

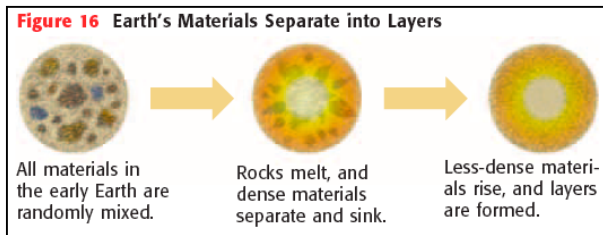
# Lect2:Structure of the Sun & Earth Notes: Chap 17.2, 17.3

What are the parts of a solar system?

What is the difference between rotation and revolution?

## Structure of the Earth

**Why is the Earth round?** The bigger an object gets, the more mass it has, the stronger gravity acts on it. When Earth was small, it was probably a lumpy rock. As more and more planetesimals collided into it, and it became more massive, the pressure becomes huge. So big in fact, that the rocks in the center become crushed and all bumps are “smoothed” over.



**Earth's Layers:** Have you ever tried mixing oil and vinegar? The heavier liquid sinks to the bottom and the lighter material moves to the top. It was the same with Earth. As its rocks melted, the heavy elements like nickel and iron sank to the core. Lighter materials moved to the surface.

**Earth's First Atmosphere:** Formed from the release of gases brought to Earth by \_\_\_\_\_ and \_\_\_\_\_. The atmosphere was probably a steamy atmosphere made of water vapor and \_\_\_\_\_. The surface was very hot, probably even molten (lava or liquid rock) in places.

**Earth's Second Atmosphere:** Earth's second atmosphere arose from impacts by comets and \_\_\_\_\_. The composition was mainly water and carbon dioxide. The carbon dioxide kept the planet very warm, much warmer than it is today.

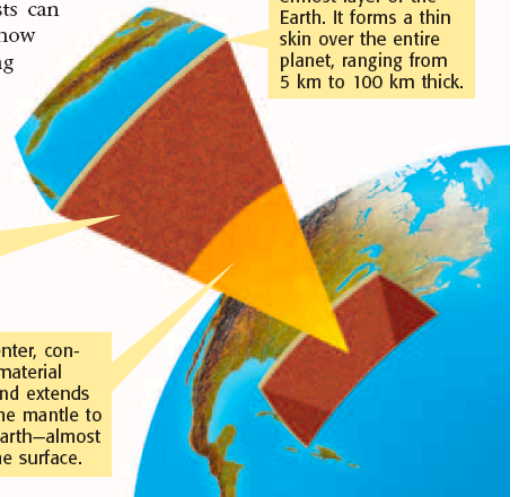
**The Earth's Interior** The Earth is divided into three distinct layers according to the composition of its materials. These layers are shown in **Figure 17**. Geologists can map the interior of the Earth by measuring how sound waves pass through the planet during earthquakes and underground explosions.

The **mantle** lies below the crust, extending from about 100 km to about 2,900 km below the surface. The mantle contains denser rocks than the crust.

The **core**, at the center, contains the heaviest material (nickel and iron) and extends from the base of the mantle to the center of the Earth—almost 6,400 km below the surface.

The **crust** is the outermost layer of the Earth. It forms a thin skin over the entire planet, ranging from 5 km to 100 km thick.

**Figure 17** The interior of the Earth consists of three layers.



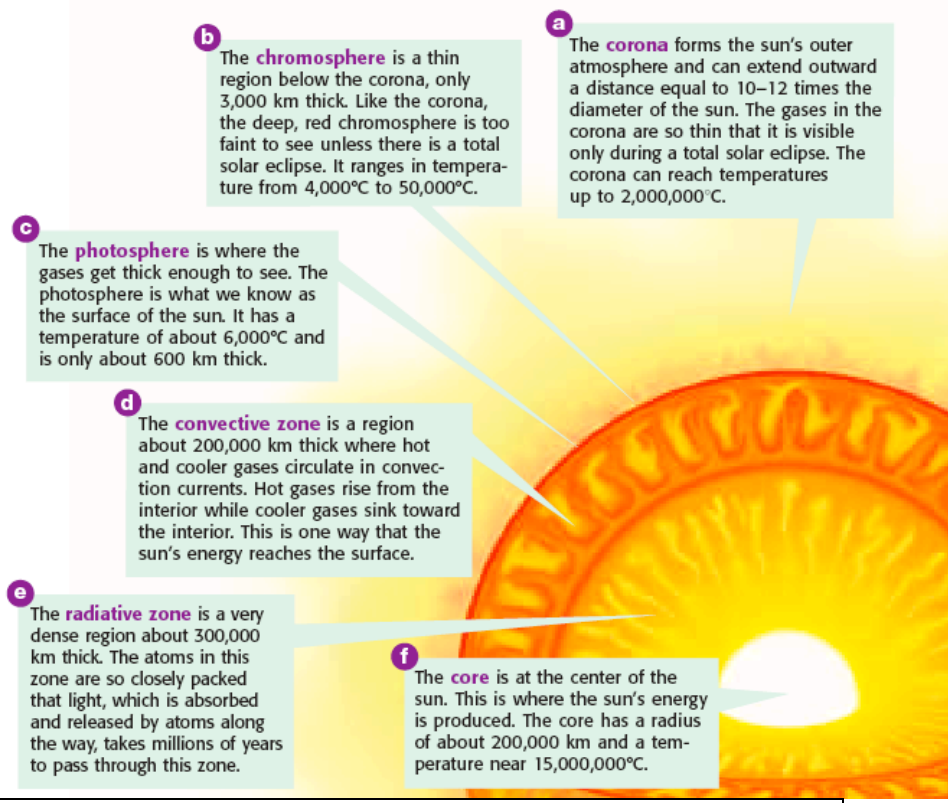
**Earth's Current Atmosphere:** At some point, life began appearing. Scientists think the first form of life was a primitive type of bacteria that lived on the ocean form. Oxygen didn't build up in the atmosphere for a long time...though scientists argue about why. As plants began to cover the land, oxygen levels increased from photosynthesis. Overall, it was the emergence of life that completely changed our atmosphere into the one we have today.

**Oceans & Continents:** After millions of years of rainfall, water began to cover the Earth and oceans formed. It took much longer for the continents to form. As the rocks in the Earth shifted (light materials rose and heavy materials sank to the core), the rock began to float and build up along the Earth's surface. Voila! You have continents!

## Structure of the Sun

**The Corona:** The outer atmosphere is called the \_\_\_\_\_. Corona is the Latin word for crown. See, this layer looks like a golden crown. This layer is so thin that you can only see it during a total \_\_\_\_\_. A solar eclipse is when the moon lines up directly between the Earth & the sun and blocks the sun from view.

**Energy production in the sun:** \_\_\_\_\_, a process where two or more nuclei join together to form a large nucleus, is the energy that powers the sun. This occurs in the \_\_\_\_\_ of the sun. The temperature in the core is over 15 million °C and the pressure is 340 billion times the air pressure on Earth. It takes *millions* of years for the energy to travel from the core to the sun's surface.



**Activity on the Surface**

The sun is basically a big ball of boiling and churning gas. As a result, it is constantly changing, both inside & out. The \_\_\_\_\_, the

visible surface of the sun, is the part that is changing. Circulation of the gases within the sun cause \_\_\_\_\_ to

reach out into space.

Never look directly at the sun. How can we see what's on the surface of the sun if we can't look directly at it? There are multiple techniques scientists use. One safe method is using a telescope to project its image onto a white surface.

\_\_\_\_\_ are cooler, dark spots on the sun's surface. They are related to changes in the magnetic properties of the sun.

\_\_\_\_\_ are giant storms on the sun's surface. They have temperatures up to 5 million degrees Celsius. The flares send out huge streams of particles from the sun.

**Hot Topics**

- The sun is a gaseous sphere made mostly of \_\_\_\_\_ and \_\_\_\_\_.
- The sun has 6 layers: core, radiative zone, convective zone, photosphere, chromosphere, and corona.
- The sun produces energy in its core by a process called \_\_\_\_\_.
- Magnetic changes within the sun cause sunspots and solar flares.

**Bill Nye: The Sun**

**True or False? Circle T or F**

1. The Earth and the sun are the same size. T or F
2. Our sun is a planet that reflects light. T or F
3. The light energy from the sun can be transferred into electrical energy by photovoltaic cells. T or F
4. Solar flares burn at a higher temperature than road flares. T or F
5. Melanin gives our skin some protection from the sun's ultra-violet radiation. T or F
6. A solar eclipse occurs when the sun comes between the Earth and the moon. T or F
7. Our sun is the source of energy that sustains all life here on Earth. T or F

**Multiple Choice: Circle the letter of the best answer**

8. Which of the following use energy either directly or indirectly from the sun?
  - A. Plants
  - B. Fuel
  - C. Human muscles
  - D. All of the above
9. Which of the following statements regarding the sun is true?
  - A. Most of the energy from the sun hits the Earth.
  - B. The sun gives off a lot of energy.
  - C. All the energy from the sun hits the Earth.
  - D. The sun does not provide enough energy to support all life on Earth.
10. Which of the following statements regarding sun spots are true?
  - A. Sun spots are dark, cool areas on the sun's surface.
  - B. Sun spots have high magnetic fields.
  - C. The size of a sun spot can be as large as the Earth.
  - D. All of the above.