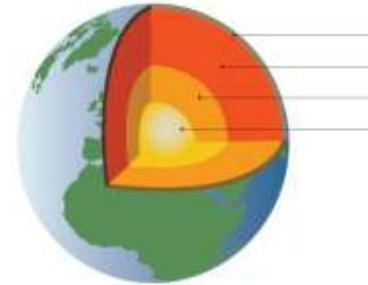


EARTH'S LAYERS AND WAVES NOTES

What are Earth's Layers?

Label the layers:



Layer	State of Matter	Temp. (amt. of thermal energy = heat)	Density
Crust		Coldest	Least dense
Mantle		↓	↓
Outer Core			
Inner Core		Hottest	Most dense

Glue this side into your notebook

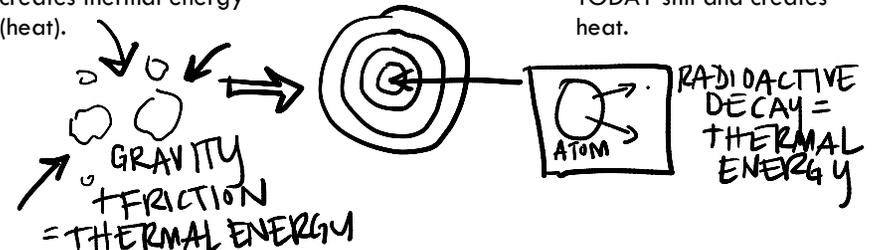


How'd the layers get like this? (planetary differentiation)

1. First rocks are pulled together because of _____, which causes dense materials to sink and less dense materials to rise, creating friction between the rocks and creates thermal energy (heat).

2. The planets now have layers based on their densities. More dense layers are in the middle.

3. Inside Earth now, _____ occurs, which is when atoms break down by losing protons and giving off thermal energy (heat). This happens inside Earth TODAY still and creates heat.



Planetary differentiation = the formation of planets due to gravity pulling more dense rock down and less dense rock rose, creating layers based on density

What is **density**?

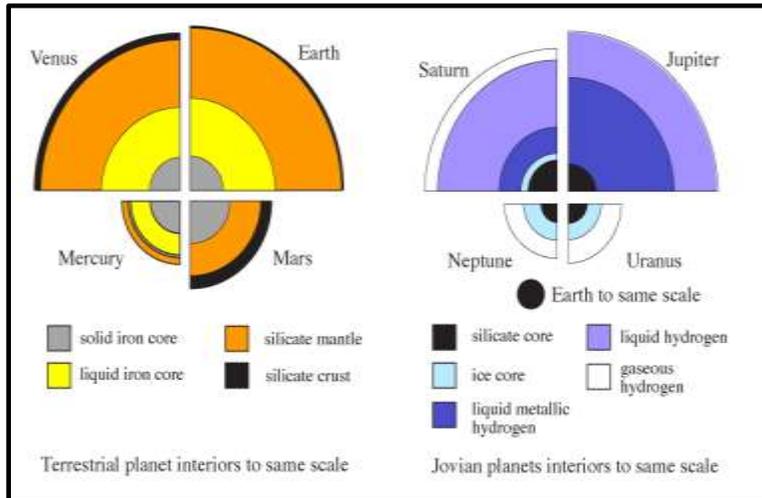
Sketch a picture of the atoms of dense and not dense material:



dense



not dense



Explain how this image demonstrates that planetary differentiation affects all planets, not just Earth

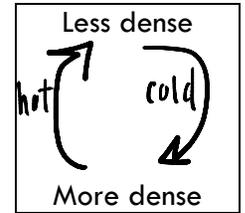
How do matter and energy transfer inside Earth?

We know that the Inside the Earth is a constant source of heat (thermal energy). This heat causes the movement of matter around the Earth, which also makes the energy around Earth move through it.

Heat (thermal energy) inside the Earth comes from:

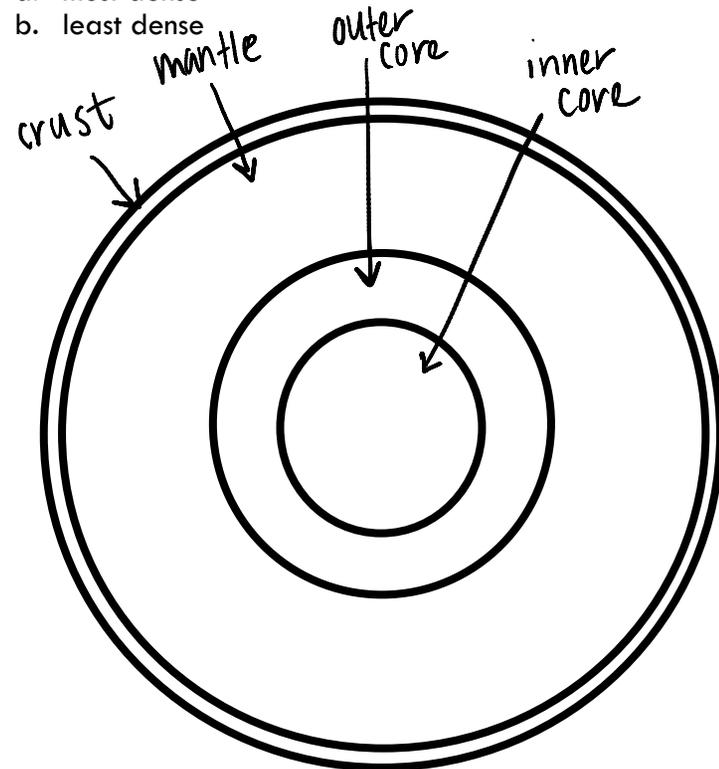
- 1.
- 2.

This heat fuels **convection currents** in the mantle.



The inside of Earth is like a stove top heating the magma in the mantle, which causes it to heat up, get less dense and rise, cool off near the crust and get more dense and sink, to then be heated by the inside of Earth again and repeat the cycle. Draw convection currents in the mantle below and label where the magma in the currents is is:

- a. most dense
- b. least dense





Glue this side into your notebook



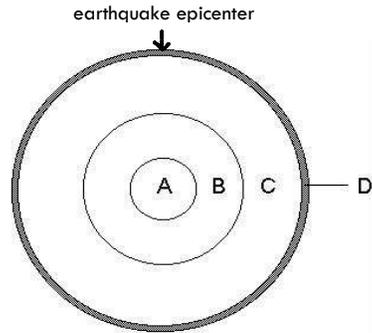
How do **WAVES** tell us what the inside of Earth is like?
Seismic waves (earthquake waves, are another way energy travels through the Earth. Their behavior tells us a lot about what is inside Earth.

Wave Evidence	Explanation of evidence
Waves refract inside Earth	<p data-bbox="1247 321 1528 350">What does this mean?</p> <p data-bbox="1247 493 1738 522">Why do waves refract inside of Earth?</p> <div data-bbox="1325 764 1961 1328"></div> <p data-bbox="1247 1414 1982 1474">Draw what waves refracting looks like on the cross-section of Earth.</p>

Waves reflect inside Earth

What does this mean?

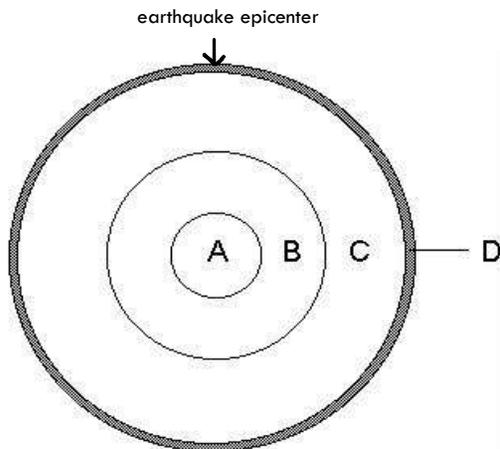
Why do waves reflect inside the Earth?



Draw what waves reflecting looks like on the cross-section of Earth.

S-waves don't travel inside of the outer core

What does this mean and why do S-waves NOT travel inside the outer core?

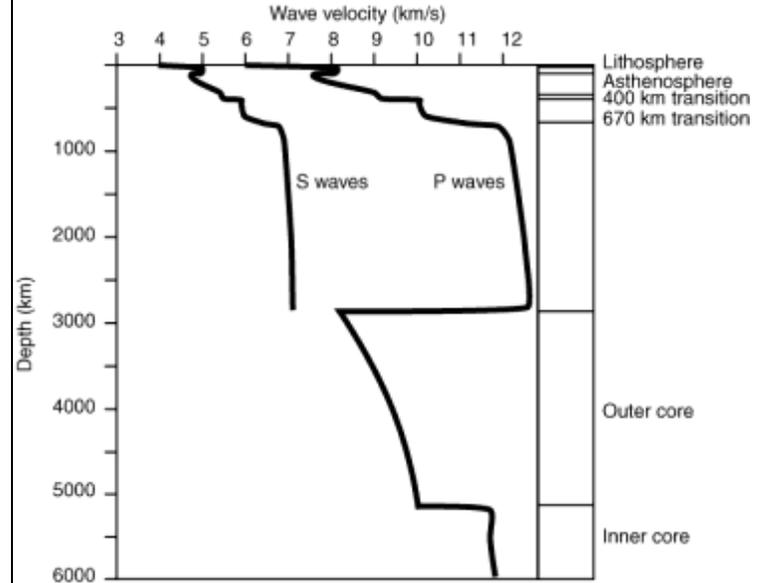


Draw what that looks like on the cross-section of Earth.

Wave speed is different though the layers

Why does wave speed change inside Earth?

Here is a graph of evidence for the change in speed as waves travel through the Earth.



Explain below what this graph tells you:

P-waves

S-waves

