

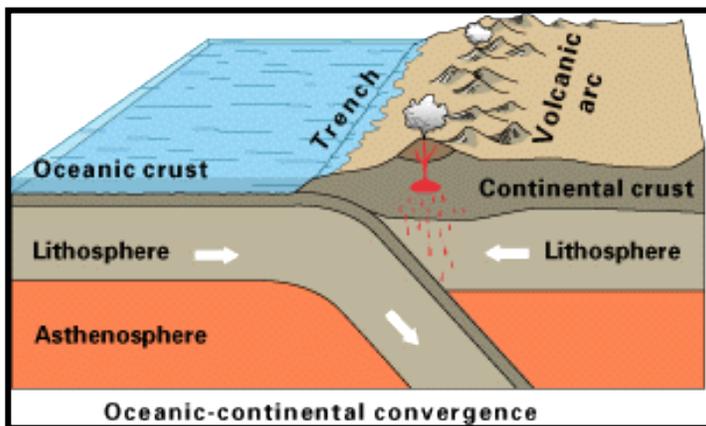
Plate Tectonics

Chapter 5

The Theory of Plate Tectonics has revolutionized the way we look at the Earth. Prior to the sixteenth century people thought that the ocean's floors, which cover two thirds of the Earth's surface were flat and featureless.

Navigators in the early part of the sixteenth century began to drop hand lines over the sides of their boats and take soundings. They found that the open ocean could differ considerably in depth.

A Dutch mapmaker in 1596 proposed the idea that the Americas were torn away from Europe and Africa by earthquakes and floods. It was not until 1912 that Alfred Wegener proposed a theory about how the continents might be drifting apart.



Subduction zones develop when an oceanic plate subducts beneath a continental plate creating deep trenches and large stratovolcanoes. USGS

Alfred Wegener's 1912 Theory of Continental Drift

Alfred Wegener, a German meteorologist, wrote two articles explaining his theory of *Continental Drift*. He believed that at one time all continents were one giant super continent called Pangaea. Pangaea over time split apart eventually creating the continents we have today.

He based his theory on the remarkable fit of Africa and South America, coal found in Antarctica, and the fossil remains of the same types of plants and animals on the coasts of South America and Africa. He believed that the continents plowed through the oceans as they moved around the planet.

What scientists believed about the continents at that time

Scientists, at that time, believed that it was impossible for continents and oceans to move around the Earth. They believed that the continents and the oceans were the same age and formed at the beginning of Earth's history.

Wegener spent the rest of his life trying to prove his theory was true. He died on an ice cap in Greenland in 1930 trying to find evidence that would support his theory. It was not until the 1950s that scientist began to find evidence that supported his theory of Continental Drift.

Name _____

Date _____

Plate Tectonics

Quiz 5

Fill in the blanks using words from the Word Bank

1. Alfred Wegener believed that that at one time all of the continents were one giant super continent called _____.
2. Bathymetric surveys taken during the first half of the nineteenth century with deep-sea line soundings gave the first clue to mid-oceanic _____.
3. The Mid-Atlantic Range is just one _____ of a global mid-oceanic ridge that encircles the Earth.
4. The _____ of Plate Tectonics has revolutionized the way we look at the Earth.
5. A Dutch mapmaker in 1596 proposed that the _____ were torn away from Europe and Africa by earthquakes and floods.
6. The _____ rocks in mid-oceanic ridges are located at the crest of the ridge and become progressively older as they move away from the crest.
7. A _____ plate converging with an oceanic plate creates a subduction zone.
8. Magnetite in _____ locks in the Earth's magnetic orientation at the time the lava is erupted.
9. The _____ found in the ocean were not nearly deep enough if the oceans and continents were the same age.
10. Survey ships laying the trans-Atlantic _____ cable confirmed the underwater mountain range in the Atlantic Ocean.

Word Bank

theory	Americas	Pangaea	ridges	telegraph
sediments	segment	youngest	continental	basalt

Tectonic Plate Boundaries

Activity 5

Introduction

The Earth's crustal plates fit together on the surface of the Earth like pieces of a jigsaw puzzle. The plates seem to "float" on the surface on the asthenosphere. The asthenosphere is a dense layer of rock that allows the plates to move around the surface of the Earth. In this activity, you will be creating three major crustal plate boundaries.



Three major plate boundaries

Materials

- ◆ Wax paper
- ◆ Graham crackers
- ◆ Chocolate frosting
- ◆ Plastic or table knife

Directions

1. Place a piece of wax paper on a table or other smooth surface.
2. Place a rectangular piece of graham cracker in the upper right corner of the wax paper. This cracker represents the mantle rocks beneath the asthenosphere.
3. Spread chocolate frosting on the mantle rocks to form the asthenosphere.
4. Place another rectangular piece of cracker over the asthenosphere.
5. The top graham crackers represent the crustal plates as they move around the Earth.
6. The asthenosphere can flow under pressure when you move the top cracker across the chocolate frosting with your fingertips to create the different plate boundaries.

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