

Question: What causes convection currents in Earth's mantle?

## Convection and the Mantle

To explain how heat moves from Earth's core through the mantle, you need to know how heat is transferred.

There are three types of heat transfer:

**Radiation** - the transfer of energy through empty space; has no direct contact between heat source and an object.

Example: Sunlight warming Earth's surface

**Conduction** - heat transfer by direct contact of particles of matter. Example: Metal spoon heating up in a pot of hot soup.

**Convection** - transfer of heat by the movement of a heated fluid (includes liquids and gases).

Heat transfer by convection is caused by differences in temperature and density within a fluid.

→ **Density** - measure of how much mass there is in a volume of a substance.

Example: heating water on a stove - as water on bottom gets hot, it expands, becomes less dense and rises; when the surface water starts warming up it becomes denser and moves to bottom causing a **convection current**, or the flow that transfers heat

Convection currents flow in the mantle - heat source is the Earth's core and from the mantle itself. These currents have been acting like a conveyor belt moving the lithosphere above for the past four billion years!

