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. Trials:
_____

7. 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?_____

Scientific Method Period _____ Date_____

Identifying Independent and Dependent Variables, and Study Designs

Additional Practice Problems

Instructions: For each research description below, identify the independent variable, the dependent variable, and the type of study (lab experiment, naturalistic observation, survey, or case study). Answers are on the last page.

1. A researcher hypothesizes that blondes really do have more fun. To test this hypothesis, she interviews a natural brunette who has recently become a blonde to determine if there is any change in the amount of fun she has.

   Independent variable: _____

   Dependent variable: _____

   Type of study: _____

2. A developmental psychologist is testing the hypothesis that children in first grade know more words in the English language than children in Kindergarten. To test this, she sits in on two classes (one first grade, the other Kindergarten) and counts the average number of words children in each class speak. She then compares the counts.

   Independent variable: _____

   Dependent variable: _____

   Type of study: _____

3. A clinical psychologist hypothesizes that people who have been diagnosed as having major depression will be more likely to also be diagnosed with an anxiety disorder than will people who have not been diagnosed with major depression. To test this, he gives a survey to 100 people being treated for depression and 100 people with no known mental disorder. The survey asks them to report whether or not they have been diagnosed as having an anxiety disorder.

   Independent variable: _____

   Dependent variable: _____

   Type of study: _____

4. A pharmacologist is testing whether a new anti-anxiety medication, Moodcor, will cause people to gain weight. To test this, she gives 100 people Moodcor for one month and 100 people a placebo drug. At the end of the month, she monitors any weight gain.

   Independent variable: _____

   Dependent variable: _____

Type of study: _____

5. A developmental psychologist believes that if children successfully lie to their friends, they will be more likely to try lying to their parents. To test this hypothesis, he asks 50 children to report how many times in the last month they have lied to their friends, and whether they were successful. He then asks them how many times they have lied to their parents.

   Independent variable: _____

   Dependent variable: _____

   Type of study: _____

6. A personality psychologist believes that people who are more aggressive are more likely to purchase sports coupes than people who are less aggressive. To test this, he visits local car dealerships and asks car shoppers to complete an aggression survey. Then, he observes what types of cars they purchase (sports coupe, sedan, SUV, or pickup).

   Independent variable: _____

   Dependent variable: _____

   Type of study: _____

7. A clinical psychologist hypothesizes that listening to an inspirational tape will lead one to be in a better mood. To test this, she has 50 people listen to an hour-long inspirational tape. Another 50 listen to white noise for an hour. She then has them rate their mood on a 10-point scale.

   Independent variable: _____

   Dependent variable: _____

   Type of study: _____

8. A clinical psychologist is testing his theory that people who experienced a brain injury are developmentally delayed to the age at which they experienced the injury (for instance, if one has a brain injury at the age of 10, that person will always act like they are 10). To test this, he conducts developmental interviews with two people who experienced a brain injury at two different ages (one was 3 and one was 20).

   Independent variable: _____

   Dependent variable: _____

   Type of study: _____