California State University of Bakersfield, Department of Chemistry

Seven Layer Density Column

Introduction:

Have you ever put two different liquids together and observed how they mix together? Have you ever seen what happens when you mix oil and water? Most of you probably know that oil and water do not mix together, but do you know why? Today, we will learn about density, which is the reason why many liquids and other materials stay separated when you try to mix them.

In today's experiment you will see how materials that have different density behave when they are put in the same container. You are probably wondering what is density? Well, it is how close together the molecules of a substance are or how much mass (weight) a substance has in a given space. You can also think of density as how much space there is between the components (molecules) of a material or even how heavy or thick the material seems to be.

This is probably a little difficult to imagine, and this is why we are going to show you how density makes different liquids stay separated when we put them together. If you pour different liquids, that you could find around in your house, with varying densities in a vase, we will expect the liquids with more density are heavier and will sink to the bottom.

Materials:

Honey
Dish soap (colored)
Green Rubbing Alcohol
Food Coloring Pack
Plastic cups
Food Baster
Light Corn Syrup
Vegetable oil
Lamp oil
Glass cylinder vase
Measuring Cup

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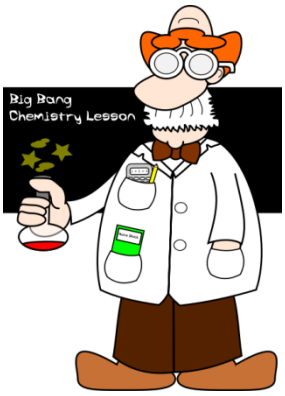
Safety:



- Always have an adult with you to help you during your experiment.
- Always wear eye protection and gloves when doing chemistry experiments
- Rubbing alcohol is flammable, so it must be kept away from any open flames or heat.
- Conduct this experiment in a well-ventilated area.

Procedure:

1. Measure about ¼ cup for each of all the liquids.
2. If you have liquids of similar color you can add a couple drops of food coloring to them. Don't try to do this with the lamp oil and vegetable oil because it will not work!
3. In a glass vase carefully add the following materials in order: honey, corn syrup, dish soap, water, vegetable oil, rubbing alcohol, and lamp oil.
4. When you are placing the honey, corn syrup, and the dish soap, you need to be careful to pour them in the center of the vase avoiding touching the sides of the vase. You can use the food baster to help you with this. Wash it after each use.
5. The rest of the liquids should be added very carefully. You can pour them on the wall of the glass vase to avoid disturbing the liquids. You can also use your food baster as well; just remember to wash if after each use.
6. Small objects of different densities can also be added to the column to observe how far they can go.
7. Write down what happened in the following space

Data and Observations:

Record your observations in this space

List the order in which the liquids were added into the glass vase

1.
2.
3.
4.
5.
6.
7.

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What did you see? Anything you were not expecting? Something really awesome? Describe it here.

Questions:

What was the densest liquid?

What keeps the liquids separated? Can you describe what density is now?

What happened when you added the rubber alcohol? Why do you think it happened?

Scientists often change variables in their experiments to see how they may affect the experimental outcome. What would happen if we added another liquid or if we change the order we add them?

References:

1. Spangler, S. Seven-Layer Density Column. In *Naked Eggs and Flying Potatoes*: U*nforgettable Experiments that Make Science Fun,* 1st ed.; Leibold, D., Ed.; Greenleaf Book Group Press: Austin TX, 2010; pp 71-75.

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