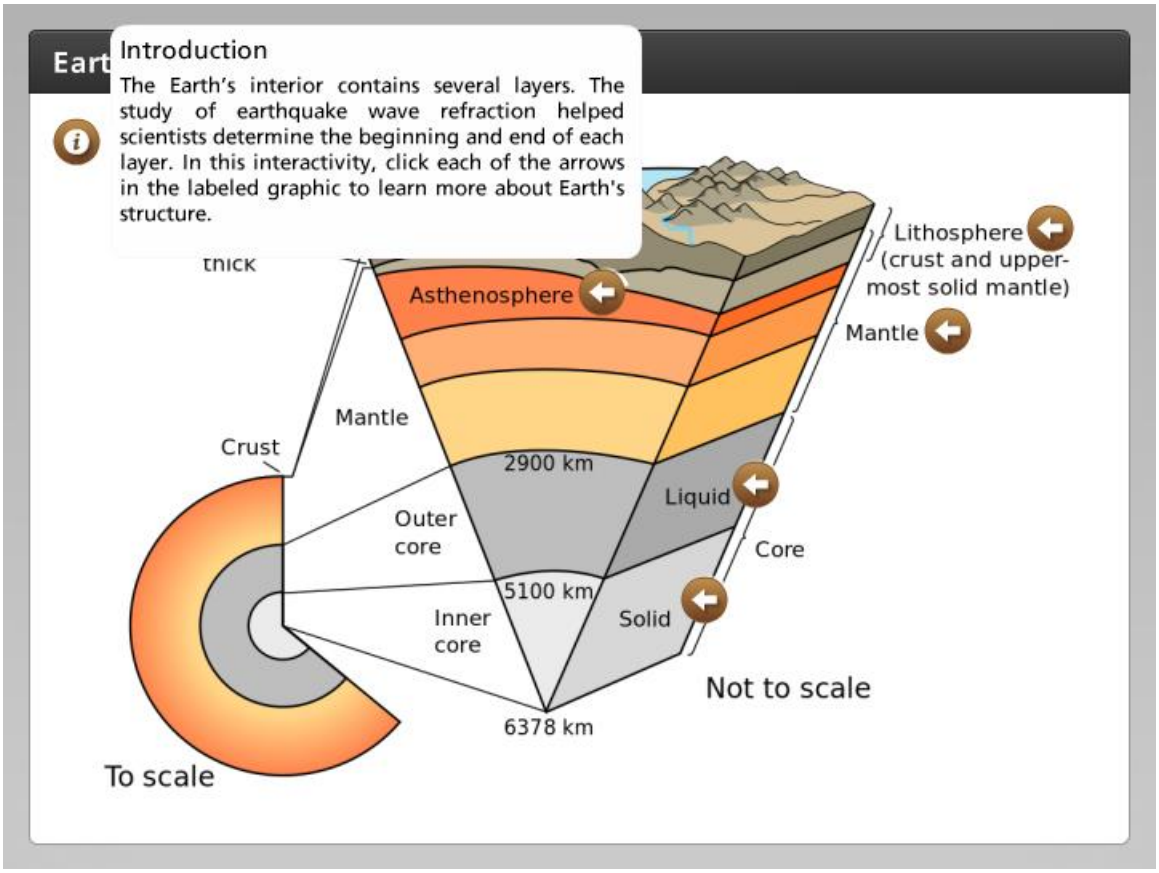
Module 7: Plate Tectonics and Earth's Structure
Topic 1 Content: Earth's Structure Notes

Introduction



The Earth's interior contains several layers. The study of earthquake wave refraction helped scientists determine the beginning and end of each layer. In this interactivity, click each of the arrows in the labeled graphic to learn more about Earth's structure.

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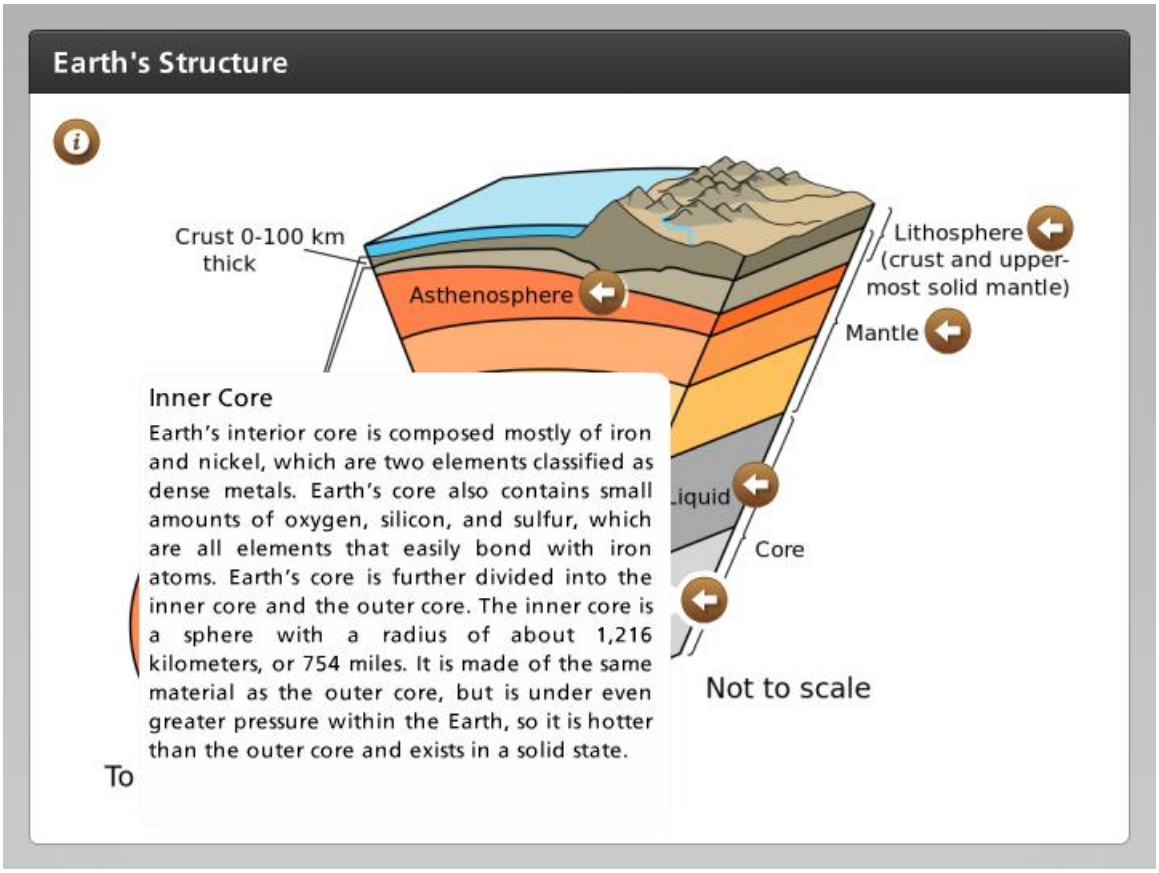
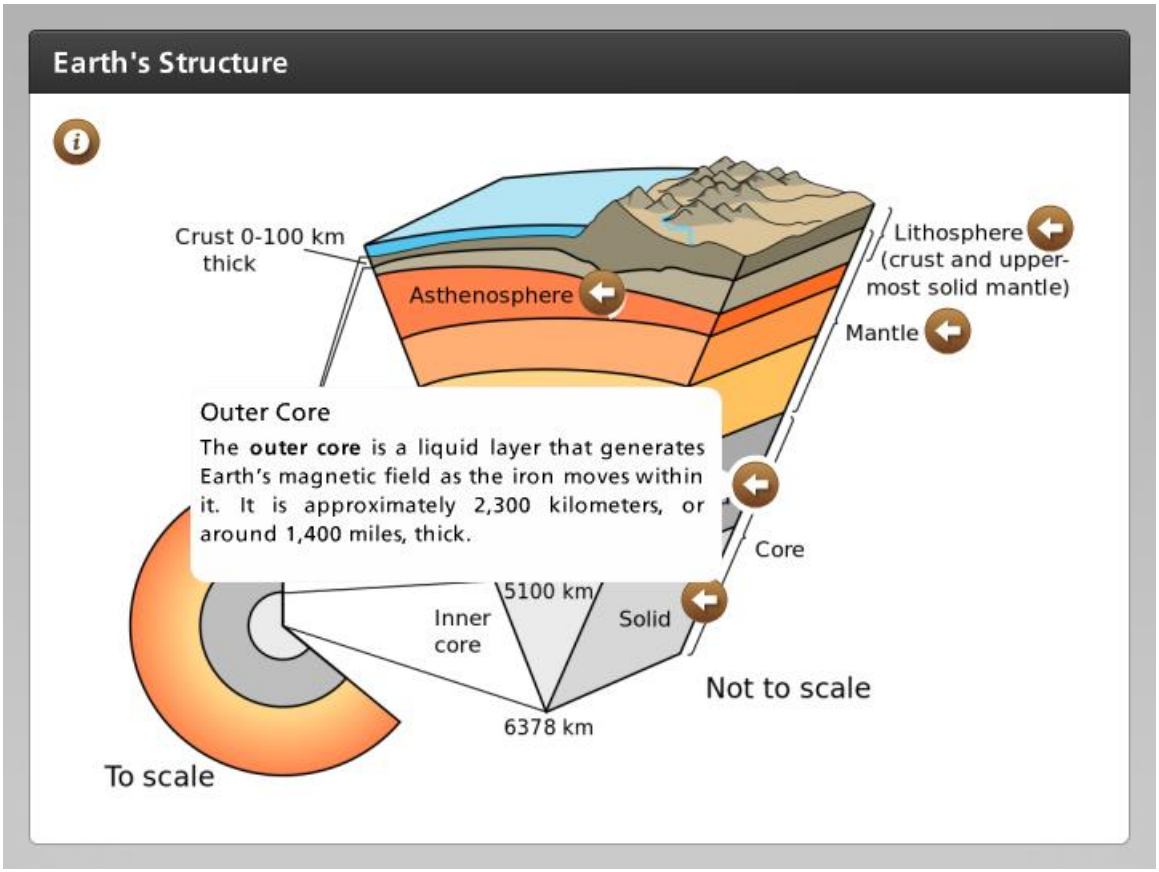
Inner Core



Earth's interior core is composed mostly of iron and nickel, which are two elements classified as dense metals. Earth's core also contains small amounts of oxygen, silicon, and sulfur, which are all elements that easily bond with iron atoms. Earth's core is further divided into the inner core and the outer core. The inner core is a sphere with a radius of about 1,216 kilometers, or 754 miles. It is made of the same material as the outer core, but is under even greater pressure within the Earth, so it is hotter than the outer core and exists in a solid state.

Outer Core



The **outer core** is a liquid layer that generates Earth's magnetic field as the iron moves within it. It is approximately 2,300 kilometers, or around 1,400 miles, thick.

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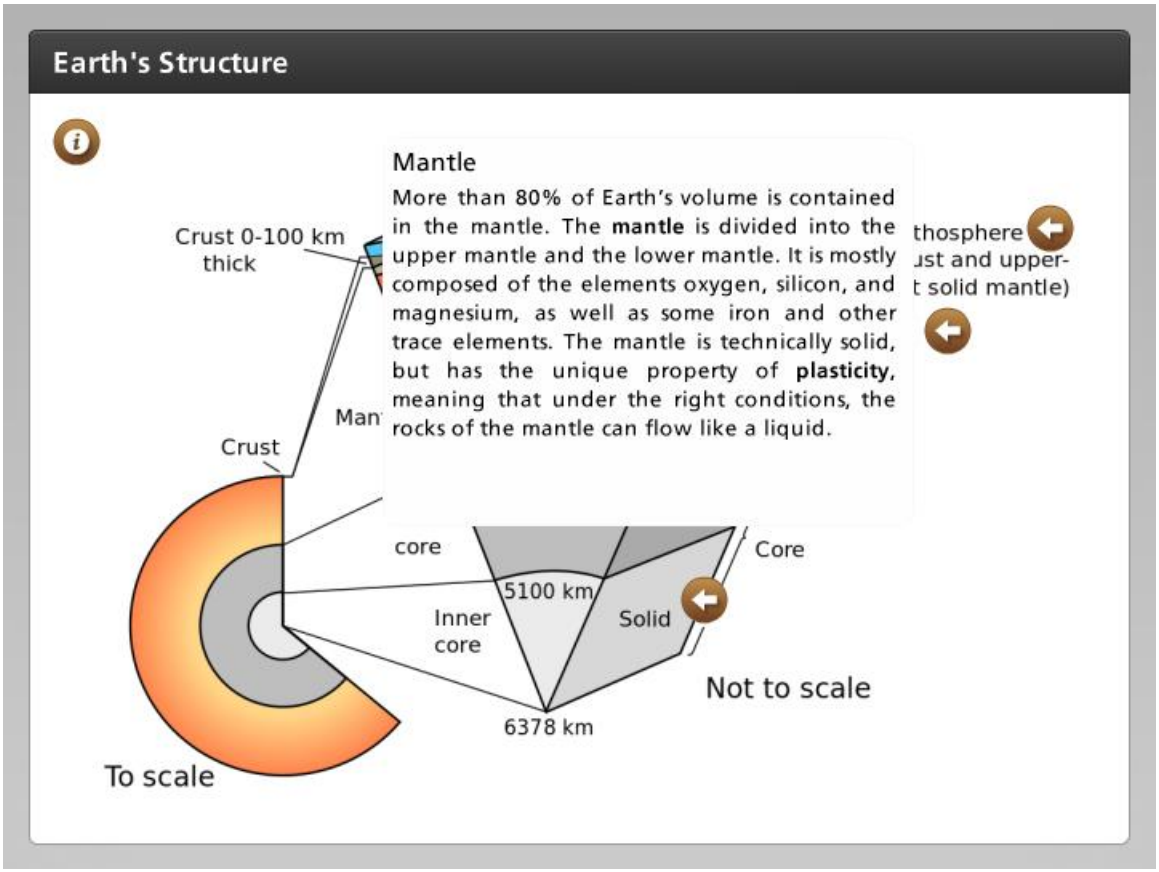
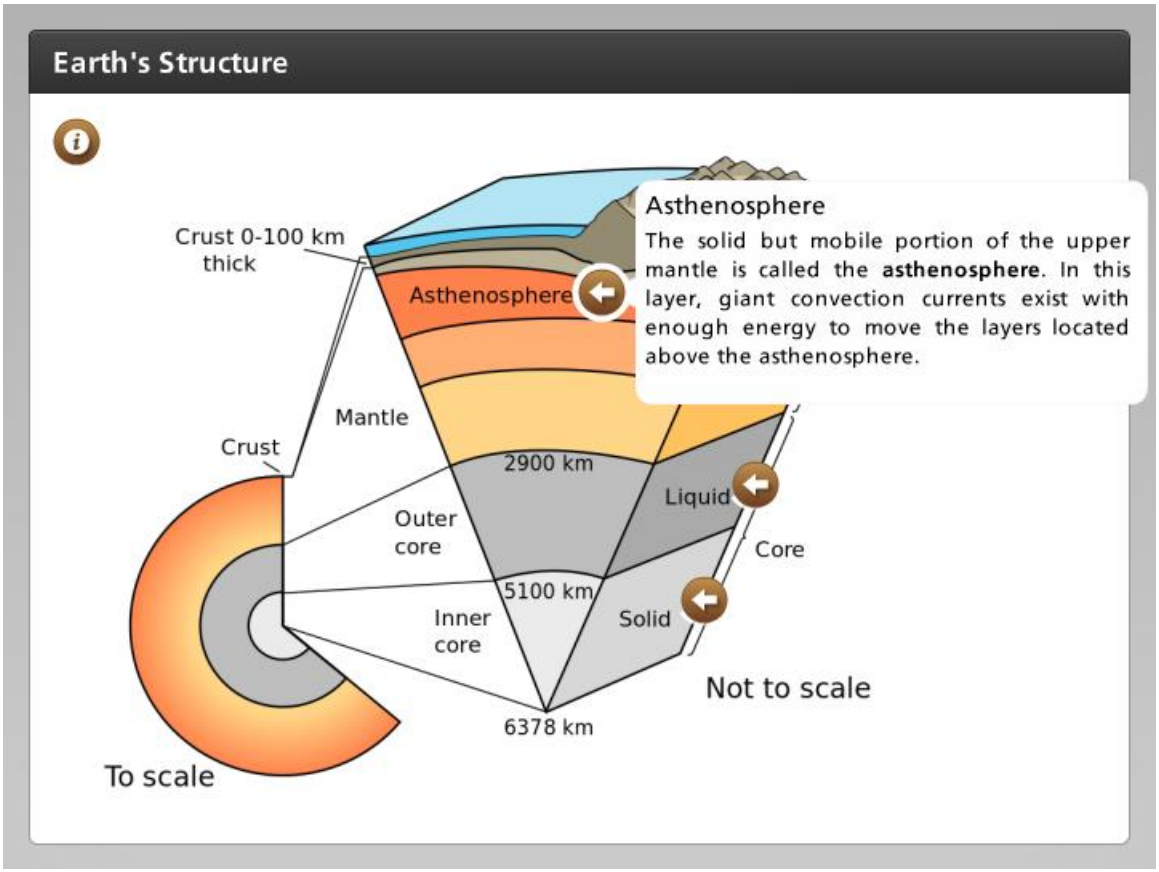
Mantle



More than 80% of Earth's volume is contained in the mantle. The **mantle** is divided into the upper mantle and the lower mantle. It is mostly composed of the elements oxygen, silicon, and magnesium, as well as some iron and other trace elements. The mantle is technically solid, but has the unique property of **plasticity**, meaning that under the right conditions, the rocks of the mantle can flow like a liquid.

Asthenosphere



The solid but mobile portion of the upper mantle is called the **asthenosphere**. In this layer, giant convection currents exist with enough energy to move the layers located above the asthenosphere.

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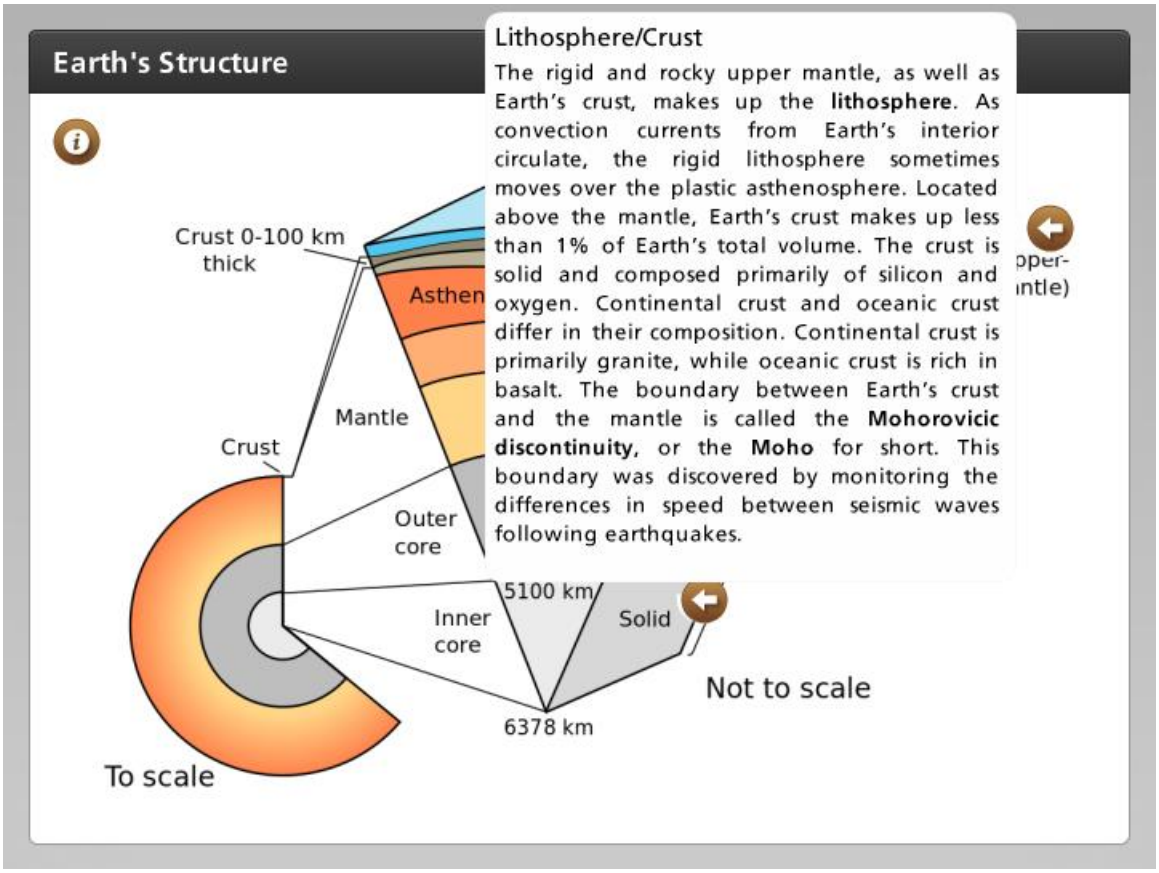
Lithosphere/Crust



The rigid and rocky upper mantle, as well as Earth's crust, makes up the **lithosphere**. As convection currents from Earth's interior circulate, the rigid lithosphere sometimes moves over the plastic asthenosphere. Located above the mantle, Earth's crust makes up less than 1% of Earth's total volume. The crust is solid and composed primarily of silicon and oxygen. Continental crust and oceanic crust differ in their composition. Continental crust is primarily granite, while oceanic crust is rich in basalt. The boundary between Earth's crust and the mantle is called the **Mohorovicic discontinuity**, or the **Moho** for short. This boundary was discovered by monitoring the differences in speed between seismic waves following earthquakes.