2 Inside Our Earth

0762CH02

The earth, our homeland is a dynamic planet. It is constantly undergoing changes inside and outside. Have you ever wondered what lies in the interior of the earth? What is the earth made up of?

Interior of the Earth

Just like an onion, the earth is made up of several concentric layers with one inside another (Fig. 2.1). The uppermost layer over the earth's surface is called the **crust**. It is the thinnest of all the layers. It is about 35 km. on the continental masses and only 5 km. on the ocean floors.

The main mineral constituents of the continental mass are **silica** and **alumina**. It is thus called **sial** *(si*-silica and *al*-alumina*)*. The oceanic crust mainly consists of silica and magnesium; it is therefore called **sima** (*si*-silica and *ma*-magnesium) (Fig. 2.2).

Just beneath the crust is the mantle which extends up to a depth of 2900 km. below the crust.

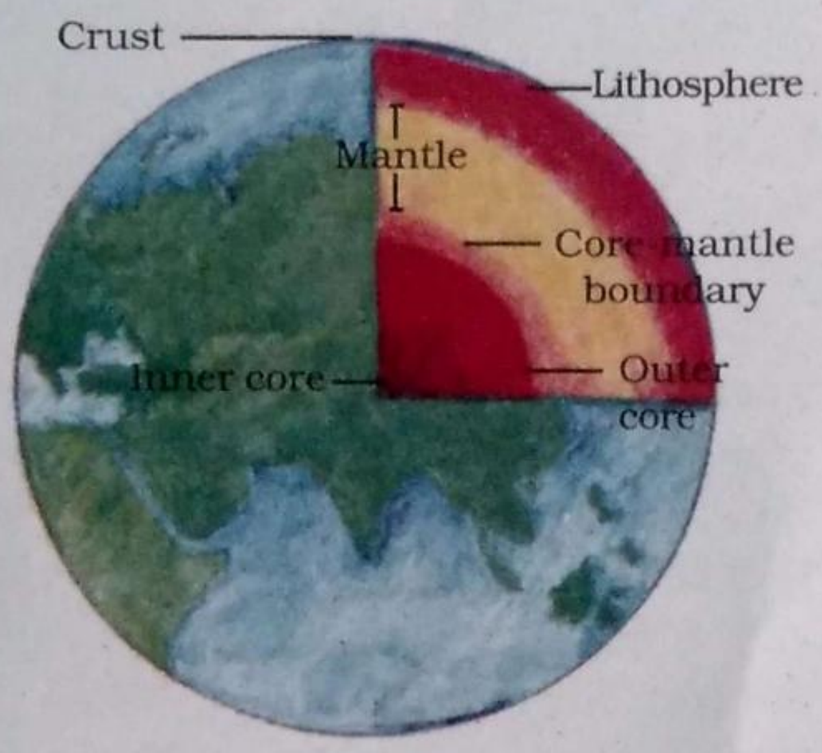


Fig. 2.1: Interior of the Earth

Do you know?

- The deepest mine in the world, is in South Africa. It is about 4 km. deep. In search for oil engineers have dug a hole about 6 km. deep.
- To reach to the centre of the earth (which is not possible!) you will have to dig a hole 6000 km. deep on the ocean floor.

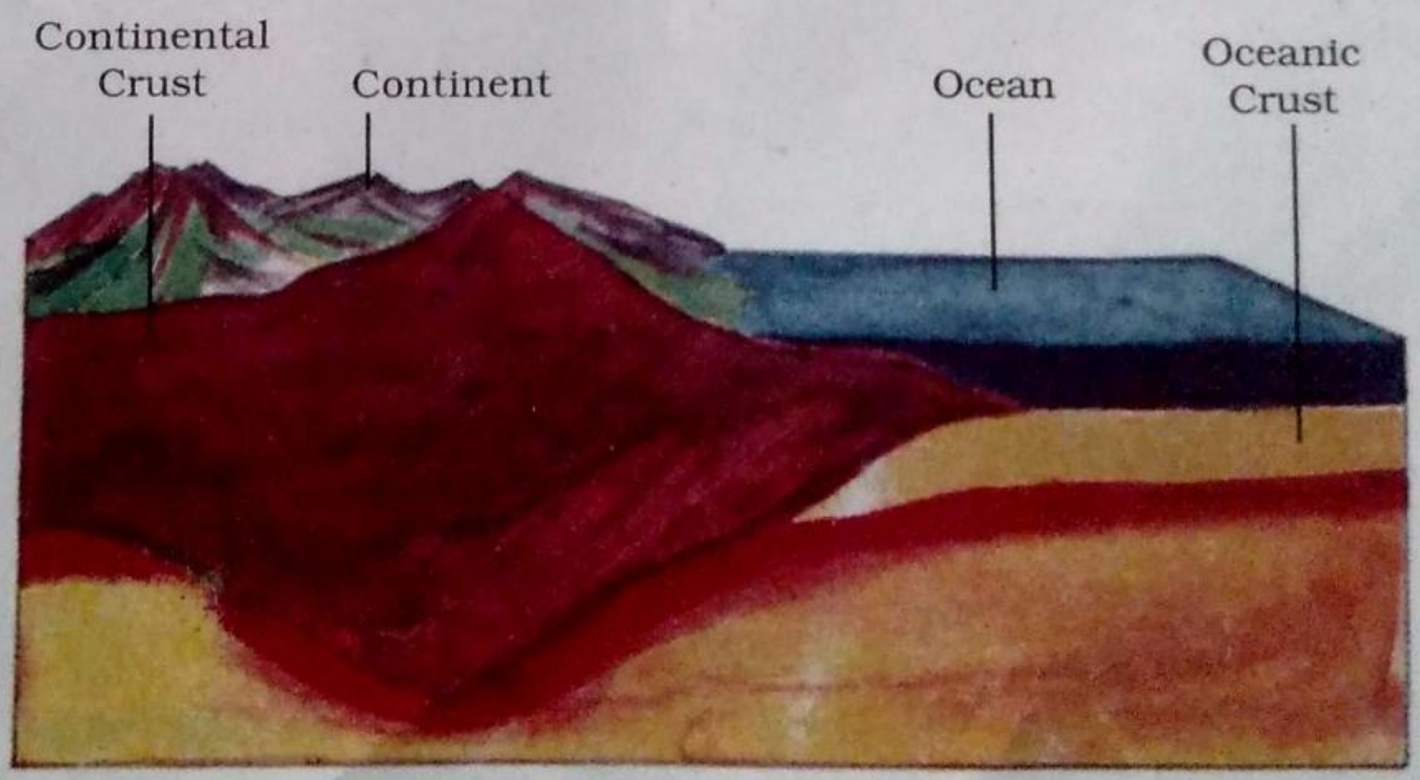


Fig. 2.2: Continental Crust and Oceanic Crust

Do you know?

- The crust forms only 1 per cent of the volume of the earth, 84 per cent consists of the mantle and 15 per cent makes the core.
- The radius of the earth is 6371 km.

The innermost layer is the core with a radius of about 3500 km. It is mainly made up of nickel and iron and is called **nife** (*ni* – nickel and *fe* – ferrous i.e. iron). The central core has very high temperature and pressure.

Rocks and Minerals

The earth's crust is made up of various types of rocks. Any natural mass of mineral matter that makes up the earth's crust is called a **rock**. Rocks can be of different colour, size and texture.

There are three major types of rocks: **igneous rocks**, **sedimentary rocks** and **metamorphic rocks**.

When the molten magma cools, it becomes solid. Rocks thus formed are called igneous rocks. They are also called **primary rocks**. There are two types of igneous rocks: **intrusive rocks** and **extrusive rocks**.

Can you imagine lava coming out from the volcanoes? Lava is actually fiery red molten magma coming out from the interior of the earth on its surface. When this molten lava comes on the earth's surface, it rapidly cools down and becomes solid. Rocks formed in such a way on the **crust** are called **extrusive igneous rocks**. They have a very fine grained structure. For example, basalt. The Deccan plateau is made up of basalt rocks. Sometimes the molten magma cools down deep inside the earth's crust. Solid rocks so formed are called **intrusive igneous rocks**. Since they cool down slowly they form large grains. Granite is an example of such a rock. Grinding stones used to prepare paste/powder of spices and grains are made of granite.

Word Origin

Igneous: Latin word *Ignis* meaning fire.

Sedimentary: Latin word *sedimentum* meaning settle down.

Metamorphic: Greek word *metamorphose* meaning change of form.

Glossary

Fossils: The remains of the dead plants and animals trapped in the layers of rocks are called fossils.

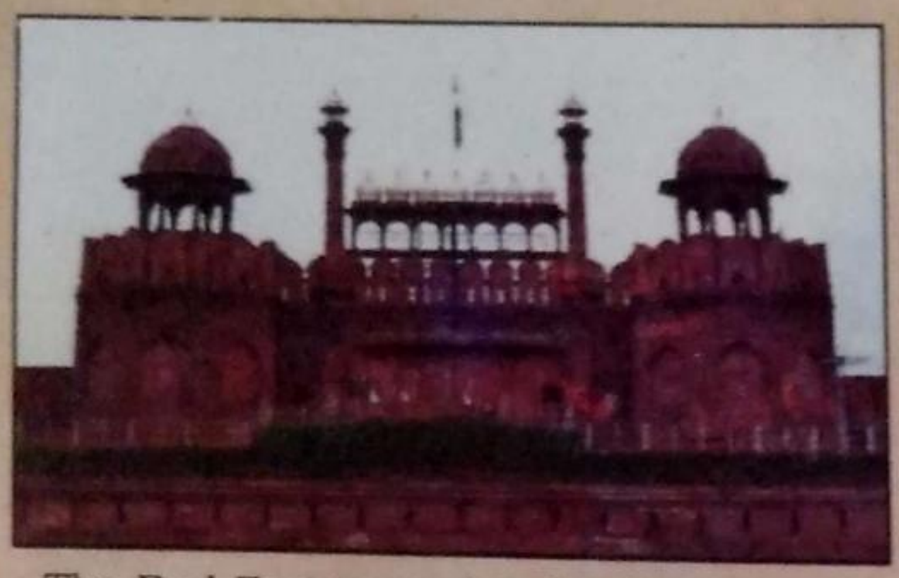
Rocks roll down, crack, and hit each other and are broken down into small fragments. These smaller particles are called **sediments**. These sediments are transported and deposited by wind, water, etc. These loose sediments are compressed and hardened to form layers of rocks. These types of rocks are called **sedimentary rocks**. For example, sandstone is made from grains of sand. These rocks may also contain fossils of plants, animals and other micro-organisms that once lived on them.

Fig. 2.3: Sedimentary rock turned into a Metamorphic rock

Igneous and sedimentary rocks can change into metamorphic rocks under great heat and pressure (Fig. 2.3). For example, clay changes into slate and limestone into marble.

Rocks are very useful to us. The hard rocks are used for making roads, houses and buildings. You use stones in many games. For example, seven stones (*pitthoo*), hop-scotch (*stapu/kit kit*), five stones (*gittî*). Find out some more such games by asking your grand parents, parents, neighbours, etc.

Collect pictures of some monuments and find out which are the rocks used to build them. Two pictures have been collected for you.



The Red Fort is made of red sandstone

The Taj Mahal is made of white marble

You will be surprised to know that one type of rock changes to another type under certain conditions in a cyclic manner. This process of transformation of the rock from one to another is known as the **rock cycle**. You have already learnt when the molten magma cools; it solidifies to become igneous rock. These igneous rocks are broken down into small particles that are transported and deposited to form sedimentary rocks. When the igneous and sedimentary rocks are subjected to heat and pressure they change into metamorphic rocks. The metamorphic rocks which are still under great heat and pressure melt down to form molten magma. This molten magma again can cool down and solidify into igneous rocks (Fig. 2.4).

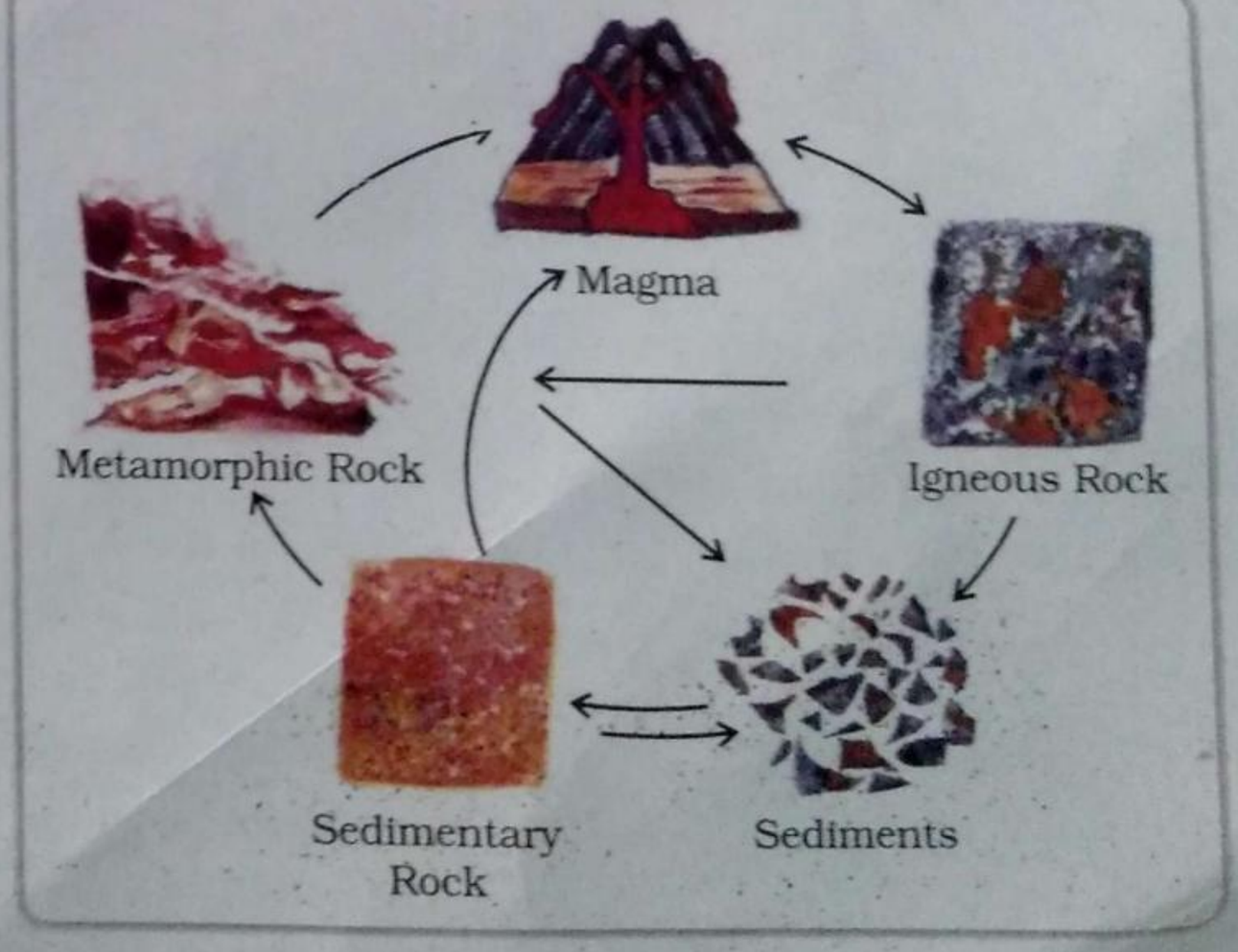


***Fig. 2.4:** Rock Cycle*

What are the minerals found in your state?

Collect some samples to show in your class.

Rocks are made up of different minerals. Minerals are naturally occurring substances which have certain physical properties and definite chemical composition. Minerals are very important to humankind. Some are used as fuels. For example, coal, natural gas and petroleum. They are also used in industries – iron, aluminium, gold, uranium, etc, in medicine, in fertilisers, etc.

1. Answer the following questions.

(i) What are the three layers of the earth?

(ii) What is a rock?

(iii) Name three types of rocks.

(iv) How are extrusive and intrusive rocks formed?

(v) What do you mean by a rock cycle?

(vi) What are the uses of rocks?

(vii) What are metamorphic rocks?

2. Tick the correct answer.

(i) The rock which is made up of molten magma is

(a) Igneous (b) Sedimentary (c) Metamorphic

(ii) The innermost layer of the earth is

(a) Crust (b) Core (c) Mantle

(iii) Gold, petroleum and coal are examples of

(a) Rocks (b) Minerals (c) Fossils

(iv) Rocks which contain fossils are

(a) Sedimentary rocks

(b) Metamorphic rocks

(c) Igneous rocks

(v) The thinnest layer of the earth is

(a) Crust (b) Mantle (c) Core

3. Match the following.

(i) Core	(a) Earth's surface
(ii) Minerals	(b) Used for roads and buildings
(iii) Rocks	(c) Made of silicon and alumina
(iv) Clay	(d) Has definite chemical composition
(v) Sial	(e) Innermost layer
	(f) Changes into slate
	(g) Process of transformation of the rock

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Que 1. What are the three layers of the earth?

Ans. The three layers of earth are :-
1. Crust
2. Mantle
3. Core

Que 2. What is a rock?

Ans. Any natural mass of mineral matter that makes up the earth's crust is called a rock. There is various types of rocks of different texture, size and colour.

Que 3. Name three types of rocks.

Ans. The three types of rocks are :-
1) Igneous Rocks
2) Sedimentary Rocks
3) Metamorphic Rocks

Que 4. How are extrusive and intrusive rocks formed?

Ans. When the molten lava coming out of volcanoes comes on the earth's

surface and cools down rapidly to become a solid piece of rock, extrusive rocks are formed. For example - basalt.

When the molten lava solidifies deep inside the earth's crust, the rocks so formed are called intrusive rocks. for example - granite.

Que 5. What do you mean by a rock cycle?

Ans. The process of transformation of rocks from one type to another, due to change in certain condition in a cyclic manner is called a rock cycle.

Que 6 What are the use of rocks?

Ans. Rocks are useful for various purposes:-

1) It helps in making roads.
2) It is used in the construction of houses and building.
3. They are used in fertilisers.

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Que 1. What are metamorphic rocks?
Ans. The type of rocks form when igneous and sedimentary rocks experience heat and pressure are called metamorphic rocks.

Give reasons:-

1. We can't go to the centre of the earth.
Ans. We can't go to the centre of the earth because the temperature and pressure at the centre of the earth are very high and not just human beings, but even rocks melt at the centre of the earth.

2. Sedimentary rocks are formed from sediments.
Ans. The small fragments of rocks that hit each other and break to reach the ground are called sediments. These sediments

are. transported and deposited by wind, water etc. and then compressed and hardened. to form a layer of rocks called the sedimentary rocks.

3) Limestone is changed into marble.

Ans. Limestone under heat and pressure changes into marble. It is a metamorphic rock.