Red, White, and Blue II - Demonstration

This colorful demonstration illustrates the rule "likes dissolve likes" by combining three immiscible liquids to create a density column.

Materials
- Blue lamp oil
- Whole milk
- Light corn syrup
- Red food coloring
- Tall form 400 mL beaker

Substitutions
- red lamp oil
- blue food coloring
- tall plastic or glass jar

Procedure
1. Wrap the outside of the beaker loosely with aluminum foil so that you can pour your liquids into the glass and can uncover the glass easily by removing the foil.

2. Add several drops of red food coloring to the light corn syrup and invert several times to mix. (If you are using red lamp oil, substitute blue food coloring.)

3. Slowly pour the three liquids into the glass in the order: a) red colored syrup, b) milk, and c) blue lamp oil. The more slowly you are able to pour the liquids, the less mixing that occurs.

4. Ask the students what color will result from mixing red, white, and blue. Then lift the aluminum foil mask to reveal three layers, with the red syrup on the bottom, white milk over the syrup, and blue lamp oil on top.
Teacher's Notes

Because the milk is not exposed to air, the density column will be stable for several days. The oil will retard spoilage of the milk.

Most discount stores will carry colored lamp oil. The colors available often depend on the season. You can color your syrup differently to adjust for the color of the lamp oil that is available.

The order of mixing isn’t crucial. To obtain maximum separation of the layers you should pour the liquids in the order suggested. There are two points to consider:

a. The relative densities of the liquids determine the order of liquids in the column, with the least dense liquid on the top, the most dense on the bottom.

b. The polarities of the liquids prevent mixing. The oil and syrup will be relatively non-polar, while the milk is relatively polar.

Disposal

All substances can go down the drain with copious amounts of water for disposal.