Testable or Not **HW 1 HOMEWORK-NAME_____**

For each question, circle whether it is based on an opinion (O), can be found through research alone (R), is too broad to test (B), or is a good, testable question, (**T**).

1. O R B **T** Are there different numbers of seeds in Washington Delicious, Jonathan, and Granny Smith apples?
2. O R B **T** What types of apples grow in Missouri?
3. O R B **T** Why do people smoke?
4. O R B **T** Does talking to a plant affect its growth?
5. O R B **T** Where are whales found in the world?
6. O R B **T** What happens if you do not eat breakfast?
7. O R B **T** Which planet is the most interesting to study?
8. O R B **T** Which of the following objects are attracted by a magnet: paperclip, penny, foil, or pencil?
9. O R B **T** Will larger or smaller seeds germinate faster?
10. O R B **T** Do larger or smaller seeds make prettier flowers?
11. O R B **T** Do flying saucers really exist?
12. O R B **T** Which pill design – tablet, caplet, or capsule dissolve faster?
13. O R B **T** Does the color of a surface affect its temperature?
14. O R B **T** Why does doing homework help your grades?
15. O R B **T** How does the size of a helicopter's blade length affect the speed and number of rotations?
16. O R B **T** How does the temperature of a classroom affect student performance?

Use the following ideas for investigations (scientific experiments).

1.) Underline what the scientist is changing

2.) Circle what the scientist is measuring.

3.) Then, **write a clear testable question**.

You want to figure out if girls or boys read more books per year.

_____

_____

You want to know if different colored candles burn for different lengths of time.

_____

_____

You want to know if Kellogg's Raisin Bran has more raisins than generic cereal.

_____

_____

You want to know if salt will affect the melting speed on ice.

_____

_____

You want to know if different amounts of plant food will affect the number of stems on a daisy plant.

_____

_____

You want to know if the temperature of the room will make kids more lethargic (tired).

_____

_____

Hypothesis Writing Practice HOMEWORK-NAME_____

For each of the following questions, write a reasonable hypothesis using the correct format. Format- **If (put the IV with your opinion), then (put the DV with your opinion.)**

1. How will batting practice affect a player's batting average?

_____

_____

2. How does the depth of a lake affect its temperature?

_____

_____

3. How does advertising affect the number of people who show up for a basketball game?

_____

_____

4. How does the size of a paper towel affect the amount of water it can hold?

_____

_____

5. Does fertilizer affect the growth of a plant?

_____

_____

6. How does the shape of a container affect how quickly water will evaporate from it?

_____

_____

7. How does the amount of acorns affect the number of deer in an area?

_____

_____

Choose a Variable **HOMEWORK-NAME_____**

Independent Variable Practice

For each of the following situations, think of at least three possible variables – conditions that can change or be changed (independent variables). Then choose one variable to write a testable question about.

Example

1) What variables can affect the number of fish in a lake?

1. _____, 2. _____

3. _____ - now circle 1 and write a…

…Testable question: _____

_____

2) What variables can affect the speed of a runner?

1. _____, 2. _____

3. _____ - now circle 1 and write a…

…Testable question: _____

_____

3) What variables can affect attendance at a baseball game?

1. _____, 2. _____

3. _____ - now circle 1 and write a…

…Testable question: _____

_____

4) What variables can affect the amount of fruit an apple tree produces?

1. _____, 2. _____

3. _____ - now circle 1 and write a…

…Testable question: _____

_____

5) What variables can affect student performance on a math test?

1. _____, 2. _____

3. _____ - now circle 1 and write a…

…Testable question: _____

_____

Practice Identifying Variables- HOMEWORK-NAME_____

For each of the following situations, identify a possible independent and dependent variable.

1. A study was done to find if different tire treads affect the braking distance of a car.
   Independent variable: _____
   Dependent variable: _____

2. A study was attempted to see if the length of the string in a string telephone affected the clarity of the sound.
   Independent variable: _____
   Dependent variable: _____

3. A study was conducted to see if bean plants sprouted faster in sandy, rocky, or humus soil.
   Independent variable: _____
   Dependent variable: _____

4. A mouse was put into a maze and had to finds its way out as quickly as possible. Cheese was put in the exit for one try. Nothing was put in the exit for the other try.
   Independent variable: _____
   Dependent variable: _____

Name that Graph- HOMEWORK-NAME_____

For each of the following situations, circle which type of graph should be used.

1. The growth of a plant in centimeters over a one month period.

bar graph line graph

2. For each grade level at Zalma Elementary there are different numbers of students.

bar graph line graph

3. Types of favorite lunches for Zalma fifth graders.

bar graph line graph

4. The rise and fall of gas prices in a month.

bar graph line graph

5. One student's grades in science over the course of a school year.

bar graph line graph

6. Numbers of boys and girls in different elementary schools.

bar graph line graph

7. Current prices of five different kinds of sports cars.

bar graph line graph

8. How far the Layton family traveled each day during their two-week vacation.

bar graph line graph

9. The attendance of fifth graders during the entire year of 2005 and the entire year of 2006.

bar graph line graph

Graphing Practice- HOMEWORK-NAME_____

For each of the following situations, circle which type of graph should be used.

1. Your results show that at 8:00 a.m., the outdoor temperature was 61 º F, at 9:00 a.m., the temperature was 19 º C, at 10:00 a.m. it was 21 º C, at 11:00 a.m. it was 24 º C, and at 12:00 p.m. it was 27 º C.

bar graph *line graph*

2. Your data shows that at rest, Lucy's heart rate was 60 beats per minute (bpm). After 20 minutes of aerobic exercise, her heart rate was 155 bpm, and after a 10 mn. Cool down, her heart rate was 90 bpm.

bar graph *line graph*

3. Your results show that it took 3 mn for water to drain from a pot with only soil in it. It took 1 mn for water to drain from a pot with only rocks, and it took 2 mn for water to drain from a pot with only sand. (mn=minutes)

bar graph *line graph*

*For the next investigation, also create a **data table** to display the results.*

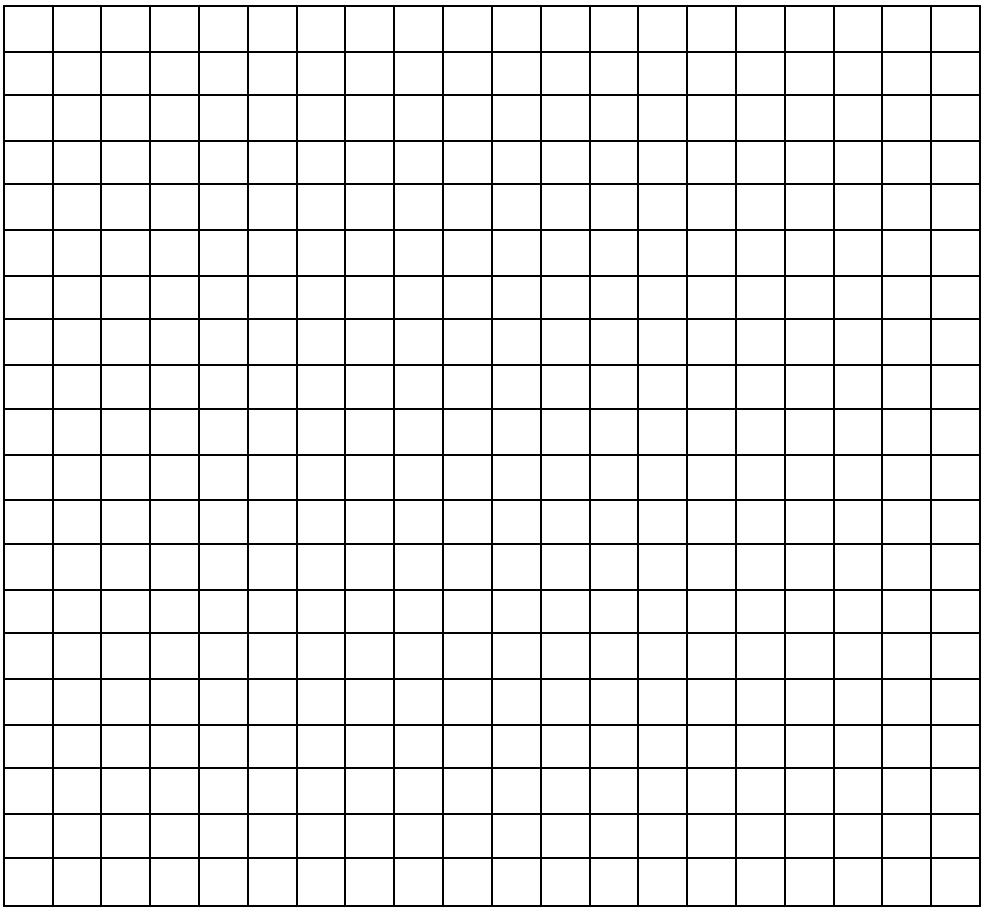
4. Your results show that Joy® dish soap made 18 cm of suds, Palmolive® soap made 13 cm of suds, and Best Choice® made 11 cm of suds.

bar graph *line graph*

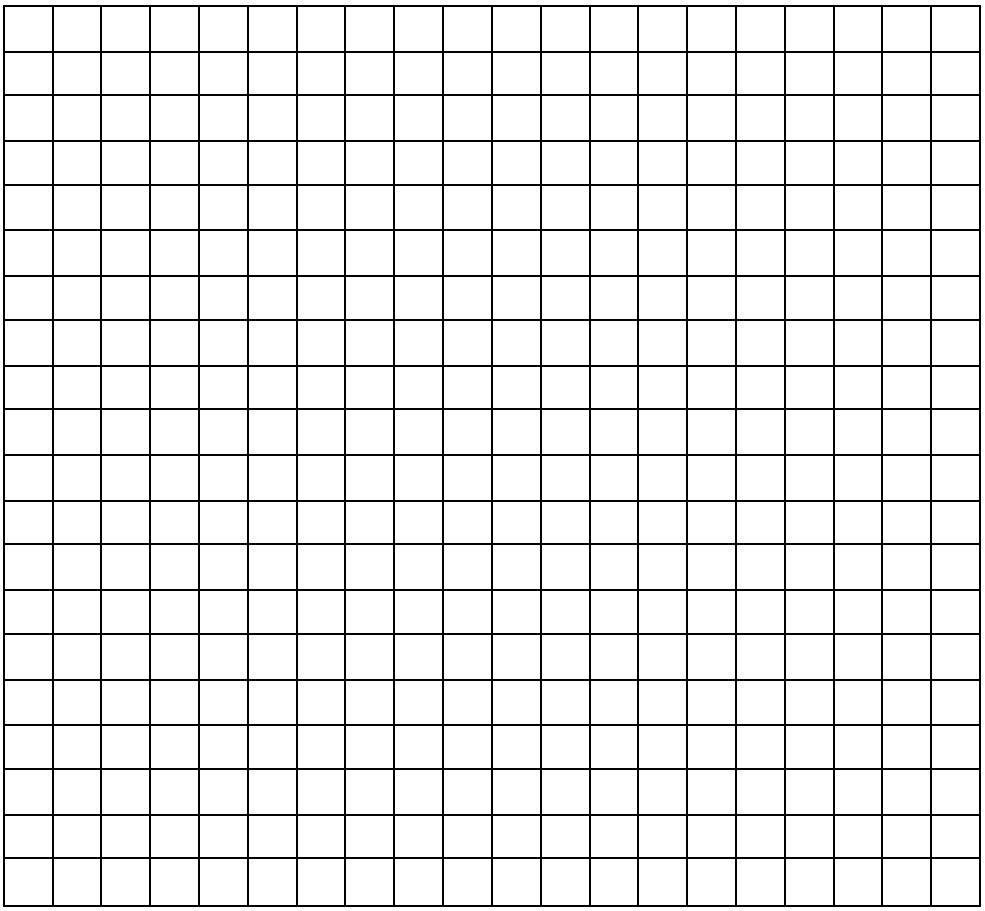
Data table:

Now, use the data from these investigations to create a graph displaying the results.

5. Your investigation reveals that out of ten packs of Sweetarts® candies there were 62 red, 40 purple, 30 blue, 28 green, 26 yellow, and 14 orange candies.



6. Your data shows that during the first week, a plant grew 2 cm. During the second week, it grew to 3 cm. During the third week, the plant grew to 5 cm, and during the fourth week, it grew to 6 cm.



Conclusion Practice- HOMEWORK-NAME_____

This is a table from an investigation that measured how much water three different paper towels can absorb. Write a conclusion and inference statement.

Hypothesis: If Brand A is used, then it will absorb the most water.

The effect of paper towel brand on the amount of water absorbed

Towel Brand	**Amount of water absorbed**			
	Trial 1	**Trial 2**	**Trial 3**	**Average**
A	25 ml	29 ml	27 ml	27 ml
B	26 ml	23 ml	22 ml	23.7 ml
C	18 ml	20 ml	23 ml	20. 3 ml

Conclusion statement:

(Did your results support your hypothesis? What did you think would happen? What *did* happen? Use your average numbers!)

_____

_____

_____

_____

_____

_____

_____

Inference statement:

(What happened? No numbers here – just a quick summary. Why do you think it happened that way?)

_____

_____

_____

_____

_____

_____

Scientific Method Study Guide

List the 6 steps of the scientific method, in order. Know the details of each step.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Be able to write a testable question, hypothesis, IV, DV, CC, Identify the Control Group if needed & conclusion.

Be able to construct a graph, either line or bar and find the average of the data.

Write a <u>definition</u> for the following terms, in your own words:

7. Independent variable _____

_____

8. Dependent variable _____

_____

9. Constant Conditions (variables)_____

_____

10. Control Group_____

_____

Notes

Many assignments were copied or adapted from teacher Mindy Semple's 2001 presentation: "Integrating the Scientific Method and the Science Fair."

The following assignments can be found in Science Fair Projects, published by Instructional Fair, Inc. in 1990.:

That's a Good Question!
What's the Problem?
Hypothesis – A Careful Guess
Results at a Glance

Scientific Method Test

You want to know if the amount of baking soda will affect how long it takes a lid to pop.

Question: _____

Hypothesis: _____

_____

Independent Variable: _____

Dependent Variable: _____

Constants: 1._____

2._____

3. _____

What would a control group be in this experiment? _____

_____

You want to know if more candy will equal higher test scores in 5th graders.

Question: _____

Hypothesis: _____

_____

Independent Variable: _____

Dependent Variable: _____

Constants: 1._____

2._____

3. _____

What would a control group be in this experiment? _____

_____

Write a procedure for the candy experiment. Include the materials you would need.

Materials:

Procedure: