**ROCKS OF EAST AFRICA:**

* A rock is an aggregate of mineral particles forming part of the earth’s crust. It is hard, solid and compact mass. Rocks include substances such as sand, stone, shell, coral and clay.
* Rocks are classified into igneous rocks, sedimentary and metamorphic.
* **Igneous rocks:**

They are also known as fire formed rocks.

They are formed from the solidification of highly heated molten magma.

Magma that is liquid hot deep underground flows out due to high pressure and temperature caused by radio activities and geochemical reactions in the earth’s interior. Molten rocks are turned into a molten state or magma and pushed into or onto the crust.

Molten material cools, solidifies and crystallizes to form igneous rocks. Features resulting from volcanic activity is therefore made up of igneous rocks.

These rocks differ from other rock types because of the following characteristics.

* They are non-stratified rocks i.e they don’t have strata or layers.
* They are crystalline rocks i.e have crystals.
* They don’t have fossils i.e remains of plants and animals.
* They have a uniform appearance.

Igneous rocks are classified into 3 depending on the nature of lava and where lava solidifies from i.e Volcanic igneous, hyperbyssal igneous and plutonic igneous.

**Volcanic igneous** are formed where lava solidify on the earth’s surface. This is attributed to much pressure on the lines of weakness. Lava is pushed onto the surface from where it cools, solidifies and crystalline at a fast rate once exposed onto the surface results into the formation of extrusive features. These rocks have fine crystals. E.g Obsidian, Basalt, Rhyolite.

**Hyperbyssal igneous** rocks are formed where lava solidify near to the surface. This mainly results from intermediate lava that cools and solidifies at a moderate rate to form medium sized crystals. Such rocks are common where intrusive features are formed near to the surface. They can be seen from features like Dykes, Sills and Laccoliths. Others are Quartzite and Dolerite.

**Plutonic igneous** rocks are formed where lava cools and solidifies at a great depth away from the earth’s surface. They are often a result of acidic lava that cannot flow for long before solidifying. Lava is deposited far away from the earth’s surface cools at a low rate to from large crystals. Plutonic rocks are associated with intrusive features such as Batholith and laccolith.

* **Sedimentary rocks.**

These are referred to as secondary rocks. They formed from primary rocks (Igneous rocks). They are formed as a result of weathering of the parent rock turning into smaller particles which are transported, deposited in low-lying areas to form sedimentary rock.

These rocks are characterized by the following:

* They are formed in layers(strata)
* They are non-crystalline
* They contain animal fossils (remains of plants and animals)

These rocks result from a process of lithification which involves weathering, transportation, deposition, accumulation and cementing of weathered materials or sediments.

Sedimentary rocks are common in low-lying areas where materials are deposited.

Sediments are cemented by organic matter as well as carbonates. These rocks contain fossils of plants and animals which are deposited together with sediments.

They also form layers or strata indicating the different levels of deposition of material. The sedimentary rocks are common below water bodies due to maximum deposition.

Sedimentary rocks are classified into 3 according to their mode of formation i.e mechanically formed sedimentary rocks, organically and chemically formed sedimentary rocks.

**Mechanically** formed sedimentary rock is formed where physical weathering lead to the formation of sediments. Sediments/ particles are transported and cemented to form sedimentary rocks. Weathered materials are transported by water (alluvium) by wind (loess) or by ice (moraine). The weathered material is finally deposited in low-lying areas to form mechanically formed sedimentary rocks such as Clay, sand, silt.

**Organically** formed sedimentary rocks result from remains of plants and animals. Organic material is transported, deposited and cemented to form organically formed sedimentary rocks. Animal and plant remains form organically formed sedimentary rocks in low-lying areas where they are deposited. Examples are coal in Ruhuhu valley of Tanzania, coral reefs formed from the deposition of remains of marine animals known as polyps. Other examples include peat, lignite.

**Chemically** formed sedimentary rocks result from precipitation and evaporation of salt solutions. Water that is received onto the earth’s surface contains soluble salts in a solution. The salt elements may be precipitated by direct evaporation or due to chemical reactions. This results in the formation of chemically formed sedimentary rocks especially in dry areas. Examples include rock salt e.g at Lake Katwe, Gypsum, limestone at Nyakasura near Fort portal, Sironko and Tanga.

* **Metamorphic rocks**

These are rocks that are formed when igneous and sedimentary rocks are changed due to great pressure/heat.

They are often referred to as tertiary rocks because they are formed from secondary rocks.

Metamorphic rocks result from dynamic metamorphism or thermal metamorphism.

Due to volcanic activities, hot material is deposited into the earth crust which affects the nearby rocks that are changed into new rocks.

The pressure and heat produces physical and chemical changes in the original rock to form a metamorphic rock. Examples are Marble made from Limestone, Shale from clay, Gneiss from Granite and Quartzite from sandstone, Clay may be changed to slate, Slate to Schist.

In some cases, existing rocks are changed due to a combination of great heat and pressure and thus regional metamorphism.

**ROCK CYCLE:**

This is the process that involves changing one rock type into another. The rock cycle involves the changes of igneous rocks into sedimentary rocks which are also changed into metamorphic rocks and finally metamorphic rocks which are turned into igneous rocks. The rock cycle begins with the formation of igneous rocks due to intrusion and extrusion of magma. Magma solidifies crystalline to form igneous rocks.

Once igneous rock is exposed to the agents of weathering, they are broken into smaller particles called sediments. The sediments are transported by water, ice and wind. Sediments accumulate, cemented and harden to form sedimentary rocks (mechanically, organically and chemically formed sedimentary rocks.

Sedimentary rocks are turned into metamorphic rocks due to great heat, much pressure or a combination of the two. Metamorphic rocks are sometimes exposed to great heat forcing them to melt. This is common due to subduction where the sea floor below the continental land mass.

The great heat generated is responsible for the melting of metamorphic rocks along the coast to form magma which again solidifies to form igneous rocks and the process continues thus the rock cycle.

**Magma**

**Cooling, Solidification**

**Crystallization Great heat due to Subduction**

**Igneous rocks**

**Heat & Pressure**

**Metamorphic rocks**

**Weathering**

**Weathering**

**Sediments**

**Transportation, Deposition, Cementation**

**Great heat**

**& Pressure**

**Sedimentary Rocks**

**Sample Questions:**

1. (a) What is meant by a rock cycle?

(b) Explain the importance of Rocks

2. (a) Distinguish between igneous and sedimentary rocks

(b) Assess the importance of igneous rocks

3. Discuss the processes to the formation of different rock types in E.A

4. Account for the formation of rocks in East Africa

**IMPORTANCE OF ROCKS**

* Rocks are made of minerals which support the mining sector e.g cobalt, iron, lime that provide raw materials e.g Copper, diamond, limestone for cement thus improving the construction industry and sold for foreign exchange.
* Rocks weather to form soils e.g fertile volcanic soils which encourage agricultural activities that provide food, raw materials to agro based industries that provide employment to the local people.
* The existence of hard rocks along the river bed provides sites for H.E.P generation. Such hard rocks are responsible for the formation of water falls used to generate electricity for domestic and industrial purposes.
* Some rocks provide beautiful scenery that attract tourist to East Africa. Tourist brings in foreign exchange thus widening the government tax base due to taxation of the tourism industry.
* Rocks are used for research and academic purposes e.g trying to find out the mode of formation of rocks, rock ages, different types which improves on knowledge.
* Rocks provide construction materials when weathered and broken into smaller particles known as boulders or pebbles. These are used to construct houses, railway, bridges and roads thus improving on infrastructures.
* Some rock types are a source of fuel especially sedimentary rocks. Coal and peat rocks provide heat energy thus supporting industrial and economic growth.
* Some rocks e.g sedimentary rocks like coral reefs provide shelter to coastal lands. This allows the establishment of ports e.g Mombasa, Dar le salaam.
* Sedimentary rocks such as clay are used for pottery and brick making especially in low-lying areas. This has provided employment opportunities to the people who practice pottery, construction materials like brocks e.g at Kajjansi in Wakiso, along Kampala – Entebbe road.
* Hard rocks affect the general appearance of land. They resist weathering leading to the formation of uplands or hills. Such features modify the climate through the formation of relief rainfall that supports crop growth, forests.
* Volcanic mountains are barrier to communication hence promote remoteness and limits trade and commerce.
* Rock avalanches/ mass wasting may destroy property and lives e.g the Bududa incident of 2010.

**Prepared and Organized**:

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