Biology 19-20
Semester 1 Final Exam Study Guide

- ✓ The final exam will be all multiple-choice and true false.
- ✓ There will be no rest room passes until you are done with the test.
- ✓ This study guide will be worth daily points for completing the assigned portions.
  - If you meet all of your daily goals you can choose to use a handwritten front and back index card (**3inx5in normal size**) on your final.
  - These must be turned in with your final.
- ✓ Bring something to work on/keep you busy after you finish your final.
  - There are no locker trips.
  - No electronics are allowed until EVERYONE is done taking the final exam.

"Success is a state of mind. If you want success, start thinking of yourself as a success."

- ✓ Keys to success:
  - Review your binder. You have all the information you need from Q1 and Q2.
  - Complete this study guide using your binder!
  - Use class time and resource periods before finals to get help.
  - Use old study guides in addition to this study guide for help and extra practice. Be sure to focus on what this study guide covers, but those old study guides help a lot.

Final exam will cover the following topics: Scientific Thought, Chemistry, Biochemistry, Cells, and DNA Replication, Mitosis, and Meiosis.

Wednesday, January 15th		Thursday, January 16th		Friday, January 17th	
Resource	8:10-9:40	Resource	8:10-9:40	Resource	8:10-8:45
5th period	9:50-11:20	1st period	9:50-11:20	3rd period	8:50-10:20
Lunch	11:25-12:15	Lunch	11:25-12:15	4th Period	10:30- 12:00
6th period	12:20-1:50	2nd period	12:20-1:50	Lunch	12:00-12:30
7th period	2:00-3:30	Resource	2:00-3:30	Busses Leave	12:30
				8th period make-up	12:30-3:30

Nature of Science: Chapter 1 (20 Questions)

Science Process

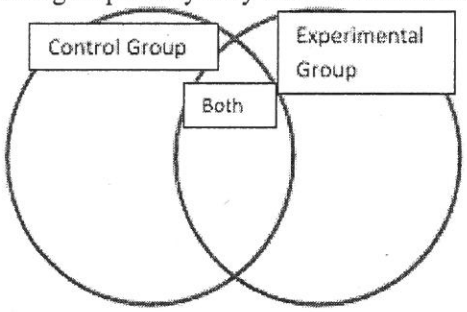
1. Define Observation =

2. Define Inference =

3. Label the following statements either as an observation (O) or an inference (I)
   A. ____ Zach is wearing a blue shirt.
   B. ____ Anyone who wears a Yankees shirt likes baseball.
   C. ____ There are 15 students on the bus.
   D. ____ Julie must have gotten in trouble because I saw her go to the principal's office
   E. ____ People who live in Alaska like winter.
   F. ____ It is hot outside today.

4. Define Hypothesis.

5. Compare and Contrast the Control Group and Experimental Group in an experiment.
(You cannot use the word group or say they occur in science/science experiment as a comparison.)



6. If plants are watered, then growth height will increase.

IV:
DV:
Constants:
Hypothesis:

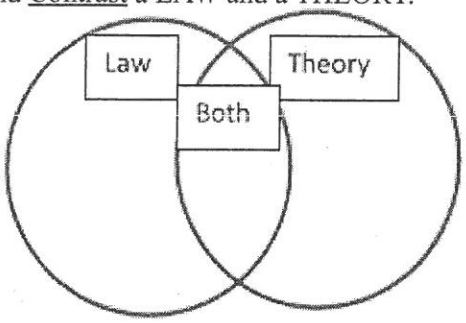
7. If trees have leaves, then bird nests will increase.

IV:
DV:
Experimental Group:
Control Group:

8. If acid rain is in water, then fish population will increase.

IV:
DV:
Hypothesis:

9. Compare and Contrast a LAW and a THEORY.

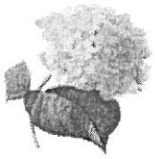


10. Using scenario #1 below, answer the following questions:

SCENARIO #1 - Maggie's Plant Experiment

In this exercise you will read the following scenario and identify the parts of the scientific method in it.

Maggie read that some plants grow better if the soil is acidic. She can't believe that a plant can grow when exposed to acid. Maggie decides to test if the plants she has will grow better when acid is added to the soil. She puts potting soil in two planting containers and transplants two of her geraniums that seem about the same size into the pots. She puts the pots in the same location so that they both get the same sunlight each day, are at the same temperature and she makes sure they get the same amount of water. However, Maggie puts a tablespoon of vinegar in the water she gives to one of the plants. She measures the growth of the plants every week for five weeks and records the results in a data table below:



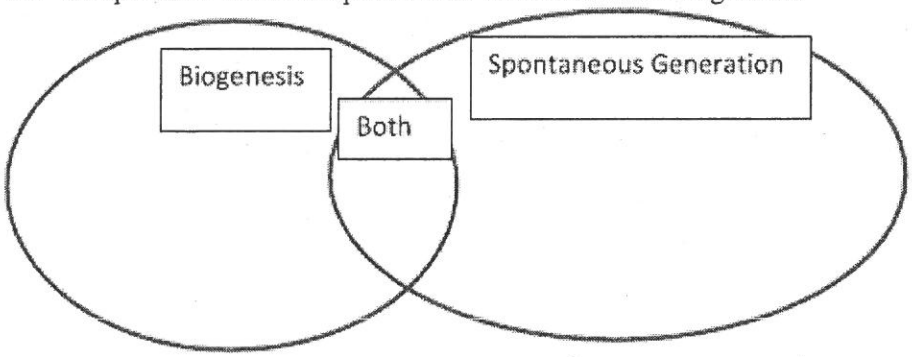
Week	Height of Plants in Container with Vinegar (cm)	Height of Plants in Container without Vinegar (cm)
1	10.0	10.0
2	12.4	11.5
3	14.8	13.0
4	18.0	15.7
5	21.4	17.8

1. **Hypothesis:** _____
2. **Dependent Variable:** _____
3. **Independent Variable:** _____
4. **Constants:** _____
5. **Control Group:** _____
6. **Experimental Group:** _____

11. Why do scientists repeat experiments and/or publish their work?

Spontaneous Generation:

12. Compare and Contrast Spontaneous Generation and Biogenesis.



Characteristics of Life

13. Define Biology:

14. For each example below write which characteristic of life is represented by each statement.

A. _____ "That boy shot up five inches in only one year."

B. _____ "Our cat had a litter of kittens yesterday."

C. _____ "My dog has become much less clumsy now that he is a year old."

D. _____ "Eat a good breakfast and you will be able to run longer."

E. _____ "When that car pulled in the driveway, my cat ran to hide under the porch."

F. _____ "Owl's night vision can see movement of mice on even the darkest night."

G. _____ "Single-celled organisms live in the pond behind school."

H. _____ Your body normally maintains a temperature of $98.6^{O}F$

I. _____ A giraffe uses its long neck to eat from the high branches of a tree.

15. What characteristics of living things were absent from the examples in problem #13 above?

16. How many characteristics of life does an organism have to possess to be considered alive?

Chemistry Review: Chapter 2.1 (18 Questions)

17. What are the three parts of an atom?

18. Fill in the table below regarding parts of an atom

Atom Particle	Location in the Atom	Charge
Proton		
		Neutral
	Surrounding the Nucleus (In orbits, shells)	

19. Using your periodic table, how do you find the number of protons?

20. Using your periodic table, how do you find the number of electrons?

21. Fill in the table below regarding electrons.

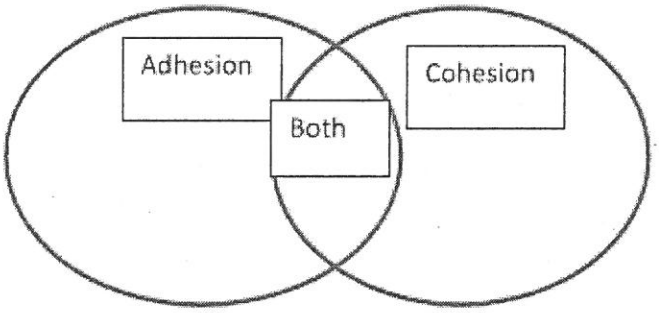
Electron Type	Definition	Purpose	How to find on the periodic table
Core			
Valence			

22. Complete the following table for normal atoms.

Element	Symbol	Number of Protons	Number of Electrons	Valence Electrons
Magnesium		12		
Sodium			11	
Boron		5		

23. What elements is water made of?

24. Compare and Contrast Adhesion and Cohesion (Make sure to cite specific examples from lab).



25. What is pH?

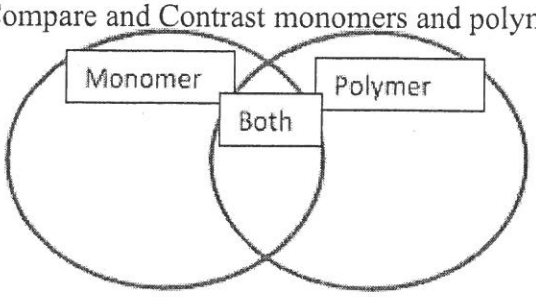
26. Fill in the table below regarding pH.

	Acid	**Base**	**Neutral**
pH range			
What molecules/ions are present?			
What is the weakest pH of this substance?			
What is the strongest pH of this substance			

Biochemistry: (35 Questions)

Monomer/Polymer

27. Compare and Contrast monomers and polymers.



Macromolecules

28. Fill in the table below regarding macromolecules.

Macromolecule	Uses/Function	Monomer	Polymer
Carbohydrates			
Lipids			
Proteins			
Nucleic Acid			

Carbohydrates

29. What three elements do all carbohydrates contain?

A.

B.

C.

30. What is the relationship between O and H in Carbohydrates?

31. Fill in the table below regarding polysaccharides.

Polysaccharide Examples	Is it found in Plant or Animal? (Circle One)	Can Human's Digest this? (Circle One)
	Plant or Animal	Yes or No
	Plant or Animal	Yes or No
	Plant or Animal	Yes or No

Lipids

32. What are the two components of a lipid?
33. Fill in the table below regarding types of fats.

Type of Fat	Amount of Hydrogen (H) (Circle One)	Found in Plants of Animals (Circle One)	Solid or Liquid (Circle One)	Healthier or Unhealthy (Circle One)
Saturated	Lots or Little	Plants or Animals	Solid or Liquid	Healthier or Unhealthy
Unsaturated	Lots or Little	Plants or Animals	Solid or Liquid	Healthier or Unhealthy

34. Describe several, 2 or more, functions of lipids in the body.

Proteins and Enzymes

35. How many total amino acids are there?

36. How do you get so many proteins from so few amino acids?

37. What bond forms between amino acids and links them together?

38. In the chemical equation below, label the reactants and products.

$$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$$

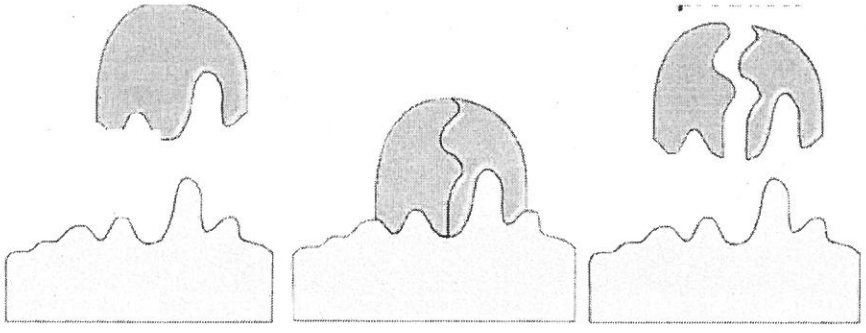
39. Fill in the table below regarding definitions of the following terms.

Term	Definition
Enzyme	
Substrate	
Lock and Key	
Activation Site	
Activation Energy	

40. Explain the difference in activation energy between the reaction with the enzyme and without the enzyme.

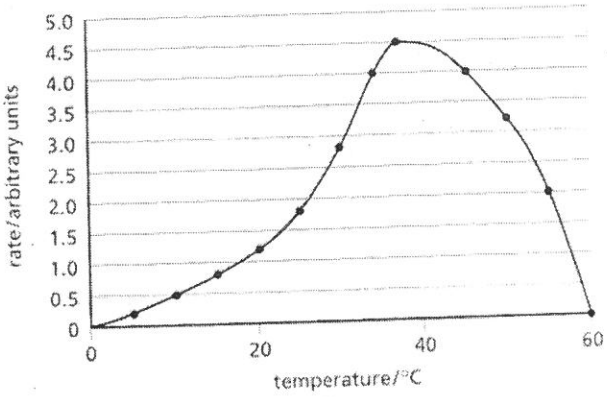
    A. What causes this difference?

41. Label where substrate, enzyme, product(s), reactant, lock and key fit, and active site are on the following diagram:



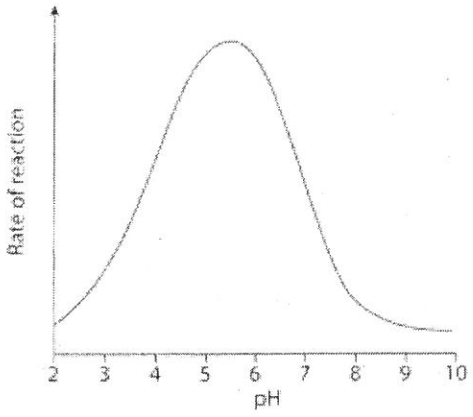
42. What happens to an enzyme if it becomes denatured?

Use the graphs to the right to answer the following questions:



43. What is the temperature required for maximum enzyme effectiveness?

44. What will happen to the enzyme's effectiveness if the solution is heated to 55^0C?
    a). Why?

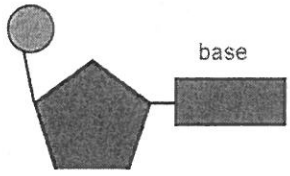


45. What is the pH needed for maximum enzyme effectiveness?

46. What will happen to the enzyme's effectiveness if the solution is made very acidic?

Nucleic Acids

47. Label the three building blocks of a nucleotide on the diagram below.



48. Where is DNA found?
49. Describe the function of nucleic acids?

50. What are 3 differences between RNA and DNA molecules?
    A.
    B.
    C.

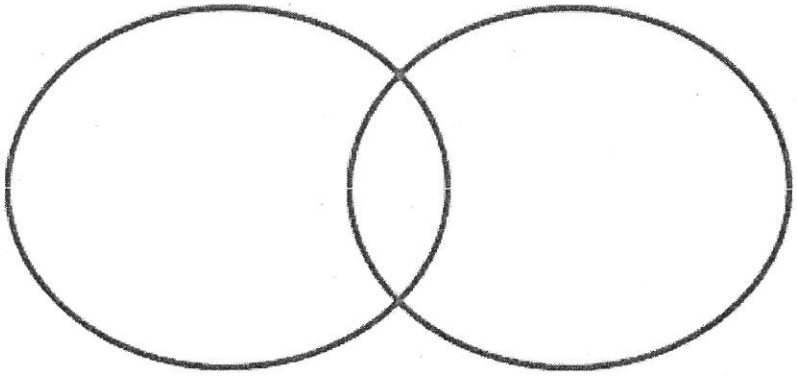
51. What is a base pair?

52. List the base pairs for DNA and RNA.

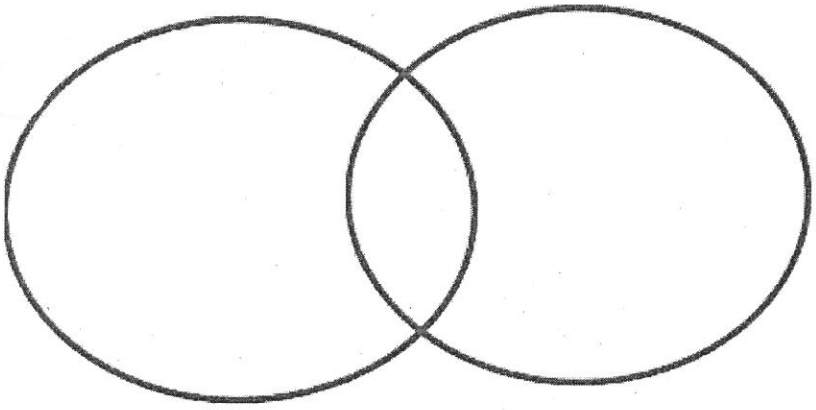
Chapter 7: Cells and Their Components (27 Questions)

53. What are the three principles with the cell theory?

54. Compare and contrast prokaryote and eukaryote cells.



55. Compare and contrast animal and plant cells.



56. Fill in the table below regarding feedback.

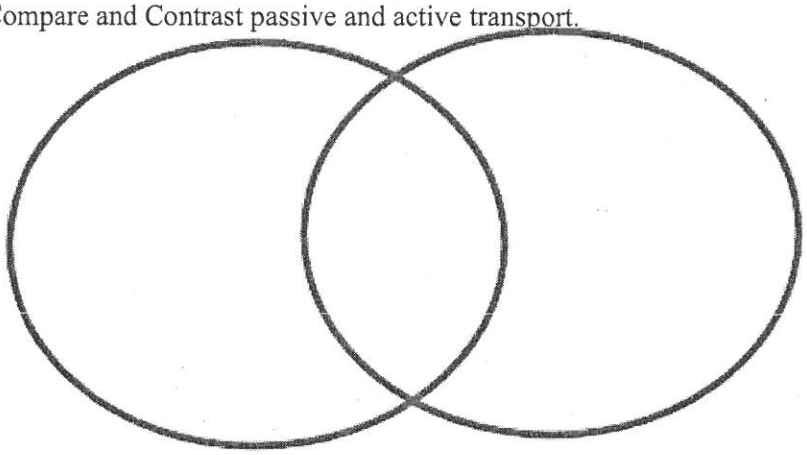
Type of Feedback	Definition	Example	Diagram/Graph
Positive			
Negative			

57. Fill in the table below regarding the function of cell parts and their presence in plant and/or animal cells.

Organelle	Function/Purpose in the cell	Is it found in plant cells, animal cells, or both
Nucleus		
Nucleolus		
Mitochondria		
Chloroplast		
Cytoplasm		
Rough ER		
Smooth ER		
Golgi Apparatus		
Lysosome		
Vacuole		
Ribosomes		
Cell Membrane		
Cell Wall		

58. What is homeostasis?
    A. Why is it so important?

59. Compare and Contrast passive and active transport.



60. Fill in the table below regarding types of transport.

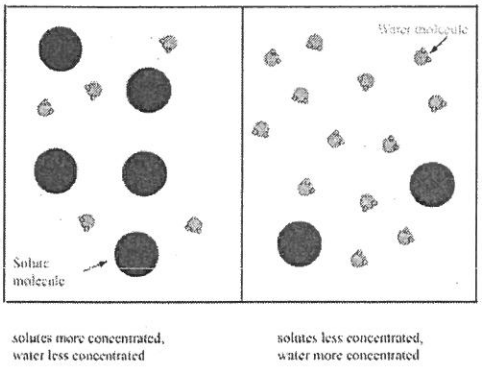
Type of Transport	Movement Type (High to Low or Low to High)	Types of Molecules Moving (examples)	Does if require energy? (Yes or No)
Diffusion			
Osmosis			
Facilitated Diffusion			
Active			

61. Fill in the table below regarding solutions created by osmosis.

Solution Type	**Definition (Include water movement) (Into the cell, Out of the cell, Both)**	**Drawing (Before and After)**
Isotonic		
Hypertonic		
Hypotonic		

62. When does water stop moving across a membrane?

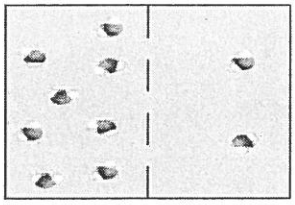
63. What direction would the sugar particles (large circles) move if active transport was at work?



64. Using the diagram above, explain the direction the water molecules, small circles, pictured would move and why.

65. If passive transport was occurring, draw how water would move across the cell membrane in the picture below. Explain why this occurs.

66. What type of solution would be produced in the diagram below. Explain why.



Outside	Cell

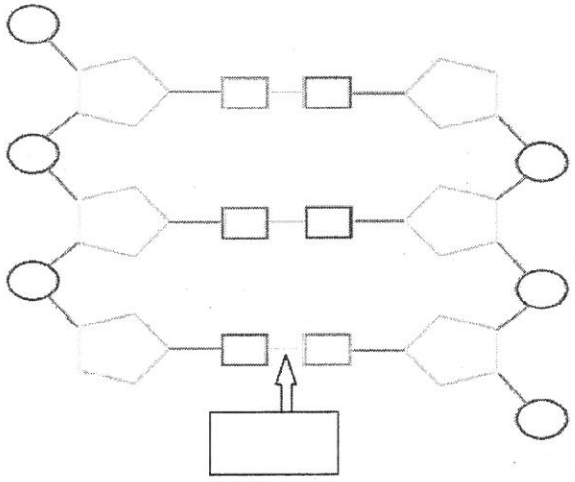
Chapter 10 and 12 DNA Structure, DNA Replication, Mitosis and Meiosis (20 Questions)

DNA & RNA:

67. What is the full name for DNA?

68. What 3D shape is used to describe a DNA molecule?

Use the picture below to answer the following questions



69. Circle one nucleotide.
70. Label the three parts of the nucleotide you circled.

71. Identify the chemical bond the arrow is pointing to in the picture above.

72. If a DNA molecule has 30% thymine, what percent of adenine, cytosine, and guanine must the molecule have? Remember, all should equal 100% total!

    A=
    C=
    G=

DNA Replication

73. What is DNA replication?

74. Complete the other half of the DNA molecule. **CGG ATC AAA TGA**

75. Fill in the table below regarding the steps of DNA Replication.

Step	Enzyme Involved	Summary of the Step/Process
1		
2		
3		

76. Draw a model to explain why the process of DNA Replication is considered semi conservative.

Mitosis

77. How many cell divisions occur in mitosis?

78. What type of cells are produced by meiosis?

79. Describe the amount of chromosomes contained in cells produced by ~~meiosis~~ mitosis?

80. Define the following terms:
    A. Sister chromatid

    B. Centromere

    C. Centriole

    D. Spindle Fiber

81. Describe what happens in each of the following phases and draw a cell in that phase.

Phase	Description	Drawing
Interphase		
Prophase		
Metaphase		
Anaphase		
Telophase/ Cytokinesis		

82. Color in the phases in the table above that are included in mitosis/cell division?

83. How does cancer form?

Meiosis

84. How many cell divisions occur in meiosis?

85. What type of cells are produced by meiosis?

86. Describe the amount of chromosomes contained in cells produced by meiosis?

87. Define crossing over:

88. Describe what happens in each of the following phases and draw a cell in that phase

Phase	Description	Drawing
Interphase		
Prophase 1		
Metaphase 1		
Anaphase 1		
Telophase/Cyto kinesis 1		
Prophase 2		
Metaphase 2		
Anaphase 2		
Telophase /Cytokinesis 2		

89. Describe how Mitosis and Meiosis Relate.

Mitosis	Both	Meiosis