Module 7: Plate Tectonics and Earth's Structure
Topic 2 Content: Plate Tectonics – The Basics Presentation Notes

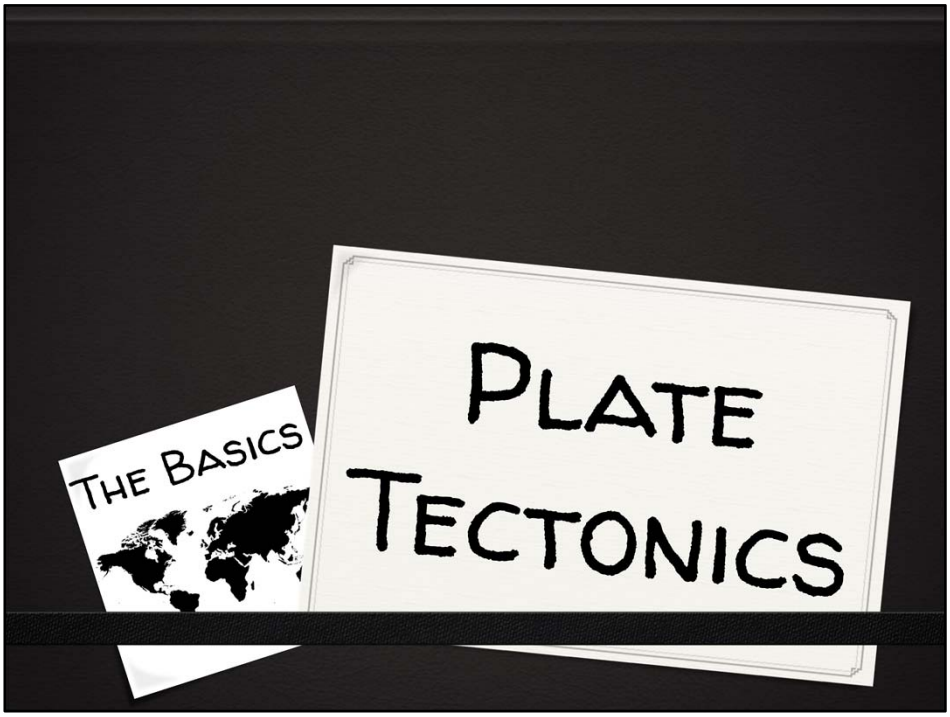
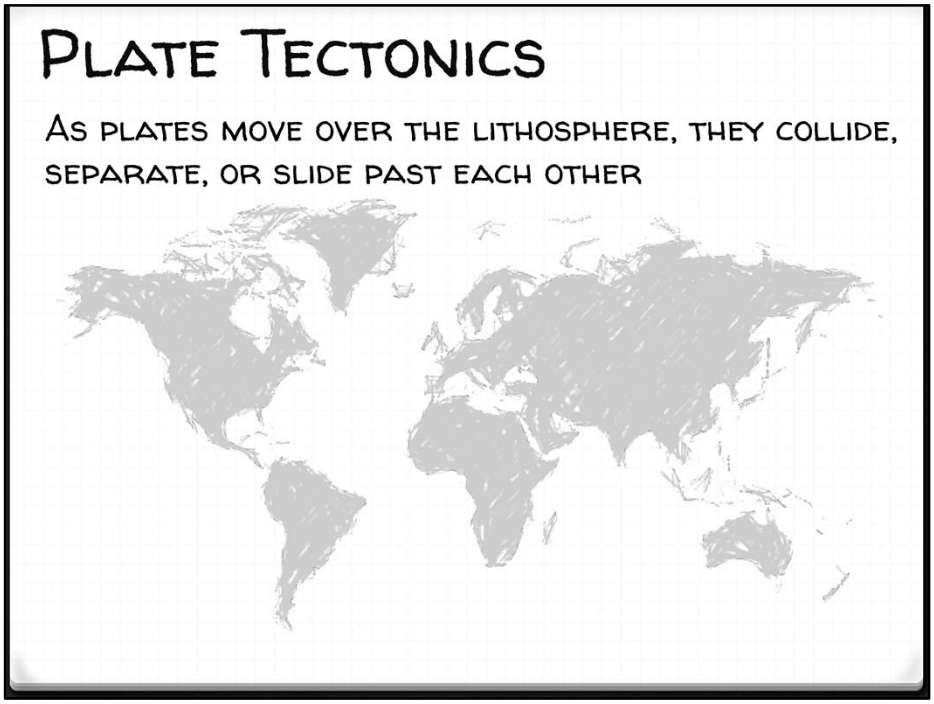


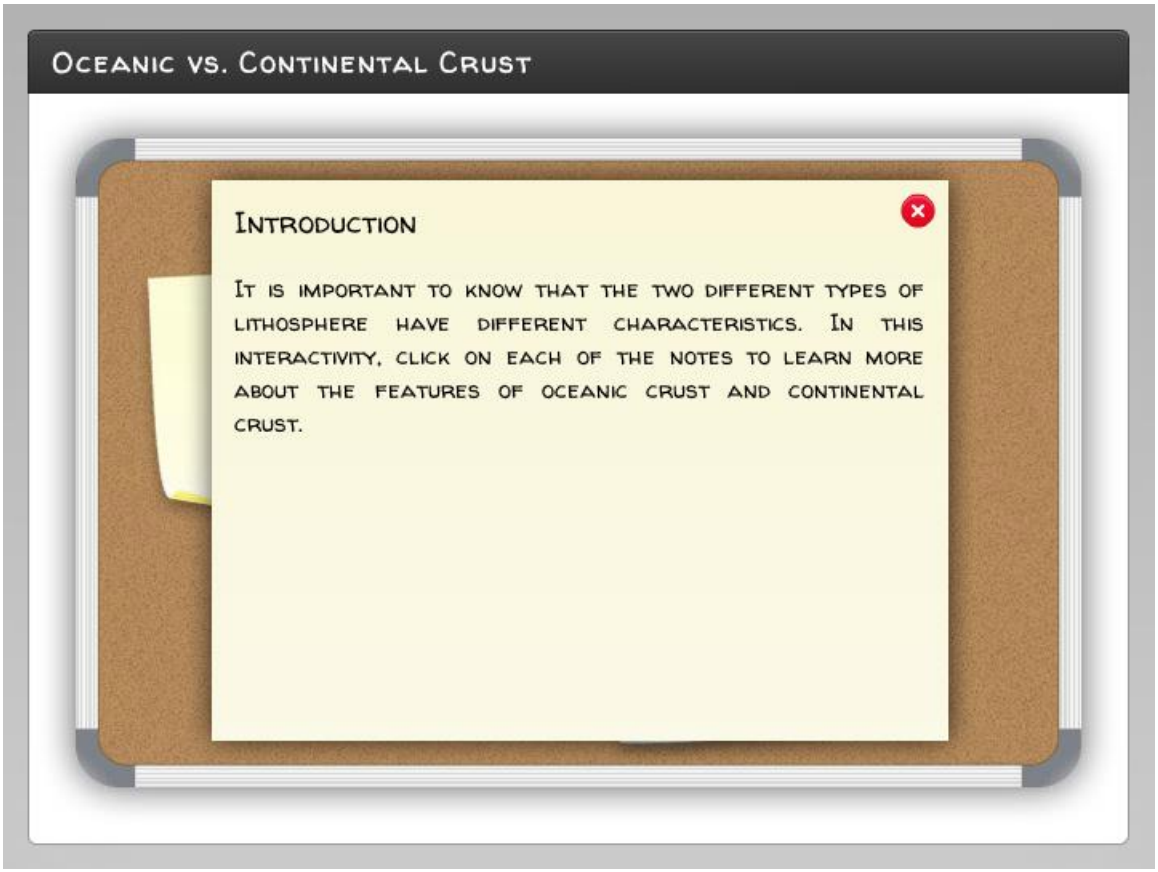
Plate Tectonics – The Basics

Module 7: Plate Tectonics and Earth's Structure
Topic 2 Content: Plate Tectonics – The Basics Presentation Notes



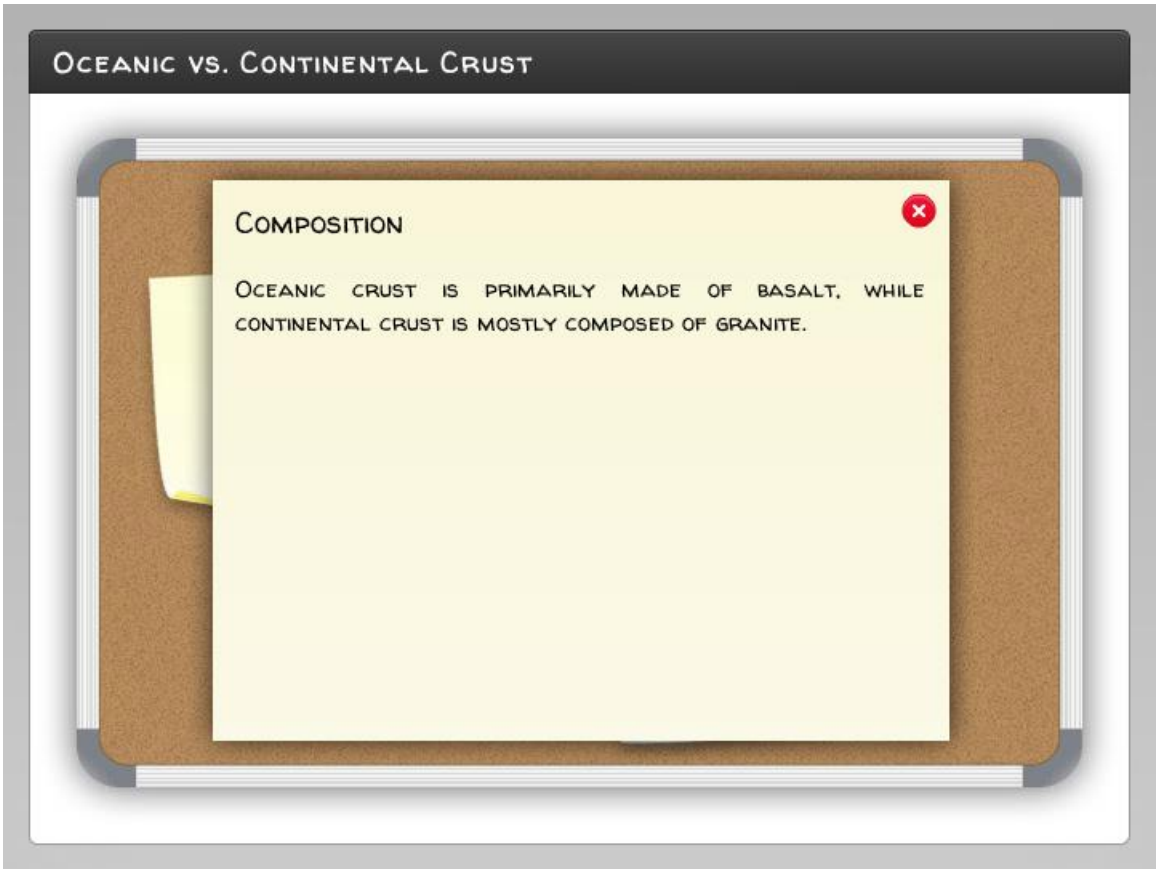
Earth's crust is divided into several plates. Scientists believe that convection currents in Earth's mantle cause the plates, also known as the lithosphere, to move on top of the plastic asthenosphere. As the plates move, the arrangements of Earth's landmasses move and change. These plates can either collide, separate, or slide past each other. This theory is called **plate tectonics,** and scientists theorize that it has been occurring on Earth for billions of years.

Module 7: Plate Tectonics and Earth's Structure
Topic 2 Content: Plate Tectonics – The Basics Presentation Notes

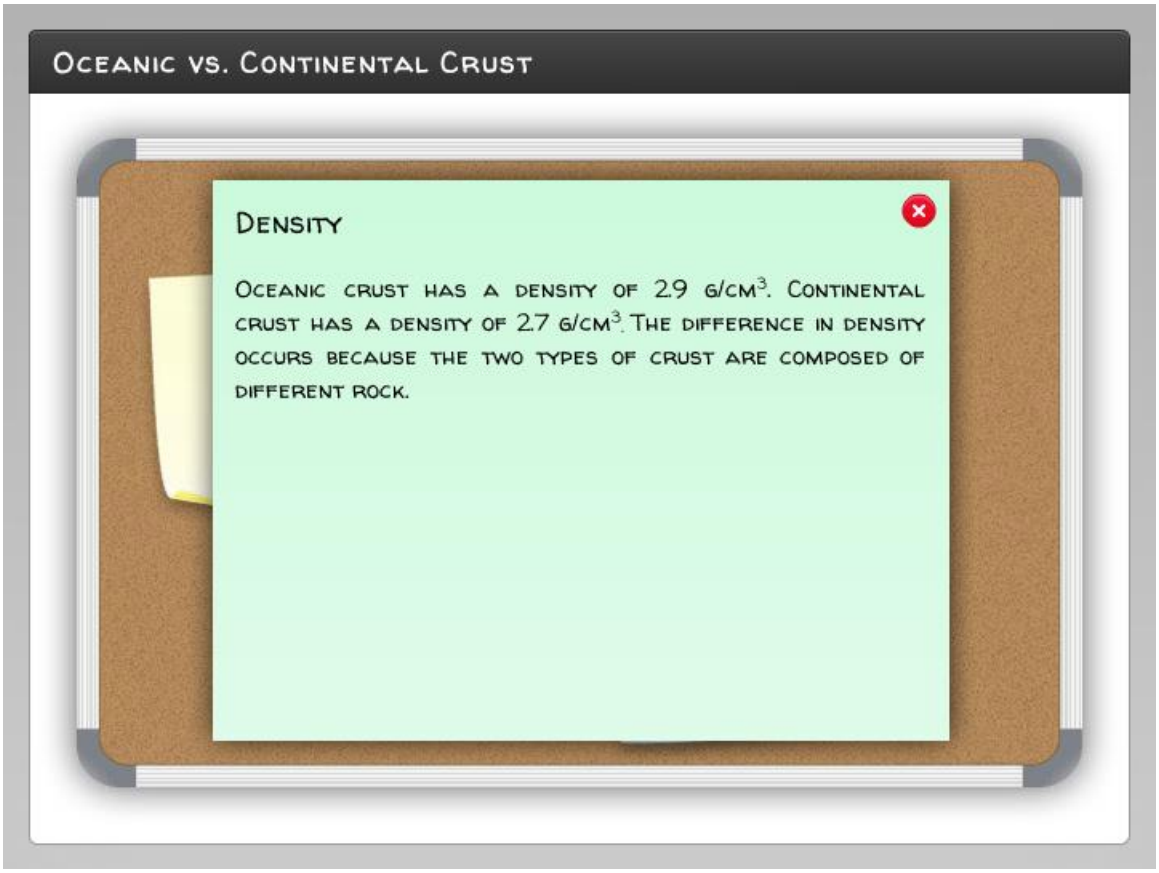


It is important to know that the two different types of lithosphere have different characteristics. In this interactivity, click on each of the notes to learn more about the features of oceanic crust and continental crust.

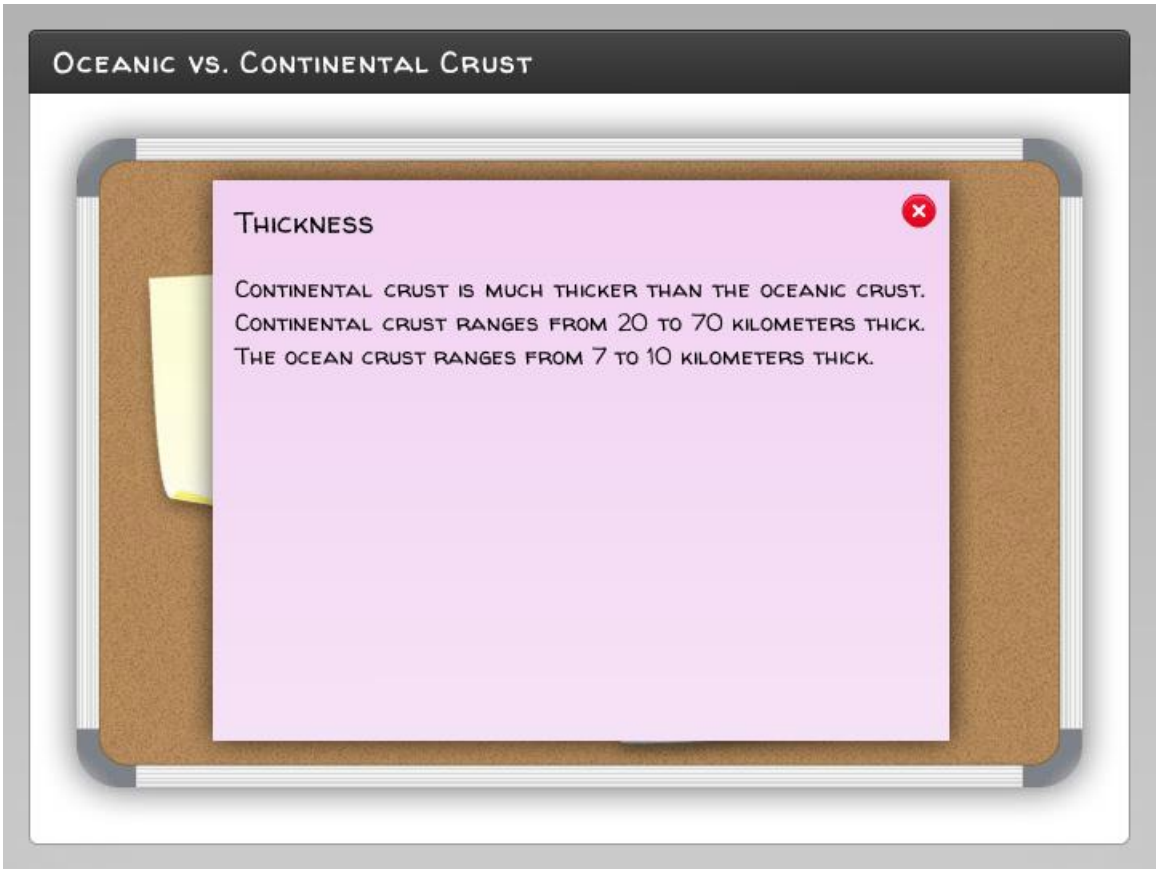
Module 7: Plate Tectonics and Earth's Structure
Topic 2 Content: Plate Tectonics – The Basics Presentation Notes



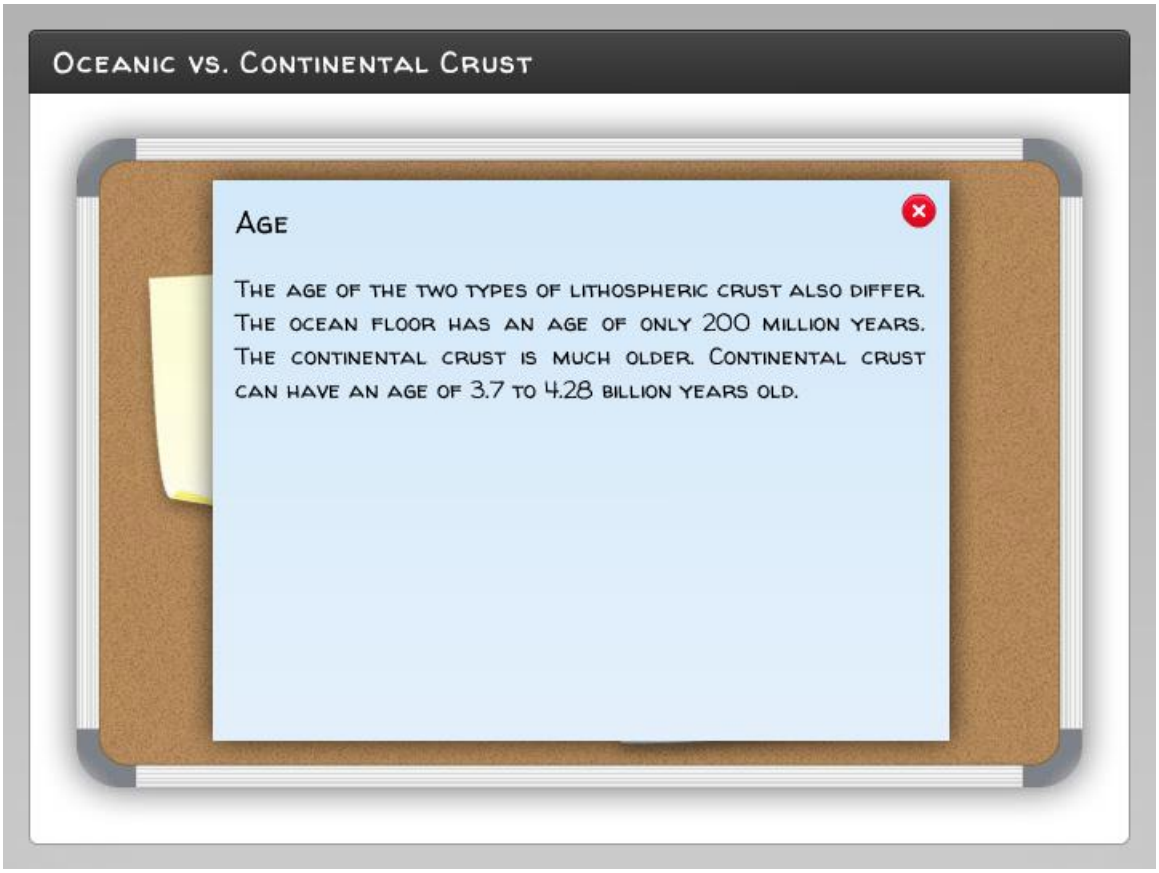
Oceanic crust is primarily made of basalt, while continental crust is mostly composed of granite.



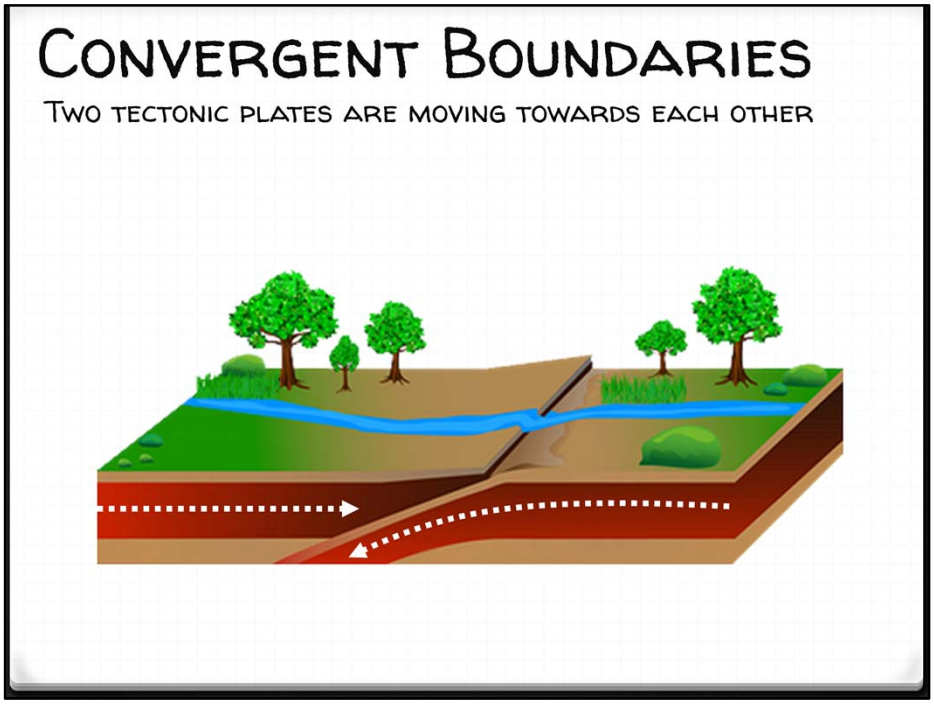
Oceanic crust has a density of 2.9 g/cm3. Continental crust has a density of 2.7 g/cm3. The difference in density occurs because the two types of crust are composed of different rock.



Continental crust is much thicker than the oceanic crust. Continental crust ranges from 20 to 70 kilometers thick. The ocean crust ranges from 7 to 10 kilometers thick.

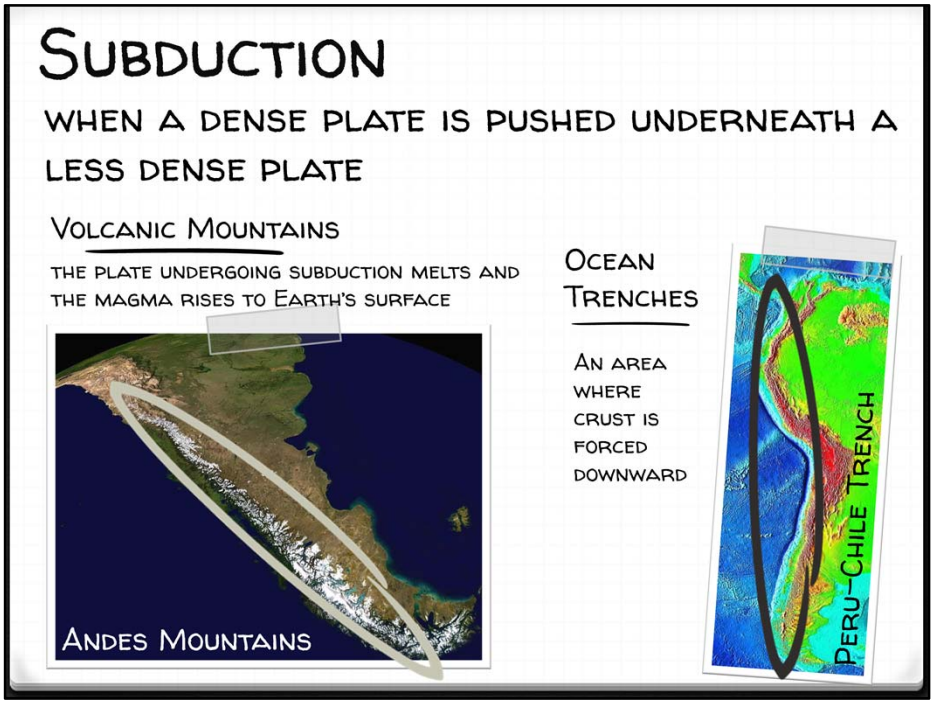


The age of the two types of lithospheric crust also differ. The ocean floor has an age of only 200 million years. The continental crust is much older. Continental crust can have an age of 3.7 to 4.28 billion years old.



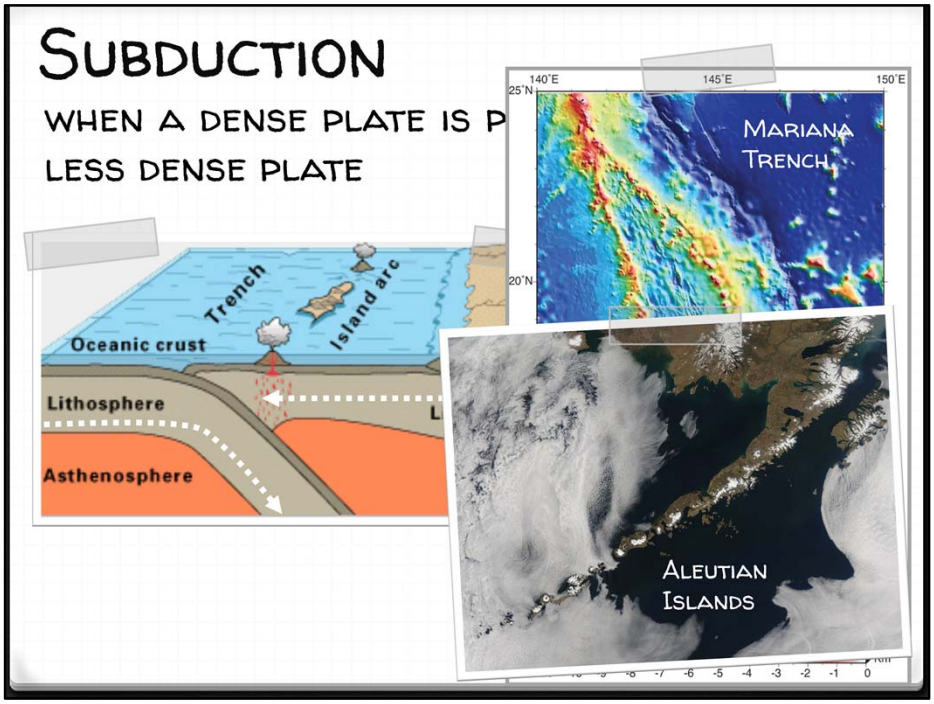
A **convergent boundary** occurs when two tectonic plates are moving towards each other. Due to the friction and pressure of two colliding plates, earthquakes and volcanoes are common at convergent boundaries. As two plates collide, they form either a subduction zone or a continental collision.

Module 7: Plate Tectonics and Earth's Structure
Topic 2 Content: Plate Tectonics – The Basics Presentation Notes



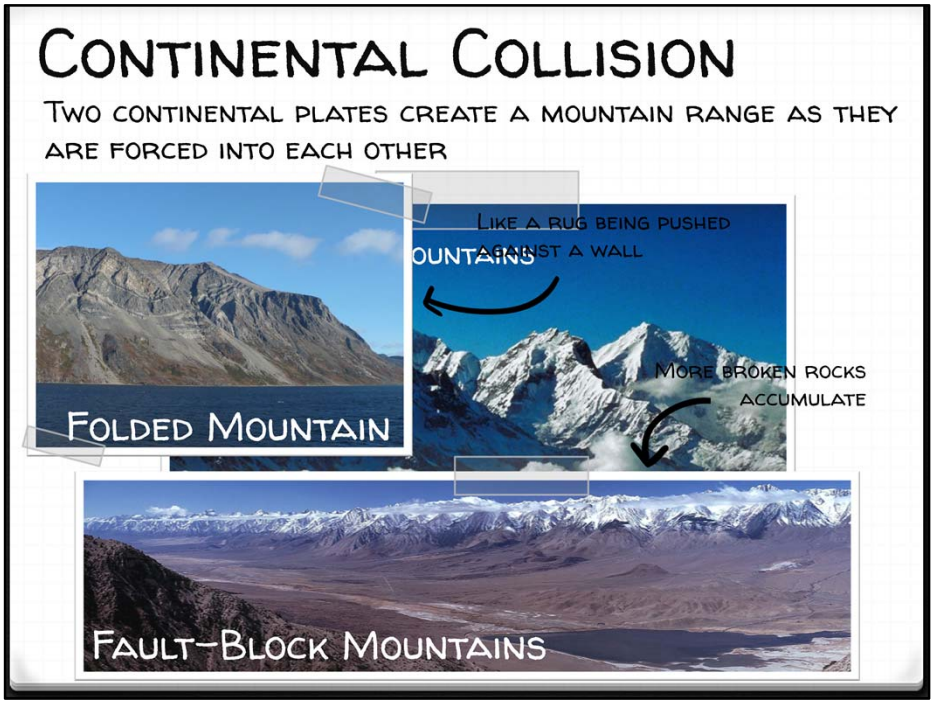
Subduction is when one plate, usually the more dense oceanic crust, is pushed underneath a less dense plate, such as continental crust. Subduction zones can create **volcanic mountains** as the plate undergoing subduction melts and the magma rises to Earth's surface. The Andes Mountains are one example of volcanic mountains formed by subduction of oceanic crust underneath continental crust. This subduction also creates an **ocean trench** where the crust was forced downward. The Peru-Chile trench is an example of the trench that formed as the Andes Mountains were forming.

Module 7: Plate Tectonics and Earth's Structure
Topic 2 Content: Plate Tectonics – The Basics Presentation Notes

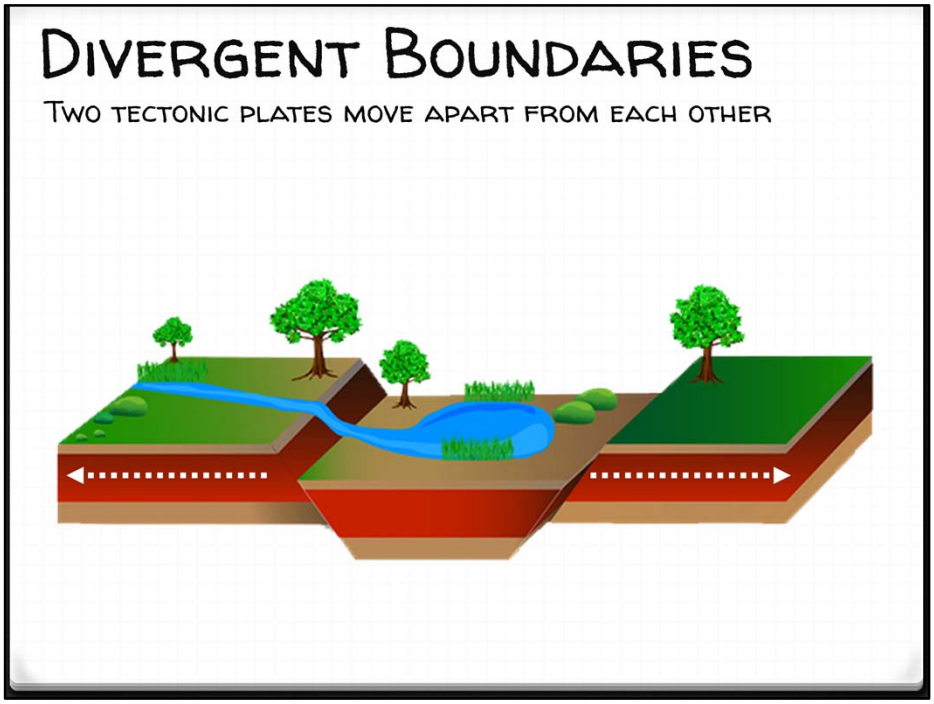


When two plates of oceanic crust collide, the more dense plate undergoes subduction and melts. The subduction of two oceanic plates forms an ocean trench where the oceanic crust was forced downward. The Mariana Trench is an example of an ocean trench at the boundary of two oceanic plates. As the newly melted magma rises through weak points in the oceanic crust over it, **volcanic island arcs** can form. Japan, the Mariana Islands, and the Aleutian Islands are all examples of island arcs formed at convergent ocean boundaries.

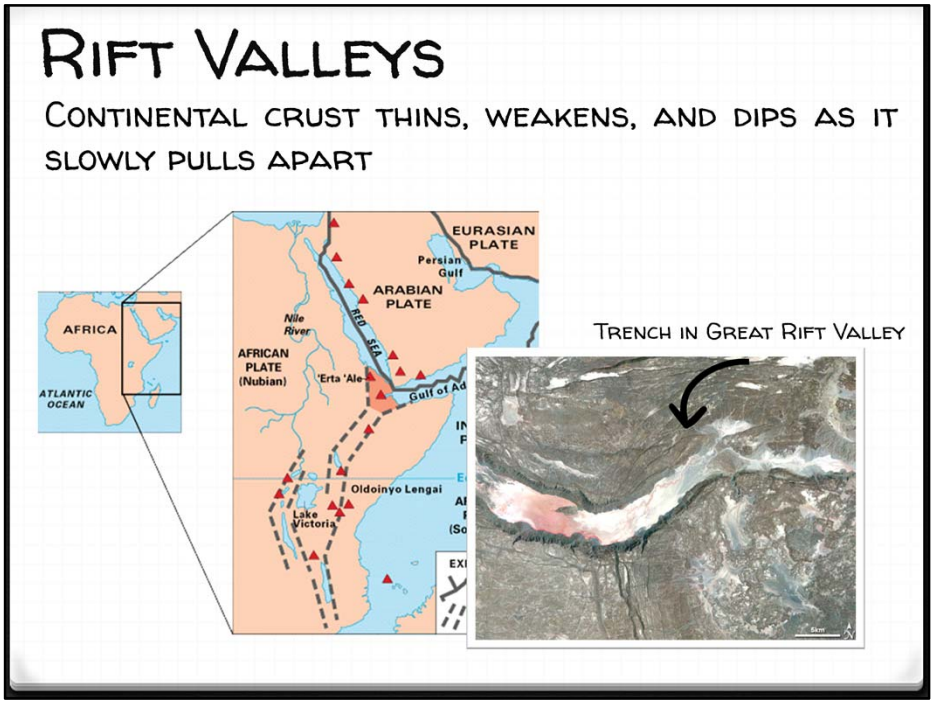
Module 7: Plate Tectonics and Earth's Structure
Topic 2 Content: Plate Tectonics – The Basics Presentation Notes



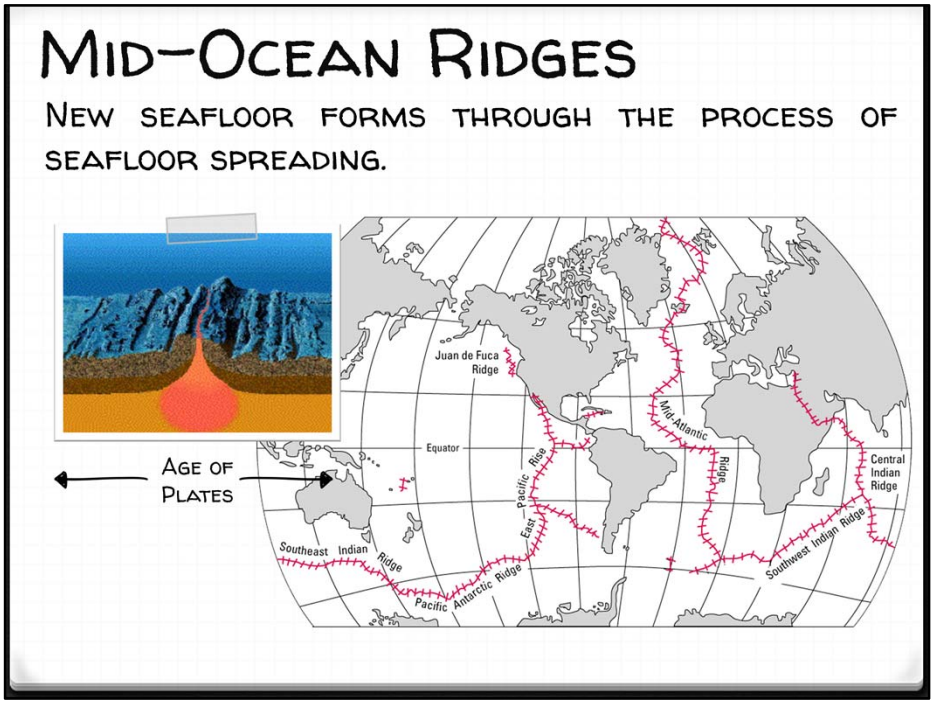
A **continental collision** occurs when two continental plates create a mountain range as they are forced into each other. This is how the Himalayan Mountains first formed millions of years ago. They are still rising today as the plates continue to collide. When continental plates collide, two processes may occur. The land from one plate may fold on top of the other. This is much like a rug that is being pushed against a wall. The mountains will take a more rounded shape in appearance due to the folding of the underlying rock layers. In other cases, the rocks will break before folding occurs. This break is called a fault, and more and more broken older rock will accumulate and push over the younger rock. This is termed thrust-faulting and can cause fault-block mountains. As you can see from the two images, fault-block mountains have a very rugged topography when compared to the rounded folded mountains.



A **divergent boundary** exists where two tectonic plates are moving apart from each other.

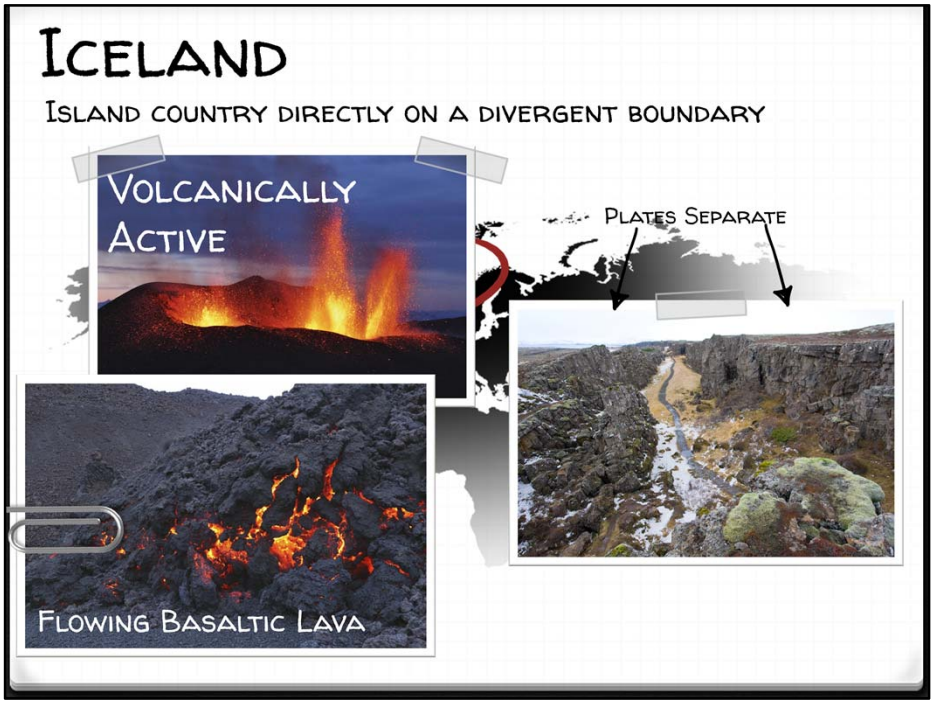


Divergent boundaries on continents create a feature called a **rift valley** as the continental crust thins, weakens, and dips as it slowly pulls apart. The Great Rift Valley in eastern Africa is an example of a divergent boundary on a continental plate.

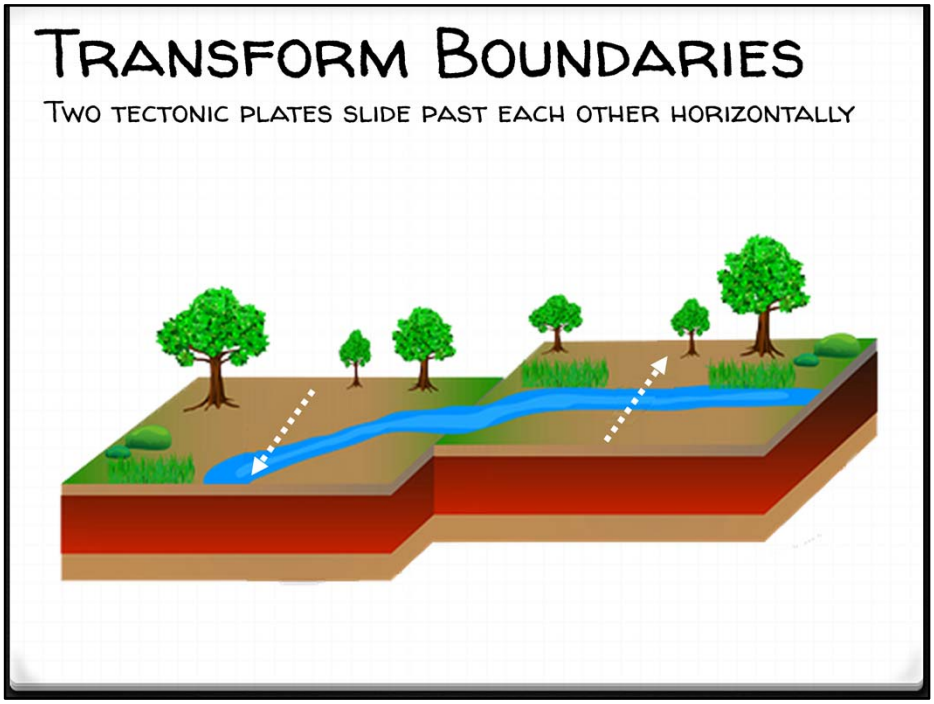


With **mid-ocean ridges**, new seafloor forms through the process of seafloor spreading. As the plates spread apart, magma from the mantle rises to fill the new space in between. As you move away from the mid-ocean ridge, the age of the seafloor and rock increases. Geologists and oceanographers study these ocean ridges, which are often home to interesting seafloor communities, such as black smokers and hydrothermal vents.

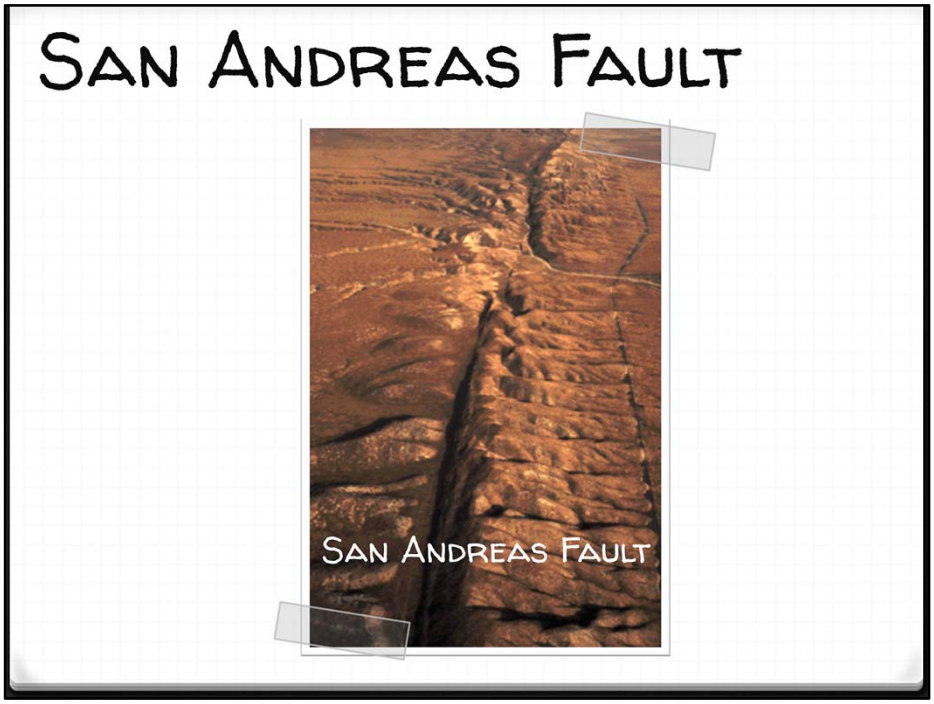
Module 7: Plate Tectonics and Earth's Structure
Topic 2 Content: Plate Tectonics – The Basics Presentation Notes



The island country of Iceland is situated directly on a divergent boundary. This means that Iceland is growing each year as the plates separate. It also means that Iceland is volcanically active. Iceland is different from other areas that are volcanically active. Many volcanoes form in subduction zones, but Iceland's volcanoes form when the plates separate. This creates fissure volcanoes. These fissures are large cracks that erupt a flowing basaltic lava. The lava flows are slow moving, but they will turn everything in their path into igneous rock.



A **transform boundary** is a type of plate boundary where the lithosphere is not created or destroyed, like it is at convergent and divergent boundaries. At a transform boundary, two tectonic plates slide past each other horizontally. Earthquakes are common at transform boundaries as pressure builds up and releases as the plates grind past each other.



The San Andreas Fault in California is one example of a transform boundary between the Pacific Plate and the North American Plate.