Ice: The Hard Facts!

When water freezes, the water molecules arrange themselves in a special way to form ice crystals. The crystals repeat themselves over and over again to form a nice hard piece of ice. But what happens if water has something dissolved in it already like salt or sugar? Let's do an experiment to find out!

Materials:

- Water
- 3 clear plastic cups
- Salt
- Sugar
- Tablespoon
- Masking tape
- Pen
- Popsicle stick

Procedures:

1. Use your masking tape and a pen to label your three cups fresh, salt, and sugar. Add about ¼ cup of water to each cup. Do not add anything to the cup marked "fresh".

2. Add 1 tablespoon of salt and 1 tablespoon of sugar to their labeled cups. Stir until no more salt or sugar will dissolve.

3. Make a prediction about which liquid you think will freeze first. How about which one you think will freeze the hardest? Why do you think that?
4. Carefully place the three cups in the freezer where they will not spill. Allow the cups to stay undisturbed in the freezer overnight.

5. The next day, take the cups out of the freezer and observe the ice in each cup. Does all the ice look the same?
6. Try scraping or poking the ice with a Popsicle stick. What do you notice?

Think about this ...

Have you ever noticed how a Popsicle is frozen but it is easier to bite than an ice cube? Based on the activity you just did, what do you think is one of the main ingredients in Popsicles that make them pretty easy to bite even when they are frozen?

Where's the Chemistry?

Water molecules arrange themselves in an orderly pattern when they freeze. But when salt or sugar is dissolved into the water, these substances interfere with the regular ice crystal structure. This makes it take longer for the liquid to freeze and can make the frozen liquid less hard once it does freeze.

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".