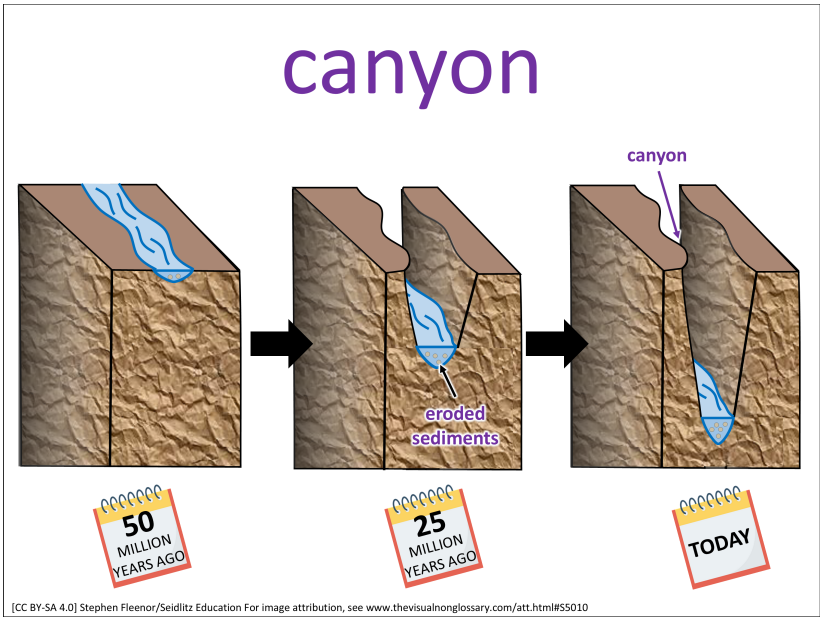
The Visual Non-Glossary™

Carved by Water

The purpose for reading is to understand how weathering and erosion change Earth's surface to form a canyon over time.

Pay Attention To:

- How weathering changes rock
- How erosion moves sediments
- How small changes over time lead to a canyon



The Grand Canyon in Arizona is a very large landform in the United States. It has tall rock walls with a river at the bottom. Scientists say this huge **canyon** did not form quickly. It formed slowly as water changed Earth's surface over a long time.

The process starts with **weathering**. **Weathering** breaks rock into smaller pieces. Water, ice, and changes in temperature can cause cracks in rock. Over time, the cracks get bigger and pieces break apart.

Next is **erosion**. **Erosion** happens when water, wind, or ice moves broken rock to a new place. When a river flows, it picks up small pieces of rock called **sediments**. A faster river can carry more **sediments**. These **sediments** scrape against the riverbank and bottom. This scraping removes more rock.

In a classroom investigation, students model this process by pouring water over packed soil in a tray. At first, the soil looks flat. As water flows, small paths begin to form. Faster water cuts deeper into the soil. Slower water carries fewer **sediments**. Over time, the paths grow wider and deeper. This model shows how a **canyon** forms

through **weathering** and **erosion**.

Over many years, a river can carve deep into rock. Faster water may remove more **sediments**, while slower water changes the land more slowly. These changes shape the land into the deep valleys we call a **canyon**.

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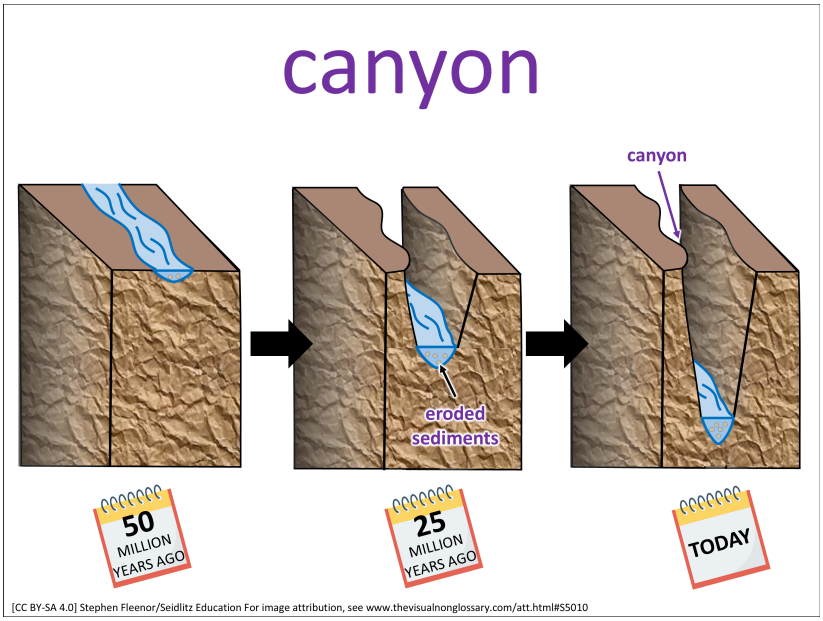

The Grand Canyon in Arizona is one of the largest landforms in the United States. It stretches for miles across the desert, with steep rock walls that drop down to a river below. Scientists explain that this massive **canyon** did not appear all at once. It formed slowly as moving water changed Earth's surface over a very long time.

The process begins with **weathering**. **Weathering** breaks down rock into smaller pieces. Changes in temperature, water, and even ice can cause cracks in the rock. Over time, these cracks grow larger. Small pieces break apart and become loose material.

Next comes **erosion**. **Erosion** happens when water, wind, or ice moves broken pieces of rock from one place to another. When a river flows over rock, it picks up small pieces called **sediments**. The faster the river moves, the more **sediments** it can carry. As these **sediments** travel downstream, they scrape and bump against the riverbank and riverbed. This action removes more rock.

Constructed Learning

In a classroom investigation, students model this process by pouring water over a tray filled with packed soil. At first, the surface looks flat. As water continues to flow, small channels begin to form. When the water moves faster, it cuts deeper into the soil. When the water slows down, fewer **sediments** are carried away. Over time, the channels grow wider and deeper. This simple model helps students see how a **canyon** forms through repeated **weathering** and **erosion**.

Over thousands of years, a river can carve deeper and deeper into rock. If the river flows faster, it may carry more **sediments** and remove more material. If the river slows down, the changes may happen more gradually. These long-term processes shape the land into the steep walls and deep valleys that we recognize as a **canyon**.

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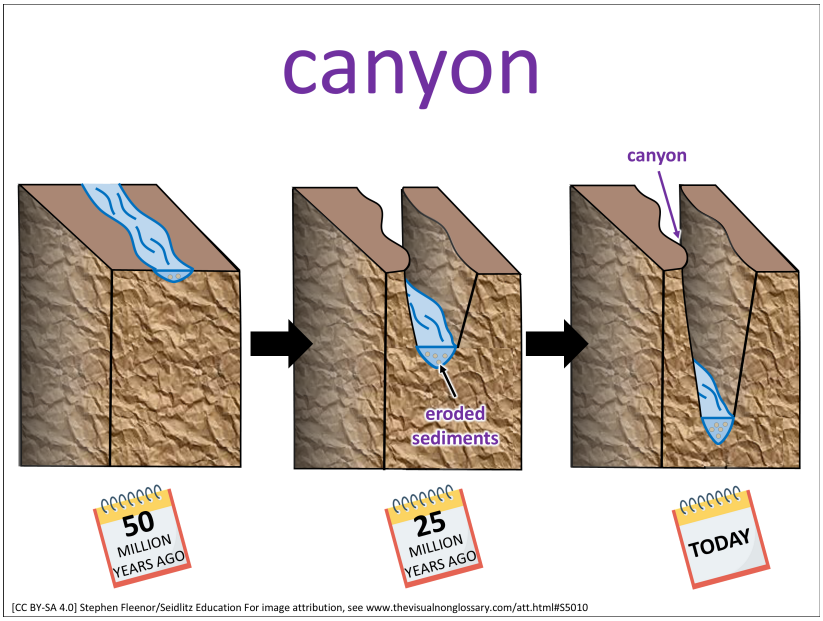

The Grand Canyon in Arizona is one of the most extensive landforms in the United States. It extends for miles across the desert, with towering rock walls that descend to a river below. Scientists explain that this enormous **canyon** did not form suddenly. Instead, it developed gradually as flowing water reshaped Earth's surface over a vast period of time.

The process begins with **weathering**. **Weathering** breaks solid rock into smaller fragments. Variations in temperature, water movement, and even ice expansion can create cracks in rock layers. Over time, these cracks widen, and pieces separate from the larger rock formation.

Following **weathering**, **erosion** occurs. **Erosion** is the movement of broken rock by water, wind, or ice. As a river flows across exposed rock, it collects small particles known as **sediments**. A faster-moving river can transport a greater amount of **sediments**. These **sediments** grind against the riverbank and riverbed as they travel. This grinding action removes additional rock material.

Constructed Learning

In a classroom investigation, students model this process by pouring water over a tray filled with compacted soil. At first, the surface appears level. As water continues to flow, small channels begin to form. Increased water speed cuts more deeply into the soil. Reduced speed results in fewer **sediments** being transported. Over time, the channels expand in both width and depth. This model demonstrates how a **canyon** forms through ongoing **weathering** and **erosion**.

Across thousands of years, a river can carve progressively deeper into solid rock. Greater flow rates may increase the removal of **sediments**, while slower flow may reduce the rate of change. These continuous processes eventually shape the dramatic cliffs and valleys that define a **canyon**.