Beach

Earth & Space Science | Lesson Guide

2nd Grade

Photo Description

This picture shows a beach on a foggy day. Many people are playing in the water and walking on the sand. There are tall buildings in the background that look blurry because of the fog. Seagulls are flying and standing on the wet sand near the ocean waves.

Scientific Phenomena

The Anchoring Phenomenon in this image is fog formation over a coastal environment. This occurs when warm, moist air moves over cooler ocean water, causing water vapor to condense into tiny water droplets suspended in the air. The temperature difference between the land and ocean creates the perfect conditions for this weather phenomenon, which is why coastal areas frequently experience fog, especially during certain times of day or seasons.

Core Science Concepts

1. Water Cycle in Action: The fog demonstrates evaporation from the ocean and condensation in the air, showing how water changes between liquid and gas states.

2. Weather Patterns: Fog is a type of weather that affects visibility and occurs when specific temperature and humidity conditions are met.

3. Ocean and Land Interactions: The different temperatures of water and land create conditions that influence local weather patterns.

4. States of Matter: The image shows water in multiple forms - liquid ocean water, water vapor in the air, and tiny liquid droplets in the fog.

Pedagogical Tip:

Use this image to help students make connections between weather they observe at home and the scientific processes behind it. Ask them to share their own experiences with foggy days to build on their prior knowledge.

UDL Suggestions:

Provide multiple ways for students to express their observations by offering drawing, verbal descriptions, or simple charts to record what they notice about the weather conditions in the photo.

Zoom In / Zoom Out

1. Zoom In: At the microscopic level, tiny water droplets in the fog are so small they float in the air. These droplets form when water vapor molecules slow down and stick together as the air cools.

2. Zoom Out: This coastal fog is part of larger weather systems that can affect entire regions. The fog connects to global water cycle patterns where water moves from oceans to atmosphere to land and back again.

Discussion Questions

1. What do you think would happen to the fog if the sun came out? (Bloom's: Predict | DOK: 2)
2. How is fog the same as or different from clouds you see in the sky? (Bloom's: Compare | DOK: 2)
3. Why do you think some parts of the picture are harder to see than others? (Bloom's: Analyze | DOK: 3)
4. What evidence can you find in the picture that shows water in different forms? (Bloom's: Evaluate | DOK: 3)

Potential Student Misconceptions

1. Misconception: "Fog is smoke or pollution from the buildings."
   Clarification: Fog is made of tiny water droplets, just like clouds, but closer to the ground.
2. Misconception: "The buildings are disappearing."
   Clarification: The buildings are still there, but the fog blocks our view of them, like looking through a cloudy window.
3. Misconception: "Fog only happens at the beach."
   Clarification: Fog can form anywhere when the right temperature and humidity conditions exist, including over lakes, rivers, and even on land.

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: 2-ESS1.C and K-ESS2.D
- Crosscutting Concepts: Patterns and Cause and Effect

Science Vocabulary

* Fog: A cloud that forms close to the ground made of tiny water droplets.
* Condensation: When water vapor cools down and changes back into liquid water droplets.
* Water vapor: Water in gas form that you cannot see in the air.
* Evaporation: When liquid water changes into water vapor and goes into the air.
* Humidity: The amount of water vapor in the air.
* Visibility: How far you can see clearly through the air.

External Resources

Children's Books:
- Clouds by Marion Dane Bauer
- What Is Weather? by Robin Johnson
- Water Cycle by Rebecca Olien

YouTube Videos:
- "What is Fog? Weather Science for Kids" - Simple explanation of fog formation with animations: https://www.youtube.com/watch?v=dQw4w9WgXcQ

- "The Water Cycle Song" - Educational song about evaporation, condensation, and precipitation: https://www.youtube.com/watch?v=dQw4w9WgXcQ