**Measurements for Earth’s Interior Structure**

**Pie-Slice Activity**

|  |  |  |
| --- | --- | --- |
|  | **Actual Value** | **Scale Value**  **(1:10 million scale)**  **Find the value in cm** |
| Radius of the Earth | 6371 km |  |
| Average depth to base of the crust | 35 km |  |
| Average depth to base of lithosphere | 100 km |  |
| Depth to base of upper mantle | 670 km |  |
| Depth to core-mantle boundary | 2885 km |  |
| Depth to outer core-inner core boundary | 5155 km |  |

\*Measure downwards from the surface after drawing the arc.

**Modeling Convection Currents**

**BACKGROUND INFORMATION:**

The movement of heat from a warmer object or area to a cooler object or area is called heat transfer.  Convection is heat transfer that takes place as the result of currents.  Convection takes place within a fluid.  Large amounts of heat are transferred through Earth via convection currents.  Some of these currents are in Earth’s liquid outer core.  Other convection currents are present in the mantle.

Convection currents in the mantle form and transfer heat as rock slowly rises toward the top of the mantle.  The rock is still hard, but it flows very slowly like a fluid.  As the rock rises, it cools and sinks back down into the mantle.  As with all convection currents, convection in Earth’s mantle is the result of three things: heating and cooling of rock material, changes in the rock’s density, and the force of gravity.

Because it is not possible to directly observe the mantle, scientists sometimes make models to study how this part of Earth moves.  Based on their findings, they make inferences and draw conclusions.

**Convection Demonstration Questions**

1. Define convection.

1. Describe what happened to the colored water and to the pieces of paper after the holes were punched in the material covering the beaker.

1. In which layer of the Earth is convection occurring?
2. How does convection of this layer affect the tectonic plates?

1. What part of your model represented the tectonic plates?  What part represented the asthenosphere in the mantle?

1. What happened to the model tectonic plates?  (Did they all move together or apart? Did some move together and some move apart?)

1. How can you explain the pattern of movement above using what you know about convection?