

Weathering and Erosion

Weathering of Rock
vs.
Erosion of Sediment

Weathering

- The breaking of rock into sediment (bits and pieces of rock)
- Two main categories of weathering:
 - Physical/Mechanical
 - Chemical

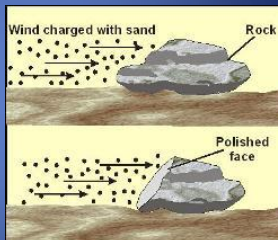
Physical/Mechanical Weathering

- Physical forces break rock down without changing mineral composition
- Causes of physical weathering:
 - Wind
 - Water
 - Ice
 - Biological



Physical Weathering: Wind

- Wind acts via abrasion: small particles hit the rock and chip away small pieces at a time.
- The side facing the wind will wear away the fastest.



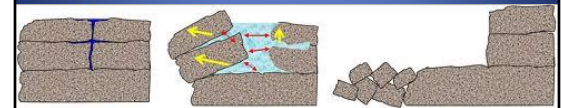
Physical Weathering: Water

- Water acts via abrasion: the rock tumbles around and pieces are knocked off as it hits other objects in the water.
- The rock becomes smaller, smoother, and rounder over time.



Physical Weathering: Ice

- Ice acts via frost wedging: water gets into tiny cracks in the rock, freezes, expands, and makes the cracks larger until the rock splits.



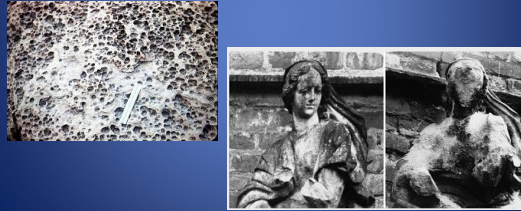
Physical Weathering: Biological

- Biological weathering occurs through plant roots, burrowing animals, human mining, etc.



Chemical Weathering

- Change in the composition of a rock due to acid rain
- Often involves dissolving the rock



Weathering

- The breaking of rock into sediment (bits and pieces of rock)
- Three factors can change the rate of weathering:
 - Climate
 - Topography
 - Rock composition

Rate of Weathering Factors: Climate

- Climate
 - Rain—more rain = more chemical weathering
 - Wind—more wind = more physical weathering (wind abrasion)
 - Temperature—lower temperatures = more physical weathering (frost wedging)

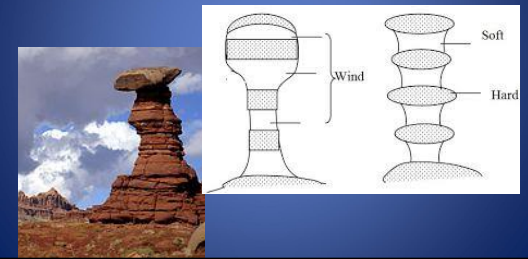
Rate of Weathering Factors: Topography

- Topography
 - Steep slopes = more weathering
 - Flatter slopes = less weathering



Rate of Weathering Factors: Rock Composition

- Certain types of rock resist weathering because they are harder.



Check for Understanding

- Sort the provided picture cards into types of weathering.
- When your group thinks you've got them all right, raise your hand for me to check. I will give you a thumbs up or tell you how many are incorrect.

Erosion of Sediment

- The movement of weathered sediment from one location to another.
- Agents of erosion:
 - Gravity
 - Wind
 - Water (run off, rivers, oceans)
 - Ice (glaciers)



Rate of Erosion Factors

- Speed of erosion is determined by:
 - Type/amount of vegetation
 - Gradient (steepness) of the slope
 - Climate



Rate of Erosion Factors: Type/Amount of Vegetation

- Trees—deeper roots = slower erosion
- Grass—shallow roots = faster erosion
- NONE—no plants = VERY fast erosion



Rate of Erosion Factors: Gradient

- Steep slope = faster erosion
- Gentle slope = slower erosion



Rate of Erosion Factors: Climate

- Wind
 - More wind = faster erosion
 - Less wind = slower erosion
- Rain
 - More rain = faster erosion
 - Less rain = slower erosion

