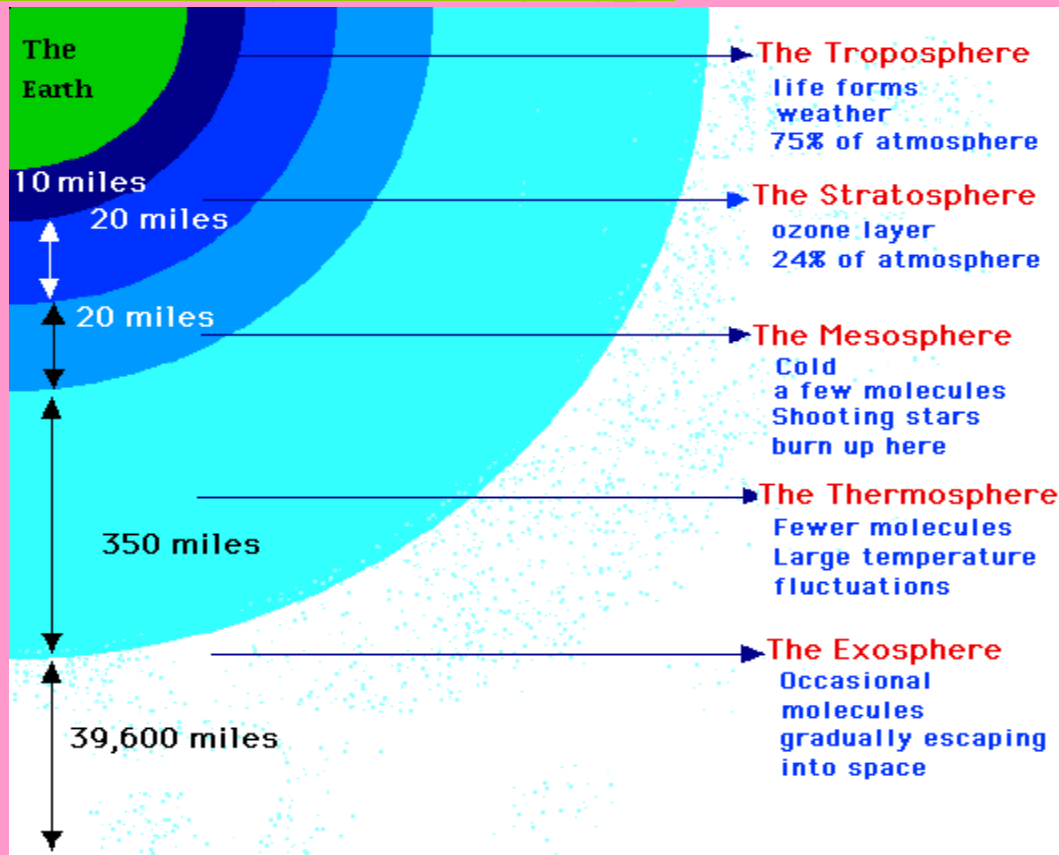
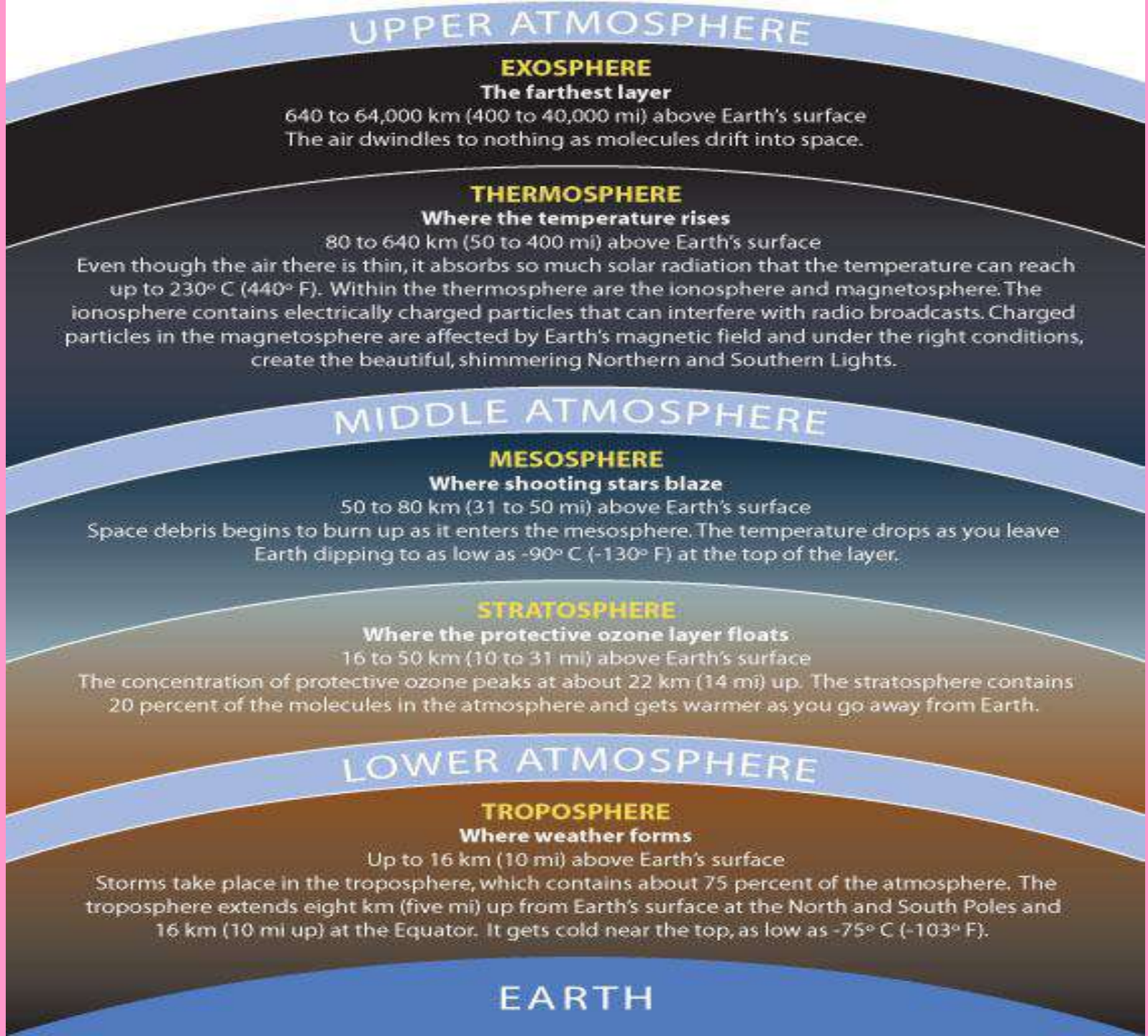
Skydiver breaks speed of sound in historic jump from edge of space

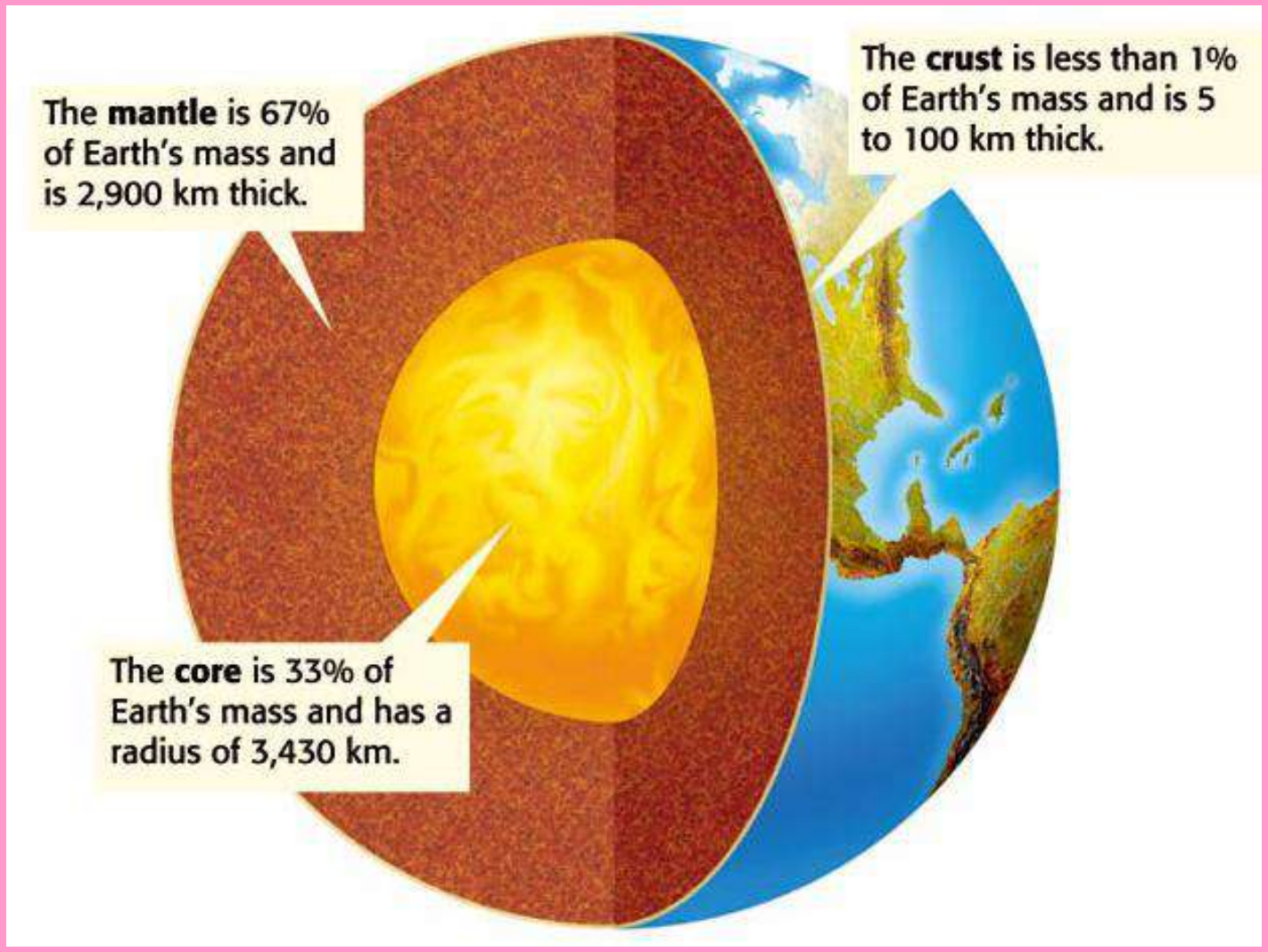
- http://abcnews.go.com/Technology/felix-baumgartner-daredevils-supersonic-leap-breaks-records/story?id=17465225#.UHthWK7Z2So
- http://www.telegraph.co.uk/science/space/9607604/Skydiver-Felix-Baumgartner-attempts-to-break-sound-barrier-live.html
- http://www.cnn.com/2012/10/14/us/skydiver-record-attempt/index.html?hpt=hp_c1




UPPER ATMOSPHERE
EXOSPHERE
The farthest layer
640 to 64,000 km (400 to 40,000 mi) above Earth's surface
The air dwindles to nothing as molecules drift into space.
THERMOSPHERE
Where the temperature rises
80 to 640 km (50 to 400 mi) above Earth's surface
Even though the air there is thin, it absorbs so much solar radiation that the temperature can reach up to 230° C (440° F). Within the thermosphere are the ionosphere and magnetosphere. The ionosphere contains electrically charged particles that can interfere with radio broadcasts. Charged particles in the magnetosphere are affected by Earth's magnetic field and under the right conditions, create the beautiful, shimmering Northern and Southern Lights.
MIDDLE ATMOSPHERE
MESOSPHERE
Where shooting stars blaze
50 to 80 km (31 to 50 mi) above Earth's surface
Space debris begins to burn up as it enters the mesosphere. The temperature drops as you leave Earth dipping to as low as -90° C (-130° F) at the top of the layer.
STRATOSPHERE
Where the protective ozone layer floats
16 to 50 km (10 to 31 mi) above Earth's surface
The concentration of protective ozone peaks at about 22 km (14 mi) up. The stratosphere contains 20 percent of the molecules in the atmosphere and gets warmer as you go away from Earth.
LOWER ATMOSPHERE
TROPOSPHERE
Where weather forms
Up to 16 km (10 mi) above Earth's surface
Storms take place in the troposphere, which contains about 75 percent of the atmosphere. The troposphere extends eight km (five mi) up from Earth's surface at the North and South Poles and 16 km (10 mi up) at the Equator. It gets cold near the top, as low as -75° C (-103° F).
EARTH

Inside the Earth
Objectives

- **Identify** the layers of the Earth by their composition.
- **Identify** the layers of the Earth by their physical properties.
- **Describe** a tectonic plate.
- **Explain** how scientists know about the structure of Earth's interior.


The **mantle** is 67% of Earth's mass and is 2,900 km thick.
The **crust** is less than 1% of Earth's mass and is 5 to 100 km thick.
The **core** is 33% of Earth's mass and has a radius of 3,430 km.

I. The Composition of the Earth

A. The Crust The outermost layer of the Earth is the crust. The crust is 5 to 100 km thick. It is the thinnest layer of the Earth.

B. The Mantle The layer of the Earth between the crust and the core is the mantle. The mantle is much thicker than the crust and contains most of the Earth's mass.

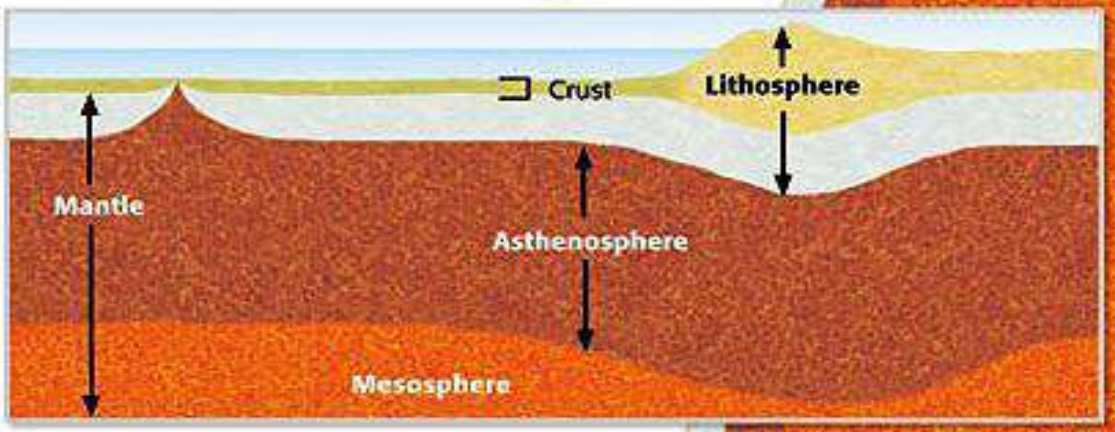
C. The Core The layer of the Earth that extends from below the mantle to the center of the Earth is the core. Scientists think that the Earth's core is made mostly of iron.

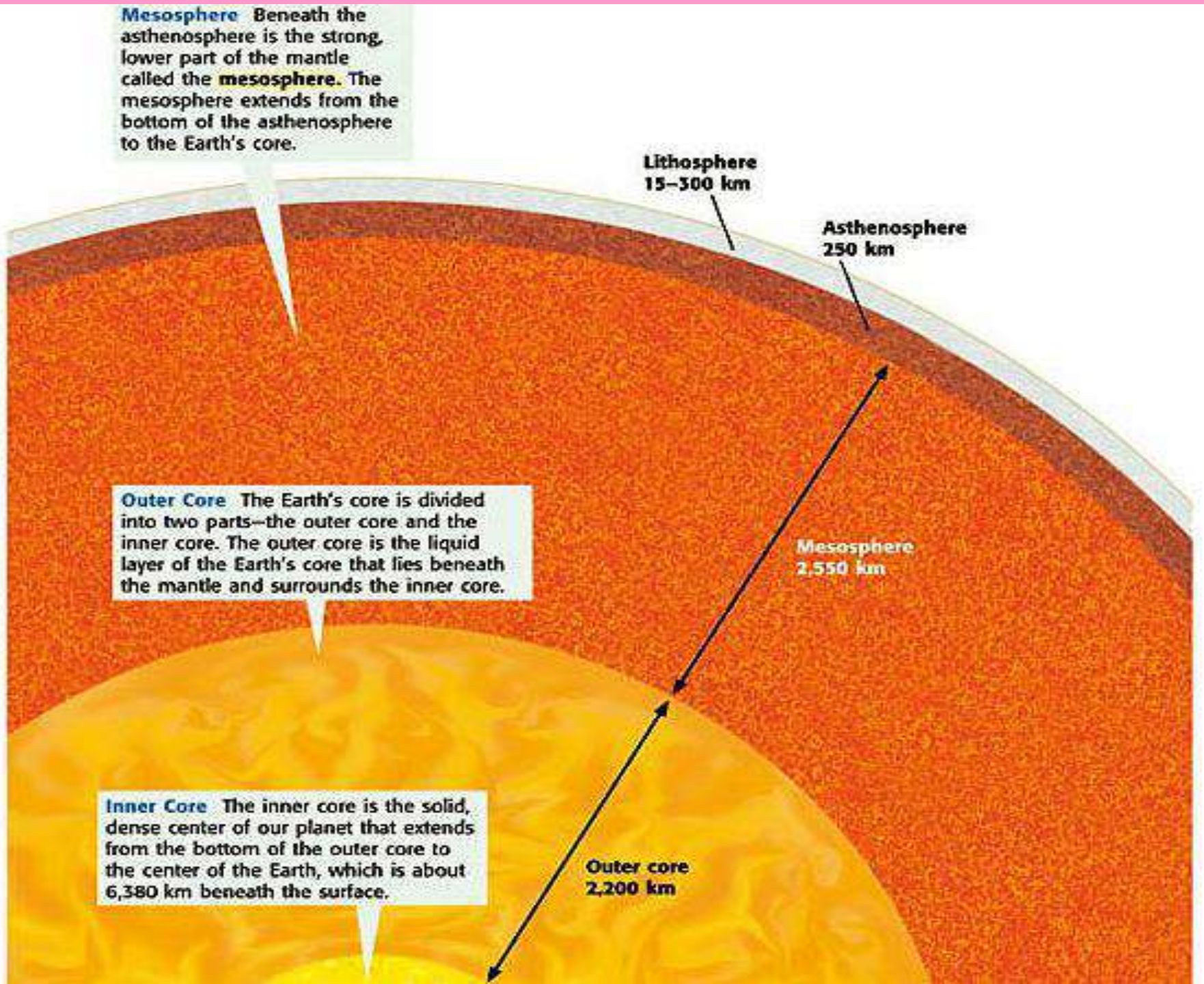
II. The Physical Structure of the Earth

A. Five Physical Layers The Earth is divided into five physical layers— the lithosphere, asthenosphere, mesosphere, outer core, and inner core.

Lithosphere The outermost, rigid layer of the Earth is the **lithosphere.** The lithosphere is made of two parts—the crust and the rigid upper part of the mantle. The lithosphere is divided into pieces called *tectonic plates.*

Asthenosphere The **asthenosphere** is a plastic layer of the mantle on which pieces of the lithosphere move. The asthenosphere is made of solid rock that flows very slowly.



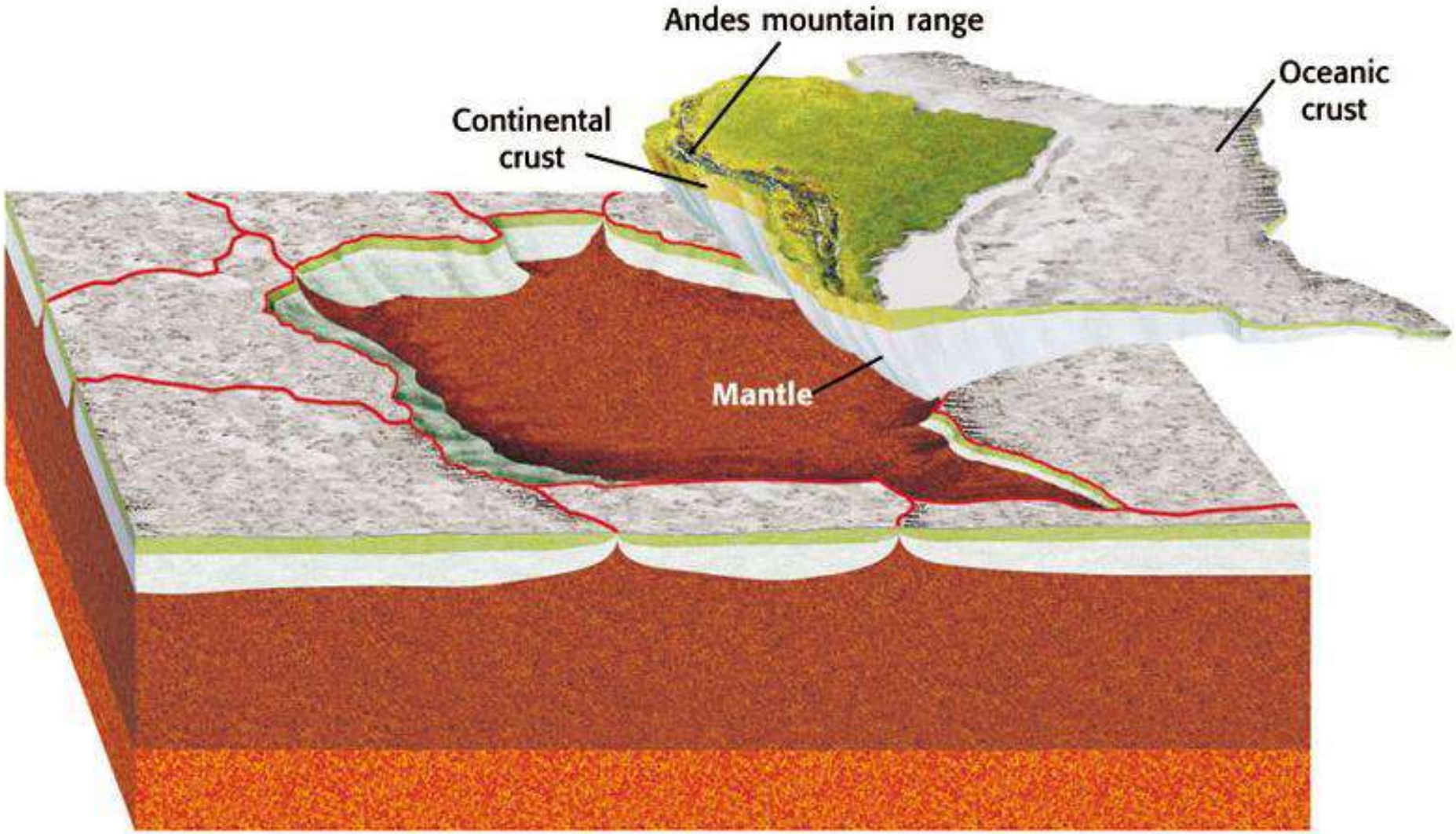

Mesosphere Beneath the asthenosphere is the strong, lower part of the mantle called the mesosphere. The mesosphere extends from the bottom of the asthenosphere to the Earth's core.
Lithosphere 15–300 km
Asthenosphere 250 km
Outer Core The Earth's core is divided into two parts—the outer core and the inner core. The outer core is the liquid layer of the Earth's core that lies beneath the mantle and surrounds the inner core.
Mesosphere 2,550 km
Inner Core The inner core is the solid, dense center of our planet that extends from the bottom of the outer core to the center of the Earth, which is about 6,380 km beneath the surface.
Outer core 2,200 km

III. Tectonic Plates

A. A Giant Jigsaw Puzzle Each tectonic plate fits together with the tectonic plates that surround it. The lithosphere is like a jigsaw puzzle, and the tectonic plates are the pieces.

B. A Tectonic Plate Close-up Many tectonic plates not only consist of the upper part of the mantle but also consist of both oceanic crust and continental crust.

C. Like Ice Cubes in a Bowl of Punch Tectonic plates "float" on the asthenosphere. The plates cover the surface of the asthenosphere, and they touch one another and move around.


Andes mountain range
Oceanic crust
Continental crust
Mantle

IV. Mapping the Earth's Interior

A. Seismic Waves When an earthquake happens, vibrations called *seismic waves* are produced. Seismic waves travel at different speeds depending on the density and composition of material that they pass through.

B. Seismographs When an earthquake happens, machines called *seismographs* measure the times at which different seismic waves arrive and record the differences in their speeds. Seismologists can then use these measurements to calculate the density and thickness of Earth's layers.