Earth’s Structure

6.E.2.1 Summarize the structure of the Earth, including the layers, the mantle and core based on the relative position, composition and density.

• Geologist use indirect observations when they try to learn about Earth’s interior. (A geologist is a scientist who studies the history of the earth and its life, especially as recorded in rocks.) Although the best way to find out what’s inside Earth might be to dig a tunnel to its center, that isn’t possible.

• The deepest mines in the world only scratch Earth’s surface. A tunnel would need to be more than ___________ km (3,728 miles) deep to reach the center, so geologists must use indirect observations to gather clues about what Earth’s interior is made of and how it is structured. The indirect evidence includes information learned by studying earthquakes and rocks that are exposed at Earth’s surface.

• Scientist or geologist use indirect observations to gather clues about what the Earth’s interior is made of and how it is structured. Geologist studies:
  1. _______________________
  2. _______________________

1. Waves – The speed of waves traveling through the Earth depends on the density and nature of the material they are traveling through. For example, a wave travels faster in solid rock than it does in a liquid. By studying the speed of these waves and the paths they take, geologists uncover clues as to how the planet is put together.

2. Rock Clues – Another clue to what’s inside Earth comes in the form of certain rocks found in different places on Earth’s surface. These rocks are made of material similar to what is thought to exist deep inside Earth. The rocks formed far below the surface. Forces inside Earth pushed them closer to the surface, where they eventually were exposed by erosion. The seismic clues and the rock clues suggest that Earth is made up of layers of different kinds of materials.

Earth’s Layers

• Based on evidence from earthquake waves and exposed rocks, scientists have produced a model of Earth’s interior. The model shows that Earth’s interior has at least four distinct layers—the ___________, the _____________, the ________________, and the ______________._

Earth’s structure is similar in some ways to the structure of a peach. A peach has a thin skin covering the thick, juicy part that you eat. Under that is a large pit that surrounds a seed.

Inner Core

• The pit and seed are similar to Earth’s core. Earth’s core is divided into two distinct parts—one that is liquid and one that is solid. The innermost layer of Earth’s interior is the solid inner core. This part of the core is dense and composed mostly of __________ iron. When seismic waves produced by earthquakes reach this layer they speed up, indicating that the inner core is solid.

• Conditions in the ____________ core are extreme compared to those at the surface. At about 5,000°C, the inner core is the hottest part of Earth. Also, because of the weight of the surrounding rock, the core is under tremendous pressure. Pressure, or the force pushing on an
area, increases the deeper you go beneath Earth’s surface. Pressure increases because more material is pushing toward Earth’s center as a result of gravity. The inner core, at the center of Earth, experiences the greatest amount of pressure.

**Outer Core**
- The ________________ lies above the inner core and is thought to be composed mostly of molten metal. The outer core stops one type of seismic wave and slows down another. Because of this, scientists have concluded that the outer core is a liquid. The location of the outer core is similar to the location of the pit in the peach model. Even the wrinkled surface of the pit resembles the uneven nature of the boundary between Earth’s outer core and its mantle as indicated by seismic studies.

**Mantle**
- The layer in Earth’s interior above the outer core is the _________________. In the peach model, the mantle would be the juicy part of the peach that you would eat. The mantle is the largest layer of Earth’s interior. Even though it’s solid, the mantle flows slowly, similar to putty.

**Crust**
- Earth’s outermost layer is the _______________. In the model of the peach, this layer would be the fuzzy skin of the peach. Earth’s crust is thin when compared to the other layers, though its thickness does vary. It is thinnest under the oceans and thickest through the continents. All features on Earth’s surface are part of the crust.

**Earth’s Structure**
- Although Earth’s structure can be divided into four basic layers, it also can be divided into other layers based on physical properties that change with depth beneath the surface. Density, temperature, and pressure are properties that are lowest in the crust and greatest in the inner core.

**Earth Is Made Up Of Many Layers**
(The ________________ is composed of crust and uppermost mantle. The _________________ is a plastic like layer upon which the plates of the lithosphere float and move.)
- _________________ – rigid layer of Earth about 100 km thick, made up the crust and a part of the upper mantle.
- _________________ – lies beneath the lithosphere and consists of partially molten rock.
- _________________ – the outermost layer of Earth’s lithosphere that is found under the oceans.
- _________________ – the relatively thick part of the earth's crust that forms the large landmasses.