**Weathering and Erosion:**

**Unit 1: Materials and Processes that Shape a Planet**

**Mini-Unit:** Rocks

**Goal 3**:The student will demonstrate the ability to explain how rock formation, weathering, sedimentation, and rock reformation constitute a continuing “rock cycle” in which the total amount of material stays the same even as its form changes

**Objectives – The student will be able to:**

* Explain the role of gravity and natural agents (water, wind, glaciers) on Earth (landform changes) and how they impact the rock cycle
* Explain the principles of hydrology, including evaporation, transpiration, surface and groundwater flows, aquifers, porosity, water retention, permeability, particle surface area, desalinization, and sources of water contamination and pollution

**Textbook:** Unit 5, Chapters 14, p. 340

Weathering and Erosion:

Weathering – the natural process by which atmosphere and environmental forces, such as wind, rain, and temperature changes, disintegrate, and decompose rocks

1. Mechanical – the process by which rocks break down into smaller pieces by physical means
2. Chemical – the process by which rocks break down as a result of chemical reactions

Types of Mechanical/Physical Weathering:

1. Ice Wedging – when water gets into the cracks of rocks, freezes and expands putting stress or breaking the rock
2. Abrasion – when rocks rub against each other, usually fragments being carried by agents of erosion, leads to rounding of particles
3. Plant or Animal Activity – the roots of plants or the displacement of rocks or soil by animals contribute to erosion
4. Changes in Temperature – the daily expanding and contraction of rocks due to changing temperatures

Types of Chemical Weathering:

1. Oxidation – process in which elements combine with oxygen, commonly occurs in rock that has iron in it
2. Hydrolysis – an chemical reaction of a substance with water, thus minerals will dissolve in water
3. Acid Rain – precipitation that contains a high concentration of acid due to pollution

Factors that Affect the Rates of Weathering:

1. Rock Composition – density and composition changes the rate of erosion
2. Surface Area – the more surface area exposed, the faster the weathering
3. Fractures and Joints – naturally forming cracks make the rocks weaker
4. Climate – alternating hot and cold weather allows for faster weathering, as well as hot and humid
5. Topography – steep slopes allow for faster erosion

Sediment – fragments or particles of rock produced by weathering, named according to size

|  |  |
| --- | --- |
| **Particle Size** | **Name** |
| <.0004 cm | Clay |
| .0004-.006 cm | Silt |
| .006-.2 cm | Sand |
| .02-6.4 cm | Pebbles |

Deposition – process by which transported sediment is dropped in new places by agents of erosion

Horizontal Sorting/Deposition – particles carried by a stream or wind begin to be deposited as velocity decreases, thus larger particles are deposited first and smaller particles are carried further



Vertical Sorting/Deposition – larger or more dense particles will settle first, smaller or less dense particles take a little longer