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# Big Idea

A combination of Constructive and Destructive geologic processes formed Earth's surface.

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## Weathering

### I Can...

1. Explain how mechanical weathering and chemical weathering differ.
2. Describe how weathering affects Earth's surface.
3. Explain how climate affects weathering.

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## Weathering

Is the process of breaking rock into smaller and smaller pieces.

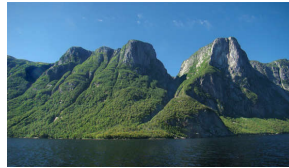
These smaller, loose pieces are called sediment.  
ex. Sand, Silt, and Clay



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## Weathering

Over millions of years, weathering has changed Earth's surface. The process continues today.



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## Weathering



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## Weathering

Two different types of weathering work together to shape Earth's surface.

- Mechanical



- Chemical



## Mechanical Weathering

Mechanical weathering occurs when rocks are broken apart by physical processes. This means that the overall chemical makeup of the rock stays the same. Thus, each fragment has characteristics similar to the original rock.



## Mechanical Weathering

Common Causes:

1. Growing Plants
2. Burrowing Animals
3. Ice (freezing, expanding, and melting)
4. Abrasion (grinding of rocks by other rocks)

## Mechanical Weathering: Plants & Animals

Water and nutrients that collect in the cracks of rocks result in conditions in which plants can grow. As the roots grow, they enlarge the cracks.



## Mechanical Weathering: Plants & Animals

Burrowing animals also cause mechanical weathering.



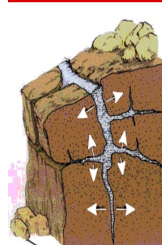
As these animals burrow, they loosen sediment and push it to the surface.

## Mechanical Weathering: Ice Wedging

- Freezing and Thawing of Water

- \* Water seeps into **Cracks**
- \* Water freezes when the temperature drops.
- \* Water **Expands** when it freezes.
- \* Ice acts a wedge: A simple machine forcing objects apart.
- \* Wedges of ice in rocks widen and deepen the cracks in the rocks.
- \* When the ice melts, the water seeps deeper into the cracks.

## Mechanical Weathering: Ice Wedging



## **Mechanical Weathering: Review**

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1. Describe Mechanical Weathering.
2. Identify and explain ways mechanical weathering can impact the surface of the Earth.

## **Weathering: Surface Area**

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Mechanical weathering by plants, animals, and ice wedging reduces rocks to smaller pieces. The smaller pieces of rock have more of their surfaces exposed to the air and water. This speeds up a different type of weathering called chemical weathering.

## **Chemical Weathering**

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Chemical weathering, occurs when chemical reactions dissolve the minerals in rocks or change them into different materials. This type of weathering changes the chemical composition of the rock, which can weaken the rock.

## **Chemical Weathering**

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## **Effects of Climate**

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Climate affects the rate of weathering.

- Weathering occurs faster in wet climates
  - Rainfall for chemical weathering
  - Water for freezing and thawing (Mechanical)
- Weathering occurs faster at higher temperatures.
  - Minerals dissolve faster

## **Effects of Rock Type**

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- Some rocks weather more rapidly than others.
- Depends on the types of minerals that are in the rocks.
- Permeable rocks (full of tiny holes) weather quickly. Why?