

Name _____

Polarity of Solvents: Dr. Slotsky Chemistry I

Part I: "Like mixes with Like" - Polarity of ethyl alcohol (C_2H_6O) and ethyl acetate ($C_4H_8O_2$)

Solvents have a property called 'polarity'. Water is a very polar solvent, and vegetable oil is very nonpolar. Solvents with similar polarities will MIX easily. Solvents with very different polarities will NOT MIX.

Label 4 test tubes with masking tape. Label one as "Water", another as "Oil", another as "Alcohol", and another as "Ethyl Acetate". Fill them up with 1-2" of the appropriate solvent. As ethyl acetate is highly flammable, I will dispense it to you. You may dispense your own water, oil, and alcohol.

Use other test tubes to test which solvents are able to mix with each other. You may have to swirl and let it settle. Do NOT point the tube at anybody after mixing, as it may squirt. When you have finished testing a mixture, dispose of the solvents in the WASTE JUG. Do NOT pour them down the drain!

Does water mix with alcohol? _____ Does water mix with ethyl acetate? _____

Does water mix with oil? _____ Does alcohol mix with ethyl acetate? _____

Does alcohol mix with oil? _____ Does ethyl acetate mix with oil? _____

Given this information, please order the solvents from MOST POLAR to LEAST POLAR:

_____ > _____ > _____ > _____

When you are finished, clean all test tubes with SOAP and a test tube brush! You can check if a tube is clean by filling it with water. If it is cloudy or has blobs of oil floating in it, it is not clean yet!

WARNING: ALCOHOL AND ETHYL ACETATE ARE TOXIC AND HIGHLY FLAMMABLE. DISPOSE OF ALL WASTE FROM THIS EXPERIMENT IN THE PROVIDED WASTE JUG. DO NOT POUR ANY DOWN THE DRAIN.

Part II on back →

Name _____

Part II: "Like dissolves like" – Polarity of food coloring dye and permanent marker dye

A variety of food colorings and permanent marker dyes are available. Choose a pair with different colors. I will give you a mixture of the 2 dyes, which you will need to separate.

Food coloring color: _____

Permanent marker dye color: _____

Put 50 mL of water in a beaker, and add 25 mL of ethyl acetate. Add the dye and swirl the entire mixture around until it is thoroughly mixed up. Allow it to settle and it should break up into a water layer and an oil layer again. If it does not completely separate, add about a teaspoon of sodium chloride, stir to dissolve, and allow to separate again.

The water layer is the BOTTOM layer. What is its color? _____

The oil layer is the TOP layer. What is its color? _____

Substances with high polarity dissolve easily in water, while nonpolar substances dissolve easily in oil.

Which is more polar, the food coloring or the permanent marker dye? _____

Make your own Lava Lamp! Swirl your mixture and watch the 2 colors. Add a tablet of Alka-Seltzer to keep things bubbly and interesting.

OIL DOES NOT GO DOWN THE DRAIN. A waste jug for oil and a funnel will be made available to you. When you are finished, pour your top layer (oil layer) into the jug. The bottom layer (water layer) can go safely down the sink drain.

Wash your beaker with soap and a test tube brush. Test if it is clean by adding water – if it looks cloudy or there are blobs of oil floating around in it, the beaker is not clean yet!