Science 7/8
Unit: Scientific Method

Name_____
Period_____
Mail Box ____

Scientific Method Practice

Directions: Read the experiments below and answer the questions that follow.

Squidward loves playing his clarinet and believes it attracts more jellyfish than any other instrument he has played. In order to test his hypothesis, Squidward played a song on his clarinet for a total of 5 minutes and counted the number of jellyfish he saw in his front yard. He repeated the experiment using a flute and a guitar. He also recorded the number of jellyfish he observed when he was not playing an instrument. The results are shown in the table below:

Trial	No Music	Clarinet	Flute	Guitar
1	5	15	7	12
2	3	16	6	12
3	2	14	5	13

1. What is Squidward's hypothesis? _____

2. Independent variable? _____

3. Dependent variable? _____

4. List three constants? _____

5. Does the data support his hypothesis? (What can he conclude?) Explain. _____

_____

Designing An Experiment

SpongeBob wants to test which paper towel is the most absorbent. He is going to test 5 different brands. He has a hunch that the "Soaky" brand might be the most absorbent because it has more fibers per square centimeter (cm) than the other brands.

1. State a hypothesis: _____

_____

2. Independent variable? _____

3. Dependent variable? _____

SpongeBob decides to put each brand of paper towel in a different liquid- one in water, one in vinegar, one in apple juice, one in orange juice, and one in syrup.

4. Is this a properly designed experiment? _____ Why or why not?_____

_____

5. List three constants._____ _____

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Variables Skills Check

Directions: For the following problems, I have listed factors from the experiment. Label whether each factor is a constant *(many)*, a control *(one)*, an independent variable (IV) *(one)*, or a dependent variable (DV) *(one)*.

Example 1 Mrs. Gunther wanted to improve her vertical jump. She had been measuring the height of her vertical jump while wearing her brand new Adidas cross trainers. She was wondering if she also bought the new Nike shoes with the shocks if it would be able to increase her vertical jumping height. She decided to go and buy a brand new pair of the Nike shoes with shocks. She had Ms. Wolf measure her vertical jump while she was wearing the new Adidas cross trainers. Then she had Ms. Wolf measure her vertical jump while she was wearing the new Nike shoes with shocks to see in which shoe she could jump the highest. Each time she jumped from the same exact spot.

A. Height of the vertical jump	**D. Ms. Wolf (is measuring)**
B. New Adidas cross trainers	**E. New Nike shoes with shocks**
C. Mrs. Gunther (she is jumping)	**F. Spot where Gunther jumps from**

Example 2 Mr. Gallo bought a brand new "Roadscreecher" tricycle. He has been having problems with the stopping distance of the original tires on the trike when he takes his feet off of the pedals even though they are brand new. Mr. Gallo decides to try some new "Roadhandler" tires on his ride to see if they would improve his stopping distance. Mr. Gallo then asked Mr. Conklin to measure the stopping distance of the "Roadscreecher" with the original tires as he drove the trike around a complete lap of the New Paltz High School track and then took his feet off the pedals. Then they changed the original tires to the new "Roadhandler" tires, and again Mr. Gallo was the driver. He did a complete lap of the New Paltz High School track and then took his feet off the pedals. Mr. Conklin then measures the stopping distance with the new tires.

A. Trike with original tires	**D. Stopping distance of the tires**
B. Tricycle itself	**E.New "Roadhandler" tires**
C. Mr. Gallo (the driver)	**F. Mr. Conklin (the measurer)**

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Scientific Method Simpson Worksheet

1. Smithers thinks that a special juice will increase the productivity of workers. He creates two groups of 50 workers each and assigns each group the same task -in this case, they're supposed to staple a set of papers. Group A is given the special juice to drink while they work. Group B is not given the special juice. After an hour, Smithers counts how many stacks of paper each group has made. Group A made 1,587 stacks and Group B made 2,113 stacks.

Identify the –

Control Group	Independent Variable
Dependent Variable	What should Smithers conclusion be?

2. Homer notices that his shower is covered in a strange green slime. His friend Barney tells him that coconut juice will get rid of the green slime. Homer decides to check this out by spraying half of the shower with coconut juice. He sprays the other half of the shower with water. After 3 days of "treatment" there is no change in the appearance of the green slime on either side of the shower.

Identify the

What was the initial observation?	Control Group
Independent variable	Dependent variable
What should Homer's conclusion be?	

3. Bart believes that mice exposed to microwaves will become extra strong – maybe he's been reading too much Radioactive Man. He decides to perform this experiment by placing 10 mice in the microwave for 10 seconds. He compared these 10 mice to another 10 mice that have not been exposed to radiation. His test consisted of a heavy block of wood that blocked the mouse food. He found that 8 out of 10 of the microwaved mice were able to push the block away. Seven out of 10 of the non- microwaved mice were able to do the same thing.

Identify the

Control Group	Independent Variable
Dependent Variable	What should Bart's conclusion be?
How could Bart's experiment be improved?	

4. Krusty was told that a certain itching powder was the newest best thing on the market. The itching powder claims to cause 50% longer lasting itches. Interested in this product, he buys the itching powder and compares it to his usual product. Test Subject A is sprinkled with the original itching powder and another Test Subject B was sprinkled with the experimental powder. Subject A reported having itches for 30 minutes and Subject B reported having itches for 45 minutes.

Identify the

Control Group	Independent Variable
Dependent Variable	What should Krusty's conclusion be?
Explain whether the data supports the advertisement claims about its product?	

5. Lisa is working on a science project. Her task is to answer the question –Does Happy Hair (which is a commercial hair product) affect the speed of hair growth?" Her family is willing to volunteer for the experiment.

Control Group	Experimental Group
Independent Variable	Dependent Variable
Data to be collected?	

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"Famous Examples of the Scientific Method"

Introduction:

The scientific method is not a new idea; it has been used by generations of scientists. This activity will introduce you to some of the most famous scientific experiments and discoveries – ones that continue to influence our lives even today! See if you identify the different parts of the scientific method and experimental design in each.

The Strange Case of BeriBeri

In 1887 a strange nerve disease attacked the people in the Dutch East Indies. The disease was called "beriberi". Symptoms of the disease included weakness and loss of appetite, victims often died of heart failure.

Experiment #1

Scientist thought the disease might be caused by bacteria. They injected chickens with blood from patients with the beriberi disease. The injected chickens became sick. However, so did the other group of chickens that were not injected with bacteria.

1. What was the initial hypothesis in this example?

2. A hypothesis is always based on prior knowledge, research and observations. What do you think scientists based this hypothesis on?

3. What is the independent variable in this case? _____

4. What is the dependent variable in this case?_____

5. What was the experimental group? _____

6. What was the control group?_____

7. Why is it important to have a control group?

8. Would this first experiment be considered a failure? Explain why or why not.

Experiment #2

One of the scientists studying Beriberi was named Dr. Eijkman. He realized that before the experiment, all the chicken had eaten whole grain rice, but during the experiment, the chickens were fed only polished rice. Dr. Eijkman researched this further by testing two new groups of chickens. One group was fed the polished rice, the other group was fed the

whole- grain rice. Only the polished rice chickens got the illness. As a result, he believed that the polished rice was missing a nutrient needed to prevent the disease.

1. What observation did Dr. Eijkman make during the first Beriberi experiment?

2. What is the independent variable in this case? _____

3. What is the dependent variable in this case? _____

4. What was the experimental group? _____

5. What was the control group?_____

6. Explain what Dr. Eijkman would need to do next in order to share his discovery with other scientists and have his conclusions be considered valid.

The Discovery of Penicillin

In 1928, Sir Alexander Fleming was studying Staphylococcus bacteria growing in culture dishes. He noticed that a type of mold called Penicillium was also growing in some of the dishes. A clear area existed around the mold because all the bacteria that had grown in this area died.

Experiment #3

Fleming thought that the mold must be producing a chemical that killed the bacteria. He decided to isolate this substance and test it to see if it would kill bacteria. Fleming transferred the mold to a liquid broth solution. This solution contained all the material the mold needed to grow. After the mold grew, he removed it. He then grew two identical groups of bacteria. He then took the mold infused broth and added it to the groups of bacteria. Those bacteria died. Fleming then added a liquid broth that did not contain mold to the second group of bacteria. This group survived.

1. What is the independent variable in this case? _____

2. What is the dependent variable in this case? _____

3. What was the experimental group? _____

4. What was the control group?_____

5. When an experiment is designed, all variable between the experimental and control must be held constant. List three constants below.