

Final Exam EOC Review Packet

Unit 1: Biochemistry

1. Organic Molecules: Each organic molecule is assembled from smaller organic compounds.

Organic Molecule	Subunits (Made up of...)	Function	Test(s)/ + Result
Carbohydrates (Sugars)			
Lipids (Fats)			
Proteins			
Nucleic Acids			

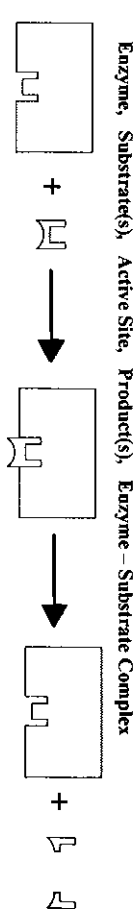
2. **IMPORTANT:** Enzymes, hormones, antibodies are _____ and are composed of _____

3. Match the molecule with its function and subunits

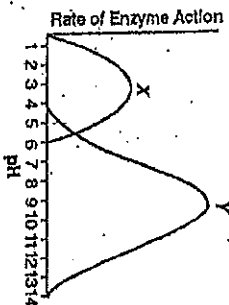
- | | |
|------------------|---|
| _____ Cellulose | A. The structural molecule which makes up the cell wall |
| _____ Insulin | B. To destroy pathogens in the body; made of amino acids |
| _____ Glycogen | C. The product of photosynthesis; made of sugars |
| _____ Enzymes | D. To speed up reactions; made of amino acids |
| _____ Hemoglobin | E. To store genetic information; made of nucleotides |
| _____ DNA | F. To send chemical messages; made of amino acids |
| _____ RNA | G. To store genetic messages; made of nucleotides |
| _____ Glucose | H. To transport oxygen in the blood; made of amino acids |
| _____ Hormones | I. To regulate the amount of blood sugar; made of amino acids |
| _____ Antibodies | J. How animals store starch; made of sugars and starches |

Unit 1: Biochemistry (cont.)

4. Label the image below using the terms:



5. Enzymes are what type of organic molecule? _____ Are enzymes reusable? Yes or No _____
6. How do pH and temperature alter the activity of an enzyme?
- a. What is this called? _____
7. What is the optimum pH for enzyme X? _____
- a. Is this an acid or base? _____
8. What is the optimum pH for enzyme Y? _____
- a. Is this an acid or a base? _____
9. At what pH will both enzymes work?
10. Describe what the function of a buffer is and how it helps to maintain homeostasis



Unit 2: Cells

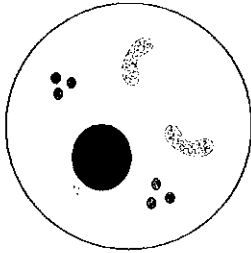
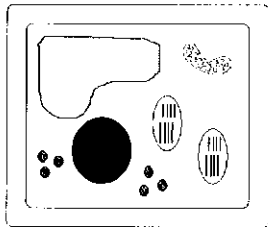
11. What is the function of the following organelles and what type of cell are they located in?

Cell Part	Prokaryote	Eukaryote	Function
Nucleus			
Cell Membrane (Plasma Membrane)			
Cell wall			
Mitochondria			
Vacuoles			
Chloroplasts			
Ribosomes			

Unit 2: Cells (cont.)

12. Label the plant and animal cells below using the following organelles:

Nucleus	Cytoplasm	Chloroplast	Cell Wall
Mitochondria	Cell Membrane	Ribosome	Vacuole



13. Name the three (3) things plant cells have that animal cells **do not have**:

14. Name three (3) ways that prokaryotes and eukaryotes are different.

a. What are the 3 organelles that prokaryotic cells have?

15. What tool is used to observe cells?

16. Complete the following chart:

Specialized Cell	Structure	Picture	Function
Red Blood Cells			
Muscle Cells			
Xylem Cells			
Phloem Cells			
Guard Cells/ Stomata			

Unit 3: Cell Energetics

17. What is the plasma (cell) membrane made out of? _____

- In **osmosis**, **water** moves from an area of _____ to an area of _____ concentration with no energy used.
- In **diffusion**, **molecules** move from an area of _____ to an area of _____ concentration with no energy used.
- In **facilitated diffusion**, **molecules** move from an area of _____ to an area of _____ concentration with no energy used. However, a _____ is used to transport the molecules.
- In **active transport**, **molecules** move from an area of _____ to an area of _____ concentration requiring _____ and a protein.

18. Compare/Contrast

	PASSIVE TRANSPORT	ACTIVE TRANSPORT
Requires energy?		
Low to high concentration or high to low concentration?		

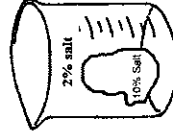
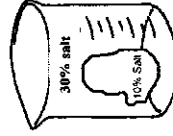
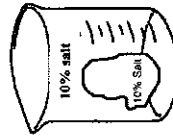
19. If a freshwater plant cell is put in salt water, what will the cell do?

20. If a saltwater plant cell is put in fresh water, what will the cell do?

21. In your own words, what is **homeostasis**?

22. In each of the situations pictured, indicate whether the cell will:

- **Gain Water, Loose Water, Is At Equilibrium**
- Draw arrows to show which way the water will move



Unit 3: Cell Energetics (cont.)

23. Write the equation for **Photosynthesis**:

- a. In what **organelle** does it occur? _____
- b. What gas does a plant use: _____
- c. What gas does a plant **produce/release**: _____

24. Write the equation for **Cellular Respiration**:

- a. In what **organelle** does it occur? _____
- 25. What is different about aerobic and anaerobic respiration?

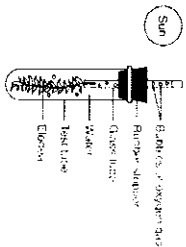
26. Where does **Lactic Acid Fermentation** take place? _____

27. Where does **Alcoholic Fermentation** take place? _____

- a. What are the **PRODUCTS**?

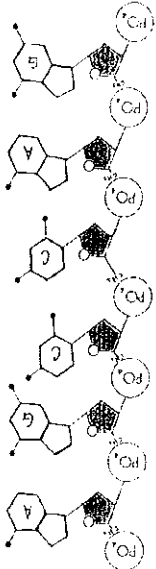
28. What process is happening in the image to the right?

- a. How can you tell?



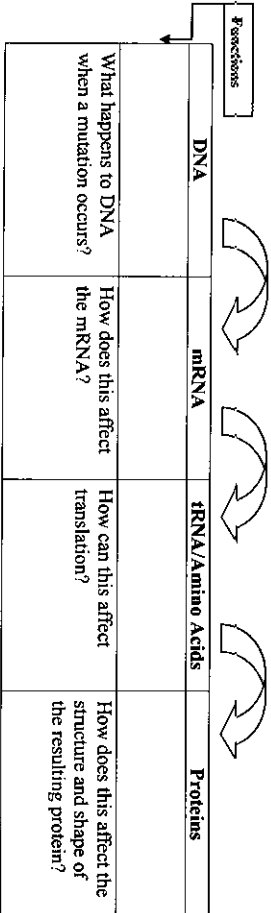
Unit 4: DNA Replication & Protein Synthesis

29. Given the DNA nucleotide sequence in the strand below, that would be the **complementary DNA strand**?



30. What are the **black pentagons**?

31. Central Dogma of Protein Synthesis: complete the chart below in as much detail as possible



Unit 4: DNA Replication & Protein Synthesis (cont.)

32. If the given strand of DNA: G A C T A G T C A undergoes transcription, what will the mRNA be?

33. After **translation**, what would the amino acid sequence be?

*Hint: use the mRNA Codon Chart below

2nd base in codon

	U	C	A	G
U	Phe Leu Leu Leu	Ser Ser Ser STOP	Tyr STOP STOP Tyr	Cys Gly STOP Tyr
C	Leu Leu Leu Leu	Phe Phe Phe Pro	His His Gln Gln	Arg Arg Arg Arg
A	Ile Ile Ile Met	Thr Thr Thr Thr	Asn Asn Lys Lys	Ser Ser Arg Arg
G	Val Val Val Val	Ala Ala Ala Ala	Asp Asp Glu Glu	Gly Gly Gly Cys

3rd base in codon

35. Compare RNA and DNA in the following table:

	RNA	DNA
Sugar		
Bases		
# Strands		
Location in Cell		
Function		

36. a. Transcription occurs in the _____ of a cell and makes a copy of _____ from DNA

b. Then mRNA leaves the nucleus and goes to the _____ to bind to a _____

c. The anticodon on the _____ molecule binds to the codon on the mRNA.

d. This molecule has an _____ attached to it.

e. Amino acids are linked together to create a _____.

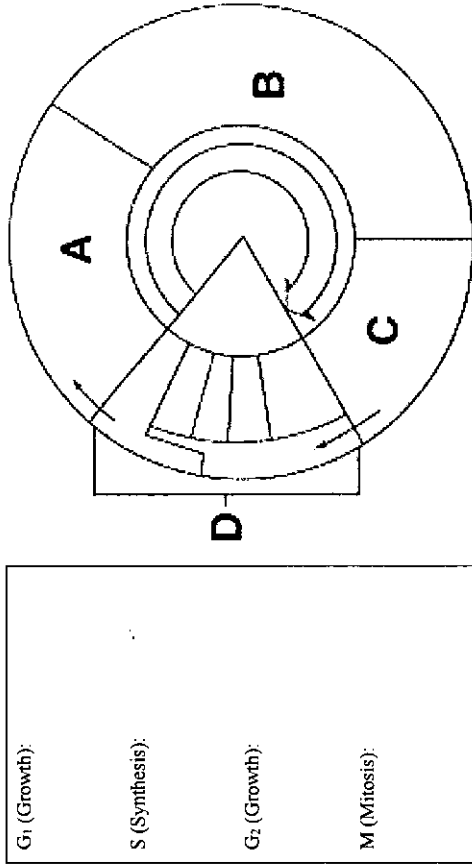
Unit 5: Reproduction

37. Complete the following chart:

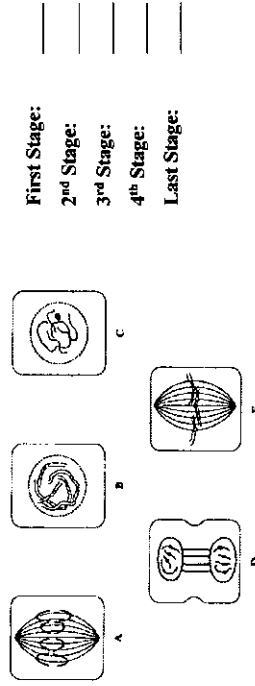
	MITOSIS	MEIOSIS
Type of reproduction (Asexual or sexual)		
Chromosome number of mother cell (1N=haploid or 2N=diploid)		
Chromosome number of daughter cells (1N=haploid or 2N=diploid)		
Number of cell divisions		
Number of cells produced		
Type of cells this produces		
If there are 50 chromosomes in the mother cell, how many are in the daughter cells?		
When does replication happen?		
SOURCES OF VARIATION	INDICATE IF THEY HAPPEN IN EACH PROCESS OR THEY DO NOT	
	MITOSIS	MEIOSIS
Crossing over		
Random assortment of chromosomes		
Gene mutations		
Nondisjunction		
Fertilization		

Unit 5: Reproduction (cont.)

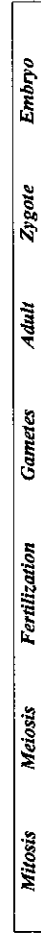
38. Label the diagram and describe what is happening at each phase



39. Put the following stages of mitosis (cell division) in order from first to last:



40. Put the following words in the order that they must happen to make a new individual:



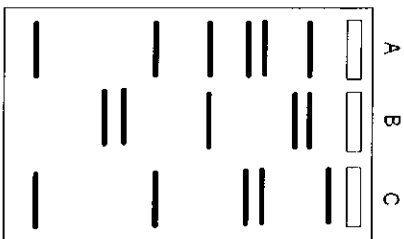
Unit 6: Biotechnology

41. What is the purpose of the Human Genome Project?

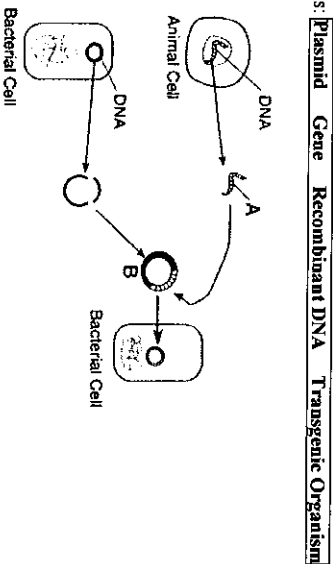
42. What is cloning, in your own words?

43. What process creates a DNA fingerprinting?

44. Look at the DNA fingerprint to the right. →
Which individuals are most closely related?



45. Describe what is happening in the diagram below



46. What modern medicine is most closely associated with the process below?

Unit 7: Genetics

47. In the given Punnett Square: **T = tall and t = short**. Give the genotype for the parents: _____ x _____

T	t
Tt	Tt
t	tt

- a. Give the phenotype for the parents. _____ x _____
- b. What are the genotypes and phenotypes of the offspring?
- c. What is the genotypic ratio of the offspring? _____ : _____ : _____
- d. What is the phenotypic ratio of the offspring? _____ : _____

Incomplete Dominance=Blending Phenotype

48. Cross a pure-breeding red flower (RR) with a pure-breeding white flower.

- a. What colors will be seen in the offspring? [what percent]?
- b. What will their genotypes be? [what percent]?

49. If two offspring from the above cross are crossing with each other:

- a. What colors will be seen in the offspring? [what percent]?
- b. What will their genotypes be? [what percent]?

Co-Dominance= Both show up in the Phenotype

50. A black cat breeds with a tan cat, and their kittens are all black-and-tan tabby.

- a. What will be the resulting phenotypes? [what percent]?
- b. What will be the resulting genotypes? [what percent]?
- c. What will be the genotypes of the parents?

Multiple Alleles (Blood types)

51. If a woman with Type A blood has a child with a man with Type B blood and their first child has Type O blood, what are the parents genotypes?

Women: _____ x Man: _____ Show the Cross!

- a. What are the odds that they will have a child with Type O blood again?
- b. What are the odds they will have a child with homozygous Type A blood?
- c. What are the odds that they will have a child with Type AB blood?

Unit 7: Genetics (cont.)

Sex-linked traits (X-linked Traits)

52. What are the male sex chromosomes in humans? _____
53. What are the female sex chromosomes in humans? _____
54. Colorblindness and hemophilia are sex-linked traits.
 - a. What chromosome are these genes found on? _____
55. Cross a female who is a carrier for hemophilia with a normal male.

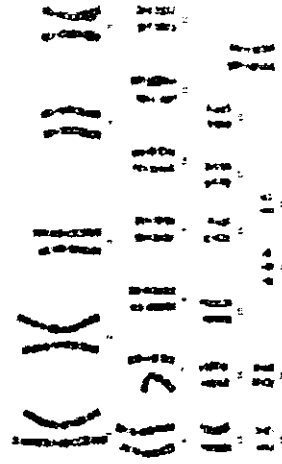
 - a. What are the odds that they will have a child with hemophilia.
 - b. What are the odds that they will have a daughter who is a carrier for hemophilia?
56. Why are males more likely to show a sex-linked disorder?

Pedigrees

57. What is the inheritance pattern shown by this pedigree? (dominant or recessive?)
 - a. How do you know? (which individuals tells you)
58. Using the letters A and a
 - Write the genotype of as many individuals as possible.
 - If you cannot tell if it is AA or Aa, write " $Aa^{?}$ "
59. What is the genotype of person II4?
60. What is the genotype of person I3?

Karyotypes = pictures of chromosomes

61. What is the sex of the person whose karyotype is shown?
62. What is the disorder that this person has?
 - a. Circle your evidence in the karyotype.
63. How is this disorder caused?



Unit 8: Evolution

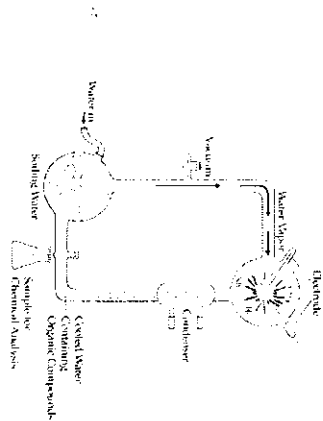
64.		Discussion of importance to evolutionary theory
	Patterns in fossil evidence	
	Biochemical comparisons (DNA and proteins)	
	The role of variations	
	The role of geographic isolation	
	The importance of the environment	

65. What is the Endosymbiotic Theory?
66. Explain why anaerobic heterotrophic prokaryotes had to develop before aerobic eukaryotes.
 - Be sure to include the changing environment and theory of how organelles evolved.
67. Contrast ABIOTIC and BIOGENESIS.
68. Who conducted the experiment shown to the right and what did it prove?
69. Who conducted the experiment shown to the left and what did it prove?

Unit 8: Evolution (cont.)

70. Who conducted the experiment shown to the right?

- What did it prove?



71. What is the difference between EVOLUTION AND NATURAL SELECTION?

a. Evolution:

b. Natural Selection:

72. Penicillin is an antibiotic that was developed and used in the early part of the 20th century.

At first, the antibiotic was very effective in killing the syphilis bacteria.

Over time, more and more syphilis bacteria became resistant to penicillin.

- Explain how this resistance may have developed:

73. Why does sexual reproduction speed up evolution?

- Hint: Think about sexual reproduction in comparison to asexual reproduction

74. Different organisms have developed structural adaptations to be more successful in their environments to obtain food, adapt from water to land, and ensure successful reproduction. Explain the adaptation below:

A group of finches were isolated on an island and over many generations, the beaks of the species changed from short and hooked to long and pointed.

- What caused this change to occur to create this new species?

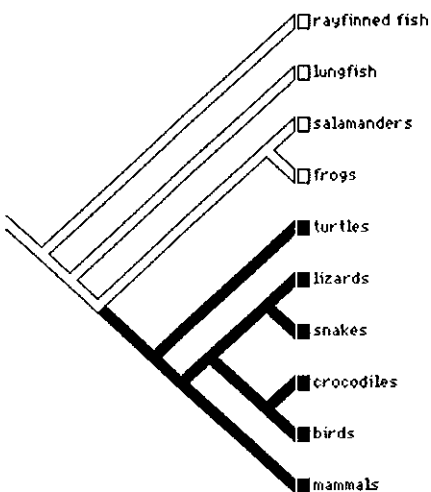
Unit 8: Evolution (cont.)

- Use the Phylogenetic Tree to answer questions 75 – 77

75. Which 3 pairs of organisms are most closely related?

76. Which organism is most closely related to the ray-finned fish?

77. Which organisms are the mammals most closely related to?

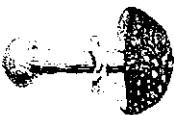


- Use the dichotomous key to identify the following organisms:

78. _____



79. _____



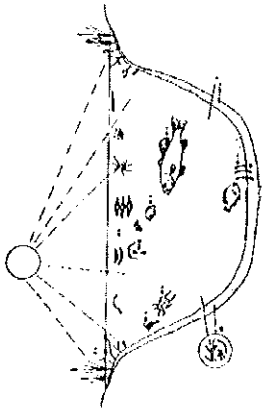
Dichotomous Key	
1. A. only 1 cell.....	go to 2
B. more than 1 cell.....	go to 3
2. A. no nucleus.....	Bacteria
B. has a nucleus.....	Protista
3. A. autotrophic.....	Plantae
B. heterotrophic.....	go to 4
4. A. mobile.....	Animalia
B. immobile.....	Fungi

80. What is the current seven-level classification system? (Hint: Remember your acronym)

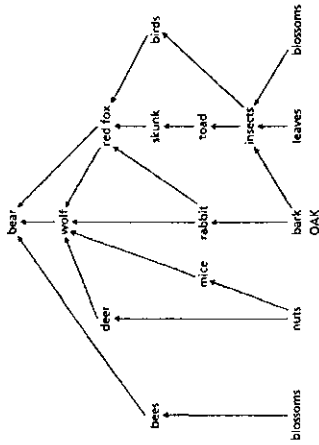
81. What are the 3 biological domains?

Unit 9: Ecology

- 82. List three (3) **biotic factors** in the ecosystem picture
- 83. List three (3) **abiotic factors** in the ecosystem picture



- Use the food web to answer question 88 – 92

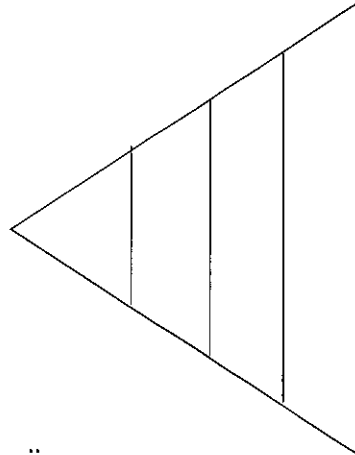


- 84. What are the producers?
- 85. What are the primary consumer/herbivores?
- 86. What are the secondary consumers?
- 87. What are the tertiary consumers?
- 88. What would happen to the ecosystem if the insects were removed from the food web?

- Create an energy pyramid from the food chain:

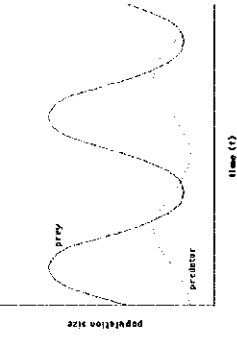
Oak bark → Rabbit → Wolf → Bear

- 89. Who has the most energy in this pyramid?
- 90. Who has the least energy?
- 91. Who has the highest biomass in this pyramid?
- 92. Who has the lowest biomass?
- 93. What happens to energy as it moves through the food chain/web?
- 94. What is the ultimate source of energy for this food web?



Unit 9: Ecology (cont.)

- 99. What is the role of bacteria and fungi in an ecosystem?
- 100. What are they called and what is their job?
- 101. What is a predator-prey relationship?



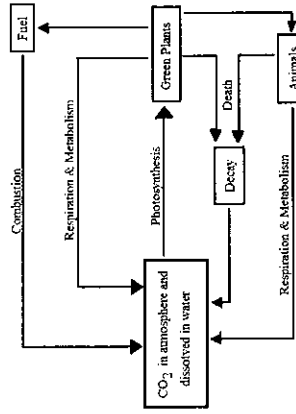
102. Explain the graph:

103. What is mutualism?

- Provide an example in your explanation.

103. What is the role of nitrogen in the ecosystem?

104. How does nitrogen get from the atmosphere into the tissues of living things?



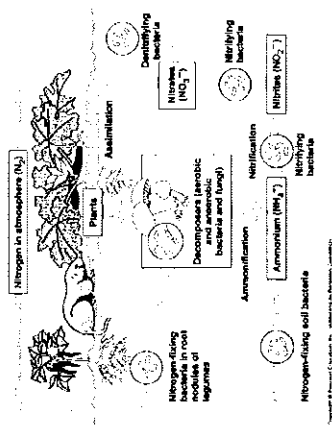
Basic Carbon Cycle Flow Diagram

105. What processes adds CO₂ to the atmosphere?

- Circle them in the diagram (at left)

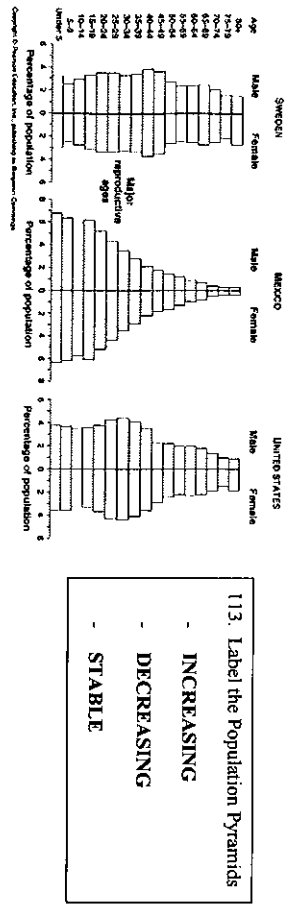
106. What process REMOVES CO₂ from the atmosphere?

- Underline them in the diagram (at left)



107. List the biological levels of organization: (start with *atom* and end with *biosphere*) (Hint: 12 or 13 total)

Population Growth:		S curve	J Curve
108. Draw the charts →			
109. Exponential or Logistic?			
110. Does it reach carrying capacity?			
111. Are there any limiting factors?			
112. Which one describes humans?			



Making Predictions:

Scenario	Population will: Increase, Decrease, Stay Stable
114. High birth rate, high infant mortality rate	
115. High birth rate, low death rate	
116. Low birth rate, high death rate	
117. High birth rate, high emigration rates	

118. What is the number one cause of ALL environmental problems?

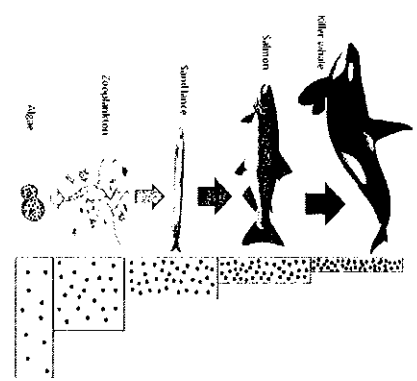
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119. What is the difference between the Greenhouse Effect and Ozone Depletion?

	Caused By	Effect on Environment
Greenhouse Effect		
Ozone Depletion		

120. What is an invasive species?

121. Use the diagram to explain bioaccumulation.



18

Unit 9 Extension: Classification, Kingdoms & Behavior

ALL SEMESTER "Catch – All" AREA

95. Fill in the chart with the correct choice for each row

Domain: Kingdom:	Eubacteria		Archaea		Eukarya		
	Bacteria	Archaea	Protista	Fungi	Plantae	Animalia	
Eukaryotic or prokaryotic							
Multicellular or single-celled							
Sexual or asexual reproduction							
Autotrophic or heterotrophic							
Aerobic or anaerobic							
Cell walls or no cell walls							

96. Label each description with the correct kingdom: **Plantae, Fungi, Animalia, Protista**

- Contains autotrophs and heterotrophs: _____
- Contains gymnosperms and angiosperms: _____
- Contains annelid worms, insects, amphibians, and mammals: _____
- Contains decomposers: _____

97. What are the differences between bacteria and viruses?

98. Label each description with the correct type of behavior:

Conditioning	Imprinting	Chemotaxis	Instinct	Phototaxis
--------------	------------	------------	----------	------------

- A dog always salivates that the ringing of a bell _____
- A baby mammal sucking milk _____
- A worm moving away from bright light _____
- A baby learns who her parents are by recognizing their faces _____
- A protist moves away from harmful chemicals _____

Unit Vocabulary Review Analysis

Quarter 3

Unit 0: Characteristics of Life

- 1. _____
- 2. _____
- 3. _____

Definition

Unit 1: Biochemistry

- 1. _____
- 2. _____
- 3. _____

Unit 2: Cells

- 1. _____
- 2. _____
- 3. _____

Unit 3 Part 1: Cell Transport

- 1. _____
- 2. _____
- 3. _____

Unit 3 Part 2A: Photosynthesis

- 1. _____
- 2. _____
- 3. _____

Unit 3: Part 2B: Respiration

- 1. _____
- 2. _____
- 3. _____

Unit 4: Part 1: DNA Replication

- 1. _____
- 2. _____
- 3. _____

Unit 4: Part 2: Protein Synthesis

- 1. _____
- 2. _____
- 3. _____

Quarter 4

Unit 5: Reproduction

- 1. _____
- 2. _____
- 3. _____

Unit 6: Biotechnology

- 1. _____
- 2. _____
- 3. _____

Definition

Unit 7: Genetics

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

Unit 8: Evolution

- 1. _____
- 2. _____
- 3. _____

Unit 9: Ecology

- 1. _____
- 2. _____
- 3. _____

