Earth's Interior

Clues about Earth's Interior

- The core must be made out of something dense like metal because Earth's overall density is greater than that of crustal rocks.
- Metal must be within Earth because Earth has a magnetic field.
- **Meteorites** (fragments of planetary bodies) remain from the time of the Solar System's formation and are thought to be similar to the Earth's interior.

Study Tip

This guide combines multiple concepts: Earth's crust, Earth's mantle, Earth's core, and Lithosphere and Asthenosphere. This can help you understand Earth's interior as a whole.

Earth's Crust

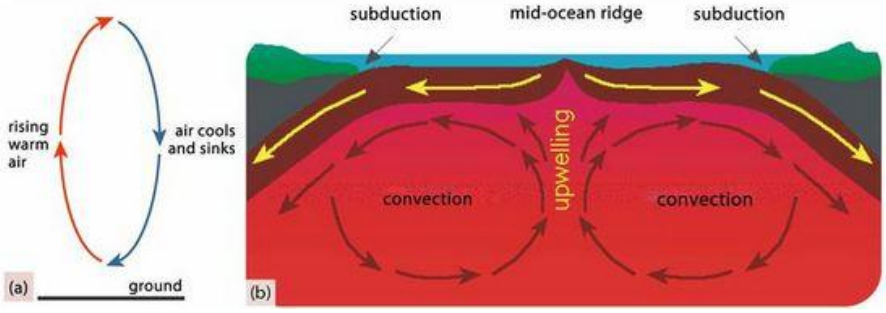
- The **crust** is the uppermost layer and is less than 1% of the Earth by mass. **Oceanic crust** is made up of magma that erupted onto the seafloor. It's relatively thin, lies above the mantle, and is coated with sediment.
- **Continental crust** is made up a variety of all types of rocks, though it is mostly composed of granite. It rises higher than oceanic crust due to its lower density and greater thickness.

Crust	Thickness	Density	Composition	Rock types
Oceanic	5-12 km (3-8 mi)	3.0 g/cm^3	Mafic	Basalt and gabbro
Continental	Avg. 35 km (22 mi)	2.7 g/cm^3	Felsic	All types

This chart compares some characteristics of the two types of crust

Earth's Mantle

The next layer down is the **mantle**. When the Earth was young, **Kimberlite pipes** originated from the mantle, shooting up volcanic rock containing diamonds. The mantle is made up of solid peridotite. The two types of heat flow that occur within the mantle are conduction and convection:



- **Conduction**: Heat is transferred through the rapid collision of atoms. The mantle is hot due to heat conducted from the core.
- **Convection**: Convection currents form from the movement materials of different temperatures. **Convection cells** in the mantle are circular patterns of rising warm air and sinking cool air.

Earth's Core

As stated earlier, the core must be made up of metal because the Earth has a magnetic field and Earth's surface layers are much less dense than Earth overall. Scientists know that the inner core is solid and the outer core is liquid because:

- Secondary seismic waves stop at the inner core.
- The strong magnetic field is caused by convection in the outer core, and convection occurs in liquids or gases.

Lithosphere and Asthenosphere

The **lithosphere** is about 100 km thick and is composed of the crust and the uppermost mantle. It behaves as a brittle, rigid solid. The **asthenosphere** is the part of the upper mantle that acts like a hot plastic and flows. The lithosphere rides on the asthenosphere.

Concept Check

- What clues confirm that Earth's inner core is solid and outer core is liquid?
- What is oceanic crust? Continental crust?
- What are Kimberlite pipes?
- Describe the mantle.
- Compare the two: conduction vs. convection.
- Compare the two: the lithosphere vs. the asthenosphere.