Date: _____ Name: _____

Density Towers Experiment

This activity was created by Alora.

Here's an activity that will let you play with density, viscosity, and buoyancy. Let's make a tower of liquids!

DEFINITIONS

DENSITY is the mass of a liquid per unit volume. It is kind of like the "heaviness" of a substance. If we have the same volume of two liquids, the one that has a higher density will be heavier. In your density tower, you'll be able to see distinct layers because of differences in liquid densities.

VISCOSITY is the rate at which a liquid flows while it's moving, like when it's being poured from one container to another. For example: honey flows slowly compared to water, and has a high viscosity.

BUOYANCY is the ability to float on top of a liquid. The buoyancy of an object depends on the density and shape of that solid object. A solid object can only float on top of a liquid that is denser than the solid itself.

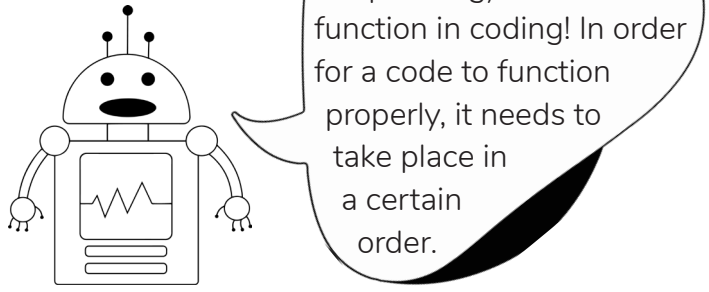
Using the signs < and > estimate which liquid has a higher density or viscosity!

DENSITY

Honey	Canola Oil
Water	Maple Syrup
Rubbing Alcohol	Corn Syrup

VISCOSITY

Water	Honey
Coffee	Ketchup
White glue	Canola Oil



Use this diagram to record all the data from your density tower experiment!

Liquid density
(draw and label the different liquid layers in order)

Solid buoyancy
(draw the different objects and where they settled)

SLO: 8-3-01, 8-3-06, 8-3-08

Turn the page to continue this activity!

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MATERIALS
- Tall, clear container or vase
- Food colouring (optional)
- Small cups (one per liquid)
- Paper towel
- Masking tape
- Permanent marker

LIQUIDS
- Honey
- Corn syrup
- Pancake syrup
- Milk / Cream
- Dish soap
- Water
- Vegetable oil
- Baby oil
- Rubbing alcohol

TEST OBJECTS
- Bolt
- Plastic bead
- Popcorn kernel
- Macaroni noodle (uncooked)
- Rice

If you don't have some of these liquids or test objects, you may just omit them from the experiment. This just means your tower won't have quite as many layers which is totally okay!

1. Line up the small cups, and label each one with the name of one of the liquids you'll be using in the density tower. In order to have things run smoother, put them in order from most dense to least dense. **Hint:** They are in order in the material list, from densest (honey) to least dense (rubbing alcohol)
2. Mark the same place on each cup up to which you will fill it with your liquid. Make sure they're as close to the same level as possible on each individual cup.
3. Test the size of your density tower container:
   a. Take one of the cups and fill it up to the line with water. Put this cup of water into the large container that will hold your density tower.
   b. Repeat this until you have done it as many times as you have liquids (eg. if you are using all 9 liquids, do this step 9 times in total). This will ensure the large container can hold all of the liquid you have planned. If it doesn't hold all of the "cups" of water, you need a larger container or need to use a smaller volume of each liquid.
   c. Once you have verified your container is a good volume, empty it and return to the experiment!
4. Fill each cup with its respective liquid up to the mark you determined was a good volume. **Optional:** Colour the water cup with food colouring to make it a more distinctive layer.
5. Start adding liquids from the densest to the least dense into the density tower container. Be sure to add layers slowly to prevent disrupting the layers!
   a. When adding the liquids with high viscosity (honey, syrups, milk, and soap), try your best not to touch the sides of the density tower container while you pour them. They will stick and make for messier layers.
   b. When adding the liquids with low viscosity (i.e. water, oils, and rubbing alcohol), try to pour them down the sides to prevent disturbing the layer underneath.
6. Allow some time for the layers to settle! A couple of minutes should do.
7. Observe the distinct layers of your density tower and draw it out on the previous page!
8. Test the density / buoyancy of the solid materials! Allow some time between objects for the layers to form again before dropping in the next object.
   a. Order them from heaviest to lightest and simply drop them into your density tower.
   b. Document on the next page where the object stopped in your density tower.
   c. Try dropping in other small items that weren't listed above.