Scientific Inquiry Study Guide

* To be filled out while you view the lecture and read the assigned text

1. What is the smallest unit of life that can exist on its own?
2. Ecology is the study of \_\_\_\_\_\_\_\_\_.
3. What are some things we can do with what can be learned by studying biology? (i.e. what can we do with information learned about where an organism lives and how it interacts with the world around it?)
4. Scientists seek to categorize the world. Can you think of reasons why this may be important in a biological context?
5. Science is limited to that which is observable. Can you explain why this is important?
6. A hypothesis is a \_\_\_\_\_\_\_\_\_\_ statement that answers your question, short and to the point.
7. Explain in your own words the difference between a hypothesis and a theory.
8. In what form should your prediction statement always be phrased in?
9. For the following components of an experiment, define each in your own words.
   1. Dependent Variable
   2. Independent Variable
   3. Controlled Variables
   4. Control Group
   5. Experiment Group
10. Why is it so important to create an experiment that is repeatable?
11. What role do positive and negative controls have in an experiment?

**Test Your Understanding:**

You are a scientist working for large pharmaceutical company and you believe that you have invented a new drug that is more effective at controlling blood pressure in individuals that suffer from high blood pressure. The question you are tasked with answering is:

**“Does the new drug control high blood pressure better than the current industry standard?”**

* 1. Based on this question, develop an appropriate hypothesis.
  2. What is an appropriate prediction statement?
  3. Based on the prediction statement you developed, can you identify your dependent variable:
  4. Independent variable?
  5. Now think about controls. In this example, there are a number of potential controls, both positive and negative. For the positive control, we are looking for an independent variable that, when administered to our test subjects will definitively lower blood pressure. Can you think of what that would be?
  6. How about the negative control? Can you think of an independent variable that would definitely have no effect on blood pressure?
  7. Based on the hypothetical data presented in the lecture slides, what conclusions can be drawn for the data? What are some questions that the data set brings to mind?

**Terms to master from the text:**

(These may show up on exams or in associated activities for this section)

atom experiment scientific theory

molecule ecosystem variable

cell homeostasis prediction

tissues community species

organs control group biosphere

organ systems experimental group observation

reproduction multi-celled organism critical thinking

population hypothesis control