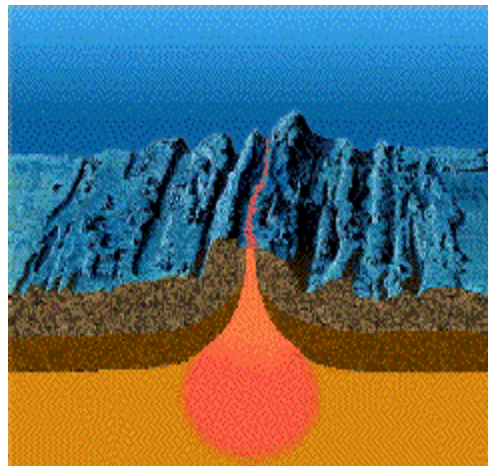


Seafloor Spreading:

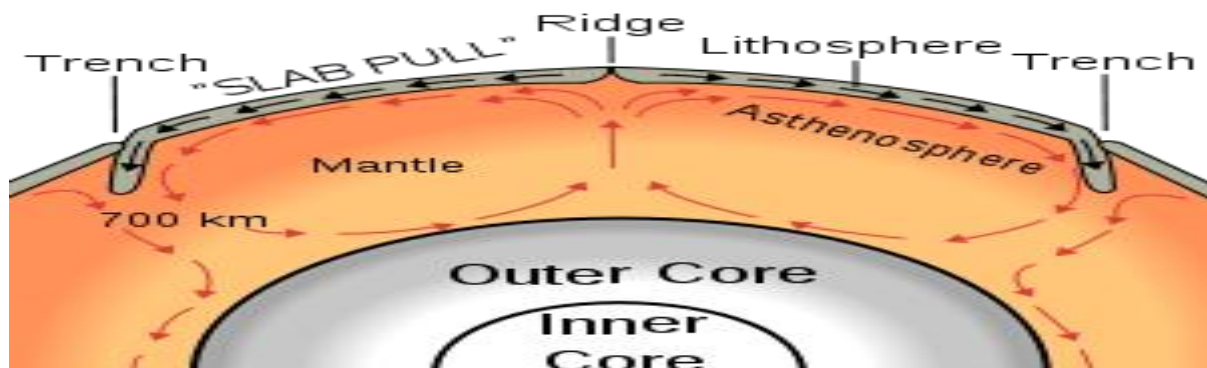
Seafloor spreading is a process that occurs at mid-ocean ridges, where new oceanic crust is formed through volcanic activity and then gradually moves away from the ridge. Seafloor spreading helps explain continental drift in the theory of plate tectonics. When oceanic plates diverge, tensional stress causes fractures to occur in the lithosphere. Basaltic magma rises up the fractures and cools on the ocean floor to form new sea floor. Older rocks will be found further away from the spreading zone while younger rocks will be found nearer to the spreading zone.

A mid-ocean ridge is a general term for an underwater mountain system that consists of various mountain ranges (chains), typically having a valley known as a rift running along its spine, formed by plate tectonics. This type of oceanic ridge is characteristic of what is known as an oceanic spreading center, which is responsible for seafloor spreading. The uplifted seafloor results from convection currents which rise in the mantle as magma at a linear weakness in the oceanic crust, and emerge as lava, creating new crust upon cooling. A mid-ocean ridge demarcates the boundary between two tectonic plates, and consequently is termed a divergent plate boundary.



Process:

There are two processes, ridge-push and slab pull, thought to be responsible for the spreading seen at mid-ocean ridges, and there is some uncertainty as to which is dominant. Ridge-push occurs when the growing bulk of the ridge pushes the rest of the tectonic plate away from the ridge, often towards a subduction zone. At the subduction zone, "slab-pull" comes into effect. This is simply the weight of the tectonic plate being subducted (pulled) below the overlying plate dragging the rest of the plate along behind it.



The rate at which the mid-ocean ridge creates new material is known as the spreading rate, and is generally measured in mm/yr. The common subdivisions of spreading rate are fast, medium, and slow with values generally being >100 mm/yr, $100\text{--}55$ mm/yr, and $55\text{--}20$ mm/yr, respectively. The spreading rate of the north Atlantic Ocean is ~ 25 mm/yr, while in the Pacific region, it is $80\text{--}120$ mm/yr. Ridges that spread at rates <20 mm/yr are referred to as ultraslow spreading ridges (e.g., the Gakkel ridge in the Arctic Ocean and the Southwest Indian Ridge) and they provide a much different perspective on crustal formation than their faster spreading brethren.