Seasons

Earth & Space Science | Lesson Guide

2nd Grade

Photo Description

Snow covers an old wagon and evergreen trees on a cold winter day. The white snow sits thick on top of the wagon's roof and wheels. Everything looks quiet and still in this snowy scene.

Scientific Phenomena

This image represents the Anchoring Phenomenon of seasonal weather changes and precipitation in the form of snow. Snow forms when water vapor in clouds freezes into ice crystals at temperatures below 32°F (0°C). These ice crystals stick together and fall to the ground as snowflakes. The accumulation we see demonstrates how precipitation can transform landscapes and affect objects in our environment during winter months.

Core Science Concepts

1. States of Matter: Snow is water in its solid state, showing how the same substance (water) can exist in different forms depending on temperature.

2. Weather Patterns: Seasonal changes bring different types of precipitation, with snow occurring during colder months when temperatures drop below freezing.

3. Temperature Effects: Cold air temperatures cause water to freeze and remain frozen, allowing snow to accumulate and stay on surfaces.

4. Seasonal Changes: Winter brings observable changes to our environment, including snow cover that affects how landscapes look and how objects appear.

Pedagogical Tip:

Use concrete, hands-on experiences like bringing snow inside to observe melting, or freezing water in different containers to help students understand state changes.

UDL Suggestions:

Provide multiple ways for students to document observations through drawings, photos, verbal descriptions, or simple charts to accommodate different learning preferences and abilities.

Zoom In / Zoom Out

1. Zoom In: Each snowflake is made of tiny ice crystals that form unique patterns. Water molecules slow down and stick together when it gets very cold, creating the solid ice we see as snow.

2. Zoom Out: This snowy scene is part of Earth's water cycle, where water moves between oceans, clouds, and land. The snow will eventually melt and flow back to rivers and oceans, continuing the endless cycle.

Discussion Questions

1. What do you think will happen to this snow when spring comes? (Bloom's: Predict | DOK: 2)

2. How do you think the wagon would look different in summer compared to winter? (Bloom's: Compare | DOK: 2)

3. Why do you think the snow stays on top of things instead of falling through them? (Bloom's: Analyze | DOK: 3)

4. What other changes do you notice in your neighborhood during winter? (Bloom's: Observe | DOK: 1)

Potential Student Misconceptions

1. Misconception: Snow only happens when it's very, very cold outside.
   Clarification: Snow can form and fall at temperatures just below freezing (32°F), and we can have snow even when it doesn't feel extremely cold.

2. Misconception: Snow and ice are different things entirely.
   Clarification: Snow is made of ice crystals - it's the same substance (frozen water) just in a different form.

3. Misconception: Snow falls because clouds are too heavy.
   Clarification: Snow forms when water vapor in clouds freezes into crystals that become heavy enough to fall due to gravity.

Cross-Curricular Ideas

1. Math - Measurement & Data: Students can measure snow accumulation on objects outside using rulers or sticks marked with inches. Create a simple chart or graph showing how much snow collected on different surfaces (wagon, tree, ground) over several days. This connects precipitation observation to quantitative data collection.

2. ELA - Descriptive Writing: Have students write or dictate sentences describing how the snowy wagon looks and feels. Use sensory words like "cold," "white," "sparkly," and "quiet." Create a class book titled "Winter Wonderland" where each student contributes one illustrated page with their snow descriptions.

3. Social Studies - Community Helpers: Discuss how snow affects people in our community. Talk about snow removal workers, farmers, and how people prepare for winter. Students can draw pictures of winter activities and discuss how Native Americans and pioneers prepared for snowy winters in different ways than we do today.

4. Art - Winter Scene Painting: Students create their own snowy landscape using white paint, cotton balls, or paper to represent snow on trees and objects. They can paint or draw wagons, trees, and frozen water scenes, experimenting with how white stands out against darker colors in their artwork.

STEM Career Connection

1. Meteorologist (Weather Scientist): Meteorologists study weather and climate patterns, including when and where snow will fall. They use special tools and computers to predict winter storms and help people prepare for snowy weather. They work for weather stations, airlines, and weather forecasting companies. Average Annual Salary: $97,000

2. Hydrologist (Water Scientist): Hydrologists study water in all its forms—rain, snow, ice, and rivers. They track how snow melts in spring and flows into rivers and lakes, helping us understand the water cycle and protect our water supply. Average Annual Salary: $84,000

3. Climate Scientist: Climate scientists study long-term weather patterns and seasonal changes over many years. They use information about snow, temperature, and precipitation to understand how Earth's climate is changing and help communities prepare for different weather conditions. Average Annual Salary: $104,000

NGSS Connections

- Performance Expectation: 2-ESS1-1 - Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
- Disciplinary Core Ideas: K-ESS2.D Weather and Climate
- Crosscutting Concepts: Patterns - Students observe patterns of seasonal weather changes

Science Vocabulary

* Snow: Frozen water that falls from clouds as white flakes or crystals.
* Temperature: How hot or cold something is, measured with a thermometer.
* Freezing: When liquid water gets so cold it turns into solid ice.
* Precipitation: Water that falls from the sky as rain, snow, sleet, or hail.
* Seasonal: Things that happen during certain times of the year like spring, summer, fall, or winter.

External Resources

Children's Books:
- The Snowy Day by Ezra Jack Keats
- Snow is Falling by Franklyn Branley
- The Story of Snow by Mark Cassino