ACTIVITY 2.2 EXPLORING THE NON-POLARITY OF OILS

You will need:

- a plate
- water
- vegetable oil
- eye dropper
- drop of soap (optional)

What to do:

Pour some water onto the paper plate so that it is filled but not overflowing. Fill the eye dropper with oil and squeeze out drops of oil here and there onto the surface of the water. Then experiment with moving the oil droplets around with your finger or the end of the dropper. Investigate the answers to the following questions:

What happens when two drops touch?
How close can they come without joining?
If you stir the water a bit, will the droplets randomly bump into each other and join together?
Why do they join?
Can you pull all the oil droplets together into one big clump?
Are oil droplets ever any other shape besides round?
How small can the oil droplets be?
What happens if you add a small drop of soap? Does this help you get smaller oil droplets?

Discussion:

Oil is non-polar. Oil molecules are not attracted to water molecules. In fact, oil is said to be "hydrophobic" which means "water hating" or "afraid of water." Oil will try to stay away from water. Oil molecules will try to get together and create a place that is water-free. Of course, some unlucky oil molecules are going to get stuck on the outside of the oil circle, touching water molecules. Oil would like to keep the number of unlucky molecules as low as possible, and it turns out that a circle is the shape that will have the smallest outer surface area. If oil formed a square or a triangle or any other shape, the ratio of molecules on the outside versus the inside would be less than ideal. A circle gives the greatest number inside and the lowest number on the outside. This is in two dimensions, of course. What shape would be ideal in three dimensions? What do you call a 3-dimensional circle? We will see this in lesson 5.