Weather

Earth & Space Science | Lesson Guide

3rd Grade

Photo Description

This image shows a dramatic storm moving into a community on a clear day. Dark, heavy clouds are building up over a lake or large body of water in the distance, while the foreground shows streets, power lines, and green grass still in sunshine. The dark clouds tell us that rain and strong winds are coming very soon.

Scientific Phenomena

Anchoring Phenomenon: Storm Formation and Severe Weather Development

This image captures the moment when warm, moist air rises and cools in the atmosphere, causing water vapor to condense into clouds. When clouds develop rapidly and become very dark (like those visible over the water), it indicates strong updrafts and the potential for severe weather. The contrast between the clear sky in the foreground and the dark, towering clouds in the background shows how weather systems move across landscapes. This is happening because of temperature and pressure differences in the atmosphere—warmer air near the ground rises, and as it rises, it cools and the moisture in it condenses, forming the visible storm clouds.

Core Science Concepts

* Weather Patterns and Changes: Weather can change quickly, and we can observe signs that storms are approaching by watching cloud development, sky color, and wind patterns.

* The Water Cycle: Water evaporates from the lake and other sources, rises into the atmosphere, cools, and condenses into clouds. This process is visible in the formation of these storm clouds.

* Clouds and Precipitation: Different types of clouds bring different weather. Dark, thick clouds like cumulonimbus clouds shown here typically bring heavy rain, wind, and sometimes severe weather.

* Atmospheric Conditions: Air temperature, moisture, and pressure changes drive weather formation and movement across Earth's surface.

Pedagogical Tip:

Help students make personal connections by asking them to recall their own experiences with sudden storms. Create a "Storm Observation Chart" where students document changes they notice in the sky before and during storms at home or school. This builds observational skills and weather literacy that will support their understanding of atmospheric processes.

UDL Suggestions:

Representation: Provide students with labeled diagrams showing cloud formation stages, weather symbols, and atmospheric layers to support varied learning styles. Use animated videos alongside still images so visual learners and students needing movement breaks can access the content in different ways.

Action & Expression: Offer multiple ways for students to demonstrate learning: drawing storm diagrams, acting out cloud formation, creating weather data charts, or verbally explaining what they observe. This allows students with different strengths to show understanding.

Engagement: Connect the phenomenon to student safety (what to do during storms) and local community preparedness. This real-world relevance increases motivation and demonstrates why weather science matters in their lives.

Discussion Questions

1. What do you think is happening in the sky right now in this picture, and why do you think the clouds look so dark? (Bloom's: Understand | DOK: 1)

2. How do you think the weather in the background (over the water) will change the weather in the foreground (where the road is) in the next hour? (Bloom's: Predict | DOK: 2)

3. What evidence in this photo tells us that a storm is coming? What would you do to prepare if you saw a sky like this? (Bloom's: Analyze | DOK: 2)

4. Why do you think dark clouds bring rain, while light, puffy clouds might not? Where does the water in clouds come from? (Bloom's: Analyze | DOK: 3)

Extension Activities

Activity 1: Storm Observation Log
Have students create a simple weather observation chart over 1-2 weeks. Each day, they sketch the sky, record the temperature, describe cloud types, and note any weather changes. When a storm approaches, have them make hourly observations to document how quickly conditions change. This builds data collection skills and helps them recognize storm patterns.

Activity 2: Cloud Formation in a Bottle
Demonstrate cloud formation using a clear plastic bottle, warm water, a match, and ice. When students see water vapor condense into visible clouds inside the bottle, they'll understand the process happening in the photograph. Discuss how the "warm air" (from hot water) and "cold air" (from ice) create the same conditions as in real storms.

Activity 3: Storm Safety Preparation Plan
Working in small groups, have students create a poster or digital presentation about how their family or school should prepare for severe weather. Include observations that warn of approaching storms, safety steps, and supplies needed. This applies their learning to real-world preparedness and addresses the natural hazards aspect of the NGSS standard.

NGSS Connections

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

Disciplinary Core Ideas:
* 3-ESS2.D Weather and Climate—Scientists record patterns of the Sun, Moon, and stars, and weather patterns can be observed, recorded, and predicted.
* 3-ESS3.B Natural Hazards—Severe weather (storms, hurricanes, tornadoes) can be observed and can cause damage; people can prepare for and respond to hazardous weather.

Crosscutting Concepts:
* Patterns — Weather patterns change over time and can be observed and predicted.
* Cause and Effect — Temperature and moisture differences cause weather to form and change.
* Scale, Proportion, and Quantity — Storms can vary in size and intensity, affecting different areas differently.

Science Vocabulary

* Storm: A weather event with strong winds, heavy rain, thunder, and lightning that can be dangerous.

* Clouds: Visible masses of water droplets or ice crystals floating in the sky formed when water vapor cools and condenses.

* Weather: The condition of the atmosphere at a particular place and time, including temperature, wind, and precipitation.

* Precipitation: Water falling from clouds to Earth in the form of rain, snow, sleet, or hail.

* Atmosphere: The layer of air that surrounds Earth and protects us; where weather happens.

* Forecast: A prediction of what the weather will be like in the future based on observations and data.

External Resources

Children's Books:
Come On, Rain!* by Karen Hesse (poetic narrative about a storm and its community impact)
Weather* by Manya Stojic (explores different weather conditions and patterns)
Up in the Sky: Airplanes* and Weather by Giles Laroche (explains atmospheric phenomena including storms)

YouTube Videos:
* "How Thunderstorms Form" - National Geographic Kids (3:45 min)
Engaging animation explaining cloud formation, updrafts, and storm development in kid-friendly language.
https://www.youtube.com/watch?v=bozAAXnwfS4

* "The Water Cycle" - Crash Course Kids (4:30 min)
Explains evaporation, condensation, and precipitation with clear visuals showing how storms connect to the water cycle.
https://www.youtube.com/watch?v=CBypHSVSuJY