

Flash Notes – Rocks & Minerals

Many of the materials that we use everyday are made from different kinds of rocks.

WHAT ARE ROCKS?

Rocks are made of minerals. A mineral is a natural non-living substance. A rock may contain one or more minerals. The type of a rock depends on the quality, the quantity and the arrangements of minerals in it.

Depending on the way in which they are formed, rocks can be grouped into three types:-

Igneous, Sedimentary and Metamorphic.

IGNEOUS ROCKS

- The earth can be divided into three layers: Crust, Mantle, and Core.
- What we see as soil and mountains is only the surface of the earth which is also called the Crust.
- Below the crust is the Mantle and below the mantle, in the middle of the Earth is the Core.
- This core is made up of solid rock as well as hot liquid material called magma.
- Igneous rocks are formed by the cooling and hardening of this hot magma or lava.
- Igneous rocks form the base of all forms of land – plains, mountains and ocean beds.
- Some of the magma cools and hardens below the surface of the earth while some flows out on the earth's surface and then hardens to form igneous rocks. The magma that reaches the surface of the earth is called **lava**.
- The type of igneous rock formed depends on the kind of mineral the magma contains and the size of the mineral particles.

GRANITE: Granite is the most common igneous rock on the earth's surface. The three main minerals in granite are quartz, feldspar and mica. The colour of granite, grey or pink, depends upon the content of its feldspar. This hard stone is used for making buildings, statues and streets.

PUMICE: Pumice is another light-coloured igneous rock. It has many holes and pockets which are formed by the gases trapped inside at the time of its formation. This light lava rock is light grey or cream - coloured. Dentists use powdered pumice for polishing our teeth. It is the only rock that can float. It is also used in making lightweight building materials such as concrete blocks.

OBSIDIAN: Obsidian is another lava rock, which is formed by the quick cooling of lava and is smooth and glassy. It looks almost like black glass. Because of its sharp edges it is used to make cutting tools. It is used in making jewellery and ornaments.

SEDIMENTARY ROCKS

- Rain, wind, and rivers flowing down mountains, wear away rocks on mountain.
- These rock particles are carried down and deposited elsewhere.
- Repeated deposition presses down the lower layers and hardens them into rocks.
- Such rocks are called **Sedimentary rocks**.
- They are always formed in layers. They cover three-fourths of the Earth's surface, although they make up less than 5% of the total of Earth's rocks.
- Examples of sedimentary rocks are:

SANDSTONE: Sandstone is a common sedimentary rock. It is a soft stone that is made up of sand particles deposited close to one another. It mostly contains quartz grains. Sandstone may be yellow, brown, red or pink-colored. The Red Fort in New Delhi and many monuments in Rajasthan are made up of sandstone.

CONGLOMERATE: Conglomerate is a rock of uneven texture. It has round pebbles and gravel cemented together by minerals and by sand that has been carried by water. It has coarse grains and can withstand weathering. Conglomerate is found mostly in shades of grey and orange. It is used as an ornamental rock and for polishing ornaments. It is also used in construction and especially in flooring.

SHALE: Shale is made up of solidified clay and mud particles that are piled up in layers. Because of its clay content it is used to make tiles and bricks. It is also used in combination with other substances in the making of cement.

LIMESTONE: It is a rock with fine grains that are quite soft. It is formed from remains of marine animals like tiny bits of animal shells or due to chemical reactions between minerals like calcium. It is used in making many things such as whitewash, paints, and cement.

Scientists can find out about life on earth by studying sedimentary rocks, because the traces of ancient plant and animal life, called fossils, are found in them. These may be shells, bones of animals, prints of leaves or footprints.

METAMORPHIC ROCKS

Metamorphic rocks are rocks that are formed due to physical and chemical changes in Igneous, sedimentary or old metamorphic rocks themselves.

They are formed due to a process called metamorphism, which means 'change in form'. Most metamorphic rocks were once either igneous or sedimentary. Tons and tons of pressure, which favors heat built-up, changed them to metamorphic rocks.

In some rocks the minerals are broken into smaller ones, while in others the minerals are stretched into flat particles. There are many kinds of metamorphic rocks.

SLATE: Slate is a metamorphic rock made from shale, a sedimentary rock. Like Shale it breaks into thin flat layers. It is used to make slates, blackboards, bricks and cement.

GNEISS: Gneiss is a metamorphic rock that is formed from granite. It has different kinds of minerals in it, giving it a striped or streaked look. It has light and dark bands. It is used as a building stone.

MARBLE: It is formed from the Sedimentary Rock, Limestone. It is found in different colours, white being the most common. It is used in making statues, material for flooring and also for various ornamental purposes.

QUARTZITE: It is formed from sandstone that is rich in the mineral quartz. It is a very hard rock and is weather resistant. It is used in glass and ceramic industries and also in making jewellery and ornaments and statues.

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MINERALS

- All rocks are made up of substances called minerals.
- Minerals are chemical substances with a fixed chemical composition that occur in nature.
- They form due to natural processes within the Earth.
- They may be simple substances or very complex ones.
- Minerals are of two types: metallic and non-metallic.
- Magnetite and bauxite are examples of metallic minerals, whereas examples of non-metallic minerals are calcite, gypsum, mica and quartz.
- Some minerals, such as iron, calcium and potassium are important for living organisms.

METALLIC MINERALS:

For example:

Iron, Aluminium, Copper and Zinc that we use in everyday life are obtained from metallic minerals like haematite, bauxite, pyrite and calamine respectively.

Precious metals like **gold**, **silver**, and **platinum** are used for making jewellery.

NON-METALLIC MINERALS:

Coal and petroleum are valuable underground resources. They contribute greatly to our total energy supply.

COAL:

Coal is one of the most valuable minerals stored in the earth. It has been used as a fuel for hundreds of years. Asia has more than one-third of the world's coal.

Coal is usually found in layers, it is formed when dead plant matter gets buried under great pressure over millions of years, and hence it is also called a fossil fuel.

-Millions of years ago land was low-lying, and covered with thick swampy forests.

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-As plants died, they fell into the swamp and began to decay. New vegetation pressed the dead plants to the bottom.

-Due to extreme pressure the vegetable matter changed into peat, lignite and coal.

Coal is used as a fuel:

- for cooking
- for heating homes and buildings
- for producing electricity in power plants
- in steam engines and
- in blast furnaces in the steel industry.

PETROLEUM:

- Like coal petroleum is also a fossil fuel, which is formed when large quantities of dead organisms (land and sea organisms) get buried in layers.
- These dead organisms are subjected to intense heat and pressure and gradually get converted into oil and gas.
- Petroleum or crude oil has several names like rock oil, fossil fuel, black gold and liquid sunlight.
- Petroleum is normally refined into various types of fuel such as Petrol, Diesel, Kerosene, Gasoline and LPG.
- In India, petroleum is obtained from many places. Some of these are Ankaleshwar in Gujarat, Digboi in Assam and Bombay High on the Mumbai coast.
- . It is also used for dry-cleaning.
- It is used for making lubricating oil, printing ink, and medicines.
- Paraffin wax obtained from it to use to make candles, waterproof cartons and polish.

CONSERVE NATURAL RESOURCES:

“The earth has enough for everybody’s need but not enough for everybody’s greed” said **Mahatma Gandhi**.

We must conserve natural resources.

- To save fuel at home we must keep our stoves and machines in good condition.
- We should use coal and oil very carefully. We should also use inexhaustible sources of energy like the sun, wind and water.
- Mineral deposits in the earth are limited. They should not be used carelessly or wasted while mining.
- Animals and plants too are gifts of nature to human beings. Since they depend on each other for their survival, the balance between the two must not be disturbed.