A Colourful Density Experiment

October 03, 2024 / DIY / STEM Activities / Chemistry / Ages 6 - 8 / Rainbow In A Tube

Explore the mysteries of colour mixing and density through this simple yet artistic science project!

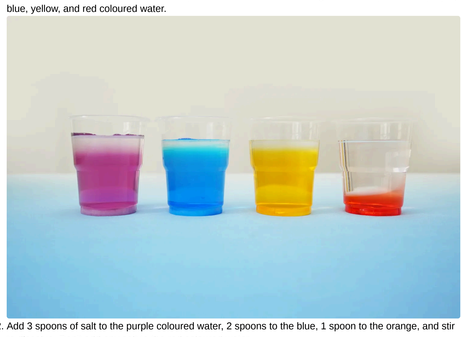
- Age: 6-8
- Time: Less than 30 minutes
- Mess Level: Messy

Materials Needed:

Food colouring
Water
Salt
Stirring stick
Cups
Test tube or clear bottle
Dropper
Spoon

Step-by-Step Instructions:

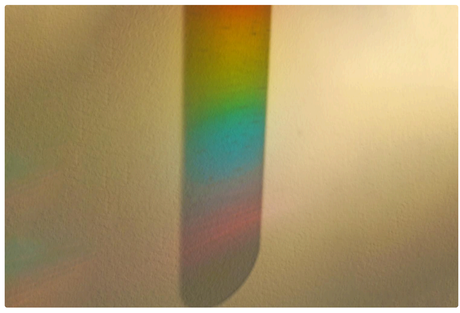
1. Pour 100ml of water into four separate cups. Add different food colourings to each cup to create purple, blue, yellow, and red coloured water.



2. Add 3 spoons of salt to the purple coloured water, 2 spoons to the blue, 1 spoon to the orange, and stir to dissolve. Don't add any salt to the red coloured water.

3. A hand is adding a small amount of white powder, likely sugar or salt, to a clear plastic cup containing a layered liquid. The cup is one of four arranged in a row on a light blue surface, each cup containing a different coloured liquid, creating a rainbow effect. The colours are vibrant and distinct, showing purple, blue, yellow, and red. The background is a plain, off-white wall. The image shows a step in a density experiment, focusing on the addition of a substance to alter the density of one of the layers.

4. Did you notice that a new colour appears where two solutions meet? You can take your completed rainbow to observe in sunlight or shine a light through it to create a beautiful rainbow projection on the wall.



The Science Behind It:

The purpose of adding salt to the coloured water is to increase the density of the solution. Different amounts of salt result in different densities of the coloured water. Solutions with higher density will sink, while those with lower density will float. When we add the solutions in order from highest to lowest density, they stack in layers, forming a relatively stable state, which is the rainbow we see.

Did you notice that we created 7 colours of the rainbow using only 4 colours? Why is this? This involves colour mixing. Using just red, yellow, and blue, and adjusting their proportions, we can create an endless variety of new colours. Try mixing your favourite colours at home.