

TENDER HEART HIGH SCHOOL

Section 33 B, Chandigarh

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SUBJECT: Geography

CLASS: VII

Chapter 4

(1) Introduction

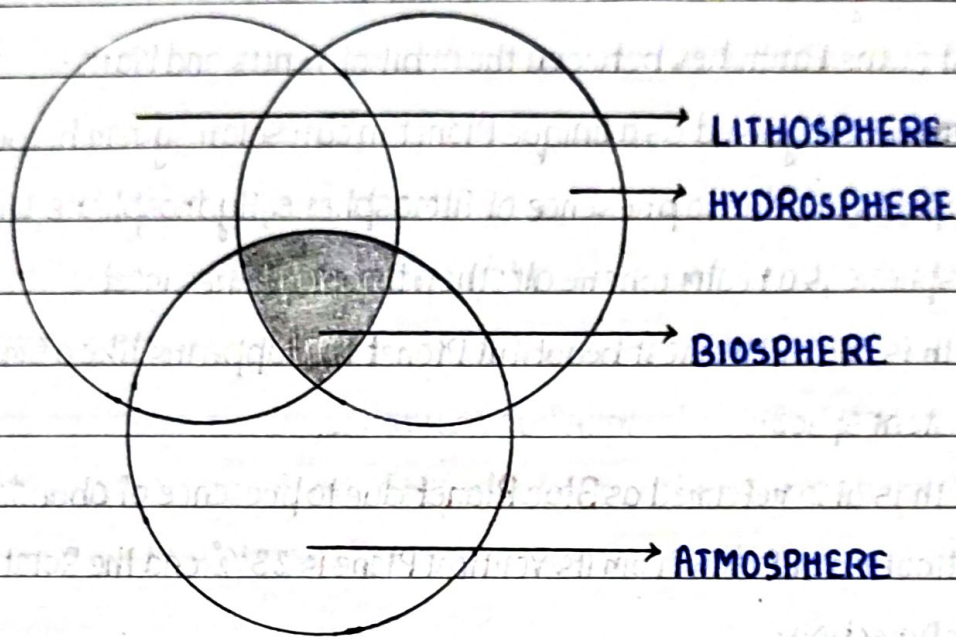
- weathering describes the means by which soil, rocks and minerals are changed by Physical and chemical processes into other soil components.
- Weathering may proceed rapidly or slowly over a decade depending upon the soil forming factors in an area.
- The development of soil reflects the weathering process. moreover, the factors affecting the formation of soil are:

(a) Parent Material (b) Climate (c) Living Organisms (d) Topography (e) Time

(a) Parent Material

- When climate, living organisms, topography and time acts on parent material, it is weathered into smaller particles forming soil.
- There are many types of parent material with different mineral content. These parent material can be the rock or the remnant of Rock.

REALMS OF THE EARTH OR SPHERES OF THE EARTH



(1) Lithosphere:

- The realm of land is known as Lithosphere.
- It consists of Crust and upper Mantle.
- It is broken into about dozen of separate rigid blocks, known as **Plates**.
- It is covered with thin layer of soil that supports life and provides land for Agriculture and settlement.
- It provides a medium for cycle of nutrients and it is also the source of various Minerals.
- Thus, In Lithosphere, the Crust mainly consists of Igneous Rocks and the rest portion of Lithosphere consists of Sedimentary and Metamorphic Rocks.

(2) Hydrosphere:

- The realm of Water is known as Hydrosphere.
- Water exists in Solid, Liquid and Gaseous form on our Earth.
- Our Earth has 71% of Water on its surface in different forms such as oceans, seas, lakes, rivers, Polar ice caps, Glaciers etc.
- Water present on Earth helps to dissolve and transport nutrients from the Soil to Plants.
- All the early civilizations of the world have flourished around the water source.
- Ocean water plays an important role in moderating the temperature of the Earth. Moreover, it also helps in phenomena of **Water Cycle**.
- Thus, Hydrosphere in the form of Ocean Water is the main source of mineral like Petroleum. Moreover, it is also important for Trade.

(3) Atmosphere:

- The Sphere of Air is known as Atmosphere.
- Atmosphere is actually the envelope of Air that surrounds the Earth.
- It is attached to Earth by Gravitational Force.
- The Atmosphere of Earth extends upto 1600 kms from the surface.
- Earth's Atmosphere contains approximately 78% of Nitrogen, 21% of Oxygen and 1% of Other Gases.
- In Earth's Atmosphere, Oxygen is important for breathing and Combustion, Nitrogen is important for Nitrogen Cycle, Carbon dioxide is important for trapping heat and Photosynthesis etc.
- The Earth's Atmosphere is divided into four layers, namely Troposphere, Stratosphere, Mesosphere and Thermosphere. Further, Thermosphere is divided into Ionosphere and Exosphere.
- The Earth's Atmosphere traps terrestrial radiation that keeps the Earth warm during the nights.
- Stratosphere in Earth's Atmosphere has **Ozone Layer** that protects the Earth from harmful Ultraviolet (UV) rays.

- Rocks are the naturally occurring material that forms the crust of the Earth. Moreover, it is the collection of different minerals and it is found in different colour, size and texture.
- Mostly Rocks are categorised according to mineral and chemical composition present in it and the way in which they are formed.
- Rocks forms the Earth's solid layer, which is also referred as **Rocksphere**.
- The scientific study of character and origin of Rocks is known as **Petrology**, which is an essential part of **Geology**.

(2) Difference between Rocks and Minerals

ROCKS	MINERALS
→ Rocks are considered as aggregates of mineral elements.	→ Minerals are naturally occurring solid inorganic substances.
→ Rocks are heterogeneous in form.	→ Minerals are Homogeneous in form.
→ Rocks has no definite chemical composition.	→ Minerals have a definite chemical composition.
→ Major rocks are Igneous Rocks, Sedimentary Rocks and Metamorphic Rocks.	→ Major mineral groups are Silicates, Carbonates, Sulphides and metallic minerals.

(3) Importance of Rocks

- When Rocks are disintegrated into fine particles, it results in the formation of soil upon which all the agricultural activities depend.
- Rocks helps us in acquiring knowledge about past animals, environment and plants that are now extinct, because all the fossils are found in rocks.

- Rocks contains variety of minerals that are useful for Industries such as Iron, Copper, Marble, Granite etc.
- Rocks provide basic material for construction of Roads, Dams, Buildings etc.
- Rocks also have reserves of Coal, Petroleum and Natural Gas.
- Gold a precious mineral found in rocks helps to know the value of a nations currency.
- Rocks also acts as shelter for many organisms, as sometimes it is seen that many organisms make their shelter in the cracks of the rocks.
- Rock salt extracted from sedimentary rocks is used in cooking.
- The Study of Rocks helps to know about the formation of Earth, past climate and movement of Tectonic Plates.

(3) Types of Rocks and their Classification

(A) IGNEOUS Rock:

- These are those rocks that are formed due to cooling, solidification and crystallisation of Hot Lava.
- Igneous Rocks are the first rocks that were formed on the Earth's crust, so they are also known as Primary Rocks.
- Since all the other rocks are formed directly or indirectly from Igneous Rocks, so these rocks are also known as Parent Rocks. eg: Granite, Syenite, Obsidian, Pumice etc.

* Features of Igneous Rock

- These Rocks are Granular and crystalline in Nature.
- These Rocks are hard rocks and water does not percolates through these rocks.
- These rocks are not found in layers due to solidification of Magma.
- These rocks dont contain any fossil.
- These rocks are found in Volcanic Zones.
- These rocks are generally weathered by Mechanical Weathering.

(i) Intrusive Igneous Rocks:

When the rising magma is not able to reach the Earth's surface during a volcanic activity, then the magma cools and solidifies below the Earth's surface. This cooling and solidification of lava forms Intrusive Igneous Rocks. eg: Granite, Tonalite, Monzonite etc.

(ii) Extrusive Igneous Rocks

- These rocks are formed due to cooling and solidification of hot and molten lava on the Earth's surface.
- These rocks are formed during fissure type of volcanic eruption. Moreover, they are also known as Volcanic Rocks.
- These rocks are fine grained because the lava is cooled and solidified very quickly as soon as it reaches the surface of the Earth.
- eg: Basalt, Gabbro, Obsidian etc.

(B) Sedimentary Rocks:

- These are those rocks that are formed due to deposition of organic particles on the Earth's surface.
- Moreover, when weight and pressure of the overlying layers consolidates the organic particles that is deposited, it forms sedimentary rocks.
- These rocks are formed in layers and they are deposited in or near the waterbodies.
- These rocks are also known as stratified rocks, layered rocks or secondary rocks.
- eg: Limestone, Dolomite etc.

Features of Sedimentary Rocks

- These rocks are formed from the sediments of older rocks, plants and animal remains.
- These rocks are found in layers.
- These rocks are found in or near the waterbodies.
- These rocks possess different size of joints.
- These rocks are formed perpendicular to bedding plane.
- Folds and Faults are the special feature of sedimentary rocks.
- Most of the sedimentary rocks are permeable and porous.

TYPES

(1) Mechanically Formed Sedimentary Rocks:

These rocks are formed by fragments of pre-existing rocks with the help of process of weathering and Erosion. Moreover, these rocks are sub-divided according to their grain size. Sandstone, shale etc.

(2) Organically formed Sedimentary Rock:

→ These rocks are formed from the remains of plants and animals.

→ These rocks are also called fossils. eg. Petroleum, limestone, Coral etc.

3. Chemically formed Sedimentary rocks:

→ These rocks are formed when chemically active water comes in contact with substance.

Some rocks of these type are chert, Travertine, Gypsum etc.

(3) Metamorphic Rocks

- These Rocks are formed because of Alteration of Igneous and Sedimentary Rocks due to very high temperature and pressure.
- In this original rocks change in such a way that they loose their colour, texture, hardness and mineral composition.
- The process by which Metamorphic Rocks are formed is known as Metamorphism.

Causes of Metamorphism

- It takes place over a long period of time.
- Metamorphism may be caused due to Volcanic Activity, Movement in Earth's Crust and sometimes when a Rock lies deep within the Crust.
- It takes place during mountain building process and totally changes the texture and nature of the original Rocks completely and also makes the rock harder and more resistant.

Features of Metamorphism

- These rocks are more compact and harder than the original Rocks.
- These rocks can form from Igneous, Sedimentary or Metamorphic Rocks also.
- They don't contain any fossil.
- These rocks are impermeable in nature.
- These rocks can also have crystalline form.
- Metamorphism creates the formation of new minerals.

TYPES OF METAMORPHISM

DYNAMIC METAMORPHISM

THERMAL METAMORPHISM

CONTACT METAMORPHISM

REGIONAL METAMORPHISM

(A) REGIONAL METAMORPHISM:

In this type of metamorphism, the rocks get buried inside the earth and may undergo changes due to the effect of high pressure and high temperature.

(B) CONTACT METAMORPHISM:

In this type of metamorphism, the rocks undergoes change when they come in contact with hot lava. Moreover, in this metamorphism, the minerals in the rocks and new minerals adds up to form new rocks. eg: Marble is formed from limestone.

(C) THERMAL METAMORPHISM:

In this type of metamorphism, rocks undergoes chemical change due to exposition to high temperature. eg: Shale changes to Slate.

Coal changes to Graphite.

(D) Dynamic Metamorphism:

In this type of metamorphism, the rocks undergoes changes due to exposition to high pressure.

Examples of Metamorphic Rocks:

(i) Igneous to Metamorphic:

(a) Schist:

It is the altered form of Basalt.

(b) Gneiss:

It is the altered form of Granite.

(c) Amphibolite:

It is the altered form of Basalt or Gabbro.

(d) Eclogite:

It is the altered form of Basalt or Gabbro.

(b) Sedimentary to Metamorphic:

(a) Quartzite:

It is altered form of sandstone.

(b) Marble:

It is altered form of Limestone.

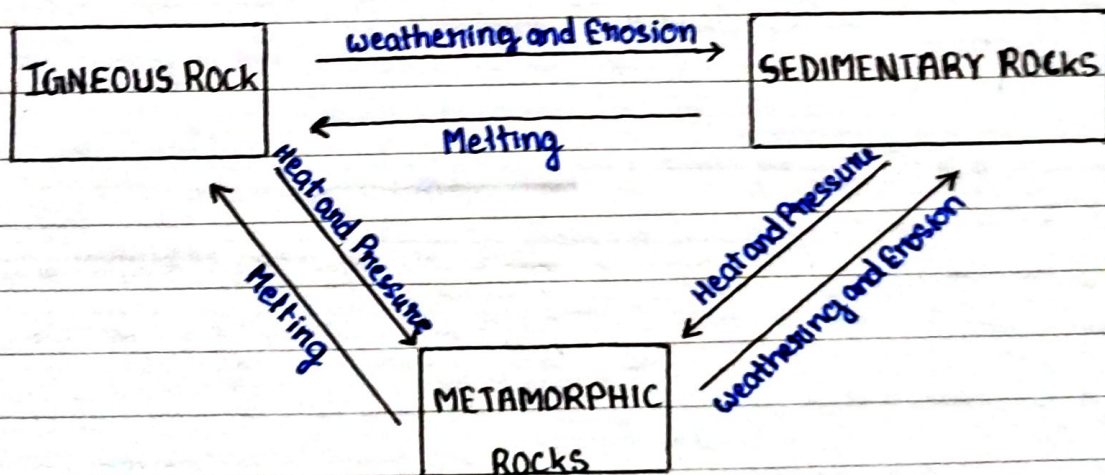
(c) Slate:

It is altered form of Clay or Shale.

(d) Gneiss:

It is altered form of Coal.

Rock Cycle



- The Parent Material of all the rocks are Igneous Rocks. When these rocks come out of the surface of the earth, they are eroded and their material turns into sediments.
- When this sediments deposits in layers, they take form of Sedimentary Rocks.

- These sedimentary Rocks are again buried into the Earth due to forces of Earth.
- If these sedimentary Rocks goes very deep inside the Earth, they melt, change into lava and again come out as Igneous Rocks.
- If these sediments don't go too deep, they may change into metamorphic rocks.
- Thus, this cyclic process of changing the form of Rocks is called Rock Cycle.