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- **Composition of Earth's Crust**
- **rocks**

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Educator since February 2019

#M.Sc Geography # PG diploma in environment
education .4years teaching experience#Geography
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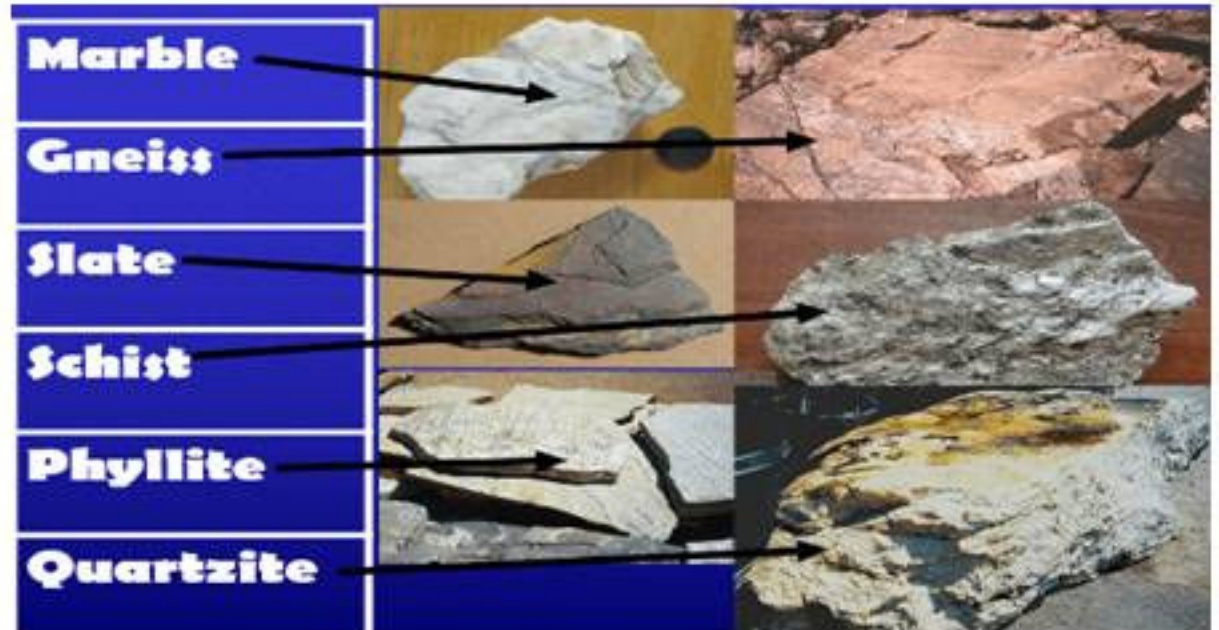
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ROCKS

- Rocks are material that form crust of earth
- A rock is nothing but a composition of minerals.
- The scientific study of rocks is called **petrology**.



Types of Rocks

Igneous rocks



Sedimentary rocks



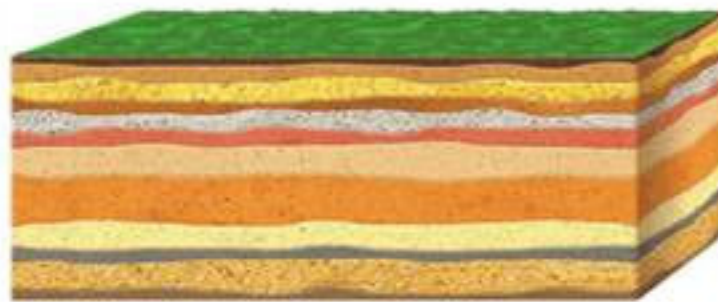
Metamorphic rocks



igneous rock, sedimentary rock, and metamorphic rock.



Igneous Rock forms when magma or lava cools and hardens.



Sedimentary Rock forms when pieces of rock are pressed and cemented together.



Metamorphic Rock forms from other rocks that are changed by heat and pressure. 2

आग्नेय चट्टान

- आग्नेय चट्टान आग्नेय चट्टान की रचना धरातल के नीचे स्थित तप्त एवं तरल चट्टानी पदार्थ, अर्थात् मैग्मा, के सतह के ऊपर आकार लावा प्रवाह के रूप में निकल कर अथवा ऊपर उठने के क्रम में बाहर निकल पाने से पहले ही, सतह के नीचे ही ठंडे होकर इन पिघले पदार्थों के ठोस रूप में जम जाने से होती है। अतः आग्नेय चट्टानें पिघले हुए चट्टानी पदार्थ के ठंडे होकर जम जाने से बनती हैं।
- Igneous rocks are formed by the cooling of highly heated molten fluid material called as Magma.
- As they comprise the earth's first crust and all other rocks are derived from them, they are also called as the parents of all rocks or the **Primary Rocks**.
- On the basis of their mode of occurrence, igneous rocks can be classified as **Intrusive and Extrusive Igneous Rocks**.

आग्नेय चट्टान

❑ Extrusive Igneous Rocks बहिर्भेदी या ज्वालामुखीय चट्टान

- They are formed by the cooling of the **lava** on the earth's surface.
- These rocks are also called as **Volcanic Rocks**.
- Eg: Gabbro, Basalt, etc.



❑ Intrusive Igneous Rocks अंतर्भेदी चट्टान

- They are formed when **magma** solidifies below the earth's surface.
- intrusive igneous rocks are called as **Plutonic rocks** and shallow depth intrusive igneous rocks are called as **Hypabyssal Rocks**.
- Eg: Granite, dolerite, etc.



❖ **Granite** due to Pressure **Gneiss**

अवसादी चट्टान

❑ Sedimentary Rocks

- ✓ अपक्षय एवं अपरदन के विभिन्न साधनों द्वारा मौलिक चट्टानों के विघटन, वियोजन और टूटने से परिवहन तथा किसी स्थान पर जमाव के परिणामस्वरूप उनके अवसादों से निर्मित शैल को अवसादी शैल कहा जाता है।
- ✓ The great Vindhyan highland in central India consists of sandstones, shales, limestones.
- ✓ Coal deposits occur in river basins of the Damodar, Mahanadi, Godavari in the Gondwana sedimentary deposits.
- ✓ अवसाद शैलों का निर्माण तीन प्रकार से होता है।

➤ Mechanically

➤ Organically/ Biologically

➤ Chemically

अवसादी चट्टान

- ✓ These rocks are formed by successive deposition of sediments.
- ✓ Due to successive depositions, they have a layered or stratified structure and hence are also called as **Stratified Rocks**.
- ✓ Cover 75 per cent of the earth's crust
- ✓ Sedimentary rocks have also been found on Mars.
- ✓ Alluvial deposits in the Indo-Ganga Alluvial deposits in the Indo-Ganga plain and coastal plains coastal plains is of sedimentary accumulation.
- ✓ Sedimentary rocks are not as rich in minerals as the igneous rocks

❖ **Limestone**

Heat

Marble

❖ **Sandstone**

Heat

Quartzite

❖ **Coal**

Heat

Anthracite

अवसादी चट्टान

❑ Mechanically formed

- They are formed by the consolidation of sediments under excessive pressure and cementation.
- Eg: **Conglomerate, Breccia, Sandstone, Shale, etc.**

❑ Organically/ Biologically formed

- The consolidation of organic matters derived from plants and animals form this type of rocks.
- Eg: **Coal, limestone, chalk, chert, etc.**

❑ Chemically formed

- They are formed by various chemical reactions.
- Eg: **Gypsum, rock salt, limestone, etc.**

कायांतरित चट्टान

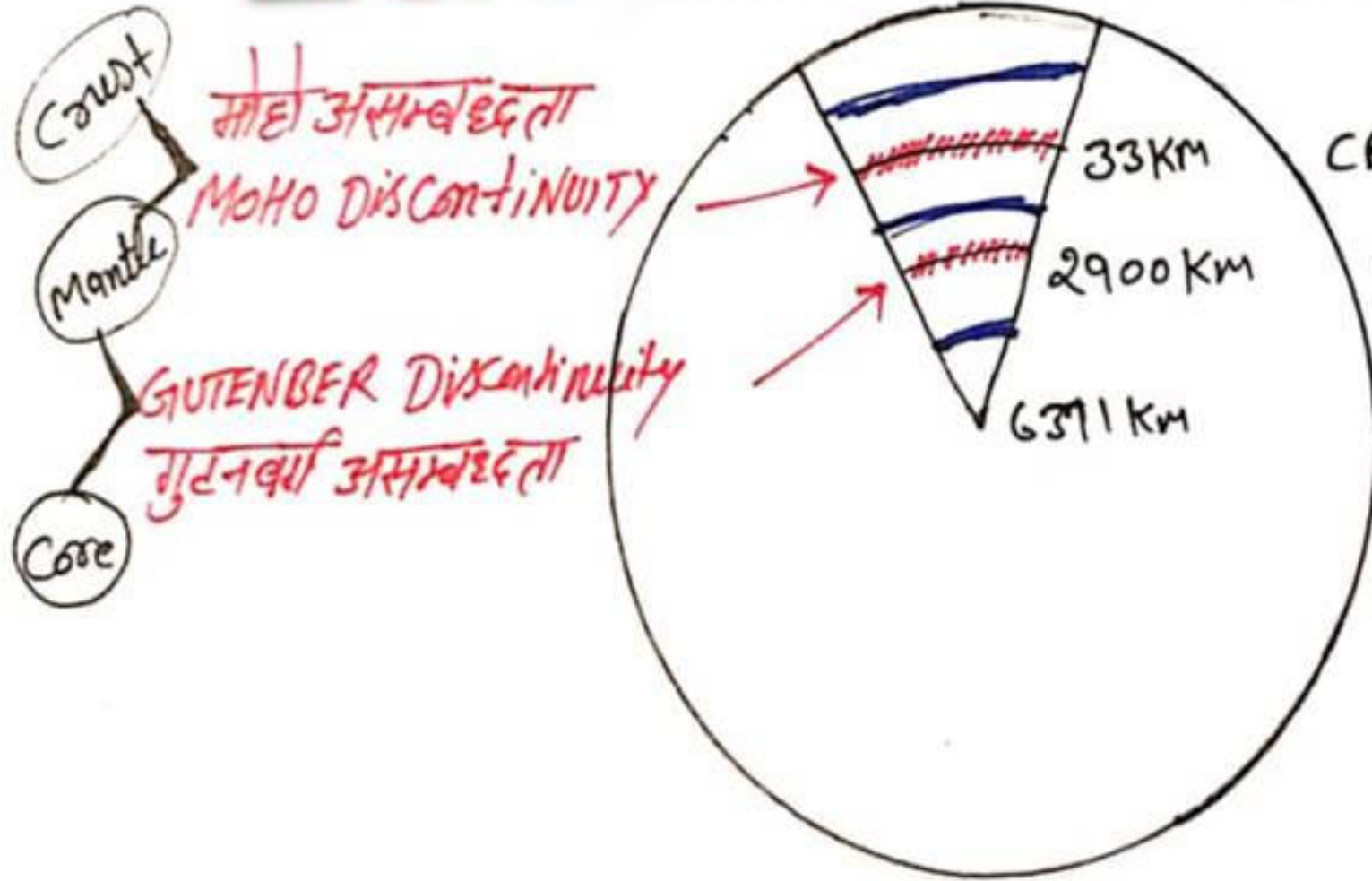
❑ Metamorphic Rocks

- The word metamorphic means **change of form**.
- when original structure of igneous & sedimentary rocks partially or wholly change under the action of heat & pressure.

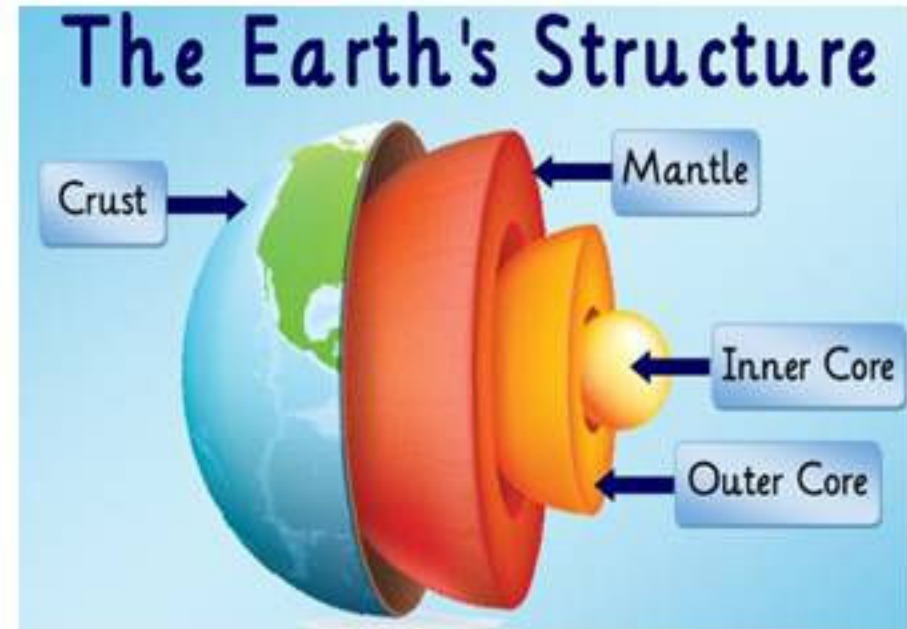
❖ **Slate to Phyllite**

❖ **Anthracite to Graphite**

Earth's Layers



CRUST भूपटल CONRAD Dis.
MANTLE अतुपटल REPETI Dis.
CORE अग्निस LEHMEN Dis.



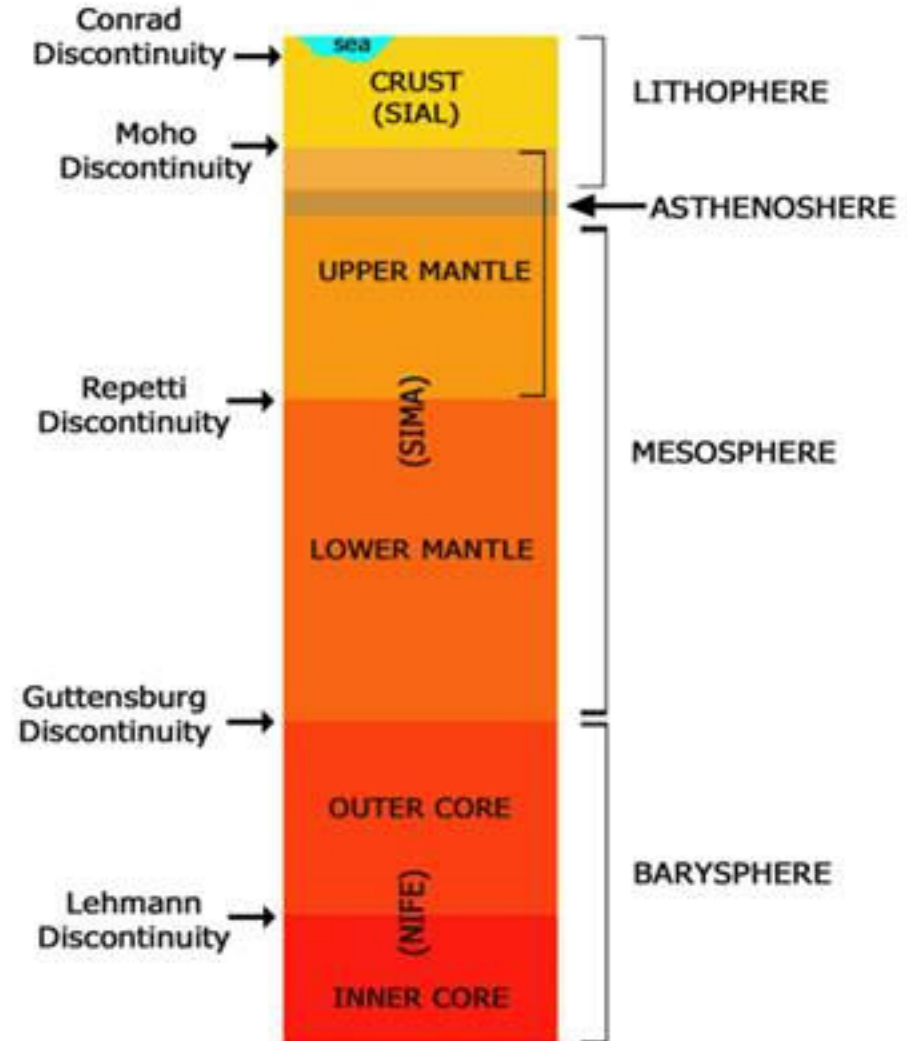
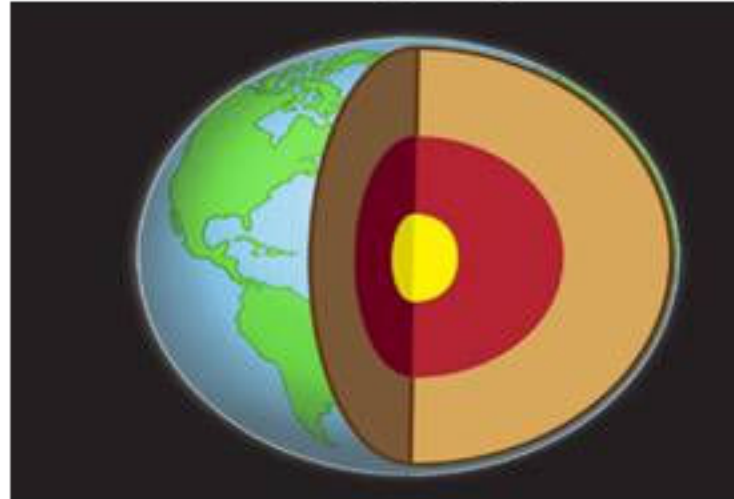
INTERIOR OF THE EARTH

Earth's Layers

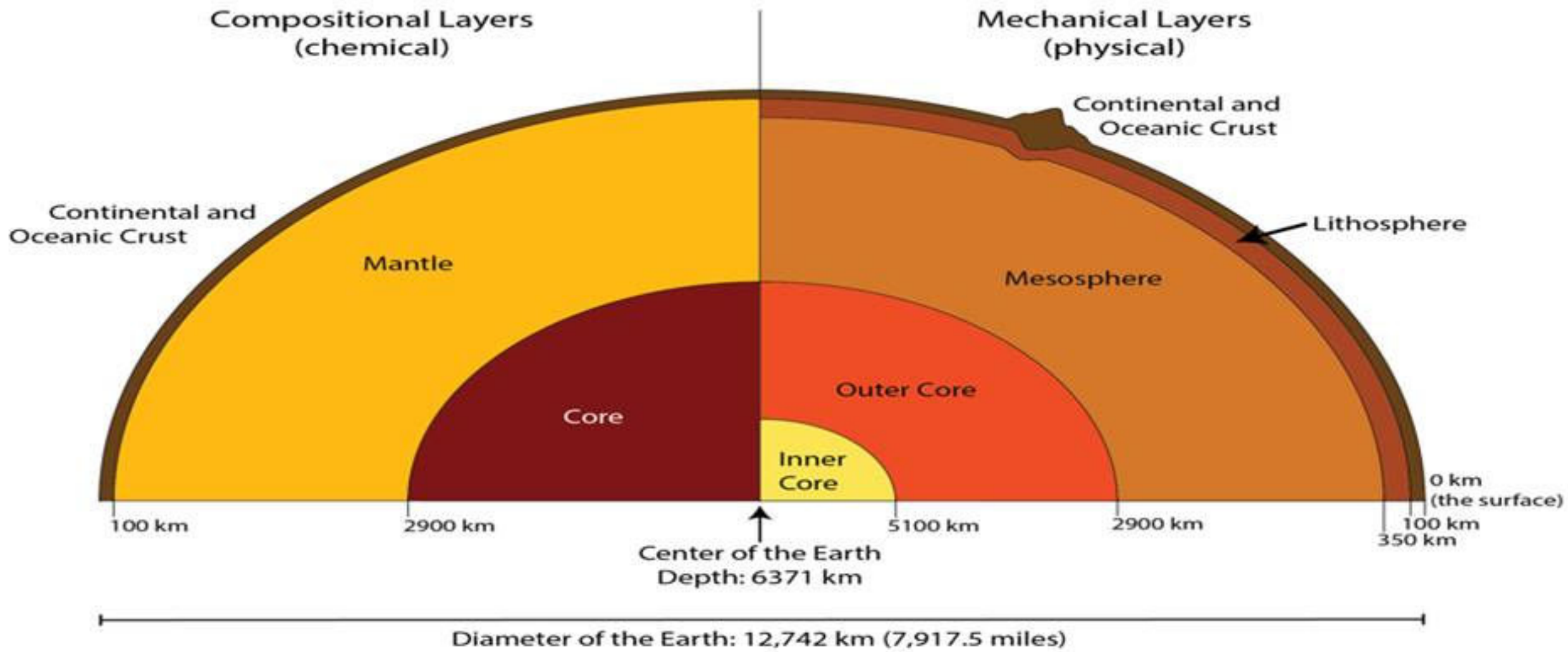


Earth's Layers based on chemical properties

- 1) Crust
- 2) Mantle
- 3) Core
- Asthenosphere
- Lithosphere
- Seismic Discontinuities



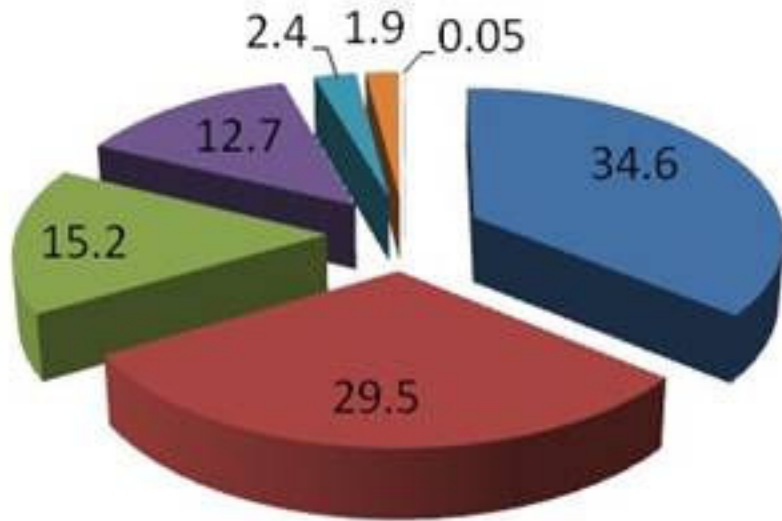
Two different views of the Interior of the Earth



Chemical Composition

In Earth

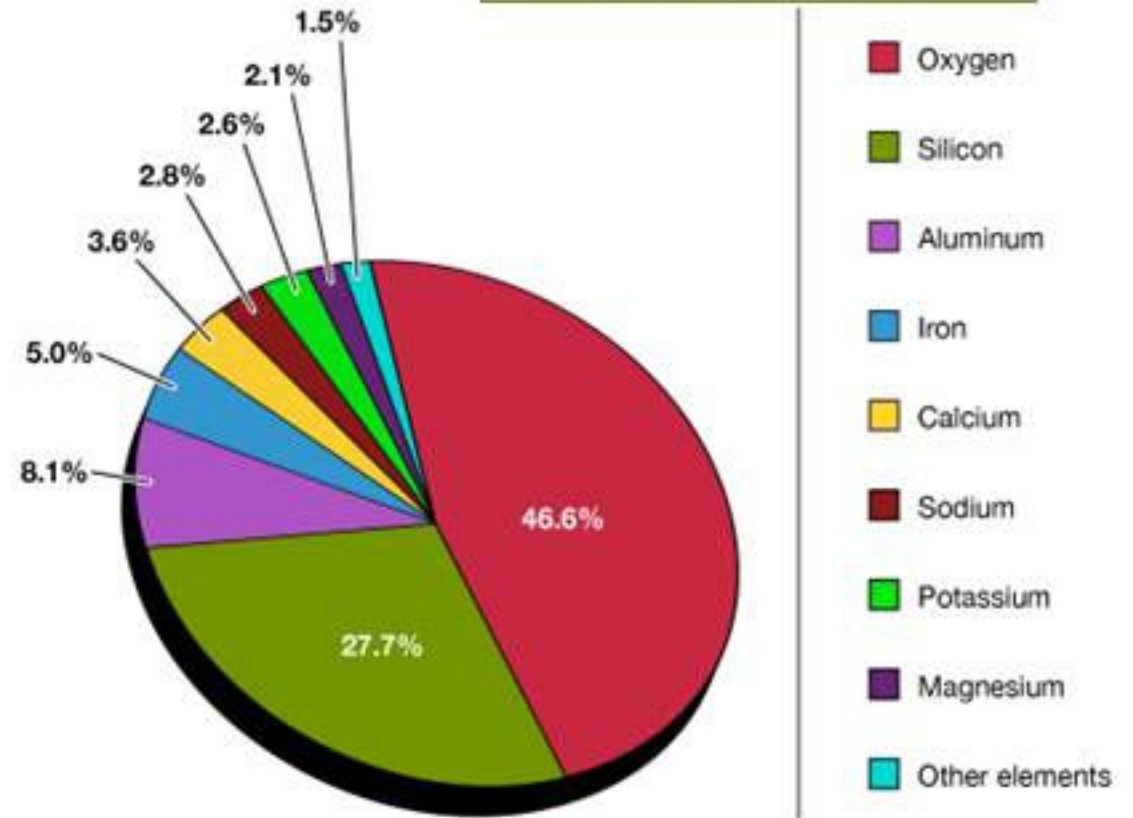
Chemical Composition in %



- Iron
- Oxygen
- Silicon
- Magnesium
- Nickel
- Sulphur
- Titanium

IOSIMANI

In Crust



- Oxygen
- Silicon
- Aluminum
- Iron
- Calcium
- Sodium
- Potassium
- Magnesium
- Other elements

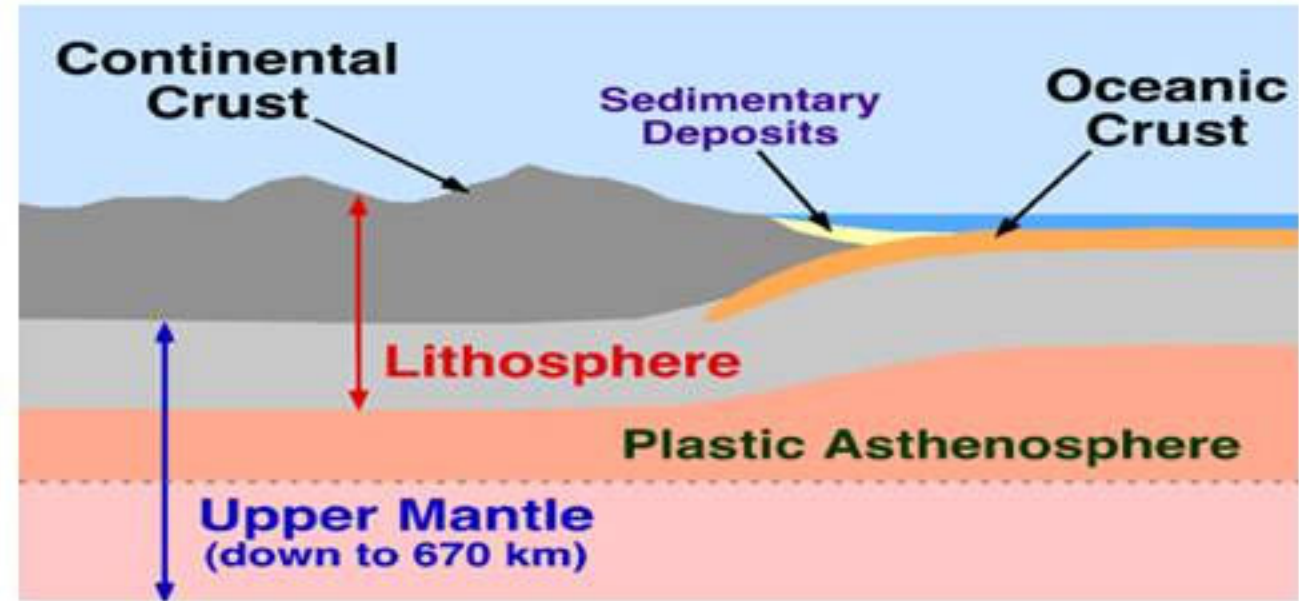
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❑ Lithosphere

There are two types of lithosphere:

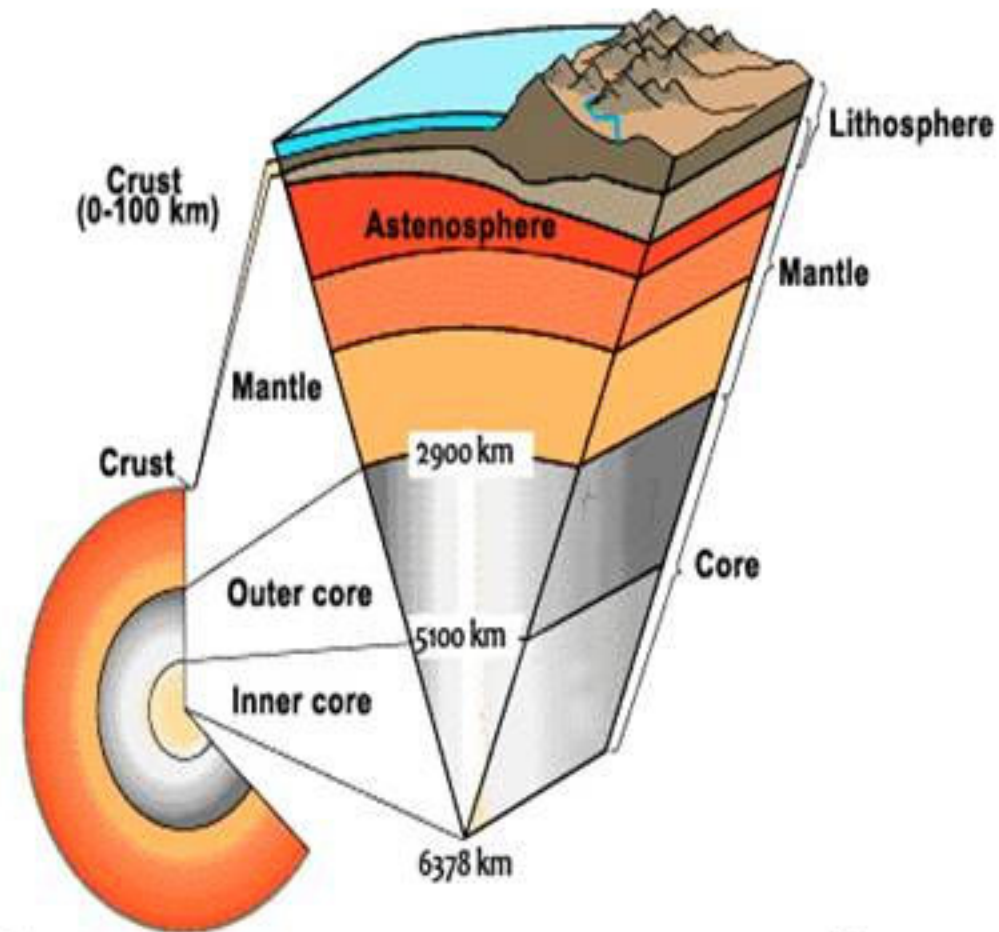
- ❖ Oceanic lithosphere
- ❖ Continental lithosphere

- Earth's lithosphere includes the crust and the uppermost mantle, which constitute the hard and rigid outer layer of the Earth.
- The lithosphere is subdivided into **tectonic plates**. The uppermost part of the lithosphere that chemically reacts to the atmosphere, hydrosphere and biosphere through the soil forming process is called the **pedosphere**.



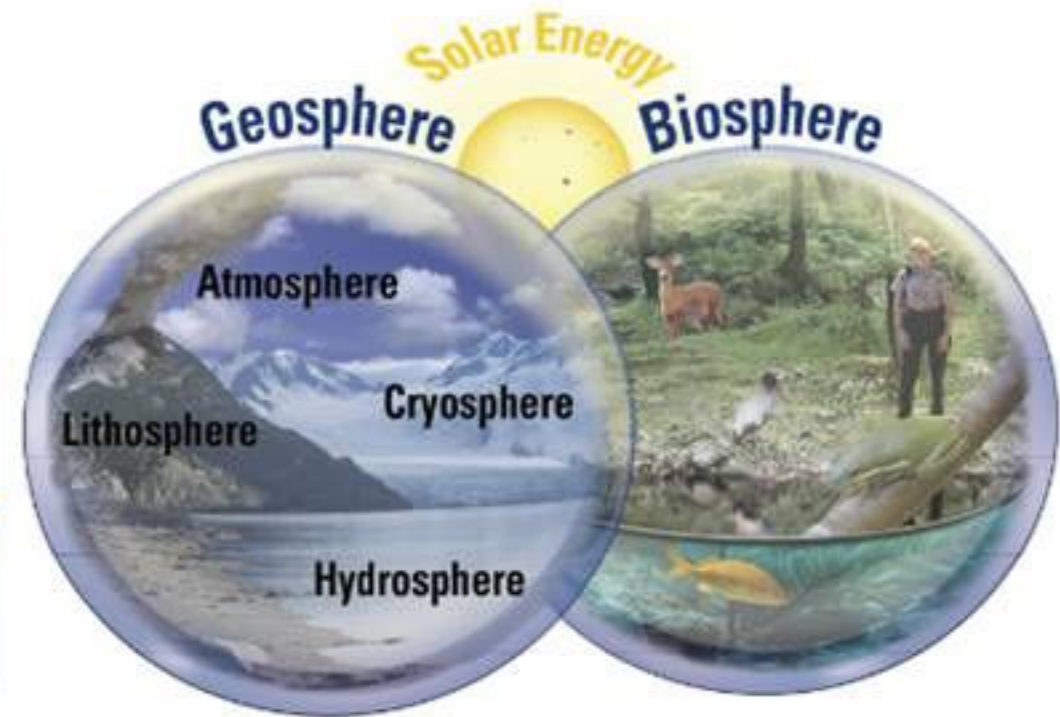
❑ Asthenosphere

- The upper portion of the mantle is called asthenosphere.
- The word **astheno** means **weak**.
- It is considered to be extending up to 400 km.
- It is the main source of magma that finds its way to the surface during volcanic eruptions. It has a density higher than the crust's.



The Geosphere

- ❑ The lithosphere resting on a weak asthenosphere are essential to the theory of plate tectonics.
- ❑ **The geosphere** may be taken as the collective name for the **lithosphere**, the **hydrosphere**, the **cryosphere**, and the **atmosphere**.



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