What Does Salt Do to Ice?

Estimated Time:
Prep: 10 min.
Activity: 15 min.

Introduction

Overview

Experiment: Students will use salt to melt and refreeze an ice cube over a string "fishing line."

Key Concepts: Students will develop their understanding of states of **matter**, exploring how increasing and decreasing **temperature** can cause water to change from a **solid** to a **liquid** and back again.

Lead-In

Review the states of matter, explaining that water can exist as a **solid** (ice), a **liquid** (water), or a **gas** (steam). Remind students that changing the temperature of water can make it change from one state to another.

Demonstrate what happens to **molecules** when they change states. Tell students that they represent all the molecules in a substance. Explain that when liquids freeze, the molecules **contract**, or move closer together, to form a solid. Group the students in a confined space. They should be packed in and unable to move around easily. Now tell them that you're going to heat things up and turn them into a liquid. Have the students stand in a space that is confined but not too small. They should be able to move around but not spread their arms. Explain that when liquid gets heated it boils and turns into a gas, and the molecules **expand** into the air. Have students spread out around the room. Reverse the process and cool the molecules down.

Tell students that they will explore what salt does to ice.

Teacher Preparation

Teacher-Provided Experiment Materials:
- Salt
- Ice
- Water
- Timer

Try This! Materials:
- Warm water
- 2 clear plastic containers*
- Salt
- Freezer

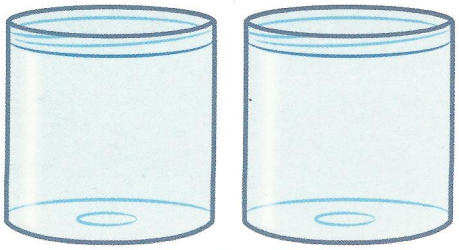
Prepare:
- Make copies of the Experiment Sheet.

**included in kit*

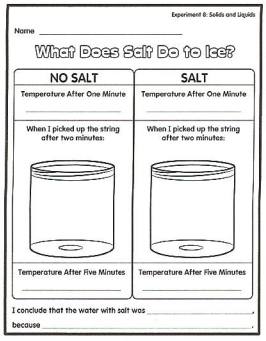
Vocabulary

- **contract** to become smaller
- **expand** to become larger
- **gas** a form of matter that has no shape of its own and fills any container, such as air
- **liquid** a form of matter that flows and takes the shape of its container, such as milk
- **matter** anything that takes up space
- **molecule** the smallest particle of a substance; it has all the properties that make up the substance
- **solid** a substance that is firm or hard and is not a gas or a liquid
- **temperature** how hot something is

You Will Need



2 clear plastic containers



Experiment Sheet

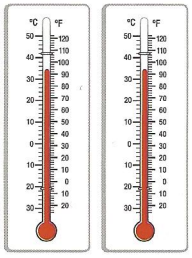
Teacher-Provided Materials

water

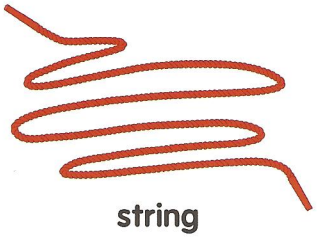
salt

timer

ice cubes



2 thermometers



string

teaspoon

write & wipe marker

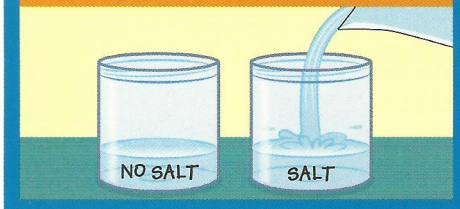
Procedure

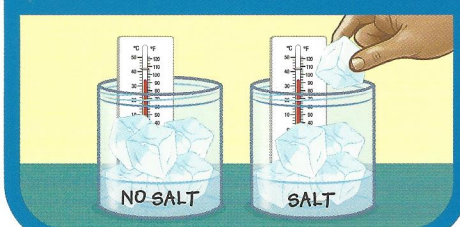
1

Partially fill the containers with water and add six ice cubes to each.

Write "No Salt" on one container and "Salt" on the other.

Take the temperature after one minute.



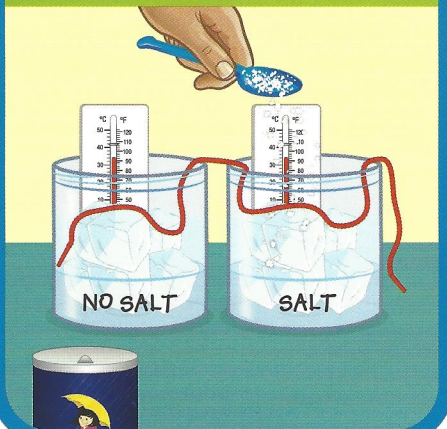


2

Dip the string in water and lay it across the top of the ice cubes in each container. Sprinkle five teaspoons of salt over the ice and string in the "Salt" container.

After two minutes, pick up the string.

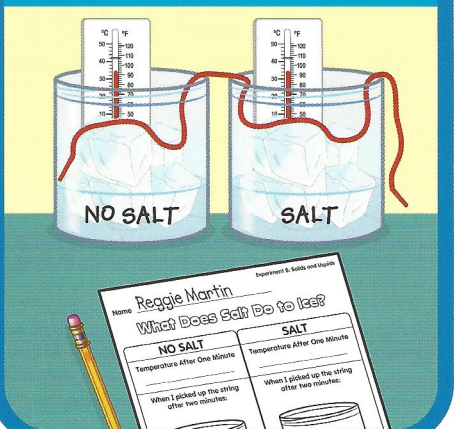
Record your results.



3

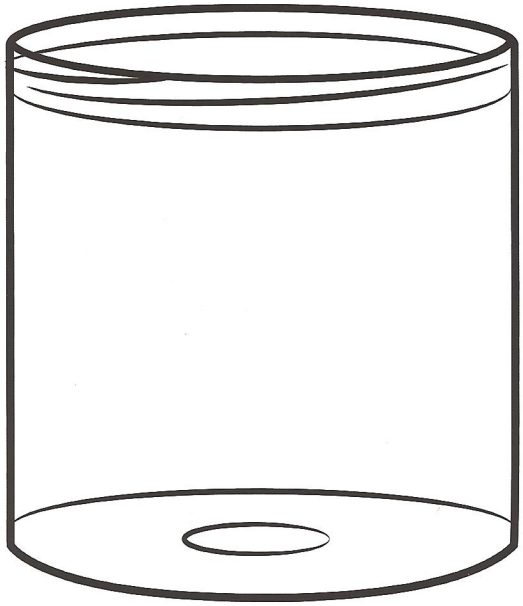
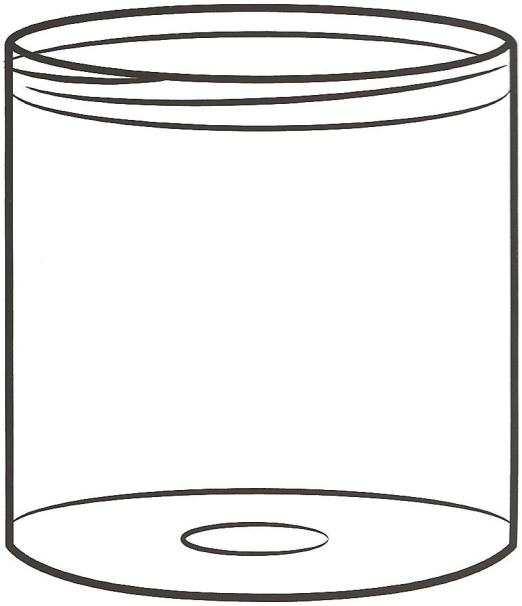
After five minutes, take the temperature of each container.

Record your results.



Name _____

What Does Salt Do to Ice?

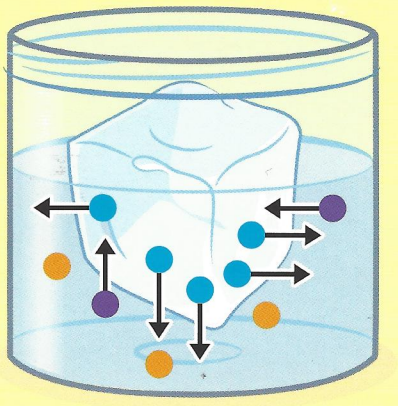
NO SALT	SALT
Temperature After One Minute _____	Temperature After One Minute _____
When I picked up the string after two minutes: 	When I picked up the string after two minutes: 
Temperature After Five Minutes _____	Temperature After Five Minutes _____

I conclude that the water with salt was _____,

because _____.

Why?

When ice is placed in a warm environment, such as a glass of water, an exchange of molecules takes place—with some of the ice molecules escaping into the water (melting), and some of the water molecules being captured back onto the ice (freezing). Adding salt lowers the freezing point of water, making it harder for water molecules to be frozen back onto the ice. The salt "melts" the top of the ice cube momentarily, allowing the string to be saturated with water. The melted water then refreezes onto the ice cube, trapping the string in the ice.



= ice molecule
= salt molecule
= water molecule

Discussion Prompts & Questions

- What happens to a solid when it is heated?
- Is ice a solid or a liquid?
- What is ice made of?
- What makes water freeze? What makes ice melt?
- How are solids and liquids different?

Sentence Frames

- I predict that the salt will make the ice _____.
- I think the water will _____ because _____.
- Ice melts when _____.
- Water freezes when _____.

Try This!

Fill two containers halfway with warm water. Add salt to one container, stirring to dissolve the salt. Keep adding salt until it no longer dissolves. (You may have to add up to ⅓ of a cup of salt.) Place both containers in the freezer and check on them every hour to chart their progress. Which container freezes faster? Why?