



Nature of Science

Name _____



Towel Testing

Purpose: To practice the skills used to design experiments

Problem: Many brands of paper towels claim that they are the strongest. Research is needed to determine which brand of paper towel really is the strongest.

Background Information: Since paper towels are usually wet when they are being used, the "wet strength" of the towel is important. Wet strength is the strength of paper when it is wet. This can be measured by the amount of mass that a wet paper towel can hold.

The Task: To design an experimental investigation (a fair test) to test the strength of three different brands of paper towels. You will have these materials to conduct the experiment:

3 Brands of paper towels	1 Mason Jar	Water
Graduated cylinder	Pennies	Triple Beam Balance
Ruler		



Write your **LAB REPORT** on notebook paper.

Step 1: Identify the **INDEPENDENT VARIABLE**, the **DEPENDENT VARIABLE**, and all of the **CONTROLLED VARIABLES**

Step 2: Write a **RESEARCH QUESTION** using *affect* or *effect*.

Step 3: Write a **HYPOTHESIS** that shows the expected *relationship* between the variables. Use an **IF, THEN** statement. Write a **NULL HYPOTHESIS**.

Step 4: Design an **EXPERIMENTAL INVESTIGATION** to *test your hypothesis*.

Step 5: Write the **PROCEDURE** you will follow during your investigation, *step-by-step*.

Step 6: Make the **DATA TABLE** to record your data and your reduced data.

✓ **Paper towel strength can be measured with an M value.**

- When water is put on a paper towel, it spreads out in a circle
- A comparison of the ratio of the mass of the pennies and the diameter² of the spread of the water gives us the M value
 - $\frac{\text{Mass of Pennies}}{\text{Diameter}^2} = M$
- The larger the value of M,, the stronger the paper towel

Step 7: Make a **GRAPH** of your reduced data. Remember **DRY MIX** and **TAILS**. Use a piece of graph paper for the graph.

Step 8: ANALYZE your data: What story does the graph tell? What do you know about the effect of the independent variable on the dependent variable?

Step 9: Write a **CONCLUSION**. Answer you original questions. Accept or reject your hypothesis. Use actual data [real numbers] to provide evidence for what you say. Reflect on your investigation; what worked well? What problems did you have and how did you solve them? How could this investigation be expanded?