

UPSC Civil Services Examination

UPSC Notes [GS-I]

Topic: Types of Rocks [Geography Notes for UPSC]

Different kinds of rocks

There are many different kinds of rocks which are classified into three families on the basis of their mode of formation.

Classification of Rocks:

Igneous Rocks	Solidified from magma and lava
Sedimentary Rocks	The result of the deposition of fragments of rocks by exogenous processes
Metamorphic Rocks	Formed out of existing rocks undergoing recrystallization

Igneous Rocks

- It is formed out of magma and lava from the interior of the earth.
- They are also known as primary rocks.
- When magma in its upward movement cools and turns into solid form it is called igneous rock.
- The process of cooling and solidification can happen in the crust of the earth or on the surface of the earth.
- Igneous rocks are classified based on texture.
- If the molten material is
 - Cooled slowly at great depths, mineral grains may be very large.
 - Sudden cooling at the surface results in small and smooth grains.
 - Intermediate conditions of cooling would result in intermediate sizes of grains making up igneous rocks.
- Examples of igneous rocks
 - Granite
 - Gabbro
 - Pegmatite
 - Basalt
 - Volcanic

- Breccia
- Tuff

Sedimentary Rocks

- Rocks of the earth's surface are exposed to denudation agents and are broken up into various sizes of fragments.
- These fragments are carried by various exogenous agencies and deposited.
- These deposits through compaction turn into rocks. This process is called lithification.
- In several sedimentary rocks, the layers of deposits maintain their characteristics even after lithification.
- Sandstone, shale are some of the examples for Sedimentary Rocks.
- Depending upon the mode of formation, sedimentary rocks are categorized into three groups:
 - Mechanically formed
 - Eg: Sandstone, conglomerate, limestone, shale, loess, etc.
 - Chemically formed
 - Eg: Chert, limestone, halite, potash, etc.
 - Organically formed
 - Eg: Geyserite, chalk, limestone, coal, etc.

Metamorphic Rocks

- These rocks form under the action of volume, pressure, and temperature (PVT) changes.
- Metamorphism happens when rocks are forced down to lower levels by tectonic processes or when molten magma rising through the crust comes in contact with the crustal rocks or the underlying rocks are exposed to great amounts of pressure by overlying rocks.
- The materials of rocks chemically modify and recrystallize due to thermal metamorphism.
- There are two types of thermal metamorphism
 - Contact metamorphism
 - Regional metamorphism
- Contact metamorphism
 - The rocks come in contact with hot intruding magma and lava and the rock materials recrystallize under high temperatures.
- Regional metamorphism
 - The rocks experience recrystallization due to deformation caused by tectonic shearing together with high temperature or pressure or both.