



Can Sugar Dissolve to Change the Freezing Point of Water?

Furnished as a Free Service to Home Educators

By

The Backyard Scientist
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The following experiment from the Backyard Scientist was developed expressly for use in newsletters serving home educators. This experiment is NOT contained in the award-winning *Backyard Scientist* books and science kits. As in the *Backyard Scientist* books, it is designed to be simple, fun, and of course to teach an important scientific concept.

Gather the following supplies:

- Bowl
- Thermometer
- Two small plastic cups
- Ice
- Spoon
- Measuring cup
- Water
- ¼ cup Kosher salt
- Sugar packets
- Marker
- Clock or timer
- Pencil and paper to record your observations

Begin experimenting.

1. Fill the bowl with water and ice.
2. Measure the temperature. The ice water is ready when its temperature falls to 0°C.
3. Once the water reaches this temperature add the ¼ cup of salt.
4. Stir well to dissolve as much of the salt as possible.
5. After five minutes, use the thermometer to measure the temperature of the water and salt solution.
6. Label one cup **A** and the other cup **B**.

7. Add 10 ml of ice water (no ice) to each cup.
8. In cup **B**, add ½ packet of sugar.
9. Place both cups **A** and **B** into the bowl filled with salted ice-water.
10. Wait for ten minutes.
11. Observe the contents of cups **A** and **B**.

Can you answer the following questions from your observations?

1. Did the temperature of the water change after salt was added?
2. What temperature did it reach?
3. What happened to the water in cups **A** and **B**?

Backyard Scientist solution to the experiment.

Like the salty ocean water, the salt lowered the freezing temperature of the water in the bowl from 0°C to about -2°C. Any ice in the bowl should have begun to melt.

The water in Cup A began to freeze. The solution of sugar and water in Cup B did not freeze. The sugar lowered the freezing point of the water, preventing it from freezing.

Sugar is glucose. It, like ethyl glycol in anti-freeze dissolves in water forming a solution. Ethyl glycol is used in car and truck engines to reduce the freezing point of the water to prevent the water from freezing and damaging the radiator and engine components.

A substance (solute) dissolves in another substance (solvent) producing a mixture called a solution. Solutes can change the temperature at which liquids freeze. Note: not all mixtures are solutions.

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About the author.

Jane Hoffman, the Backyard Scientist, is the internationally known author of the award-winning *Backyard Scientist* hands on science books and science kits. The nine science books and three kits will excite, motivate and instruct any student. Also available from the Backyard Scientist is the “Parent Guide to Teaching Science.” This work covering grades K –12 helps parents insure they are teaching the science subjects and materials their students should be learning by grade level. Her newest book, *A Science Wonderland for the Very Young* targets children ages 2-7 years.

In addition to writing and developing these exciting materials, Jane is a sought-after speaker at Home School and other educational conferences nationwide where she makes science come alive. Everyone leaves her sessions better informed as well as motivated and enthused to apply the concepts they learned. Hoffman’s teacher inservice workshops for teachers are rated the best available by teachers and administrators. She has been serving the homeschool and educational markets with quality materials for more than 20 years.

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