Name _____ Chimera/Science

Date _____ NOTES

Density Lab Online Activity

Vocabulary: buoyancy, density, graduated cylinder, mass, matter, scale, volume

Prior Knowledge Questions (Do these BEFORE.)

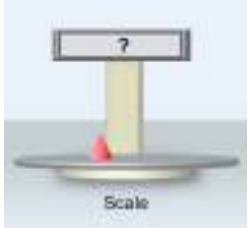
1. Of the objects below, circle the ones you think would float in water.

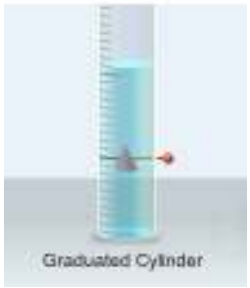
2. Why do you think some objects float, while others sink? _____

_____

_____

Warm-up





The *Density Laboratory* allows you to measure a variety of objects, then drop them in water (or other liquid) to see if they sink or float.

1. An object's **mass** is the amount of **matter** it contains. The mass of an object can be measured with a calibrated **scale** like the one shown. Drag the first object onto the **Scale**. (This is **object 1**.)

   What is the mass of **object 1**? _____

2. An object's **volume** is the amount of space it takes up. The volume of an irregular object can be measured by how much water it displaces in a **graduated cylinder**. Place **object 1** into the **Graduated Cylinder**.

   What is the volume of **object 1**? _____

   Note: While milliliters (mL) are used to measure liquid volumes, the equivalent unit cubic centimeters (cm^3) are used for solids. Therefore, write the volume of object 1 in cm^3.

3. Drag **object 1** into the **Beaker of Liquid**. Does it sink or float? _____

Time to get started!

- Drag **object 1** back to the shelf.
- Record the data on the table below for **object 1.**
- Caulate the density of **object 1** *(to the nearest hundredth).* You may use the calculator on the computer.
- **Check that Liquid Density is set to 1.0 g/mL and stays there for the entire activity.**

Object	mass	volume	Sink or float?	density
	grams	mL		g/cm^3
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

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1. Name the object with the **largest mass**. Did it float? _____

2. Name the object with the **smallest mass**. Did it float? _____

3. Name the object with the **largest volume**. Did it float? _____

4. Name the object with the **smallest volume**? Did it float? _____

5. For the objects that floated, what were their densities compared to the density of water?

_____

_____

_____

6. For the objects that sank, what were their densities com-pared to the density of water?

_____

_____

_____

7. If the **density** of the liquid in the tank was **2.0 g/cm3**, which objects would sink to the bottom and why?

_____

_____

_____

8. If the **density** of the liquid in the tank was **5.0 g/cm3**, which objects would sink to the bottom and why?

_____

_____

_____

EXTENSION

Introduction: In the third century B.C., King Hieron of Syracuse asked the famous mathematician Archimedes to determine if his crown was made of pure gold. This was a puzzling problem for Archimedes—he knew how to measure the weight of the crown, but how could he measure the volume?

Archimedes solved the problem when he got into his bath and noticed the water spilling over the sides of the tub. He realized that the volume of the displaced water must be equal to the volume of the object placed into the water. Archimedes was so excited by his discovery that he jumped out of the bath and ran through the streets shouting “Eureka!”

Question: How can you tell if a crown is made of solid gold?

1. ***Think about it***: Gold is one of the densest substances known, with a density of 19.3 g/cm3. If the gold in the crown was mixed with a less-valuable metal like bronze or copper, how would that affect its density?

   _____

   _____

2. ***Observe***: Drag each of the crowns into the liquid. Based on what you see, which crown do you think is densest? Explain why you think so.

   _____

   _____

3. ***Measure***: Find the mass, volume, and density of each of the three crowns.

Crown	mass	volume	Sink or float?	density
	grams	mL		g/cm^3
A				
B				
C				

4. ***Draw conclusions***: Which of the three crowns was made of gold? _____

   Explain: _____

   _____