



Name: _____

Date: _____

Nazareth Academy High School: Summer Assignment

Define the following terms:

1. Data: _____
2. Independent variable: _____
3. Dependent variable: _____
4. Scientific method: _____

Short Answer:

1. List the steps to the scientific method. _____

2. How is a theory different from a hypothesis? _____

3. Give two examples of quantitative data. _____

4. Give two examples of qualitative data. _____

5. How many variables should an experiment test at a time? Explain your answer. _____

6. Why is it important that scientists communicate and report their findings? _____

7. A drug company is testing the effectiveness of a new blood pressure medicine using rats as the test subjects.

a) Describe the experimental group: _____

b) Describe the control group: _____

c) What is the independent variable? _____

d) What is the dependent variable? _____

e) What are some possible factors that must remain constant during the testing? _____

f) What is the ONE factor that will be different between the experimental group and the control group?

8. What is meant by the term "controlled experiment"? _____

9. Why must experiments be repeated many times? _____

Fill in the blanks:

1. The part of the experiment in which the experimental factor has been removed is referred to as the _____.

2. The group that shows the effect of the variable being tested is called the _____.

3. Over time, a hypothesis that is supported by many experiments and much data becomes a _____.

4. The purpose of an experiment is to gather data to determine if the _____ is supported or not supported.

Read each statement and determine if the statement is true or false. If the statement is false, correct the underlined word to make the statement true.

- _____ 1. A biologist who is measuring the length of salmon as they travel upstream is collecting qualitative data.
- _____ 2. An experiment is a procedure that tests a hypothesis by providing data and observations under controlled conditions.
- _____ 3. In scientific investigations, experimenting usually comes before hypothesizing.
- _____ 4. In an experiment, the control group is used to test the effect of the independent variable.
- _____ 5. Science begins with an observation.

Multiple Choice:

- _____ 1. Which of the following would be done last if one is following the scientific method?
(a) forming a hypothesis (b) observing a problem (c) performing an experiment
(d) reporting the results.
- _____ 2. A hypothesis:
(a) can be tested (b) is a prediction about the expected outcome of an experiment
(c) must be stated in a form that can be either proven or disproven (d) all of the above are true.
- _____ 3. The factors in an experiment that can be changed are called:
(a) variables (b) data (c) the hypothesis (d) the control.

Identify the independent variable and the dependent variable in each of the following hypotheses:

1. The process of photosynthesis requires a source of carbon dioxide.

HYPOTHESIS: Increasing the concentration of carbon dioxide available to aquatic plants will increase the rate of photosynthesis, as measured by the number of oxygen bubbles produced.

Independent variable: _____

Dependent variable: _____

2. Cell membranes are fragile and can easily be damaged by various substances.

HYPOTHESIS: When testing the effect of different alcohols on the cell membrane of red beet cells, the damage to the membrane can be measured by the amount of red dye released into the solution.

Independent variable: _____

Dependent variable: _____

3. Water is the solvent of life, meaning that many substances can easily dissolve in it.

HYPOTHESIS: Increasing the temperature of a salt water solution will result in a greater amount of salt being dissolved in the solution.

Independent variable: _____

Dependent variable: _____

4. Transpiration is the loss of water from the leaves of plants. The stomata of leaves must open to allow carbon dioxide to enter the leaf for photosynthesis, but when they are open, water vapor escapes into the atmosphere.

HYPOTHESIS: As the intensity of light is increased, the rate of transpiration will increase, as measured in by the loss of mass of the plant.

Independent variable: _____

Dependent variable: _____

5. A catalyst is a substance used to increase the rate of a chemical reaction. Two catalysts are tested to see which will most effectively increase the rate of hydrogen peroxide decomposition. Hydrogen peroxide decomposes into water and oxygen.

HYPOTHESIS: Catalyst A will increase the rate of reaction faster than Catalyst B.

Independent variable: _____

Dependent variable: _____

6. Enzymes are biological catalysts. Enzymes are proteins that are found inside cells to increase the rate of chemical reactions within each cell. Enzymes are denatured (destroyed) by various environmental conditions. Amylase is an enzyme in the digestive system that helps to break down complex carbohydrates into simple sugars.

HYPOTHESIS: Amylase works best in an environment with a pH level of 7.

Independent variable: _____

Dependent variable: _____