If Mixing Is Urgent–Try Detergent! from Celebrating Chemistry

Normally, oil and water do not mix together very well. This fact makes it hard for water to wash away oily dirt. Detergent can help water and oil mix together. This mixing helps the water wash the oil away. You can try the following activity to see how much detergent really helps oil and water to mix!

Materials

White index card
1 Zip-closing plastic bag
Masking tape
Marker or ballpoint pen
Measuring spoons
3 Small disposable paper or plastic cups (3 oz.)
Water
Food coloring (blue, green, or red)
Vegetable oil
Liquid dish detergent
Dropper
Toothpicks

ADAPTATION: To see this experiment better, try using a magnifying lens and a flashlight.

SAFETY! *SAFETY: Be sure to follow Milli's Safety Tips! Do not drink any of the water samples in this activity.*

Procedure

1. Place the index card inside the plastic bag and close the bag.
2. Use the masking tape and pen to label one of the cups "vegetable oil", another "water" and the third "detergent".
3. Place about 1 tablespoon of water into the "water" cup. Add 1 drop of food coloring to the water and swirl to mix.
4. Place about 1 teaspoon of vegetable oil in the cup labeled "vegetable oil", and about 1 teaspoon of dish detergent in the cup labeled "detergent".
5. Use your dropper to place about six drops of colored water on the plastic bag.
6. Do the same thing on another spot on the bag so that you have two large drops of colored water on the bag in separate places.
7. You can use the same dropper to add a few drops of oil to the water in each area. Does the oil mix with the water or does it stay separate?
8. Use a toothpick to stir the water and oil in one of the areas. Does the oil stay mixed with the water, or does it separate when you stop mixing?
9. Dip a clean toothpick in the liquid dish detergent. Use this toothpick to stir the other area of oil and water. Does it look like the oil and water are mixing any better than they did without the detergent? Keep stirring to see how well the oil and water can be mixed. Does the oil mix with the water now? If the oil and the water are not mixing completely, you may want to dip the toothpick in the detergent again, and then stir the oil and water some more.
10. Describe what you saw in the table found in the "What Did You Observe?" table.
11. Thoroughly clean the work area and wash your hands.

Try this...

Detergent is used to get the oil and grease off pots, pans, and dishes. Shampoo and soap are used to get oils off your hair and skin. If detergent helps grease and water to mix, what do you think would happen if you tried the same activity with shampoo or soap? Try it and see! Be certain to follow all safety precautions.

Where's the Chemistry?

Water and oil do not mix with each other, because they are very different kinds of materials. They feel different when you touch them, and they act differently when you drop them on to a plastic sheet. Detergents are special kinds of materials that can dissolve in both water and oil. Because the detergent can mix with both the oil and the water, it allows these two very different materials to mix together.

What Did You Observe?

Mixing Oil with Water

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Mixing Oil, Water, and Detergent

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The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".