

SOAP POWER!

Soap is our best weapon against viruses.

Learn why with this lesson!

Experiment 1: Dissolving Oil in Water

Usually oil and water don't mix. This makes it hard for water to wash away oil, grease, and fats. Viruses come in a fatty shell that repels water. What do we do?

In this activity, we'll see how soap attaches to oil, letting the water dissolve the oil.

Materials

- glass or plastic bottle or jar
- water
- oil
- liquid dishwashing soap
- food coloring (optional)

Procedure

- Fill bottle about half way with water
- (Add food coloring if you want)
- Add some oil

- Seal your bottle and shake. Notice how the oil separates after about a minute or so.
- Now add a few drops of dish soap to the bottle and shake. Notice how the water becomes cloudy and less oil separates to the top. Some of the oil is dissolving into the water, because of the soap.

Explanation

Water molecules are made up of one oxygen atom and two hydrogen atoms. This makes water molecules polar, which means that they are like little magnets with a positive and a negative side. Water is able to dissolve other polar molecules like salt and sugar. Water's charge helps it break up the chemical structures of other molecules.

Oils, by contrast, are nonpolar, and don't stick to the magnetic water molecule. In fact, oils are hydrophobic, or "water fearing." Instead of being attracted to water molecules, oil molecules are repelled by them. Therefore, when you add oil to a cup of water the two don't mix with each other. Because oil is less dense than water, it will always float on top of water, creating a surface layer of oil.

Soap is polar at one end so it can stick to water. But it also has a tail that sticks to oil. This lets soap molecules stick to oil and fat. Then the water sticks to the soap and pulls apart the oil, dissolving the oily mess.

Similarly, soap and water can pull apart the oily shell of a virus.