

Layers of the Earth

<http://science.discovery.com/videos/greatest-discoveries-earth-science/>

Earth's Interior

- Earth's interior consists of three major zones. Each is defined by its chemical composition:

Crust

Mantle

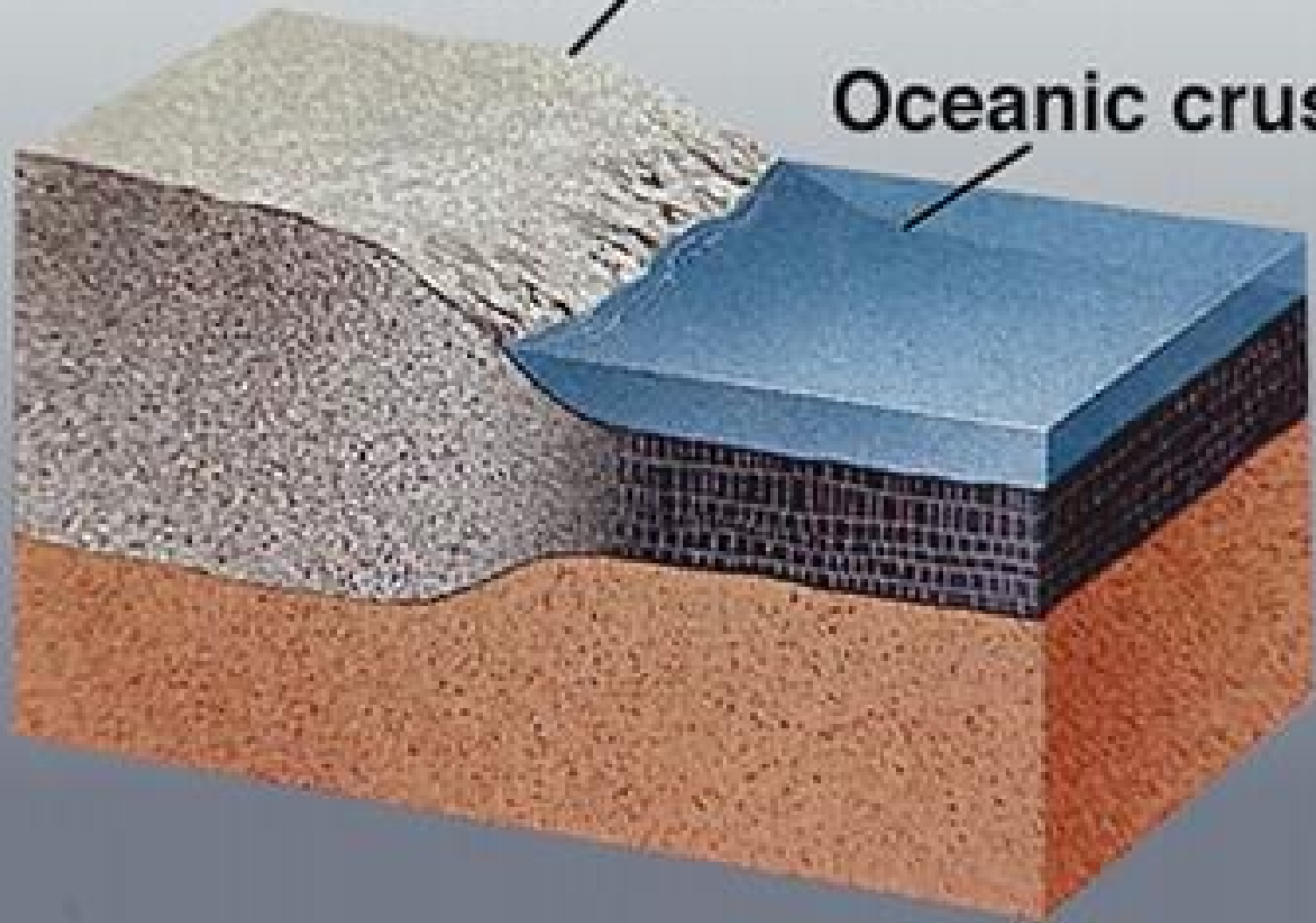
Core

The Crust

- Where we live—solid rock
- Thin, rocky outer layer
- Divided into two types: continental and oceanic
 - **Continental**
 - 8-75 km thick (avg. 40 km)—thick!
 - consists of mostly granitic rocks.
 - **Oceanic**
 - Roughly 7 km thick---thin!
 - Consists of mostly basalt and gabbro

Continental crust

Oceanic crust



True or False?

- **The Earth's crust can be categorized two ways:**
 - **Oceanic and Continental**
- **Continental crust is thinner than Oceanic crust.**
- **The crust is the thick, rocky, innermost layer of the earth.**

The Mantle:

- **82% of earth's volume**
- **Solid, rocky shell that sometimes acts like a liquid, plastic-like--flows.**
- **Extends to a depth of 2890 km.**
- **Dominant rock in upper mantle is peridotite.**
- **Composed mostly of Silicon and Oxygen**

Lets See How the Mantle Moves

- It's called
Convection!

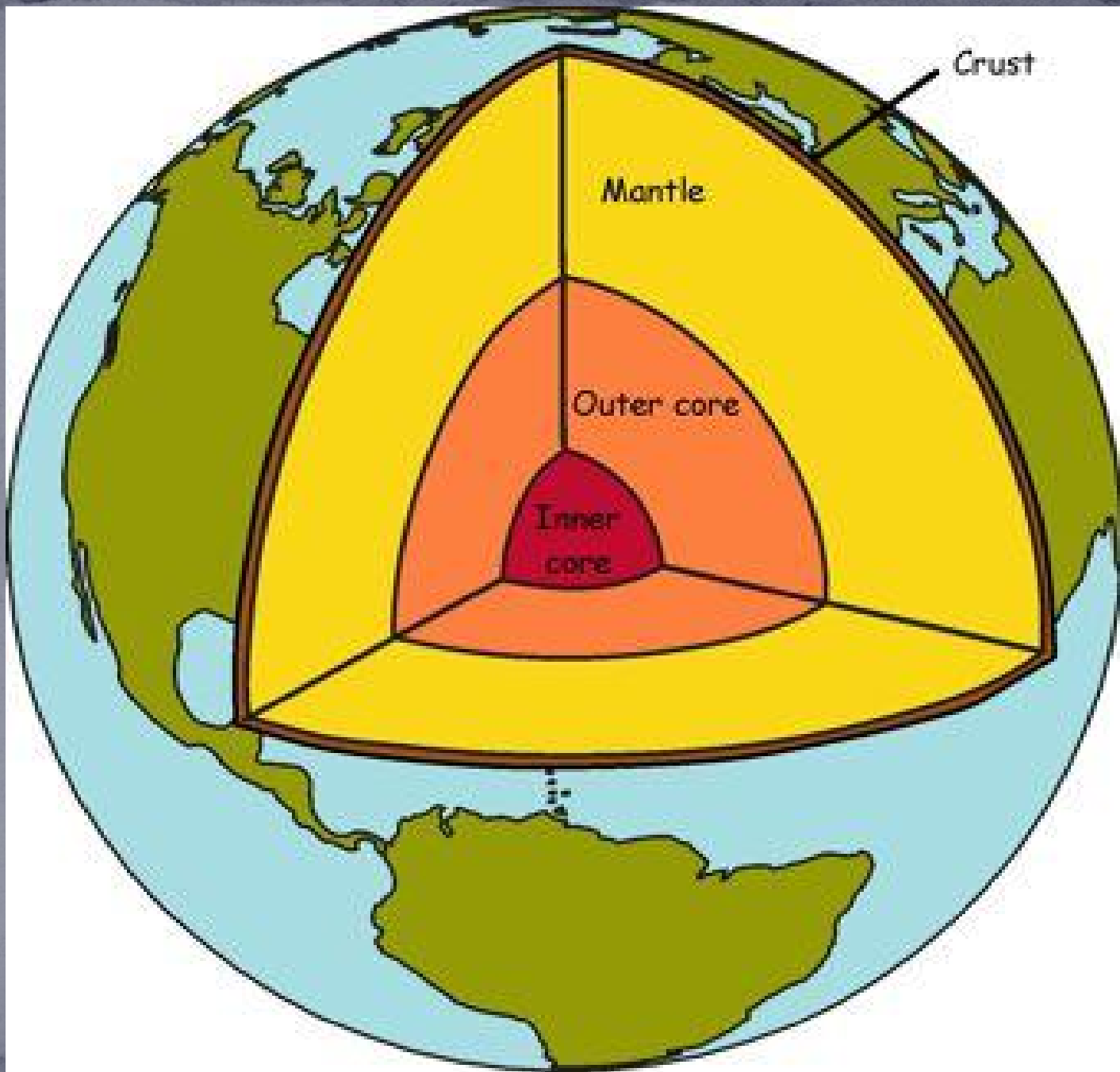


True or False?

- **The mantle is made up of a material that can act like a solid and a liquid.**
- **The mantle is the smallest or thinnest layer of the earth.**

The Core:

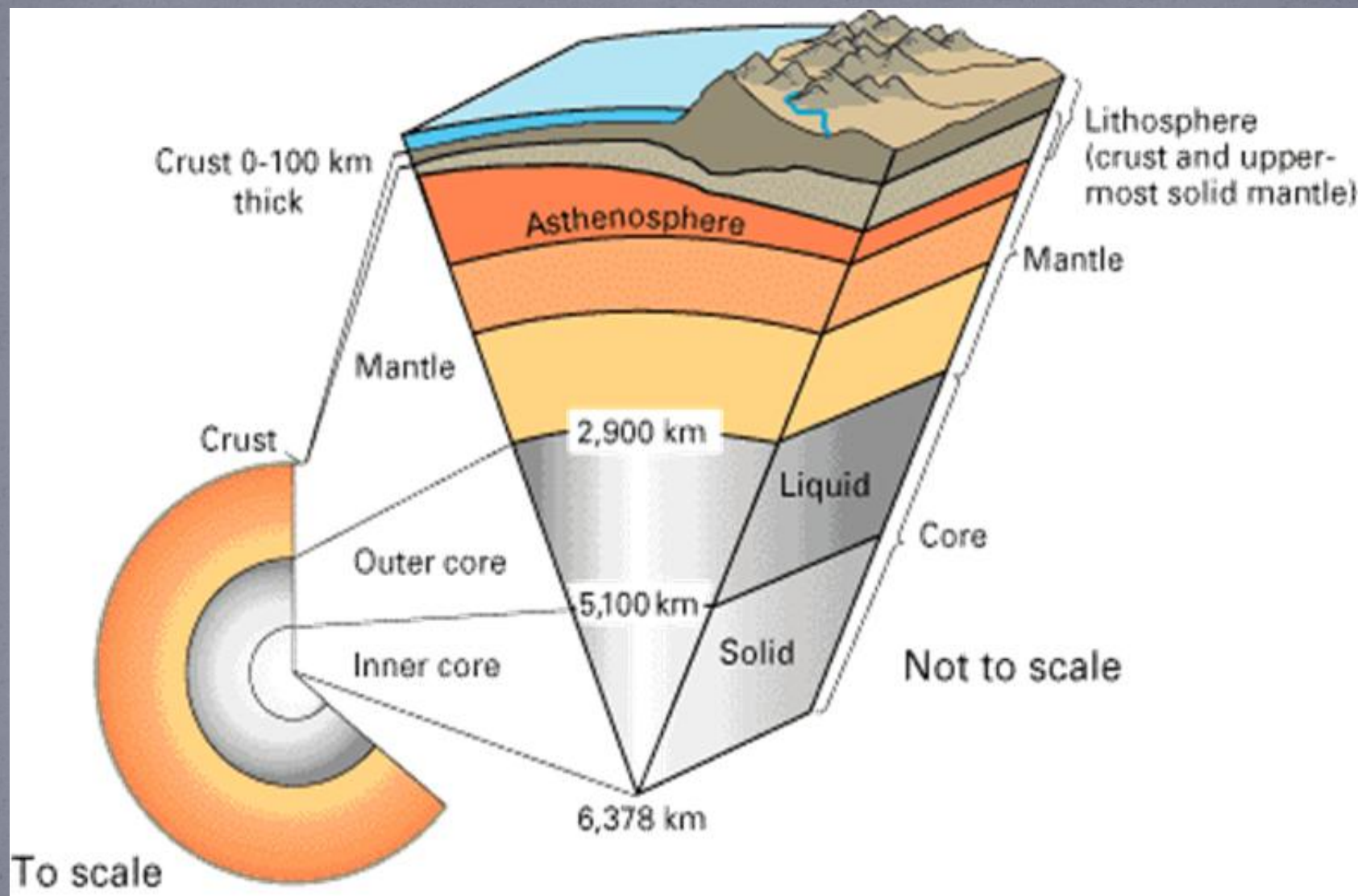
- A sphere composed of an iron-nickel alloy.
- Similar in composition to metallic meteorites.
- Temperature 5000-7000° C



Layers:

- **Lithosphere:** the crust and upper portion of the mantle (solid part). Around 100km thick.
- **Asthenosphere:** also part of the upper mantle. Temperature and pressure cause the rocks to easily deform (like hot wax or silly putty).
- **Lower mantle:** From 660 km down to the base of the mantle. Rigid layer. Rocks are still hot and can flow gradually.

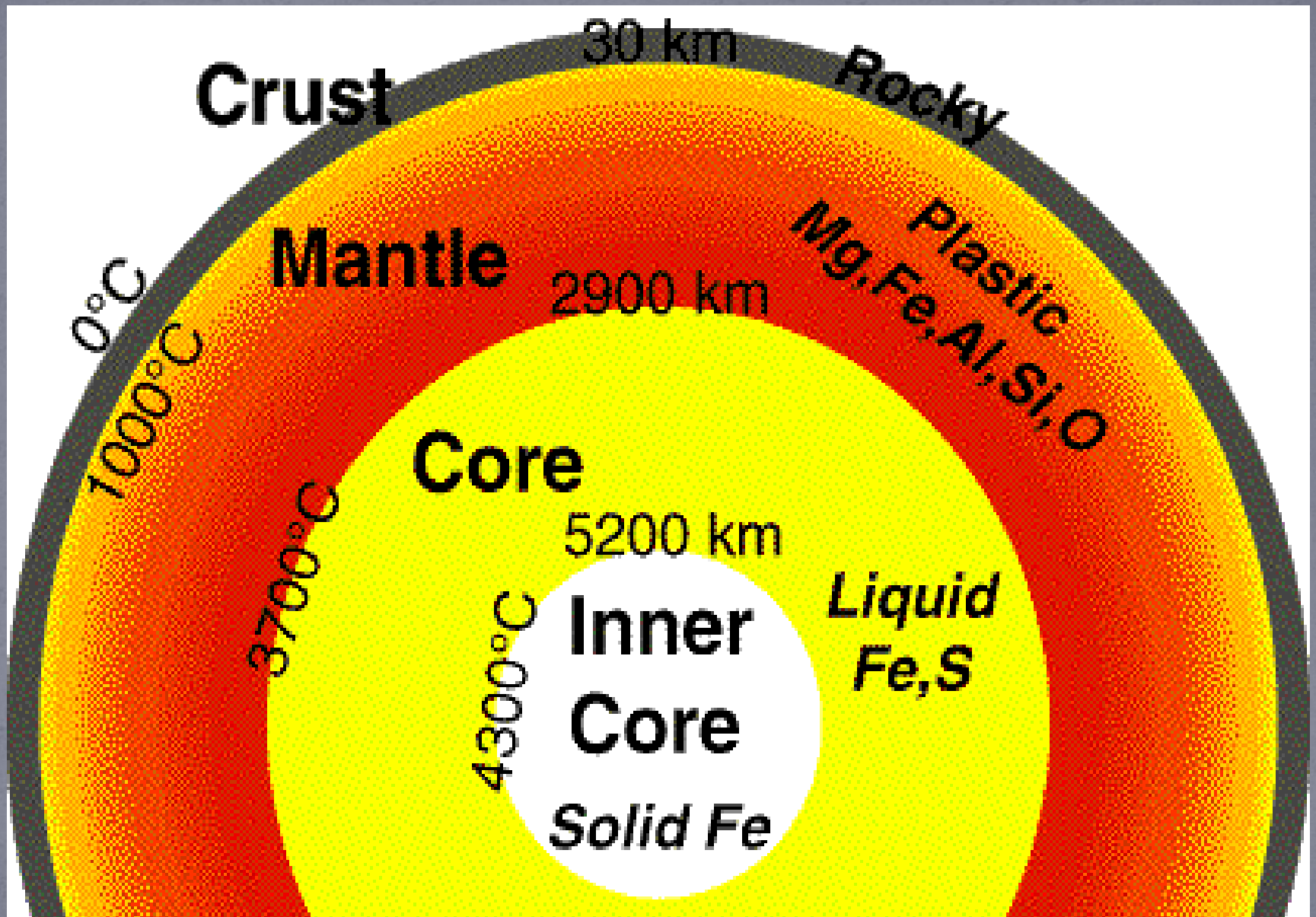
- **Outer core: liquid layer 2260 km thick. This layer is thought to generate the Earth's magnetic field.**
- **Inner core: sphere with a radius of 1220 km. Despite high temperature, this area is solid because of the intense pressure.**



True or False?

- **The lithosphere is composed of the crust and the upper, solid portion of the mantle.**
- **The core is composed of two parts.**
- **The inner core is liquid and the outer core is solid.**

- **Temperature and pressure increases as you go further down the layers.**
- **If we can't see inside, how do scientists know?**



Seismic Waves:

- **Vibrations that travel through the earth.**
 - **Vibrations are caused by earthquakes.**
 - **2 main types: P waves and S waves.**
 - **S waves won't pass through liquid.**
-
- **Mohorovicic discontinuity: area between crust and mantle where the velocity of seismic waves increases abruptly.**

Interesting facts:

- **Density=mass/volume**
- **Density of the earth=5.5 g/cm³**
- **Neither the sun's heat nor winter cold penetrates the Earth below 20 meters.**
- **At 20 m and above, the temperature is relatively the same as the surface temperature (except where there are volcanoes and hot springs).**
- **Below 20m, the temperature increases 1° every 40 m.**

True or False?

- **Temperature and pressure decrease as you go farther down into the layers of the earth.**
- **Seismic waves are vibrations that travel through the earth. They are caused by earthquakes.**

