

When a solid dissolves in a liquid, the solid breaks apart into tiny pieces that mix with water and become one solution. But what does it mean for a liquid or a gas to dissolve in a liquid? Try the following activity to find out!

Materials:

- 3 clear plastic cups
- Water
- Powdered drink mix (Kool-Aid Grape works well)
- Food coloring (blue and yellow)
- Carbonated water
- Salt or sugar
- M&Ms (plain works best)
- Straw

Procedures:

1. Pour water into two plastic cups until they are about $\frac{3}{4}$ full.
2. Place 1 drop of blue and 1 drop of yellow food coloring into one of the cups. Do not stir.
3. Place a small amount of drink mix on the surface of the water in the other cup. Do not stir.



4. Watch both cups from the side. What do you observe?
5. Stir the contents of both cups. Look at the solutions in the cups. What happened to the solid drink mix and the liquid food coloring? Why do you think that you cannot see them as separate from the water any more?

6. Fill another clear plastic cup about $\frac{3}{4}$ full of carbonated water. The bubbles you see are carbon dioxide gas. Sprinkle a little salt or sugar on the surface of the soda. What do you notice? Do you think there is more gas in the soda that you cannot see?



7. Place an M&M in the soda and see if more gas bubbles form. Do you think that carbon dioxide gas is dissolved in the water?

Think about this ...

Dissolving solids, liquids, and gases is more important than you may realize. All the solid and liquid foods that we eat and drink need to be broken down by our digestive system and the nutrients finally dissolved in our blood so that we can use them. The same is true of the oxygen gas we breathe. It also needs to be dissolved in the blood in order to be used. If it wasn't for dissolving solids, liquids, and gases humans and other living things could not survive.

Where's the Chemistry?

When a substance is added to a liquid, in this case water, the substance may break apart to different degrees. If the substance breaks apart so much and becomes so intermixed with the water that you cannot tell them apart, then the substance has dissolved in the water and the combination is called a solution. That is what happened with the solid drink

mix and the liquid food coloring. They became so completely combined and thoroughly intermixed with the water that they became one solution. The gas in the carbonated water was already so thoroughly intermixed with the water that it was a solution of carbonated water. Placing salt, sugar, or an M&M in the water gave the gas a surface on which to attach and collect and form into a bubble that floated to the surface.



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".

