Density Cubes

Tennessee State Science Standards
Physical Science: Matter and its interactions
Crosscutting Concepts: Scale, Proportion, and Quantity – Students make and evaluate derived/proportional measurements.
Science and Engineering Practices: Planning and carrying out controlled investigations.

Supplies:

- 10 sets of density cubes
- 10 plastic graduated cylinders
- Lesson Binder
- Lesson Box

Supplies Needed but NOT included

- 10 balances to 0.1 g

In this lab students will get to explore the concept of density and put to practice their measuring skills. Students will measure the mass with a balance precise to 0.1 grams (Must be provided by teacher) and the volume in cm^3.

$$Density = \frac{mass(g)}{volume\ (cm^3)}$$

Once students have figured out the density of all of the cubes, students will then figure out the density of water using graduated cylinders to find out the mass. Students will need to be informed or reminded that one milliliter of liquid equals cm^3.

Density Cubes Lab

Name:_____

Density is the measurement of how much mass occupies a set amount of space.

$$Density = \frac{mass(g)}{volume\ (cm^3)}$$

In this lab there are 10 cubes of unknown material. Find the density of each cube and record it in the chart.

Procedure:

1. Obtaining the mass of the cube to the nearest tenth of a gram from a balance
2. Find the volume in cubic centimeters. To obtain the volume measure one side of a cube and cube (multiply it by itself three times) that number.
3. To find the cube's density divide the mass in grams by the volume in cubic centimeters for each cube. The answer to that division problem is the density. Record in Density column.
4. Find the density of water. See the procedure below.
5. Predict whether each cube will float in water
6. Float each cube in water; make sure you keep track of which was which cube
7. Finish filling the chart out and answer the Post-Lab questions.

Cube	Mass (g)	Length of side	Volume (length^3)	Density g/cm^3	Prediction : Float in water?	Did it Float in water?
1						
2						
3						
4						
5						
6						

7						
8						
9						
10						

Procedure for finding the density of water:

1. Weigh the empty graduated cylinder and record it here_____(g)
2. Add any amount of water to the graduated cylinder and measure it precisely _____(mL)
3. Weight the graduated cylinder containing the water_____(g)
4. Find the mass of the water. Hint. Subtract the mass of the graduated cylinder from the mass of the water filled graduated cylinder. Write your answer here_____(g)
5. What is the density of water, knowing that milliliters are equal to cubic centimeters?
   _____(g)/_____(mL) or (cm^3) = Density =_____g/cm^3

Post-Lab Questions:

1. How many cubes floated?

2. What do you notice about the density of cubes that float compared to the density of water?

3. What do you notice about the density of cubes that sank compared to the density of water?

4. Instead of water, if you had a liquid with a density of 8 g/cm^3 how many of the cubes would float and Why?