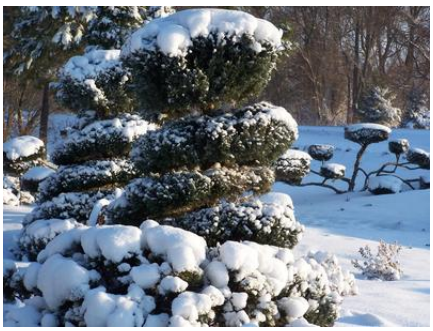
Winter Seasons

Earth & Space Science | Lesson Guide

3rd Grade

Photo Description



This image shows evergreen trees (like pine and spruce trees) completely covered with thick, fluffy snow during winter. The bright white snow clings to the green branches, and you can see bare deciduous trees in the background. The sunny day makes the snow sparkle and shine brightly against the blue sky and snowy ground.

Scientific Phenomena

Anchoring Phenomenon: Why do evergreen trees get covered with heavy snow while deciduous trees lose their leaves?

Scientific Explanation: During winter, water vapor in the air freezes into snow crystals when temperatures drop below freezing (32°F or 0°C). Evergreen trees keep their needle-like leaves year-round, giving snow many surfaces to accumulate on. The snow sticks to these branches and builds up into thick, heavy layers. Deciduous trees (shown bare in the background) have already dropped their leaves to conserve water and energy during the cold season, so they have fewer surfaces for snow to collect on. This visible difference helps us observe how different plants adapt to winter conditions.

Core Science Concepts

1. States of Water: Water exists in three states—solid (ice/snow), liquid (water), and gas (water vapor). In this image, we see water as snow (solid) and can infer the water vapor that froze to create it.

2. Seasonal Changes: Winter is a season characterized by cold temperatures, snow, and shorter days. Trees and plants respond differently to winter conditions based on their species.

3. Plant Adaptations: Evergreen trees keep their leaves year-round as an adaptation to winter, while deciduous trees shed their leaves to survive harsh winter conditions with less water loss.

4. Weather and Snow Formation: Snow forms when water vapor in clouds freezes into ice crystals high in the atmosphere, then falls to the ground when it becomes heavy enough.

Pedagogical Tip:

When teaching about snow formation, help students make the connection between what they observe (snow on trees) and the invisible process (water freezing in clouds). Use the phrase "frozen water vapor" repeatedly so students understand snow is not just "cold water" but water that has changed states.

UDL Suggestions:

Representation: Provide images comparing evergreen vs. deciduous trees side-by-side. Use video of snow falling or melting to show the water cycle in action. Engagement: Allow students to touch real evergreen branches and compare needle texture to deciduous twigs. Action & Expression: Let students sketch the two tree types or create a physical model using pipe cleaners (evergreen) vs. bare sticks (deciduous) and sprinkle artificial snow on both to compare accumulation.

Discussion Questions

1. Why do you think evergreen trees keep their leaves in winter when other trees lose theirs? (Bloom's: Evaluate | DOK: 3)
2. What do you observe about where the snow is piling up on these trees? Why might that be? (Bloom's: Analyze | DOK: 2)
3. If all the snow on this tree melted, where would that water go? (Bloom's: Understand | DOK: 1)
4. How might the snow covering these trees help or hurt the plant? (Bloom's: Evaluate | DOK: 3)

Extension Activities

1. Snow Accumulation Experiment: Have students place small evergreen branches and bare twigs in a box of "snow" (shredded white paper or cotton). Shake the box gently and observe which type accumulates more. Record observations in a data table. Discuss why the shapes of the branches matter.

2. Seasonal Tree Sorting: Provide pictures of various trees in different seasons. Students sort them into "Evergreen" and "Deciduous" categories and explain their reasoning. Create a class chart showing which trees are visible during each season in your region.

3. Winter Weather Tracking: Over 2-3 weeks, have students record daily temperature, precipitation, and cloud cover on a simple weather chart. Create a class graph showing temperature changes and connect observations to the photo (i.e., "We had 2 snowy days like in the picture!").

NGSS Connections

Performance Expectation: 3-ESS2-1: Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

Disciplinary Core Ideas:
- 3-ESS2.D - Weather and climate (seasonal patterns and how living things respond)
- 3-LS1.A - Structure and function (how different plants have different structures suited to their environment)

Crosscutting Concepts:
- Patterns - Seasonal patterns of weather and plant behavior
- Structure and Function - How evergreen needles capture snow differently than bare branches

Science Vocabulary

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

* Deciduous: A tree that loses all its leaves in the fall to prepare for winter and grows new leaves in spring.

* Snow: Frozen water that falls from clouds in winter when it is cold enough.

* Freeze: To turn from a liquid into a solid by cooling it to very cold temperatures.

* Accumulate: To collect or pile up in larger and larger amounts over time.

* Adaptation: A special feature or behavior that helps a plant or animal survive in its environment.

External Resources

Children's Books:
- Snow by Manya Stojic (explores snow across different ecosystems)
- Winter Trees by William Carlos Williams (age-appropriate poetry about winter plant changes)
- Stranger in the Woods by Carl R. Sams II and Jean Stoick (winter wildlife and evergreen habitats)

YouTube Videos:
- "How Snow Forms" - National Geographic Kids
  https://www.youtube.com/watch?v=f8Ty94BOeIQ
  (Simple animation explaining water cycle and snow formation, ~3 minutes)

- "Evergreen vs. Deciduous Trees" - Crash Course Kids
  https://www.youtube.com/watch?v=ZnQ5Tt7UmZE
  (Engaging comparison of tree types and seasonal adaptation, ~4 minutes)