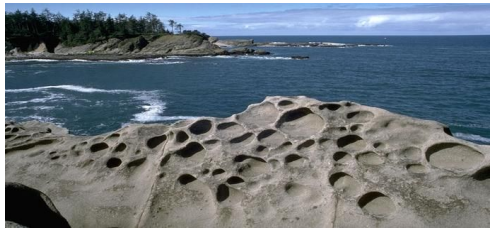
Erosion and Weathering

Objective

-Explain the differences between chemical and physical weathering.



-Compare erosion by water, wind, ice, and gravity.

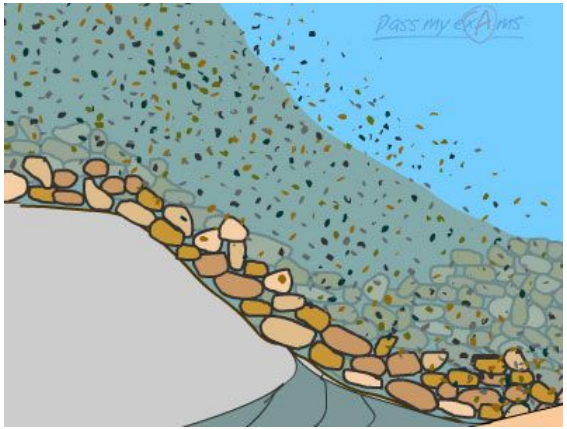
-Explain the effects of human activity on shorelines and mountainsides.

Essential Question

Why should we care about erosion?

Erosion

- Once a rock material has been weathered (or broken down), it is ready to be **eroded**, or transported.
- **Erosion** refers to the transportation of rock, soil, and mineral particles.
- **Deposition** refers to the process by which an agent of erosion loses energy and drops (or deposits) the sediment it is carrying



Erosion

- The main driving force behind all agents of erosion is **gravity**.
- Without gravity the other major natural agents of erosion such as: **wind, running water, glaciers, waves, and rain** would not occur.

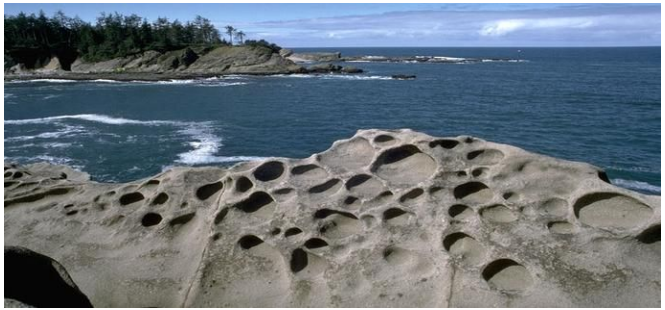
Weathering

Weathering is the break-up of rock due to exposure to the atmosphere.

Weathering

Two types of weathering:

1) Chemical Weathering



2) Mechanical Weathering

Weathering

Mechanical weathering, or **disintegration,** involves physically breaking rocks into fragments ….

...*without changing their chemical composition*..

Weathering

3 Factors Contributing to Mechanical Weathering

1) Water**
2) Wind
3) Biological Activity

**Water has the most significant impact

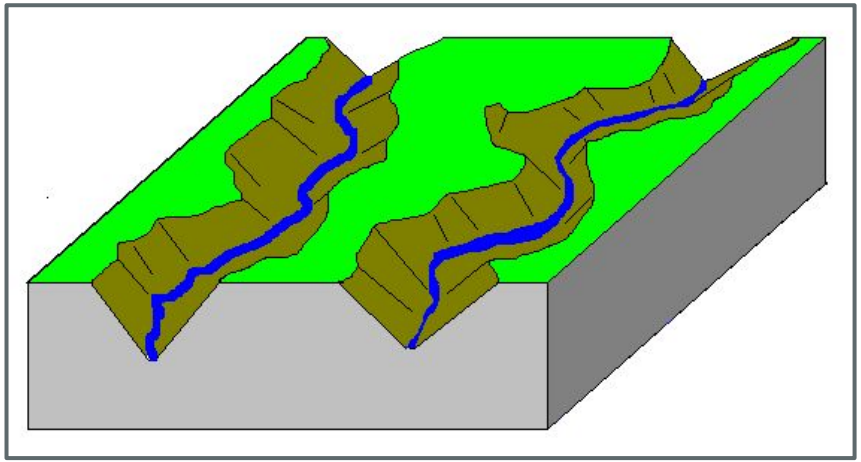
Mechanical Weathering: Water

1) **Mechanical Weathering by Water**
   a. **<u>Frost Wedging</u> =** the freezing and thawing of water in the cracks

Mechanical Weathering:Water Erosion

1. **Mechanical Weathering by Water**
   b) **Running water** is the primary agent of erosion on Earth.

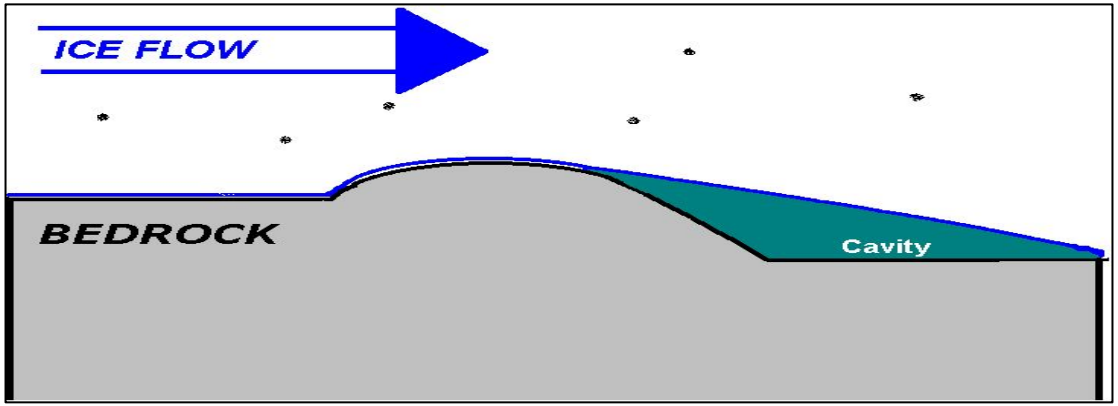
   – Creates **v-shaped valleys** *(valles)* such as the Grand Canyon: http://www.youtube.com/watch?v=lN0cZg_9XeM&feature=related



Mechanical Weathering: Water Erosion

1. **Mechanical Weathering by water**
   c) **Glacial Weathering/Ice Erosion**

Glaciers and avalanches can cause weathering as ice and rock interact.



Mechanical Weathering: Water Erosion

Glacial Weathering/Ice Erosion creates:

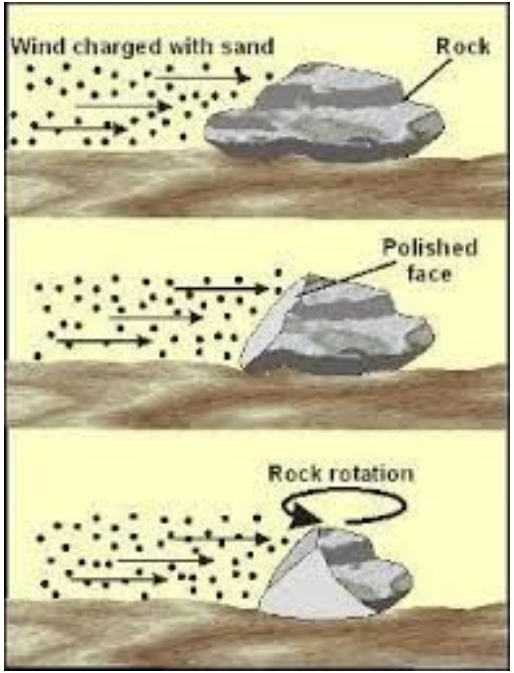
1) **U-Shaped valleys**

2) **Glacial Lakes**

Mechanical Weathering: Wind

2) Mechanical Weathering by **Wind**

Both wind and water can cause
abrasion as rock fragments bounce (rebotar) off each other.



Mechanical Weathering: Wind

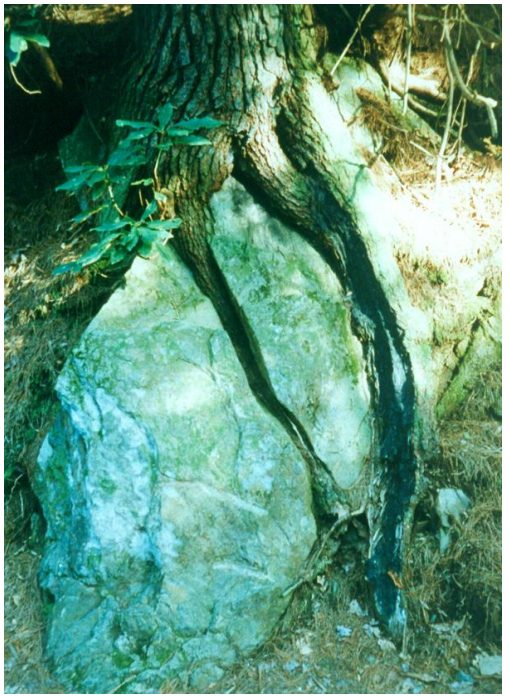
Abrasion creates:

1) **Dunes**

2) **Monument Valley (Arizona/Utah)**

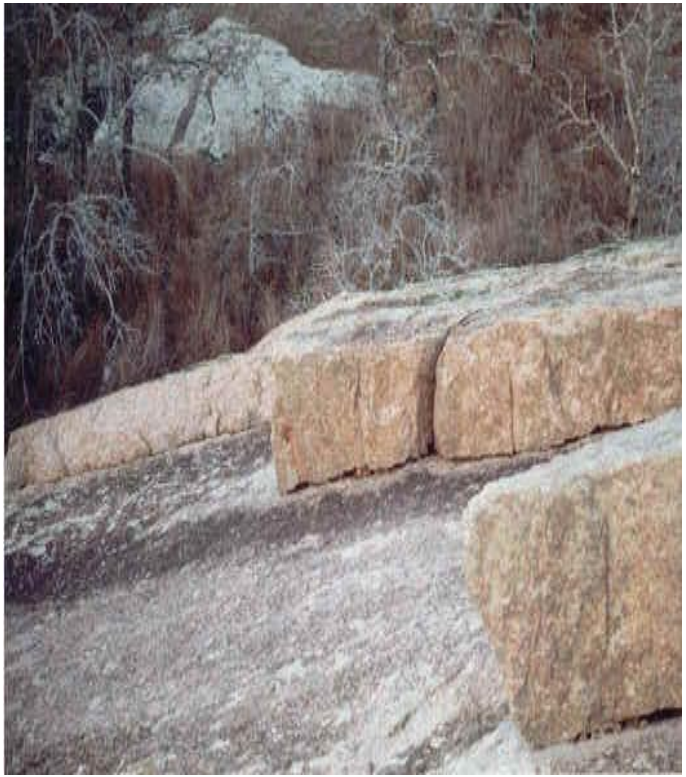
Mechanical Weathering: Biological Processes

3. **Mechanical Weathering by Biological Processes-**
   a. **Root wedging-** Powerful plant roots grow into rock cracks and cause fractures.



Weathering

3. **Mechanical Weathering by Biological Processes-**
   b. **Mechanical Exfoliation-** The peeling off (pelando) of sheets of rock as they expand (expandir) and crack (agrietarse).

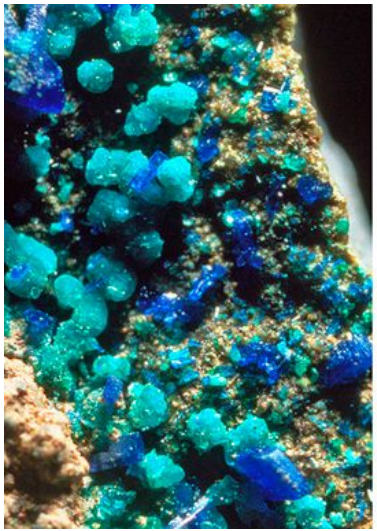


Weathering

Chemical weathering, or **decomposition**, is when some of the rock's minerals are *changed into* ***different substances***.

Examples:

- rain
- acid from plants
- oxidizing
- demineralizing by water



Weathering

Chemical Weathering- when water interacts with minerals

- **Limestone** is made of calcium carbonate.
  - When carbon dioxide is dissolved *(disuelto)* in rainwater, it makes a weak acid *(ácido débil)* called **carbonic acid**.
  - When carbonic acid comes into contact with **limestone**, it reacts *(reaccionar)* with the rock to form calcium bicarbonate.

Weathering

Factors that affect RATE (speed) of weathering

1) Mechanical weathering SPEEDS UP Chemical weathering
2) The chemical composition of the rock
3) Temperature and moisture
4) Climate- how many times water will freeze and thaw

Effects of Weathering

1) Dust Bowl: 1930's in the USA

2) Landslides