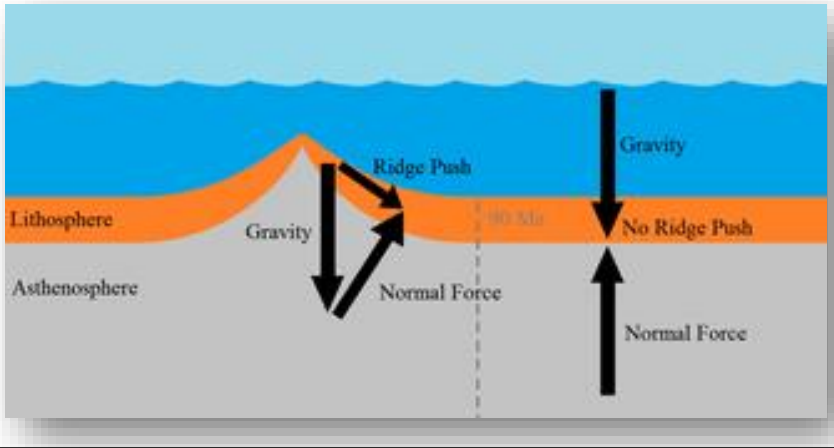
A-Level Geography Resource Package

[Physical >> Hazards >> Tectonics >> Plate Movement]

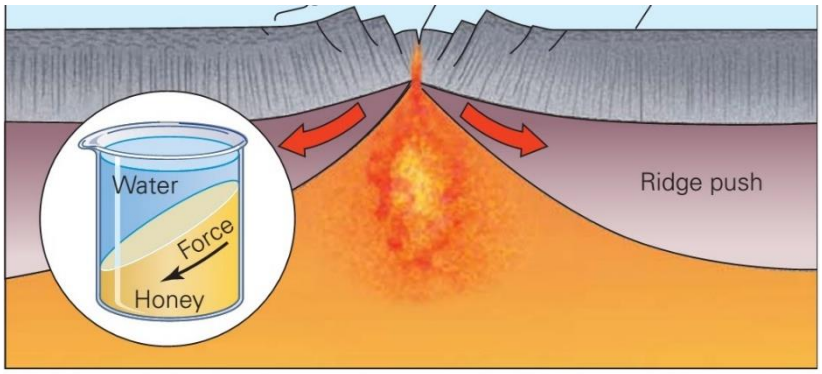
Ridge Push:

> A proposed **driving force** for plate motion, that occurs at Mid-Ocean Ridges, as a result of the hot, rigid **lithosphere sliding down** the raised asthenosphere.



In Detail:

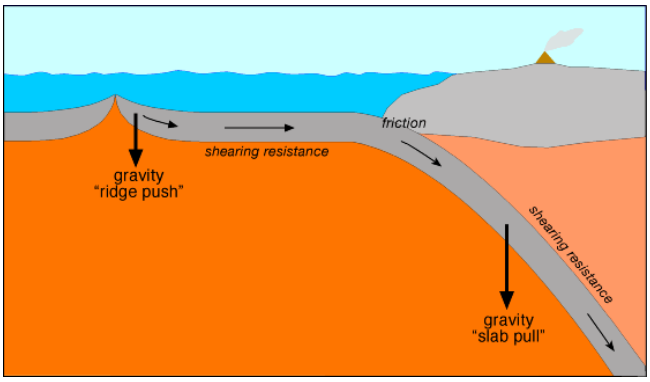
The molten magma that rises at a mid-ocean ridge is very hot and henceforth has the ability to heat the rocks around it. As the asthenosphere and lithosphere at the ridge are heated, they expand and become elevated above the surrounding sea floor. This elevation produces a slope down and away from the ridge. Because the rock that forms from the magma is very hot at first, it is less dense and more buoyant than the rocks farther away from the mid-ocean ridge. However, as the newly formed rock ages and cools, it becomes denser. Gravity then causes this older, denser lithosphere to slide away diagonally from the previous ridge, down the now sloping asthenosphere. Then, as the older, denser lithosphere slides away, new molten magma wells up at the mid-ocean ridge, eventually becoming new lithosphere. Scientists have used computer models to show that the cooling, subsiding rock exerts a force on spreading lithospheric plates that could help drive their movements. This force is called ridge push, though the phrase "ridge push" is somewhat misleading. It might be more accurate to refer to ridge push as gravitational sliding.



(a) Ridge push develops because the region of a rift is elevated. Like a wedge of honey with a sloping surface, the mass of the ridge pushes sideways.

Slab Pull:

> the proposed **pulling force** exerted by a cold, dense oceanic plate **plunging** into the mantle due to its own weight.



In Detail:

At a subduction boundary, one plate is denser and heavier than the other plate. The denser, heavier plate begins to subduct beneath the plate that is less dense. The edge of the subducting plate is much colder and heavier than the mantle, so it continues to sink, pulling the rest of the plate along with it. The force that the sinking edge of the plate exerts on the rest of the plate is called slab pull. Slab pull can be compared to the following situation: Suppose your jacket is resting on a table. You drop a heavy set of keys into a pocket that is dangling over the edge. The weight of the keys pulls downward on the rest of the jacket, causing it to slide toward the edge of the table. Currently, many scientists consider slab pull to be a much stronger factor than ridge push or mantle convection in driving plate movements.

Working in Synchrony

SLAB PULL IS STRONGER THAN RIDGE PUSH!