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Plate Tectonics

By Sharon Fabian

The Earth, just like a middle schooler sitting at his desk all afternoon, is restless! Even though we think of the Earth as solid and steady under our feet, it is actually moving and shifting all the time. The scientific study of this Earth movement is called plate tectonics. A plate is just a huge slab of rock, and tectonics comes from an old Greek word meaning "to build." So plate tectonics is the theory that explains how the Earth's surface is built up from rocky plates which are moving.

This theory is fairly new - it began in the 1960s. But even before that, scientists had the idea that the Earth was always shifting. In 1912, Alfred Wegener came up with a theory called "continental drift" which said that maybe the seven continents sort of floated around on the Earth. Way back in 1596, a Dutch mapmaker named Abraham Ortelius noticed that it looked like America had been "torn away from Europe and Africa." Scientists thought that, at one time, all of the continents might have been just one huge continent. They called it a supercontinent and named it Pangaea. It may have existed around 225 million years ago. If you take a world map and cut out the continents, you can try to piece them together like a puzzle to make Pangaea.

Scientists have learned much more about these moving plates since the 1960s by studying the boundaries where the plates bump together. Since many of these boundaries are under the ocean, they use modern technology to search for clues. Sonar has been used to find out how deep the ocean is in various areas. Satellites have mapped out the boundaries of the plates and shown how they changed over time. Magnetic strips on the ocean floor have been discovered by scientists using magnetometers.

One really big discovery was the mid-ocean ridge. The mid-ocean ridge is a huge underwater mountain chain that zigzags around some of the continents and circles much of the Earth. The mid-ocean ridge has been built up from magma that pushes up from below. At the same time that magma is pushing up and causing the sea floor to spread in some places, in other places the sea floor is gradually disappearing down inside ocean trenches.

A part of the mid-ocean ridge, called the Mid-Atlantic Ridge, goes right through the middle of Iceland. In fact, it formed Iceland! It causes big splits called fissures, lots of volcanoes, and lava fountains.

Another example of spreading, or plates pulling apart, happened in northern Africa many years ago. There Saudi Arabia became separated from the rest of the continent of Africa as the plates spread apart. That is how the Red Sea was formed. When plates pull apart, forming new crust for the Earth, they are called divergent plates.

Plates can also move toward each other. Then they are called convergent plates. Sometimes they crash together; sometimes one plate slowly slides under the other.

Sometimes the plates scrape together side by side. The San Andreas Fault, which runs down the middle of California, is an example of plates that are scraping along side by side. It is known as a transform fault. If you have heard people joking about California falling into the ocean, this is what they are talking about! Of course these things take time, often millions of years.

Altogether there are about 12 large plates that make up the surface of the Earth. Many of the continents have their own plate. For example there is a North American plate, which includes all of North America and extends out into the ocean on both sides. Europe and Asia share a plate, the Eurasian Plate. There are also plates that are mostly under the oceans. Plate tectonics show us powerful forces at work within the Earth. These forces cause earthquakes to happen, volcanoes to erupt, and mountains to form. People cannot control these powerful forces, but we can learn a lot from them.

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Questions

- _____ 1. The theory that explains how the Earth's surface is made up of moving rocky plates is called:
- A. sea floor spreading
 - B. plate tectonics
 - C. continental drift
 - D. supercontinent
- _____ 2. At one time, all of the continents may have been joined in one giant continent called:
- A. North America
 - B. Europe
 - C. Eurasia
 - D. Pangaea
- _____ 3. The mid-ocean ridge is:
- A. another name for Pangaea
 - B. the Rocky Mountains
 - C. a volcano
 - D. a huge mountain range under the ocean
- _____ 4. The word that describes plates pulling apart is:
- A. convergent
 - B. boundary
 - C. continental
 - D. divergent
- _____ 5. The word that describes plates pushing together is:
- A. boundary
 - B. continental
 - C. convergent
 - D. divergent
- _____ 6. This article is mainly about:
- A. how Saudi Arabia separated from the continent of Africa
 - B. the theory of plate tectonics
 - C. the supercontinent
 - D. volcanoes caused by the Mid-Atlantic Ridge in Iceland
7. List and describe two powerful forces of nature caused by plate tectonics.

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8. What do you think will happen as the plates continue to move?
