**Class Notes 3.2**

**Vocabulary 3.2**

1. **Radiation-** The transfer of energy by electromagnetic waves.
2. **Convection-** The transfer of heat by the movement of a fluid.
3. **Conduction-** The transfer of heat from one particle of matter to anther.
4. **Convection Current-** The movement of fluid, caused by differences in temp. that transfers heat from one part of the fluid to another.
5. **Density-** The ratio of the mass of a substance to its volume

(mass/volume)

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**Misconception: *Rock cannot flow.***

**Did you know that the solid rock in Earth’s mantle can flow like a fluid**?

**To learn how, look at this image of a lava lamp.**

Heat from a bulb causes solid globs of wax at the bottom of the lamp to expand. As they expand, the globs become less dense. The globs then rise through the more dense fluid that surrounds them. In Earth’s mantle, great heat and pressure create regions of rock that are less dense than the rock around them. Over millions of years, the less dense rock slowly rises—like the solid globs in the lava lamp!

H**ow is Heat Transferred?**

**Heat is constantly being transferred inside Earth and all around Earth’s surface.**

**What is heat transfer????**

The movement of energy from a warmer object to a cooler object.

**Three types of heat transfer:**

**radiation**, **convection**, and **conduction.**

The transfer of energy that is carried in rays like light is called **radiation**.

Heat transfer by the movement of a fluid is called **convection.**

Heat transfer between materials that are touching is called **conduction.**

**Radiation**

The sun constantly transfers light and heat through the air, warming your skin. The transfer of energy that is carried in rays like light is called **radiation.**

Examples of radiation:

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**Conduction**

Have you ever walked barefoot over hot sand? Your feet can feel as if they are burning! That is because the sand transfers its heat to your skin. Heat transfer between materials that are touching is called conduction.

Examples of Conduction:

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**Convection**

Seagulls often soar on warm air currents. The currents are created as warm air rises from the ground The warm air heats cooler air above it Heat transfer by the movement of a fluid is called convection.

Examples of Convection:

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**How Does Convection Occur in Earth’s Mantle?**

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

The flow that transfers heat within a fluid is called a **convection current**.

**Three Processes/forces combine to set convection in motion:**

1. **Heating and cooling of a fluid**,
2. *changes in the fluid’s density*,
3. *force of gravity* combine to set convection currents in motion.

**Inside Earth,** large amounts of **heat are transferred by convection currents** within the core and mantle.

**Heat from the core and the mantle** causes convection currents in the mantle.

**How Does Convection Occur in Earth’s Mantle?**

**Convection Currents**

**What is Density?**

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

The flow that transfers heat within a fluid is called a convection current.

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Convection Currents in Earth pg. 109

Over millions of years, the great heat and pressure in the mantle have caused solid mantle rock to warm and flow very slowly.

Many geologists think that plumes of mantle rock rise slowly from the bottom of the mantle toward the top.

The hot rock eventually cools and sinks back through the mantle. Over and over, the cycle of rising and sinking takes place.

Convections currents like these have been moving inside Earth for more than four billion years!

**Did You Know?**

Convection currents may form on planets other than Earth. For example, scientists believe that the Great Red Spot on Jupiter may be the result of storms that have convection currents.

[**Online Tutorial**](http://maggiesscienceconnection.weebly.com/mantle-convection-plate-tectonics-earthquakes--volcanoes.html)

[**Clip Convection Currents**](http://www.youtube.com/watch?v=ryrXAGY1dmE)

[**Textbook Resource**](http://www.sciencebook.dkonline.com/11.html)

[**Additional Resources**](http://mail.colonial.net/~hkaiter/Layers_of_the_Earth.html)