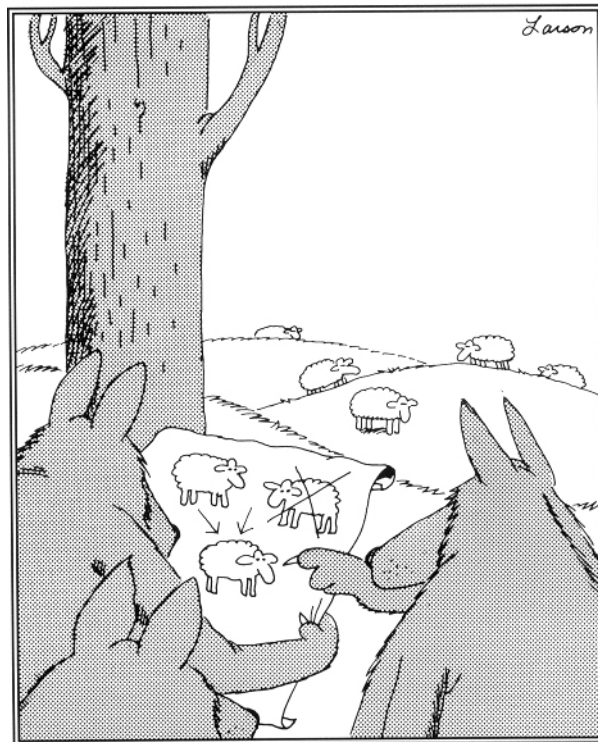


Name \_\_\_\_\_

**BIOL 103 – Exam 1 – Fall 2008**



Natural selection at work

**Please do not start until you have been asked to do so.**

**If you have any uncertainty regarding what the question is asking for, please consult the instructor.**

1. (4 pts) How many people are there on earth? \_\_\_\_\_

2. (4 pts) How old is the earth? \_\_\_\_\_

3. (4 pts) When did the last ice age end? \_\_\_\_\_

4. (8 pts) The Dutch botanist Jan Baptista van Helmont described the following experiment that he conducted in the early 17<sup>th</sup> century.

“I took an earthen vessel, in which I put 200 pounds of earth that had dried in a furnace, which I moistened with rainwater, and I implanted therein the trunk or stem of a willow tree, weighing five pounds. And at length, five years being finished, the tree spring from thence did weigh 169 pounds and about three ounces. ... Lest the dust that flew about should be mingled with the earth, I covered the lip or mouth of the vessel with an iron plate covered with tin and easily passable with many holes. ... I again dried the earth up in the vessel, and there was found the same 200 pounds, wanting about two ounces. Therefore, 164 pounds of wood, bark, and roots, arose out of water only.”

a) What hypothesis was van Helmont’s experiment designed to test?

b) What prediction does this hypothesis make?

5. (8 pts) Your instructor has just submitted a paper to the *Journal of North American Fisheries Management* describing genetic differences between cutthroat trout populations in Montana. What process must the paper undergo to be published? Describe the steps the editor of the journal uses to decide whether to publish the paper. What is the name of this decision process?

6. (6 pts) Describe the structure of cellulose, protein, and DNA molecules (one sentence each).

7. (4 pts) How do organisms store the information needed to construct a protein?

8. (12 pts) Name the four substances listed below, and then use these chemical compounds to complete the chemical equations for respiration and photosynthesis.

CO<sub>2</sub> \_\_\_\_\_

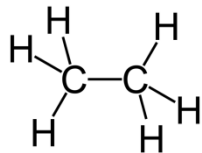
O<sub>2</sub> \_\_\_\_\_

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> \_\_\_\_\_

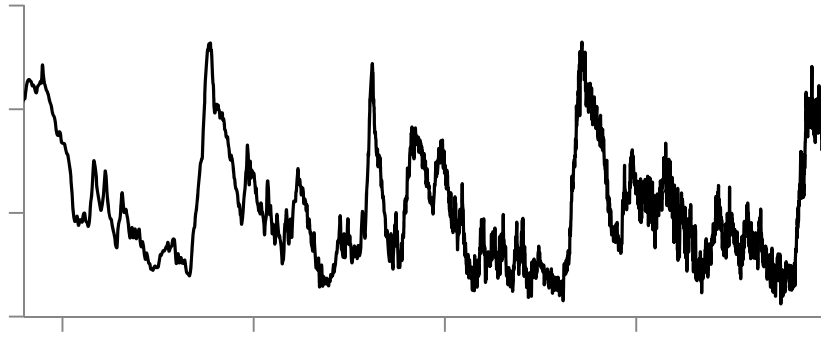
H<sub>2</sub>O \_\_\_\_\_

Respiration \_\_\_\_\_ + \_\_\_\_\_ → \_\_\_\_\_ + \_\_\_\_\_

Photosynthesis \_\_\_\_\_ + \_\_\_\_\_ → \_\_\_\_\_ + \_\_\_\_\_



9. (6 pts) Ethane (left) is colorless, odorless gas, and the second largest component of natural gas. When it burns, it combines with oxygen to produce carbon dioxide and water. Write out a balanced chemical formula for this reaction.



10. (8 pts) Label the axes on the graph above (4 pts). How were the data collected?

11. (8 pts) The shape of the coastlines of Africa and South America suggest that these two continents were joined in the distant past and have drifted apart. Describe two pieces of evidence (aside from their shape) that this has happened.

12. (8 pts) Describe an ecological lesson illustrated by the history of rabbits in Australia (1 sentence). **Do not derive a lesson that tells people what they should or should not do.** Explain why the history of rabbits in Australia supports your lesson (1-3 sentences)

13. (6 pts) The population of the United States is approximately 300 million and growing 1% per year. If this continues for the rest of my four-year-old daughter's life, how many people will there be in the United States when she is an old woman? Explain your assumptions and reasoning.

14. (6 pts) Dick is 32 years old and would like to retire when he is 60. He is considering two possible investments: a stock portfolio which hopefully will increase in value 10% per year and his company' pension plan which is guaranteed to increase in value by 5% per year. Dick has \$10,000. How much more would the stock portfolio be worth compared to the pension plan when he retires?

15. (8 pts) According to the textbook, what is the "Lesson of Easter Island?"