Science 9

Scientific Method I

Name:
Date:
Block:

What is science?
Science is a way of studying the natural world through a structure of questioning and experimenting. It is not static, meaning that as new facts and studies arise, our understanding of the world begins to change.

The Scientific Method

The steps to the scientific method are as follows:

What is a **hypothesis**?

A hypothesis is an ____________________ ______________________ about how things work. It makes a ____________________ about an ____________________ and attempts to answer a question.

E.g.:

What is a **conclusion**?

A conclusion is a summary of the ____________________. It will *either* ____________________ or ____________________ the ____________________.

Types of Data

Qualitative:

Qualitative data is used to describe ____________________.

E.g.:

Quantitative:

Quantitative data is used to describe the ____________________ (the ______________) of something.

E.g.:

Types of Variables

E.g.: Two brands of paper towels are compared to see which one holds the most liquid. 50 mL of water is placed into two beakers. One paper towel from the brand, Cleans-a-Lot, is placed into Beaker 1 while one paper towel from another brand, Good-at-Cleaning, is placed into Beaker 2. When the paper towels are removed from the two beakers, it was discovered that Beaker 1 contained 15 mL of water while Beaker 2 contained 5 mL of water.

Independent:

An independent variable is ____________________ ____________________ by the experimenter.

E.g.:

Dependent:

A dependent variable changes with ____________________ to the ____________________ ____________________.

E.g.:

Controlled:

A controlled variable ____________________ ____________________ within the ____________________. These variables are quantities that the experimenter wants to ____________________ ____________________.

E.g.:

Practice:

1. Rebecca notices that some of the plants in her garden are growing very quickly, whereas the same plants in other parts of her garden are not. After doing some research, she discovers that the plant that she has in her garden need a certain amount of sunlight everyday to grow well. She decides to conduct an experiment. She grew five of the same plants and exposed them to sunlight for a specified period of time. After 6 weeks, she measures out the height of her plants. Here are her results:

Plant #	Amount of time exposed to light	Final height
1	20 min	3.0 cm
2	40 min	6.0 cm
3	60 min	14.0 cm
4	80 min	18.0 cm
5	100 min	29.0 cm

Based off of Rebecca's experiment and results, answer the following questions:

a. What was the independent variable?

b. What was the dependent variable?

c. List 3 controlled variables in Rebecca's experiment.

d. Write a hypothesis that would fit into Rebecca's experimental setup.

e. Write a proposed conclusion Rebecca could make for her experiment.

2. Outline how you would plan out an experiment using the Scientific Method to test out how much water an individual should be drinking every day in order for a person to feel more awake during the day.

3. Chelsey wants to know why sea water freezes at a lower temperature than fresh water. She goes to the library and conducts some research about the properties and composition of fresh water and sea water. She goes back home and takes out a notebook and writes "If sea water has salt in it, then it will freeze at a lower temperature than regular fresh water." Chelsey then goes to her lab and does the following:
    a. Fills 2 beakers with water.
    b. Dissolves 20g of salt into one beaker.
    c. Places both beakers into the freezer at -1.5℃ for 2.0 hours.

   Chelsey takes out both the beakers at the same time and notes that the beaker containing salt water is a liquid and the beaker that has no salt in it has frozen.
    a. Which statement would be the hypothesis?

    b. What conclusion could Chelsey make based on her observations?

    c. What is the independent variable in this experiment?

    d. What is the dependent variable in this experiment?

    e. What are 2 controls in this experiment?