



MONTSHIRE AT HOME: DENSITY



Activity: Liquid Rainbows

Have you ever wondered how liquids can stack on top of each other instead of mixing together? It's because they have different densities and don't mix well together.

See this in action! Create a liquid rainbow. Use density to colorfully layer salt solutions.

Materials

- ▶ 2 cups of water
- ▶ 1 empty cup (for waste water)
- ▶ Test tube (or other clear, skinny container)
- ▶ Pipette (substitutes: eye dropper, straw, syringe)
- ▶ 1 tablespoon of salt
- ▶ Spoon
- ▶ Food coloring, 2 colors

Instructions

1. Add salt to one cup of water. Stir and observe. What do you notice happening in the cup?
2. Stir until most of the salt is dissolved. Allow the water to settle until it is almost clear again.
3. Add 2–3 drops of food coloring into the salt water and fresh water cups. How does the food coloring behave in each cup? Why do you think this is happening?

NOTE: If you and a buddy are each doing your own project, add one color to your cups and a different color to your friend's cups. This will help later on in the experiment.

4. Add a few more drops of food coloring in each cup to darken the color. Stir to mix.
5. If you and a friend made different colored solutions, trade your fresh water with your friend's fresh water. If not, get another cup of water and make it a different color.
6. One at a time, add the 2 colored solutions to the test tube to try and get them to layer (not mix together). Which solution, salty or fresh, do you think should go in first?
7. Use the empty cup as a waste container to dump out your test tube and try again!

What's Going On?

Density is the amount of mass in a given volume. By dissolving salt into one of the water cups, we gave that water a bit more mass and increased its density. If carefully added to the test tube in the correct order, the more dense salt water will layer under the fresh water.

Challenge

After you've tried a few times and have started to fill the waste cup, you now have a third solution. What is the density of this water? Could you use it to make a three-layered rainbow?