

# TOWER OF LIQUIDS

Create a layered liquid rainbow.

Almost anyone can make a tower of blocks, but it takes a scientist to make a tower of liquids. That's because stacking liquids requires that you know something about density. The liquids here all have different densities, so they don't mix, and they are arranged in order, with the most dense on the bottom.

## MATERIALS

Pint-size (or larger) mason jar, preferably with smooth sides

Several smaller containers for holding the liquids

Spoon or small spatula

Turkey baster, oral medicine syringe, or large eyedropper

Liquids (in order of density\*)

- Honey
- Light corn syrup
- Milk
- Dishwashing soap
- Water, tinted with food coloring
- Vegetable oil

Small objects to float on the layers, for example:

- Small screw or bolt
- Grape
- Ping-Pong ball
- Small rubber ball
- Large paper clip
- Small toys

*\*You do not need to use all of the listed liquids, but you do need to follow the order from most to least dense.*



## INSTRUCTIONS

- 1** Place an equal amount of liquid in each of the smaller jars (except for the honey, which is easier to add right from its container). We used 4 ounces of each to fill a quart jar.
- 2** Carefully pour a layer of honey into the bottom of the jar. Try to avoid getting any on the sides so you can see the other layers better.
- 3** Add the corn syrup by holding a spatula or long-handled spoon inside the jar and pouring the liquid over it. This method makes the corn syrup land more gently and prevents the layers from mixing.
- 4** Add the milk, soap, water, and oil using a turkey baster, syringe, or eyedropper, slowly adding the liquids in small amounts to avoid mixing the layers. Try dribbling the liquid down the side of the jar rather than down the center. Rinse the tool before adding a new layer to avoid contamination. These layers take patience!

## What to Watch For

If some layers look at first like they have mixed, don't worry. After a few minutes they should separate. When you are done, you should have a neatly stacked tower of variously colored liquids.

## Take It Further

Gather various small objects made of different materials, such as a metal screw, a large button, a grape, and a Ping-Pong ball. Once your layers are stable, gently drop one object at a time into the jar and observe what happens. Each object will sink until it reaches the level of liquid that has a greater level of density than it does.



## What's Going On

The layers in the tower stay separate because they have been stacked according to their density. Density is not the same as weight, but it's related: it's how heavy a thing is combined with how big it is. So a small thing that weighs a lot, such as a gold coin, is dense, while a large thing that's light, such as Styrofoam, is not. If two things are the same size, the heavier one is more dense.

The density of a solid object determines if it will sink or float in a liquid. And as the Tower of Liquids shows, less dense liquids float on top of more dense ones.







