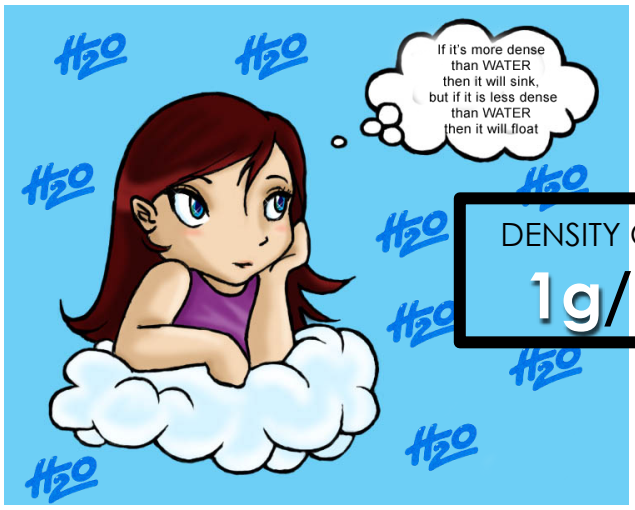
Name: _____

That is So Dense!

Mass ÷ Volume = Density (M÷V=D)

Archimedes discovered over 2,000 years ago that different materials have different **DENSITIES**. Thus he was able to determine if the king's crown was indeed made of pure gold because he was able to determine the **DENSITY** of pure gold and compare it to the **DENSITY** of the crown. In metric units, that would be **19.3g/cm³** for gold.



DENSITY OF WATER
1g/cm³

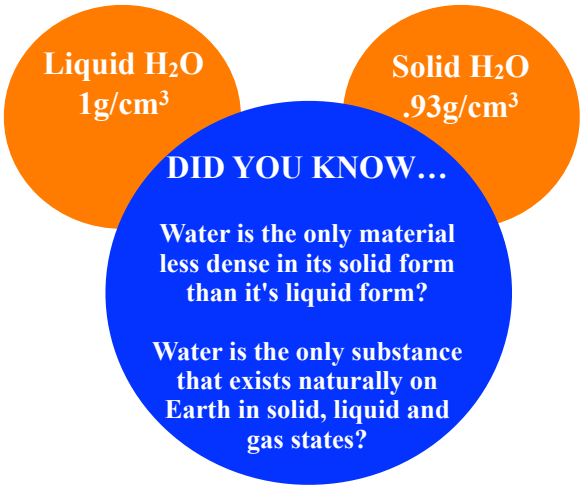
Will It Float?

Well, that depends. Water, H_2O, has a density of 1g/cm³. Any material with a density greater than water will sink and any material with a density less than water will float.

Metric Moment

1ml = 1cm³ = 1g of H_2O

The Metric System, or International System of Units, came in to use during the French Revolution as a solution to the problem of the plethora of local systems of measurement that restrained trade between areas.



EXTRA! EXTRA!

WOOD FLOATS!

VICTORIA

Scientists in Victoria, B.C. have finally provided proof that wood floats. In a stunning discovery, the scientists determined that the density of most woods was LESS than the density of water (SEE Table right).

In a related story, **surfers** the world over are relieved that they will not be sinking to the bottom of the ocean any time soon.

Density of Various Woods (g/cm³)

Douglas Fir	.53g/cm³
Pine	.56/cm³
Red Cedar	.38/cm³
Sitka Spruce	.45/cm³

In today's assignment you will be measuring the mass and volume of various objects and determining their **DENSITY**.

MATERIALS

- Set of 5 Density Cylinders (ALUMINUM, LEAD, TIN, ZINC, COPPER)
- Density Cube Sets
- Pokémon
- Overflow Cans
- Graduated Cylinders
- Water
- Triple Beam Balances
- Digital Electronic Scales
- M÷V=Density in g/cm^3

STATION 1: Density Cylinders

1. Measure the mass of one of the Density Cylinders. MASS: _____
2. Measure the volume of the same Density Cylinder. VOLUME: _____
3. Calculate the DENSITY of the Cylinder using the equation, M÷V=D. (Show Your Work)

4. Determine the DENSITIES of all 5 Density cylinders and list them in the table below from most dense to least dense.

Material	Mass	Volume	Density

5. Which Density Cylinder is the has the smallest VOLUME?

6. Which cylinder has the greatest DENSITY?

7. Why does the cylinder with the smallest VOLUME have the greatest DENSITY? What is making it so DENSE?

STATION 2: Density Cubes

1. Find one Density Cube that will float in water and one Density Cube that will not float in water.
2. In the space below, determine the VOLUME of each of your Density Cubes **NOT** using the water displacement method. (Show Your Work and Round to the nearest ONE HUNDREDTH.)

3. Measure the MASS of each of your cubes and fill in the table below.

Material	Mass	Volume	Density

4. Explain why one of your materials will float in water and the other material will not float in water.

STATION 3: Pokémon

1. Calculate the DENSITY of three Pokémon.

Pokémon	Mass	Volume	Density

2. You are a scientist and this is a complicated question. See if you can figure out the question so that you can provide a logical answer. You need to have a really good understanding of what density is to answer it. OK, ready?

I think the densities that you calculate for your three Pokémon in #1 above should be the same or very close*(with the equipment we have 'very close' is sometime the best we can do)*. Why do I think this?

Density of Different Materials	
• Gold 19.3g/cm3 • Silver 10.5g/cm3 • Platinum 21.4g/cm3 • Copper 8.9g/cm3 • Lead 11.3g/cm3 • Iron 7.9g/cm3 • Steel 7.9g/cm3 • Tin 7.3g/cm3	• Butter .87g/cm3 • Ice .93g/cm3 • Rubber 1.5g/cm3 • Paper 1.2g/cm3 • Gasoline .74g/cm3 • Milk 1.1g/cm3 • Bamboo .3g/cm3 • Maple .76g/cm3

1) Name 4 Items from the above table that would NOT float in Water.

2) Explain why the items chosen in Question 1 will not float in water.

3) Fill in the Blanks.

Mass	Volume	Density
20 grams	**20cm3**	
100 g	**50ml**	
75g	**25ml**	
227g	**73ml**	
579g	**30cm3**	
193.14g	**222cm3**	
401.5g	**55ml**	

4) Why does **wood** float in water?

5) Use the table at the top of the page to name the material.

Mass	Volume	Density	Material
401.5g	**55ml**		
600g	**2 litres**		
2825g	**250cm3**		
1 kilogram	**1000ml**		

6) This block weighs **316g.** What material is it made of?