Theme: Earth and Space

TOPIC 4.1: ROCKS AND MINERALS

Competency: The learner appreciates that rocks are composed of different minerals and these determine the properties of the rocks.

A rock is a naturally occurring solid mass of mineral material without any specific atomic structure. Rocks can be composed of one or more minerals.

Note: A mineral is a naturally occurring inorganic solid substance with a specific chemical composition and crystalline structure.

Monomineralic rocks are rocks that contains only one mineral for example limestone rocks

Polymineralic rocks are rocks that contains two or more minerals for example granite that contains quartz, feldspar, and mica.

Classification of rocks.

Rocks are classified based on their origin and how they were formed which includes;

- Sedimentary rocks
- Igneous rocks
- Metamorphic rocks

Sedimentary rocks

Sedimentary rocks are rocks that are formed by the accumulation or deposition of mineral or organic sediments at Earth's surface. They usually form layers due to successive accumulation of deposits that occurs over time. Examples of sedimentary rocks includes; limestone, shale, sandstone, coal, and mudstone.

Most sedimentary rocks are made up of solid sediments that have been weathered from other rocks. The weathered sediments are then eroded by water, wind or glaciers and deposited in new location in a low land.

Characteristics of sedimentary rocks

- Sedimentary rocks have layers (contain strata).
- Sedimentary rocks are spongy
- Sedimentary rocks are soft compared to other rocks.
- Sedimentary rocks are formed by weathering and deposition of pre-existing rocks.
- Sedimentary rocks contain fossils.

Sedimentary rocks are further sub-divided into; **mechanically formed sedimentary rocks, chemically formed sedimentary rocks** and **organically formed sedimentary rocks**

1. **Mechanically formed sedimentary rocks.** These are formed when inorganic rock particles are weathered, eroded, deposited and compacted in layers. The layers are composed of graded sizes with large particles on the top layer, medium particles in the middles layer and the smallest particles at the bottom layer. These layers are then cemented by carbonates and iron oxides solution forming a compact rock.
2. **Chemically formed sedimentary rocks.** These rocks are formed from precipitation and evaporation of salt solution like rock salts and saline rocks in oceans. The dissolved minerals in the water precipitates out and accumulate to form rocks.
3. **Organically formed sedimentary rocks.** These are rocks formed by decomposition of plant and animal remains which accumulates over time when the plants and animals die. The remains of this organic matter contain calcium carbonate and iron oxides that cement their skeletons to form organic sedimentary rocks.

Igneous rocks

Igneous rocks are rocks formed from the cooling and solidification of molten lava and magma. The magma can be derived from partial melts of existing rocks in either a planet's mantle or crust.

Examples of igneous rocks includes; granite, basalt, rhyolite, scoria, and Pumice.

Characteristics of igneous rocks

- Igneous rocks are formed by cooling of molten rocks.
- Igneous rocks are crystalline (forms crystals after cooling).
- Igneous rocks do not contain fossils.
- Igneous rocks lack layers (strata).
- Igneous rocks are generally harder than sedimentary rocks.

There are majorly two types of igneous rocks which includes;

1. **Extrusive or volcanic rocks**; these are formed from the fast cooling of lava on Earth's surface. Fast cooling does not allow time for large crystals to grow. Extrusive igneous rocks have small or no crystals, thus have a smooth and fine texture for example obsidian.
2. **Intrusive or plutonic rock;** these are formed from slow cooling of magma within the Earth crust. Slow cooling allows time for large crystals to grow; thus they have a coarse and rough texture for example granite.