

Experimental Design Worksheet
Scientific Method

Name _____

Date _____

Definitions: Define the following words and concepts related to the scientific method.

1. Hypothesis: _____

2. Independent Variable: _____

3. Dependent Variable: _____

4. Control Group: _____

5. Experimental Groups: _____

6. Constants: _____

7. Trials: _____

8. Variables (use a dictionary if necessary): _____

Practice: Write a hypothesis for each of the statements and identify the variables, control group, and experimental group.

1. Cigarette smoking increases the risk of lung cancer.

Hypothesis: If _____, then _____

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

2. Eating breakfast increases performance in school.

Hypothesis: If _____, then _____

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

3. Hummingbirds are attracted to the color red.

Hypothesis: If _____, then _____

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

4. Bats locate food using sound waves.

Hypothesis: If _____, then _____

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

5. iBook batteries last for 5 hours.

Hypothesis: If _____, then _____

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

Situations: Read the situation below and design an experiment.

John Smith has been hired by the city of Virginia Beach to investigate the recent shark attacks off the resort's coast. He has a budget of \$40,000, a 25 foot boat, and three graduate student assistants to help him. A helicopter has also been donated by a local television station, should he need one.

* * *

1. List 2 hypotheses John and his crew may have come up with for the recent shark attacks.
 - a. If _____, then _____
 - b. If _____, then _____
2. What materials will John need to perform this experiment (How will they spend the \$40,000?).

3. Where should they perform the experiment (Hint: Where do sharks like to live)? _____
4. Pick one of the two hypotheses and determine the following:
 - a. Control Group: _____
 - b. Experimental Group: _____
 - c. Dependent Variable: _____
 - d. Independent Variable: _____
5. What type of data do you think John will collect (What will be the results of the experiment)?

6. What conclusions will John be able to make from the results of the experiment?

In the statements below, write the hypothesis, variable, control groups and experimental groups.

1. Plants grow best in white light.

Hypothesis: If _____, then _____

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

2. The deer population decreases in the winter due to the lack of food.

Hypothesis: If _____, then _____

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

3. Students who study perform better in school.

Hypothesis: If _____, then _____

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

Read the following situation and answer the following questions.

Suzie Q wants to know the effect of different colors of light on the growth of plants. She believes that plants can survive best in white light. She buys 5 ferns of the same species, which are all approximately the same age and height. She places one in white light, one in blue light, one in green light, one in red light and one in the closet. All of the ferns are planted in Miracle-Grow and given 20 mL of water once a day for 2 weeks. After the two weeks, Suzie observes the plants and makes measurements.

Hypothesis: If _____, then _____

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

Constants: _____

What types of measurements can Suzie make on the plants to determine how they did in different types of light? _____