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

1. Hypothesis: _Proposed explanations to a problem based on observation or research_________

2. Independent Variable: _The variable the scientist controls/manipulates; known as the experimental variable or manipulated variable._

3. Dependent Variable: The response to the change in the independent variable; the measurements collected in the experiment.

4. Control Group: the group that does not change variables; does not receive the independent variable; it is the standard of comparison for the experimental group____

5. Experimental Groups: the group exposed to the independent variable; the test group___

6. Constants: variables that are not changed in the control group and experimental group; they remain the same in both groups.__

7. Trials: each time an experiment is run __________________

8. Variables (use a dictionary if necessary): traits that can be changed in the experiment__

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 If you smoke cigarettes_, then _your chances of getting cancer increases_ __

Independent Variable: smoking cigarettes_______Dependent Variable: whether you get cancer

Control Group: people who do not smoke Experimental Group: smokers____

2. Eating breakfast increases performance in school.

Hypothesis: If If you eat breakfast______, then you will get better grades__

Independent Variable: breakfast_________________________ Dependent Variable: grades_________________________

Control Group: students who do not eat breakfast_ Experimental Group: students who eat breakfast
3. Hummingbirds are attracted to the color red.

Hypothesis: If a bird feeder is red________, then it will attract hummingbirds__

Independent Variable: color of feeder Dependent Variable: hummingbirds present

Control Group: feeder that is not red________ Experimental Group: feeder that is red ______

4. Bats locate food using sound waves.

Hypothesis: If bats hear a sound____________, then they will be attracted to it ______

Independent Variable: sound waves_________ Dependent Variable: number of bats________

Control Group: no sound_______________ Experimental Group: sound _______________

5. iBook batteries last for 5 hours.

Hypothesis: If you use iBook batteries______, then your iBook will run for 5 years __

Independent Variable: battery type_________ Dependent Variable: time plays_________

Control Group: different type of battery_____Experimental Group:iBook battery ______

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.

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1. List 2 hypotheses John and his crew may have come up with for the recent shark attacks.

   a. If swimmers wear bright colored swimming suits________, then sharks will attack________________________

   b. If____________________________________, then ______________________________________

2. What materials will John need to perform this experiment (How will they spend the $40,000?). ___manikins, bright swim suits and dark swim suits, floating devices;_______________________________________________________________________________________

3. Where should they perform the experiment (Hint: Where do sharks like to live)? beaches_______

4. Pick one of the two hypotheses and determine the following:

   a. Control Group: dark swim suits _____________________________

   b. Experimental Group: colorful swim suits___________________

   c. Dependent Variable: number of shark attacks________________
d. Independent Variable: color of swim suit____________________

5. What type of data do you think John will collect (What will be the results of the experiment?)? 
___number of shark attacks_____________________________________________

6. What conclusions will John be able to make from the results of the experiment? ____Whether wearing bright, colorful swim suits increases the number of shark attacks_____________________________________

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

1. Plants grow best in white light.

Hypothesis: If plants are grown in white light______, then they will grow taller __

Independent Variable: type of light_________Dependent Variable: height of plant __

Control Group: plants in different colors of light_ Experimental Group: plants in white light__

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

Hypothesis: If there is a lack of food______, then the deer population will decrease_____

Independent Variable: amount of food_______Dependent Variable: number of deer____

Control Group: plenty of food______________Experimental Group: lack of food____

3. Students who study perform better in school.

Hypothesis: If a student studies___________, then he/she will get good grades__________

Independent Variable: studying ______________Dependent Variable: grades __

Control Group: not studying_________________Experimental Group: studying_______

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 plants are grown in white light______, then they will grow taller________________________

Independent Variable: type of light_________Dependent Variable: height of plant__________

Control Group: plant in closet_______________Experimental Group: plants in different colors of light_______

Constants: same species of plant, same age and height, plant food, amount of water, time period_______

What types of measurements can Suzie make on the plants to determine how they did in different types of light? measure growth in height and width________________