Photo Description

This image shows evergreen trees heavily covered with thick snow and frost during winter. The snow has accumulated on all the branches, bending them downward under the weight. In the background, you can see bare deciduous trees and a frozen or snow-covered pond, showing how different trees respond differently to winter conditions.

Scientific Phenomena

Anchoring Phenomenon: Why does snow stick to evergreen trees during winter?

Snow accumulates on evergreen branches because of how the branches grow and their surface texture. Evergreen trees have needle-like leaves (or small flat needles) that point outward in many directions, creating a large surface area for snow to collect on. When temperatures stay near freezing and snow is wet and heavy, it sticks more easily to these surfaces. Additionally, the evergreen's cone or pyramid shape and dense branching pattern naturally trap and hold snow. The weight of accumulated snow can actually bend the branches downward, as you can see in this photo. This is a seasonal pattern that happens repeatedly each winter in snowy climates.

Core Science Concepts

* States of Matter and Phase Changes: Water exists in three states—solid (ice/snow), liquid (water), and gas (water vapor). Snow is frozen water that forms in clouds and falls to Earth when conditions are cold enough.

* Seasonal Weather Patterns: Winter brings predictable changes in temperature, precipitation, and daylight hours. Snow is a form of precipitation that occurs in cold climates during winter months.

* Plant Adaptations to Winter: Different trees have adapted differently to survive winter. Evergreen trees keep their needles year-round, while deciduous trees drop their leaves to conserve water and energy during cold months.

* Properties of Snow and Accumulation: Snow has low density compared to liquid water, but when compressed or when wet snow sticks together, it becomes heavy and can exert significant weight on objects like tree branches.

Pedagogical Tip:

Rather than simply telling students "snow is frozen water," allow them to observe and compare real samples: fresh snow, compressed snow, and ice. Ask them to predict which will melt fastest and why. This hands-on comparison deepens their understanding of how water's properties change with temperature and density—key concepts for this grade level.

UDL Suggestions:

Multiple Means of Engagement: Some students may have limited experience with snow if they live in warm climates. Provide high-quality images, videos, or virtual tours of snowy landscapes. Pair visual learning with tactile experiences (if possible, using ice and water in the classroom) and discussions about winter in different regions. This honors diverse student backgrounds while building conceptual understanding.

Discussion Questions

1. Why do you think the evergreen tree's branches are bending down so much while the bare trees in the background are standing straight? (Bloom's: Analyze | DOK: 2)

2. Compare how this evergreen tree looks in winter to how you think it looks in summer. What is the same, and what is different? (Bloom's: Evaluate | DOK: 3)

3. If the temperature rose and the snow began to melt, what do you predict would happen to the tree branches first? (Bloom's: Predict/Synthesize | DOK: 3)

4. Why do you think it's important for evergreen trees to be flexible and able to bend under the weight of snow? (Bloom's: Evaluate | DOK: 3)

Extension Activities

1. Snow Observation Journal: If your area gets snow, have students observe and sketch snow-covered trees or objects over several days. Ask them to record observations about how much snow accumulated, which objects hold the most snow, and how the snow changes as temperatures fluctuate. This reinforces observation skills and understanding of seasonal patterns.

2. Build a Winter Landscape Model: Using white playdough or papier-mâché, students can construct miniature evergreen and deciduous trees, then use shaving cream or cotton balls to simulate snow accumulation. This tactile activity helps them understand structural differences between tree types and visualize how snow affects different branches.

3. Water State Exploration Station: Set up a classroom station with ice cubes, snow (if available), liquid water, and a heat source (like a sunny windowsill or lamp). Students make predictions about which states of water will change and how, then observe the transitions from solid to liquid to gas (evaporation). Connect this to the photo by explaining that the snow in the photo could eventually melt and evaporate.

NGSS Connections

Performance Expectation:
4-ESS2-1: Make observations and measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Disciplinary Core Ideas:
* 4-ESS1.A - The repeating patterns of seasons result from Earth's tilt and orbit around the sun
* 4-ESS2.A - Rainfall helps shape the land and affects the types of living things found in a region

Crosscutting Concepts:
* Patterns - Seasonal weather patterns repeat year after year
* Cause and Effect - Cold temperatures cause water to freeze into snow; snow accumulation causes branches to bend

Science Vocabulary

* Evergreen: A tree or plant that keeps its green needles or leaves all year long, even during winter.

* Precipitation: Water that falls from clouds to Earth, including rain, snow, sleet, and hail.

* Accumulation: The process of something collecting or building up over time, like snow piling up on branches.

* Seasonal: Something that happens at a particular time of year, like snow in winter or flowers in spring.

* Deciduous: A tree that loses all its leaves in the fall and grows new ones in the spring.

* Frost: A thin layer of ice crystals that forms on surfaces when water vapor freezes directly into ice without becoming liquid first.

External Resources

Children's Books:
 Stranger in the Woods* by Carl R. Sams II and Jean Stoick — Beautiful photography of winter wildlife and snow-covered landscapes
 Come On, Rain!* by Karen Hesse — While focused on rain, this teaches about water and precipitation cycles in accessible language
 Winter Trees by William Carlos Williams (poetry) or Trees of Winter* by James Kavanagh — Illustrated guides to identifying winter trees

YouTube Videos:
* "Why Do Trees Lose Their Leaves in Fall?" by Crash Course Kids (5 min) — Explains deciduous vs. evergreen tree adaptations: https://www.youtube.com/watch?v=xGaKQKdeLe8

* "Snow Formation and Accumulation" by National Geographic Kids (4 min) — Shows how snow forms in clouds and accumulates on landscapes: https://www.youtube.com/watch?v=DXfHbXvUu7c