

## Photo Description



A big ice ball sits in a blue tray. The ice is clear and round like a ball. Water is melting from the ice and making puddles in the tray.

## Scientific Phenomena

This image shows the Anchoring Phenomenon of phase change from solid to liquid. The ice ball is melting because thermal energy from the warmer air is being transferred to the ice. When ice absorbs enough heat energy, the water molecules begin moving faster and break free from their rigid crystal structure, transforming from solid ice into liquid water. This is a physical change where the substance (water) remains the same, but its state of matter changes.

## Core Science Concepts

1. States of Matter: Water exists in three states - solid (ice), liquid (water), and gas (water vapor). The ice ball demonstrates the solid state transitioning to liquid state.
2. Heat Transfer: Thermal energy moves from warmer objects (room temperature air) to cooler objects (ice), causing the temperature change that leads to melting.
3. Physical vs. Chemical Changes: Melting is a physical change because the ice is still water - just in a different form. No new substance is created.
4. Observable Properties: Students can observe and measure changes in the ice ball over time, including size, shape, temperature, and the amount of liquid water produced.

### Pedagogical Tip:

Use a simple graphic organizer with "Before," "During," and "After" columns to help students document their observations of the melting process. This supports their understanding of change over time.

### UDL Suggestions:

Provide multiple ways for students to record observations: drawing pictures, taking photos, using simple measurement tools, or verbally describing what they see. This accommodates different learning preferences and abilities.

## Zoom In / Zoom Out

1. Zoom In: At the molecular level, water molecules in ice are arranged in a rigid, organized pattern held together by hydrogen bonds. As thermal energy increases, these molecules vibrate more rapidly until they break free from their fixed positions and begin flowing as liquid water.

2. Zoom Out: This melting process is part of the larger water cycle that occurs throughout Earth's systems. Ice melts in glaciers, frozen lakes, and snow-covered mountains, contributing to rivers, streams, and eventually oceans, which then evaporate to form clouds and precipitation.

### Discussion Questions

1. What do you notice happening to the ice ball over time? (Bloom's: Observe | DOK: 1)
2. Why do you think the ice is changing into water? (Bloom's: Analyze | DOK: 2)
3. What would happen if we put the melted water back in the freezer? (Bloom's: Predict | DOK: 2)
4. How is this ice ball similar to ice cubes in your drink at home? (Bloom's: Compare | DOK: 2)

### Potential Student Misconceptions

1. Misconception: "The ice disappears when it melts."

Clarification: The ice doesn't disappear - it changes from solid to liquid water. The same amount of water is still there, just in a different form.

2. Misconception: "Only hot things can melt ice."

Clarification: Anything warmer than the ice can cause melting, including room temperature air. Ice melts when it absorbs thermal energy from its surroundings.

3. Misconception: "Melting creates new water."

Clarification: Melting doesn't create new water - it changes existing water from solid to liquid form.

### Cross-Curricular Ideas

1. Math - Measurement & Data: Students can measure the height of the ice ball at regular time intervals (every 5 or 10 minutes) using a ruler or measuring tape. They can record their measurements on a simple chart or graph, creating a visual representation of how the ice ball shrinks over time. This connects to 2.MD.A.1 (measuring lengths) and 2.MD.D.9 (creating picture graphs).
2. ELA - Sequencing & Writing: Have students draw or write about the sequence of events as the ice melts using "First," "Next," "Then," and "Last." They can create a simple sentence frame like "First, the ice was \_\_\_\_\_. Next, it started to \_\_\_\_\_. This supports 2.RL.3.3 (describing story events in order) and 2.W.3.2 (writing narratives).
3. Art - Observational Drawing: Students can create detailed drawings of the ice ball at different stages of melting. This encourages careful observation and fine motor skills while celebrating the visual beauty of the phase change process. Display the drawings in sequence to show the transformation.
4. Social Studies - Real-World Connections: Discuss how melting ice affects communities around the world. Show pictures of glaciers, snow-capped mountains, and frozen lakes, then talk about what happens when they melt (flooding, water sources, animal habitats). This introduces students to Earth's systems and human-environment interactions in an age-appropriate way.

### STEM Career Connection

1. Meteorologist (Weather Scientist): Meteorologists study weather and how temperature changes affect water in the air and on Earth. They watch ice, snow, and rain to help predict what the weather will be. They might use instruments to measure temperature and study how ice melts during spring. Understanding melting ice helps them understand storms and seasons. Average Annual Salary: \$95,000 USD

2. Climate Scientist: Climate scientists study how Earth's temperature is changing over long periods of time. They research how glaciers and ice sheets are melting and what that means for our planet. They use this information to help protect animals and help people prepare for changes in weather and water. Average Annual Salary: \$100,000 USD

3. Water Engineer: Water engineers design systems that help people have clean water to drink and use. They understand how water changes from ice to liquid to understand how water moves through pipes, rivers, and treatment plants. They might also work on projects that manage melting snow and ice so it doesn't cause flooding. Average Annual Salary: \$92,000 USD

### NGSS Connections

- Performance Expectation: 2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- Disciplinary Core Idea: 2-PS1.A Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature.
- Crosscutting Concept: Patterns Patterns in the natural world can be observed and used as evidence.

### Science Vocabulary

- \* Melt: When something solid turns into a liquid because it gets warmer.
- \* Solid: Matter that keeps its shape and doesn't flow.
- \* Liquid: Matter that flows and takes the shape of its container.
- \* Temperature: How hot or cold something is.
- \* Energy: The power that makes things change or move.
- \* Physical change: When matter looks different but is still made of the same thing.

### External Resources

#### Children's Books:

- Water as a Solid by David Dreier
- Solid, Liquid, or Gas? by Fiona Bayrock
- The Magic School Bus: Wet All Over by Joanna Cole