Lake Landform

Earth & Space Science | Lesson Guide

5th Grade

Photo Description

This image shows a beautiful lake surrounded by trees during autumn, with fallen logs partially in the water and colorful leaves changing from green to orange and brown. The sandy or rocky beach area, the calm water surface, and the forest landscape demonstrate how water and land interact to create natural features we call lakes and how seasons change the appearance of ecosystems.

Scientific Phenomena

Anchoring Phenomenon: Why do lakes form in some places, and how do they change throughout the year?

Lakes form in depressions or low areas of land where water naturally collects from rainfall, groundwater, and streams. The fallen logs visible in this photo show how natural materials continuously enter water ecosystems, while the dramatic autumn colors illustrate how seasonal temperature changes affect living things around the lake. This is a perfect example of how landforms (physical features of Earth's surface) and ecosystems (communities of living and nonliving things) interact together.

Core Science Concepts

1. Landforms and Water Features – Lakes are natural depressions in Earth's surface that collect freshwater. They are created by glaciers, erosion, or tectonic activity over long periods of time.

2. Weathering and Erosion – The fallen logs and exposed sandy beach show how water and weather continuously break down rocks and soil, reshaping landscapes over time.

3. Seasonal Changes – The autumn foliage demonstrates how temperature changes cause visible transformations in plant life throughout the year, affecting the entire lake ecosystem.

4. Ecosystems and Interactions – Trees, water, soil, and animals depend on each other in a lake ecosystem. Fallen leaves and logs provide nutrients and habitat for fish and other organisms.

Pedagogical Tip:

Use this image as a "phenomena first" anchor for your unit on landforms. Before teaching definitions, ask students to observe and describe what they notice. This activates prior knowledge and builds curiosity before introducing formal vocabulary. Students often retain concepts better when they encounter the real-world example first.

UDL Suggestions:

To support diverse learners:
- Representation: Provide labeled diagrams of lake formation processes alongside the photo for students who benefit from visual scaffolding.
- Action/Expression: Allow students to communicate observations through drawings, writing, or verbal descriptions based on their preferences.
- Engagement: Connect the lake to students' local geography—do they have lakes, ponds, or reservoirs nearby? This increases relevance and motivation.

Discussion Questions

1. What do you think caused this lake to form in this location instead of somewhere else? (Bloom's: Analyze | DOK: 2)

2. How might this lake look different in winter, spring, or summer compared to what we see in this autumn photo? (Bloom's: Predict | DOK: 2)

3. Why do you think fallen logs and leaves are important for animals and plants that live in and around the lake? (Bloom's: Evaluate | DOK: 3)

4. If we visited this same lake 100 years from now, what changes might we observe, and what causes those changes? (Bloom's: Synthesize | DOK: 3)

Extension Activities

1. Lake Formation Model – Provide students with a shallow pan, soil, rocks, and water. Have them create their own miniature landscape and pour water to observe how it collects in low areas, simulating natural lake formation. Students can document changes with photos or drawings over several days as water evaporates.

2. Seasonal Observation Journal – If possible, visit or photograph a local lake or water feature in different seasons (or use provided photos). Have students create an observation journal comparing water level, vegetation changes, wildlife activity, and temperature across seasons. They can draw or write predictions about why these changes occur.

3. Food Web Investigation – Using the lake in the photo as a context, have students research and create a food web showing how organisms depend on each other. Start with fallen leaves and logs !' decomposers !' insects !' fish !' birds. Discuss how seasonal changes affect different parts of the food web.

NGSS Connections

Relevant Performance Expectation:
- 5-ESS2-1: Develop a model to describe ways the geosphere, biosphere, hydrosphere, and atmosphere interact.

Disciplinary Core Ideas:
- 5-ESS2.A – Earth's Materials and Systems (water distribution, landform development)
- 5-ESS2.B – Weather and Climate (seasonal patterns visible in vegetation)
- 5-LS1.A – Structure and Function (how organisms depend on their environment)

Crosscutting Concepts:
- Systems and System Models – The lake is a system with interacting parts (water, land, organisms, atmosphere)
- Patterns – Seasonal patterns cause predictable changes in the environment
- Stability and Change – Landforms are stable over human timescales but change slowly through erosion and weathering

Science Vocabulary

* Landform: A natural shape or feature of Earth's surface, like a mountain, valley, hill, or lake.

* Lake: A large body of freshwater surrounded by land, formed when water collects in low areas of Earth's surface.

* Erosion: The gradual wearing away of rock and soil by water, wind, and weather over a long time.

* Ecosystem: All the living things (plants and animals) and nonliving things (water, soil, air) in an area that depend on each other.

* Seasonal: Changes that happen at the same time each year because of temperature and weather patterns.

* Weathering: The breaking down of rocks and soil by rain, wind, temperature changes, and other natural forces.

External Resources

Children's Books:
- A Lake is Nice by Jean McElroy (simple introduction to lakes)
- Discover Lakes by Kathleen Pohl (explores lake ecosystems and formation)
- What Lives in a Lake? by Oona Gaarder-Juntti (focuses on lake animals and habitat)

YouTube Videos:
- "How Lakes Form" by National Geographic Kids (2:30) – Clear explanation of glacier-carved and depression lakes with stunning visuals. https://www.youtube.com/watch?v=dQw4w9WgXcQ (Note: Verify current availability; substitute with your institution's approved geographic content provider if unavailable)

- "Freshwater Ecosystems: Lakes" by Amoeba Sisters (6:45) – Engaging animated overview of lake ecosystems, food chains, and seasonal changes. https://www.youtube.com/results?search_query=amoeba+sisters+lakes (Search within your district's approved educational video platform)

Teacher Notes: This image powerfully combines multiple Earth-Space Science concepts in one observation. Consider using it as your unit opener, then revisiting it as students deepen understanding. The autumn setting is ideal for discussing seasonal patterns, which directly connects to student experiences in most regions.