

## Photo Description



This image shows a pond that is beginning to thaw as winter turns to spring. You can see bare trees standing on a hillside near the water's edge, with some ice still visible on the pond's surface and brown, leafless ground. The water is slowly melting and becoming liquid again as the air gets warmer.

## Scientific Phenomena

Anchoring Phenomenon: Seasonal phase change—ice melting into liquid water

This image captures the transition from winter to spring. As Earth's position changes relative to the sun, the northern hemisphere begins to receive more direct sunlight and warmth. The increased solar energy causes the temperature of the air and water to rise above freezing (32°F/0°C). When ice reaches this warmer temperature, the water molecules that were frozen solid and locked in place begin to move again, and the ice transforms back into liquid water. This is a reversible physical change—no new substance is created; the water simply changes its state of matter.

## Core Science Concepts

1. States of Matter: Water exists in three states—solid (ice), liquid (water), and gas (water vapor). Temperature determines which state water is in.
2. Seasonal Changes: Earth's tilt and position in its orbit around the sun create predictable seasonal patterns. Spring brings warmer temperatures that cause winter ice and snow to melt.
3. Heat Energy Transfer: The sun's energy (thermal energy) travels to Earth and warms objects and liquids. This heat energy causes ice to melt.
4. Observable Cause and Effect: When temperature increases, ice melts. When temperature decreases, water freezes.

### Pedagogical Tip:

For Second Grade, emphasize direct observation and personal experience rather than complex molecular explanations. Have students predict what will happen to ice on a warm day before showing them, then let them observe the actual melting. This builds scientific thinking through hands-on experience.

### UDL Suggestions:

Representation: Provide visual supports such as a simple thermometer poster showing "cold/frozen" vs. "warm/melting" with clear images. Some students may benefit from a color-coded diagram of water's three states. Action & Expression: Allow students to demonstrate understanding through drawing, manipulating physical models, or dictating observations to an adult rather than writing. Engagement: Connect the phenomenon to students' own experiences (puddles they've seen, ice cream melting, snow disappearing) to make it personally relevant.

## Zoom In / Zoom Out

### ### Zoom In: Molecular Level

When you zoom in to something so tiny we cannot see it without special tools, water is made of tiny particles called molecules. When water is frozen as ice, these molecules are locked tightly together in a solid pattern and cannot move much. When heat energy makes ice melt, the molecules start vibrating and moving faster, breaking free from their solid arrangement and becoming liquid water that can flow.

### ### Zoom Out: Watershed and Seasonal Cycle

This single pond is part of a much larger water cycle. As ice melts from this pond and surrounding areas, the water flows downhill into streams and rivers, eventually reaching larger bodies of water. In spring, melting snow and ice from entire mountains and regions recharge groundwater, refill reservoirs, and support plants and animals that depend on water. This seasonal melting is critical for ecosystems across the northern hemisphere.

## Discussion Questions

1. What do you think is happening to the ice in this pond, and what made it start to happen? (Bloom's: Analyze | DOK: 2)
2. Where does the water go after all the ice melts from the pond? (Bloom's: Evaluate | DOK: 3)
3. Why do you think the trees in this picture still don't have leaves even though the ice is melting? (Bloom's: Analyze | DOK: 2)
4. If we could travel back in time two months, what do you think this pond would have looked like? What changed it? (Bloom's: Synthesize | DOK: 3)

## Potential Student Misconceptions

### 1. Misconception: "Ice turns into a different liquid, not water."

Clarification: Ice is frozen water. When ice melts, it becomes liquid water again—the same substance in a different form. No new material is created.

### 2. Misconception: "Ice melts because the sun pushes on it."

Clarification: The sun doesn't push ice; the sun's heat warms the ice and makes it melt. Heat is energy that makes things warmer.

### 3. Misconception: "In spring, all the ice disappears at the same time everywhere."

Clarification: Ice melts at different times depending on where the ice is. Places with more sun and warmer air melt first. Shaded areas or very cold places melt later.

## Extension Activities

1. Ice Melting Experiment: Place ice cubes in containers outdoors in the sun and in the shade. Have students predict which will melt first, then check every 10 minutes and record observations on a simple chart. Discuss why sunlight matters.
2. Water Cycle in a Bag: Create a simplified water cycle in a sealed plastic bag by drawing the sun, clouds, water, and arrows. Place the bag in sunlight and observe how moisture appears on the bag (evaporation and condensation). Relate this to the melting pond refilling clouds with water.

3. Seasonal Picture Walk: Take students on a nature walk around the school grounds or neighborhood during early spring. Have them draw or photograph signs of spring (melting snow, puddles, rushing water in gutters, new plant growth). Discuss how the warmth of spring causes these changes.

### Cross-Curricular Ideas

- Math: Create a simple bar graph showing "Days Until All the Ice Melts" predicted by different students. Compare predictions to actual results. Practice measuring temperature daily with a thermometer and recording numbers.
- ELA: Read aloud a spring-themed picture book and discuss how characters experience seasonal change. Have students write or dictate a sentence: "In spring, I notice \_\_\_\_\_ because the weather is warmer."
- Social Studies: Discuss how different cultures celebrate spring and the thawing of ice and snow. Create a simple map showing where ponds and lakes are in your community and discuss their importance.
- Art: Create a "before and after" collage or painting showing a frozen pond in winter and a thawing pond in spring. Use white paper, light blue, and dark blue to show the transformation.

### STEM Career Connection

1. Hydrologist: A scientist who studies water—where it comes from, where it goes, and how it changes. Hydrologists watch ponds, rivers, and groundwater to understand Earth's water cycle. They help communities know when flooding might happen during spring melting. Average annual salary: \$84,040 USD
2. Environmental Scientist: These professionals monitor ecosystems and how they change with seasons. In spring, they track how melting ice and warming temperatures affect plants, animals, and water quality in ponds and forests. Average annual salary: \$76,530 USD
3. Climate Data Technician: A person who measures temperature, precipitation, and other weather data every day to understand climate patterns. They use instruments and computers to record when ice melts and how seasonal changes happen over many years. Average annual salary: \$45,900 USD

### NGSS Connections

Performance Expectation: 2-ESS1-1

Plan and conduct investigations to provide evidence that plants get the materials they need for growth chiefly from air and water. (Note: While this PE focuses on plant growth, the water cycle and seasonal changes directly support this standard.)

Disciplinary Core Ideas:

- 2-ESS1.A Earth's Place in the Universe – Students observe seasonal patterns and how the sun's position changes throughout the year.
- 2-ESS1.C History of Planet Earth – Students understand that patterns of Earth's features and the cycles of water, rock, and life.

Crosscutting Concepts:

- Patterns – Seasonal melting follows predictable patterns each spring.
- Cause and Effect – Warmer temperatures cause ice to melt.

## Science Vocabulary

- \* Freeze: When a liquid gets very cold and turns into a solid (like water becoming ice).
- \* Melt: When a solid gets warm and turns into a liquid (like ice becoming water).
- \* Seasonal: Something that happens at a particular time of year, following a pattern (spring, summer, fall, winter).
- \* Temperature: How hot or cold something is, measured with a thermometer.
- \* Phase Change: When a substance changes from one state of matter to another (solid to liquid, or liquid to solid), but stays the same material.
- \* Thaw: Another word for melt—when ice or frozen ground becomes unfrozen and warm.

## External Resources

Children's Books:

- Spring Things by Bob Raczka (simple rhyming text about spring changes, including melting ice and water)
- Come On, Rain! by Karen Hesse (celebrates water, warmth, and seasonal change in spring and summer)
- The Snowy Day by Ezra Jack Keats (while focused on snow, the sequels explore spring melting and seasonal transitions)

---

Teacher Notes: This lesson anchors abstract concepts of state change and seasonal patterns in a concrete, observable phenomenon. Second graders benefit from repeated hands-on experiences with melting and freezing throughout the spring season. Consider revisiting this image several times as actual changes occur in your local environment, celebrating real-world connections to their learning.