**6th Grade Unit 2: Weathering, erosion, deposition, and landforms**

*lesson 1: How does weathering change the Earth’s surface?*

4 biomes (spheres) on Earth

* Geosphere- rocks, minerals, soil, landforms any rocky part of Earth
  + “anything not alive, liquid, or gas”
* Biosphere- plants and animals and their environment
  + “anything alive”
  + the energy for life comes from the sun
* Hydrosphere- all the water (clouds, rivers, oceans)
  + cryosphere-is all the frozen water (glaciers, icebergs)
* Atmosphere- all gases on Earth
  + - traps in light from the Sun that becomes heat

All the spheres work together in a balanced system where the input (energy in)

equals the output (energy out). The system can be disrupted by changing the

atmosphere, etc.

weathering- the breakdown of rock material by physical and chemical processes

2 types of weathering:

physical weathering- rock broken down by a physical process (temp. changes,

pressure changes, plant and animal actions, water, wind, and gravity)

* temp. change: hot things expand, cold things contract

ice wedging/frost wedging- when water gets

into cracks in rock and split it apart as it freezes

* pressure change: rock form under the surface under a lot of pressure

as layers are removed over time the pressure decreases and the

rock expands cracking off top layers (called exfoliation)

* plants and animal action: roots grow into and break rock, animals

build burrows, move soil and expose rock to the weather

* wind, water, and gravity: abrasion (breaking down of rock by

the mechanical action [rubbing] of other rocks); think sand paper

Chemical weathering- breakdown of rocks by chemical means (reactions with water,

air, etc.)

* reactions with oxygen: oxygen atoms react with the molecules

that make up rock; oxidation- process where chemicals

combine with oxygen (ex. rust)

* reactions with acid rain: slightly acidic rain that breaks down

rocks faster than regular water; burning of fossil fuels creates

chemicals that go into the water (clouds) (acid precipitation)

* reaction with acids in groundwater: cause rocks to dissolve and creates

caves; stalactites and stalagmites are where dissolved rock

gets deposited by dripping water

* acids from living things: things like lichens (moss) create acid as they

grow on rocks; the acid moves through tiny cracks etc. and

chemical reactions occur

*lesson 2: How does water change Earth’s surface?*

*vocab: erosion, deposition, floodplain, delta, alluvial fan, groundwater, shoreline,*

*beach, sandbar, barrier island*

Water can:

* erosion- process that moves sediment and other materials away from

one place to another

* sediment is tiny grains of broken down rock (sand, gravel, pebbles)
* causes streams to widen and deepen
* deposition- process that drops off eroded material
  + happens when gravity’s pull downward is greater than

the force of the wind or water

Factors that affect erosion:

* gradient or the measure of the change in elevation over a distance (steepness)
  + high gradient- (steep) faster b/c pull of gravity
  + low gradient- (flat) slower b/c less gravity pulling
* load is the size and type of material carried by the water
  + fast streams can carry large particles making erosion faster
  + slow stream carry smaller particles making erosion slower
* discharge is the amount of water a stream carries at a given time
* increased discharge moves faster erodes more
* decreased discharge moves slower erodes less

groundwater- water located within the rocks below Earth’s surface

* slightly acidic so it can cause caves to form
* if the cave collapses it forms a sink hole

Landforms made by water erosion:

* by streams and rivers (flows in one directions)
  + a channel is the name for the path a stream takes
  + gets wider and deeper as time goes
  + canyons and valleys (ex. Grand Canyon)
* by ground water
  + caves and sinkholes
* by waves and currents at the shoreline
  + shoreline- the edge of the land where it meets the water
  + strong waves erode and soft waves deposit
  + currents that travel parallel to the shore called longshore current
  + with the pull of the waves and the currents it makes a zigzag pattern

in the shoreline

* + sea cliffs, sea caves, arches, sea stacks (like a column of rock)

Landforms made by deposition:

* by streams/rivers (flows in 1 direction)
  + floodplain- many layers of sediment that form a flat area
    - great place for farming b/c of lots of nutrients
    - bends in the river/stream that form as it flows are called meanders
    - if a meander gets cut off from the river is called an oxbow lake
* delta- a fan shaped area at the end of a river (in flat places)
  + - alluvial fan- like a delta but made from water running down a

mountain that forms on dry land

* by shoreline
  + beach- area of shoreline made by the material deposited by waves

and currents

* + sandbar- an underwater or exposed ridge of sand ,gravel,

or shells

* + barrier island- a long narrow island, usually made of sand,

that forms parallel to the shoreline

*lesson 3: How do wind, ice, and gravity change Earth’s surface?*

*vocab: dune, loess, glacier, glacial drift, creep, rockfall, landslide, mudflow*

Wind can shape Earth’s surface:

* abrasion- the process of grinding or wearing down of a surface over time
* wind blows sand and loose particles over surfaces causing them to be abraded;

like sandblasting

* desert pavement is when only large rock pieces are left behind after the sand

has been moved by the wind; removal of sand by the wind is called deflation

* dunes- mounds of wind deposited sand (gentle slope side faces the wind, steep side

faces away)

* loess- a thick deposit of very fine sediment deposited by wind; build up over thousands

of years create rich areas for farming

Ice can shape Earth’s surface:

* glacier- a large moving mass of ice that forms by compacting snow
* flowing ice is moved by gravity down hill
* as they move they pick up rock material that scratch and abrade the land underneath
* glacial drift- deposition of rock material by the movement of a glacier
* alpine glaciers form in mountains, they fill in V-shaped valleys and over time widen

the valley to a U-shape, bowl shape (cirques) at the head of the valley, sharp ridge

between 2 cirques is called a arête, 3 or more arête joining together form a horn

(ex. Matterhorn Mt.)

* continental glacier is a thick sheet of ice that can spread over a large area, HUGE and

create flattened smooth features like a bulldozer, glacial lakes made by these

Gravity can shape Earth’s surface:

* shifting of materials downhill, or downslope, is called mass movement
* slow mass movement is happening on most slopes even though you can’t see

it; the extremely slow movement of material downslope is called creep; caused

by water, plants, & animals loosening the soil

* rapid mass movement happens suddenly and very quickly (very dangerous); when

loose rocks fall down a steep slope called rockfall; sudden and rapid movement of

a large amount of material called a landslide; rapid movement of a large amount

of mud is called a mudflow (if its caused by a volcano it’s called a lahar), deforestation

makes rapid mass movement more common (no trees to stops the soil)