Title: **Density of Pennies**

Purpose: **Compare the densities of Pennies minted before and after 1982.**

Materials: **40 pennies minted 1981 or earlier**
40 pennies minted 1982 or later
Triple beam balance
Graduated cylinder
Unknown metal(s)

Procedure:
1) **Record mass of pre-1982 ®. (2 decimal places)**
2) **Record mass of post-1982 ®.**
3) *Use water displacement* **to record volume of pre-1982 ®. (1 decimal place)**
4) **Record volume of post-1982 ®. ** MENISCUS!!**
5) **Repeat steps 1-4 for Trial #2.**
6) **Perform** <u>two</u> **trials for Unknown metal(s).**
7) **Calculate densities for each item.**

Data:
Pre-1982 ®
   Trial #1   **Trial #2**

   Mass = _____ g   **Mass = _____ g**

   Volume $_{H20}$ = _____ mL   **Volume $_{H20}$ = _____ mL**

   Volume $_{H20 + P}$ = _____ mL   **Volume $_{H20 + P}$ = _____ mL**

   Volume $_P$ = _____ mL   **Volume $_P$ = _____ mL**

Post-1982 ®
   Trial #1   **Trial #2**

   Mass = _____ g   **Mass = _____ g**

   Volume $_{H20}$ = _____ mL   **Volume $_{H20}$ = _____ mL**

   Volume $_{H20 + P}$ = _____ mL   **Volume $_{H20 + P}$ = _____ mL**

   Volume $_P$ = _____ mL   **Volume $_P$ = _____ mL**

Unknown A

    Trial #1   **Trial #2**

        Mass = _____**g**   **Mass =** _____ **g**

        Volume $_{H20}$ **=** _____ **mL**   **Volume** $_{H20}$ **=** _____ **mL**

        Volume $_{H20 + A}$ **=** _____ **mL**   **Volume** $_{H20 + A}$ **=** _____ **mL**

        Volume $_{A}$**=** _____ **mL**   **Volume** $_{A}$ **=** _____ **mL**

Unknown B
    \`   **Trial #1**   **Trial #2**

        Mass = _____**g**   **Mass =** _____ **g**

        Volume $_{H20}$ **=** _____ **mL**   **Volume** $_{H20}$ **=** _____ **mL**

        Volume $_{H20 + B}$ **=** _____ **mL**   **Volume** $_{H20 + B}$ **=** _____ **mL**

        Volume $_{B}$ **=** _____ **mL**   **Volume** $_{B}$ **=** _____ **mL**

Calculations – *SHOW WORK*

1) Find average density of pre-1982 pennies

2) Find average density of post –1982 pennies

3) Find density of unknown A

4) Find density of unknown B

5) Calculate your percent error for each unknown metal.

Questions

1) Compare densities of pre/post pennies.

    How do you account for this?

2) Identify both unknowns using chart.
3) Give TWO intensive and TWO extensive properties of pennies.

Error:
Determine three possible sources of error and ***indicate how they would affect your results.***