**How heat inside the Earth makes our planet dynamic**

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Resource-- Khan Academy: [Mantle Convection](https://www.khanacademy.org/partner-content/amnh/earthquakes-and-volcanoes/plate-tectonics/a/mantle-convection-and-plate-tectonics)

Please read the information found on the “Mantle Convection and Plate Tectonics” page and use it to answer the following questions:

Describe what actually moves during the process of convection in the mantle; is there actually movement happening in the mantle as a result of convection?

Explain, using examples, what the statement “Convection drives our dynamic planet” means.

What is the speed at which the “solid” mantle moves as a result of convection?

Explain how mantle convection (beneath the crust) creates mountain ranges and ocean basins on the Earth’s surface.

Where within the Earth does the heat that moves through the mantle originate? Is it a result of convection, conduction, or radiation?

Click on the “Computer Model of Mantle Convection” tab on the left side of the screen, and then read the statement below:

*Scientists study mantle convection, or the flow of hot rock in the Earth's deep interior, in order to better understand how this flow shapes the surface of the Earth. When a solid, liquid, or gas is heated, it expands, becomes less dense, and rises. When it cools, it contracts, becomes more dense, and sinks. The circulation that results from hot, rising material and cool, sinking material is known as convection. Convection makes the Earth dynamic.*

Now watch the video about computer modeling of mantle convection, and answer the questions that follow.

What happens to the crust at a subduction zone?

Describe what a hot spot is.

Why is it essentially impossible for scientists to study mantle convection?

How does the computer simulation distinguish between cooler rocks and warmer rocks?

Which model of the Earth is a better match with scientific observations? Explain.

Have you ever wondered why the earth has a magnetic field? Of course you have! To learn the answer, watch this Video: [Why does the Earth have a magnetic field?](https://youtu.be/t2NqVJtNp6Y)

Electric currents produce magnetic fields. Okay, but what’s an electric current? An electric current is simply a collection of electrically charged particles (like electrons, and protons) that are all moving in the same direction. Since the Earth has a magnetic field, there must be electric charges flowing somewhere deep within the Earth. But where?

Which part of the Earth has the ability to produce a magnetic field?

What chemical element is common in this region of the Earth?

Moving iron atoms can generate magnetic fields. Based on the video, is it theoretically possible that iron atoms are in movement deep inside the Earth? Explain.

How is convection produced in the Earth’s core?

What happens to the atoms in the Outer Core as a result of convection?

Does convection in the outer core produce an electric current? \_\_\_\_\_\_\_\_\_\_\_\_

Does this electric current generate a magnetic field? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How frequently does the earth’s magnetic field “flip”?