

1 | River Environments

----- Fluvial Process -----

The term "fluvial process" refers to the various natural actions and activities associated with rivers and other water bodies. These processes are integral to the movement and shaping of landscapes by the action of flowing water. Fluvial processes include erosion, transportation, and deposition of sediments, ultimately influencing the formation of landforms and the evolution of river systems.

----- Weathering -----

Weathering is the process by which rocks and minerals at or near the Earth's surface break down or disintegrate into smaller particles. It's a crucial step in the broader geological cycle, preparing materials for erosion and transportation. There are two main types of weathering: mechanical (physical) weathering and chemical weathering.

1. Mechanical (Physical) Weathering:

- **Freeze-Thaw (Frost Action):** Water seeps into cracks in rocks, expands when it freezes, and exerts pressure on the surrounding rock, causing it to break.
- **Exfoliation:** The outer layers of rocks peel away due to the release of pressure as overlying rocks are eroded.
- **Abrasion:** Rocks are physically worn down by the impact of particles carried by wind, water, or ice.
- **Biological Activity:** Plants and animals contribute to mechanical weathering. Plant roots can grow into cracks, exerting pressure, and burrowing animals can break apart rocks.

Explain the process of biological weathering, and how it associates with mechanical weathering.

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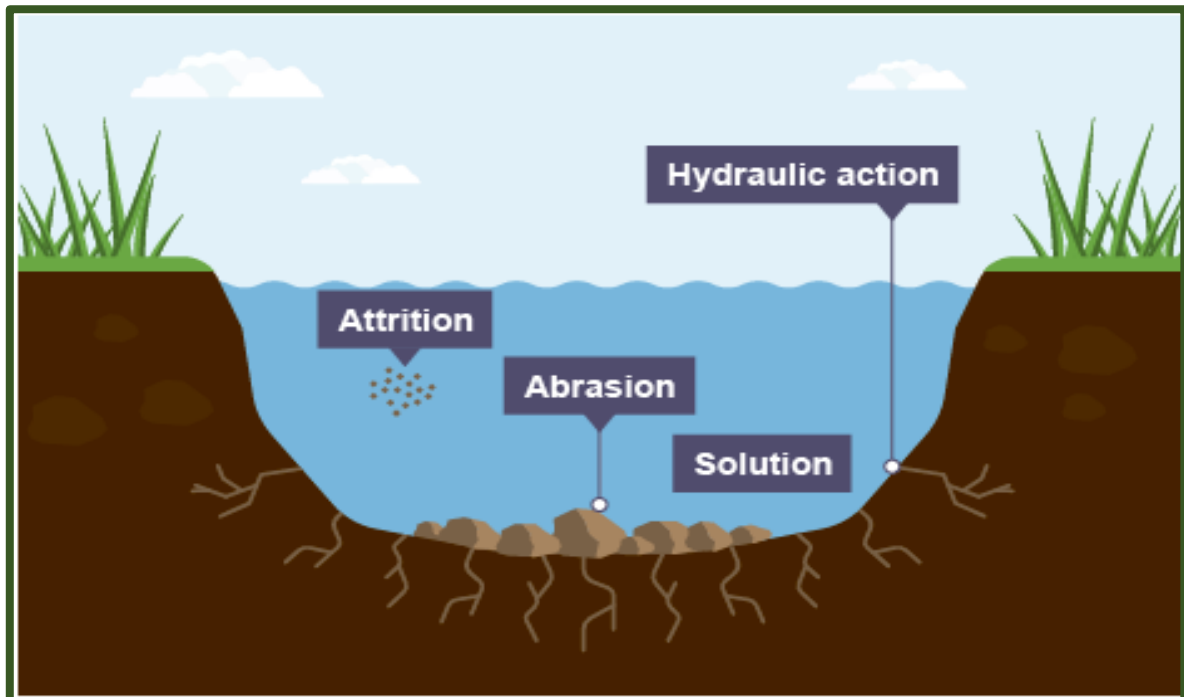
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2. Chemical Weathering:

- **Hydration:** Minerals absorb water, causing them to expand and weaken over time.
- **Oxidation:** Minerals react with oxygen, leading to the formation of oxides. This is common in iron-bearing minerals, resulting in the rusting of rocks.
- **Carbonation:** Carbon dioxide in the atmosphere dissolves in rainwater, forming carbonic acid. This acid reacts with minerals like limestone, leading to their dissolution.
- **Hydrolysis:** Water chemically reacts with minerals, breaking them down into new minerals and dissolved ions. For example, feldspar can be hydrolyzed into clay minerals.

----- Erosion -----

- **Hydraulic Action:** The force of flowing water wears away the riverbed and banks.
- **Abrasion:** The riverbed is scoured by the movement of rocks and sediment carried by the water.
- **Attrition:** Rocks and particles in the river collide, wearing each other down into smaller fragments.
- **Solution:** Some minerals are dissolved in the water, contributing to erosion.



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----- Transport -----

- **Traction:** Large rocks and boulders are rolled along the riverbed by the force of the water.
- **Saltation:** Smaller stones are bounced along the riverbed.
- **Suspension:** Fine particles, like silt and clay, are carried within the water flow.
- **Solution:** Dissolved minerals are transported within the water.

Explain why the size of load material affects the way it is transported by the river.

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----- Deposition -----

- **When Velocity Decreases:** As a river slows down, its competence decreases, leading to the deposition of coarser material.
- **When Discharge Decreases:** Reduced water volume can result in the deposition of sediment.
- **At the Mouth:** When a river meets a body of water with lower velocity, like the sea or a lake, sediment may be deposited, forming features such as deltas.