Classification of Rocks and Rock Cycle

Rocks

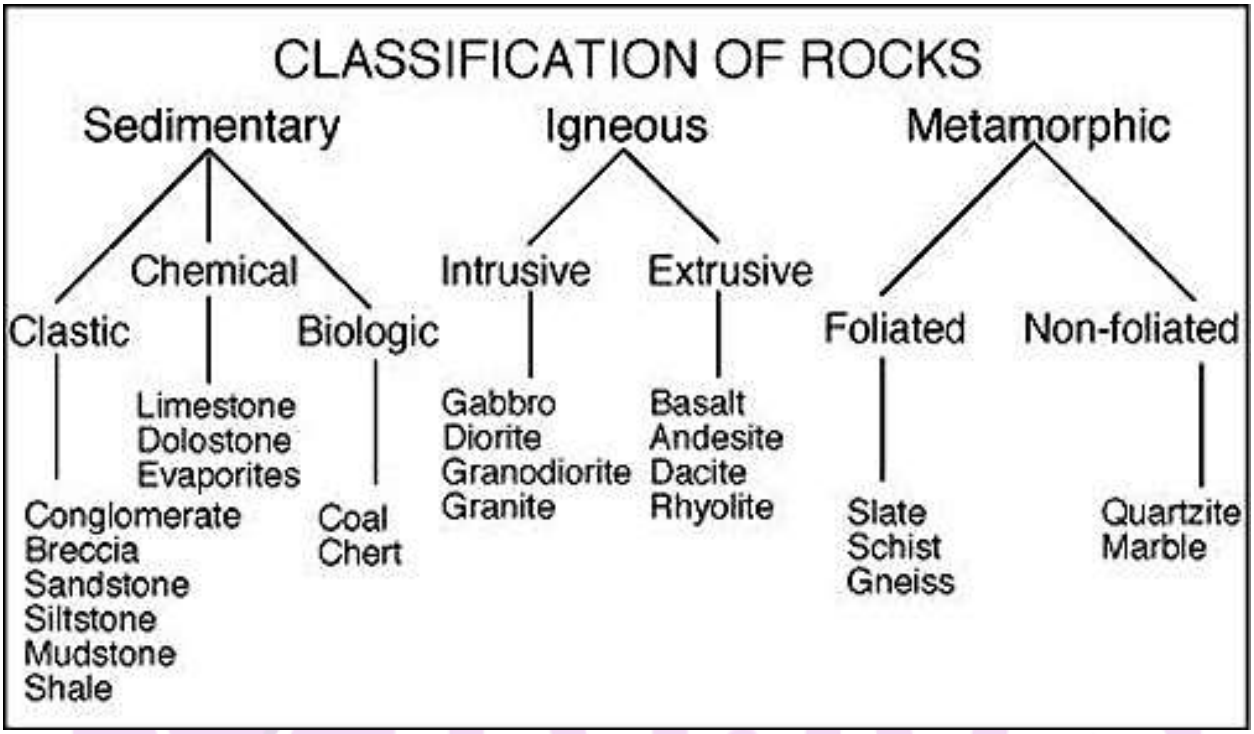
- About 98% of the total Earth's crust is composed of eight elements which are:

Sl. No.	Elements	By Weight(%)
1.	Oxygen	46.60
2.	Silicon	27.72
3.	Aluminium	8.13
4.	Iron	5.00
5.	Calcium	3.63
6.	Sodium	2.83
7.	Potassium	2.59
8.	Magnesium	2.09
9.	Others	1.41

Source- NCERT

- There are major mineral groups that are known as rock-forming minerals.
- Rock is defined as one or more minerals aggregate.
- The hot magma inside the earth is the basic source of all minerals.
- The most common minerals found in rocks are feldspar and quartz.
- *Petrology* is the science of rocks. The characteristics of rocks directly influence the type of landforms generated. Rocks are mostly classified into 3 forms. They are

Classification of Rocks



- **Igneous rocks**
    0. They are formed by cooling and solidification of magma from beneath the earth's crust. These rocks are hard and resistant.
    1. They are crystalline in nature
    2. They neither occur in *strata* nor they contain fossils
    3. Sub-division on the basis of Mineral composition
        0. Acid igneous rocks: High proportion of *Silica*. They are less dense and lighter in colour. Example: **Granite**
        1. Basic igneous rocks: they contain a greater proportion of basic oxides such as Ferrous or Magnesium while lower Silica content. They are denser and are darker in colour.
    4. Sub-division on the basis of Origin
        0. Plutonic rocks: they cool slowly at greater depths and have large mineral grains. They are intrusive rocks exposed at the surface by the denudation process. Ex: **Granite, diorite and Gabbro**
        1. Volcanic rocks: they are poured out of volcanoes as Lavas, solidify rapidly on the earth's surface and have smaller grains. Ex: **Basalt**

- **Sedimentary rocks**
    0. They are formed as the result of deposition of fragments of rocks by exogenous processes. Various rocks exposed to the denudation process are transported and deposited following which they undergo the process of *Lithification* and turn into sedimentary rocks.
    1. They are called *Stratified rocks* due to their characteristic layer formation
    2. They are non-crystalline and contain fossil deposits
    3. Sub-division on the basis of origin and compaction
        0. Mechanically formed: they are formed due to the accumulation of materials derived from other rocks which have been cemented together. Ex: **Sandstone, Grit**
        1. Organically formed:
            0. Calcareous: Formed from the remains of living organisms like Corals or Shellfish. Ex: **Limestones**
            1. Carbonaceous: Formed due to heavily compressed vegetative matter – swamps and forests Ex: Peat, Lignite etc

- Chemically formed: These rocks are precipitated chemically from the solutions of one kind or the other. Ex: Rock salts derived from Seabed, Gypsum, Potash and Nitrates.

- **Metamorphic rocks**
    0. These rocks are formed when existing Sedimentary and Igneous rocks undergo recrystallization under the action of Pressure, Volume and Temperature (PVT) changes.
    1. Types of Metamorphism
        0. Dynamic Metamorphism
        1. Thermal Metamorphism, which may be further sub-divided into
            0. Contact Metamorphism
            1. Regional Metamorphism
        2. Foliation: Arrangement of minerals in layers or lines in a metamorphic rock.
        3. Banding: Arrangement of materials into alternating thick or thin layers appearing in light and dark shades in a metamorphic rock.
        4. Examples: **Clay to Slate, Limestone into Marble, Sandstone into Quartz, Granite into Gneisses, Shale into Schist, Coal into Graphite**

Rock Cycle

Rock cycle is the continuous process in which old rocks are transformed into new ones.

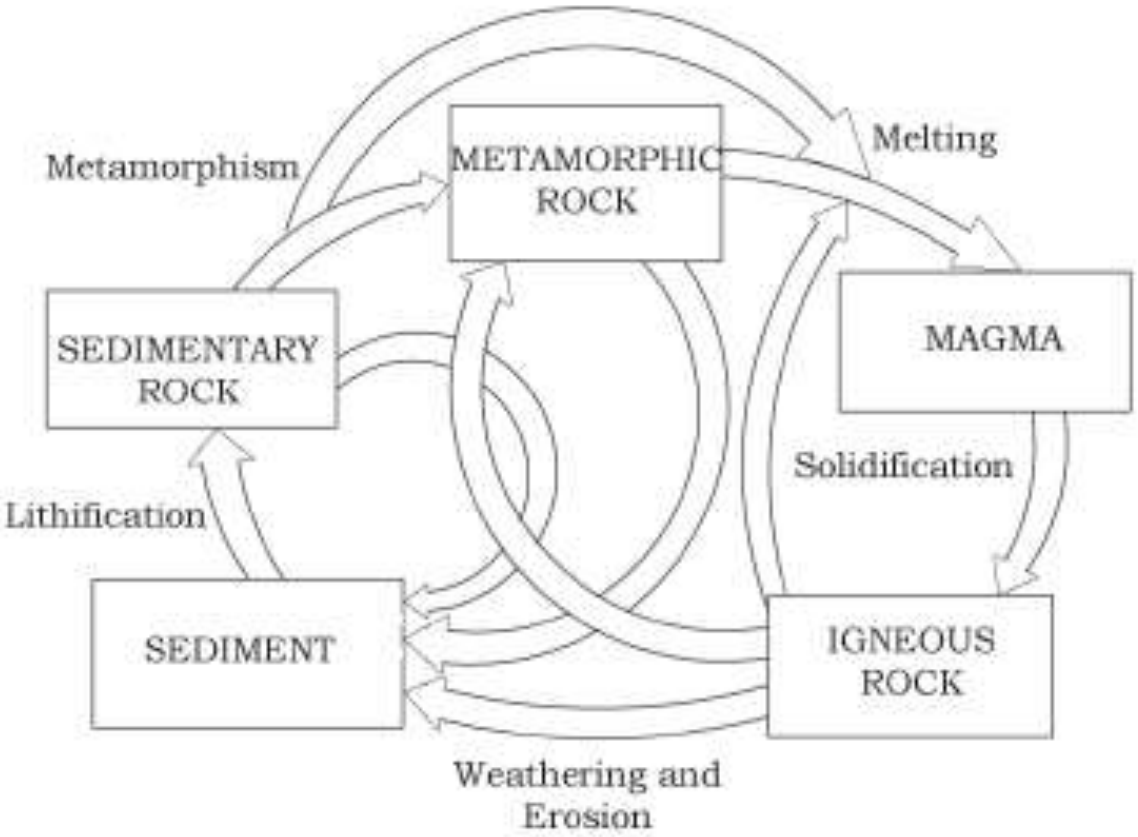


Fig 5.1 : Rock Cycle