

Name: _____

Mystery Box!

Formulas: Density = $\frac{\text{mass}}{\text{volume}}$ OR Density = mass + volume

1. What physical properties do you need to know to find the density of an object? How will you use the simulation to find these properties?

You need to know the mass and volume of an object to calculate density. The scale is used for mass, the water and water displacement for volume.

2. Fill in the following information about the Mystery boxes. Remember to include units!

Container	Mass (kg)	Volume (L)	Density (kg/L)	Float or sink in water?	Contents (see table)
A	65.14 kg	3.38 L	19.3 kg/L	SINKS	Gold
B	0.64 kg	1.00 L	0.64 kg/L	floats	Apple
C	4.08 kg	5.83 L	0.69 kg/L	floats	Gasoline
D	3.10 kg	3.38 L	0.91 kg/L	floats	Ice
E	3.53 kg	1.00 L	3.53 kg/L	SINKS	Diamond

3. Order the mystery packages from lowest density to highest density:

(Lowest) B C D E A (Highest)

4. In question 3 above put a SQUARE around the letters for the mystery packages that were able to float in water (or that you had to push down in order to calculate the volume - use your data!).

5. In question 3 above put a CIRCLE around the letters for the mystery packages that had a density less than 1 kg/L.

6. What do you notice about what you have squared and circled in question 3? Are they the same? Different?

They are the same. All of the materials in boxes B, C, D have a density $\geq 1 \text{ kg/L}$, which is the density of water. This allows them to float.