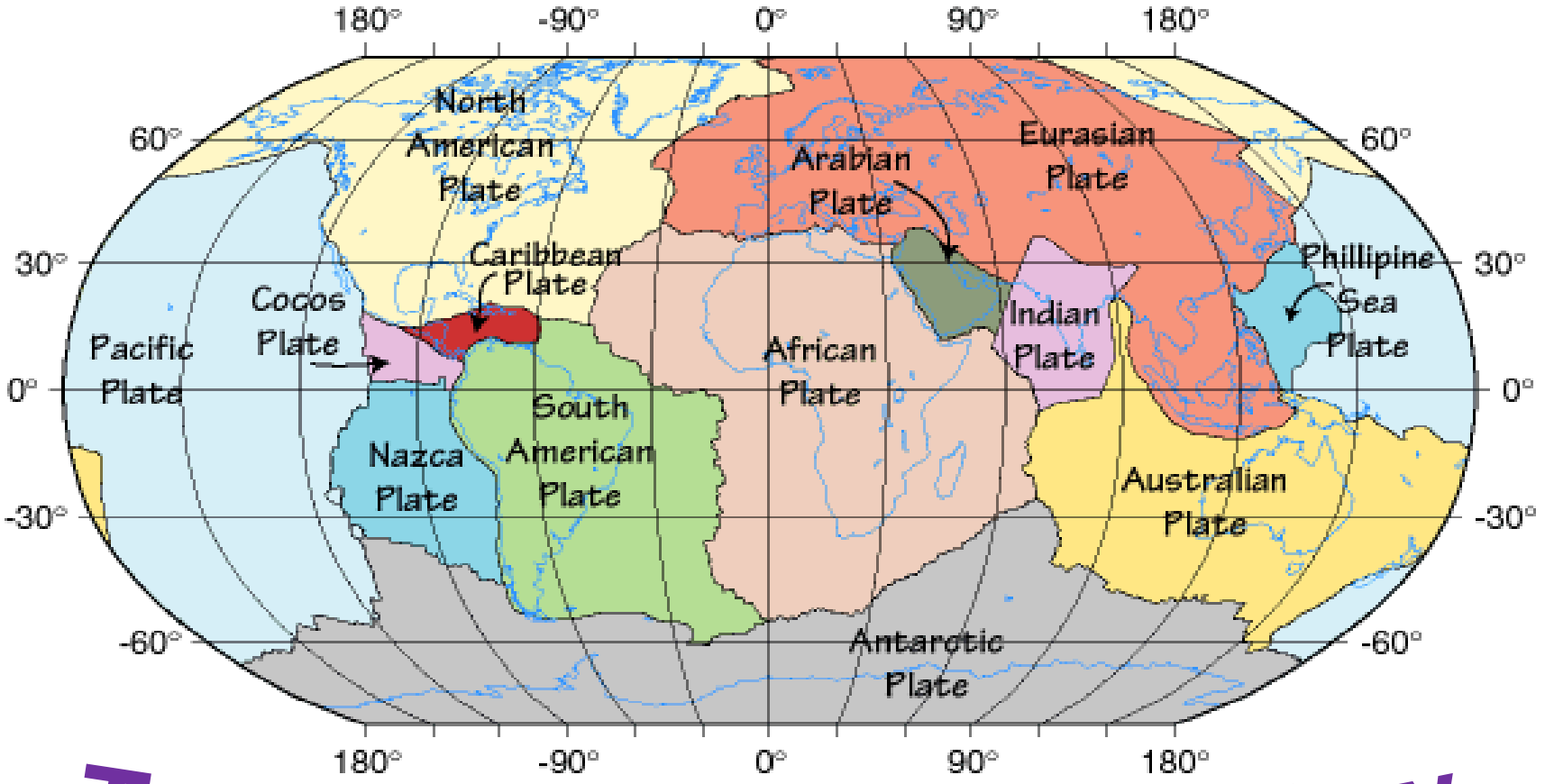
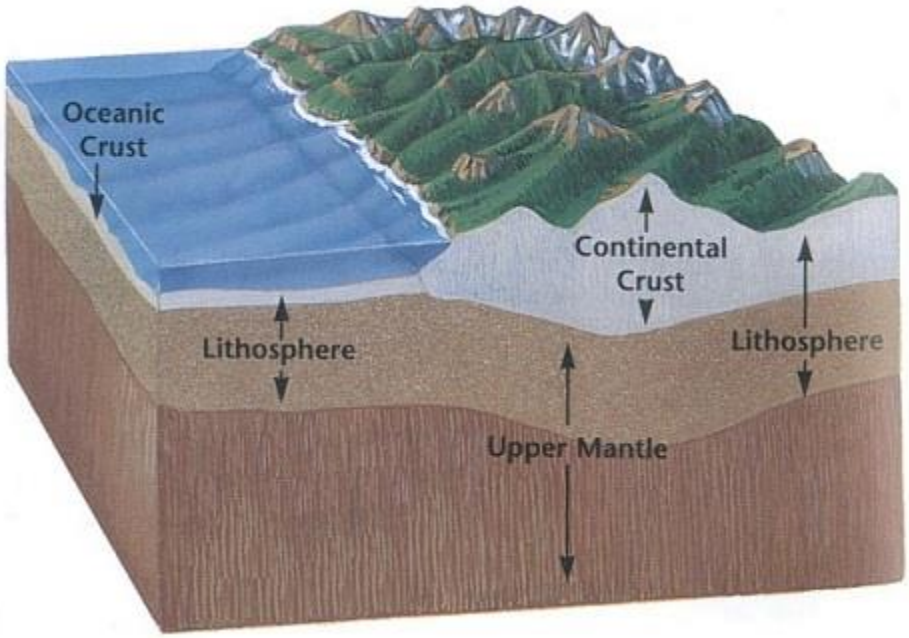
Lithosphere



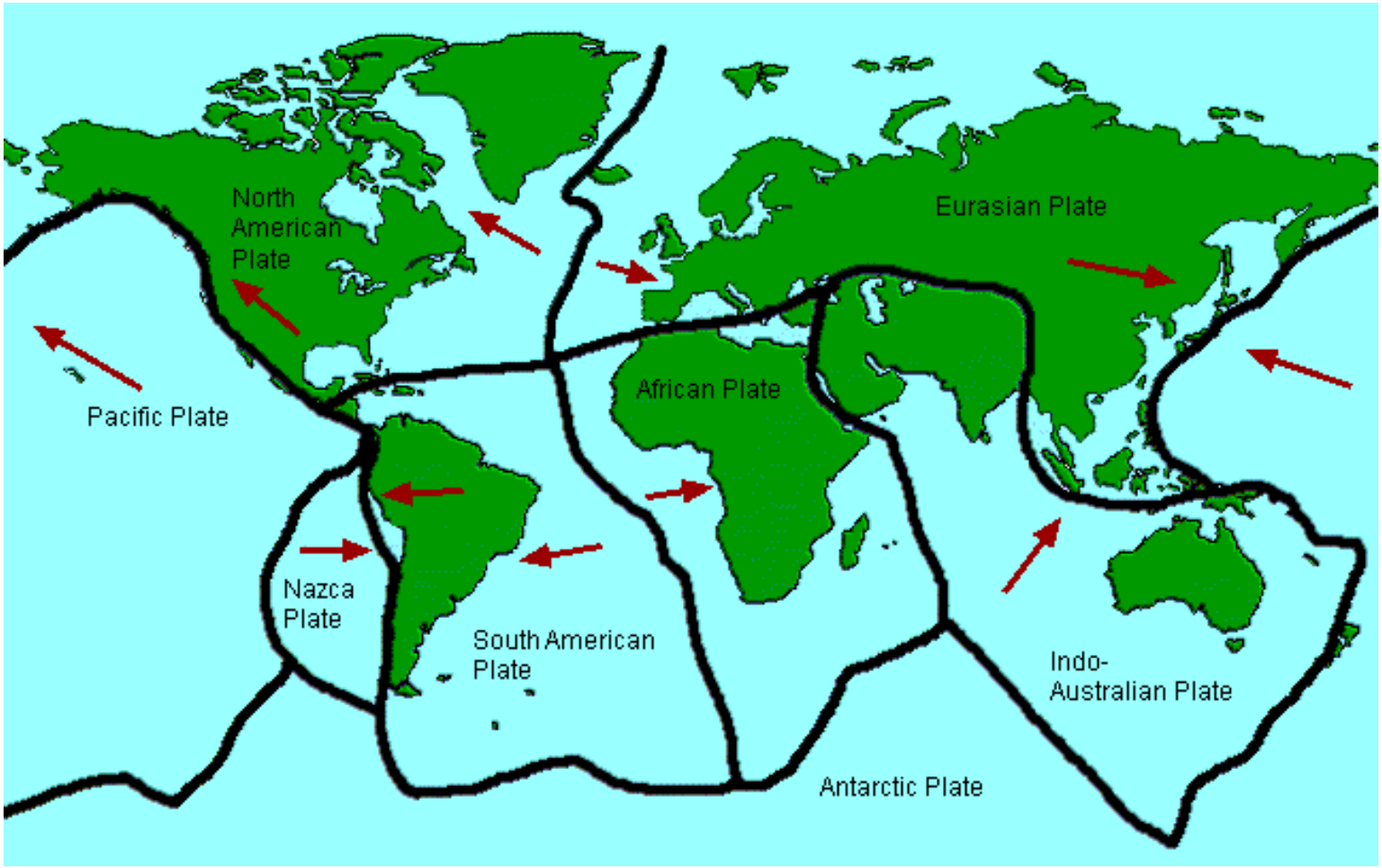
Tectonic Plates and How They Move

Lithosphere: Sphere of Rock



- rigid <u>outer layer</u>
- made of **crust** and the uppermost part of the **mantle**
- broken into pieces called **tectonic plates**
- eight major tectonic plates (plus several minor)

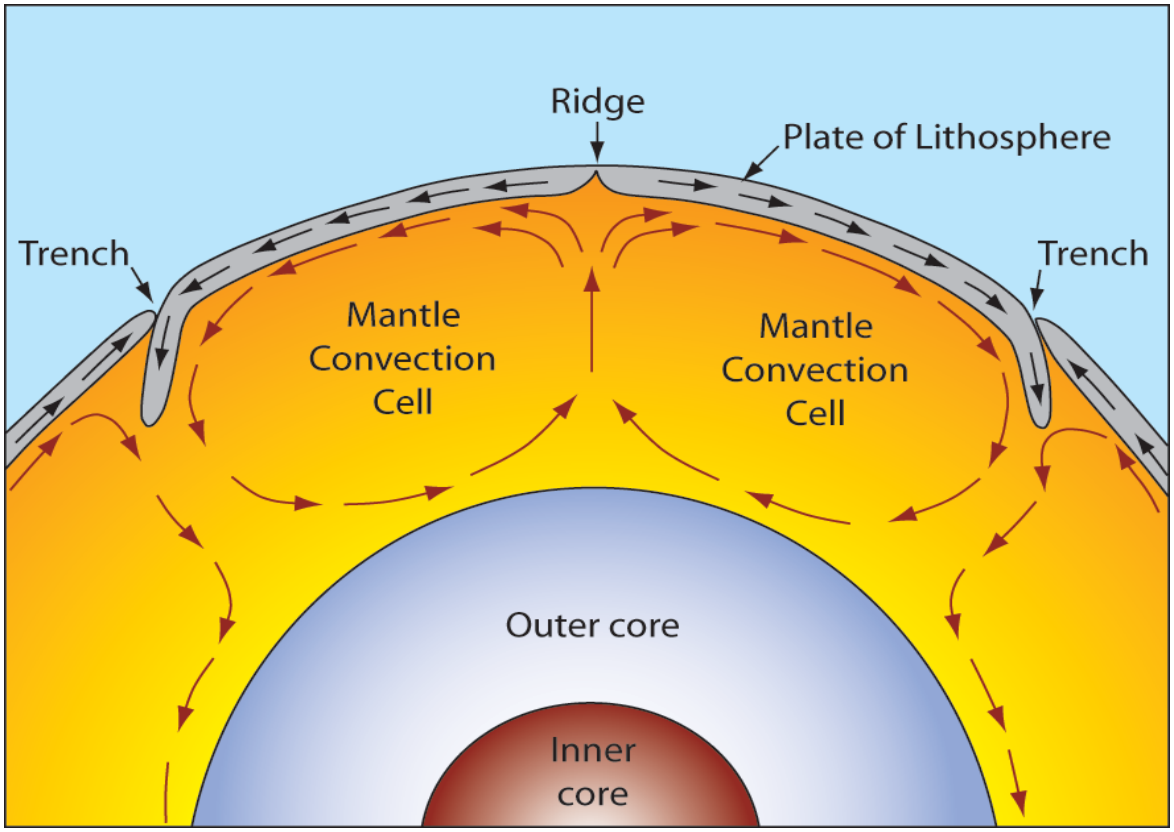
Major Tectonic Plates

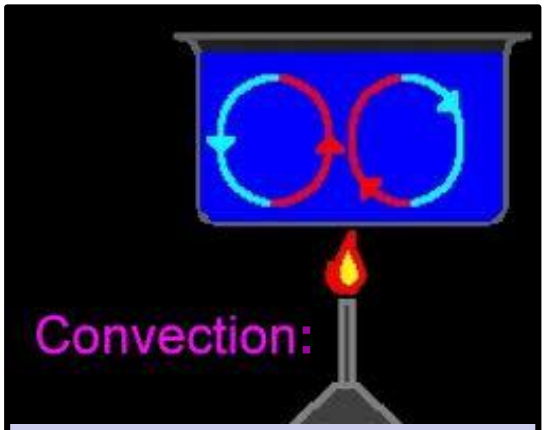


All tectonic plates move in different directions 1-2 inches per year.

How do Plates Move?

- **The driving forces of plate motion is an active subject of on-going research within geophysics.**
- **<u>Leading theory</u>: plates of lithosphere are moved around by convection in the underlying hot mantle.**





the motion of *fluid* (liquid, gas) or *rheid* (plastic rock) driven by heat transfer.

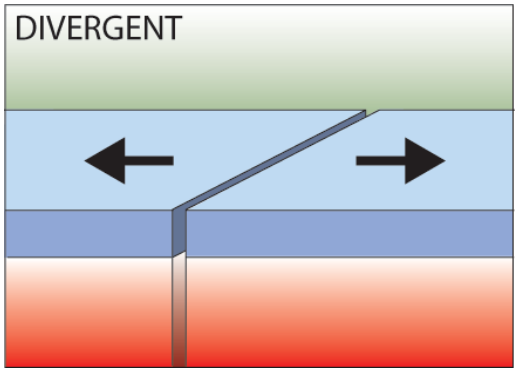
Plate Movement Simulation

Past 1500 million years (full length simulation)
https://www.youtube.com/watch?v=IlnwyAbczog

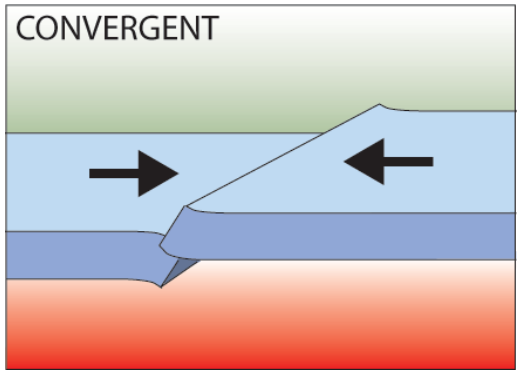
Same with oceans/landforms labeled
https://www.youtube.com/watch?v=AsCYZ-k-0uc

Three types of plate boundary

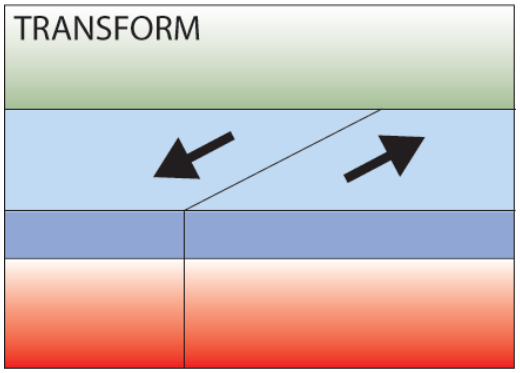
- **Divergent**



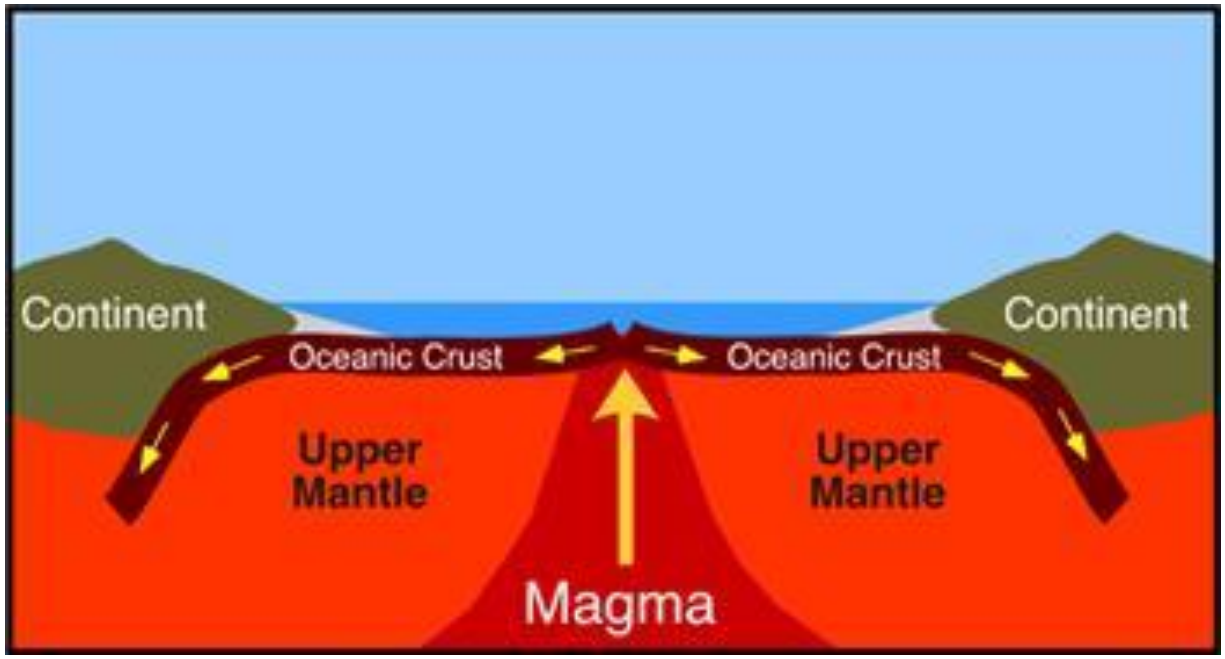
- **Convergent**



- **Transform**



Divergent Boundaries

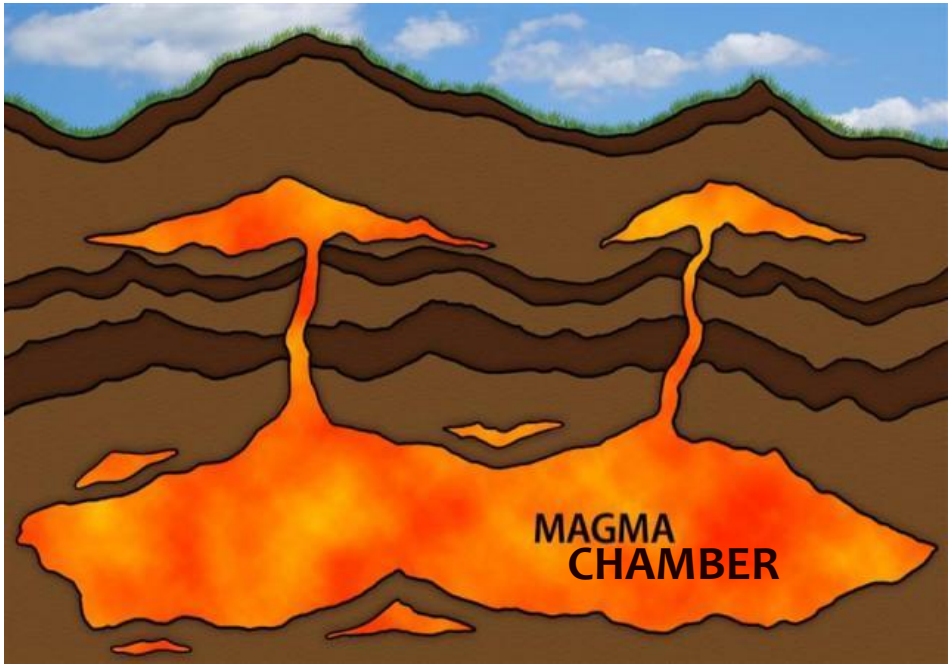


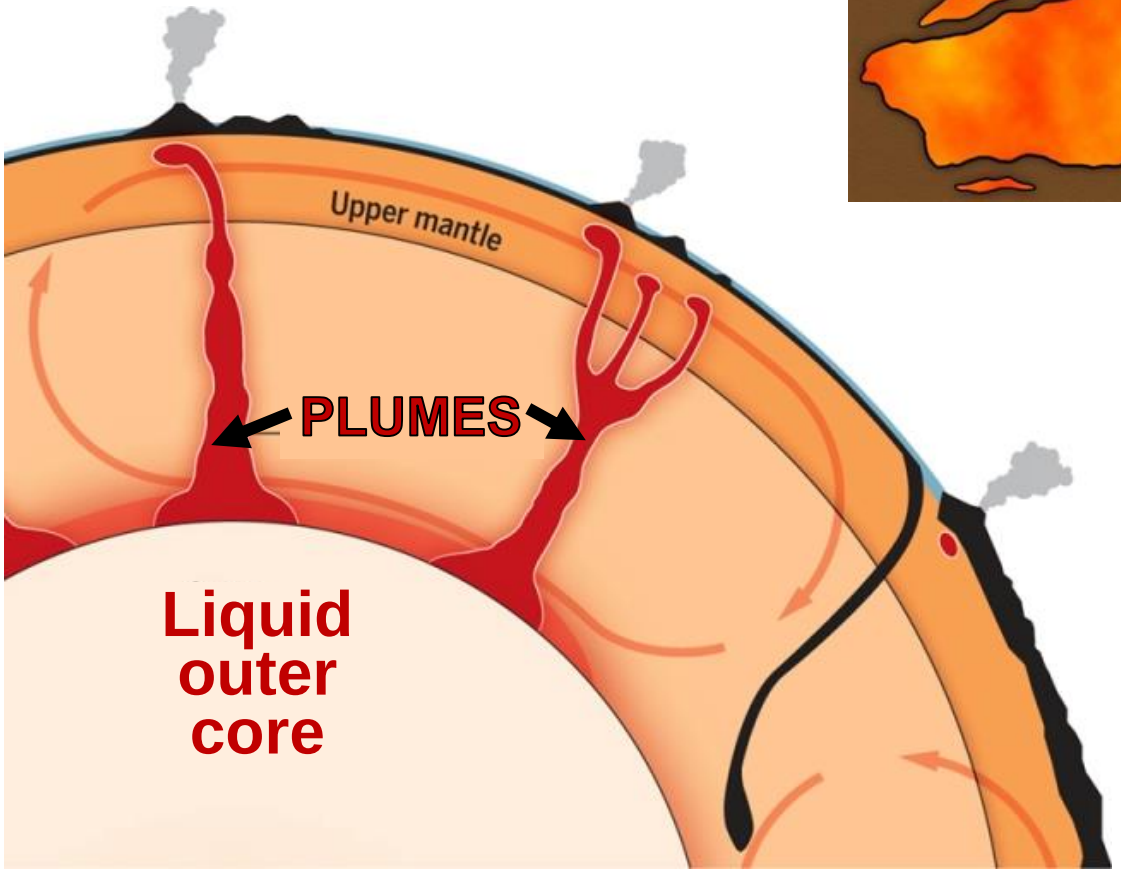
- **Spreading ridges:**
  - **as plates move apart, new material is erupted to fill the gap**
  - **young crust is formed**

What is magma and where does it come from?

Magma

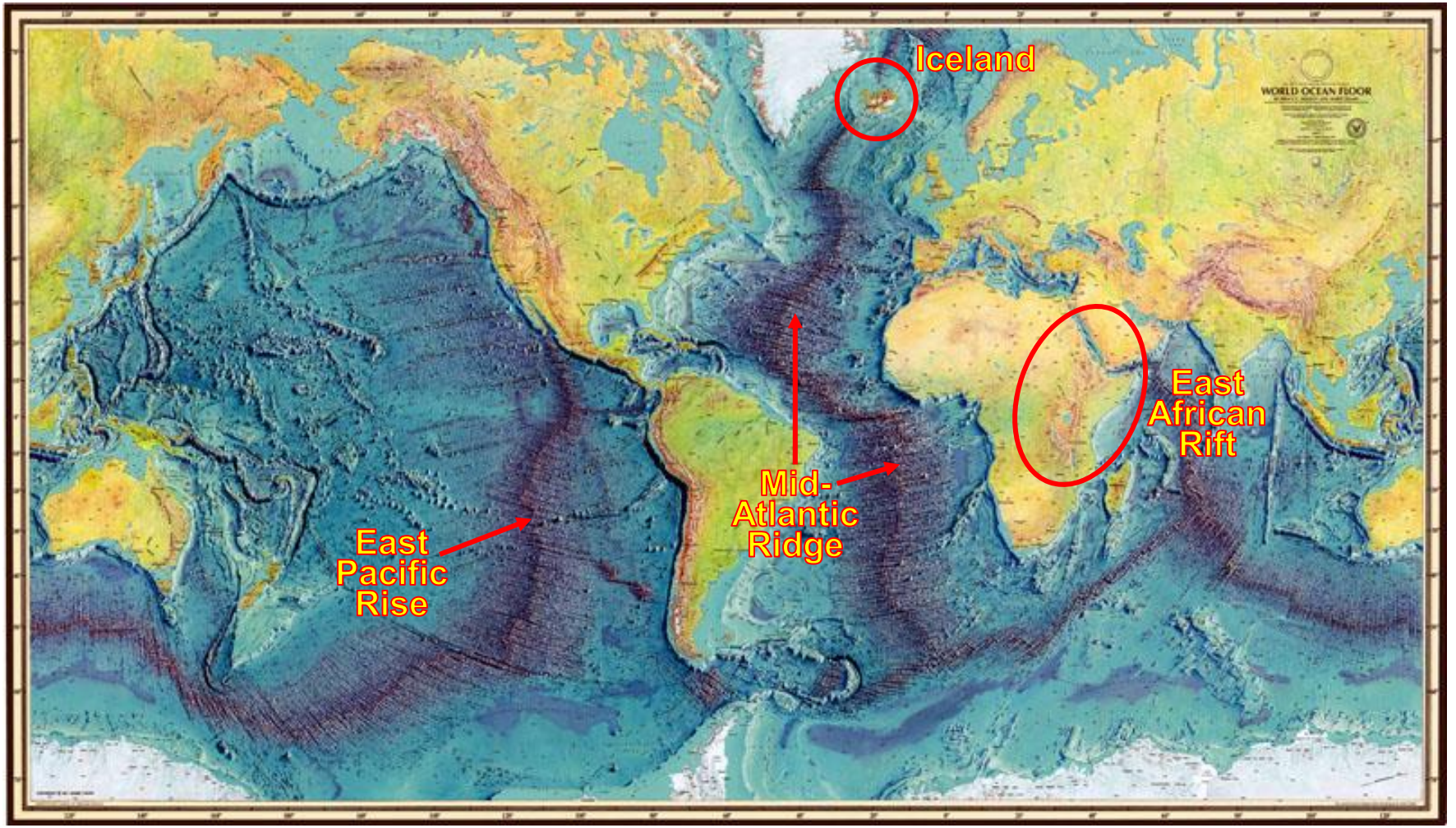
- **Partially <u>molten rock</u> found in high temperature, low pressure environments beneath the Earth's surface.**





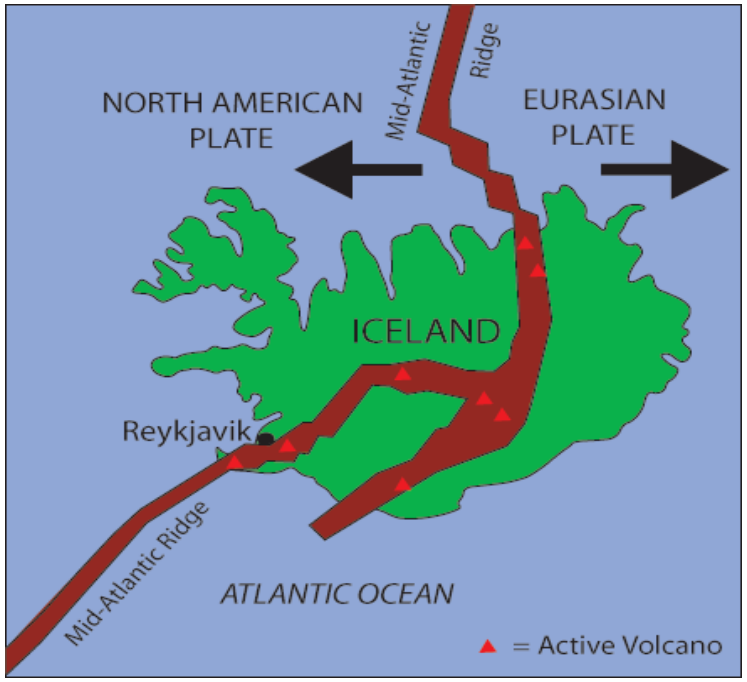
- **Develops and collects in magma chambers usually within several miles of the Earth's surface.**
- **May also rise in mantle plumes directly from the outer core/mantle boundary.**

World's Ocean Ridges and Continental Rifts



The ocean floor is <u>not flat</u>. It has well-pronounced <u>mountain ridges</u> running along the spreading plate boundaries.

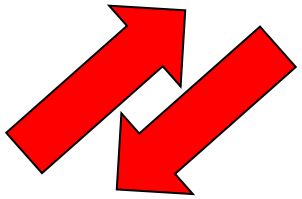
Iceland: an example of continental drift



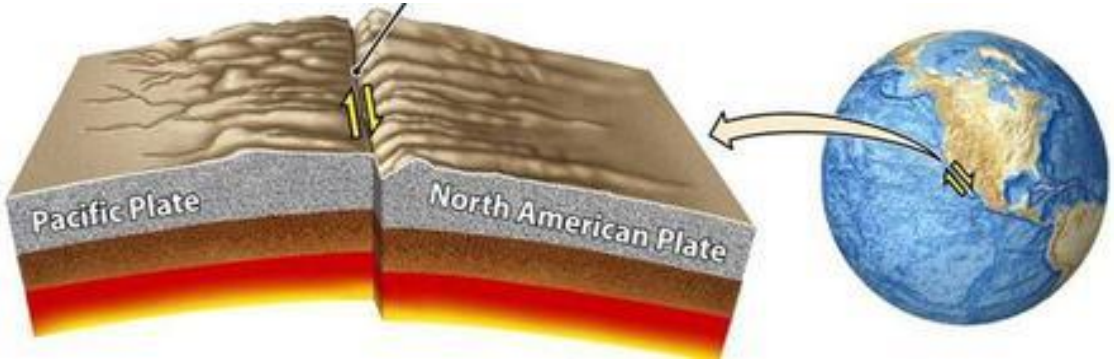
Iceland has a *divergent plate boundary* running through its middle.

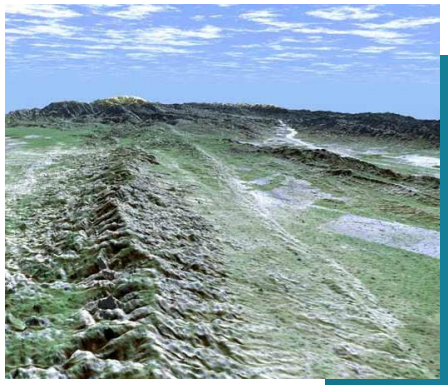
In fact, the island exists because of this feature!

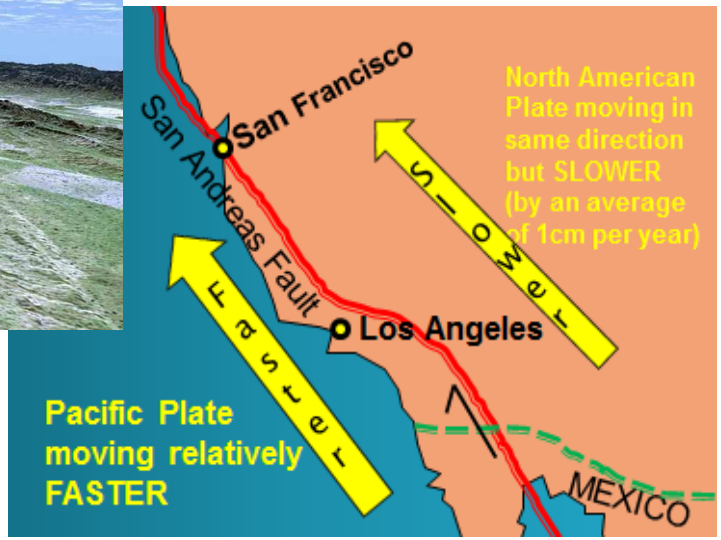
Transform Boundaries

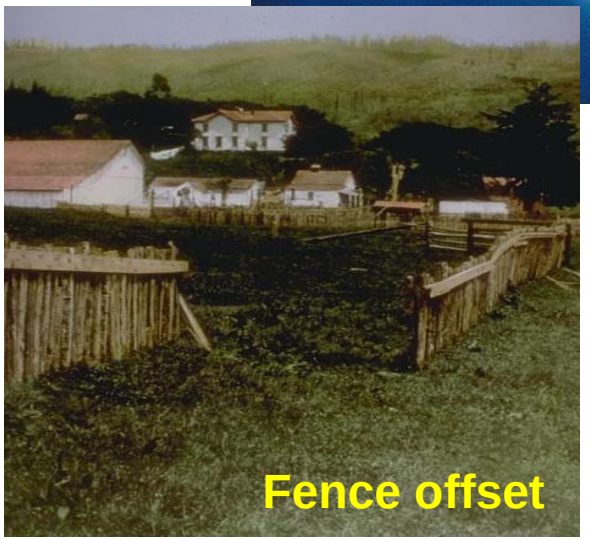


- **Plates <u>slide past</u> each other**









San Andreas Transform Fault