Name: _____ Per: _____ Date: _____

Semester Exam Study Guide

Cell Size, Cell Cycle and Cell Division are not included in the following study guide, as you have just finished a study guide on those topics. Please use that study guide to study those topics for the Semester exam.

1. What is the difference between a scientific theory and a scientific law? (Hint: what do both explain?)

2. Describe a dependent variable, independent variable, experimental group, and control group. (You may want to use an example like those we covered in class, such as an experiment testing the effects of amount of light on the rate of photosynthesis.)

3. What is a hypothesis? How do we develop hypotheses?

4. What are the 8 characteristics of life?

1.	2.	3.	4.
5.	6.	7.	8.

5. What characteristics of life do viruses possess? Which ones do they not possess? Are they considered alive?

6. What type of questions can science answer?

7. Betty Sue had a new pair of shoes. Betty Sue always seemed to ruin her shoes within two months. Betty Sue had heard of a new product called Scuff-B-Gone which was supposed to keep your shoes looking brand new for up to 6 months. Betty Sue decided to apply the Scuff-B-Gone to only the left shoe of her new shoes. She wore her new pair of shoes for two months. At the end of the two months, she compared the two shoes to see if the left shoe with Scuff-B-Gone looked any better than the right shoe without Scuff-B-Gone.

A. Independent variable

_____

B. Dependent variable

_____

C. Constants

_____

D. Control Group

_____

E. Experimental Group

_____

8. Scientists observed that white mice that were fed seeds appeared to grow more than mice fed the regular diet of leafy green and yellow vegetables. The scientists hypothesized that the protein in the seed was responsible for the growth. They designed an experiment to test this hypothesis. They divided 200 mice of the same age, size, health, and sex into two groups of 100 mice each. The mice were kept under identical conditions for 90 days. One group was given the normal low protein diet. The other group was given new high protein diet. The mass of each mouse was recorded weekly for 90 days.

A. Independent variable

_____

B. Dependent variable

_____

C. Constants

_____

D. Control Group

_____

E. Experimental Group

_____

9. Design an experiment for testing the effectiveness of Advil on treating headaches.

Describe what your control group is and will be doing:

_____

_____

_____

_____

_____

_____

_____

Describe what your experimental group is and will be doing:

_____

_____

_____

_____

_____

_____

_____

Independent Variable:

_____

_____

Dependent Variable:

_____

_____

10. How does spontaneous generation differ from biogenesis?

11. What were the experiments Pasteur, Redi, and Spallanzani do to help disprove abiogenesis?

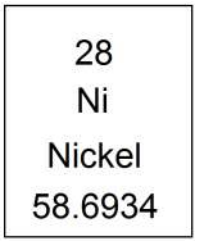
The Atom and the Cell

Describe the charge and location of the following atomic particles:

Atomic Particle	Electrical Charge	Atomic Location
Electron		
Proton		
Neutron		

7. Describe the differences between a covalent, ionic, and metallic bond.

8. The following is an element from the periodic table. Identify the following:



Atomic Number: _____

Number of Protons: _____

Number of Electron: _____

Atomic Mass: _____

Number of Neutrons: _____

9. What element is in every macromolecule?

10. List the four macromolecules. For each polymer list its monomer (if applicable), at least 2 functions, and at least 2 examples.

Macromolecule	**Monomer**	**At least 2 Functions**	**At least 2 Examples**

11. What macromolecule are enzymes? What is an enzymes function?

12. What is a prokaryote? What is a eukaryote? (What are the differences/similarities?)

13. What are the three statements of cell theory?

    1.

    2.

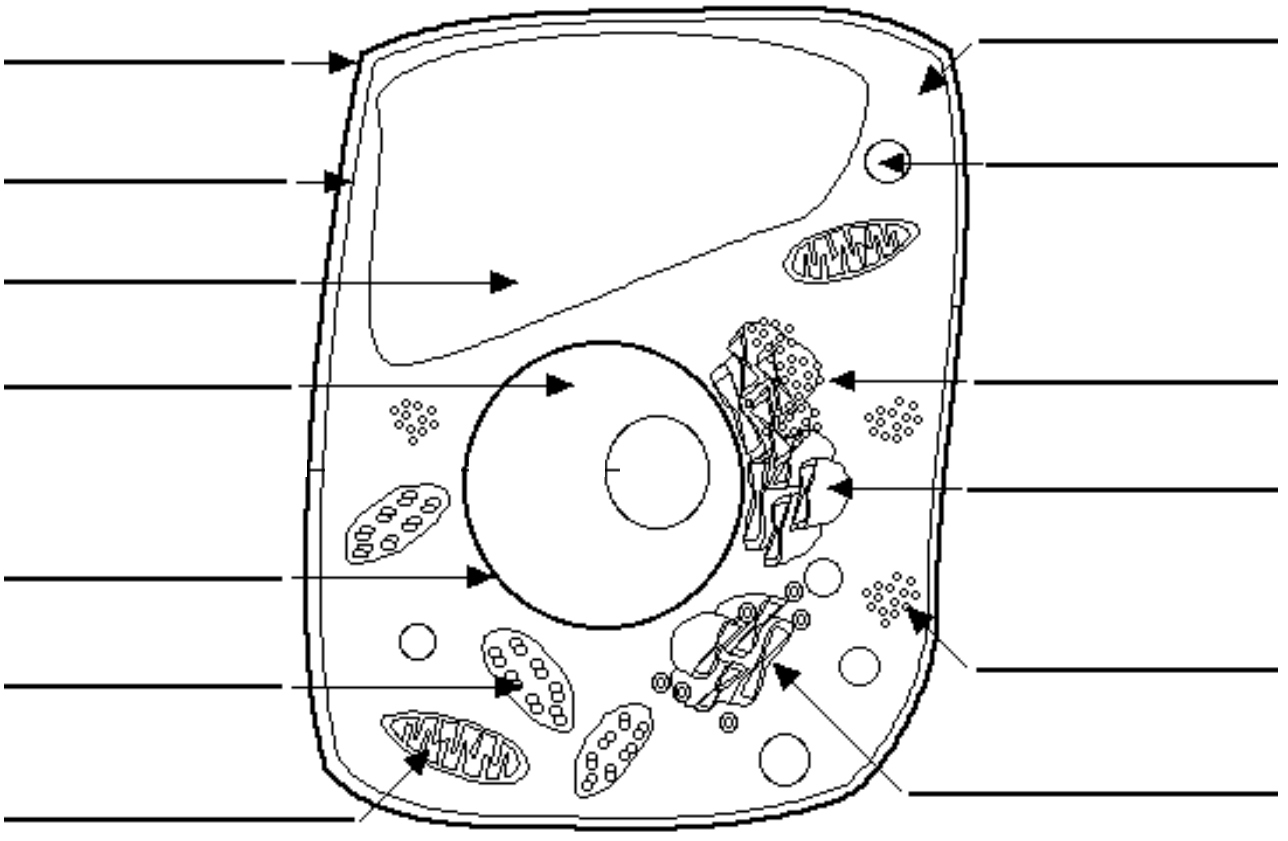
    3.

14. Fill in the following table.

Organelle	**Function (what it does)**
Nucleus	
Endoplasmic Reticulum	
Golgi apparatus	
Chloroplast	
Ribosome	
Cell Wall	
Mitochondria	
Cell Membrane	
Lysosome	
Cytoplasm	
Central Water Vacuole	

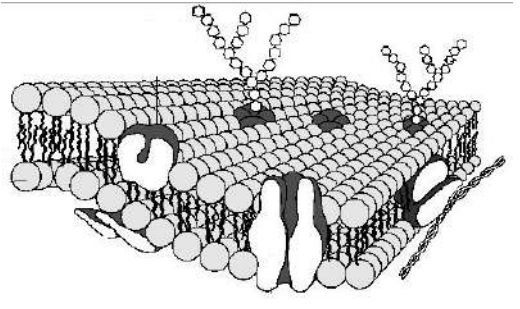
15. What three organelles are specific to plants?

16. Label the following cell diagram



Cell Membrane and Transport

17. Label the carbohydrate chain, lipid bilayer – hydrophobic, lipid bilayer – hydrophilic, and the protein channel in the cell membrane illustration.



18. How does the lipid bilayer stop large molecules from passing through the cell membrane?

19. Give an example of a large molecule. Give an example of a charged molecule. Give an example of a small, uncharged molecule.

    a. Large: _____

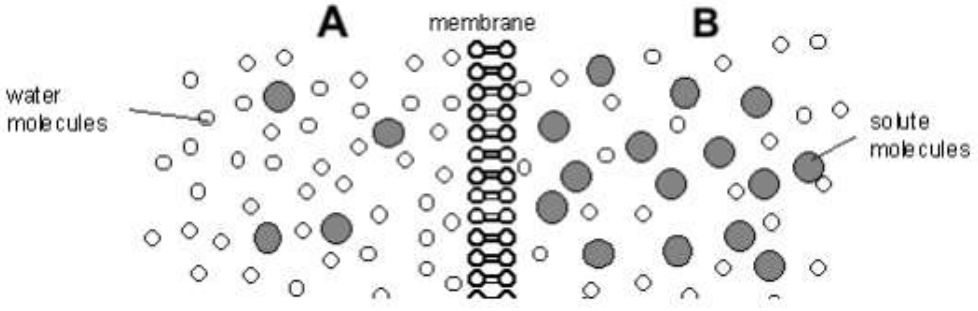
    b. Charged: _____

    c. Small, Uncharged: _____

20. What is diffusion? What is it called when diffusion has reached a point where there is an equal concentration everywhere?

21. You place a leaf in a 75% salt solution. The leaf is 15% salt and 85% water. Explain what happens to the plant cells in this solution. What type of solution is the salt solution?

22. Using the picture below answer the following questions.



    a. What type of solution is side A (hypertonic, hypotonic, or isotonic)?

    b. The solutes are charged and cannot diffuse. Which way will the water diffuse?

    c. After 24 hours what will happen to the concentration of solutes on each side? (Go up or down)

23. You place your egg into the corn syrup solution that was 65% sugar. An egg is 73% water and 27% solute. Is the egg hypotonic, hypertonic, or isotonic? Is the solution hypotonic, hypertonic, or isotonic? What happens to the egg?

24. What is osmosis?

25. What is one two differences between active and passive transport, and what is one similarity?

26. Give three types of active transport

27. What is the difference between Endocytosis and Exocytosis?

28. How do protein pumps work?

29. Describe the pH range of an acid and a base. What is the pH of a neutral substance?

Substance	**pH (range)**
Acid	
Neutral	
Base	

Energy, Photosynthesis and Respiration

30. What molecule is used directly for energy in living organisms?

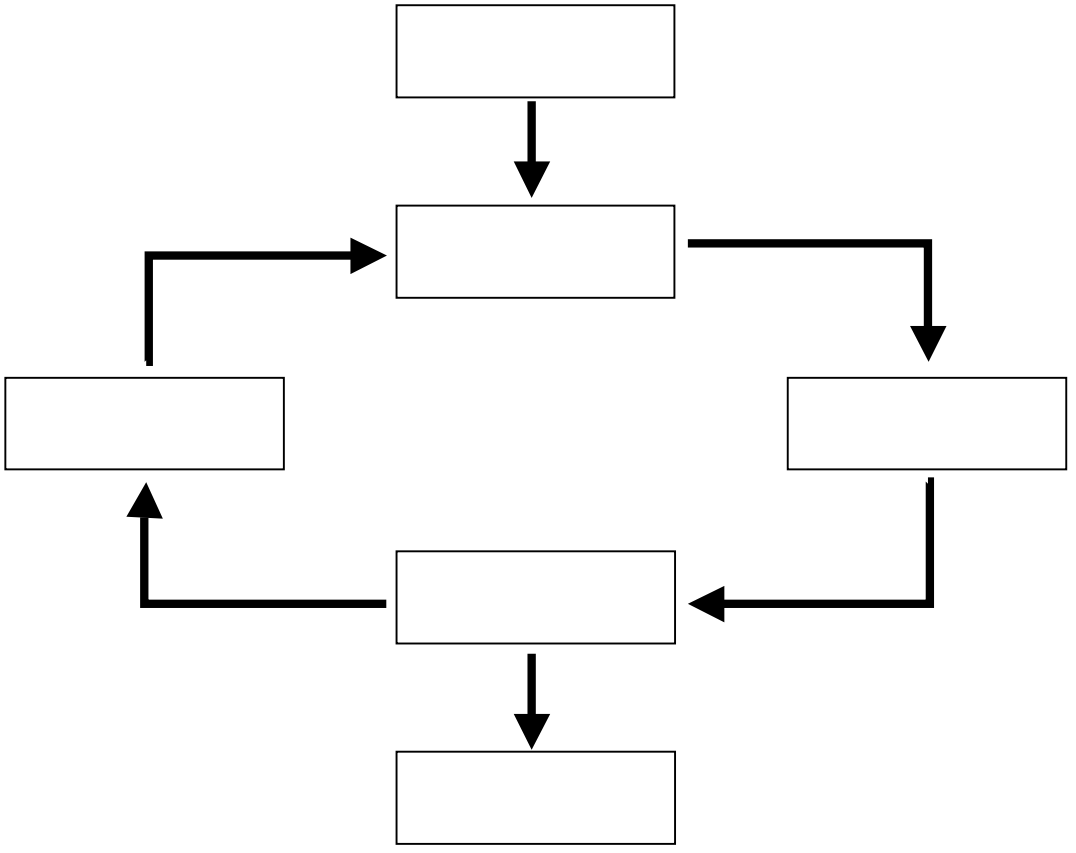
31. The energy from our _____ is converted into _____ (the molecule used for energy directly) and used in the body for cellular processes.

32. What source of energy does photosynthesis use? To what type of energy is this converted into?

33. What is the overall equation for photosynthesis?

34. Fill in the below diagram showing the relationship between Photosynthesis and Respiration using the following terms:

Photosynthesis
ATP
CO_2 and H_2O
Sugars and O_2
Cellular Respiration



35. Describe how energy is A) stored in ATP, and B) released from ATP.

A)

B)

36. In what organelle does aerobic respiration occur? _____

37. What is the overall reaction for cellular respiration?

38. What type of fermentation (anaerobic respiration) do humans undergo?

39. What is it called when a process (any process, but especially referring to respiration) occurs WITHOUT oxygen? How about WITH oxygen?

WITHOUT: _____

WITH: _____

40. T or F: ATP is a product of respiration?

41. How is photosynthesis and cellular respiration related?

42. What is photosynthesis' role in the carbon cycle? What is respirations role in the carbon cycle?