**7 Layer Potion**

supplies needed

* Honey
* Corn Syrup
* Dish Soap
* Water
* Vegetable oil
* Rubbing alcohol
* Lamp oil
* Vase or jar
* Vegetable baster

instructions

1. Measure 8 ounces of each type of liquid into the seven plastic cups. Depending on the size of the glass cylinder, you might need more or less of each liquid—8 ounces is just a good starting point. You may want to color the corn syrup and the rubbing alcohol with a few drops of food coloring to create a more dramatic effect in your column. Here is the order of layers starting from the bottom and working your way to the top:

**Honey**  
**Corn Syrup**  
**Dish Soap**  
**Water**  
**Vegetable oil**  
**Rubbing alcohol**  
**Lamp oil**

1. Start your column by pouring the honey into the cylinder. It is very important to pour the liquids carefully into the center of the cylinder. Make sure the honey does not touch the sides of the cylinder while you are pouring. It’s important to let each layer settle before adding the next one. Take your time and pour slowly and carefully.
2. **When you get to the** water, and you’ll need to use the food baster—it’s like a giant medicine dropper for food. From this point forward, it’s okay to let the liquids touch the sides of the cylinder. In fact, it’s a must! Dip the tip of the food baster in the cup of water, squeeze the bulb, and draw up some water. Rest the tip of the food baster on the inside wall of the cylinder and slowly squeeze the bulb. Let the water slowly trickle down the glass to create the next layer. Take your time!
3. Wash the food baster with some soap and water in the sink before moving on to the rubbing alcohol. If you have not already colored the rubbing alcohol, use a couple drops of food coloring to make sure this layer isn’t confused with water. Use the food baster and the inside wall of the cylinder to add this next layer.
4. You’re one layer away from success. Again, rinse the food baster in the sink before moving on to the lamp oil. Since lamp oil is flammable, you must do this last step away from any open flames. Use the food baster to draw up some lamp oil, which has a low surface tension and easily leaks out of the food baster. Keep your finger over the tip as you transport it over to the cylinder. By now you’re a pro at this. Use the baster and the inside wall of the cylinder to slowly add the final liquid layer.

The Science Behind the Magic

The science secret here is density. The density of a liquid is a measure of how much mass is contained within a given unit volume (density = mass divided by volume). If mass is a measure of how much “stuff” there is in an object or liquid, density is a measure of how tightly that “stuff” is packed together.

Based on this density equation (Density = Mass ÷ Volume), if the weight (or mass) of something increases but the volume stays the same, the density has to go up. Likewise, if the mass decreases but the volume stays the same, the density has to go down. Lighter liquids (like water or rubbing alcohol) are less dense or have less “stuff” packed into them than heavier liquids (like honey or corn syrup).

Every liquid has a density number associated with it. Water, for example, has a density of 1.0 g/cm3 (grams per cubic centimeter — another way to say this is g/mL, which is grams per milliliter). Wondering what the density of corn syrup is?  What about the density of milk, maple syrup or Dawn dish soap? We’ve broken it down here for you in our table. Here are the densities of the liquids used in the column, as well as other common liquids:

|  |  |
| --- | --- |
| **MATERIAL** | **DENSITY** (g/cm3 or g/mL) |
| Rubbing alcohol | 0.79 |
| Lamp oil (refined kerosene) | 0.81 |
| Baby oil | 0.83 |
| Vegetable oil | 0.92 |
| Ice cube | 0.92 |
| Water | 1.00 |
| Milk | 1.03 |
| Dawn dish soap | 1.06 |
| Light corn syrup | 1.33 |
| Maple Syrup | 1.37 |
| Honey | 1.42 |

The numbers in this table are based on the manufacturers’ data for each item. Densities may vary from brand to brand. You’ll notice that according to the number, rubbing alcohol should float on top of the lamp oil; however, we know from our density of liquids experiment that the lamp oil is the top layer. Chemically speaking, lamp oil is nothing more than refined kerosene with coloring and fragrance added. Does every brand of lamp oil exhibit the same characteristics? Sounds like the foundation of a great science fair project!

\*Recipe from https://www.stevespanglerscience.com/lab/experiments/seven-layer-density-column/