MCBS00590_0000[1]The Density of Pennies

The composition of pennies has changed over time. According to the U.S. Mint,

Pennies dated 1962-1982: Pennies dated 1982-present:

Composition: 95% copper, 5% zinc Composition: 97.5% zinc, 2.5% copper

Density of pre-1982 penny = **8.87 g/mL** Density of post-1982 penny = **7.19 g/mL**

**PURPOSE:** The purpose of this lab is to determine the densities of pre-1982 and post-1982 pennies.

# EQUIPMENT and MATERIALS: Electronic Balance, Pennies (10 pre-1982 and 10 post-1982), Graduated Cylinder (100mL), water

**PROCEDURES:**

If lab not done in class, watch video and use it to do this sheet:

* Weigh 10 **PRE-**1982 pennies. **Record this mass.**
* Fill a graduated cylinder with 50 mL of water.
* Tilt the cylinder and **gently** slide all ten pennies into the water.
* Read the volume of the water and the pennies together. **Record this volume.**
* **Calculate** the volume of the pennies alone by subtracting 50 mL from the final reading of the water level.   
  **Record the volume of the pennies by themselves.**
* Use the recorded mass and volume of the pennies to **calculate density**.
* Use the accepted values for density, provided by the U.S. Mint, to **calculate your percent error** for density.
* Repeat steps 1-7 with ten **POST-**1982 pennies.

**OBSERVATIONS/DATA:**

|  |  |  |  |
| --- | --- | --- | --- |
| **PRE-1982 Pennies** | | POST-1982 Pennies | |
| **Mass of 10**  **pre-1982 pennies** |  | **Mass of 10**  **pre-1982 pennies** |  |
| **Volume of**  **pennies + water** |  | **Volume of**  **pennies + water** |  |
| **Volume of JUST pennies** =  (Volume of pennies + water)   – 50 mL of water |  | **Volume of JUST pennies =**  (Volume of pennies + water)  – 50 mL of water |  |

**CALCULATIONS:** (SHOW ALL WORK!!! BOX YOUR FINAL ANSWERS!!!)

|  |  |
| --- | --- |
| **Calculate the density of PRE-1982 pennies** | **Calculate the density of POST-1982 pennies** |
|  |  |
| **Calculate the % error for the density of PRE-1982 pennies** | **Calculate the % error for the density of POST-1982 pennies** |
|  |  |

**POST-LAB QUESTIONS**

|  |  |
| --- | --- |
| **#** | **Question –** *Answer in full detailed answers!* |
| 1 | What are three possible sources of error in this lab? |
| 2 | How would each source of error affect your calculated density? Make it too big or too small? WHY? Think about the math… |
| 3 | How could the existing procedures be modified to yield a more accurate result? |