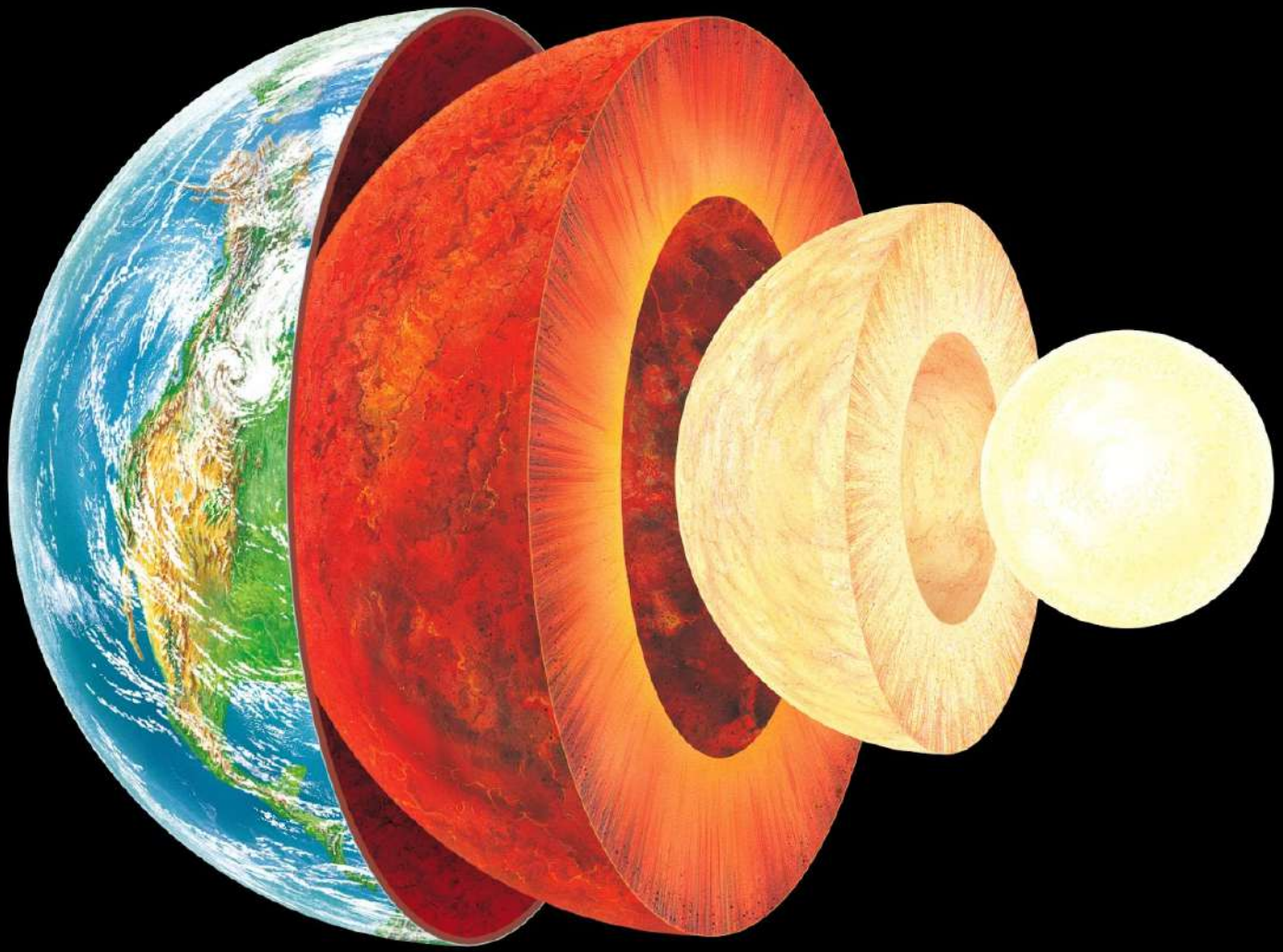
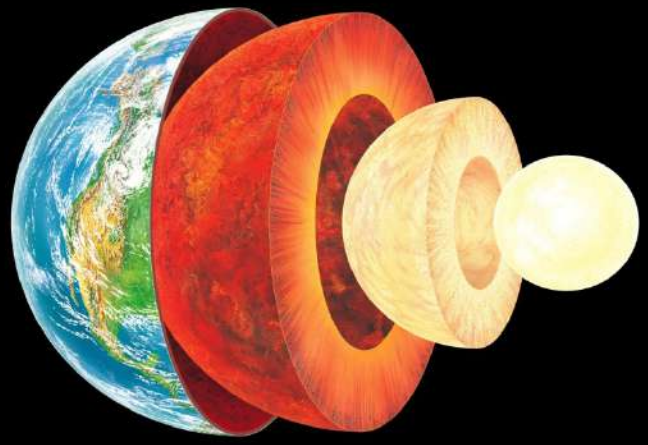
Layers of the Earth



Watch the movie trailer for Journey to the Center of the Earth. Identify characteristics that you think are true and those you think are not true. Be prepared to share.

http://safeshare.tv/x/ss57d60d9fdc0fa



Essential Question: How are layers of the Earth different from one another?

Standard:

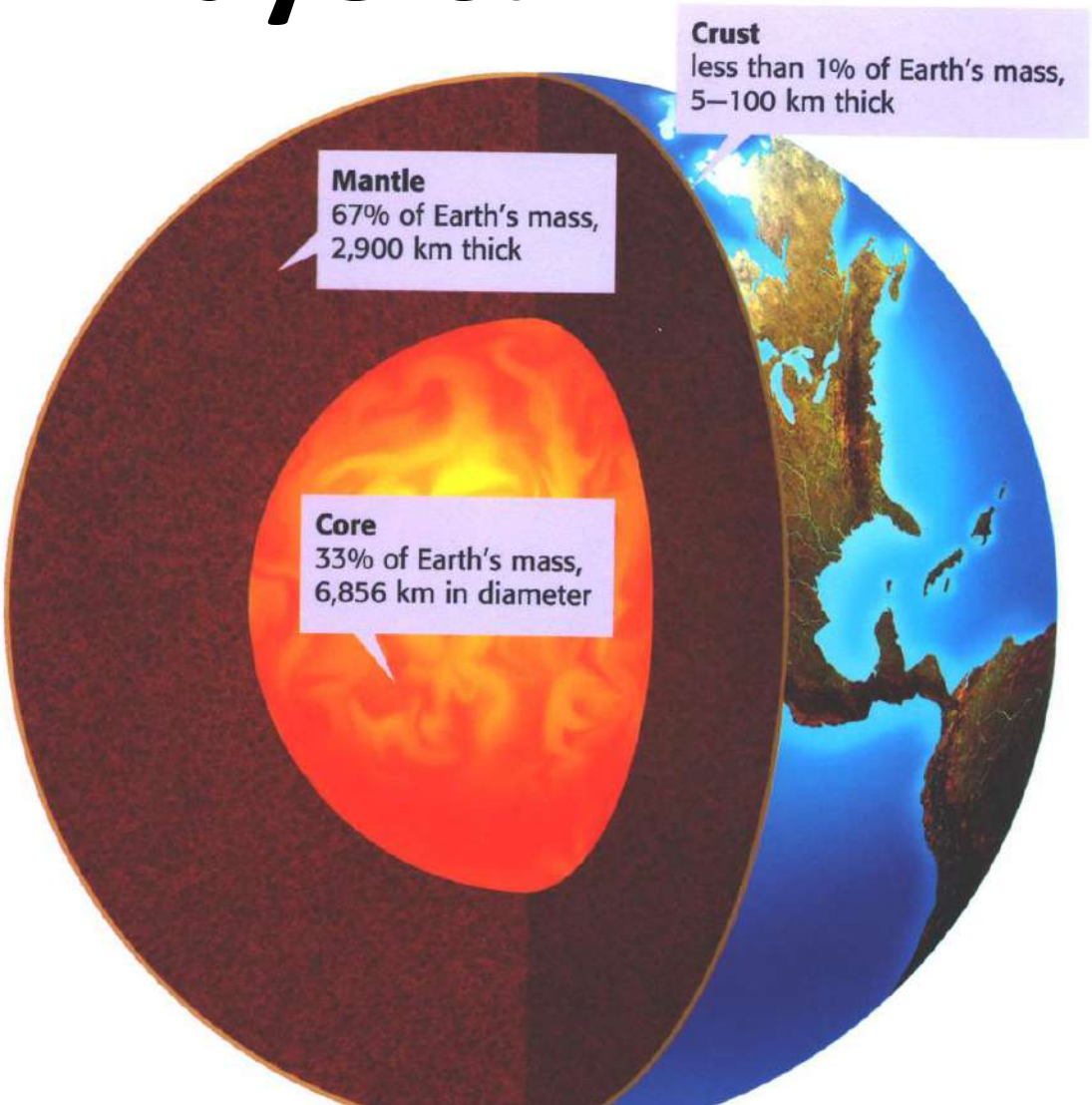
S6E5a. Compare and contrast the Earth's crust, mantle, and core including temperature, density, and composition.

The Earth is made up of 3 main layers:

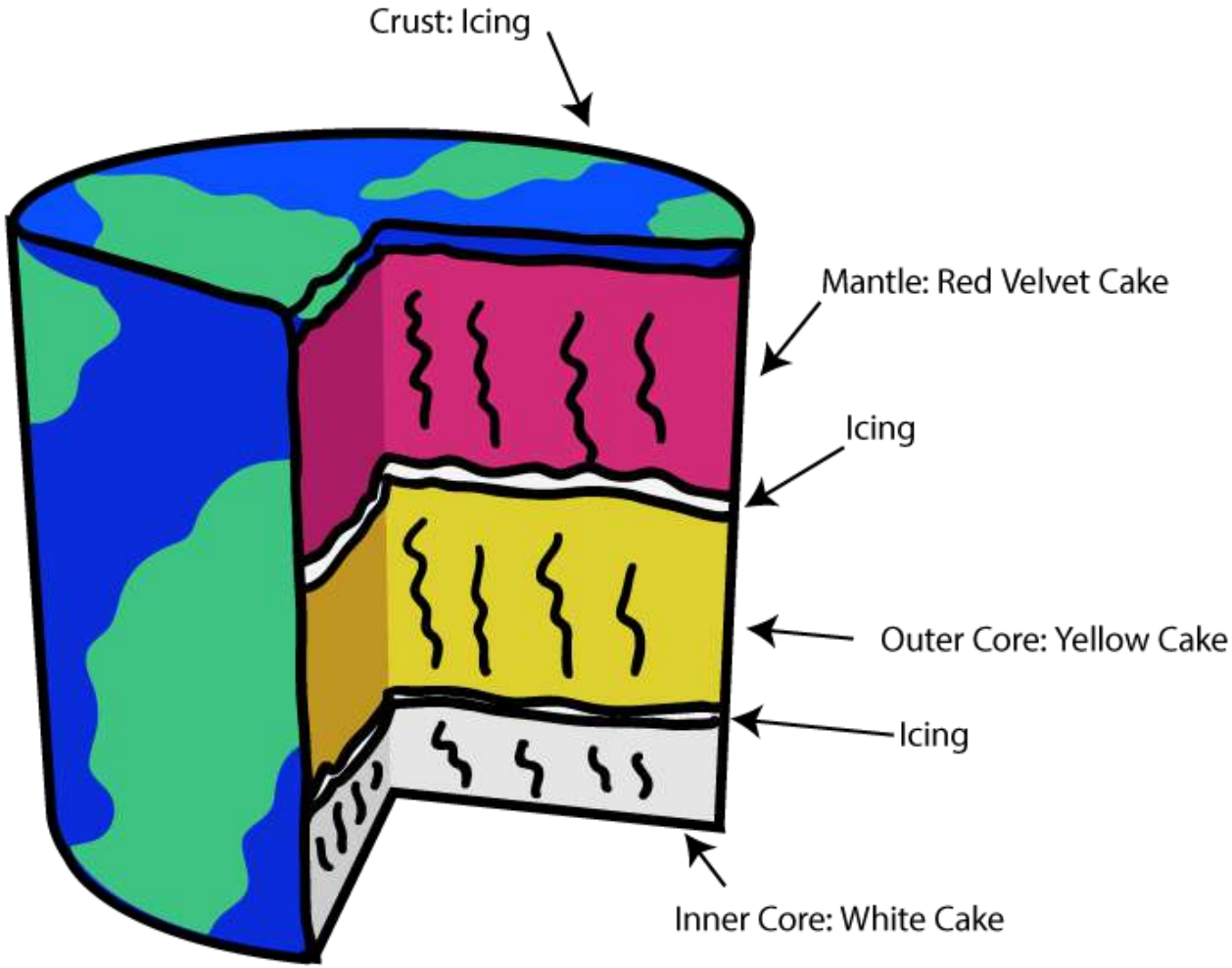
Crust

Mantle

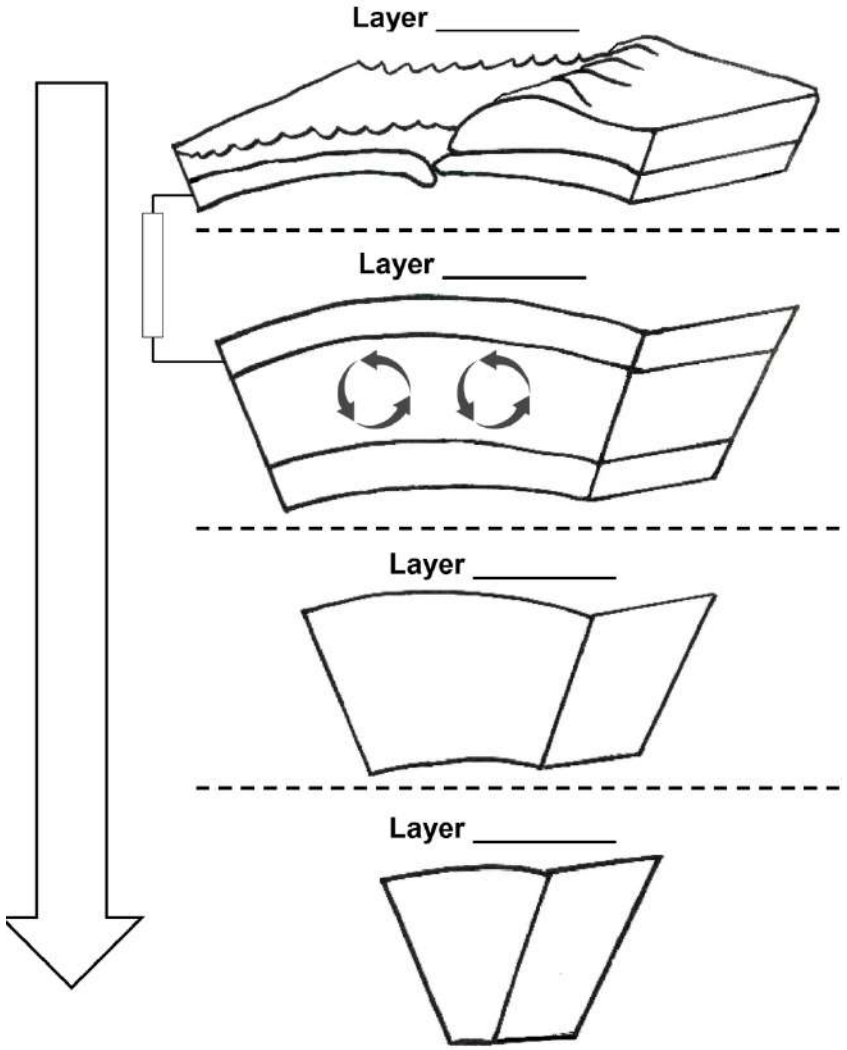
Core

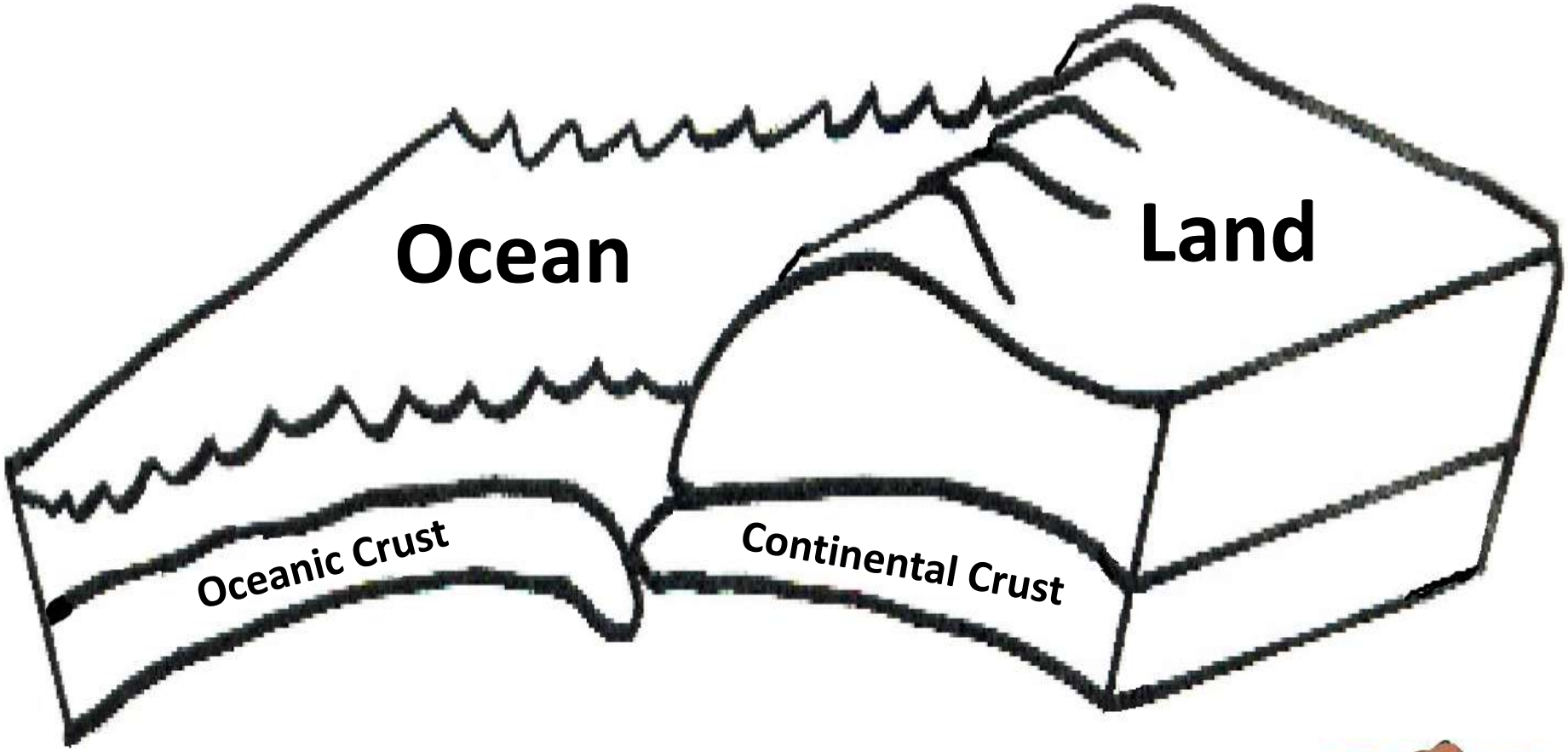


Think of the layers of the Earth like the layers of a cake.

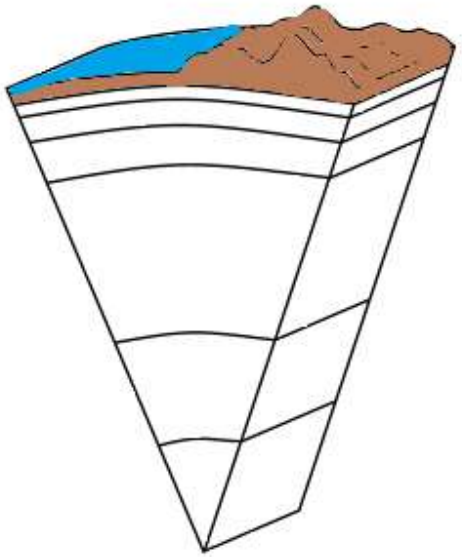


Use the Layers of the Earth Foldable to take notes

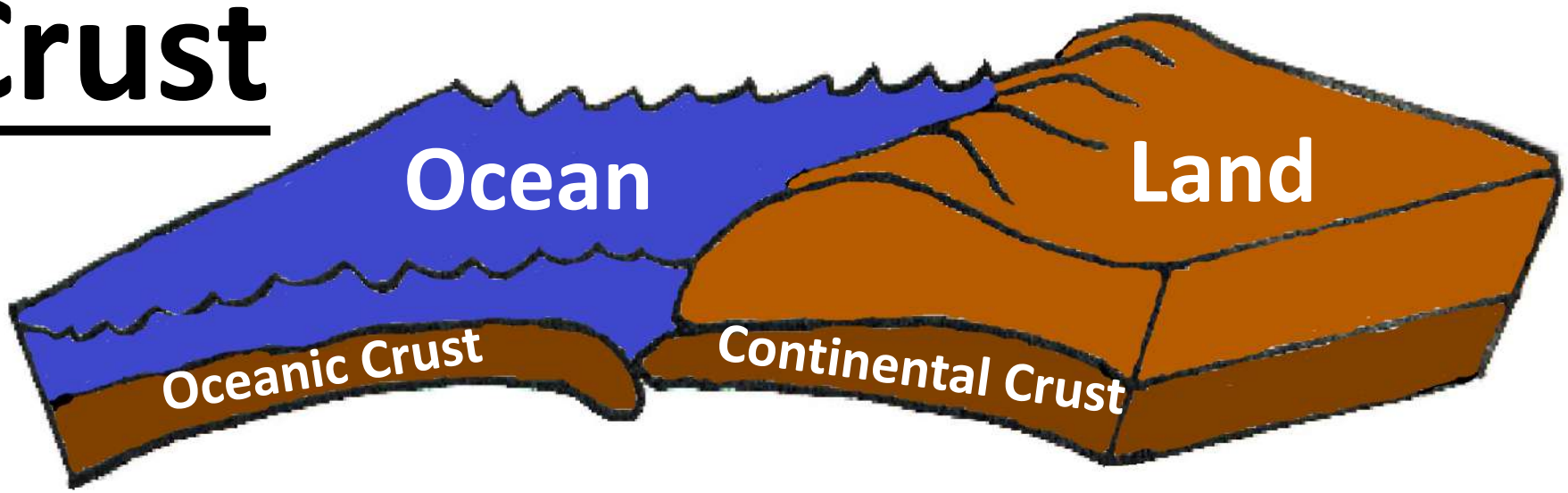




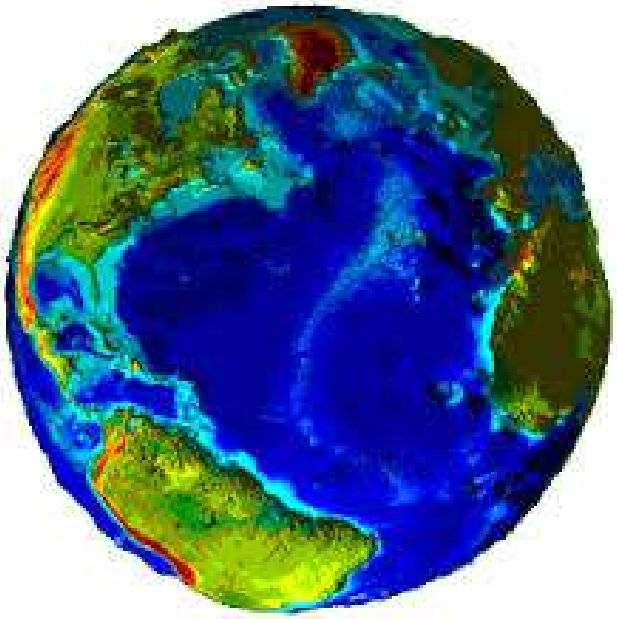
Crust



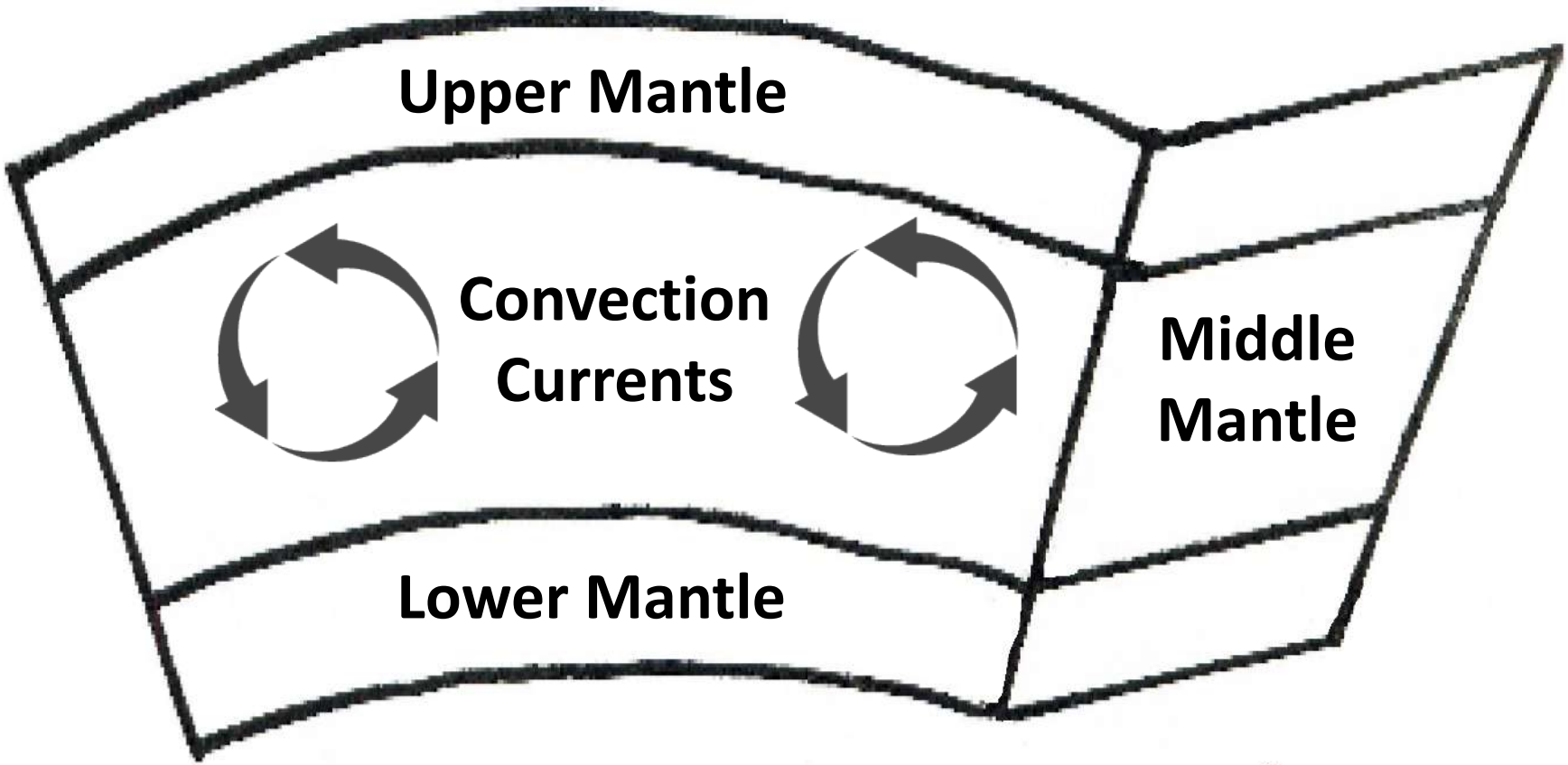
Crust



- Thinnest layer of the Earth that ranges from only 2 miles in some areas of the ocean floor to 75 miles deep under mountains
- Made up of large amounts of silicon and aluminum
- Two types of crust: oceanic crust and continental crust
- Composed of plates on which the continents and oceans rest

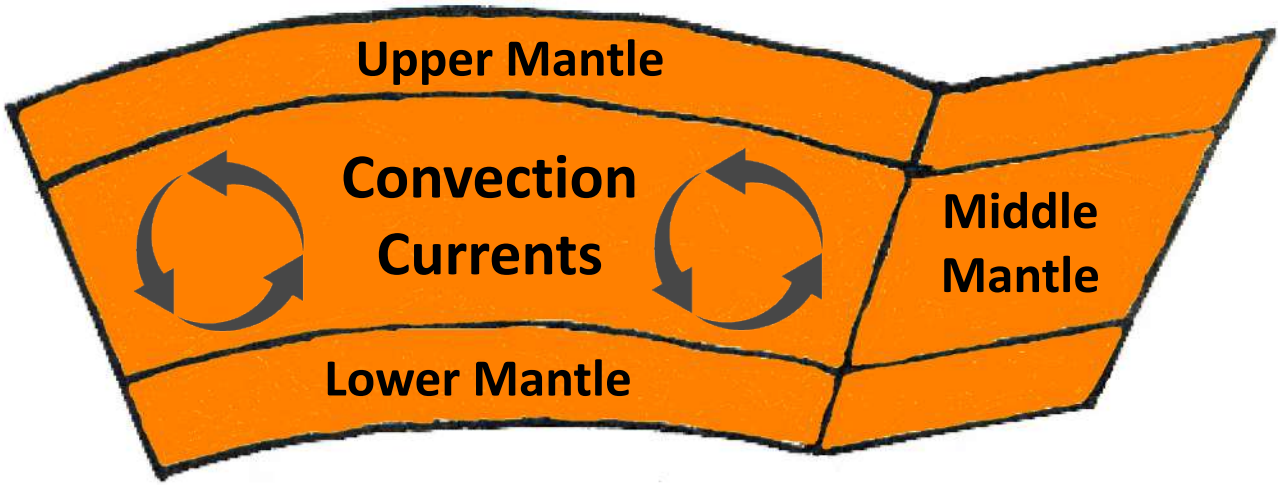


The Earth’s crust is like the skin of an apple. Turn to an elbow partner and discuss why this statement is true. Next, come up with another example.

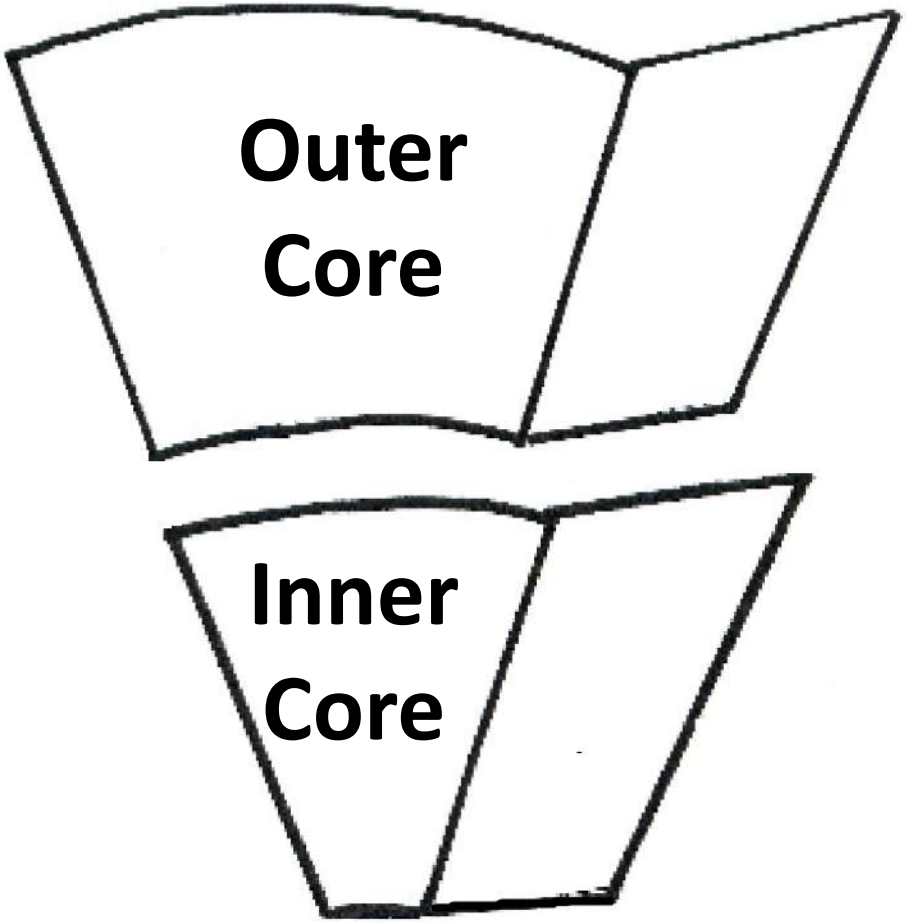

Upper Mantle
Convection Currents
Middle Mantle
Lower Mantle

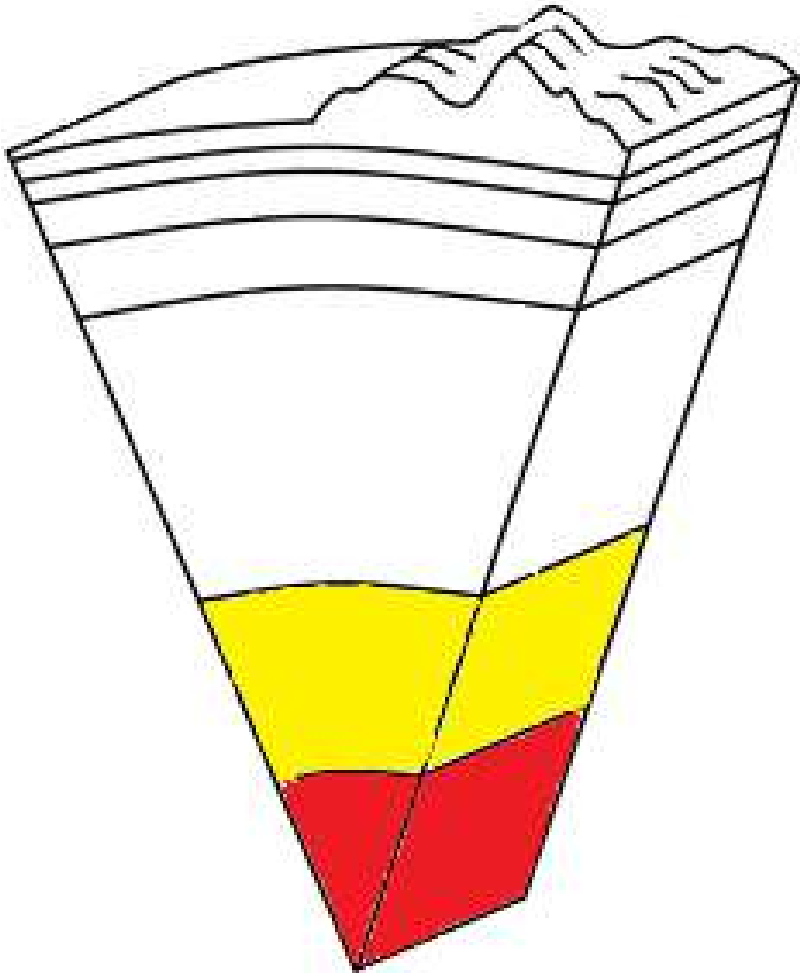
Mantle

Mantle



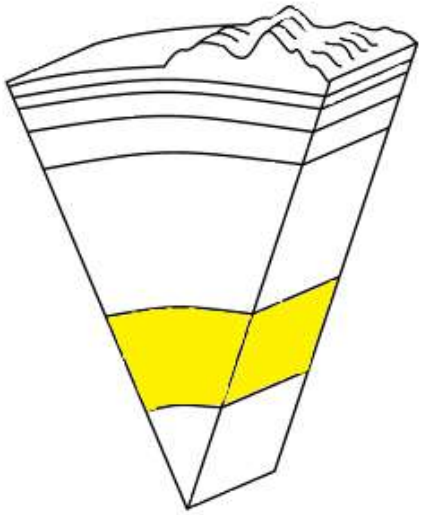
- Solid but capable of moving (like hot asphalt or fudge)
- Thickest layer of the Earth (making up 70% of the Earth's mass)
- The hot material (magma) in the mantle rises to the top of the mantle, cools, then sinks, reheats, and rises again. These convection currents cause changes in the Earth's surface





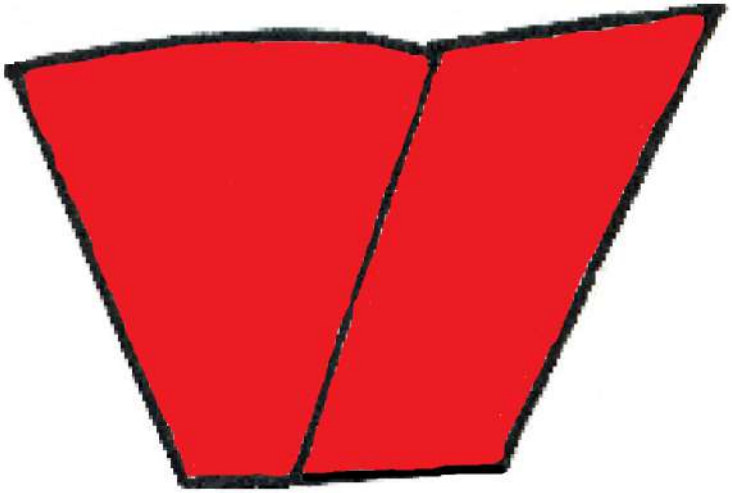
Core

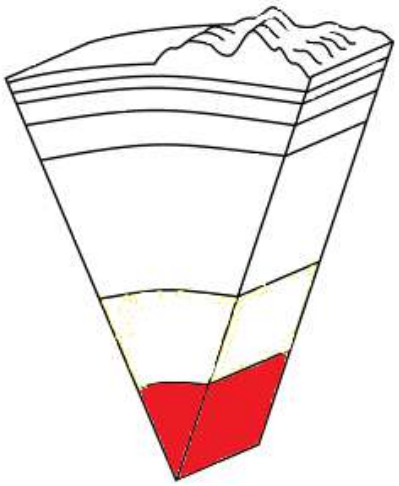
Outer Core



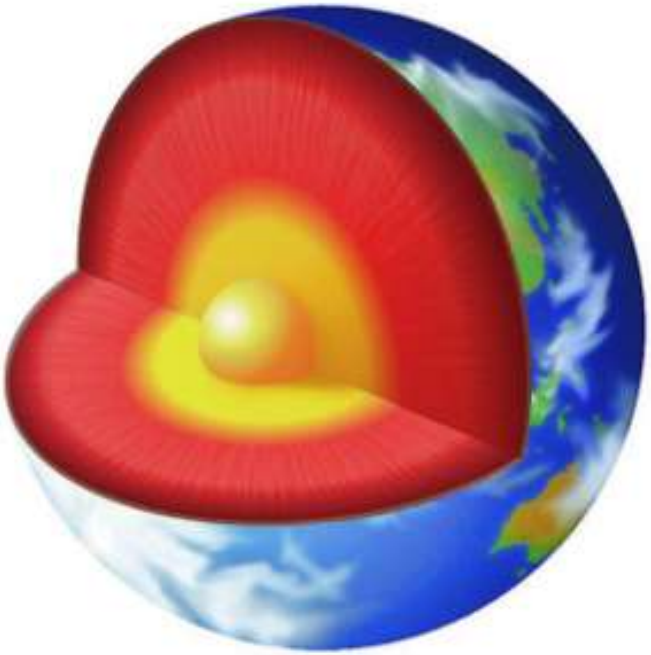
- Molten (liquid) metal that is about 4,700°C (8,500°F)
- Located about 1,800 miles beneath the crust and is about 1,400 miles thick
- Composed of the melted metals nickel and iron

Inner Core

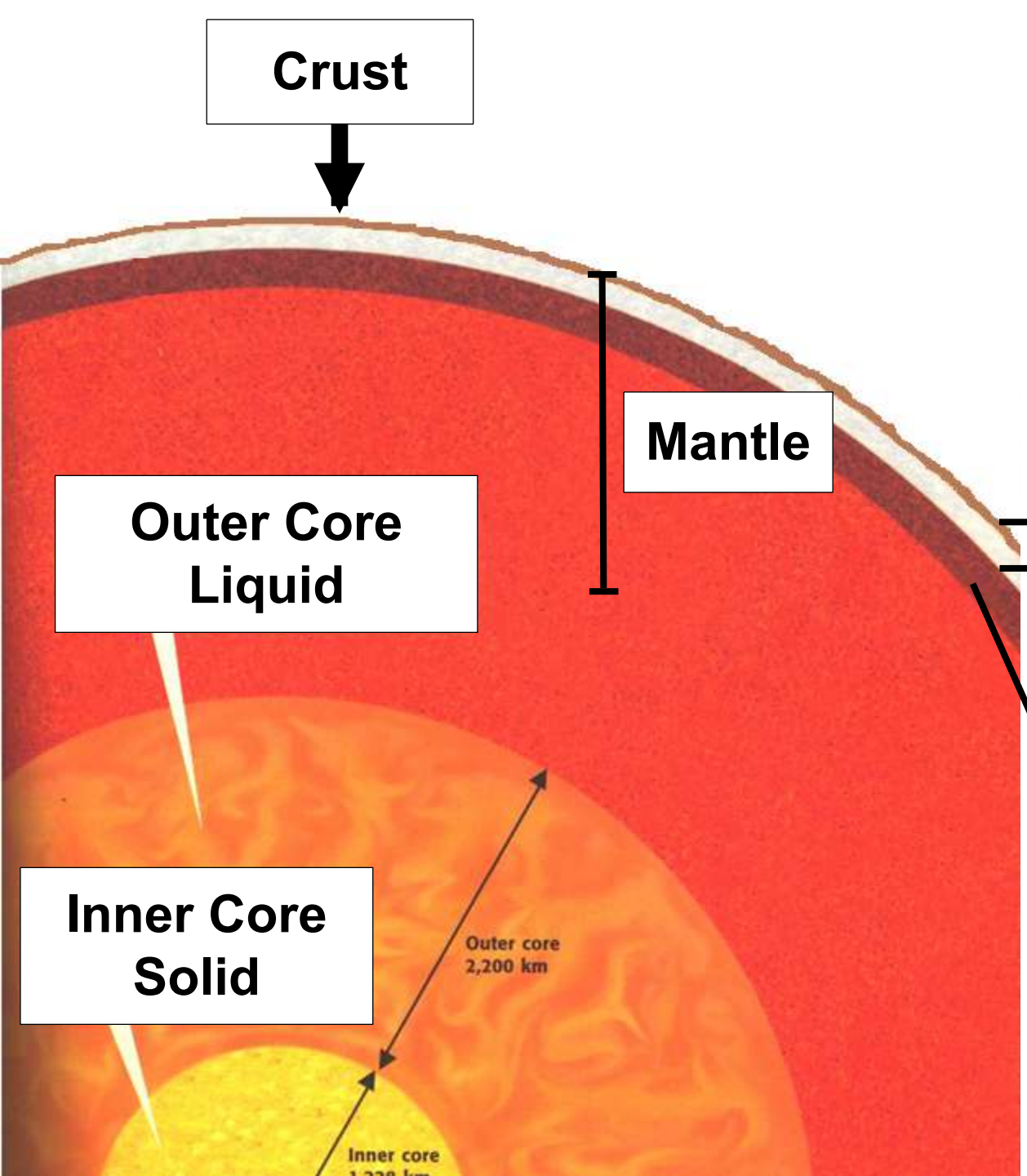




- Solid sphere composed mostly of iron
- It is believed to be as hot as 6,650°C (12,000°F)
- Heat in the core is probably generated by the radioactive decay of uranium and other elements
- It is solid because of the pressure from the outer core, mantle, and crust compressing it tremendously



The Earth is like a peach or a boiled egg. Turn to a seat partner and discuss these analogies. Come up with another analogy and be prepared to share.

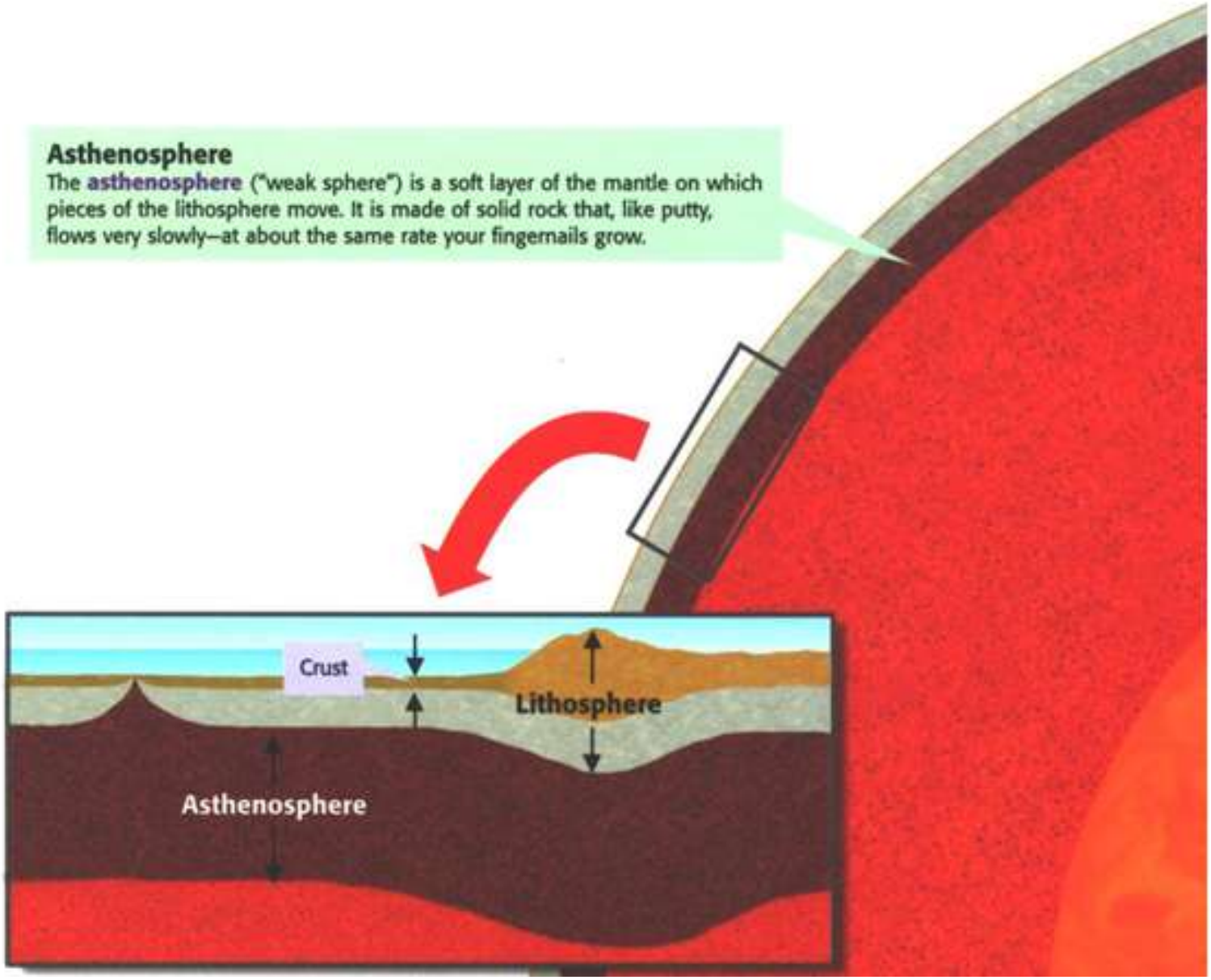


Lithosphere – Crust and Upper Layer of the Mantle

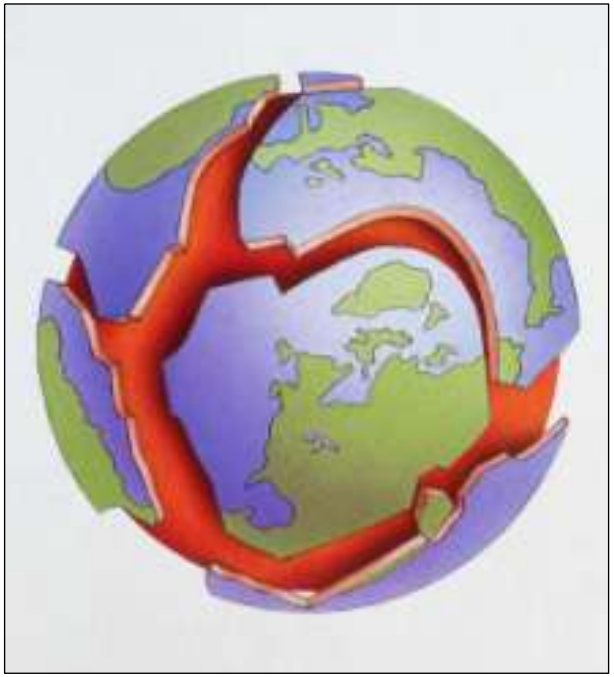
Layer of the Mantle **(asthenosphere)** that consists of hot rock of tar-like consistency, which slowly moves

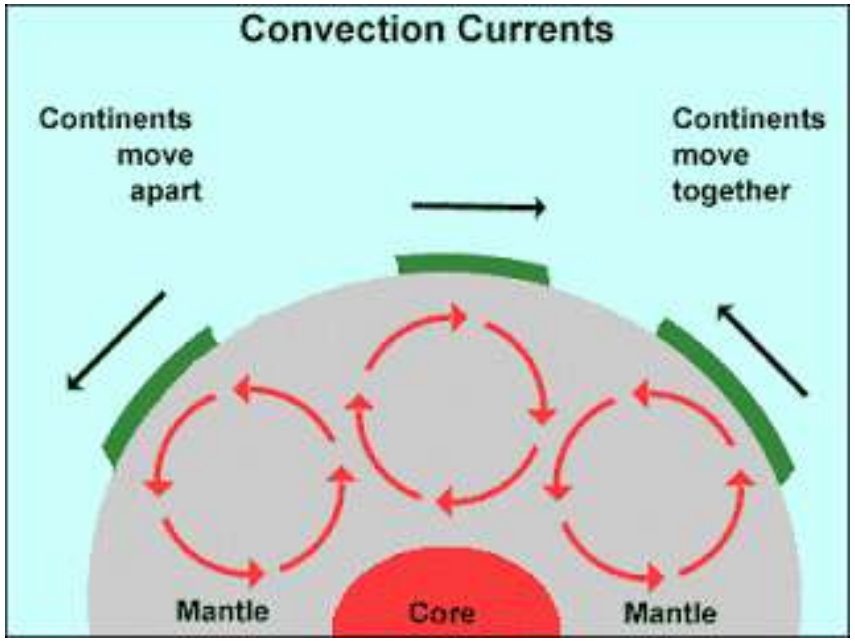
Asthenosphere

The **asthenosphere** ("weak sphere") is a soft layer of the mantle on which pieces of the lithosphere move. It is made of solid rock that, like putty, flows very slowly—at about the same rate your fingernails grow.

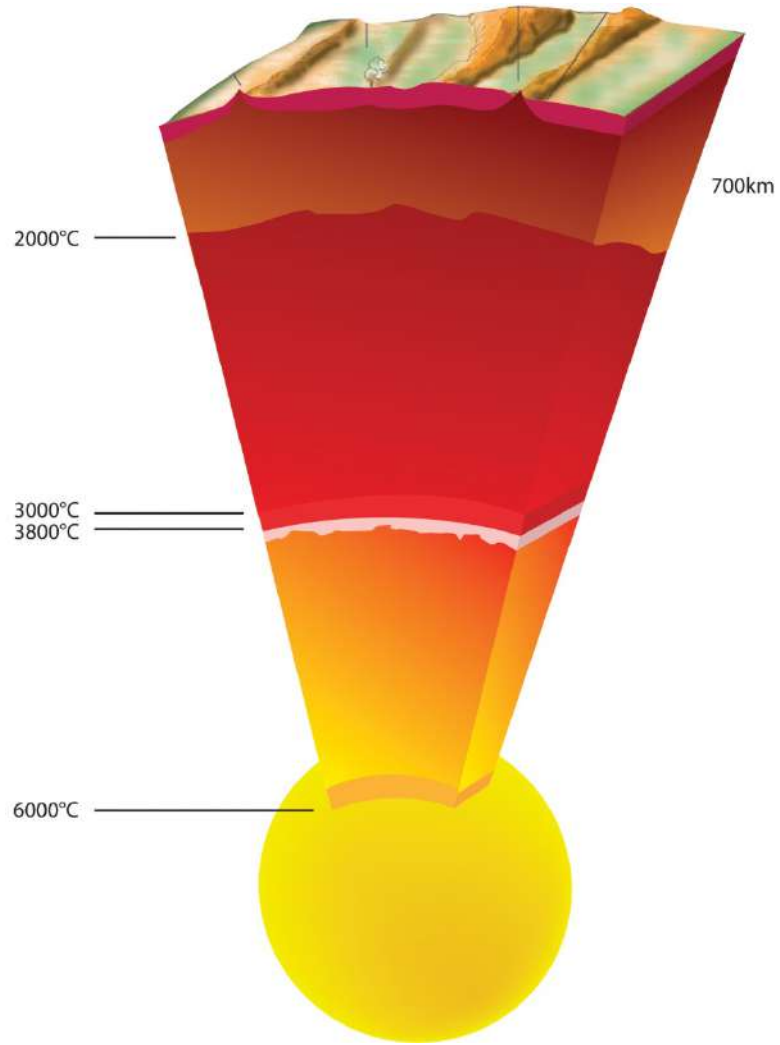


The lithosphere (crust and upper mantle) is divided into separate plates which move very slowly in response to the “convecting” part of the mantle.

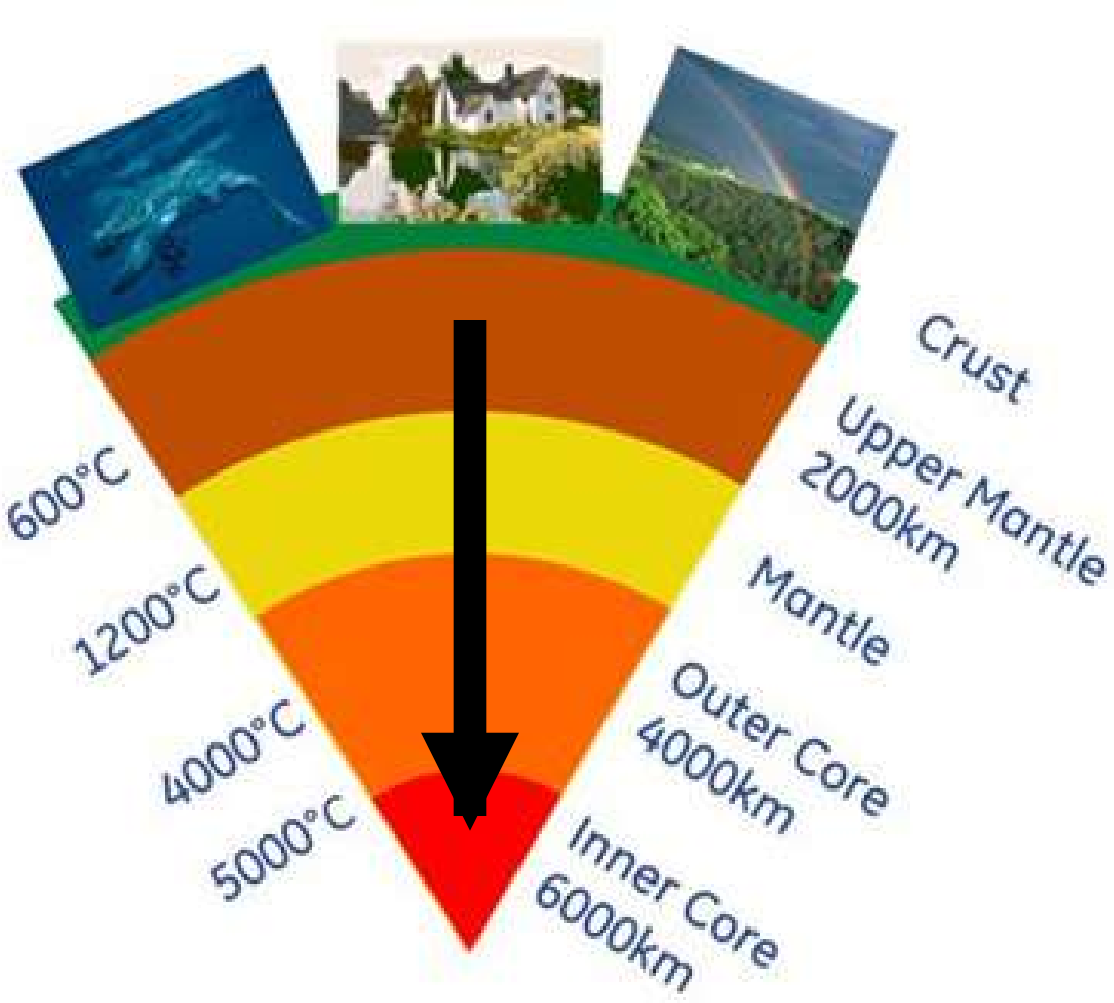




What do these two images tell us about the layers of the Earth?



Temperature increases as depth increases



Look at the information in the graph and table below. What's the relationship between depth and density/pressure?

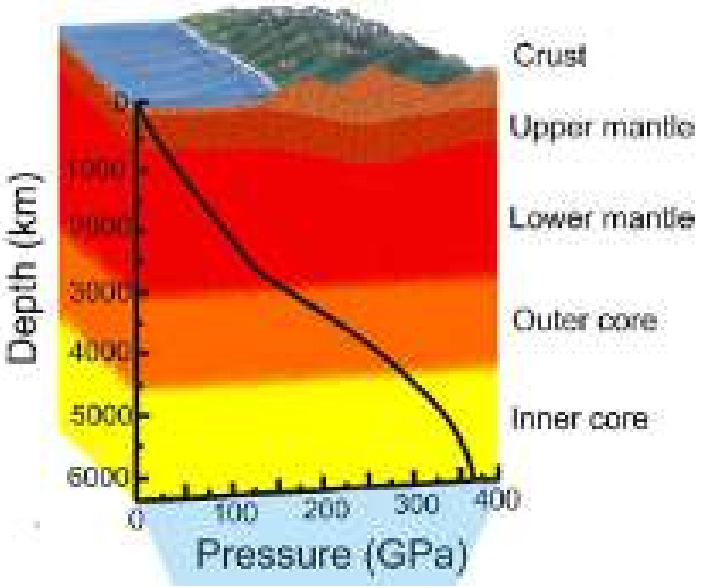
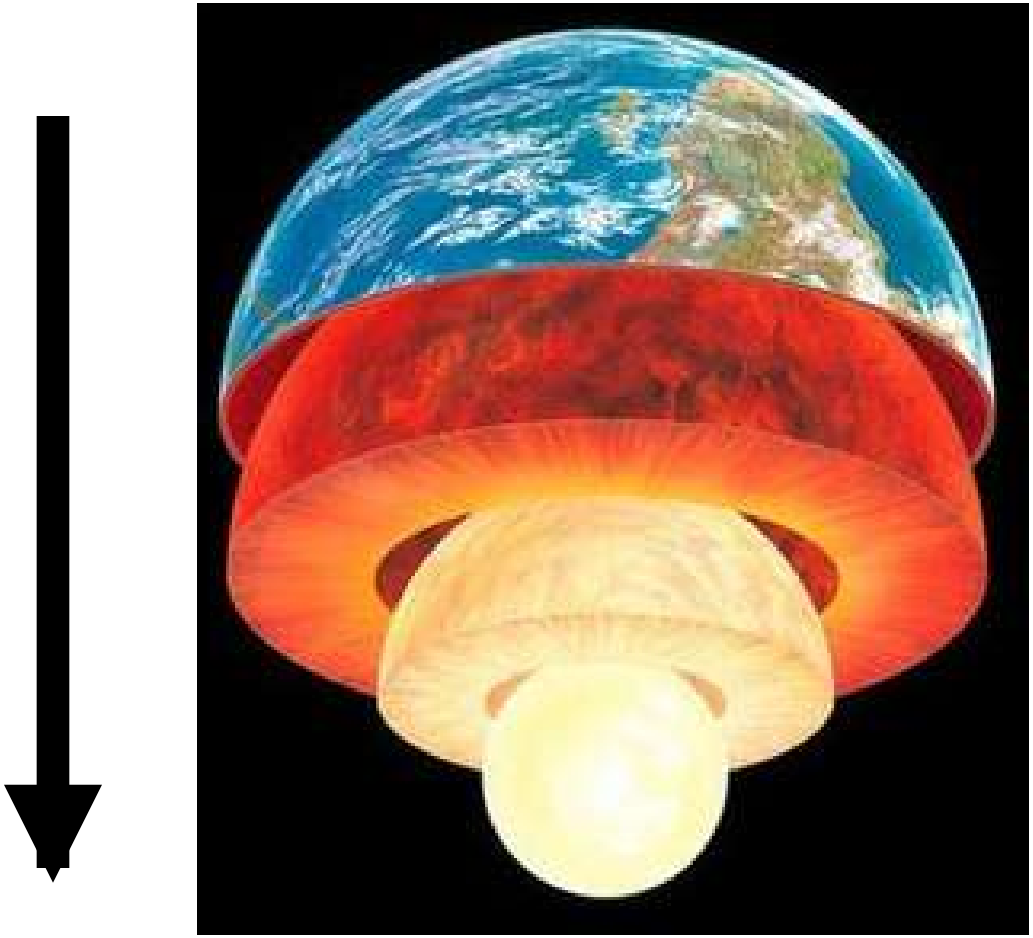
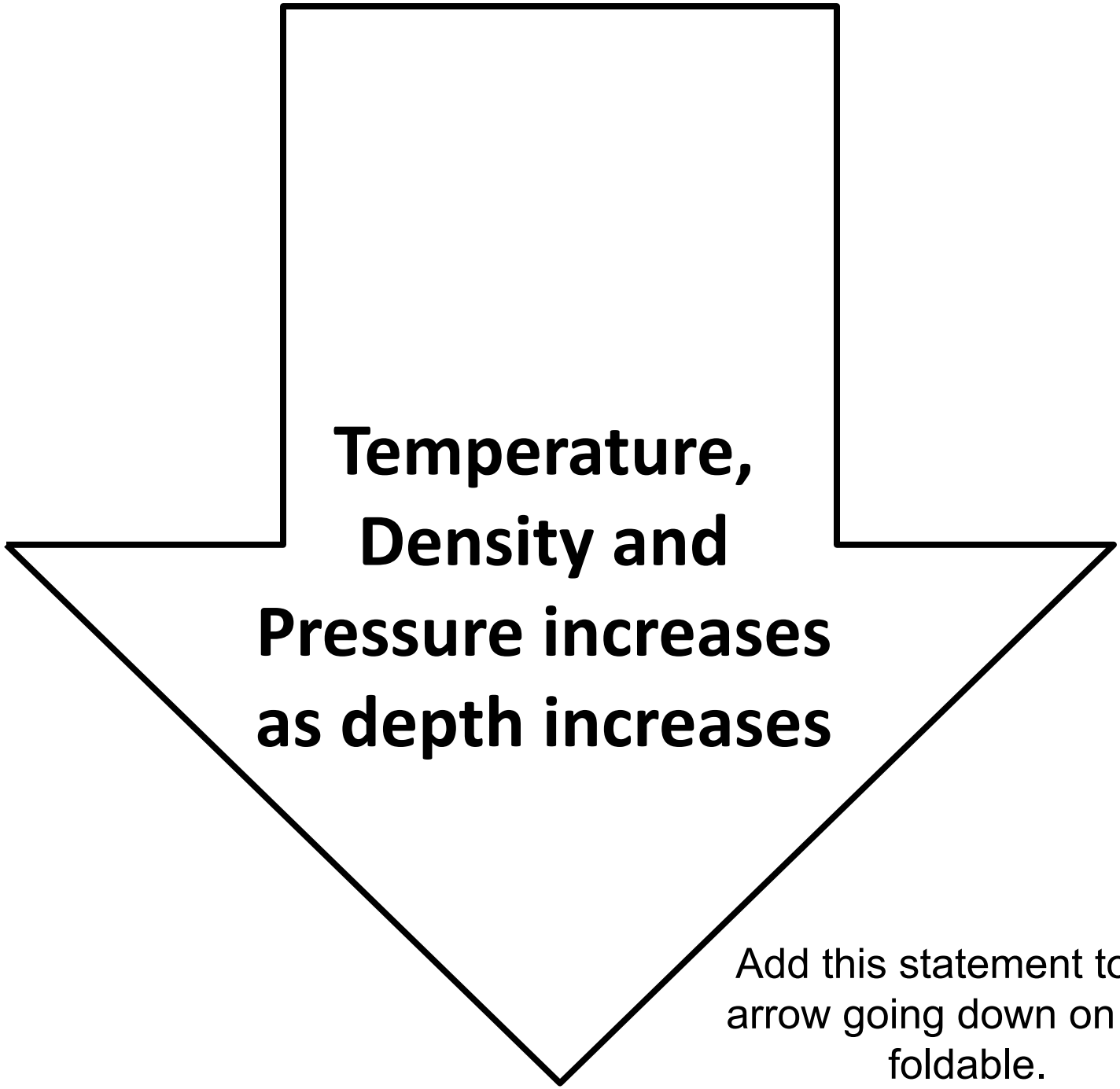


TABLE 1 Interior Properties of Earth

Property	Crust	Mantle	Core
Fraction of Earth	<1% of mass	~70%	~30%
State	"Broken rock"	Plastic	(Semi-)liquid
Depth (kilometers)	0–30	30–3030	3030–6370
Density (grams/cubic centimeter)	2.7	3.5–5.5	10–12
Representative chemical composition	SiO_2	$(Fe,Mg)SiO_4$	Fe, Ni
Temperature (Kelvin)	300–500	500–3,000	3,000–5,300
Pressure (atmospheres)	1–1,000	10^3–10^6	10^6–10^7

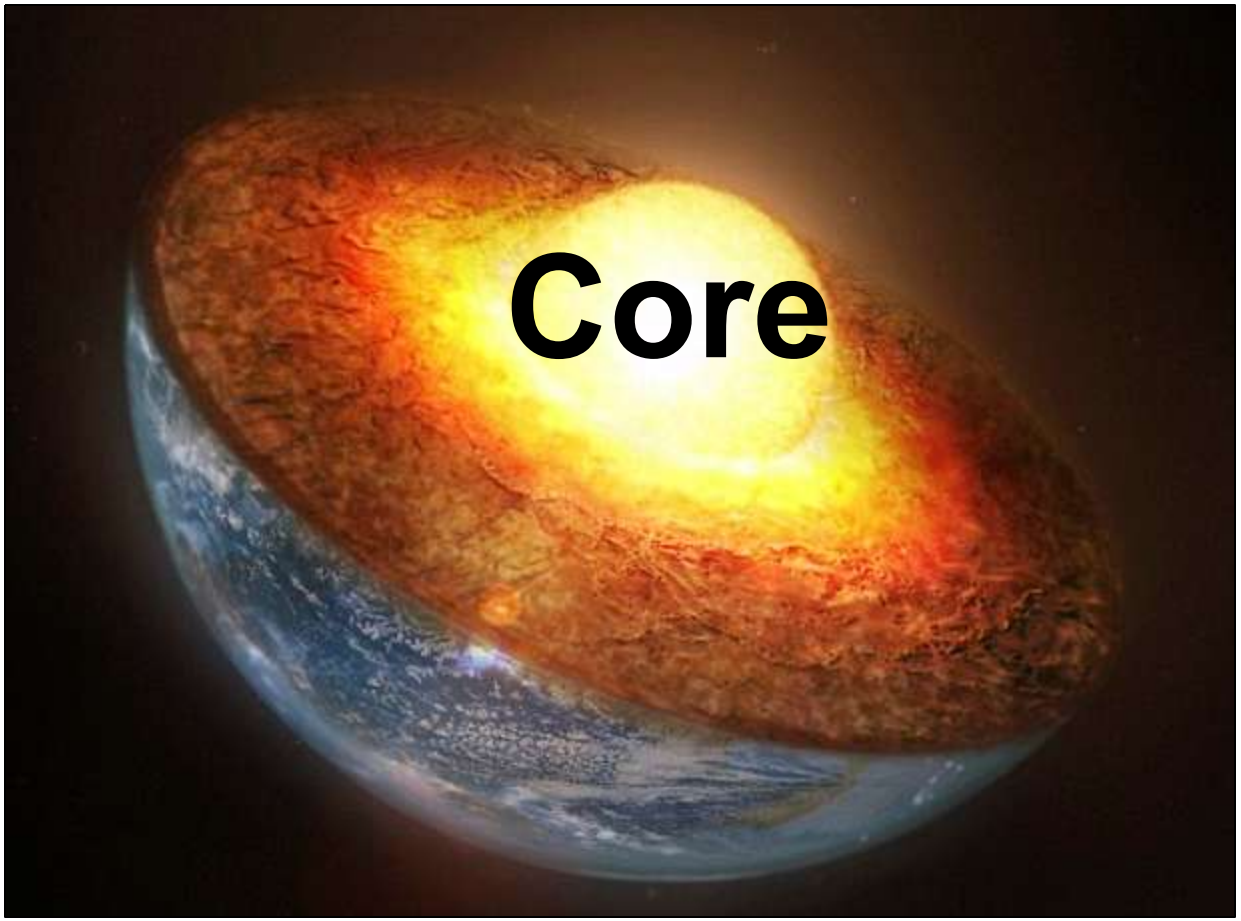
Density and Pressure increase as depth increases





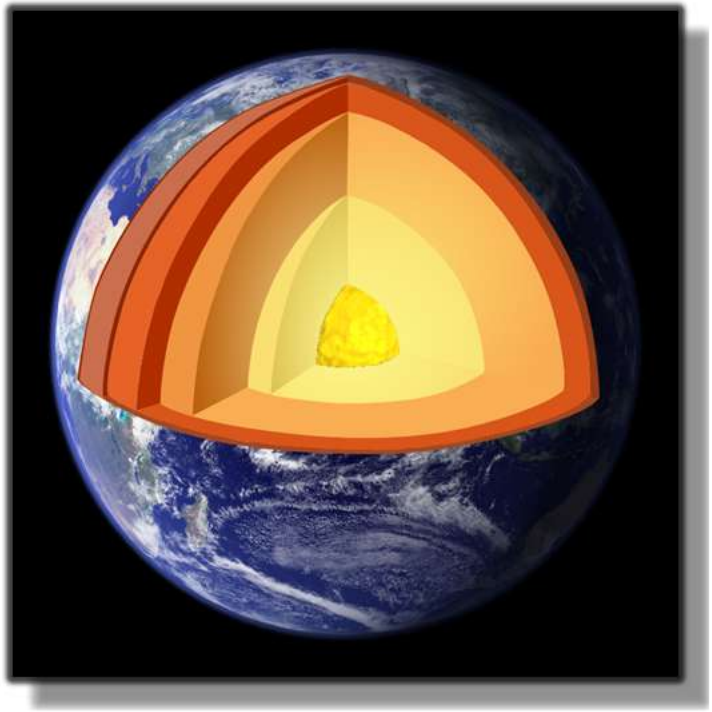
Add this statement to the arrow going down on your foldable.

Which layer of the Earth has the greatest temperature, pressure, and density?



Summary

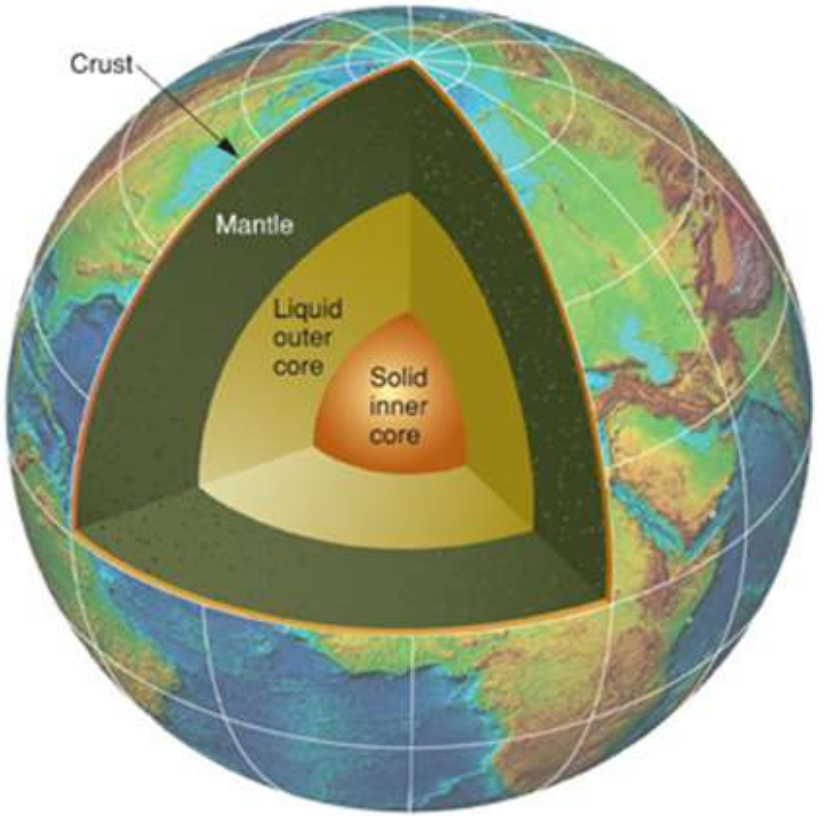
The earth is layered with a lithosphere (crust and uppermost mantle), convecting mantle, and a dense metallic core.



Pressure, temperature, and density increases as depth increases.

http://www.learner.org/interactives/dynamicearth/structure.html

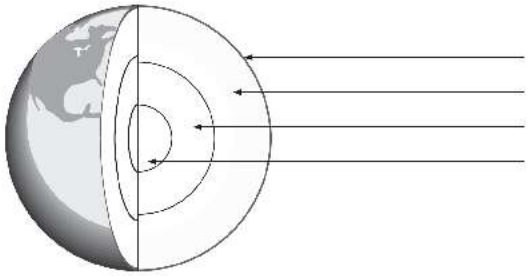
Mr. Lee's Layers of the Earth Rap



Layers of the Earth Review

Layers of the Earth Review Name _____ Date ____

Label the diagram below with the following: crust, mantle, inner core, and outer core

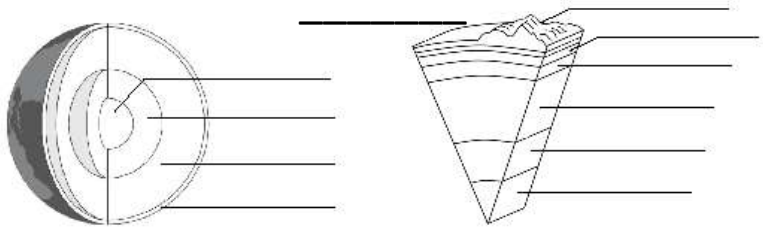


Imagine you are going to take a journey to the center of the earth (like the movie but more accurate). Write a short story below describing your journey. Include the layers of the earth and descriptions of each layer.

Summarizing Strategy

Layers of the Earth Summarizer Name _____ Date ____

Directions: Label the two diagrams with the layers of the earth. Use the following terms: Core, Inner Core, Outer Core, Crust (2), Mantle, Lower Mantle, Middle Mantle, Upper Mantle



Answer the questions below using the diagrams above.

1. Write the layers of the earth in order from lowest temperature to highest temperature.

2. Which two layers of the earth make up the lithosphere?

3. Temperature, density, and pressure _____ (increases, decreases) as depth _____ (increases, decreases).

4. Which layer of the earth has the highest pressure, temperature, and density?

5. Which of the three main layers of the earth contains convection currents that slowly move lithospheric plates?

6. Which layer of the earth is solid?