

COMPARING LAYERS INSIDE THE EARTH

Activity 1 – Comparing Layers

Composition Layer	Stress Layer (Physical)	Depth	Temperature	Characteristic
Crust	Lithosphere	0 – 100 km	Average 22°C	<ul style="list-style-type: none"> •Outermost Layer •Rigid and Brittle •Consists of oceanic and continental crust
Mantle	Asthenosphere	100 – 200 km	500 – 900 °C	<ul style="list-style-type: none"> •Plastic- like rock that moves •Where convection currents form
	Mesosphere	200 – 2900 km	Up to 4000°C	<ul style="list-style-type: none"> •Becomes more solid as it gets closer to the core •Largest layer
Core	Outer Core	2900 – 5200 km	4400 – 6400°C	<ul style="list-style-type: none"> •Liquid layer iron and nickel •Swishing of iron creates magnetic field
	Inner Core	5200 – 6400 km	8000 – 10000° C	<ul style="list-style-type: none"> •Solid layer of iron and nickel •Rock is not melted because of extreme pressure

Analysis Questions

1. What 2 composition layers make up the lithosphere?
2. What are the 2 types of crust?
3. What is the thickest stress (physical) layer?
4. What layer creates Earth's magnetic field?
5. What layer is able to move so convection currents form?

Activity 2 – Convection Observation Lab

Materials – Density Box, hot tap water, cold tap water, 2 - 600mL beakers, grease, 2 contrasting colors of food coloring.

Procedures –

1. Locate the awesome density box of science. Slide the central divider out and use a thin layer of grease to help form a seal between the 2 chambers, then slide it back in, carefully.
2. Measure 500 mL of cold tap water into the beaker and add 4 drops of food coloring.
3. Measure 500 mL of hot tap water into the beaker and add 4 drops of a food coloring. Make sure it is a different color
4. At the EXACT same time, pour hot on one side of the box and the cold water on the other side of the box.
5. Wait about 20-30 seconds to allow the water to settle.
6. Carefully, lift the divider from the chamber and observe results.

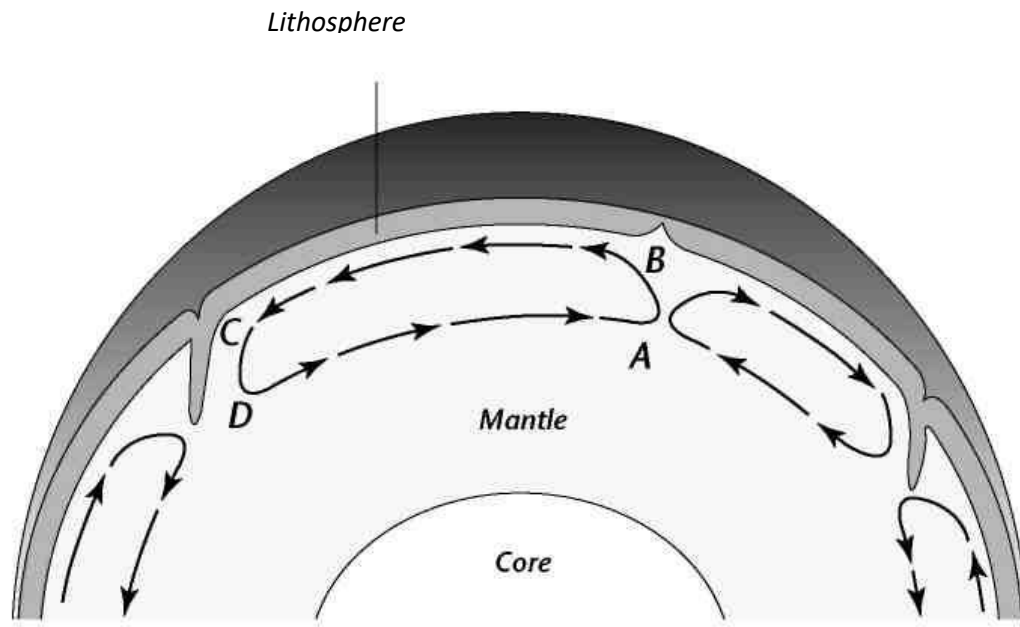
Analysis Questions

7. What color is the hot tap water? _____
8. What color is the cold tap water? _____
9. Describe what happened to the cold and hot water when the divider was removed from the container.

10. Draw a colored picture to show the results of the experiment in the box.



Activity 3 – What's Happening During Convection?



The figure below shows a convection cell in Earth's asthenosphere. A convection cell is one complete loop of a convection current. Use the figure above and the data table from activity 1 to answer the questions that follow.

Answer the following questions using the diagram above.

1. Where does the heat come from that drives this convection current in the mantle?
2. Where is the temperature of the mantle material greater, at point A or point B? Explain why.
3. Where is the density of the material greater, at point B or point C? Explain why.
4. What causes the convection cell to turn to the left at point B?
5. What happens to the temperature and density of the material between points B and C?
6. What force causes the convection cell to turn down at point C?
7. What happens to the temperature and density of the material between points D and A?
8. What causes the convection cell to turn up at point A?
9. How do you think this convection cell might affect the lithosphere above it?