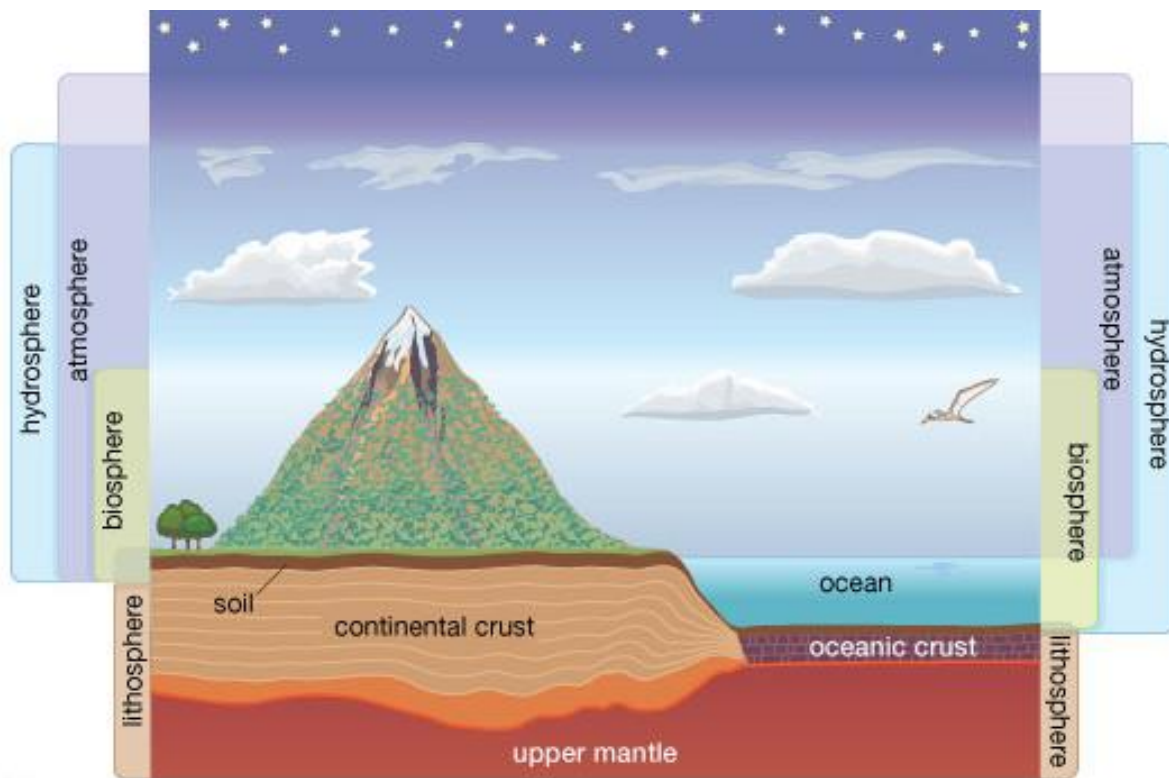


Earth Spheres

Everything in Earth's system can be placed into one of four major subsystems: land, water, living things, or air. These four subsystems are called "spheres." Specifically, they are the "lithosphere" (land), "hydrosphere" (water), "biosphere" (living things), and "atmosphere" (air). Each of these four spheres can be further divided into sub-spheres.

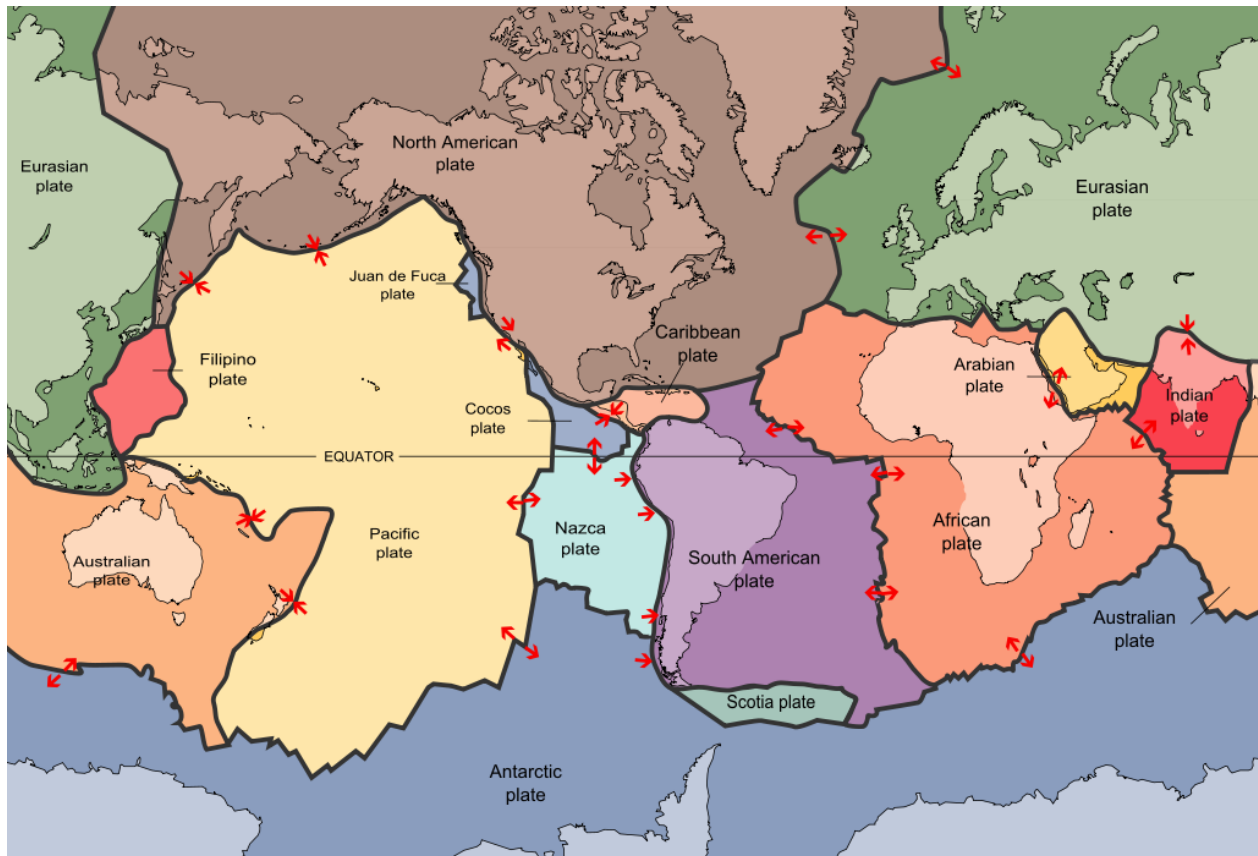
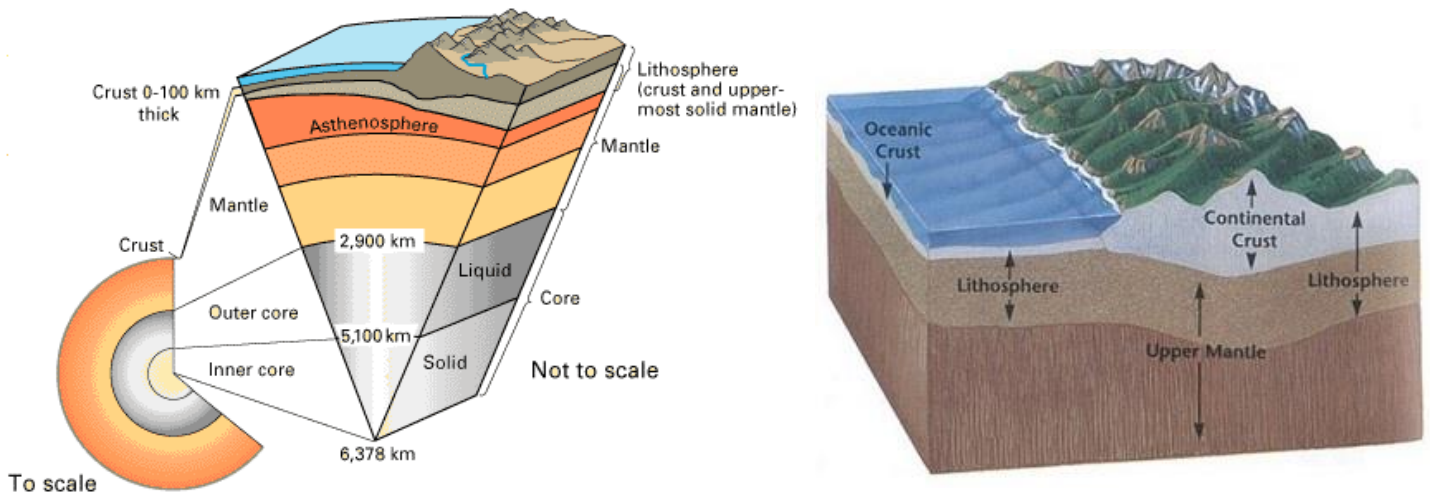


Lithosphere

The lithosphere is the solid shell of the planet Earth. That means the crust, plus the part of the upper mantle that behaves elastically on long time scales. Under the lithosphere there is the **asthenosphere**, the weaker, hotter, and deeper part of the upper mantle.

There are two types of lithosphere:

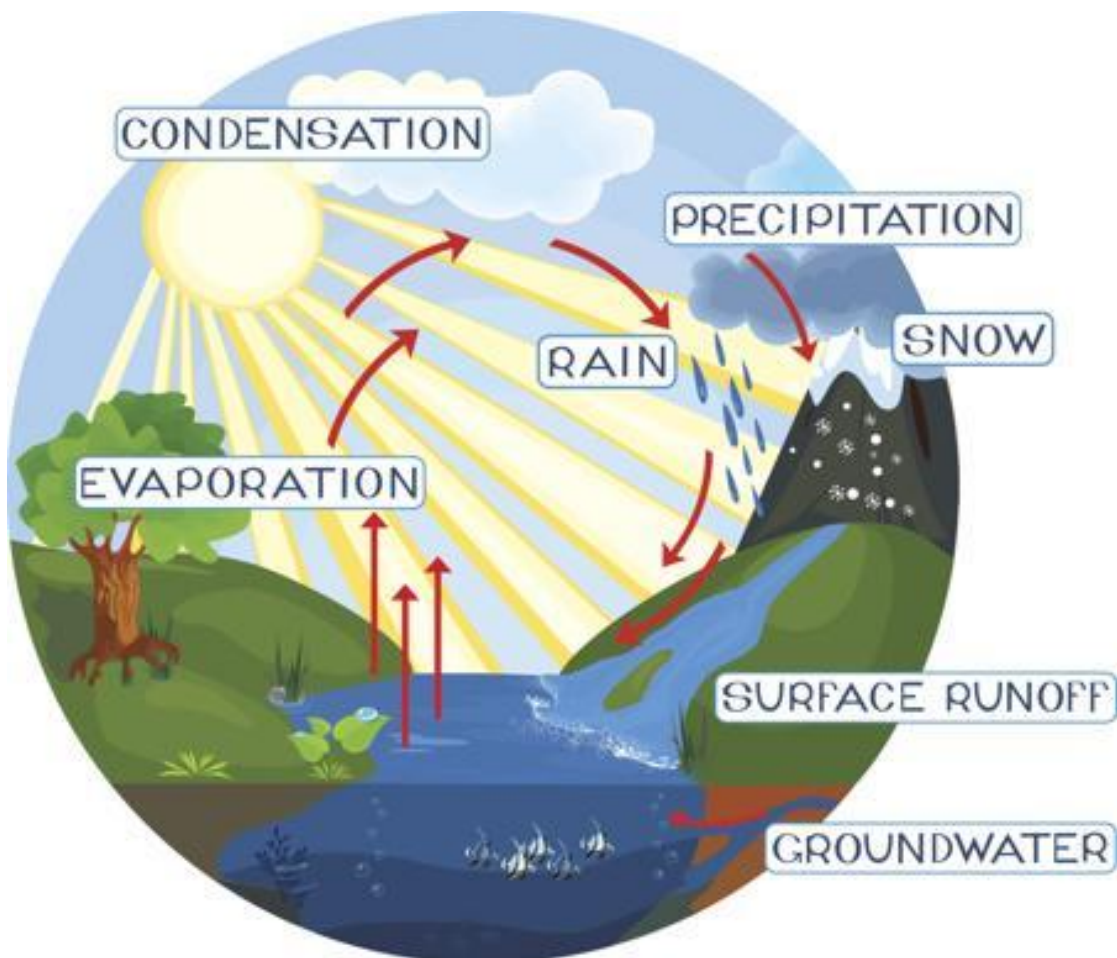
- 1- **Oceanic lithosphere**, which is associated with oceanic crust and exists in the ocean basins. Oceanic lithosphere is typically about 50–100 km thick
- 2- **Continental lithosphere**, which is associated with continental crust. Continental lithosphere has a range in thickness from about 40 km to perhaps 200 km.



Hydrosphere

A hydrosphere is the total amount of water on a planet. The hydrosphere includes water that is on the surface of the planet, underground, and in the air. A planet's hydrosphere can be liquid, vapor, or ice. On Earth, liquid water exists on the surface in the form of oceans, lakes and rivers. It also exists below ground as groundwater, in wells and aquifers. Water vapor is most visible as clouds and fog.

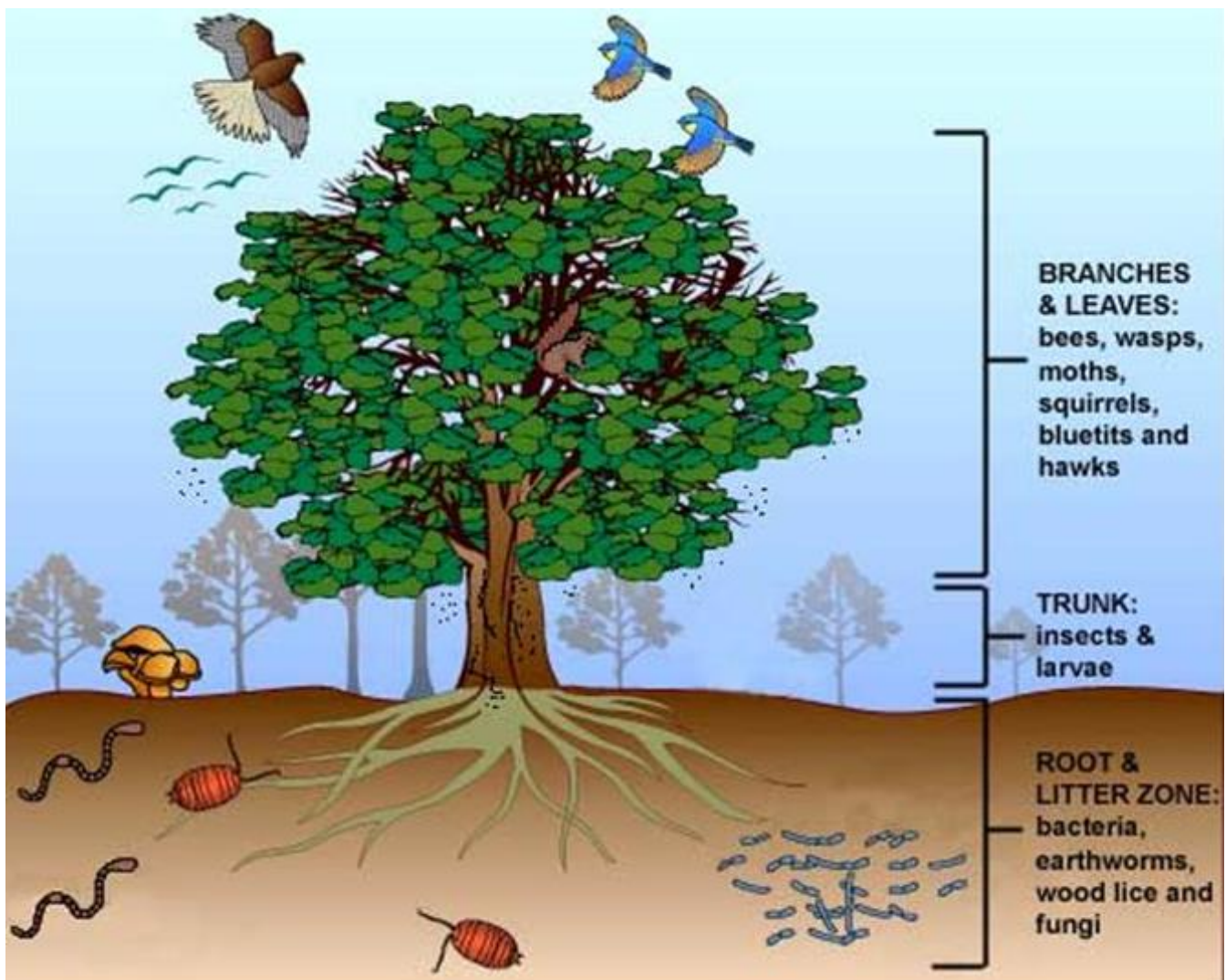
Water moves through the hydrosphere in a cycle. Water collects in clouds, then falls to Earth in the form of rain or snow. This water collects in rivers, lakes and oceans. Then it evaporates into the atmosphere to start the cycle all over again. This is called the water cycle.



Biosphere

The biosphere also known as the ecosphere, is the worldwide sum of all ecosystems. The two joined words are "bio" and "sphere". It can also be termed as the zone of life on Earth. The biosphere contains all the planet's living things. This sphere includes all of the microorganisms, plants, and animals of Earth.

It is impossible to detect from space each individual organism within the biosphere. However, biomes can be seen from space. For example, the image above distinguishes between lands covered with plants (shown in shades of green) and those that are not (shown in brown).



Atmosphere

The atmosphere contains all the air in Earth's system. It extends from less than 1 m below the planet's surface to more than 10,000 km above the planet's surface. The upper portion of the atmosphere protects the organisms of the biosphere from the sun's ultraviolet radiation. It also absorbs and emits heat.

The atmosphere of Earth is mostly composed of nitrogen (about 78%), oxygen (about 21%), argon (about 0.9%) with carbon dioxide and other gases in trace amounts.

Earth has four primary atmosphere layers, from highest to lowest, the five main layers are:

- 1- Exosphere: > 400 km
- 2- Thermosphere: 50 to 400 km
- 3- Mesosphere: 30 to 50 km
- 4- Stratosphere: 10 to 30 km
- 5- Troposphere: 0 to 10 km

