

Photo Description



This image shows evergreen trees heavily covered in snow during winter. The bright white snow clings to the dark green branches and needles, creating a beautiful contrast. You can see a frozen landscape in the background, with bare deciduous trees and a snowy ground, demonstrating how the environment changes during the coldest season of the year.

Scientific Phenomena

Anchoring Phenomenon: Snow accumulation on evergreen vegetation during winter

Why This Happens: When air temperatures drop below 32°F (0°C), water vapor in the atmosphere freezes into ice crystals that form snow. As snow falls and accumulates on tree branches, it sticks to the needles and branches of evergreen plants. Evergreen trees retain their leaves year-round (unlike deciduous trees that lose their leaves), so they provide more surface area for snow to collect and stick to. The weight of accumulated snow demonstrates gravity's effect on objects, while the persistence of snow on the ground shows that frozen water remains solid when temperatures stay cold.

Core Science Concepts

1. States of Matter & Phase Changes: Water exists in three states—solid (ice/snow), liquid (water), and gas (water vapor). Snow is frozen water that forms in the atmosphere and falls to Earth when conditions are cold enough.
2. Seasonal Temperature Patterns: Winter is the coldest season in temperate climates because the Northern Hemisphere (or Southern Hemisphere) is tilted away from the sun's direct rays, resulting in shorter days and colder temperatures that allow precipitation to fall as snow instead of rain.
3. Plant Adaptations: Evergreen trees keep their needles year-round, which helps them retain moisture and survive cold winters. Their needle shape and waxy coating help reduce water loss and allow snow to accumulate on branches.
4. Weather & Climate Conditions: Snow formation requires specific atmospheric conditions: cold temperatures, moisture in the air, and condensation nuclei (dust/particles) around which ice crystals form.

Pedagogical Tip:

Help students make personal connections by asking them to observe their own local winter conditions. Even if your region doesn't get snow, students can investigate what happens to water in cold temperatures by freezing water in ice cube trays or observing frost formation. This bridges abstract concepts to observable phenomena in their own environment.

UDL Suggestions:

Representation: Provide images of the same landscape in multiple seasons (spring, summer, fall, winter) so students can compare and contrast. Use video clips or time-lapse photography showing snow accumulation in real-time, which helps visual learners understand the process better than static images alone.

Action & Expression: Allow students to demonstrate understanding through multiple modalities—some might draw diagrams of the water cycle with snow, others might create physical models using cotton balls and branches, while others might write explanations or record video explanations.

Engagement: Connect to student interests by discussing winter sports, holiday traditions, or animals that adapt to snow. Ask students to share personal winter experiences from their own families and communities.

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Discussion Questions

1. Why do you think snow sticks to the evergreen tree's branches better than it might stick to a smooth piece of glass? (Bloom's: Analyze | DOK: 2)
2. What would happen to the snow on these trees if the temperature suddenly increased to 50°F? Use what you know about states of matter to explain your thinking. (Bloom's: Evaluate | DOK: 3)
3. How do you think evergreen trees are different from the bare trees you see in the background, and why might these differences help them survive winter? (Bloom's: Analyze | DOK: 2)
4. If you could design a plant that thrives in snowy winters, what features would you give it and why? (Bloom's: Create | DOK: 3)

Extension Activities

1. Seasonal Comparison Investigation: Have students collect or draw pictures of the same outdoor location (near your school, a local park, or a tree in the schoolyard) in all four seasons. Create a class poster or digital presentation showing how the landscape, vegetation, and weather change throughout the year. Students can write observations about which season had the most precipitation, which had the coldest temperatures, and how plants responded to each season.
2. Snow vs. Rain Experiment: Fill two clear containers with ice. Over one container, hold a strainer or cheesecloth and pour room-temperature water slowly (simulating snow falling and accumulating on branches). Over the second container, pour water directly without the strainer (simulating rain). Have students observe and measure which method resulted in more ice accumulation and discuss why. Connect this to how snow sticks to evergreen branches.
3. Plant Adaptation Design Challenge: Give students pictures of various winter plants (evergreens, dormant deciduous trees, winter grasses) and have them identify and sketch specific adaptations they notice. Then challenge them to design their own plant that would survive harsh winter conditions. Students should label at least three adaptations and explain in writing how each one helps the plant survive cold weather, snow, and reduced sunlight.

NGSS Connections

Grade 5 Performance Expectation:

5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen and that these particles are in constant motion.

Disciplinary Core Ideas:

- 5-PS1.A: Structure and Properties of Matter
- 5-ESS1.B: Earth and the Solar System (seasonal changes due to Earth's tilt)
- 5-LS1.A: Structure and Function (plant structures)

Crosscutting Concepts:

- Patterns (seasonal patterns in weather and plant behavior)
- Systems and System Models (water cycle as a system)
- Stability and Change (how matter changes state; how plants change seasonally)

Science Vocabulary

* Snow: Frozen water that falls from clouds as ice crystals when temperatures are below 32°F (0°C).

- * Evergreen: A plant or tree that keeps its leaves or needles all year long, even during winter.
- * Phase Change: When matter changes from one state to another, such as when water freezes into ice or ice melts into water.
- * Accumulation: The process of something building up or collecting in one place over time.
- * Precipitation: Water that falls from clouds to Earth, such as rain, snow, sleet, or hail.
- * Temperature: How hot or cold something is, usually measured in degrees Fahrenheit or Celsius.

External Resources

Children's Books:

- The Snowy Day by Ezra Jack Keats (classic story about winter exploration and snow)
- Snow by Manya Stojic (explores snow from different perspectives across landscapes)
- Come On, Rain! by Karen Hesse (explores water cycle and precipitation, good for contrast with snow)

YouTube Videos:

- "How Snow Forms" by Crash Course Kids (3:42 minutes) — Clear explanation of the water cycle and snow formation with engaging animations. <https://www.youtube.com/watch?v=4CK5Aov5TYU>
- "Winter Adaptations of Plants and Animals" by National Geographic Kids (4:15 minutes) — Explores how plants and animals survive winter, including evergreen strategies. <https://www.youtube.com/watch?v=Bpgf3yB3Eok>