

## Photo Description



A large, clear ice ball sits in a blue plastic tray. The ice has a cloudy white center that looks like it froze from the outside in. Water droplets cover the tray, showing that the ice is melting at room temperature.

## Scientific Phenomena

This image shows the Anchoring Phenomenon of ice melting and the freezing process that created the ice ball's unique appearance. The cloudy center formed because water freezes from the outside toward the center, trapping air bubbles and impurities in the middle. The melting occurs because the ice absorbs thermal energy from the warmer air around it, causing the solid water molecules to gain enough energy to change back into liquid water.

## Core Science Concepts

1. States of Matter: Water exists as a solid (ice), liquid (water), and gas (water vapor), and can change between these states when energy is added or removed.
2. Heat Transfer: Thermal energy moves from warmer objects (air) to cooler objects (ice), causing the ice to melt.
3. Freezing Patterns: Water freezes from the outside in, which explains why the ice ball has a clear outer layer and cloudy center.
4. Physical Changes: Melting is a reversible physical change where the substance stays the same but changes form.

### Pedagogical Tip:

Use ice investigations early in the day so students can observe changes over time. Have students make predictions about what will happen and return to check their hypotheses throughout the lesson.

### UDL Suggestions:

Provide multiple ways for students to record observations: drawing, writing, verbal descriptions, or taking photos. This supports different learning preferences and abilities while building scientific documentation skills.

## Zoom In / Zoom Out

1. Zoom In: At the molecular level, water molecules in ice are locked in a rigid crystal structure. When heat energy is added, these molecules vibrate faster and break free from their fixed positions, allowing them to flow as liquid water.
2. Zoom Out: This melting process connects to the larger water cycle on Earth. Ice melting in glaciers, lakes, and rivers provides fresh water for ecosystems and contributes to sea level changes that affect coastlines worldwide.

## Discussion Questions

1. What do you think caused the ice ball to have a cloudy center and clear edges? (Bloom's: Analyze | DOK: 2)
2. How could we speed up or slow down the melting process? (Bloom's: Apply | DOK: 2)
3. What patterns do you notice about how the ice is melting? (Bloom's: Understand | DOK: 1)
4. If we put this melted water back in the freezer, what do you predict will happen and why? (Bloom's: Evaluate | DOK: 3)

## Potential Student Misconceptions

1. Misconception: "Ice is colder than water." Reality: Ice and water can be the same temperature. Ice melts when it absorbs energy, not necessarily because the air is "hot."
2. Misconception: "The ice disappears when it melts." Reality: The ice changes form but doesn't disappear - it becomes the same amount of water.
3. Misconception: "Only fire or the sun can melt ice." Reality: Ice will melt in any environment warmer than 32°F (0°C), including normal room temperature.

## 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 and Engineering Practice: Planning and carrying out investigations to answer questions

## Science Vocabulary

- \* Melting: When a solid changes to a liquid by warming up
- \* Thermal energy: Heat energy that moves from warm things to cool things
- \* Physical change: When something changes how it looks but stays the same material
- \* States of matter: The different forms that materials can take like solid, liquid, or gas
- \* Freezing: When a liquid changes to a solid by cooling down

## External Resources

### Children's Books:

- Ice is Nice! by Robin Nelson
- Solid, Liquid, or Gas? by Fiona Bayrock
- Water Can Be... by Laura Purdie Salas

### YouTube Videos:

- "States of Matter for Kids" - Simple explanation of solids, liquids, and gases with clear examples: <https://www.youtube.com/watch?v=ZjjAXRcaZpE>
- "Ice Melting Time Lapse" - Visual demonstration of ice melting process that students can observe: <https://www.youtube.com/watch?v=NiX6NQZK8ME>