Lesson 5: Erosion & Weathering Notes

Erosion & Weathering

Definition

- **Erosion**: The process of wearing away and transporting soil, rock, and sediment by **wind, water, ice, or gravity**.
- **Weathering vs. Erosion**:
    - **Weathering**: **Breaks down** rocks into smaller pieces.
    - **Erosion**: **Moves** the broken pieces to a new location.

Types of Erosion

1. **Water Erosion** 🌊 (Most Powerful)
    - **Cause**: Rain, rivers, waves, floods.
    - **Example**: **Grand Canyon** was carved by the **Colorado River**.
2. **Wind Erosion** 🌬️
    - **Cause**: Strong winds carry sand and dust.
    - **Example**: **Sahara Desert sand dunes**, dust storms in dry areas.
3. **Glacial Erosion** ❄️
    - **Cause**: Moving glaciers scrape and reshape land.
    - **Example**: **The Great Lakes** were carved by glaciers.
4. **Gravity (Mass Movement)** 🪨
    - **Cause**: Rockfalls, landslides, mudslides.
    - **Example**: **Steep cliffs collapsing** after heavy rain.

Soil Erosion

- **Definition**: The wearing away of the top layer of soil (topsoil) by water, wind, or human activity.
- **Why It Matters**:
    - **Damages farmland** and pollutes water.
    - **Causes landslides** and loss of fertile soil.
    - **Takes hundreds of years** to naturally replace lost soil.

Weathering

- **Definition**: The process of breaking down rocks into smaller pieces by natural forces (**water, wind, ice, living organisms**).
- **Key Idea**: Weathering **does not move** the broken pieces—erosion does!
- **Importance**:
    - **Creates soil** needed for plant growth.
    - **Shapes landscapes** (valleys, caves, cliffs).
    - **Forms unique rock formations** (e.g., The Grand Canyon).

Types of Weathering

- **Chemical Weathering**: Rocks **change chemically**, forming new substances.
    - **Examples**:
        - **Rust (Oxidation)**: Iron in rocks reacts with oxygen & water → **reddish-brown rust**.
        - **Acid Rain**: Pollution makes rain acidic → wears away buildings/statues.
        - **Cave Formation**: Carbonic acid dissolves limestone → **creates caves**.

Lesson #6: Mountains & Volcanoes

What Are Mountains?

- **Large landforms** that rise steeply from the surrounding land.
- **Formed by tectonic activity** when Earth's plates **collide** or **slide past each other**.

Types of Mountains

1. **Fold Mountains**
    - **Formation**: Tectonic plates **collide**, causing Earth's crust to fold.
    - **Examples**: **Himalayas, Alps, Appalachians**.
2. **Fault-block Mountains**
    - **Formation**: Large blocks of Earth's crust **lift or tilt along faults**.
    - **Examples**: **Sierra Nevada, Tetons (Wyoming)**.
3. **Dome Mountains**

    - **Formation**: Molten rock pushes Earth's crust **upward** but **does not break**.
    - **Examples**: **Black Hills (South Dakota), Adirondacks (New York)**.
4. **Residual Mountains**
    - **Formation**: Older mountains that **eroded over time**, leaving behind remnants.
    - **Examples**: **Appalachian Mountains (USA), Urals (Russia)**.

Volcanic Mountains

- **Formed by volcanic activity** (layers of lava & ash build up over time).
- **Examples**: **Mount Fuji, Mount St. Helens, Mount Etna**.

Types of Volcanoes

1. **Shield Volcanoes** 🌋
    - **Formation**: **Gentle, non-explosive eruptions** of **runny lava** spread out in thin layers.
    - **Examples**: **Mauna Loa, Kilauea (Hawaii)**.
2. **Composite Volcanoes (Stratovolcanoes)** 🌋
    - **Formation**: Built by **alternating layers** of lava and pyroclastic material (**explosive eruptions**).
    - **Examples**: **Mount St. Helens (USA), Mount Fuji (Japan), Mount Vesuvius (Italy)**.
3. **Cinder Cone Volcanoes** 🌋
    - **Formation**: **Explosive eruptions** throw volcanic ash & rocks into the air → falls back around vent, forming **steep cone-shaped mountains**.
    - **Examples**: **Parícutin (Mexico), Sunset Crater (USA)**.
4. **Lava Domes (Volcanic Domes)** 🌋
    - **Formation**: **Slow eruption** of **thick, viscous lava** piles up, creating a **steep-sided dome**.
    - **Examples**: **Novarupta (Alaska), Mount St. Helens Lava Dome (USA)**.
5. **Fissure Volcanoes** 🌋
    - **Formation**: **Lava erupts through cracks** (fissures) in Earth's crust, forming **large lava plains**.
    - **Examples**: **Iceland's Laki fissure, East African Rift**.

The Ring of Fire 🌍🔥

- **What is it?**
    - A **seismically active zone** around the Pacific Ocean, known for **volcanoes & earthquakes**.
    - **75% of the world's active volcanoes** are in this region!
- **Where is it?**
    - Stretches from **New Zealand → Japan → Alaska → North & South America**.
    - **Key countries**: **Japan, Indonesia, Chile, Alaska, Philippines, New Zealand, California**.
- **Why is it important?**
    - **Most earthquake-prone zone** on Earth.
    - **Valuable for studying** tectonic plate movement & volcanic activity.
- **Tectonic Plate Boundaries**
    - Located along **subduction zones** where plates collide → causes **earthquakes & volcanic eruptions**.