

# Experiment 6

## Make it Mix!

Materials needed:

plastic cups  
the following food items

- milk
- water
- juice
- oil
- melted butter
- liquid soap

In this experiment the students will observe mixtures. They will see how liquids that are similar will mix and liquids that are not similar will not mix.

### I. Think about it.

Help the students answer the questions in Section I. Have them think about what might happen if they added milk to water, or milk to juice or water to oil. Their answers may vary. Help them record their answers in the blanks provided.

### II. Test it.

Help the students set up Section II. In two sets of plastic cups, have the students add 1/2 cup of the following:

water (2) cups

milk (2) cups

juice (2) cups

oil (2) cups

melted butter (2) cups

Using a third cup as the test cup, have the students pour a little (1/8 cup) of water into a little (1/8 cup) of milk. Have them observe what happens and then record their results. Help them identify when two liquids mix. When two liquids mix, they won't be able to tell where one liquid starts and the other ends. When they don't mix, droplets of one liquid will be visible in the other.

Make sure they do not confuse a color change with not mixing. The liquids could change colors, but will be mixed if there are no droplets visible.

It is not necessary to test every combination. At a minimum have the students test oil and water, oil and milk, and oil and butter.

Their results should be as follows:

	water	milk	juice	oil	butter
water	<i>mixed</i>	<i>mixed</i>	<i>mixed</i>	<i>not mixed --&gt; oil droplets visible</i>	<i>not mixed --&gt; butter droplets visible</i>
milk	<i>mixed</i>	<i>mixed</i>	<i>mixed</i>	<i>slightly mixed</i>	<i>slightly mixed</i>
juice	<i>mixed</i>	<i>mixed</i>	<i>mixed</i>	<i>not mixed --&gt; oil droplets visible</i>	<i>not mixed --&gt; butter droplets visible</i>
oil	<i>not mixed --&gt; oil droplets visible</i>	<i>slightly mixed</i>	<i>not mixed --&gt; oil droplets visible</i>	<i>mixed</i>	<i>mixed</i>
butter	<i>not mixed --&gt; butter droplets visible</i>	<i>slightly mixed</i>	<i>not mixed --&gt; butter droplets visible</i>	<i>mixed</i>	<i>mixed</i>

## II. Continued - Test it with soap.

Have the students repeat the experiment with soap. Using the same cups, add 1 teaspoon of liquid soap to one set of cups. The students should observe that soap doesn't change the liquids that already mix [e.g. water and juice], but makes the oil "mix" a little better into water and juice. Their result will vary, but may look as follows:

	water	milk	juice	oil	butter
water + soap	<i>mixed</i>	<i>mixed</i>	<i>mixed</i>	<i>somewhat mixed</i>	<i>somewhat mixed</i>
milk + soap	<i>mixed</i>	<i>mixed</i>	<i>mixed</i>	<i>somewhat mixed</i>	<i>somewhat mixed</i>
juice + soap	<i>mixed</i>	<i>mixed</i>	<i>mixed</i>	<i>somewhat mixed</i>	<i>somewhat mixed</i>
oil + soap	<i>somewhat mixed</i>	<i>somewhat mixed</i>	<i>somewhat mixed</i>	<i>mixed</i>	<i>mixed</i>
butter + soap	<i>somewhat mixed</i>	<i>somewhat mixed</i>	<i>somewhat mixed</i>	<i>mixed</i>	<i>mixed</i>

### III. What did you discover?

Help the students answer the questions in Section III. They should have observed that oil and butter do not mix with either water or juice. They also should have observed that oil mixes somewhat with milk and better with butter.

By adding soap, the students should have observed that oil mixes a little better with water and juice and much better with milk and butter.

### IV. Why?

Discuss Section IV with the students. Explain to them that liquids that are "similar" mix well and liquids that are not "similar" do not mix well. Juice is similar to water because juice is mostly water, so juice and water mix well. Milk is a colloid, but will still mix well with water and juice, because milk is mostly water. Oil and butter are similar because both oil and butter are fats. Oil and water are not similar, so oil will not mix well with either water or juice.

Explain the "rule," that similar liquids mix and dissimilar liquids do not mix.

Explain that soap is both a little bit like water and a little bit like oil, so soap mixes in both types of liquids. Because soap is like both water and oil it "dissolves" oil in water. This is why soap works as a cleaner.