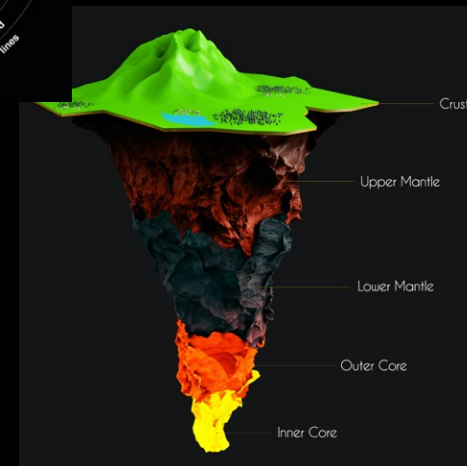
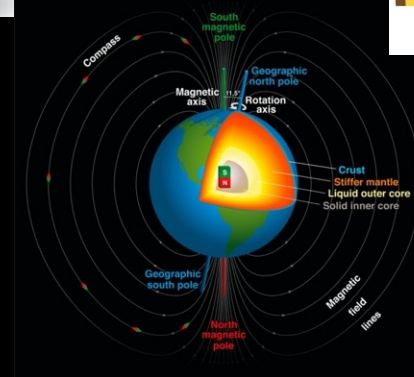
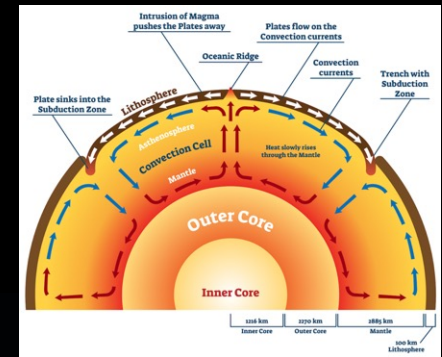
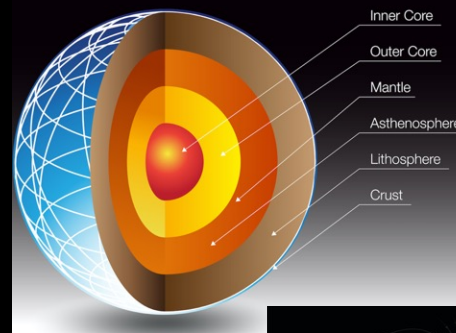


Earth's Composition

- Earth's Layers
- The Inner Core
- The Outer Core
- Planet Formation
- Earth's Magnetic Field
- The Mantle
- The Crust
- The Asthenosphere and Lithosphere
- Oceanic Crust
- Tectonic Plates Introduction



Preview File

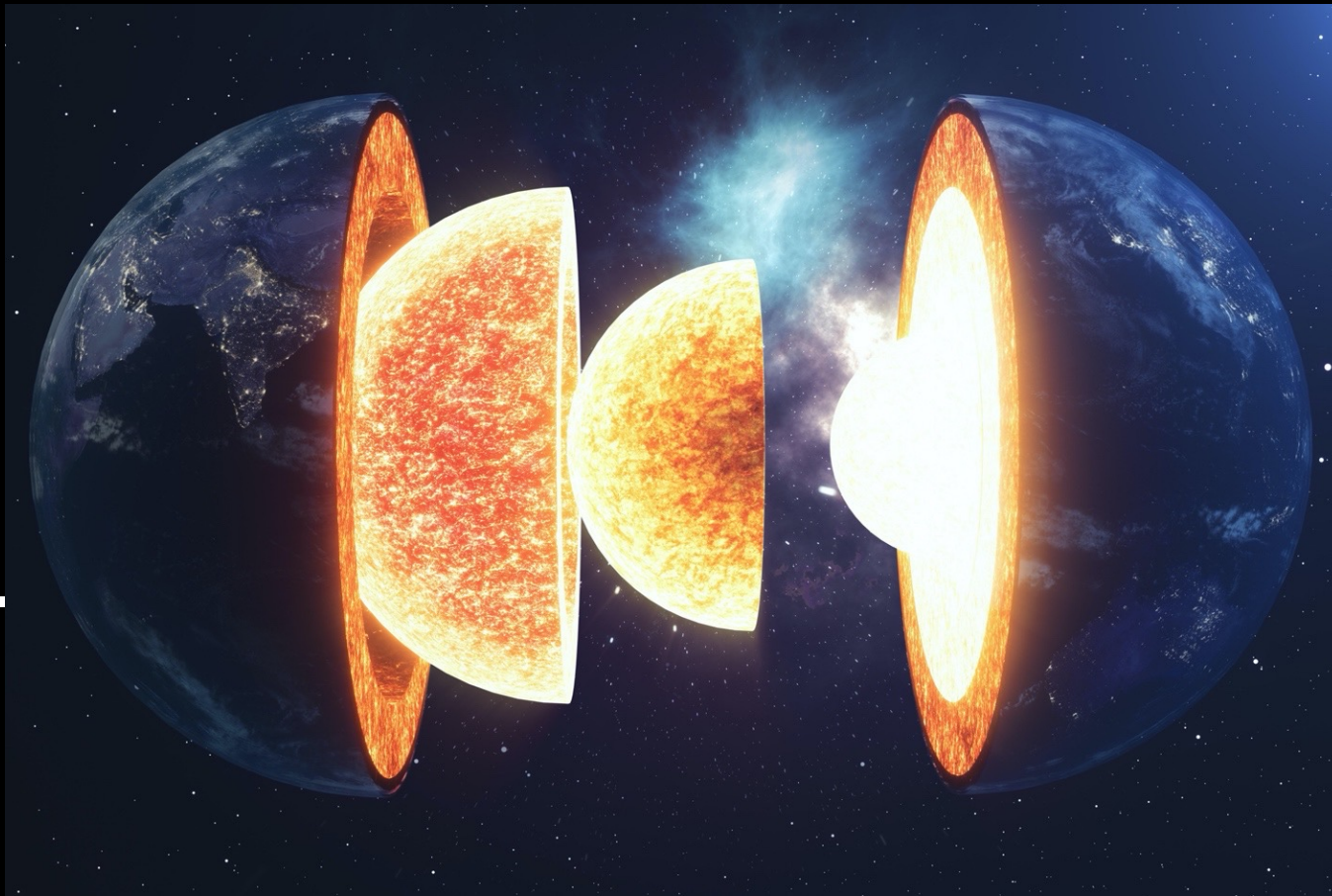
Please enjoy this preview of your Student Version of the presentation. Please note within this sample file:

- Some slides appear blank because they have been removed
- Student versions have portions of the text removed which is given in the teacher version and appear as _____ which the students are to fill in
- Other slides may have on them, this represents writing that has been removed on this sample

The paid full version of your resource includes both Google Slides and PowerPoint and is Google Classroom Ready

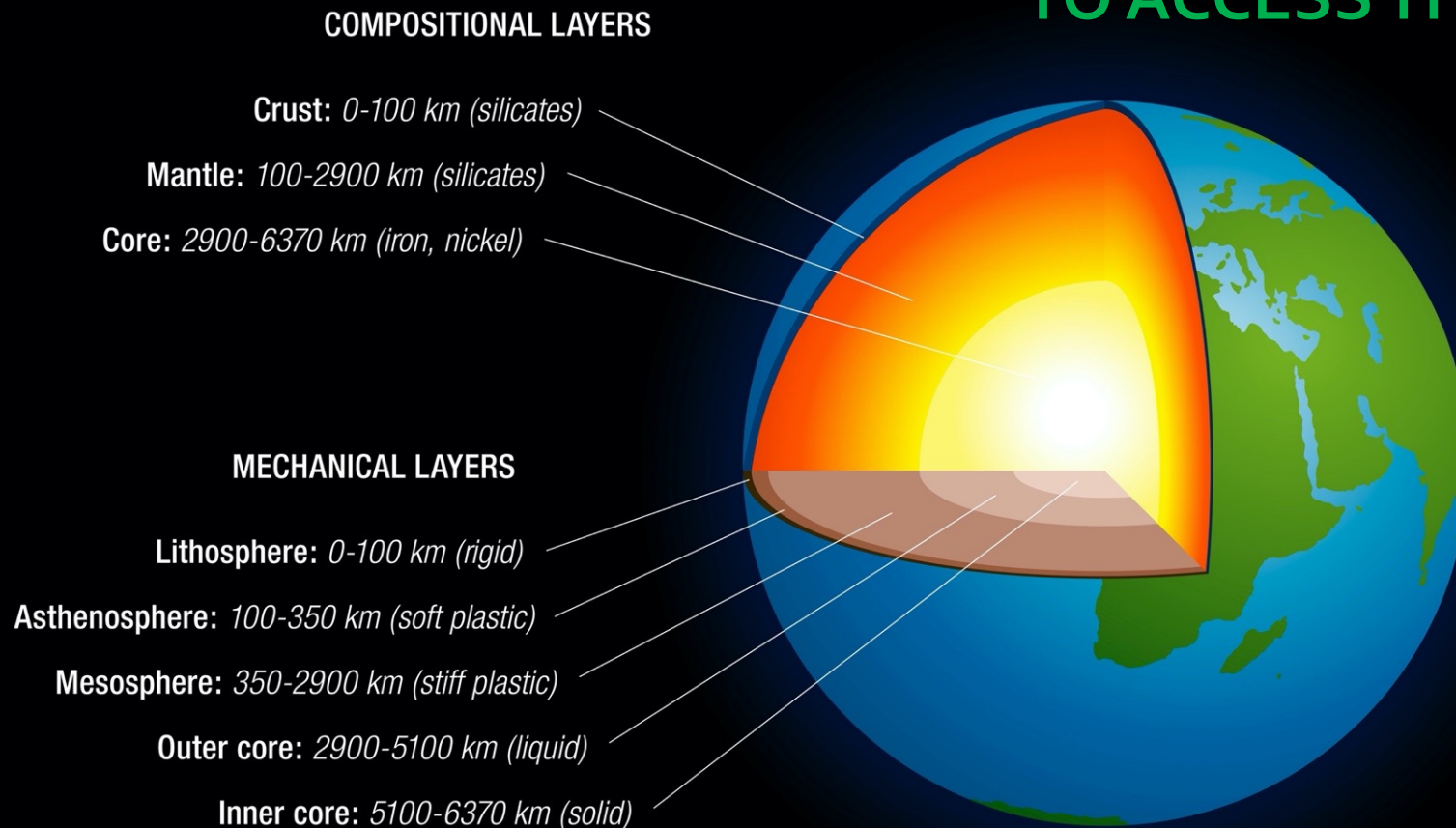


Earth's Composition: Part 1 – The Inner and Outer Cores



Layers!

CLICK THE VIDEO IMAGE
IN SLIDESHOW MODE
TO ACCESS THE VIDEO.

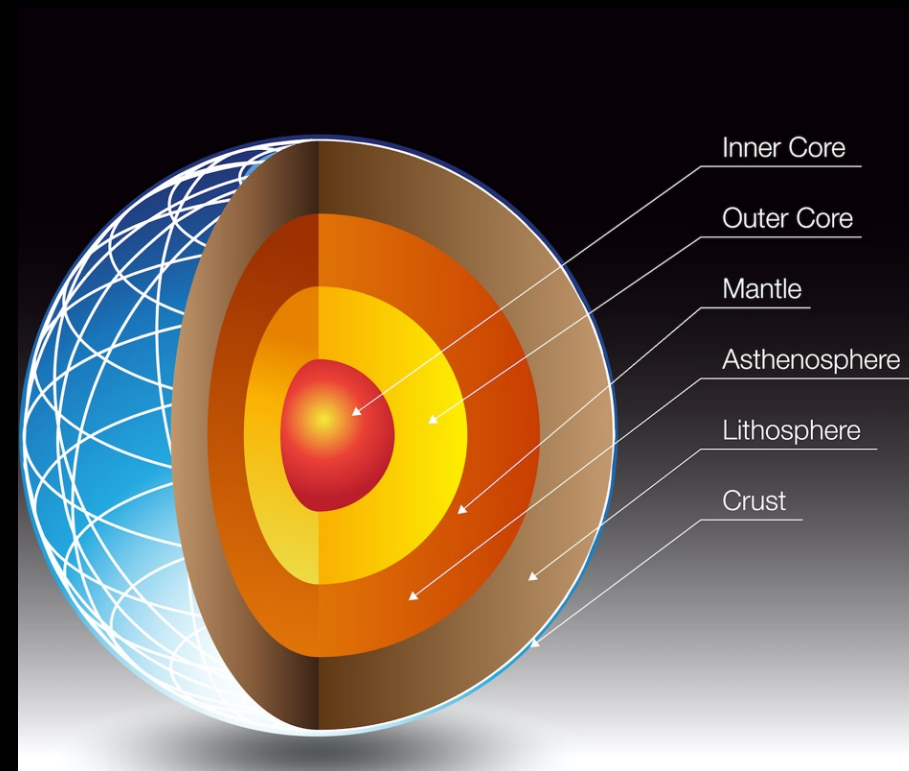


The Core

- The core is the centre of the Earth
- It is comprised of two parts:







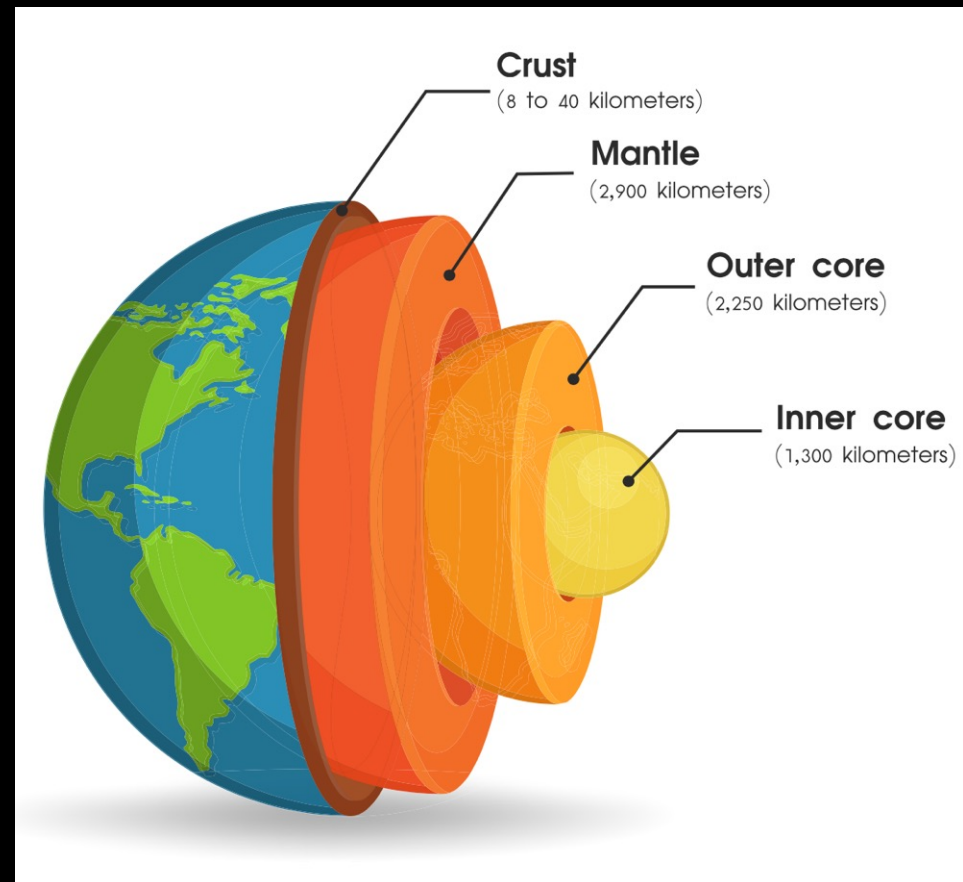
The Inner Core

- Given the chemical composition of our solar system and the theory of planetary formation, scientists believe that the inner core of the Earth is a solid nickel-iron alloy known as Nife (Ni = nickel, fe = iron)

- _____

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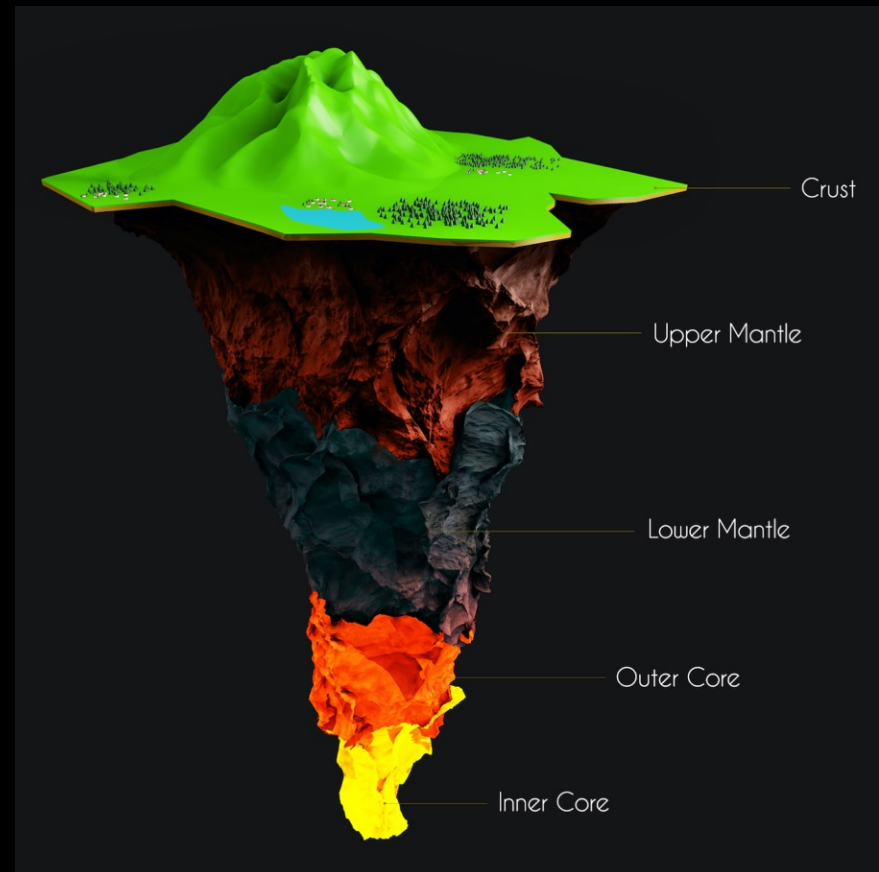
The Inner Core



The Inner Core

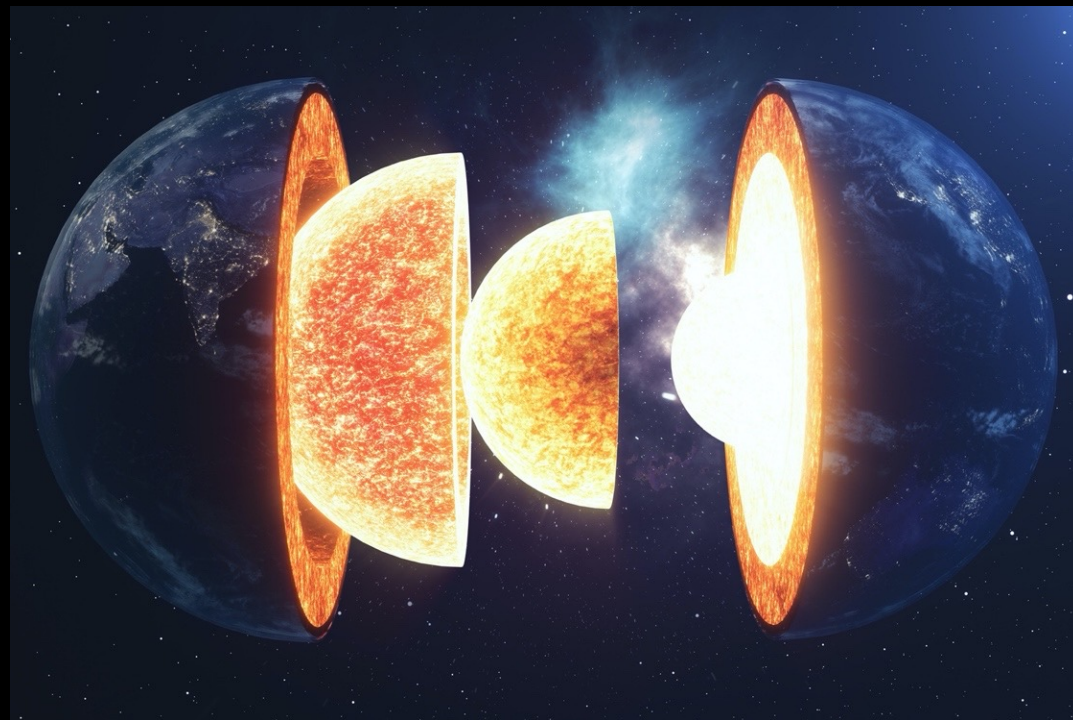
There are a few reasons that the core is this hot. The two most widely accepted reasons are:

1. Loss of Gravitational potential energy when the planet was formed by collapsing gas and dust
2. Radioactivity



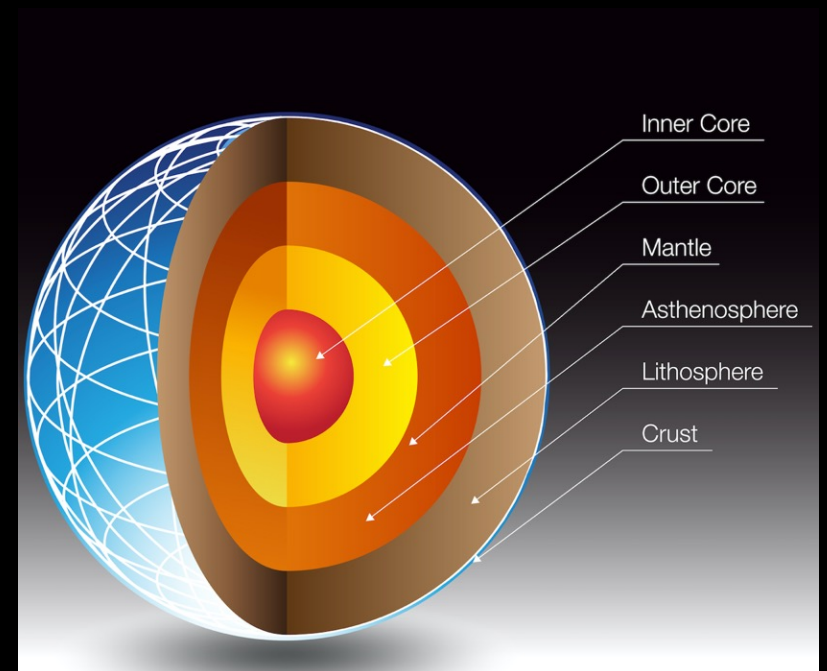
Planet Formation

- As the planet was formed, the mass all collapsed into a sphere because of gravity
- As the mass loses its potential energy (energy of position), it picks up kinetic energy (energy of motion)



Planet Formation

- As the mass smashes into itself, it starts to cause friction (heat)
- _____



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$PV=nRT$

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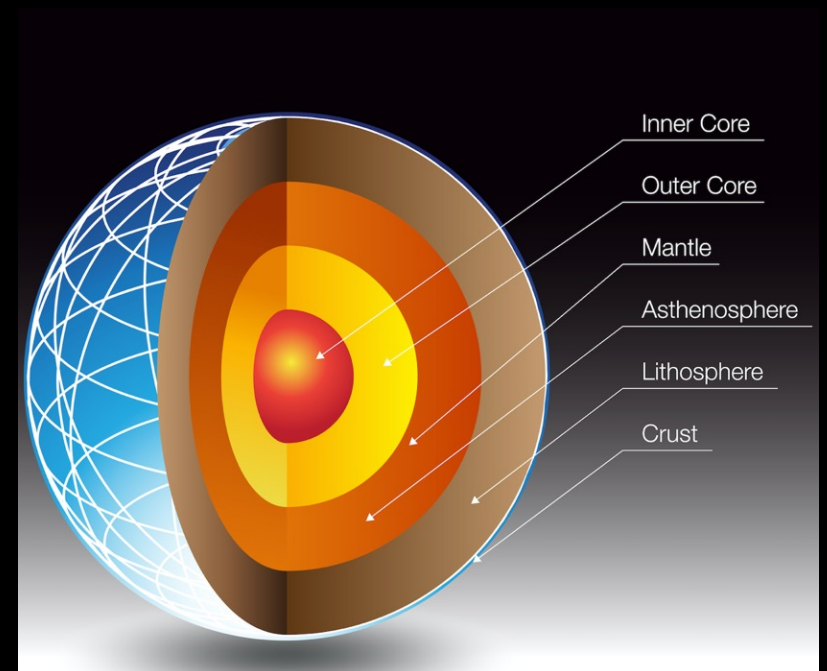
- However, friction and $PV=nRT$ is not enough to explain what's going on.
- Most calculations of friction and pressure only account for 10% of what is measured.
- _____
- _____

One More Thing

- As the Earth cools (i.e., radiates heat out into space), the core solidifies

- _____

- _____



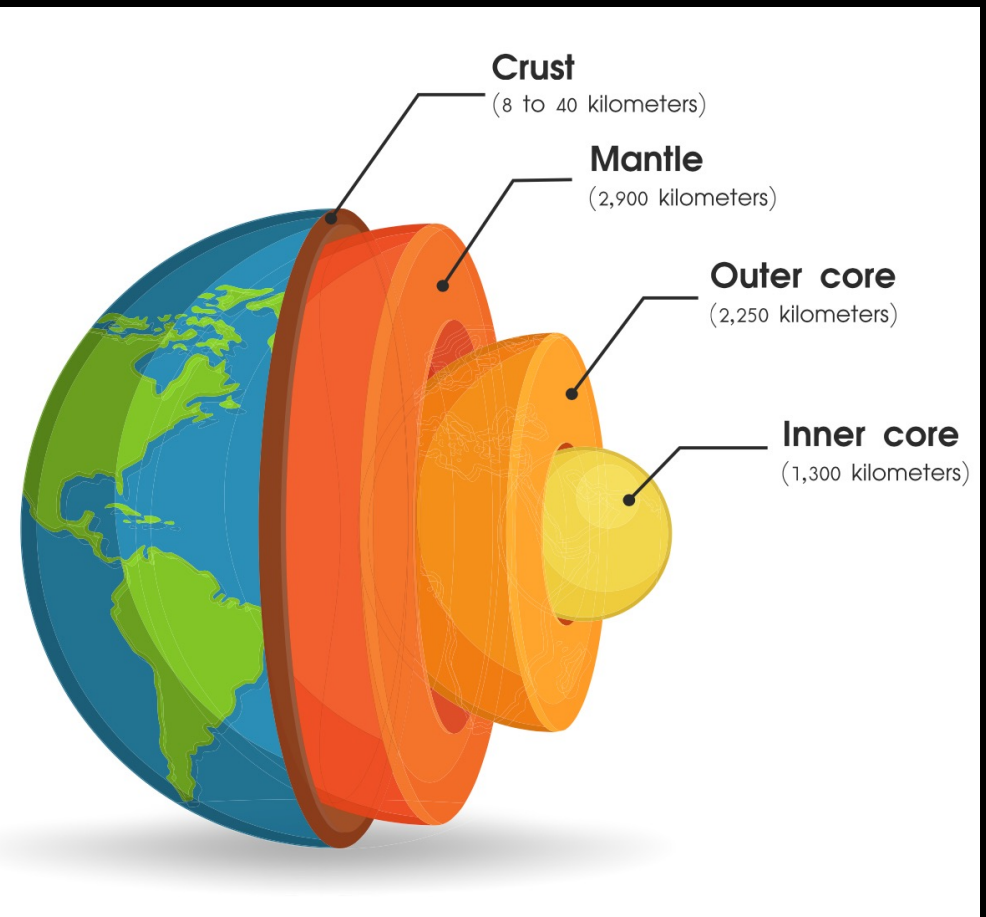
One More Thing



- Theoretically, the entire core and mantle would solidify and reach the surface
- When this happened, the Earth would become a cold dead planet... similar to the Moon



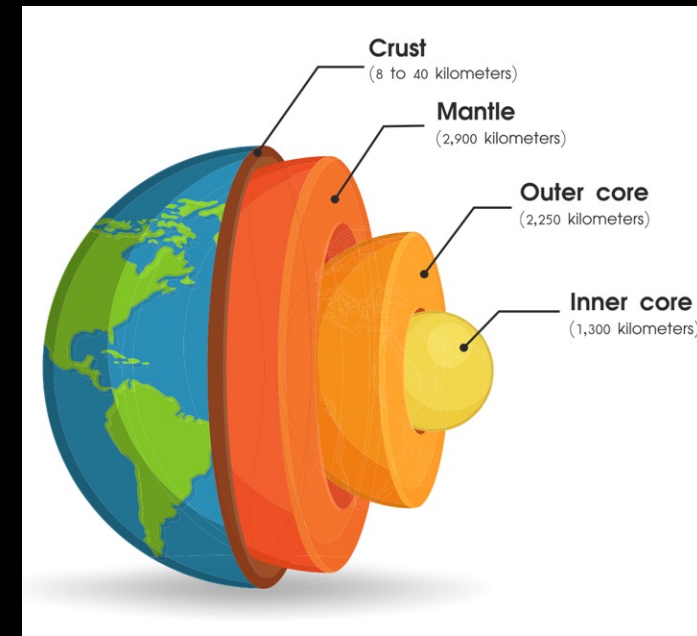
The Outer Core



The Outer Core



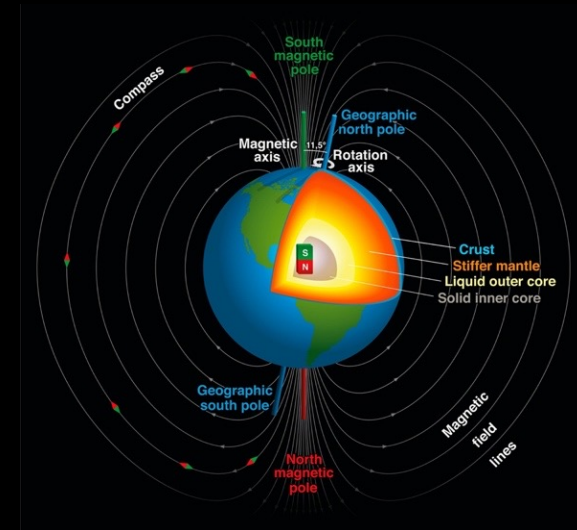
- Determined using seismic activity (vibrations from earthquakes)
- The temperature of the outer core ranges from 6100°C near the inner core to 4400°C at the outer regions.



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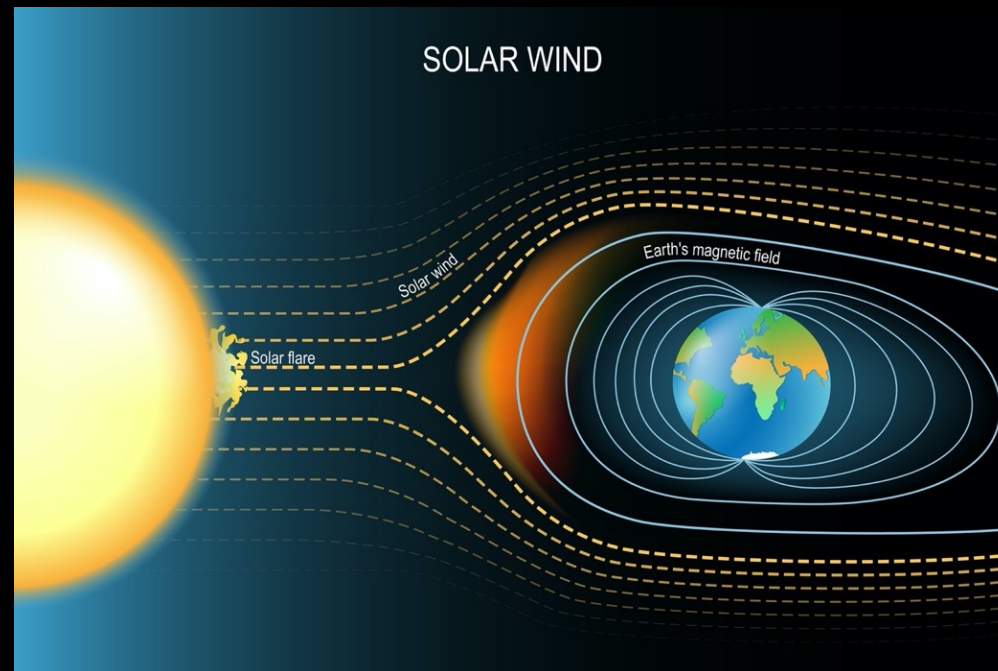
Earth's Magnetic Field

- _____
- However, just because a metal 'can' be magnetized, does not mean it will be
- _____
- Magnetic fields and Electric fields go hand in hand... i.e., Electromagnetism!



Earth's Magnetic Field

- _____
- Without it, life as we know it couldn't exist on Earth



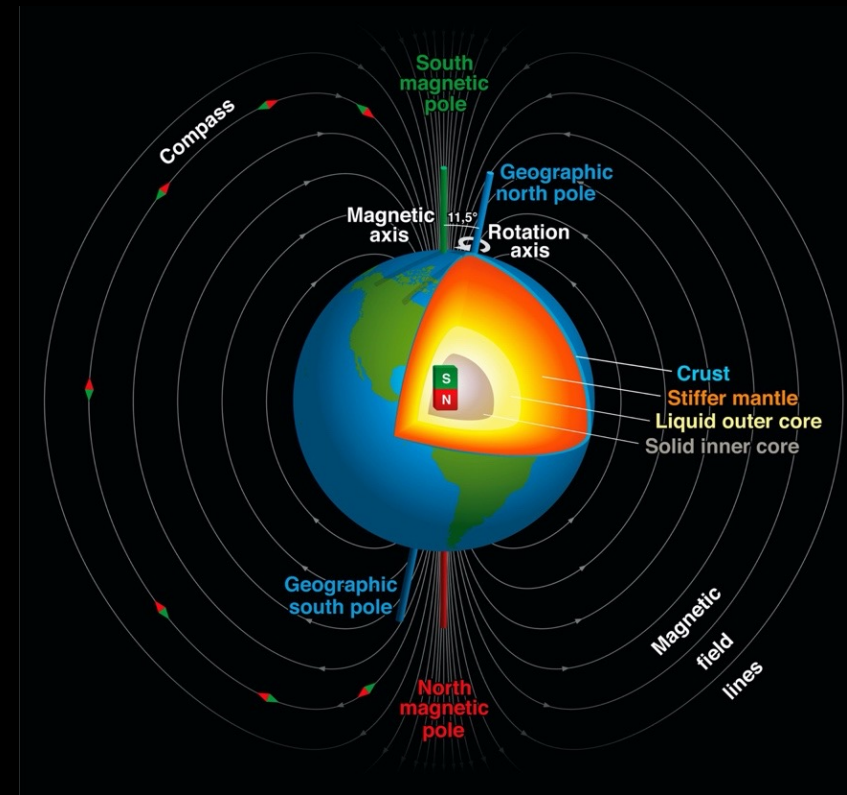
Earth's Magnetic Field



3

- The inner core, being solid, does not change
- The outer core, being liquid, allows for a changing electric field to be set up inside the Earth as the liquid metal moves round the solid inner core

■



What If The Earth's Core Cooled Down?

What do you think would happen?



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Liquid vs. Solid

- If hotter objects tend to melt... why is the inner core solid if it's hotter than the outer core?
- Pressure!



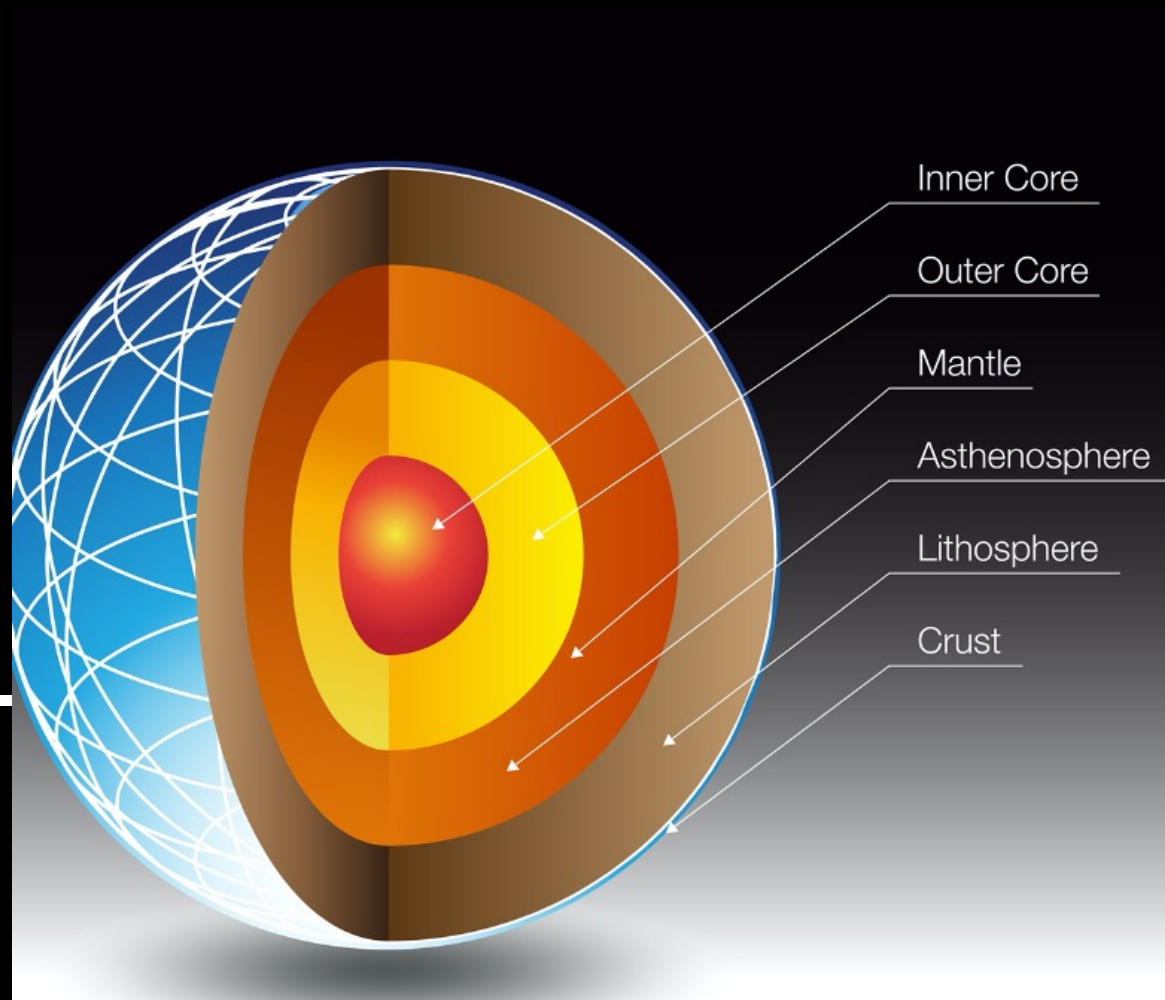
The Particle Theory of Matter

- The Particle Theory of Matter tells us that objects are solid when they are cooled because the particles have slowed down enough that the intermolecular forces can hold it together



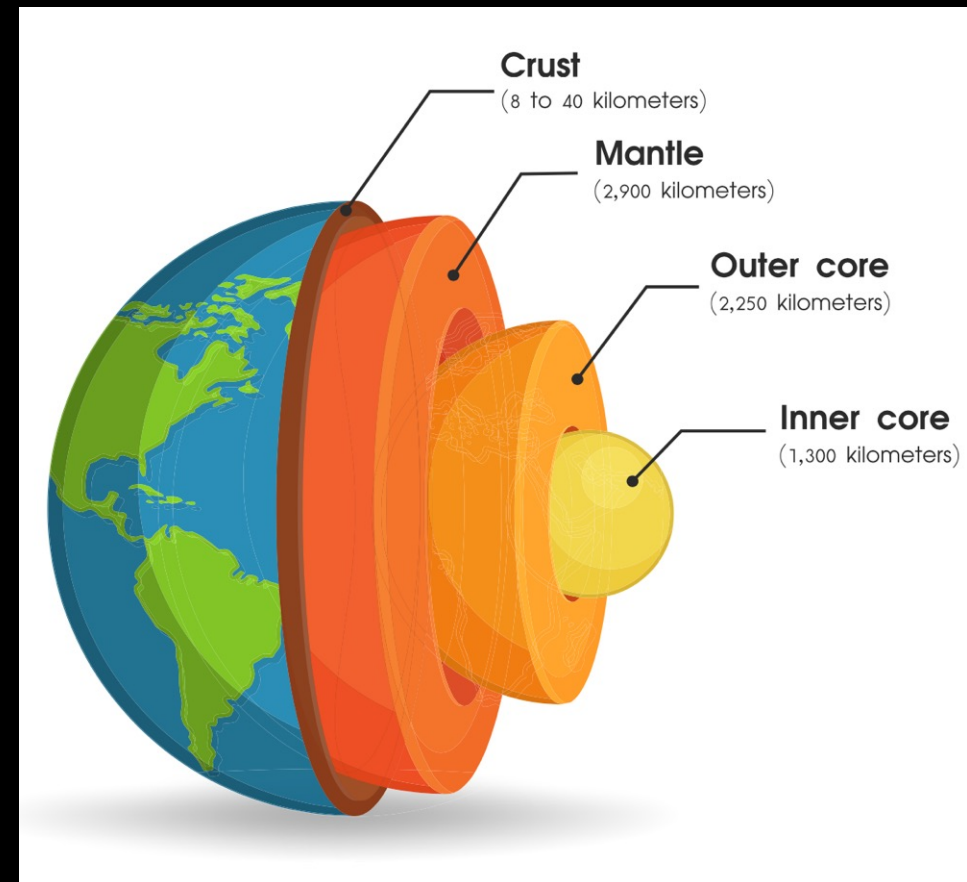
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Earth's Composition: Part 2 – The Mantle and Crust



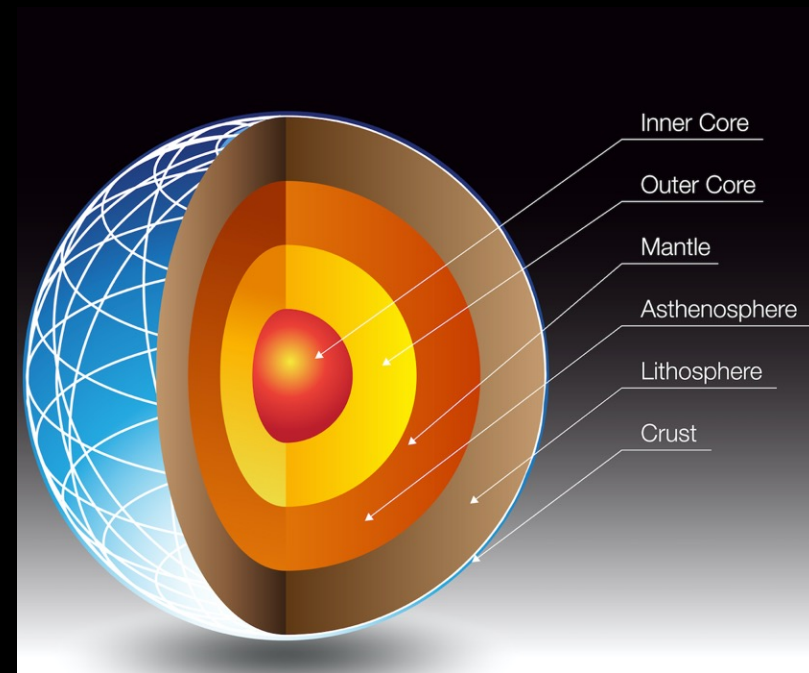
Recall: The Core

- The core is the centre of the Earth
- It is comprised of two parts:
 - The solid inner core
 - The molten (liquid) outer core



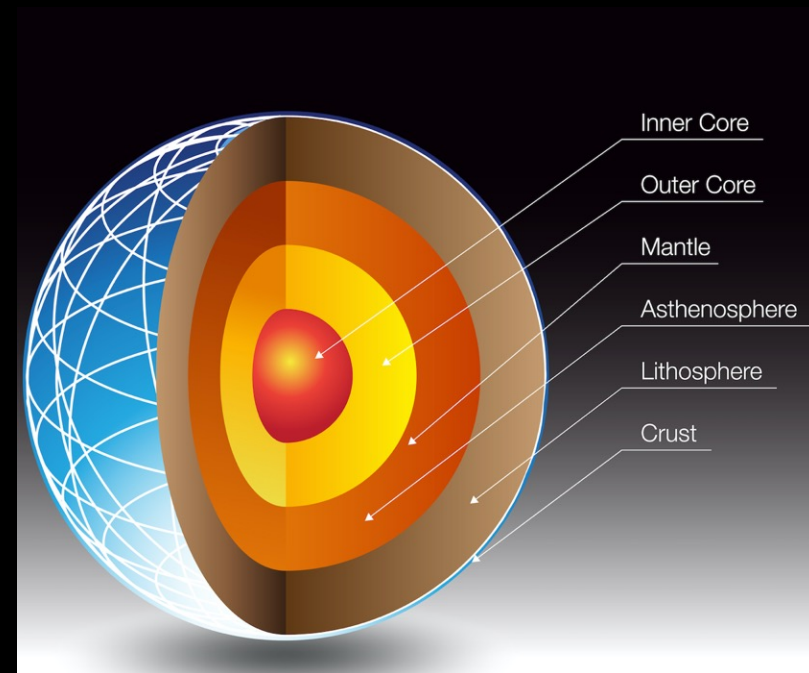
The Inner Core

- The inner core is comprised mostly of iron and nickel along with some heavier elements like gold, platinum, and radioactive materials
- The inner solid core is between 1200 and 1300 km in radius and it is approximately the same temperature as the Sun



The Outer Core

- The outer core seems to be made of the same material as the inner core, nickel and iron, but it is in liquid form
- The outer core is about 2300 km thick and lies on top of the inner core and below Earth's mantle
- The temperature of the outer core ranges from 6100°C near the inner core to 4400°C at the outer regions



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The Mantle

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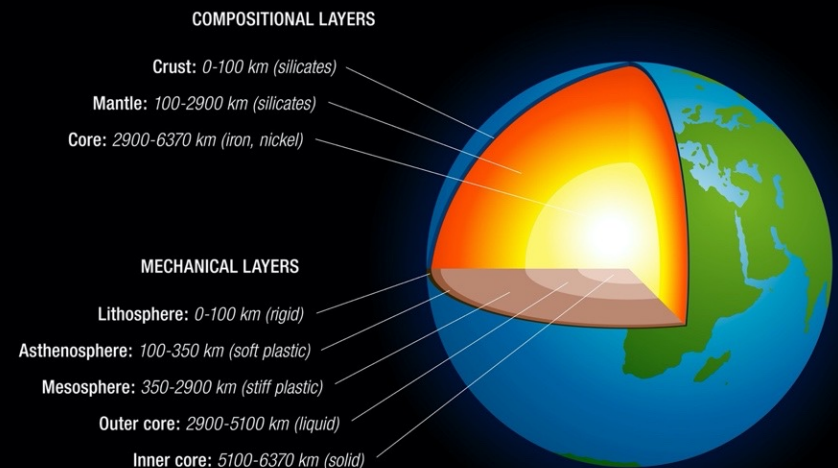
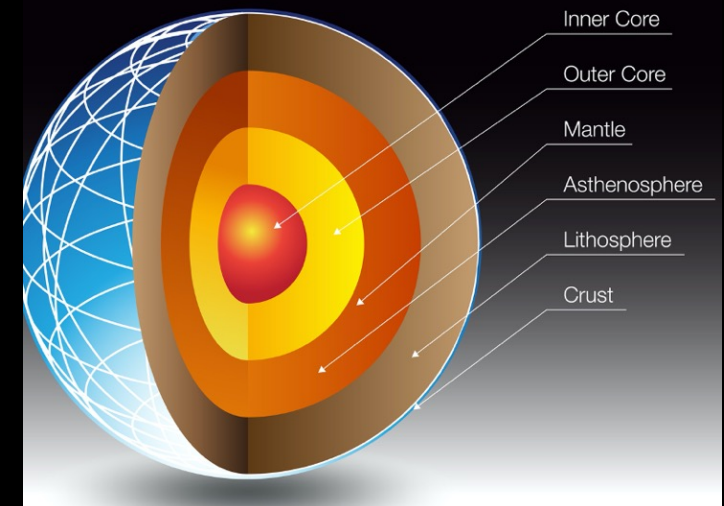


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- The section of the Earth that is between the liquid outer core and the crust



- Note: the core (inner and outer) only takes up about 14%



The Mantle

- Lava is produced in the mantle but can make its way to the surface



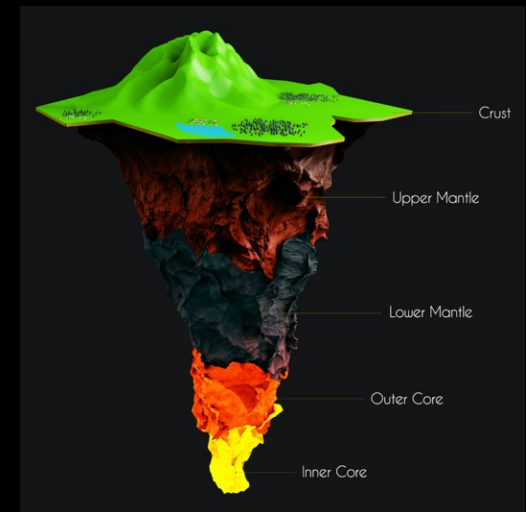
The Mantle

- _____
- Any part that is not liquid has a plastic quality to it that allows it to deform, bend, be shaped and slowly move
 - Note: For comparison... the crust does not have any plasticity. The crust is rigid.

The Mantle

The mantle is divided up into layers:

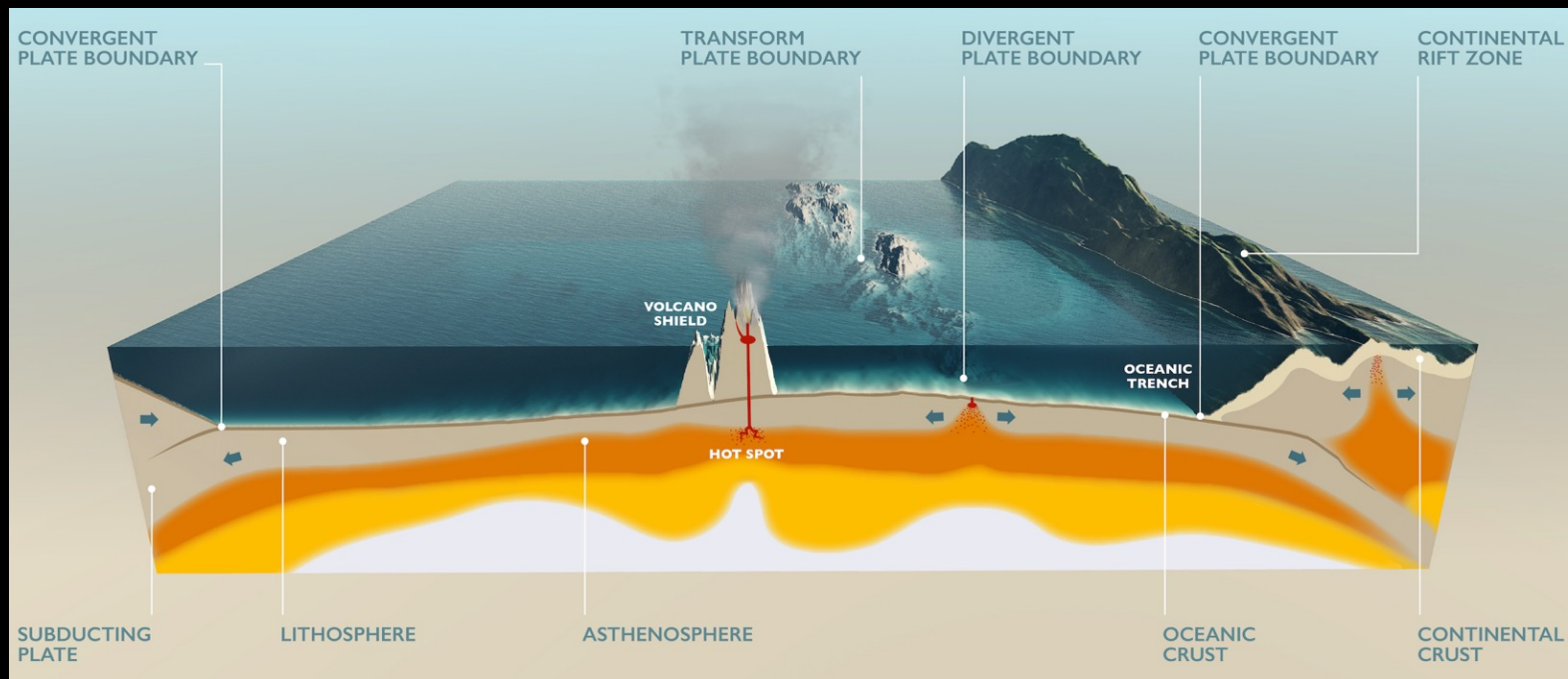
- _____
- _____
- _____
 - Comprises roughly 55 percent of the volume of the Earth
 - Is approximately 410 to 1,796 miles (or 660 to 2,891 km) deep
 - It's the transition zone between the mantle and outer core



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The Mantle

Due to high temperatures and heat in the Asthenosphere, rocks become ductile and can 'flow' at rates of cm/year.

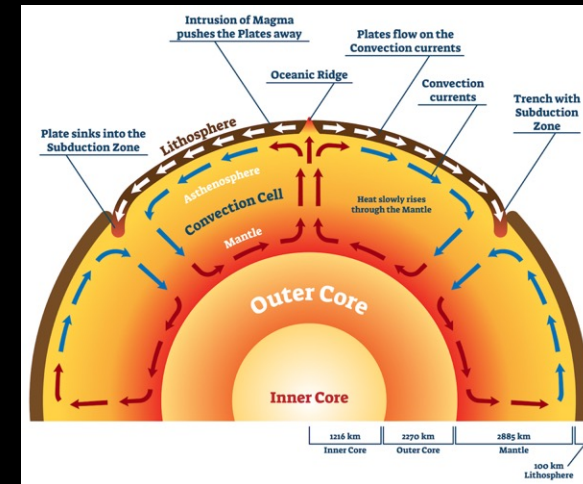


The Asthenosphere



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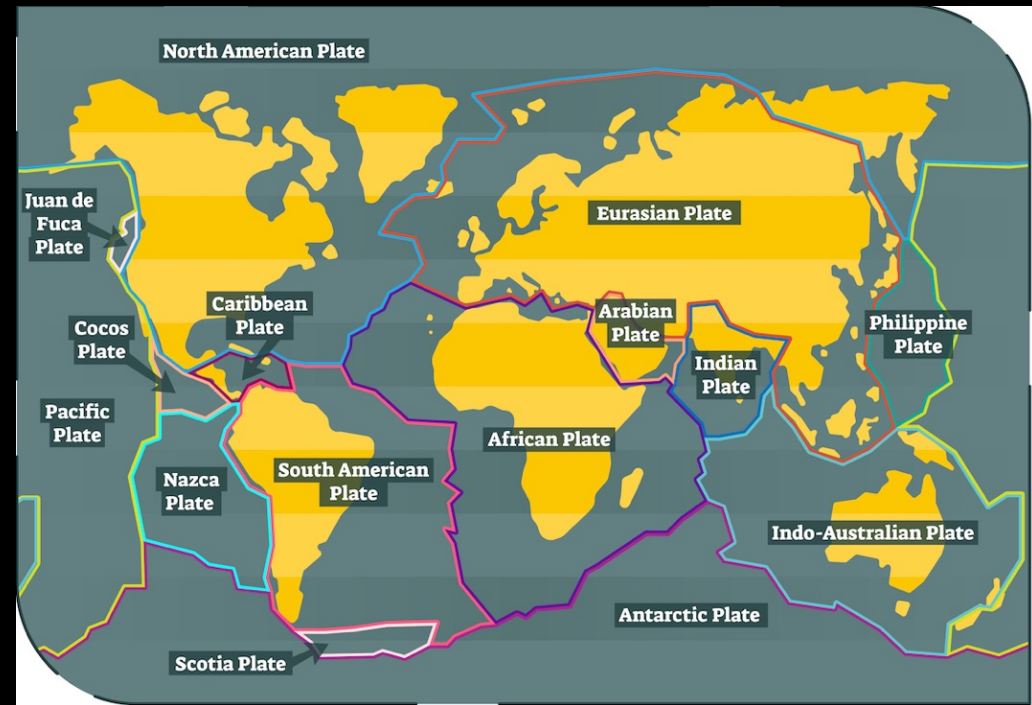




- Convection: Dense materials sink. As materials heat up, they become less dense and will float on top of the cooler/denser material

The Asthenosphere

Because the asthenosphere is plastic and flows, it is the major reason for the shifts/movements in the tectonic plates!



How do we know what we know?

- Again, we use seismology (the study of earthquakes and how sound waves pass through the Earth) to determine the different densities of the material
- Additionally, we can study things like volcanoes and lava flows to give us a direct view of what's inside.... i.e., Chemical composition



Lava versus Magma?

- What's the difference?
- They are the same thing





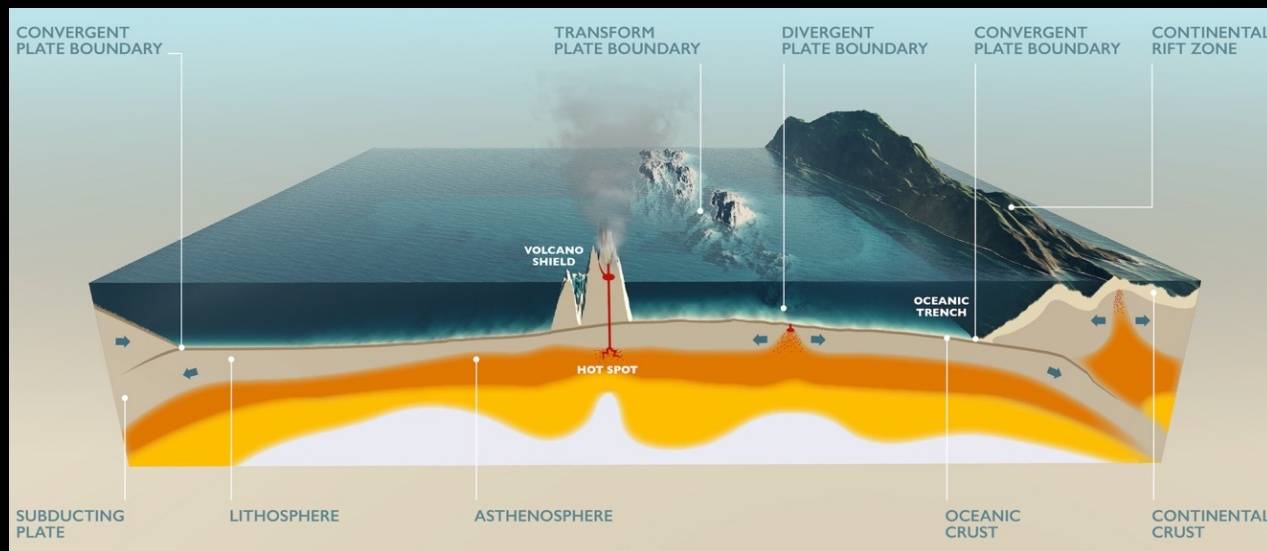


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The Lithosphere

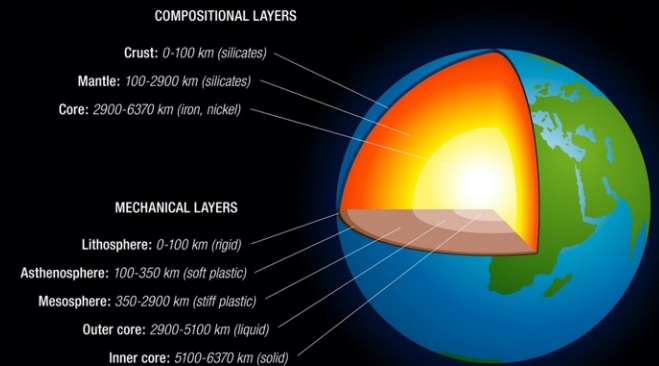
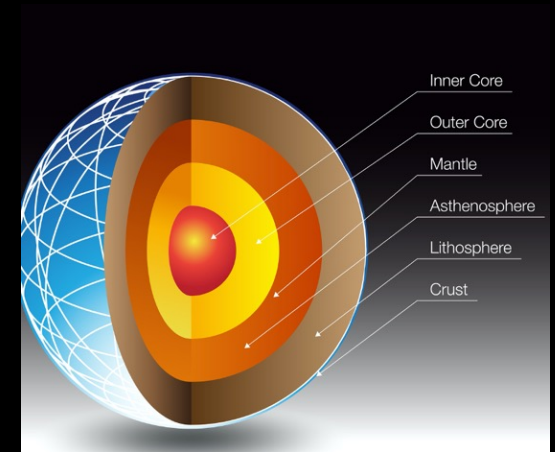
There are 2 types of Lithosphere:

1. _____
 - Includes crust under the oceans
2. _____
 - Includes crust under the continents



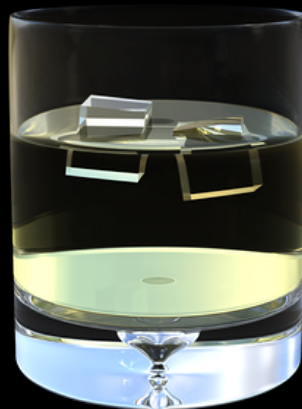
The Crust

- The crust is the outermost solid shell of the planet



The Crust

- _____
- The crust is less dense than the mantle, so, it floats on top... like ice in a glass of water



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Oceanic Crust

- Oceanic crust is much thinner than continental
- _____
- _____
- This process is at the heart of the Plate Tectonic Theory

Oceanic Crust

- _____
- _____
- Why is it less dense if it all comes from the same place?
 - It has to do with how the land cools, how different gases are released, and how different rocks of different densities sink to different levels

Tectonic Plates

The movement of these plates is the cause of many natural phenomena like earthquakes, volcanoes, etc.

