

Sea-Floor Spreading

By Patti Hutchison

¹ In 1910, Alfred Wegener proposed the theory of continental drift. He believed that the continents were drifting apart. He found evidence to prove his theory. But he could not answer one question. How were the continents moving? He thought they were plowing through the ocean crust. Other scientists knew this could not happen.

² In the 1960's scientists finally found what was missing in Wegener's theory. Geologist Harry Hess finally proved that Wegener was right. The continents are moving apart. Hess believed that sea-floor spreading is the answer to the mystery of continental drift.

³ The mid-ocean ridge is found throughout the oceans of the earth. This is a 50,000 mile chain of volcanic mountains in the middle of the ocean. These mountains have a deep crack that runs through them. It is called a rift valley. Sea-floor spreading happens here. It is a slow, regular process. There are no explosive bursts like volcanic eruptions on land.

⁴ During sea-floor spreading, magma rises from the mantle. It oozes out of the rift valley. It cools and forms new crust. A small amount of new ocean floor is added to the surface of the earth. It fills the gap at the ridge. As this cycle continues, the newly created crust slowly moves away from the ridge.

⁵ You might think that because of sea-floor spreading, the earth should be growing larger. But sea-floor spreading is a recycling process. New crust is created at the mid-ocean ridge. Old crust is pushed back into deep-sea trenches. This process is called subduction. Much of it melts into the mantle. This keeps the earth from growing larger.

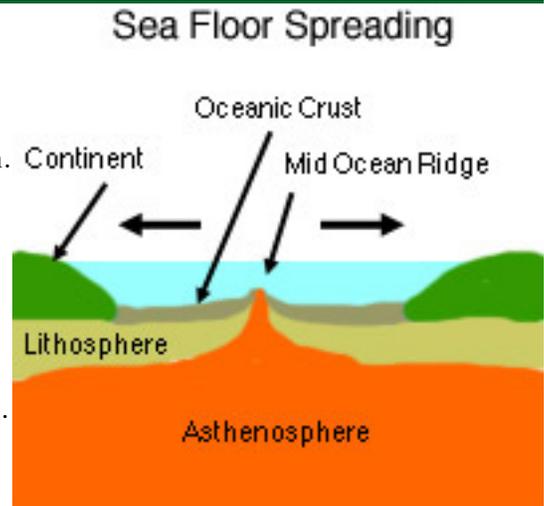
⁶ There is evidence to prove this theory. Scientists studied rocks from the ocean floor. Rocks closest to the ridge were younger than rocks found farther away. Magnetic mapping also helped to prove this theory. Scientists found identical magnetic stripes on both sides of the ridge.

⁷ Scientists studied Hess's and Wegener's work. The theory of continental drift was combined with the theory of sea-floor spreading. This led to the theory of plate tectonics.

⁸ The theory of plate tectonics says that the lithosphere is broken into pieces called tectonic plates. The plates have a thin layer of crust above a layer of cool hard rocks. Most of them have both continental and oceanic crust. These tectonic plates fit together like joints made by a carpenter. There are about twelve large plates and a few smaller ones. They make up the earth's surface.

⁹ The plates float like rafts on the asthenosphere. This is a partly molten, flowing layer below the solid part of the earth's mantle. When one plate moves, it affects all the others. The movement of some of these plates causes sea-floor spreading.

¹⁰ Other dynamic events also happen along plate boundaries. They cause our planet to be constantly changing. The theory of plate tectonics explains how earth's crust moves. Volcanoes, earthquakes, and the formation of mountains are all explained by the theory of plate tectonics.



Sea-Floor Spreading

<p>1. Where does sea-floor spreading happen?</p> <p>_____</p> <p>_____</p>	<p>2. What material forms new pieces of ocean floor?</p> <p><input type="radio"/> A Plates</p> <p><input type="radio"/> B Magma</p> <p><input type="radio"/> C Sediment</p>
<p>3. Where is old crust melted back into magma?</p> <p><input type="radio"/> A At deep-sea trenches</p> <p><input type="radio"/> B Along plate boundaries</p> <p><input type="radio"/> C At the mid-ocean ridge</p>	<p>4. The partly-melted lower mantle is called _____.</p> <p><input type="radio"/> A The asthenosphere</p> <p><input type="radio"/> B The lithosphere</p> <p><input type="radio"/> C Magma</p>
<p>5. Large pieces of the lithosphere that float on the asthenosphere are called _____.</p> <p><input type="radio"/> A Tectonic plates</p> <p><input type="radio"/> B Deep-sea trenches</p> <p><input type="radio"/> C The mid-ocean ridge</p>	<p>6. What happens when one tectonic plate moves?</p> <p>_____</p> <p>_____</p>

