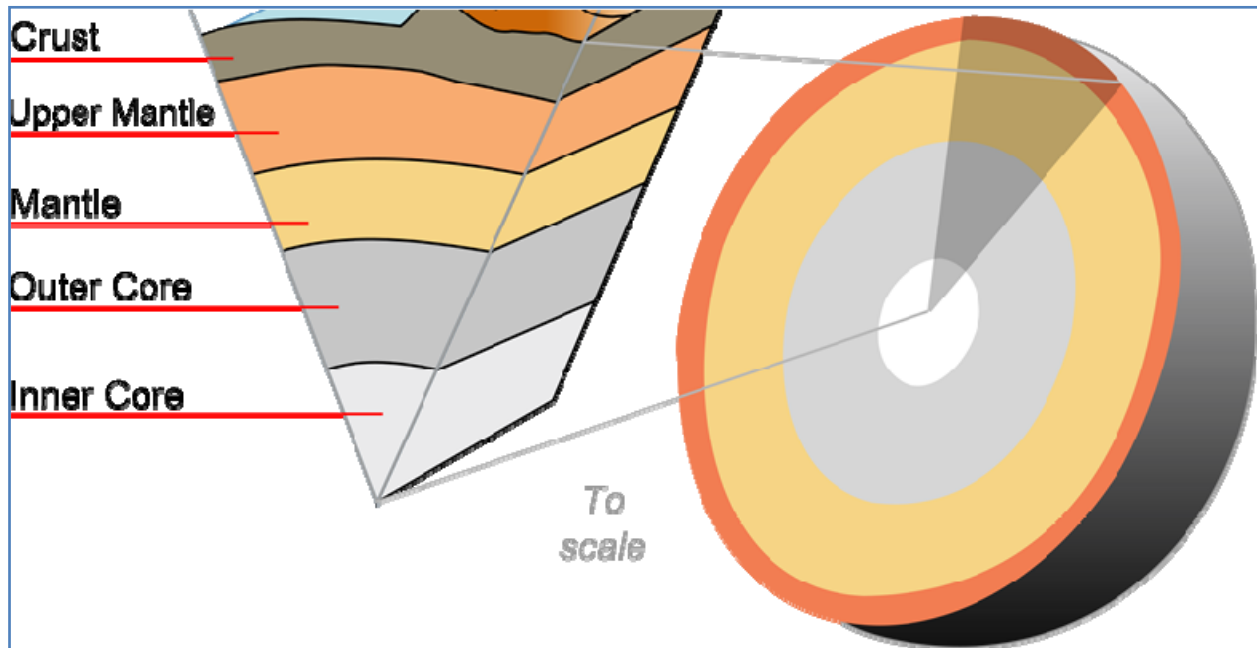


Earth's Structures

Approximately 4.5 billion years ago, the Earth and the solar system began to form from clouds of dust that resulted from the Big Bang. Scientists estimate that the Big Bang, which is thought to have been a great cosmic explosion of matter and energy from a single point, occurred about 13.7 billion years ago. From that explosion, dust particles began to collide and clump together. These clumps collided with other clumps until eventually, the Earth and other planets were formed.

The early Earth was likely extremely hot and the rock was molten in nature. This allowed the materials that make up the Earth to settle according to their density. The most dense material would have flowed toward the center of the Earth while lighter materials floated to the surface. The inner most layer, or core, is made mostly of iron. The pressure at the core is more than 1 million times greater than it is at the surface and the temperature is estimated to be over 7,200 F. The core has a solid inner core and a liquid outer core. The liquid outer core swirls around the solid inner core and scientists believe that it is this motion that creates Earth's magnetic field.

The layer surrounding the core is called the mantle. The mantle is also extremely hot. It is this heat that allows the solid rock to flow like a thick liquid. One of the outer most layers of the mantle is the asthenosphere. This portion of the mantle is very viscous

allowing the plates to move across its surface. Beyond the asthenosphere is the lithosphere. The lithosphere consists of the upper most portion of the mantle which is solid and the crust. The crust is an extremely thin layer compared to the mantle and is often compared to the skin of an apple versus the flesh within. The composition and characteristics of the crust that makes up the continents and that which makes up the sea floor.

Oceanic crust consists of a mineral called basalt while most continental rocks are types of granite. Oceanic crust is denser than continental crust, although it is thinner. Both continental and oceanic crust "float" on the Earth's mantle. However, because oceanic crust is more dense, it does not float as high on the surface of the mantle as does the continental crust. This is why continents are typically above the water level while oceanic crust is below sea level. Oceanic crusts and continental crusts also differ greatly in age. The oldest oceanic rocks are less than 200 million years old while continental rocks can be as old as 3.8 billion years!

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