

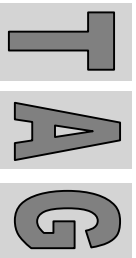
Unit 3

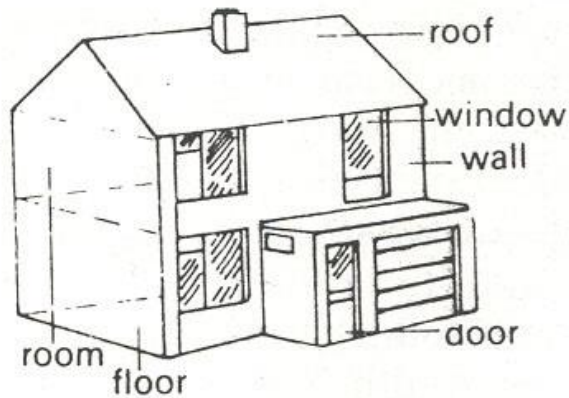
“Structure”

JEM/ENG
Mesleki Yabancı Dil
(Professional English)

Dr. Veysel Işık
Professor

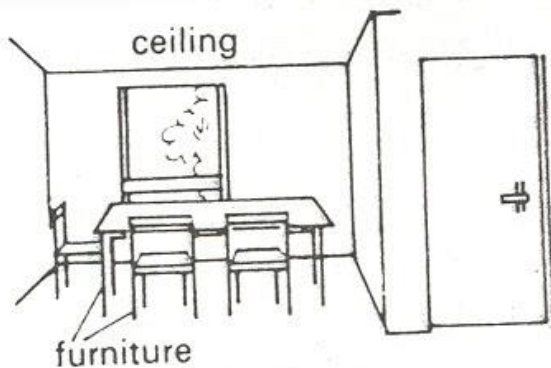
Ankara Üniversitesi
Mühendislik Fakültesi
Jeoloji Mühendisliği Bölümü





A house *consists of* walls, a roof, floors, doors and windows.

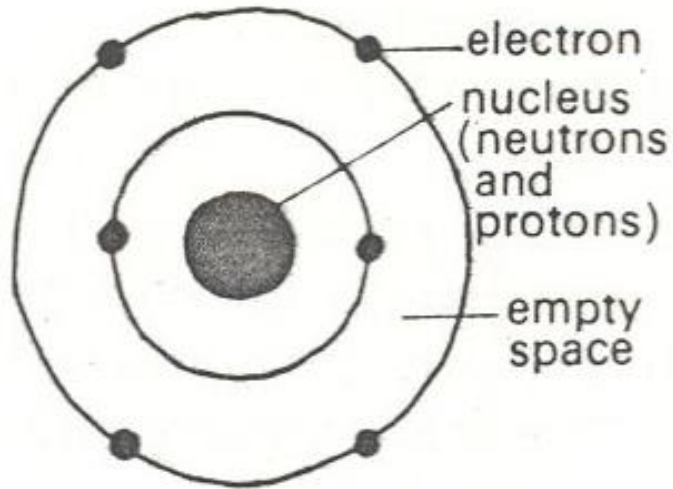
It *contains* rooms



A room walls, a ceiling, a floor, a..... and

A room often furniture.

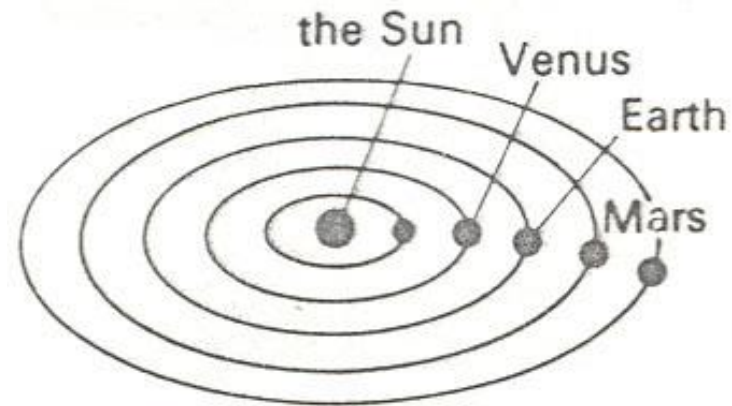
Parts and the whole



An atom of carbon *consists of* electron and nucleus.

It *contains* a nucleus in the centre.

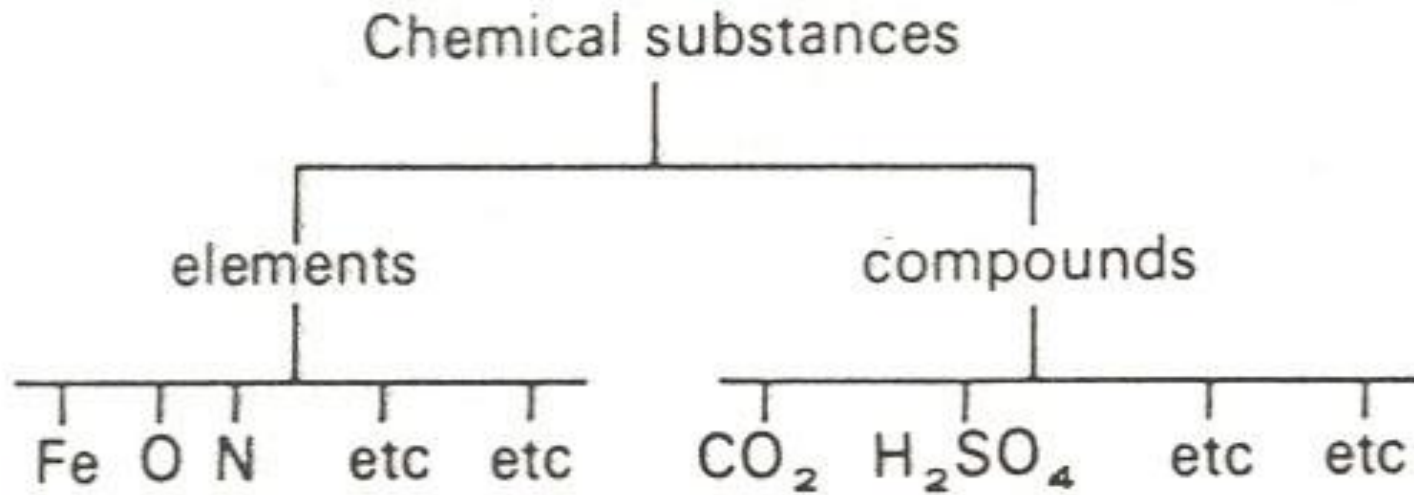
The nucleus *consists of* neutrons and protons



The solar system *consists of* the sun and planets.

Planets *include* the Earth, Mars, Venus,

Look and complete:



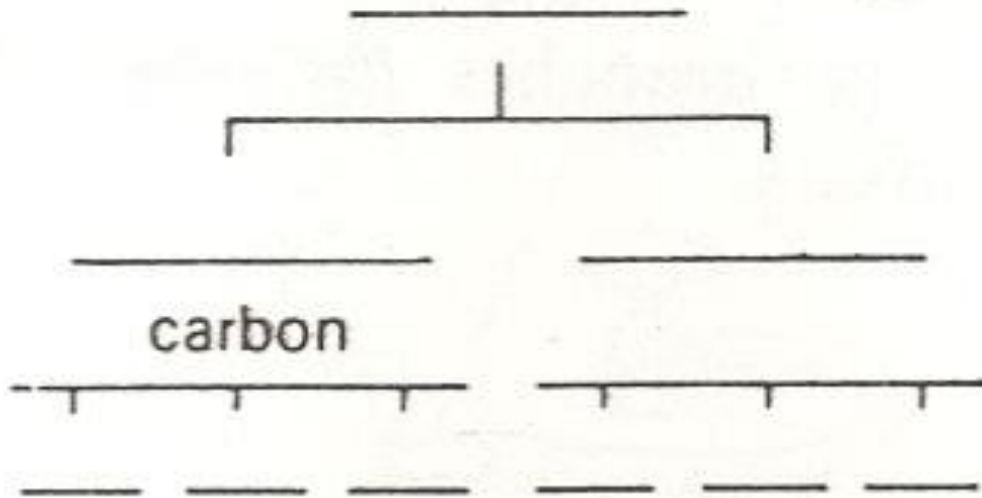
Chemical substances **consists of** and

Elements **include**

Compounds **include**

T
A
G

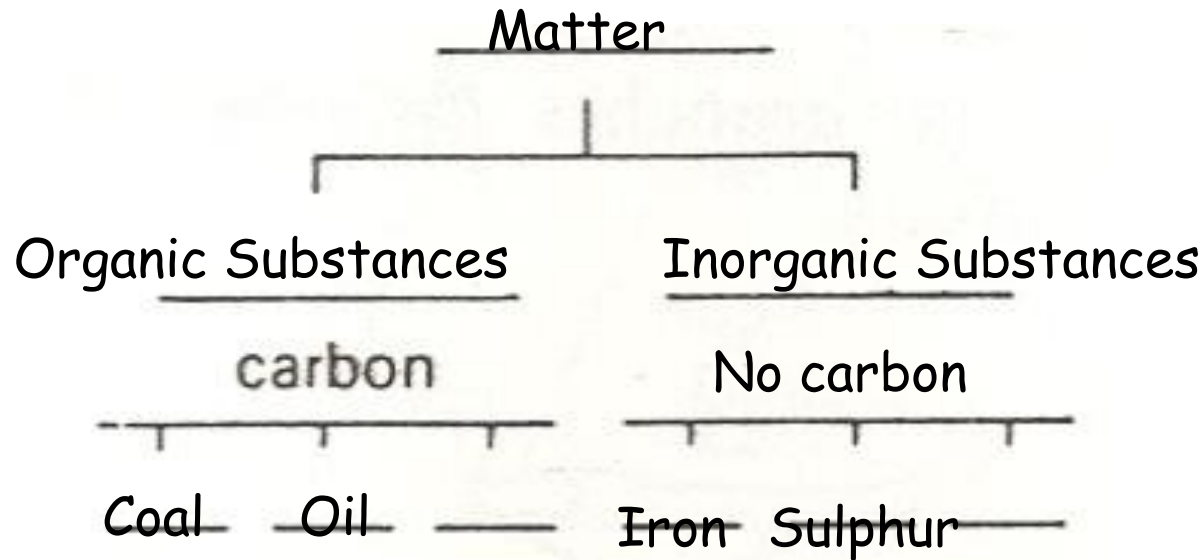
Now read the text and copy out the complete diagram:



Matter consists of organic substances and inorganic substances. Organic substances include coal and oil.

Inorganic substances include iron and sulphur. Organic substances contain carbon. Inorganic substances do not contain carbon.

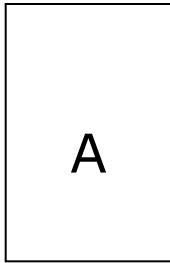
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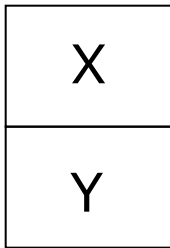
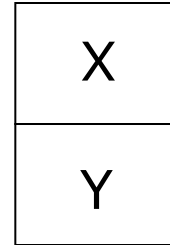
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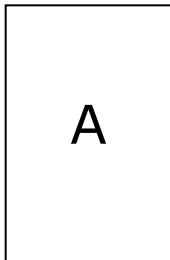
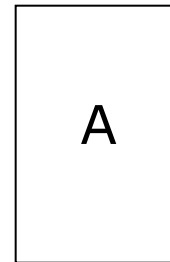
Useful verbs



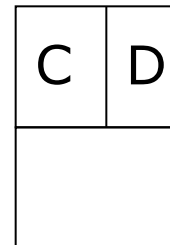
consists of
comprises
is composed of
is made up of



constitute



contains
includes



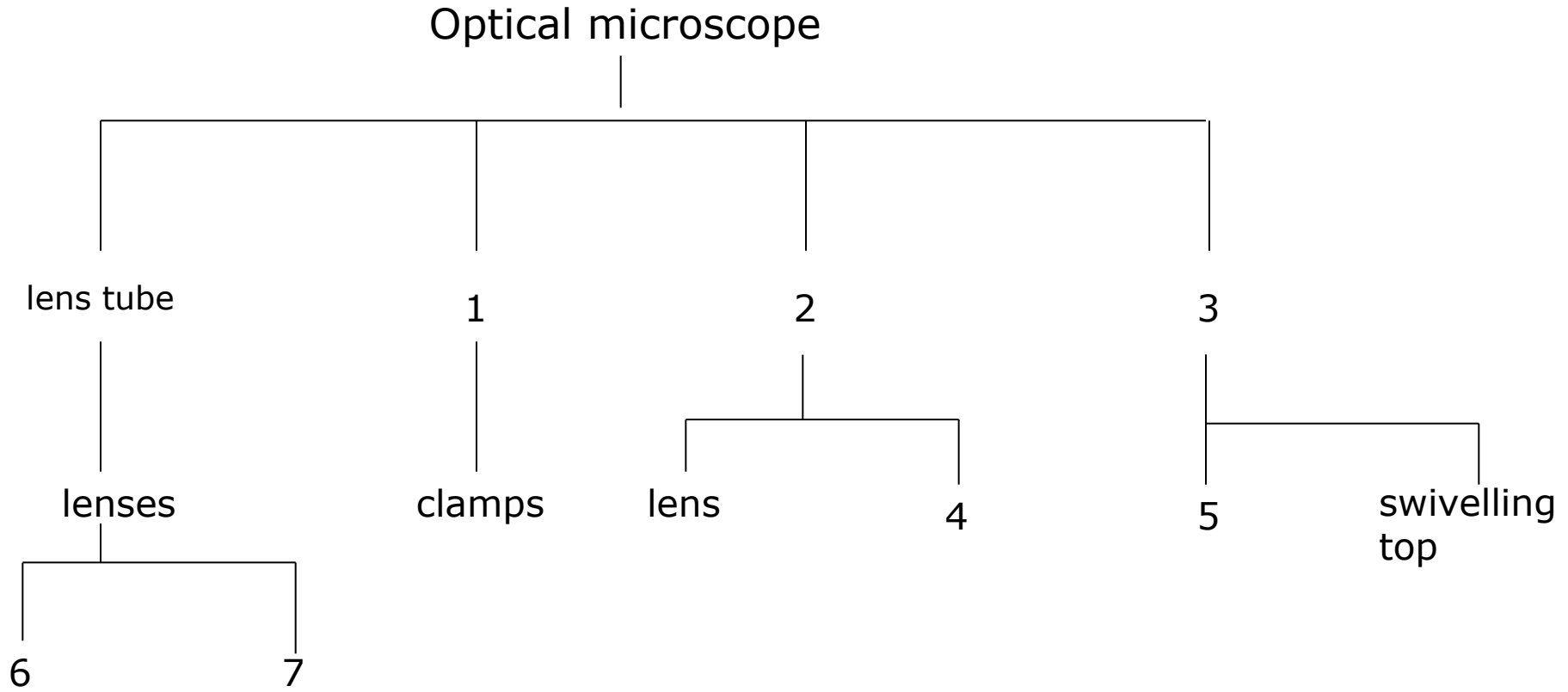
Optical Microscope

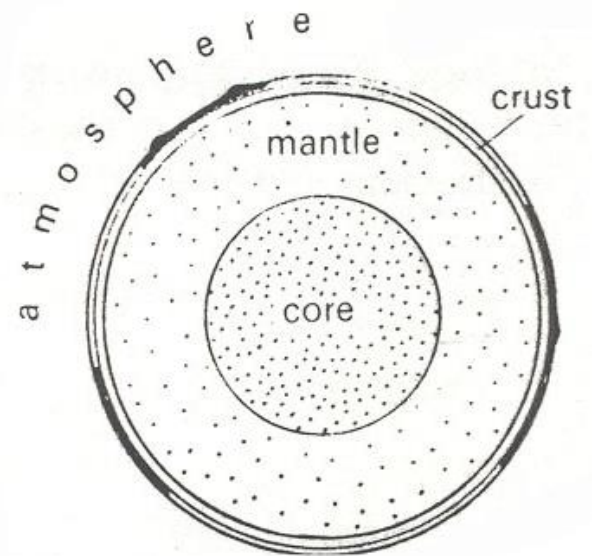
A microscope is an instrument which is used by scientists to magnify very small objects to make them visible. The commonest type is the optical microscope. An optical microscope *consists of* a lens tube, slide platform, an object condenser and a metal frame.

The lens tube *contains* a number of lenses, the most important of which are the ocular and objective lenses. These lenses are for magnifying the object. The slide platform *contains* a number of clamps for holding the slides. The object condenser is *composed of* a lens and a diaphragm. The latter is used to control the amount of light entering the lens tube. The frame *is made up of* two parts: a heavy base and a swivelling top.

The optical microscope is good enough for ordinary laboratory work but for research the much more powerful electron microscope is used.

Study this description of an optical microscope





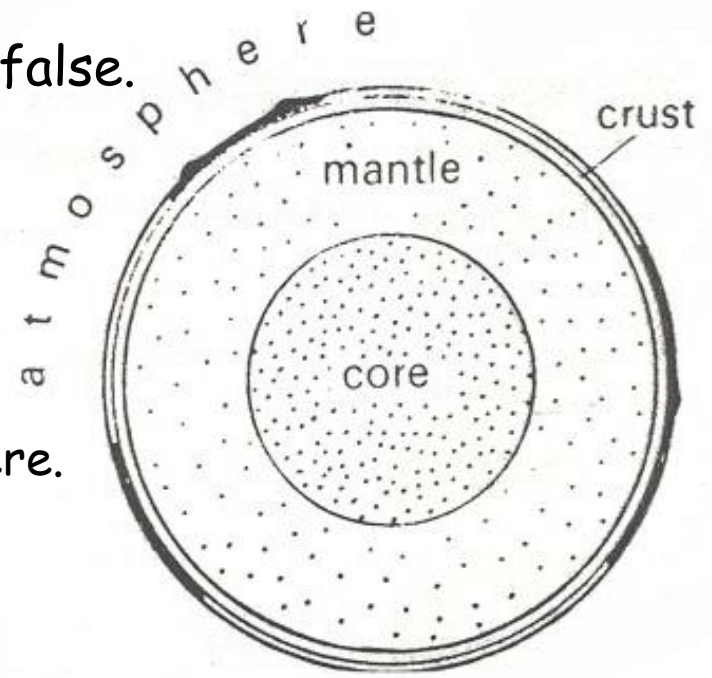
Look at this table:

The structure of the Earth

Section	Parts	Composition	Examples
the atmosphere		gases	oxygen (O) and nitrogen (N)
the crust	lithosphere hydrosphere	metamorphic, igneous and sedimentary rocks water	mountains oceans and rivers
the mantle		solid matter	
the core	outer core inner core	molten metal solid metal	nickel (Ni)

Say whether these statements are true or false.

Correct the false statements.



a) The Earth consists of a core and an atmosphere.

.....

b) The crust is part of the Earth's structure.

.....

c) Other parts of the Earth include the mantle, the core and the Sun.

.....

d) The core contains the Earth.

.....

e) The atmosphere contains gases.

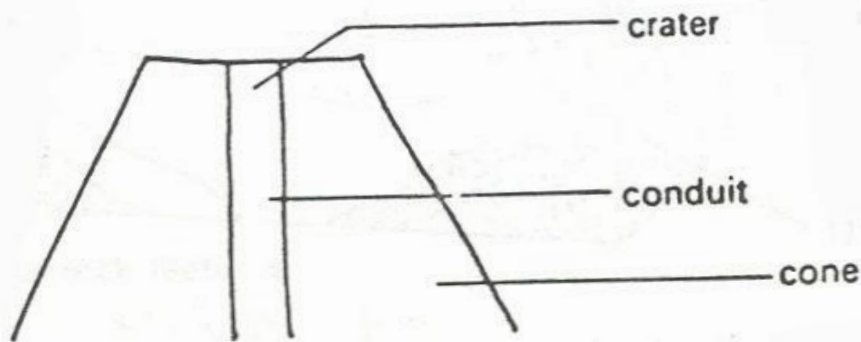
.....

Now ask and answer questions based on the table above and below:

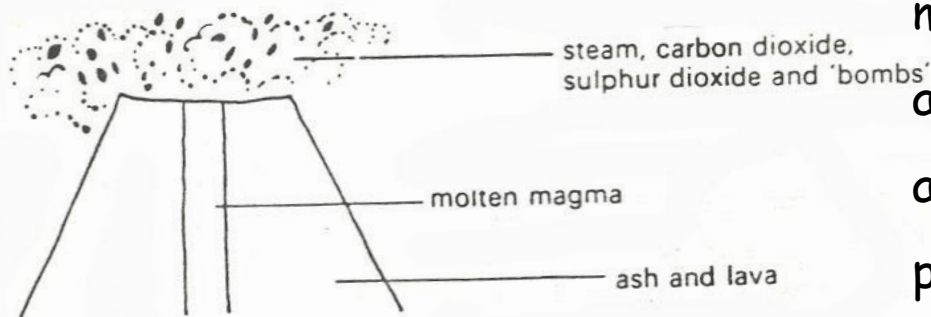
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What is the	atmosphere crust mantle core Earth	composed of?
What does the	crust core Earth	consist of?
What does the	crust core Earth	include?
How many parts is the	crust core Earth	divided into?

Reading Passage



A dormant volcano

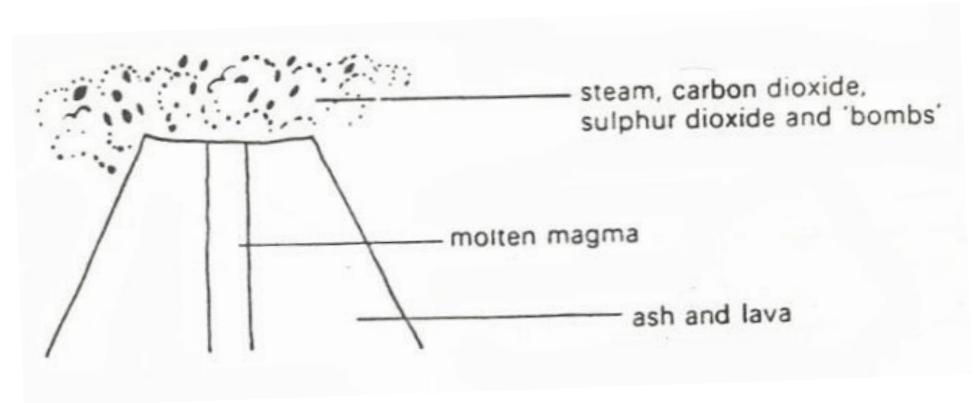
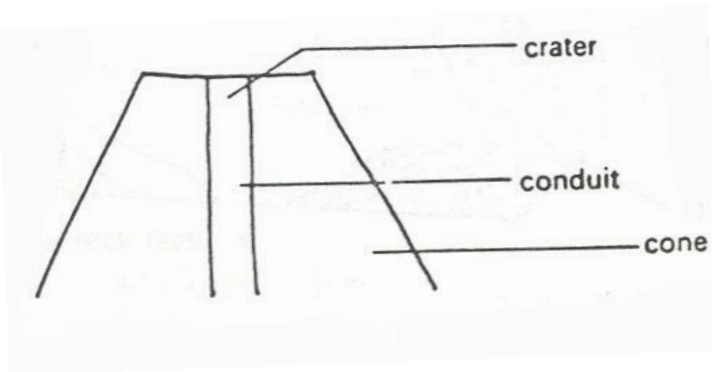


An active volcano

Volcanic mountains can be *divided into* two simple types: those which are active and those which are dormant.

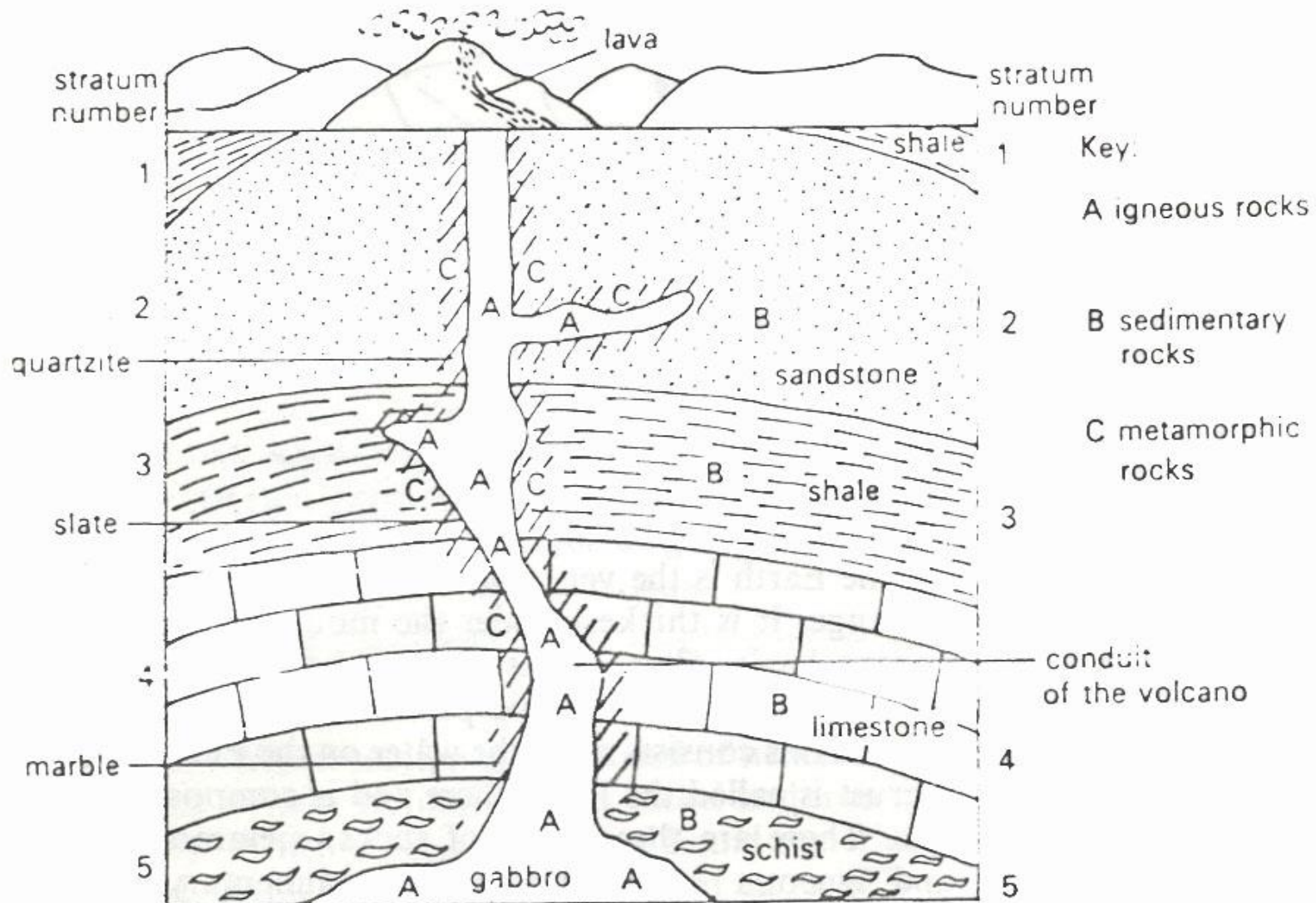
A dormant volcano *consists of* a crater, a conduit and a cone. The crater is circular in shape and is situated at the top of the mountain. It often *contains* a lake. The conduit is cylindrical and *contains* solid magma. This is *composed of* silica, iron and magnesia. The cone *consists of* lava and ash, but sometimes it also *includes* pieces of igneous rock. These came from inside the volcano when it was active, and are called volcanic bombs.

Answer the following questions:



- a) What does the conduit contain?
- b) What is the magma composed of?
- c) Does the volcanic cloud include bombs?
- d) Does it also include lava?
- e) What is the volcanic cloud composed of?
- f) What does the cone consist of?

Look at this diagram and answer following questions



How many strata *are composed of sedimentary rock?*

What does the volcano *consist of?*

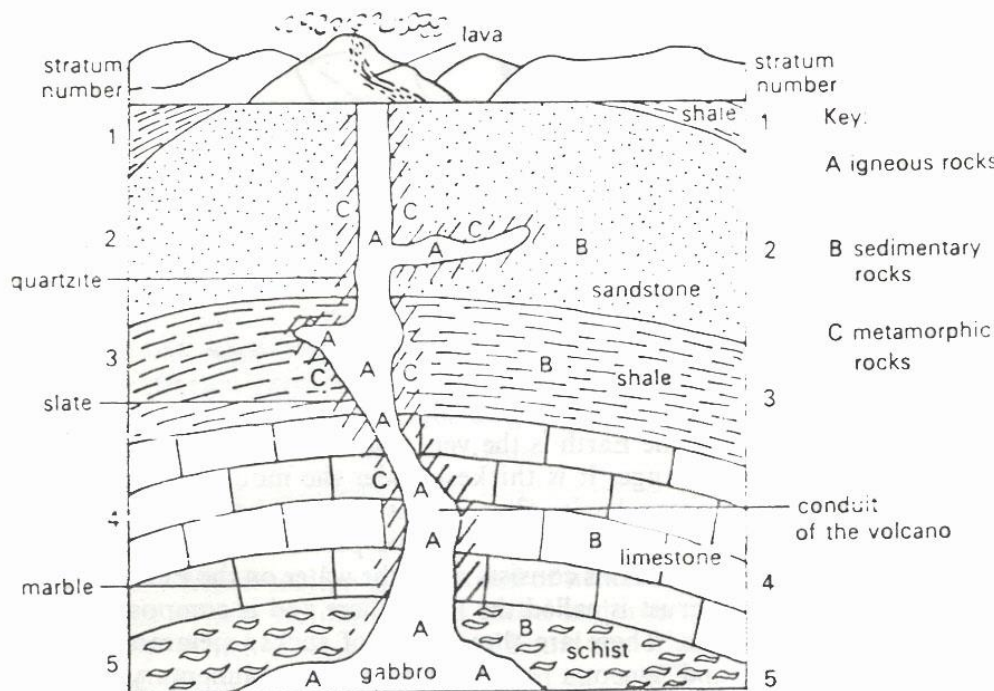
How many kinds of rock *are included in stratum 3?*

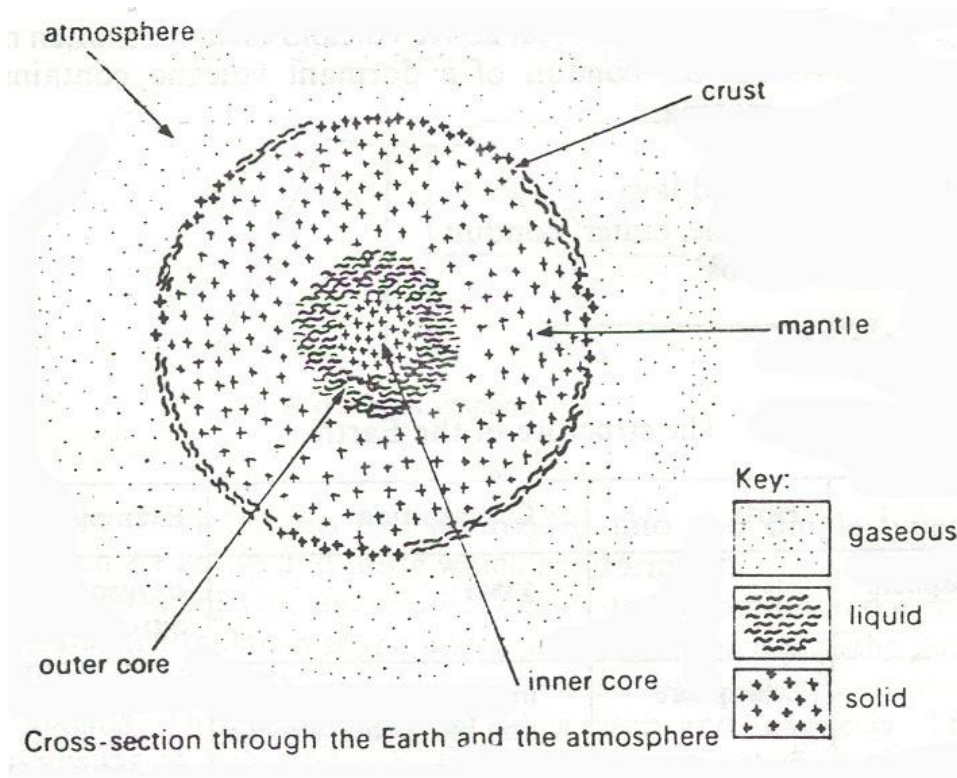
Which is older rock, limestone or sandstone, and why?

Which section *contains the youngest rock?*

Which section *consists only of igneous rock?*

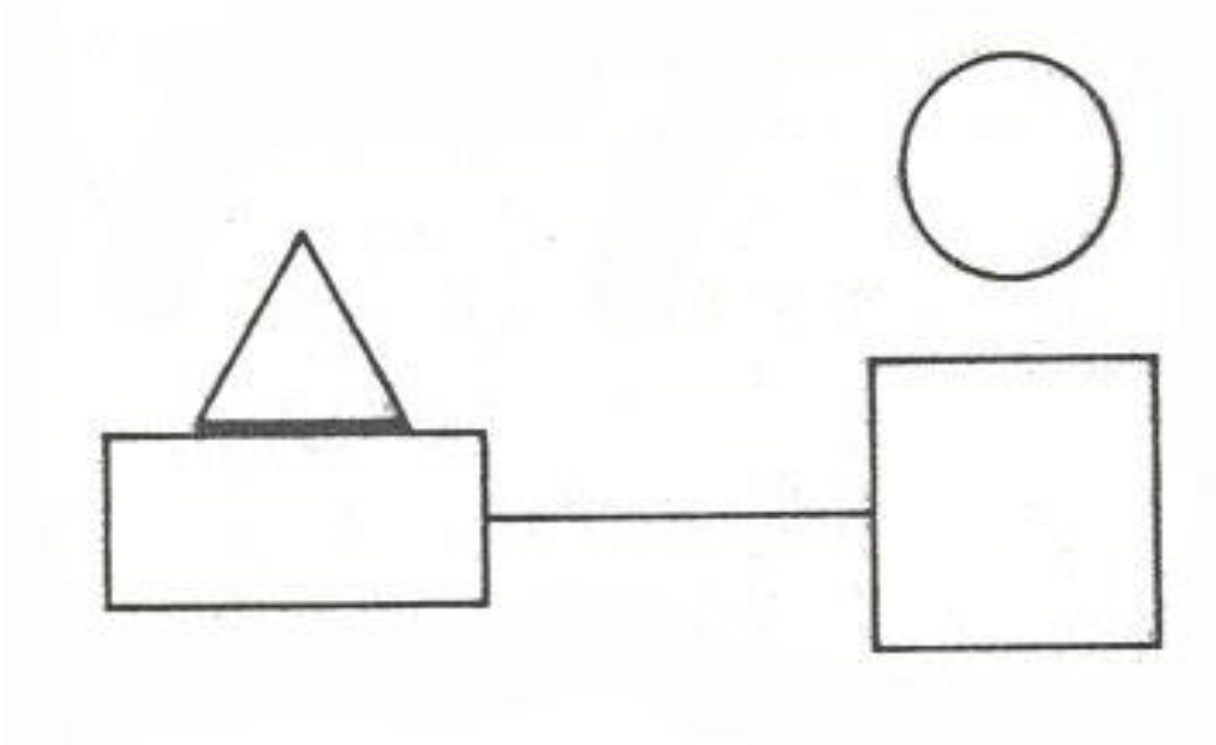
Which stratum *consists mostly of metamorphic rock?*





The Earth five sections. Each section.....matter which is gaseous, solid or liquid (see the key). In the centre of the Earth there is an inner core whichsolid nickel and iron. Around this inner core there is an which.....molten metal. Between the outer core and thethere is a deep area which.....solid matter. This is called Above the mantle is a thin area which is called Thisrocks and minerals and it.....all the water on the Earth. Surrounding the Earth is a thick layer of gases called..... The Earth with the atmosphere.....a sphere.

The connection between parts

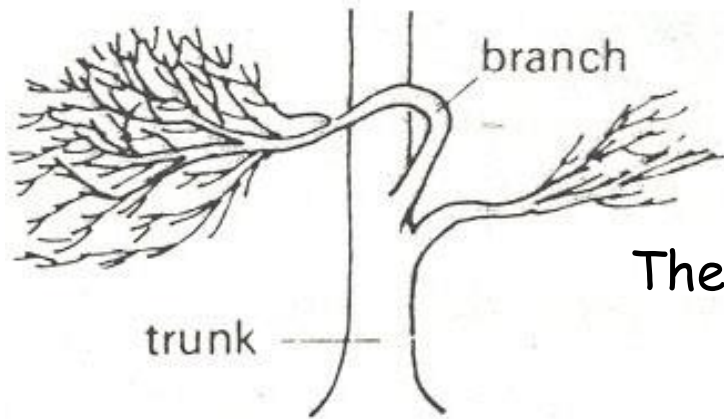


The rectangle *is connected to* the square by line.

The triangle *is attached to* the rectangle.

The circle *is detached from* the square.

The connection between parts

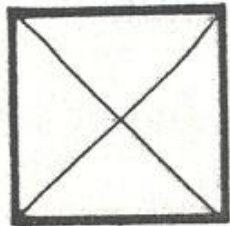


The branch of the tree *is joined to* the trunk.



The branches *are supported by* the trunk.

The connection between parts



This square is divided into triangles.

The circle is surrounded by stars.

The tyre is filled with air.

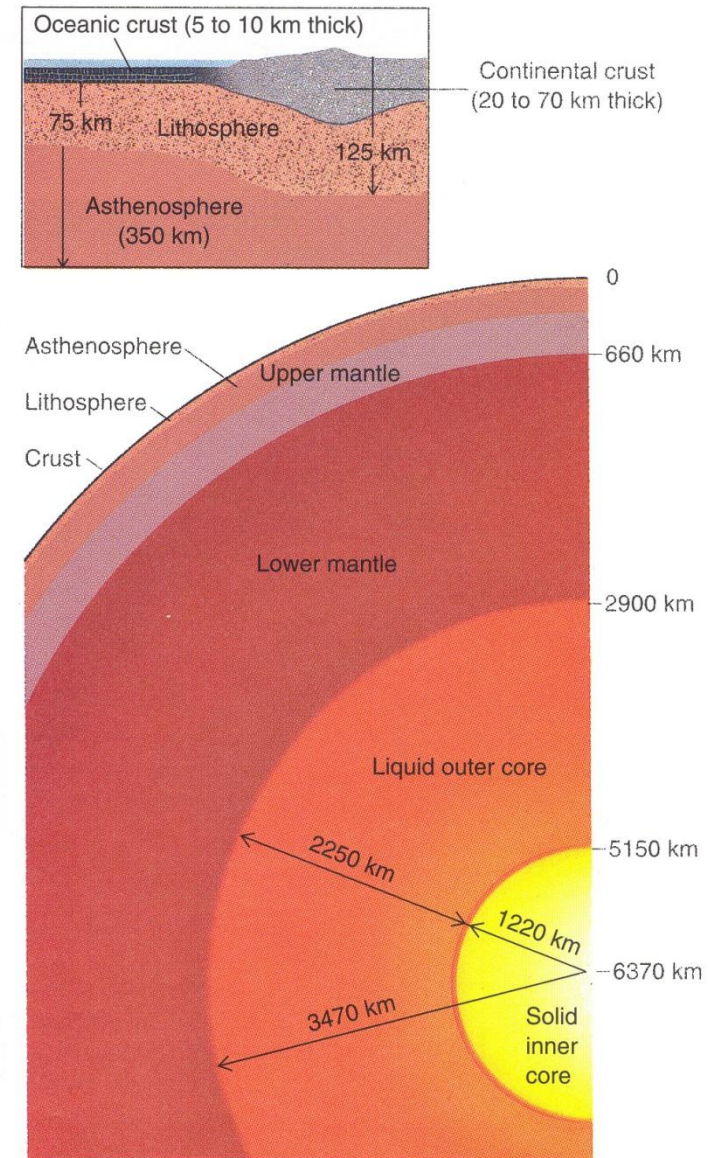
The body of a car is covered with paint.

The interior of the Earth

If we could break open the Earth, we would see that its interior **consists of** series of concentric layers (in order from the surface to the center) *the crust, the mantle, and the core.*

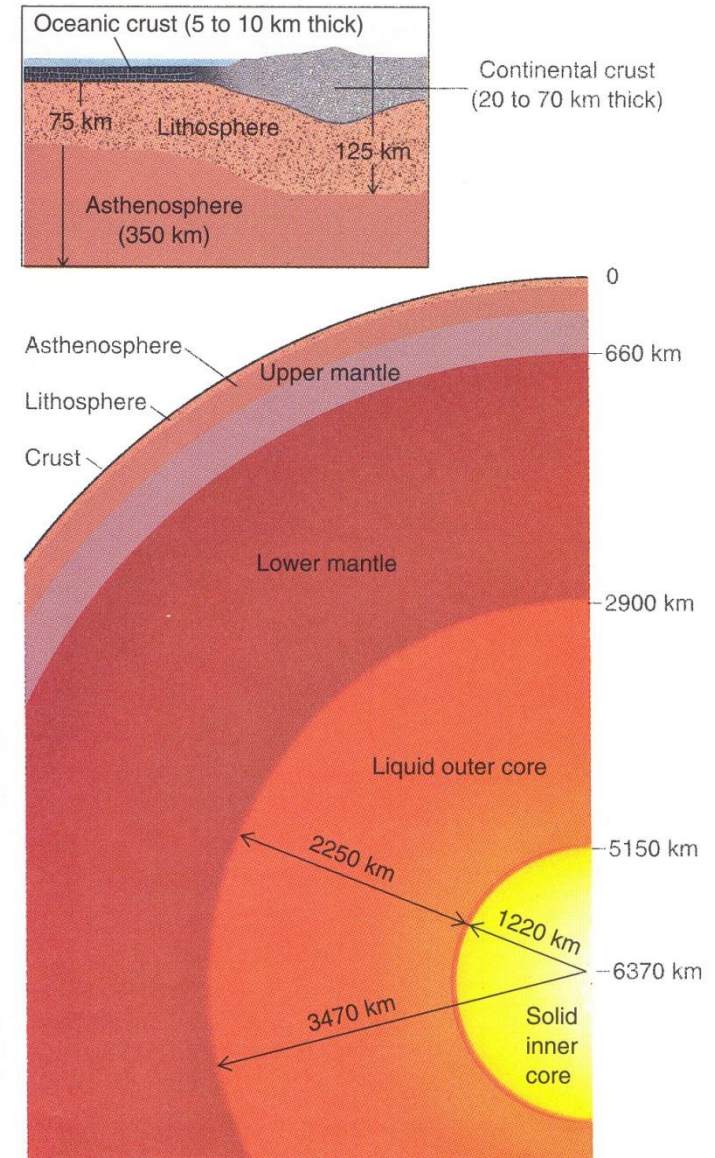
The Crust

The crust is the outermost and thinnest layer. We know more about the crust than we do about the underlying mantle and core. Because the crust is relatively cool, it **consists of** hard, strong rock. Geologists distinguish between two fundamentally different types of crust- *oceanic crust*, which underlies the sea floor, and *continental crust*, which underlies continents. Oceanic crust is 5 to 10 kilometers thick and **is composed** mostly of a dark, dense rock called *basalt*. In contrast, the average thickness of continental crust is about 20 to 40 kilometers, although under mountain ranges it can be as much as 70 kilometers thick. Continents **are composed** primarily of a light-colored, less dense rock called *granite*.



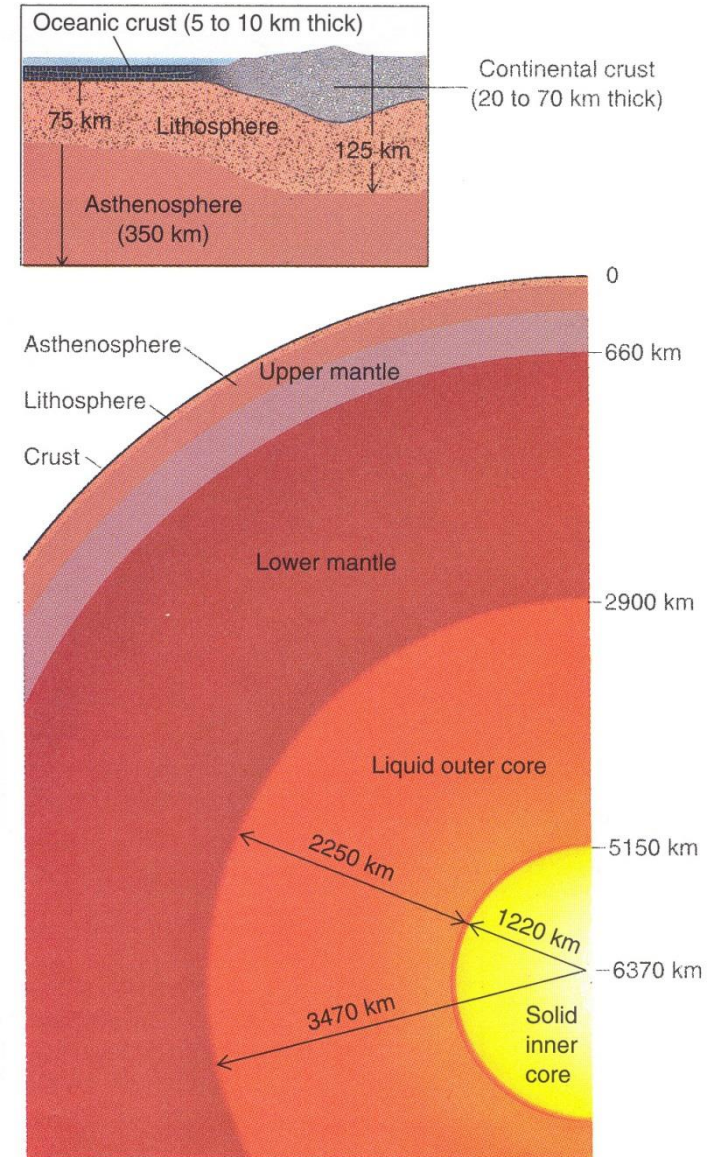
The Mantle

The *mantle* lies directly below the crust. It is almost 2900 kilometers thick and makes up 80 percent of the Earth's volume. In contrast to crust, the mantle **consists of** ultramafic rock, peridotite, which is very rich in iron and very poor in silica. This means that peridotite, though rare at the Earth's surface, is actually most abundant rock in our planet. Although the chemical composition may be similar throughout the mantle, Earth temperature and pressure increase with depth. These changes cause the strength of mantle rock to vary with depth, and thus they create layering within the mantle. The upper part of the mantle consists of two layers.



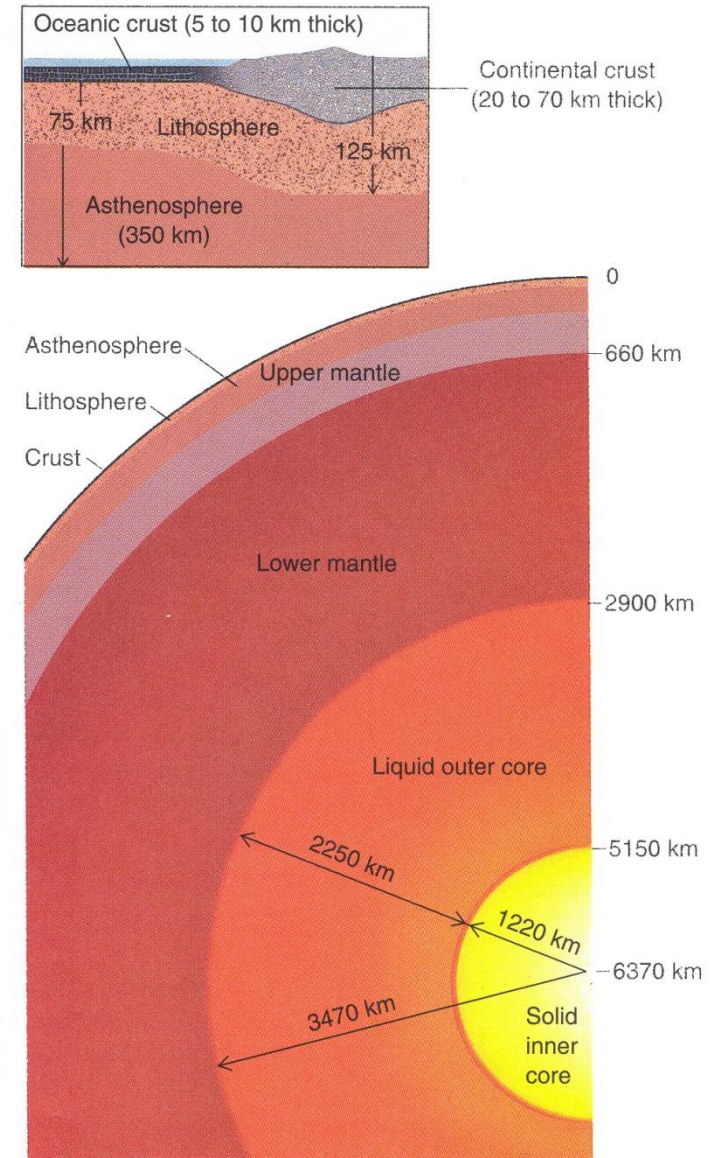
The Lithosphere

The uppermost mantle is relatively cool and consequently is hard, strong rock. In fact, its mechanical behavior is similar to that of the crust. The outer part of the Earth, **including** both the uppermost mantle and the crust, make up the *lithosphere* (Greek for “rock layer”). The lithosphere can be as thin as 10 kilometers where tectonic plates separate. However, in most regions, the lithosphere varies from about 75 kilometers thick beneath ocean basins to about 125 kilometers under the continents.



The Asthenosphere

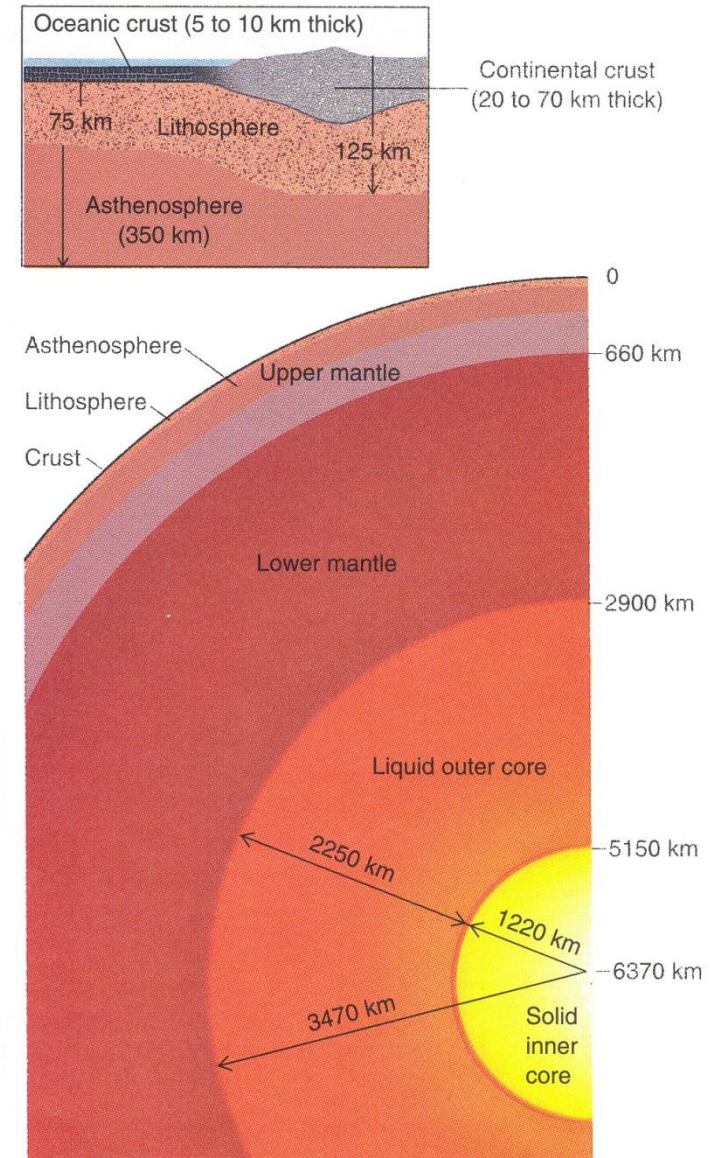
At a depth varying from about 75 to 125 kilometers, the strong, hard rock of the lithosphere gives way to the weak, plastic *asthenosphere*. The asthenosphere extends from the base of the lithosphere to a depth of about 350 kilometers. At the base of the asthenosphere, increasing pressure causes the mantle to become mechanically stronger, and it remains so all the way down to the core.



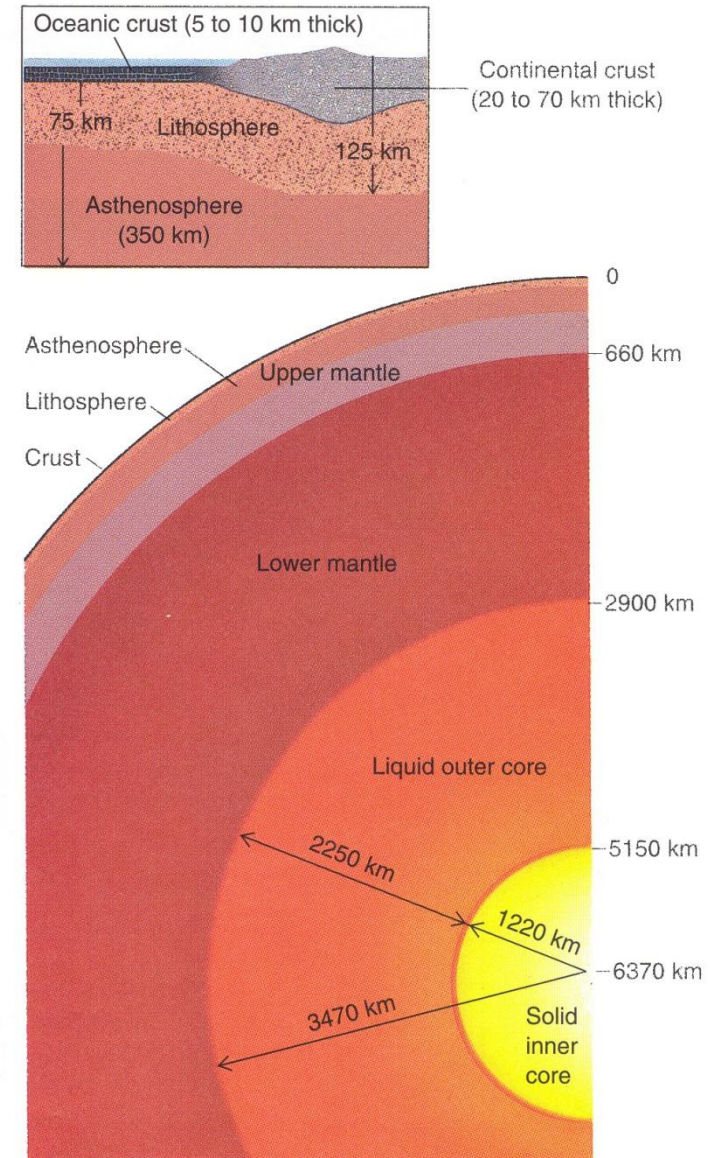
The Core

The *core* is the innermost of the Earth's layers. It is a sphere with a radius of about 3470 kilometers, larger than the planet Mars. The outer core is molten because of the high temperature in that region. Near its center, the core's temperature is about 6000°C, as hot as the Sun's surface. The pressure is greater than 1 million times that of the Earth's atmosphere at sea level.

To visualize the relative thickness of the Earth's layers, imagine that you could drive a magical vehicle at 100 kilometers per hour through the Earth, from its center to its surface. You would pass through the core in about 35 hours and the mantle in 29 hours. You would drive through oceanic crust in only 6 minutes and most continental crust in about half an hour. When you arrived at the surface, you would have spent the last 3½ hours traversing the entire asthenosphere and lithosphere.



Early calculations suggested that the core had the same density as gold, so for a number of years people held the false impression that vast riches lay at the heart of our planet. Alas, geologists eventually concluded that the core **consists of** a far less glamorous material, iron alloy (iron mixed with lesser amounts of oxygen, nickel, silicon, or sulfur). They arrived at this conclusion, in part, by comparing the properties of the core with the properties of metallic (iron) meteorites.



Key Words

Rock

Basalt

Granite

Magma

Crust

Mantle

core

Review Questions

- Draw a cross-sectional view of the Earth. List all the major layers and the thickness of each.
- Describe and explain the important differences between the lithosphere and the asthenosphere.