

Name: _____

Period: _____

Date: _____

Living Environment Unit 3: Cellular Processes Study Guide

Due Date: 11/29 (tues) Test Date: 11/30 (Wed)

Unit 3 Important Topics:

- I. Aim # 14 Cell Membrane
- II. Aim # 15 NYS Diffusion Lab
- III. Aim # 16 Photosynthesis
- IV. Aim # 17 Plant Structure/Adaptations
- V. Aim # 18 Cellular Respiration
- VI. Aim # 19 Comparing and Contrasting Photosynthesis and Cellular Respiration

Directions: Use Aim # 14-19 (Unit 3) to complete this study guide.

Part 1 Use your Aim # 14 Notes- The Cell Membrane

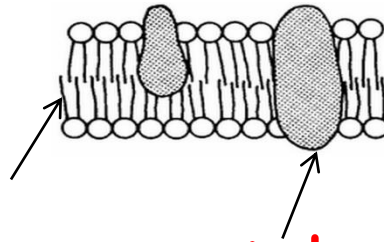
1. Record the three main functions of the cell membrane:

• _____ the contents of the cell from the _____ environment.

• _____ the _____ of materials into and out of the _____.

• Sends and responds to chemical signals.

2. Label the two structures that make up the cell membrane.



3. Define the following terms:

a. Transport: regulates and controls the transport of materials in and out of cells

b. Solvent: a substance that _____ another substance (ex: water)

c. Solute: a substance that is _____ (ex: sugar, salt)

d. Solution: When a substance is _____ into another substance (solvent + solute = solution)

e. Concentration: a measure of the amount of a _____ in a solution.

4. Which type of transport do molecules move from high to low concentration? Diffusion or Active Transport?

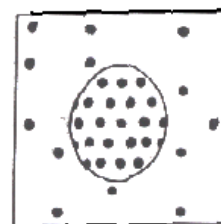
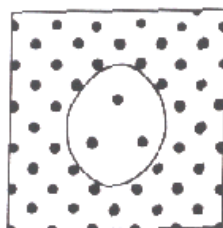
_____ Is energy required? _____ (yes or no)

5. Label high concentration and low concentration of glucose, then draw an arrow to show where the molecules will move (in the case of diffusion).

• = glucose

H= high concentration

L= low concentration

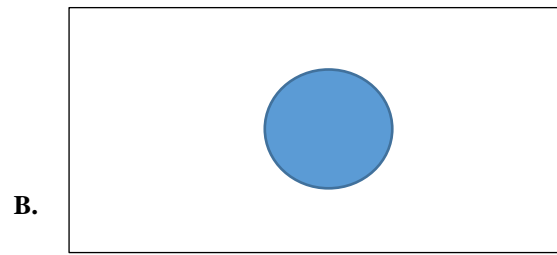
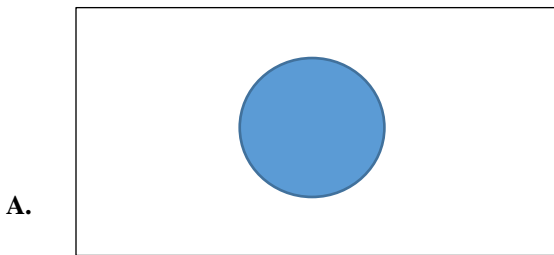


6. Identify the type of transport in which WATER moves from areas of high concentration to areas of low concentration?

_____ Is energy required? _____ (yes or no)

7. **Directions:** For each of the explanations below draw a sample of what the outside and inside of the cell looks like. Then draw an arrow to which way water will flow. Lastly fill out the last two columns of the chart below.

Question #	Intracellular fluid (inside the cell)	Extracellular fluid (outside of the cell)	Where is there more water? Inside or outside of the cell?	Where will the water move? Inside or outside the cell
A	5% salt (Hint you have to figure out how much water is in a solution that has 5 % salt)	95% salt (Hint you have to figure out how much water is in a solution that has 95 % salt)		
B	10% water	90% water		



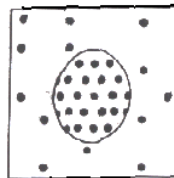
8. A cell is placed in distilled water and then transferred to a 5% salt solution. As a result of this procedure, the cell would be likely to

- a. get larger
- b. get smaller
- c. get larger, then smaller
- d. stays the same

9. Which type of transport do molecules move from low to high concentration? Diffusion or Active Transport?

_____ Is energy required? _____ (yes or no)

10. **Directions:** Label high concentration and low concentration, then draw an arrow to show where the molecules will move if they were to actively transport through the membrane.



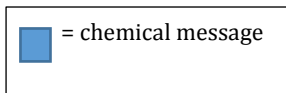
11. A student claims that a dead cell can still carry out diffusion but cannot carry out active transport.

Explain why this claim is correct. In your answer be sure to explain why a dead cell can carry our diffusion but cannot carry out active transport.

12. Why is it important that **large organic macromolecules** (such as proteins and starches) are **digested** before passing through the cell membrane?

13. Describe the role of the receptor molecules.

14. Receptor molecules are specific shapes. Draw what a receptor molecule would look like on the cell below if the chemical message is a square.



15. Defective receptor proteins on a cell membrane have the *least* effect on

- (1) homeostasis
- (2) muscle activity
- (3) nerve signals
- (4) diffusion

Part II. Use your Aim # 15- NYS Diffusion Lab Notes

16. How are starch and glucose different than each other?

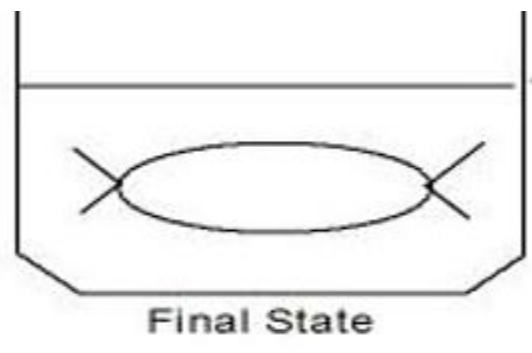
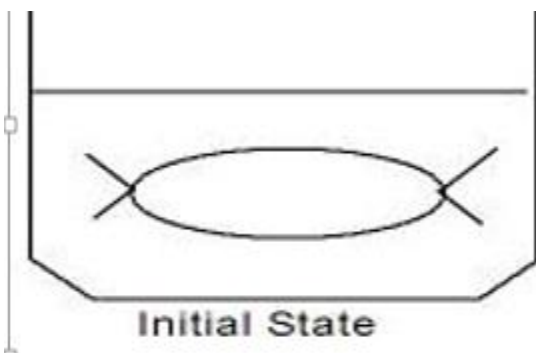
17. How are starch and glucose similar to each other?

18. Fill out the diagram below by using the key. Include the correct number of each molecule and also label the color of the inside and outside of the cell.

I= Iodine (draw 6 molecules total)
G= Glucose (draw 6 molecules total)
S= Starch (draw 4 molecules total)

Cell Color= _____
Outside water color= _____

Cell Color= _____
Outside water color= _____



19. Which molecule was not able to leave the cell? _____

20. How did we know this molecule was not able to leave the cell?

21. Which molecule was able to leave the cell? _____

22. How did we know this molecule was able to leave the cell? Be specific (explain exactly what we did)

23. Which indicator solution tests for starch? _____

24. What does a positive test for starch look like?

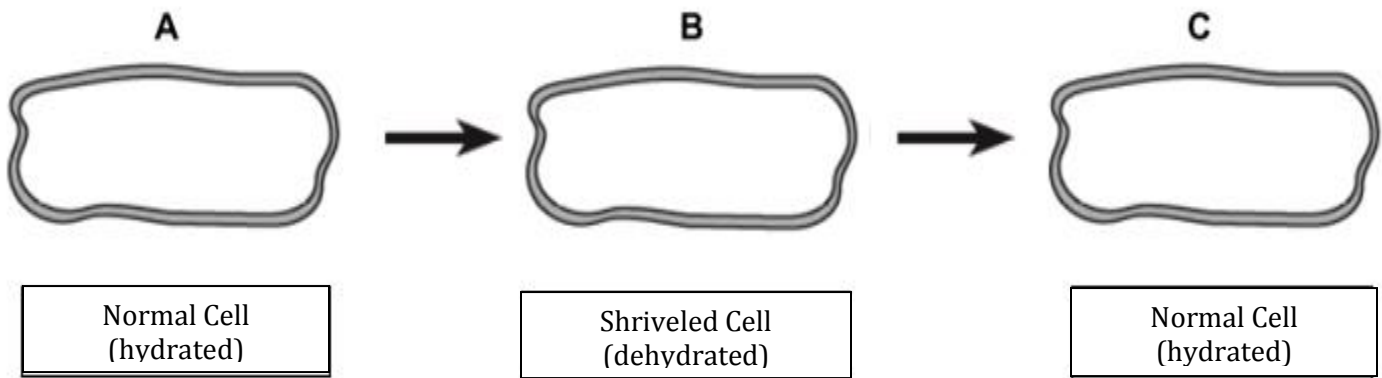
25. Which indicator solution tests for glucose? _____

26. What does a positive test for glucose look like?

27. Directions: You are provided three pictures of a plant cell below. The outline of each cell represents the cell wall.

a. Draw the size of the cell membrane and shade in the cytoplasm.

b. Label the cell wall, cell membrane, and cytoplasm.



28. Identify the substance added to the cell that changed the cell from view A to view B.

29. Identify the substance added to the cell that changed the cell from view B to view C.

30. Explain how the addition of salt effects the cell membrane. Include the movement of water in your response.

31. Explain how the addition of pure water effects the cell membrane. Include the movement of water in your response.

Part III. Use your Aim # 16 Notes- Photosynthesis

32. Write the equation for photosynthesis below:

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Directions: Use the word bank for the chart below:

Water (H ₂ O)	Oxygen (O ₂)	Glucose (C ₆ H ₁₂ O ₆)
Sunlight	Carbon dioxide (CO ₂)	

33. Fill out the following chart, using your knowledge of photosynthesis.

<u>Raw Materials of Photosynthesis:</u>	
<u>Energy source that converts (changes) the raw materials into the products:</u>	
<u>Products of Photosynthesis:</u>	

34. Where (which organelle) does photosynthesis happen? _____, which are found in _____ cells.

35. When does photosynthesis occur? Explain why.

36. Which parts of the photosynthesis formula, raw materials or products, are composed of all inorganic molecules?

37. Why can't animals perform photosynthesis?

Part IV. Use your Aim # 17 Notes- Plant Structure/Adaptations

38. Describe two functions of plant roots.

- _____
- _____

39. Describe how the guard cells and stomate are related.

40. Describe an environmental circumstance that the stomate will close.

41. Describe an environmental circumstance that the stomate will open.

42. Fill out the chart below.

	Does gas exchange occur?	What happens to the water?	What happens to carbon dioxide?	Rate of photosynthesis
OPEN STOMATE				
CLOSED STOMATE				

Part V. Use your Aim # 18 Notes- Cellular Respiration

43. Write the equation for cellular respiration below:

Directions: Use the word bank for the chart below:

• Water (H ₂ O)	Oxygen (O ₂)	Glucose (C ₆ H ₁₂ O ₆)
• ATP	Carbon dioxide (CO ₂)	

44. Fill out the following chart according to the process of cellular respiration:

Raw Materials of	
Cellular Respiration:	
Products of Cellular Respiration:	

45. Cellular respiration occurs in the _____, which is an organelle mostly found in both plant & animal cells.

- A. Mitochondria C. Vacuole
 B. Cell Membrane D. Chloroplast

46. What is present in the organelle from your answer in #32 that allows cellular respiration to occur? _____

47. During cellular respiration, what is the energy released from? _____

48. Does cellular respiration occur during daytime, night time or all the time? Explain why. _____

49. Why is ATP necessary for organisms to survive? (what do organisms need it for?) _____

Part VI. Use your Aim # 19 Notes- Photosynthesis vs. Cellular Respiration

50. Compare and Contrast Photosynthesis and Cellular Respiration using the Venn diagram.

Include the following points:

- a. Which organisms complete these processes?
- b. Where in the cell do these processes occur?
- c. Identify the raw materials of these processes.
- d. Identify the products of these processes.
- e. Why is each process imperative to maintain life? (Think about what is produced and why it is important for survival)
- f. How are these two processes similar to one another? (at least 2 similarities)

