Weather

Earth & Space Science | Lesson Guide

Kindergarten

Photo Description

This image shows a dramatic dark storm cloud moving toward a town on a sunny day. The sky has changed from bright blue to very dark gray and black, and you can see the huge cloud forming over the landscape. The road and buildings below look calm and safe, but the big cloud is bringing weather changes with it.

Scientific Phenomena

Anchoring Phenomenon: The formation and approach of a severe thunderstorm cell.

Why It's Happening:
When warm, moist air near the ground rises quickly into cooler air high in the sky, it cools down and water vapor condenses into millions of tiny water droplets. These droplets stack up on top of each other, creating tall, dark storm clouds called cumulonimbus clouds. The darkness happens because the cloud is so thick that sunlight cannot pass through it. The wind at different heights pushes this cloud across the landscape, which is why storms move and change direction.

Core Science Concepts

* Weather Changes: Weather is always changing because of moving air masses and water in the atmosphere. The same place can have sunny skies one moment and a dark storm the next.

* Water Cycle: Water evaporates from the ground and becomes invisible water vapor. When that vapor rises and cools, it condenses back into visible water droplets that form clouds.

* Clouds and Precipitation: Dark, tall clouds contain so much water that they eventually release rain, hail, or other precipitation. The color tells us about the cloud's thickness and water content.

* Observing the Sky: We can watch the sky carefully to notice changes in clouds, wind direction, and light. These observations help us predict weather changes.

Pedagogical Tip:

For Kindergarteners, use dramatic language and encourage them to USE THEIR SENSES. Ask "What do YOU see?" and "How does the air feel when a big cloud comes?" before introducing scientific terms. Concrete observations come first, vocabulary second.

UDL Suggestions:

Provide multiple means of representation: Use the photo alongside a simple animated video of clouds forming, drawings, and tactile models (cotton balls as clouds). Some students may need alternative text descriptions or simplified vocabulary. Allow students to show understanding through drawing, speaking, or pointing rather than only written responses.

Discussion Questions

1. What do you think is going to happen when that dark cloud reaches the town?
   (Bloom's: Predict | DOK: 2)

2. Why do you think the cloud looks so dark and scary? What is inside it?
   (Bloom's: Explain | DOK: 2)

3. How is the weather in the sunny area different from the weather under the dark cloud right now?
   (Bloom's: Compare | DOK: 2)

4. If you were outside right now, what would your body tell you about the weather changing?
   (Bloom's: Observe/Infer | DOK: 1)

Extension Activities

1. Cloud Observation Chart: Over one week, have students draw or paste photos of clouds they see each day and notice the patterns. Create a simple chart with three columns: "Sunny Sky," "Cloudy Sky," and "Dark Storm Cloud." Students place drawings or stickers in each column. Discuss how the clouds changed throughout the week.

2. Make a Cloud in a Bottle: Fill a clear plastic bottle partway with warm water. Light a match, blow it out, and drop the smoking match into the bottle, then quickly cap it. When students squeeze the bottle and release it, they'll see a tiny cloud form inside! This shows how water vapor becomes visible when air cools.

3. Weather Walk and Sensory Hunt: Take students outside on a day when weather is changing or could change. Have them feel the wind, notice the temperature, observe cloud movement, and listen for sounds. Come back inside and draw or discuss what their senses told them about the weather.

NGSS Connections

Relevant Performance Expectation:
K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time.

Disciplinary Core Idea:
K-ESS2.D Weather and Climate

Crosscutting Concepts:
* Patterns – Weather patterns change over time and can be observed
* Systems and System Models – The atmosphere is a system where water and air interact

Science Vocabulary

* Cloud: Billions of tiny water droplets floating together in the sky that we can see.
* Storm: Very strong, wet, and sometimes dangerous weather with heavy rain, wind, and sometimes lightning.
* Weather: What the air and sky are like outside right now—sunny, rainy, windy, or cold.
* Dark cloud: A thick cloud filled with so much water that sunlight can't shine through it.
* Wind: Moving air that pushes clouds, trees, and other things across the sky.

External Resources

Children's Books:

Come On, Rain!* by Karen Hesse (celebrates the arrival of a storm)
The Cloud Book* by Tomie dePaola (identifies different types of clouds)
Weather* by Manya Stojic (African tale about how animals predict storms)

YouTube Videos:
* "How Do Clouds Form?" by National Geographic Kids – Simple animation showing water evaporation and cloud formation. https://www.youtube.com/watch?v=jLQWyGfsCqE

* "Types of Clouds for Kids" by Crash Course Kids – Engaging 4-minute overview of cloud types and what they mean for weather. https://www.youtube.com/watch?v=rRQD7LlVqbI