maintain homeostasis?
3. Use the description of organelle function to name each of the organelles below.

Organelle

Function

Controls most cell processes and stores Genetic material

Where lipid parts of the cell membrane and proteins for export are assembled and stored

Modifies, sorts, and packages materials from the endoplasmic reticulum

Converts the energy stored in food into a more usable form

4. What is the role of lysosomes in the cell and why is this a vital role?

5. For each of the following, indicate if the structure is found only in eukaryotes (**E**), or if it is found in eukaryotes and prokaryotes (**EP**).

a. Cell membrane _____

b. Mitochondria _____

c. Ribosome _____

d. Golgi apparatus _____

e. Nucleus _____

f. Cytoplasm _____

g. DNA _____

6. What are ribosomes and what do they do?

7. If a cell's Golgi apparatus does not function properly how might this affect other cells?

8. Complete the table to summarize the types of bulk transport.

Type	Description
Endocytosis	
Phagocytosis	
Exocytosis	

9. What is the relationship between diffusion and osmosis? By definition, what is the only substance that undergoes osmosis?

10. What would happen to a sample of your red blood cells if they were placed in a hypotonic solution? Explain.

11. Explain the relationship among cell specialization, multicellular organisms, and homeostasis.

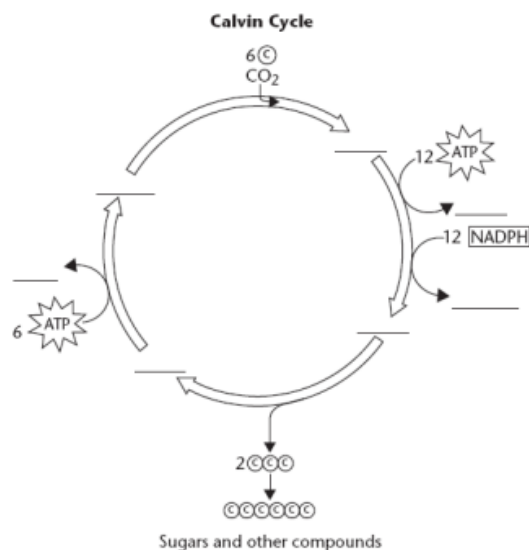
12. Recall that energy flows and that nutrients cycle through the biosphere. How does the process of photosynthesis impact both the flow of energy and the cycling of nutrients?

13. What drives the creation of a proton gradient across the thylakoid membrane during the light-dependent reactions?

14. What drives the synthesis of ATP during the light-dependent reactions?

15. Draw a diagram illustrating the steps of the light-dependent reactions. Include the following labels: *Chloroplast*, *Stroma*, *Thylakoid*, *Thylakoid Space*, *Photosystem II*, *Electron Transport Carrier 1*, *Photosystem I*, *Electron Transport Carrier 2*, *ATP Synthase*. Also show where light energy is absorbed and where the different products of the light-dependent reactions (O_2 , NADPH, and ATP) are produced.

16. Complete the diagram of the Calvin cycle by filling in the missing labels for names of the molecules.



17. Complete the chart below by writing the following phrases on the appropriate side of the chart:
Use energy from the sun, Use carbon dioxide, Produce oxygen, Produce sugars, Convert ADP into ATP, Take place in the stroma, Take place in the thylakoids, Require water, Also called Calvin cycle.

Light-dependent Reactions

Light-independent Reactions

18. What are three factors that affect the rate at which photosynthesis occurs?