$\qquad$
Partners: $\qquad$

## THE BIG D: Density!!

OBJECTIVE: You will be able to calculate the densities at different materials and recognize that density is one of the most important properties of matter.

## VOCABULARY:

mass:
volume:
density:

## PROCEDURE:

## ** MAKE SURE TO FOLLOW ALL ROUNDING RULES EXPLAINED IN THE PROCEDURE AND MAKE SURE THAT EVERY MEASUREMENT OR CALCULATION MADE HAS THE APPROPRIATE UNIT ATTACHED.

$\qquad$ 1. Measure the mass of an object using the digital scale. Your answer will be in grams (g).

Record your finding to the nearest tenth of a gram in the correct location on the Report Sheet.
2. Find the volume of the object using the appropriate method. If the object is a rectangular shape, determine the volume in cubic centimeters $\left(\mathrm{cm}^{3}\right)$ by using the metric ruler and the volume formula ( $v=/ w h$ ). If the shape is irregular, determine the volume in milliliters ( mL ) by using the water displacement method. Do NOT round this number after using the volume formula. Record your findings in the correct location on the Report Sheet.
$\qquad$ 3. Repeat steps 1 and 2 for the remaining items.
$\qquad$ 4. Calculate the density of each object by dividing the mass by the volume. Record all your density calculations to the nearest tenths place on the Report Sheet.
$\qquad$ 5. After completing Report Sheet, obtain the accepted densities for each item from your instructor and record them in the chart under summary question \#1 at the end of this lab.

I will do one example with you so that you see how it is done. Watch and Record!!


## Report Sheet

(Don't forget to round each measurement/calculation according to the procedure and attach correct units!)

| 1. Wood Bar |  |
| :---: | :---: |
|  |  |
| Mass |  |
| $1=$ |  |
| Volume | Density: |

## 2. Steel Sphere

Mass $\qquad$

Volume $\qquad$

> Density Calculation: (show your work!)

Density: $\qquad$

## 3. Aluminum Cube

> Density Calculation: (show your work!)

Mass $\qquad$
$\qquad$ $w=$ $\qquad$ $\mathrm{h}=$ $\qquad$
Volume $\qquad$ Density: $\qquad$
4. Calcite (white/gray mineral)

Mass $\qquad$

Volume $\qquad$
Density: $\qquad$


## 6. Glass Sphere

Mass $\qquad$

Volume $\qquad$

## Density Calculation: (show your work!)

Density: $\qquad$

Density: $\qquad$
Density Calculation: (show your work!)

Density

## 7. Aluminum Bar

Mass $\qquad$
$\qquad$
$=$
w =
Volume $\qquad$
8. Galena (silver mineral)

Mass $\qquad$

Volume $\qquad$

## Density Calculation: (show your work!)

Density:

## DISCUSSION QUESTIONS:

1. When everyone is totally done with their calculations, I will give you the values to put in this chart.

| Object | Actual Density $\left(\mathbf{g} / \mathbf{c m}^{\mathbf{3}}\right.$ or $\left.\mathbf{~ g} / \mathbf{m L}\right)$ |
| :---: | :--- |
| 1. wood bar |  |
| 2. steel sphere |  |
| 3. aluminum cube |  |
| 4. calcite |  |
| 5. wood cube |  |
| 6. glass sphere |  |
| 7. aluminum bar |  |
| 8. galena |  |

2. Referring to the correct densities that I gave you recorded in the chart above:

Does the size or shape of samples made out of the same material affect density?
3. Look back at your Report Sheet and the density calculations that you made and compare them to the actual values in the chart above. I'm sure you will notice that sometimes you did get the exact density measurement. But you probably had some measurements that were a little off - or even off by a lot. Name 2 different things that may have caused error in your measurements.
4. Thinking Question: Why is it important to measure the mass of an irregular object before finding its volume?
5. Using the actual density values of the materials from the chart above, and the Properties of Water chart on the Earth Science Reference Tables, put the items in the correct column on the table below.

Density of liquid water:

| Item will float in liquid water | Item will sink in liquid water |
| :--- | :--- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

