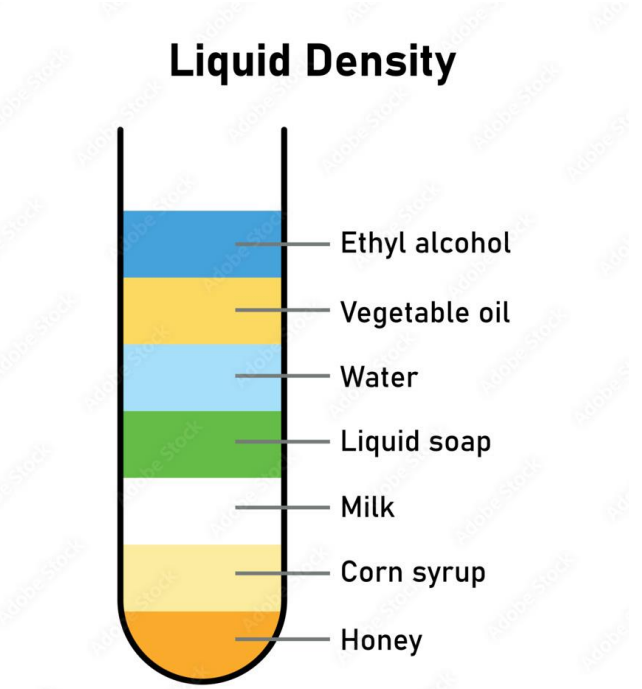
Density Distraction

Try It Out

Shake up the bottle until the beads are mixed together. Set the bottle down and watch. What happens to the beads? Keep watching for about 30 seconds. Did you see another change? How do you explain this?

What's going on?

You may have guessed the two colors of beads have different *densities*, causing one to float to the top and the other to sink. But the confusing part is that they meet again in the middle! It turns out the liquid in the bottle is not a homogenous solution. It's part isopropanol, and part salt water. These two can be mixed together, but they slowly separate, and the beads' densities are in-between the density of the lighter isopropanol and the heavier salt water.



Densities of a few common liquids. Adding salt increases the density of water. (Image: Adobe)

What's the big deal?

A salt can bond easily with water but not with organic liquids like isopropanol. If an organic compound is in solution and it needs to be separated, adding a salt may be the answer. This **Salting-Out Liquid-Liquid Extraction** technique, or SALLE, has a number of fascinating applications. One important example is in monitoring therapeutic drugs in the blood, to make sure patients are on the appropriate dosage.

Wonder While You Walk...

What do you think would happen in this experiment if you ran it again without salt in the water?