

A Penny for Your Thoughts

Measuring Mass and Volume of Pennies

Name: _____

Period: _____ NB# _____

Purpose: To model proper measuring technique of mass and volume.
To interpret the relationship between mass and volume.

Materials: 50 pennies
Balance scale
Graduated cylinder

Procedure: Parts A and B may be done in any order.

Part A: Measuring mass

Use the balance scale to measure the mass of each amount of pennies. After each measurement, make a new prediction about the mass of 100 pennies and the mass of one penny. This prediction may change as you go. We need to have a record of these changes.

| # of Pennies | Mass of Pennies (grams) | Estimate: Mass of 100 Pennies | Estimate: Mass of 1 Penny. |
|--------------|-------------------------|----------------------------------|-------------------------------|
| 5 | | | |
| 10 | | | |
| 20 | | | |
| 50 | | | |

1. Explain the mathematical procedure you used to estimate the mass of 100 pennies.
2. Explain the mathematical procedure you used to estimate the mass of one penny.
3. Your estimates in the table above may have changed each time.
 - a. Which measurement above is the most accurate estimate?
(5 pennies, 10 pennies, 20 pennies, or 50 pennies?)
 - b. Why?
 - c. Do all pennies weigh the same? How can you tell?

Part B: Measuring Volume

Pennies are an irregular solid, so we need to use liquid displacement to find their volume. Fill a graduated cylinder with exactly 30 ml of water. Carefully add the proper amount of pennies to the graduated cylinder and record the new volume. In order to know the volume of the pennies themselves, you must subtract 30 ml. Use these steps to fill in the chart below.

| # of Pennies | Volume of pennies in water (ml) | Volume of pennies only. Volume in water – 30 ml = ____ | Estimate: Volume of 100 Pennies | Estimate: Volume of 1 Penny. |
|--------------|---------------------------------|---|---------------------------------------|------------------------------------|
| 5 | | | | |
| 10 | | | | |
| 20 | | | | |
| 50 | | | | |

1. Explain the mathematical procedure you used to estimate the volume of 100 pennies.
2. Explain the mathematical procedure you used to estimate the volume of one penny.
3. Your estimates in the table above may have changed each time.
 - a. Which measurement above is the most accurate estimate?
(5 pennies, 10 pennies, 20 pennies, or 50 pennies?)
 - b. Why?
 - c. Do all pennies have the same volume? How can you tell?

Final Analysis:

1. a. Based on your measurements, which property of pennies is most constant? Mass or Volume?
 - b. How can you tell?
2. If I told you that you had 25 g of pennies, about how many pennies might you have?
3. If we know that a stack of pennies that displaces 15 ml of water has a volume of 15 cc (cubic cm), then I can say that 1 ml = _____ cc.