

SCIENCE FESTIVAL FACILITATOR'S GUIDE



Ice Cream Chemistry

1. Make sure you have the materials you need.

- Milk, cream, or half & half
- Sugar
- Vanilla extract
- Salt
- Ice (in large bowls, if needed)
- (Optional) Additional flavorings/add-ins—for example, chopped fruit or berries, chocolate chips or syrup
- 1/2 cup measures (a few to share)
- Plastic Tablespoons (a few to share)
- 1/4 teaspoon measures (a few to share)
- Plastic, zip-top bags (one large and two small for each student-adult team)
- Towels or gloves
- Plastic spoons or straws to eat ice cream

2. Watch this video on your smartphone:

<https://youtu.be/1RYfd8Q2nKQ>

3. Prepare your station.

- Fill large bowls with ice (try to keep ice readily available at your station).
- Distribute one large and two small zip-top bags to each student-adult team.
- Distribute milk, sugar, vanilla extract, optional flavorings, measuring cups and spoons, ice and salt around the table, where they can be easily shared.
- Have towels, gloves and plastic spoons ready!

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Questions to ask participants before they start:

- Do you know how the ancient Romans and Greeks made ice cream without freezers?
- Who knows how we could use this salt to make ice cream?
- Encourage students to share their ideas for a few minutes. Remember, there are no wrong answers!

Instructions:

Please read each set of instructions out loud. Make sure that you direct the correct person to complete each assigned task.

- **Student:** Add 1/2 cup milk, one Tablespoon sugar, and 1/4 teaspoon vanilla to a small zip-top bag. (Adults, help students measure ingredients if needed.) Choose and add any optional flavorings or ingredients.
- **Adult:** Squeeze out air and seal the bag tightly. Place inside a second small zip-top bag and seal.
- **Student:** Place the bagged ingredients inside a gallon-size freezer bag. Fill the freezer bag halfway with ice, pour in six tablespoons of salt.
- **Adult:** Squeeze out air and seal.
- **Both:** Take turns gently shaking the bag, making sure the ice is evenly spread out. Continue to shake the bag in your hands for 5-10 minutes. You might want to use a towel or gloves, since the bag will be cold and slippery.
- **Both:** When frozen, eat your ice cream straight out of the bag!

How It Works:

Salt makes ice melt by lowering the freezing point of the ice. By lowering the temperature at which ice is frozen, the milk mixture can freeze faster. As the liquid gets colder, it expands, and the molecules slow down. The state of matter changes from liquid (milk mixture) to solid (ice cream).

Vocabulary:

Freezing point: The temperature at which a liquid turns into a solid.

Phase change: When enough energy is added or taken away from an object that it moves from a solid, liquid, gas phase to another phase.

Real-World Application:

This is the same reason people sprinkle salt on icy roads and driveways in cold climates—it melts the ice and makes the surfaces less dangerous for people and cars.

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