Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Weathering and Erosion Guided Notes

**Mechanical Weathering**

**◆ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ weathering** occurs when physical forces break rock into smaller and smaller pieces without changing the rock’s mineral composition.

**◆** In nature three physical process are especially important causes of weathering: frost wedging, unloading, and biological activity.

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* The mechanical breakup of rock caused by the expansion of freezing water in cracks and crevices
* Sections of rock that are wedged loose may tumble into large piles called **talus,** which typically form at the base of steep, rocky cliffs.

2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* Reduced pressure on igneous rock causes it to expand and allows slabs of outer rock to break off in layers in a process called **exfoliation.**

3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  activity

* The activity of organisms, including plants, burrowing animals, and humans, can also   
  cause mechanical weathering.

**Chemical Weathering**

◆ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ weathering** is the transformation of rock into one or more new compounds.

◆ Chemical Weathering of Granite

• Weathering of potassium feldspar produces clay minerals, soluble salt (potassium bicarbonate), and silica in solution.

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** remains unaltered.

◆ Weathering of Silicate Minerals

• Produces insoluble iron oxides and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** minerals

◆ Spheroidal Weathering

• Causes the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of rock to be more rounded

◆ Two other factors affecting the rate of weathering are rock characteristics and climate.

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** characteristics

* Mineral composition and solubility
* Physical features such as joints

2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• Temperature and moisture are the most crucial factors.

• Chemical weathering is most effective in areas with high temperatures and abundant moisture.

**Rate of Weathering**

◆ Differential Weathering

• Caused by variations in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• Creates **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and spectacular rock formations and landforms

**Characteristics of Soil**

◆ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is part of the regolith that supports the growth of plants.

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the layer of rock and mineral fragments that covers most of Earth’s land surface.

◆ Soil Composition

• Soil has **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** major components: mineral matter, or broken-down rock; humus, which is the decayed remains of organisms; water; and air.

◆ Soil Texture

• Texture refers to the proportions of different particle sizes.

- **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (large size)

- **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

- **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (small size)

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (a mixture of all three sizes) is best suited for plant life.

◆ Soil Structure

• Soil particles clump together to give a soil its structure.

**Soil Formation**

◆ The most important factors in soil formation are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** material, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** , **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** , **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** , and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** .

1. Parent material

• Residual soil—parent material is the bedrock

• Transported soil—parent material has been carried from elsewhere and deposited

2. Time

• Important in all **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** processes

• The longer a soil has been forming, the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** it becomes.

3. Climate

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** effect on soil formation

4. Organisms

• Organisms influence the soil's physical and chemical properties.

• Furnish organic matter to soil

5. Slope

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

- Steep slopes often have poorly developed soils.

- Optimum slope is a flat-to-undulating upland surface.

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** , or direction the slope is facing, influences soil formation.

- Soil temperature

- Moisture

**Soil Types**

◆ Three common types of soil are pedalfer, pedocal, and laterite.

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• Best developed under forest vegetation

• Accumulation of iron oxides and aluminum-rich clays in the B horizon

2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• Accumulates calcium carbonate

• Associated with drier grasslands

3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• Hot, wet, tropical climates

• Intense chemical weathering

**Soil Erosion**

◆ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** erodes soil.

◆ Rates of Erosion

• Human activities that **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** natural vegetation, such as farming, logging, and construction, have greatly accelerated erosion.

◆ Sediment Deposition

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** fill with sediment.

• Sediments are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** by pesticides and fertilizers.

◆ Controlling Erosion

• Planting rows of trees called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** hillsides
* Plowing along the contours of hills
* Rotating crops

**Triggers of Mass Movements**

◆ The transfer of rock and soil downslope due to gravity is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .**

◆ Among the factors that commonly trigger mass movements are saturation of surface materials with water, oversteepening of slopes, removal of vegetation, and earthquakes.

**Types of Mass Movements**

◆ Geologists classify mass movements based on the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of material that moves, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** it moves, and the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of movement.

◆ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• A **rockfall** occurs when rocks or rocks fragments fall freely through the air.

◆ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• In a slide, a block of material moves suddenly along a flat, inclined surface.

• Slides that include segments of bedrock are called **rockslides.**

◆ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• A **slump** is the downward movement of a block of material along a curved surface.

◆ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• Flows are mass movements of material containing a large amount of water.

• **Mudflows** move quickly and carry a mixture of soil, rock, and water that has a consistency of   
wet concrete.

• **Earthflows** move relatively slowly and carry clay-rich sediment.

◆ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• **Creep** is the slow, downhill movement of soil and regolith.