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:

☐   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.

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

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?