Seasons

Earth & Space Science | Lesson Guide

Kindergarten

Photo Description

Snow covers everything in this winter picture. A wagon sits in the snow next to trees with white snow on their branches. The snow is thick and fluffy on top of everything outside.

Scientific Phenomena

This image represents the Anchoring Phenomenon of precipitation in the form of snow and its accumulation on surfaces. Snow forms when water vapor in clouds freezes into ice crystals at temperatures below 32°F (0°C). When these ice crystals become heavy enough, they fall to Earth as snowflakes. The accumulation occurs because the air and ground temperatures remain below freezing, preventing the snow from melting upon contact with surfaces.

Core Science Concepts

1. States of Matter: Water exists in three forms - liquid (water), solid (ice/snow), and gas (water vapor)
2. Weather Patterns: Snow is a type of precipitation that occurs during cold weather conditions
3. Temperature Effects: Freezing temperatures cause water to change from liquid to solid form
4. Seasonal Changes: Winter brings colder temperatures that allow snow to form and accumulate

> **Pedagogical Tip:**
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> Use hands-on experiences with ice cubes melting and water freezing to help kindergarteners understand state changes. Let them observe and touch different forms of water safely to make concrete connections.

> **UDL Suggestions:**
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> Provide multiple ways for students to explore this concept through sensory experiences: touching snow (if available), watching videos, using manipulatives like cotton balls to represent snow, and drawing or acting out snowfall to accommodate different learning preferences.

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 form we see as snow.

2. Zoom Out: This snowy scene is part of Earth's water cycle, where water moves between the ground, air, and clouds. The snow will eventually melt and become part of streams, rivers, and eventually return to the atmosphere to form clouds again.

Discussion Questions

1. What do you notice about how the snow sits on different objects in the picture? (Bloom's: Observe | DOK: 1)
2. Why do you think the snow sticks to the tree branches but might fall off sometimes? (Bloom's: Analyze | DOK: 2)
3. What do you predict will happen to this snow when the weather gets warmer? (Bloom's: Predict | DOK: 2)
4. How might the animals and plants in this area be affected by all this snow? (Bloom's: Evaluate | DOK: 3)

Potential Student Misconceptions

1. Misconception: "Snow comes from somewhere else, not from clouds"
   Clarification: Snow forms in clouds when water vapor freezes into ice crystals, just like rain forms in clouds but at colder temperatures.

2. Misconception: "All snow is the same"
   Clarification: Snow can be different - sometimes wet and heavy, sometimes light and fluffy, depending on temperature and humidity conditions.

3. Misconception: "Snow only happens when it's windy"
   Clarification: Snow falls because of gravity pulling the ice crystals down, not because of wind, though wind can affect how it falls.

Cross-Curricular Ideas

1. Math - Measuring Snow Depth: Create a simple snow measurement stick using a ruler or dowel. Students can measure how deep the snow is each day and record the measurements on a chart. This connects to measurement and data collection while observing weather patterns over time.

2. ELA - Winter Stories and Descriptive Writing: Read snow-themed books like The Snowy Day and have students describe the snow using their senses. They can draw pictures and dictate or write simple sentences using winter words (cold, white, fluffy, frozen) to build vocabulary and storytelling skills.

3. Art - Snowflake Symmetry and Snow Sculptures: Create paper snowflakes by folding and cutting paper to explore symmetry and patterns. Students can also build snow structures outdoors (if snow is available) or use cotton balls indoors to create 3D winter scenes, combining art with understanding of snow's physical properties.

4. Social Studies - Winter Around the World: Explore how people in different places experience winter. Discuss clothing, homes, and activities in snowy climates versus warmer climates, helping students understand how weather affects how people live.

STEM Career Connection

1. Meteorologist (Weather Scientist): A meteorologist studies weather and climate. They watch clouds, measure temperature, and predict whether it will snow or rain. They use special tools and computers to help people know what to wear and plan outdoor activities.
   Average Annual Salary: $97,000 USD

2. Climate Scientist: Climate scientists study long-term weather patterns and how Earth's temperature changes over many years. They learn why winters are sometimes snowier or warmer than other years, helping us understand our changing planet.

Average Annual Salary: $104,000 USD

3. Environmental Engineer: Environmental engineers design systems to protect water and land during different seasons. In snowy areas, they help plan how snow removal and melting water affect communities and nature, keeping both people and ecosystems safe.

Average Annual Salary: $96,000 USD

NGSS Connections

- Performance Expectation: K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time
- Disciplinary Core Ideas: K-ESS2.D Weather and Climate
- Crosscutting Concepts: Patterns, Cause and Effect

Science Vocabulary

* Snow: Frozen water that falls from clouds as white flakes
* Precipitation: Water that falls from the sky as rain, snow, or hail
* Temperature: How hot or cold something is
* Freezing: When liquid water becomes solid ice
* Accumulation: When snow piles up and gets deeper over time

External Resources

Children's Books:

- The Snowy Day by Ezra Jack Keats
- Snow is Falling by Franklyn M. Branley
- The Story of Snow by Mark Cassino