

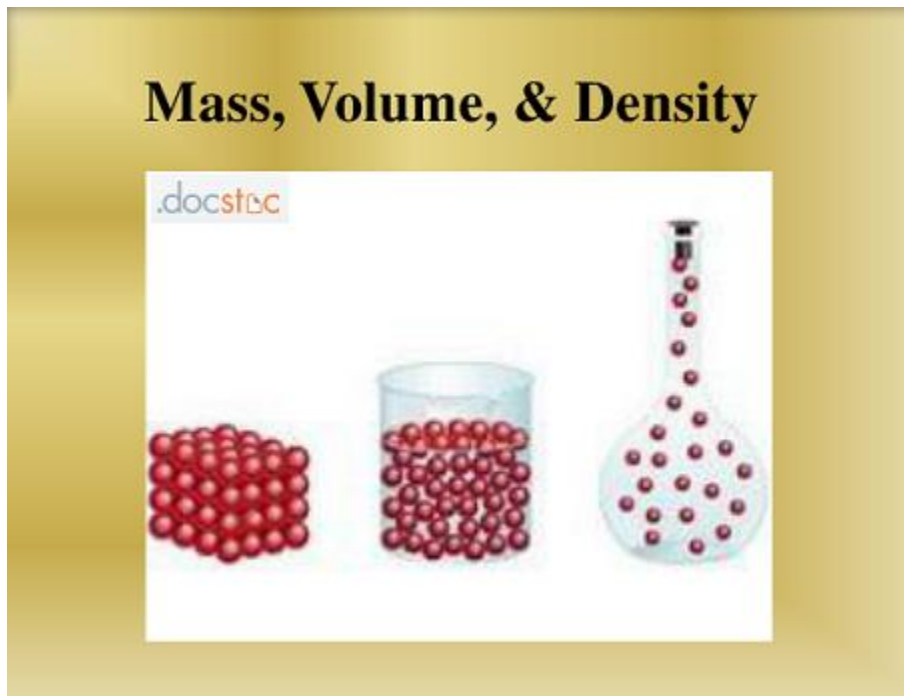
Stacking Liquids: Experiment in Density

First a few key science concept terms you'll need to understand:

Think of **mass** as the measure of **how much stuff there is in an object or liquid**.

Volume is the portion or **how much there is of the object** (for example 8 ounces [237 ml]).

Density is a measure of **how tightly that stuff is packed together**.



In the picture we see 3 examples of what we will imagine are cranberries. The density is high in the cube and low in the bottle, medium in the beaker.

What you will need:

- a clear glass cylinder such as a vase, a jar, or a large water glass
- food coloring
- food baster
- 5 plastic cups
- light corn syrup, honey, water,
- vegetable oil, dawn blue dish soap
- A kitchen scale (optional)



Procedure:

Measure each type of liquid into one of the five plastic cups. Depending on the size of the cylinder that you will fill, you may have to adjust the amount. 4 or 5 ounces of each liquid would be ideal. If you have a bigger jar, 8 ounces of each liquid would be better. The key is to use the same amount of each liquid.

use your food coloring to color the corn syrup and the water different colors for a dramatic effect. You may leave them clear, but the layers won't stand out as much as if they are colored so that you can see the stripes.

****If you are using a kitchen scale, weigh each measured portion of your liquids and write down what each of them weighs for later.**

You will layer the liquids by pouring them carefully into the center of the cylinder. Make sure not to touch the sides with the liquid while pouring the first three. **The order is important** because each of these liquids has a different density. The one on the bottom is the most dense, and the one on top is the least dense.

Pour slowly and carefully in this order:

Pro Tip: Let each liquid settle (flatten out) before pouring the next.

1. Honey
2. Corn Syrup
3. Dish Soap

For the next two use the food baster to pour **and it is important** to let the liquid trickle down the side of the glass very slowly

4. Water

Rinse the food baster before the oil if you used food colouring

5. Vegetable Oil



How does it work?

By understanding the science of density, we know the same amount or volume of two different liquids will have different weights, because they have different masses. The liquids that weigh more (have a higher density) will sink below the liquids that weigh less (have a lower density).

Material	Denisty
Dark Karo syrup or maple syrup	1.37
Light Karo syrup	1.33
Water with food coloring	1.00
Glycerin (colorless)	1.26
Vegetable Oil (yellow)	0.91
Dawn dish washing liquid (blue)	1.03
Rubbing alcohol (colorless)	0.87
Lamp oil	0.80
Honey	1.36
Baby oil	0.82

If you weighed and wrote down the weights of the liquids, you should notice that the more dense a liquid, the heavier it is!

This is also the same for metals and other solid and gaseous materials.

For example with solids: Iron is much more dense than say aluminum, and therefore is much heavier.

A gaseous example: smoke rises because it is less dense than air, and heated air rises because the heated air is less dense than cool air, therefore smoke will always float over cooler air.