

Title: Scientific Method – Penny Lab

Name:

Period:

Date:

Purpose: To identify the steps of the scientific process and to accurately measure volume, mass, temperature, and area

Materials:

5 Pennies

1 Dime

Eye Dropper

Metric Ruler

Beaker of Water

Graduated Cylinder

Triple Beam Balance

Observing:

- a. Look at your penny closely. Write in the missing words on the penny below.



- b. Describe your penny. Is it shiny? Is it old?

Sequencing:

- a. Outline your pennies below and place them in order from **oldest** to **newest** penny. Write the date inside of each penny.

- b. Outline your pennies below and place them in order from the **shiniest** to **dullest**. Write the date inside of each penny.

- c. Is there a relationship between the date of the penny and the shininess of the penny? Explain.

- d. Record the number of pennies with a "D" stamped under the date. _____

Measurement:

- a. Measure a penny across its width. This is the diameter.

Diameter: _____ millimeters (mm)

- b. How many pennies do you need to stack to get 1 cm in height?

1 cm = _____ pennies

- c. Use a metric ruler to measure the length (in cm) of the following objects.

1.Length of your Pencil

2.Length of this paper

3.Width of this paper

4.Length of your shoe

5.Length of your little finger

6.Length of your text book

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- d. Determine the surface area of this paper by multiplying the length of the paper by the width of the paper. **Remember the units!**

$$\frac{\text{Length (cm)}}{\text{Length (cm)}} \times \frac{\text{Width (cm)}}{\text{Width (cm)}} = \frac{\text{Area (cm}^2\text{)}}{\text{Area (cm}^2\text{)}}$$

- e. Use a balance to find the mass (in grams) of 1 penny, 3 pennies, & 5 pennies. **Remember the units!**
1 Penny: 3 Pennies: 5 Pennies:

- f. What factors could make your measurement incorrect?

- g. Determine the density of your pennies. Density = mass/volume. To find volume, fill a graduated cylinder to 30 mL, drop your pennies into the cylinder, and record how much the water rose. This is your volume.
Density = _____

Predicting:

- h. How many drops of water can fit on the top of a penny without spilling? For each trial predict how many drops you think will fit, then test your prediction.

| Trial | Prediction | Results |
|-------|------------|---------|
| 1. | | |
| 2. | | |
| 3. | | |

- i. What might affect the amount of water you fit on top of you penny?

Measuring Volume of a Liquid

- a. Fill a beaker with 50 mL of water. Pour this water into a graduated cylinder. Record the amount of water in the graduated cylinder. **Remember the units!**
Amount of water: _____
- b. Was the volume of the water exactly 50 mL when measured in the graduated cylinder? _____
- c. Explain why any differences may have happened.

- d. Practice using the graduated cylinder by measuring the following:

- | | |
|----------|----------|
| 1. 28 mL | 3. 45 mL |
| 2. 32 mL | 4. 21 mL |

Measuring Temperature of a Liquid

- e. Use the Celsius thermometer to measure the temperature of the water in the beaker. **Remember the units!** _____
- a. Use the thermometer to measure the temperature of ice water. _____
- b. Use the thermometer to measure the temperature of boiling water. _____

Review

- a. Identify the metric units for measuring the following.

- | | |
|------------|-----------------|
| 1. Mass: | 3. Temperature: |
| 2. Volume: | 4. Length: |

- b. Identify the instrument you would use to measure the following.

- | | |
|-----------------------------|-------------------------------|
| 1. The length of your desk: | 3. The temperature outside: |
| 2. 98 mL of water: | 4. The mass of your textbook: |