PROPERTY OF:

EARTH SCIENCE – UNIT 3 – CHAPTER 7 & 8 NOTES

WEATHERING & EROSIONAL FORCES

7.1 Weathering

- Weathering = a process that breaks down rocks into smaller and smaller fragments
  EX: potholes, statues breaking down, gravestone writing getting blurred, etc.

DRAW DIAGRAM OF A ROCK WEATHERING INTO SMALLER PIECES
DRAW DIAGRAM OF ICE WEDGING IN A ROCK
DRAW DIAGRAM OF PLANT ROOTS ON A SIDEWALK
DRAW BEFORE & AFTER DIAGRAMS OF WEATHERING ON A GRAVESTONE

- Mechanical weathering = when rocks break apart without changing their chemical composition (physical change)
  EX: plant roots growing (as the roots grow, they break rocks into smaller pieces)
  EX: ice wedging (water fills in the cracks in rocks, then freezes, expands, and breaks the rock)
- Chemical weathering = when rocks break apart by changing their chemical composition; occurs when air, water, acids, or other substances react with the minerals in the rocks (chemical change)
  EX: carbonic acid dissolves away limestone (calcite) → produces caves
  EX: oxygen coming in contact with iron → rust

SHOW DEMONSTRATION FROM ACTIVITY 6-1: WEATHERING CHALK
SHOW THE EFFECT OF SURFACE AREA ON CHALK USING AN ACID
DRAW DIAGRAMS OF CHEMICAL AND MECHINCAL WEATHERING OF CHALK

- Effect of Surface Area = when a rock is already broken into small pieces (by mechanical weathering), chemical reactions can take place more easily (by chemical weathering)

- WEATHERING OF A LARGE ROCK IS THE FIRST STEP IN CREATING SOIL!

6.1 Effect of climate

- Cool areas: Mechanical weathering is more common (more chances for ice wedging to occur)
- Warm, wet areas: Chemical weathering is more common (more chances for chemical reactions to occur)

PROPERTY OF:

8.1 Vocab

- Weathering = a process that breaks down rocks into smaller and smaller fragments
- Erosion = the movement of weathered material from one place to another
  EX: gravity, glaciers, wind, and water (rivers)
- Deposition = the dropping of sediments as a result of weathering and erosion

8.1 Mass Movements

- Mass Movement = erosion caused by gravitational forces
  - EX 1: Slump = when loose materials or rocks slip down a slope
    Underlying material is weakened and can't support the rock and sediment above.
    Produces a curved scar at the bottom.
  - EX 2: Creep = when sediments slowly inch their way downhill
    Causes trees and utility poles to lean downhill
  - EX 3: Rockslide = when large blocks of rock break loose from a steep slope and start tumbling. Common on mountains or cliffs.
    Usually caused by heavy rains, earthquakes, or ice fractures.
    Produces a "domino effect" – when one piece falls, the rest of them do too…
  - EX 4: Mudflow = thick mixture of sediments and water flowing down a slope
    Occurs in relatively dry areas after a heavy rain.
    Produces a cone-shaped deposit of sediments at the bottom.

8.1 Building on Steep Slopes is Dangerous

1. Building houses makes a slope even steeper.
2. Building houses removes vegetation (plants) from the land.
3. Building houses on steep slopes makes the land prone to slumps.
4. You can slow down erosion, but you can never eliminate it!

8.1 Steep Slopes Can Be Made Safe

1. Grow plants or trees to reduce erosion.
   2 ways that plants reduce erosion:
   - Plants hold the soil in place.
   - Plants absorb water
2. Build terraces (broad step-like cuts in the side of a slope)
   Terraces reduce erosion by making it harder for sediments to move.
3. Build retaining walls
   A retaining wall is a wall of stones or rocks built onto a slope.
   Retaining walls reduce erosion by preventing sediments from sliding downhill.

PROPERTY OF:

8.2 Glaciers
- Glacier = a moving mass of ice and snow
- Continental Glacier = a thick glacier covering a vast area; found near the poles
- Valley Glacier = glaciers found high on mountains where the temperature is lower

8.2 Glacial Erosion
- Glacial Erosion = the movement of loose or ice-fractured solid materials by glaciers
- Plucking = when boulders, gravel, and sand are added to the bottom and sides of a glacier
- Plucked materials erode other material more easily than glaciers alone
- Glaciers create U-shaped valleys (because plucking erodes the sides of the valley)
- Streams create V-shaped valleys (no plucking; erosion only occurs on the bottom of the valley)

8.2 Glacial Deposition
- Till = a mixture of different sized sediments that is deposited when the glacier stops moving
  till is deposited in front of the glacier (not in back!)
- Outwash = materials that are deposited from the melting of glaciers

8.3 Wind Erosion
- wind erosion = the movement of sediments by wind
  - EX 1: Deflation =
    when wind blows loose sediments, removing small particles and leaving behind more coarse particles
  - EX 2: Abrasion =
    when wind-blown sediments strike rock, creating a "sandblasting" effect
  - EX 3: Sand Storm =
    wind erosion over short distances (deserts, beaches, and dry riverbeds)
    EX: winds blowing sand at the beach
  - EX 4: Dust Storm =
    wind erosion over long distances (Dust Bowl: Kansas → New England)

8.3 Wind Deposition
- Sand Dune = the buildup of wind-blown sediments in front of a rock
- Dune Migration = the movement of sand dunes caused by further wind erosion
** SHOW DIAGRAM OF THE FORMATION OF A SAND DUNE **

8.3 Reducing Wind Erosion
1. Tree Belts (a physical block to wind)
2. Plant Vegetation (keeps the soil sediments in place)