

Warm up

-Get out your chromebook and record the hurricanes (*including tropical storms, tropical depressions, and remnants*) on your map you got last week. **Include storm name, today's date, and wind speed.**

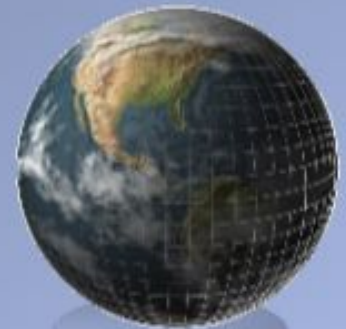
Measuring Matter



**MASS,
VOLUME,
& DENSITY**

MASS...

- Definition: Amount of matter in an object
- Units: kg or g
 - Mass is different from weight because...weight depends on pull of gravity



How do we measure mass?

With a triple beam balance or an electronic scale!



VOLUME....

- **Definition: How much space an object takes up**
- **Regular shaped object (box) = $L \times W \times H$ (cm^3 or m^3)**
- **Liquids - to find volume...use graduated cylinder (mL or L)**
- **Use graduated cylinder for odd shaped solid objects (cm^3 or m^3)**



How do we measure volume?

With a ruler, measuring tape, graduated cylinder, or a water displacement cup!



How to measure the volume of an odd shaped solid

- Obtain a clean graduated cylinder.
- Fill the graduated cylinder with enough water to cover object.

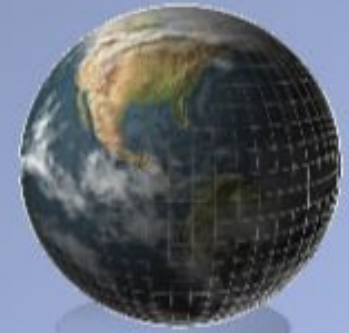
Record the volume

- Carefully place the object into the water filled graduated cylinder.
- Record the new water level.
- The volume of the object

is the $V_{\text{final}} - V_{\text{initial}}$



~~water displacement~~

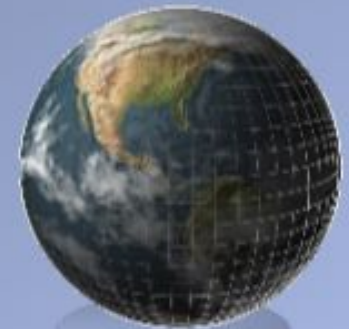
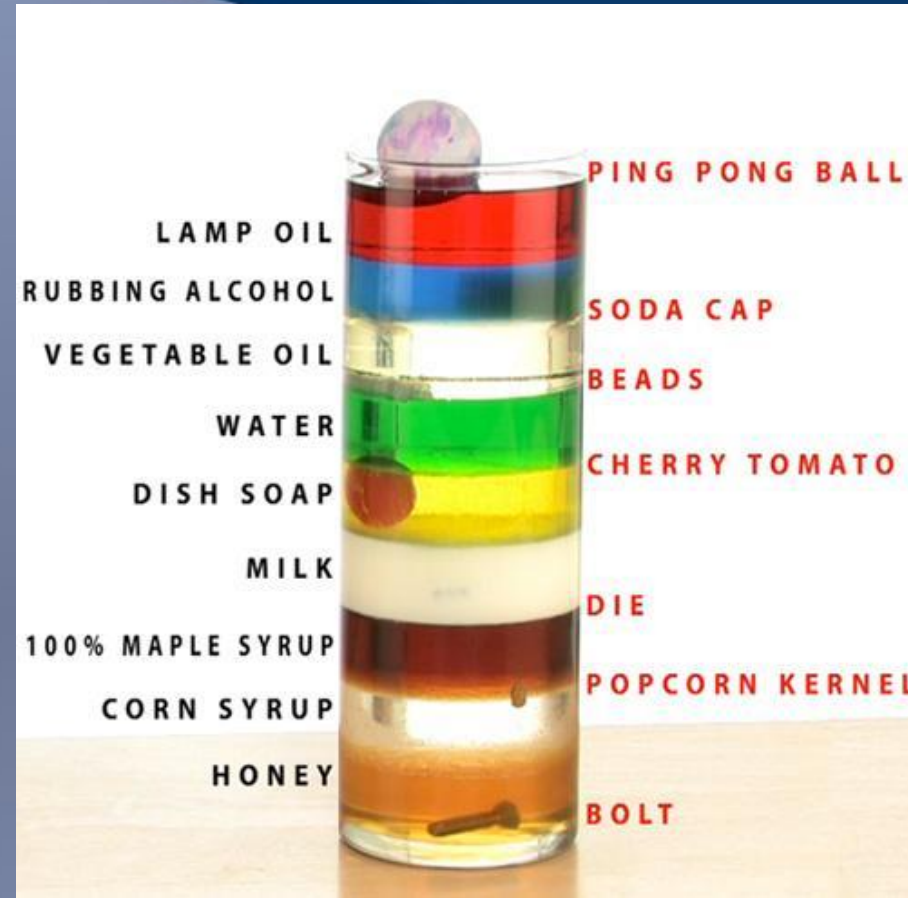


DENSITY....

- Density is the measurement of the mass of an object per unit volume of that object.

- Formula:

$$D \text{ (density)} = \frac{m \text{ (mass)}}{V \text{ (volume)}}$$



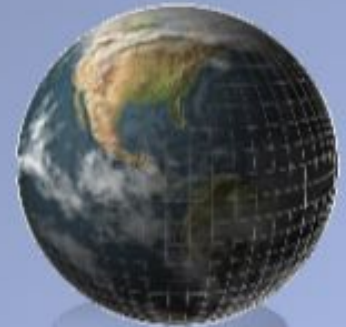
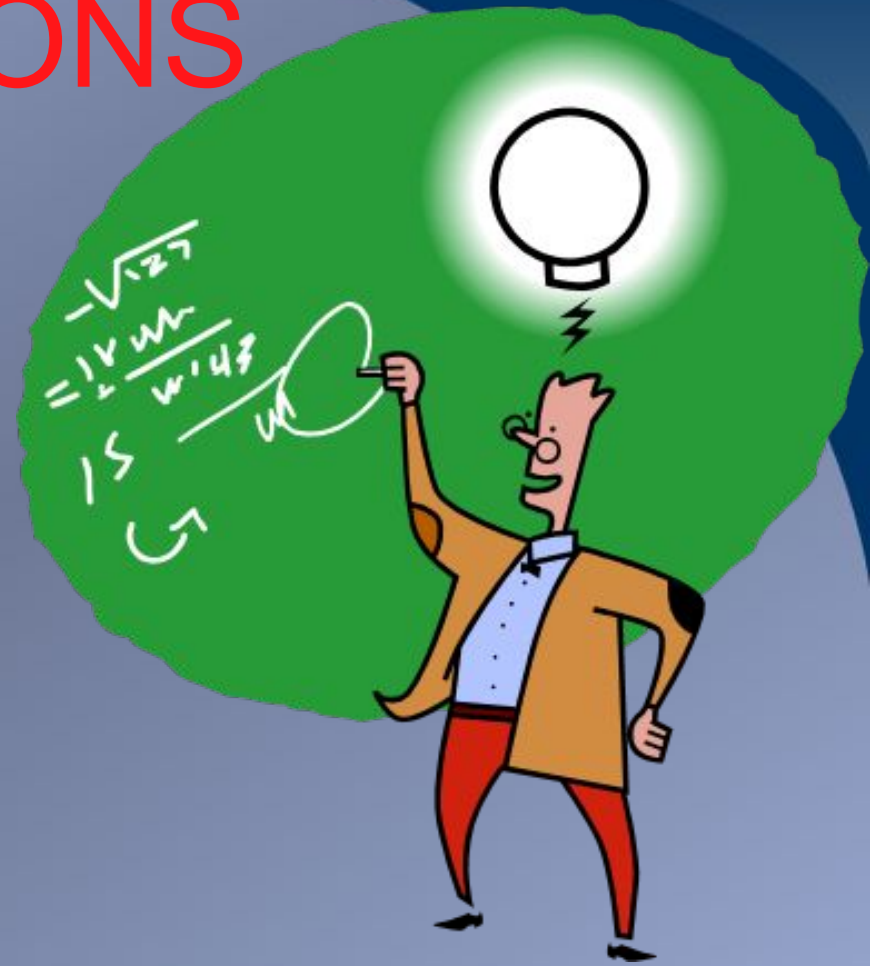
DENSITY continued

- Density is usually measured in g/mL for liquids and g/cm³ for solids.
- Remember 1 mL = 1 cm³
- Density of water is 1.00g/mL
- Density of “ocean” water is 1.027 g/mL



Density CALCULATIONS

- Always show all of your work
- Answer must have units!!!



Example Density Calculation:

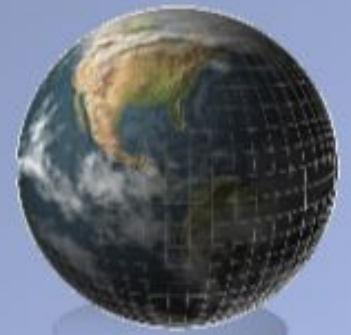
- A rock has a mass of 25.7 grams and a volume of 3.56 cm^3 . Find the density.
- 1st write: $D = \frac{\text{mass}}{\text{volume}}$
- 2nd: Substitute in the measurements
 $D = \frac{25.6 \text{ g}}{3.56 \text{ cm}^3}$
- 3rd: Calculate and circle answer.

$$\text{Density} = 7.19 \text{ g/cm}^3$$



PRACTICE.....

- Calculate the density of a marble that has a mass of 13.6 grams and a volume of 6.1 cm^3 .
- Show your work on your handout.



Let's Practice

There are several items on your lab tray that you will calculate the density for. You will determine the mass and volume for these objects in order to find the density.

Remember to always zero out your scale and make sure your unit of measurement is grams.

Principle 1

- If you pack more mass into the same volume, it is more dense.
- Draw a picture on your handout that represents this principle and show your teacher.



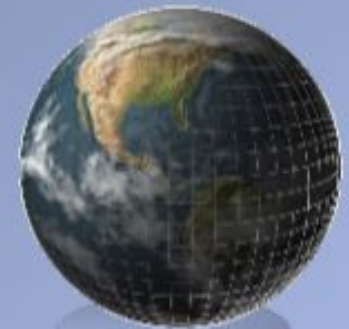
Principle 2

- If you pack the SAME mass into a SMALLER volume, it is MORE dense
- Draw a picture on your handout that represents this principle and show it to Mrs. Allen.



Principle 3

- Just because something has more mass DOES NOT mean it is more DENSE.



Density of Objects and Solutions Lab

I will put you into groups of 4. Each member of the group will complete a lab sheet.

Before we begin let's talk about lab safety.

[Let's see what you learned!](#)