# Oil and Water Emulsion

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**Abstract**

In my experiment, I observed what happens when you mix colored water, oil, and dish soap. Water was poured into a regular soda bottle with a couple drops of food coloring in the bottom. Oil was added to the mixture and the top was screwed onto the bottle. The bottle was shaken for five seconds and then set on the counter and was observed for one minute while the oil and water separated. The lid was taken back off and dish soap was added. With the cap back on, the bottle was shaken for another five seconds. While observing for a minute, the oil and water did not separate, but became one new liquid.

# Table of Contents

Introduction…….. 4

Method…… 4

Materials……4

Procedures……5

Results……5

Discussion……5

Conclusion……6

References……6

## Introduction

The purpose of this experiment was to observe the behavior of oil and water when mixed. Then, add dish soap and observe again. When you add the dish soap, it creates what is called an emulsion. The soap molecules are attracted to both the oil molecules and the water molecules, so it all mixes together in one layer. This concept is especially important in cooking. You can use eggs to bind ingredients to make a cake, or use mustard or another sauce to make salad dressing. All this can be ascertained, when we ask, 'What happens when we mix oil and water?'

## Method

2 tablespoons of water was poured into a regular soda bottle with a couple drops of food coloring in the bottom. 2 tablespoons of oil was added to the mixture and the top was screwed onto the bottle. The bottle was shaken for five seconds and then set on the counter and was observed for one minute. The lid was taken back off and 2 tablespoons of dish soap was added. With the cap back on, the bottle was shaken for another five seconds. Observe for one minute.

## Materials

- Plastic soda bottle
- 2 tablespoons water
- Food Coloring (red, blue, or green, no yellow)
- 2 tablespoons canola oil
- 2 tablespoons dish soap
- Clock

## Procedures

1. Gather materials.
2. Pour 2 tablespoons water mixed with 2-3 drops of food coloring into the soda bottle.
3. Pour 2 tablespoons of canola oil into bottle.
4. Screw on cap and shake bottle for 5 seconds. Set on counter and observe for 1 minute.
5. Add 2 tablespoons of dish soap to bottle. Repeat step 4.
6. Repeat as many times as necessary for proper observation.

## Results

The oil and colored water did not mix by themselves when shaken. When dish soap was added however, both the oil and water mixed with the soap to create one liquid.

## Discussion

The results show that the dish soap is attracted to both the water and the oil. Because there was only 2 tablespoons of dish soap, and 4 tablespoons of other liquids, only some of the oil and water mixed together, to create a third layer in the middle of the previous two. This layer was an emulsion of all three liquids.

## Conclusion

In this experiment, the object was to observe what happens when you mix colored water, oil, and dish soap. Water was poured into a regular soda bottle with a couple drops of food coloring in the bottom. Oil was added to the mixture and the top was screwed onto the bottle. The bottle was shaken for five seconds and then set on the counter and was observed for one minute while the oil and water separated. The lid was taken back off and dish soap was added. With the cap back on, the bottle was shaken for another five seconds. While observing for a minute, the oil and water did not separate, but became one new liquid. This liquid is called an emulsion. Because I didn't have enough dish soap, not all of the water and oil was included in the emulsion. To avoid this next time, I would add 4 tablespoons of dish soap. This was the only discrepancy in the experiment.

## References

"Mixing Oil, Water & Detergent - Fun Science Experiments for Kids. *"Mixing Oil, Water & Detergent - Fun Science Experiments for Kids*. N.p., n.d. Web. 15 July 2015. < http://www.sciencekids.co.nz/experiments/oilandwater.html >.