

Constructing a Density Column

Objective: In this laboratory you will learn about the differences in density of some common liquids. You will also observe that oil and water are immiscible.

Observations: In this laboratory your observations will be both qualitative (descriptive) and quantitative (measured).

- record all data carefully in a notebook using ink not pencil
- take time to observe carefully

NOTE: isopropyl alcohol (rubbing alcohol) is toxic to drink - never drink or eat during laboratory experiments.



Materials

Corn Syrup (or Honey)
Vegetable Oil
Water
Food coloring
Isopropyl Alcohol
Tall clear glass
Balance
Spatula
Spoon
Measuring Cups

The Experiment

1. Weigh the glass while it is empty and record this weight: _____
2. Measure out equal amounts of syrup, oil, water (with one drop of color) and isopropyl alcohol. The amount shown in the picture is 1/3 cup but you could use other amounts as long as you use the same amount of each liquid.



3. Pour the syrup into the glass being very careful NOT to allow it to touch the sides of the glass. Pour it straight down the center. Use the rubber spatula to remove all of the syrup possible.

4. Weigh the glass with the syrup and record _____

5. Pour the oil very slowly and gently into the glass.

6. Weigh the glass again. Record the weight of the glass + syrup + oil

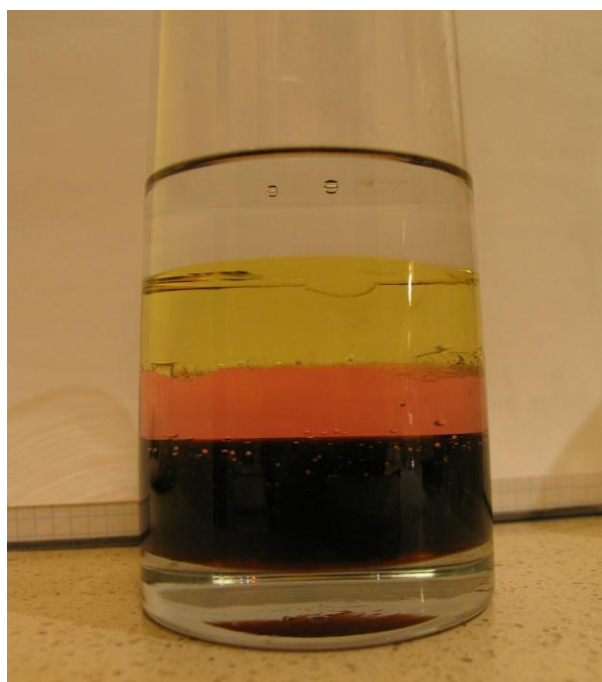


7. To add the water you will need a spoon to keep the water from splashing. Hold the spoon as shown in the photo and pour the water slowing and carefully.

8. Look at the liquids in the glass. Determine which layer belongs to which liquid. Is the water the bottom layer, the middle layer or the top layer? _____

9. Again weigh the glass and its contents. It now contains syrup, water and oil. _____

10. Add the isopropyl oil to the glass the same way you added the water - very gently using a spoon. Identify each layer and weigh the glass one last time: _____



Label each layer in this photograph.

Organizing your data

Fill out the following chart:

	Combined Mass
Empty glass	
Glass + Syrup	
Glass + Syrup + Oil	
Glass + Syrup + Oil + Water	
Glass + Syrup + Oil + Water + Alcohol	

Analysis

Using subtraction determine the mass of each substance:

Syrup

Oil

Water

Alcohol

The density of a substance is the mass of the substance divided by its volume. In our experiment **all of the volumes were the same**. Based on this - the substance with the greatest mass will be the one with the greatest density. *(If you did not keep the volumes the same then we would have to calculate density for each liquid based on the volume used.)*

Put the four substances in order from most dense to least dense:

Do the densities match the order of the layers? Which is on top - the most dense or the least dense liquid?

Conclusion

Summarize your results and think about possible errors in measurements. What have you learned about density?

This lab was written and photographed by Joy Walker.