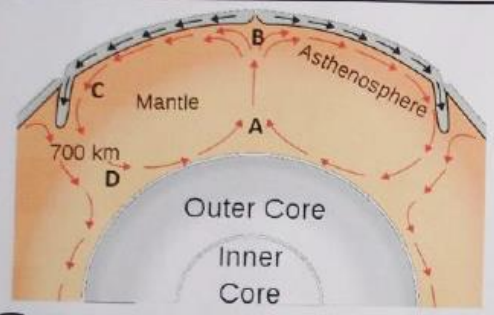
Section 2: Convection and the Mantle

Answer: Heat from the core and the mantle.

GRAPHIC ORGANIZER: CONVECTION CURRENTS



A Density of mantle material is less than material above it, so the materials begin to rise.

B Rising material hits rigid lithosphere and cannot go up any further.

C The force of gravity is working on the convection current.

D Core heat causes temperature to rise, therefore decreasing the density of material.

CAUSE	EFFECT	RESULT
Convection currents are caused by Earth's internal thermal energy causing mantle to heat, expand, and rise. As it gets closer to crust it cools, becoming denser, and sinking, forming a current.	The convection currents act as a 'conveyor belt' moving the plates of the lithosphere above.	The result of plates moving are earthquakes, volcanic eruptions, and building of mountains.

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!