

# DIY Air Force Activities:

## Densely Layered Rainbows



### Materials:

- table salt (~ 21 tsp)
- eyedropper or small syringe
- 6 clear plastic cups (same size)
- water (~ 6 cups)
- 1 Teaspoon and 1 cup measuring tools
- food coloring

Have you ever wondered what makes something float? This seemingly magical phenomena is related to density, or the amount of mass a substance has in a given space or volume. For example, think about the difference between packing a suitcase in a messy fashion vs folding clothes carefully. The carefully folded suitcase will be heavier, and it will hold more clothes than the first. This is like atoms in matter- the tighter they are packed, the greater the object's mass. There is more mass in the same volume. When we dissolve a substance like salt in water we are adding more mass to that volume of water, and therefore changing the density of the liquid. Liquids of different densities will stay separated, with the "heaviest" at the bottom and the "lightest" at the top. We can use this scientific fact to create amazing liquid rainbow layers.

### Directions

1. Arrange 6 cups in a row, label them 1-6.
2. In the first cup add 1 teaspoon (tsp) of salt, in the second add 2 tsp of salt, in the third add 3 tsp of salt, in the fourth add 4 tsp of salt, in the fifth add 5 tsp of salt, and in the sixth glass 6 tsp of salt.
3. Add 1 cup of warm tap water to each of your plastic cups containing salt. Mix thoroughly!
4. Use the food coloring to dye each cup of salt water a different color of the rainbow: 1. Red (2 drops red), 2. Orange (1 drop red, 1 drop yellow), 3. Yellow (2 drops yellow), 4. Green (1 drop yellow, 1 drop blue), 5. Blue (2 drops blue), 6. Purple (1 drop blue, 1 drop red). Gently stir.
5. Take your eyedropper, squeeze all the air out of it, and starting with the red, dunk the dropper in the liquid about a half an inch and draw up a small amount (do not release the dropper all the way and do not squeeze it more). Continue with all the cups in order to grab a bit of color from each!

Each cup has an increasing amount of salt and therefore is more dense than the last allowing you to stack the liquids! You can also try this experiment with sugar instead of salt!



### Air Force Associations:

In the atmosphere, air density decreases as altitude increases. This explains why airplanes have a flight ceiling, an altitude above which it cannot fly. As an airplane ascends, a point is eventually reached where there just isn't enough air mass to generate enough lift to overcome the airplane's weight.