

## Study Guide For Standard 5 & 6

**Age of the Earth:** Is determined by fossils, layering of rocks, and radioactive decay.

**Earth Layers-** Three main layers; Crust, Mantle, Core

**Earth Layers broken down-** Continental Crust, Oceanic crust, upper mantle, lower mantle, outer core, inner core.

**Pressure, Density, and Temperature:** All **increase** as we go deeper into the Earth .

**Composition of Earth's layers:** **Crust;** Oceanic- Basaltic, Continental-Granitic, **Mantle-** Magma(molten/plastic-like rock), **Core;** outer-molten iron and nickel, inner-solid iron

**Density:** Density increase with depth. Continental plates are **less dense** than oceanic.

**Plates-** Lithospheric plates (crust & upper mantle) float on the asthenosphere (upper mantle). The movement is caused by the **convection currents** of the mantle.

**Pangaea-** the theory that all continents were once connected.

**Continental Drift-** The **hypothesis** that the **continents drifted apart** – Alfred Wegener given credit.

**Plate Tectonics-** The current **theory** that the Earth is made of plates and the convection currents of the mantle cause them to move. The **Oceanic plates** also move apart causing sea floor spreading- Sea floor spreading creates the **mid ocean ridge**.

**Evidence** for Plate Tectonics: Sea floor spreading, puzzle-like fit of the continents, **plant and animal fossils** found in all areas of the earth regardless of current climates. For example, a tropical plant fossil found in Antarctica. Also, similar rock/mountain formations in different parts of the Earth, as well as evidence of glacial activity in tropical areas.

**Plate boundaries:** **Convergent** (coming together), **Divergent** (spreading apart), **Transform** (sliding past each other in a shearing motion).

**Three types of convergent boundaries:** Continental-Continental, Continental-Oceanic, Oceanic-Oceanic.

**Subduction zones:** Occur at convergent boundaries, and the denser material will subduct (go under) the other.

Oceanic plates subduct under continental plates because of greater density. When two oceanic plates converge, the older, more dense plate will subduct.

**Results of boundary types:** **Continental-Continental convergent:** mountain building, earthquakes; **Continental-**

**Oceanic subduction:** volcanoes, earthquakes, ridges; **Oceanic-Oceanic divergent:** sea floor spreading, earthquakes, ridges; **Oceanic-Oceanic convergent:** mountain building, earthquakes

**Transform Boundaries:** Does not destroy or create crust/rock. Earthquakes occur here. Most famous: San Andreas fault in California.

**The Ring of Fire:** A boundary that is located along the Pacific plate where it meets several other plates and numerous volcanoes and earthquakes develop.

**Earthquakes:** Caused by the pressures within the earth and plate movement.

**Minerals:** Inorganic solids, naturally occurring, with a definite molecular composition and crystal structure.

**Mineral Characteristics used for Identification:** (also includes color, density, smell, taste, & others)

**Luster:** The reflection of light on a mineral. Types are metallic and non-metallic (glass-like, and dull).

**Streak :** The powdered residue of a mineral when dragged across a streak plate. More accurate than color,

**Cleavage:** Minerals will naturally break along flat planes when struck that show crystal structure. ex: cubic, octagonal.

**Fracture:** The result of a mineral with no cleavage points due to stronger molecular bonding therefore it shatters with an irregular surface

**Hardness:** The comparison of one minerals ability to scratch the other based on Moh's Hardness Scale.

Hardness level are between 1 and 10. Diamond is hardest with a rating of 10. Minerals will scratch other minerals with the same rating and lower.

**Rocks:** Different from minerals because rocks may contain organic material. Made of at least one mineral.

**Rock Cycle:** Changes from one rock type to the other happens through melting and cooling of the rock, weathering, erosion then compaction or cementation of sediments, and extreme heat and pressure. **Any type** of rock can turn into **any other type** of rock (including the type it started as) and the continuous change is ongoing.

**Rock Types:**

**Igneous:** **Intrusive:** made from magma, formed *inside* the Earth, and cools more slowly. **Extrusive:** Made from lava, formed on or near the Earth's surface., and cools quicker.

**Metamorphic Rock:** formed by **heat** and **pressure**. The type of rock formed depends on the **parent (or starting) rock** it came from.

**Sedimentary:** Made from sediments. Sediments include: soil, rock fragments from weathering and erosion, may contain organic materials such as shells and other animals and plants. Sedimentary rock is formed through: compaction, cementation, organic, and chemical. Sedimentary rock takes **many, many years** to form.

**Sedimentary Terms:**

**Compaction:** squeezed together by the pressure of sediments above

**Cementation:** natural gluing of materials when minerals come out of fluid between sediments

**Organic:** made from the remains of once-living plants and animals. **Fossils** are often found in this type of rock.

**Chemical:** Dissolved minerals come out of solution by evaporation and leave a solid residue to form rock.

**Types of other sediment:** Silt, sand, and pebbles. Each sediment settles according to its mass and weight. Pebbles are heavier so they will settle first, followed by sand, and then silt. Think of dropping bricks, marshmallows, and then feathers; which will fall to the bottom of a pool first? The bricks would, of course, followed by the marshmallows, and then the feathers. This is how the natural formation of sediments occurs.

**Ore:** Rocks that contain metals are considered **ores**.

**Weathering:** The natural process of the breakdown of materials on earth. This is caused by wind, water, or other elements that are common on the Earth's surface. Can wear down a complete mountain range, or carve out a canyon such as Arizona's Grand Canyon. Mountain ranges that display rounded peaks are evidence of extensive weathering because the peaks have been worn down and are no longer sharp or jagged.

**Two main types of weathering:** Mechanical and chemical.

**Mechanical: Agents or causes:** temperature changes, plants, animals, gravity, water, wind, glaciers

**Chemical:** changes rock chemically ex. acid rain, oxidation, rain, plant acids

**Erosion:** Movement of weathered materials resulting in changing the Earth's natural landscape. ex. canyons, mountain wearing down, river beds

**Causes of erosion:** Wind, water, gravity, humans.

**Human contribution to erosion:** Deforestation, traditional plowing, construction sites, overgrazing.

**Soil Conservation:** Important because of small amount of Earth's surface suitable for farming, food chain is dependent on soil, oxygen-producing plants depend on soil

**methods:** Crop rotation, No-till farming, mulching, not over using fertilizers

**Soil:** Made from weathered rock and mineral fragments, decayed organic material, water, and air. Soil is broken down into different 3 different layers called **horizons (A, B, and C)**. Layers closest to the bottom contain older sediments/fossils, and the layers closer to the top are younger.

**Horizons: A. Topsoil** (nutrient rich contains weathered rock fragments, organic material, and mineral fragments)

**B. Subsoil** ( clay and small rocks) **C.** large pieces of rock above the parent rock

**S6E6. Students will describe various sources of energy and with their uses and conservation.**

- a. Explain the role of the sun as the major source of energy and its relationship to wind and water energy.
- b. Identify renewable and nonrenewable resources.

Resources can be divided into two categories: renewable and nonrenewable. Renewable resources can be replenished within a relatively short time (perhaps months, or years). Renewable resources include fresh water, fresh air, plants and plant products (food, natural fibers, lumber, fuel), animals and animal products (food, leather), wind, moving water and sun for energy.

Nonrenewable resources form very slowly on or within the Earth, over time periods of thousands of years. They accumulate so slowly, that for all intent purposes on the human time scale, the Earth can be considered to have only a set quantity of the resource. When present supplies are used, there will be no more. Nonrenewable resources include: fossil fuels (coal, oil, natural gas), soil, metallic minerals (iron, copper, gold, silver, lead, mercury, zinc, uranium), and nonmetallic minerals (kaolin, salt, lime, sulfur, diamonds, sand).