

Plate tectonics: divergent, convergent, and transform plate boundaries

Plate tectonic theory envisions Earth's surface as consisting of plates of rigid lithosphere (the crust and uppermost mantle) moving over, and locally sinking into, a ductile asthenosphere (the rest of the mantle). Those plates move relative to each other (in fact, the defining characteristic of a plate is that all of it moves together). Motion of plates relative to each other is thus critical to the theory, and there are three possible motions: moving apart (divergence), moving together (convergence), and moving past each other (at transform boundaries).

The panel at the top here shows the three kinds of boundaries and relates them to generation and destruction of lithosphere. It also shows the most likely or most dominant reason that plates move: the cooling, and therefore sinking, of oceanic lithosphere. The lower panel, less critical to understanding the whole theory, shows two possible kinds of transform boundaries, one offsetting a divergent boundary (a mid-ocean ridge) and one offsetting a convergent plate boundary (a subduction-zone trench).

