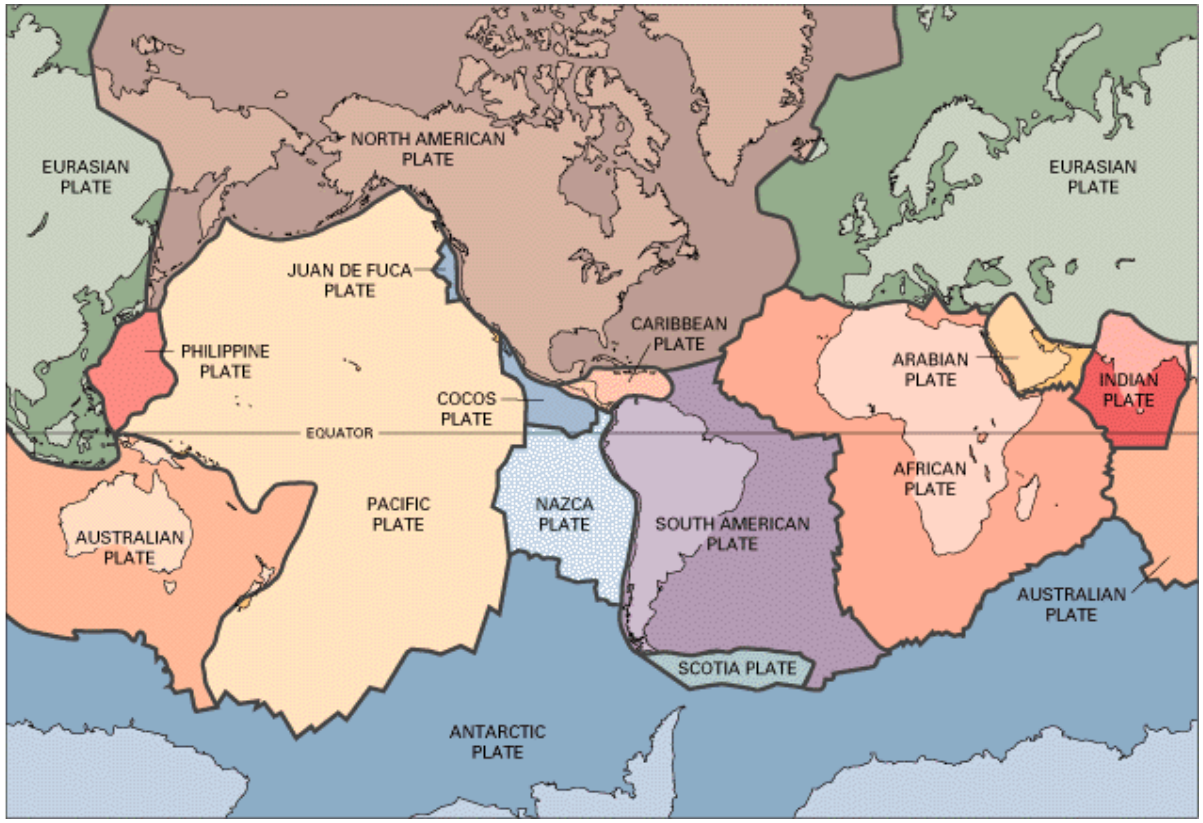
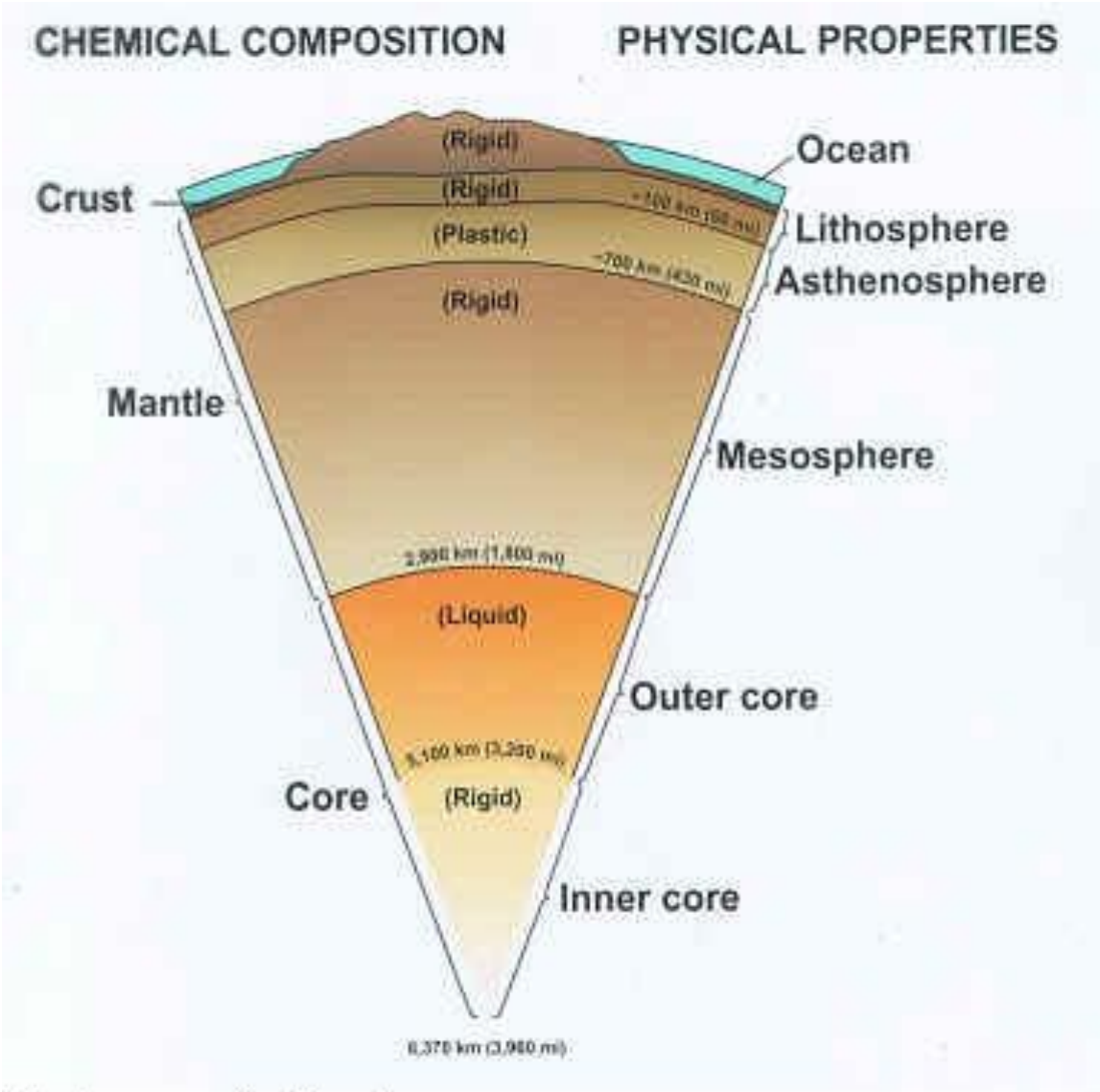
Plate Tectonics



Inside the Earth



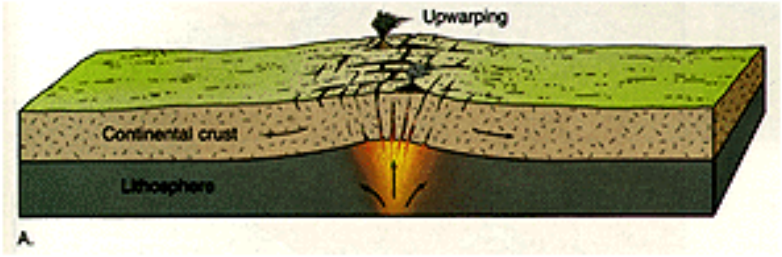
http://success.shoreline.edu

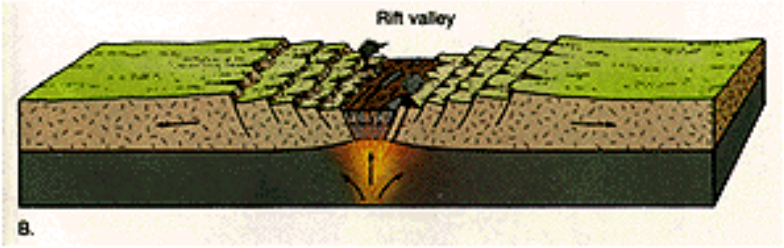
What are plates?

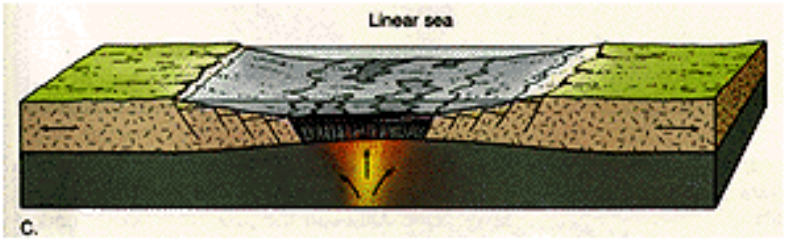
- Rigid exterior of Earth (lithosphere)
- Floats on plastic layer beneath
- Plates can include ocean floor, continents, or both

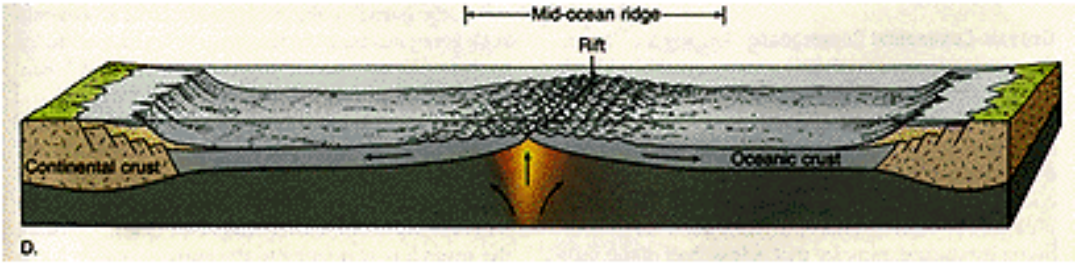
Plate Boundaries

- Divergent
- Transform
- Convergent
  - Subduction
  - Continental collision (suture)









Divergent Boundaries: spreading centers

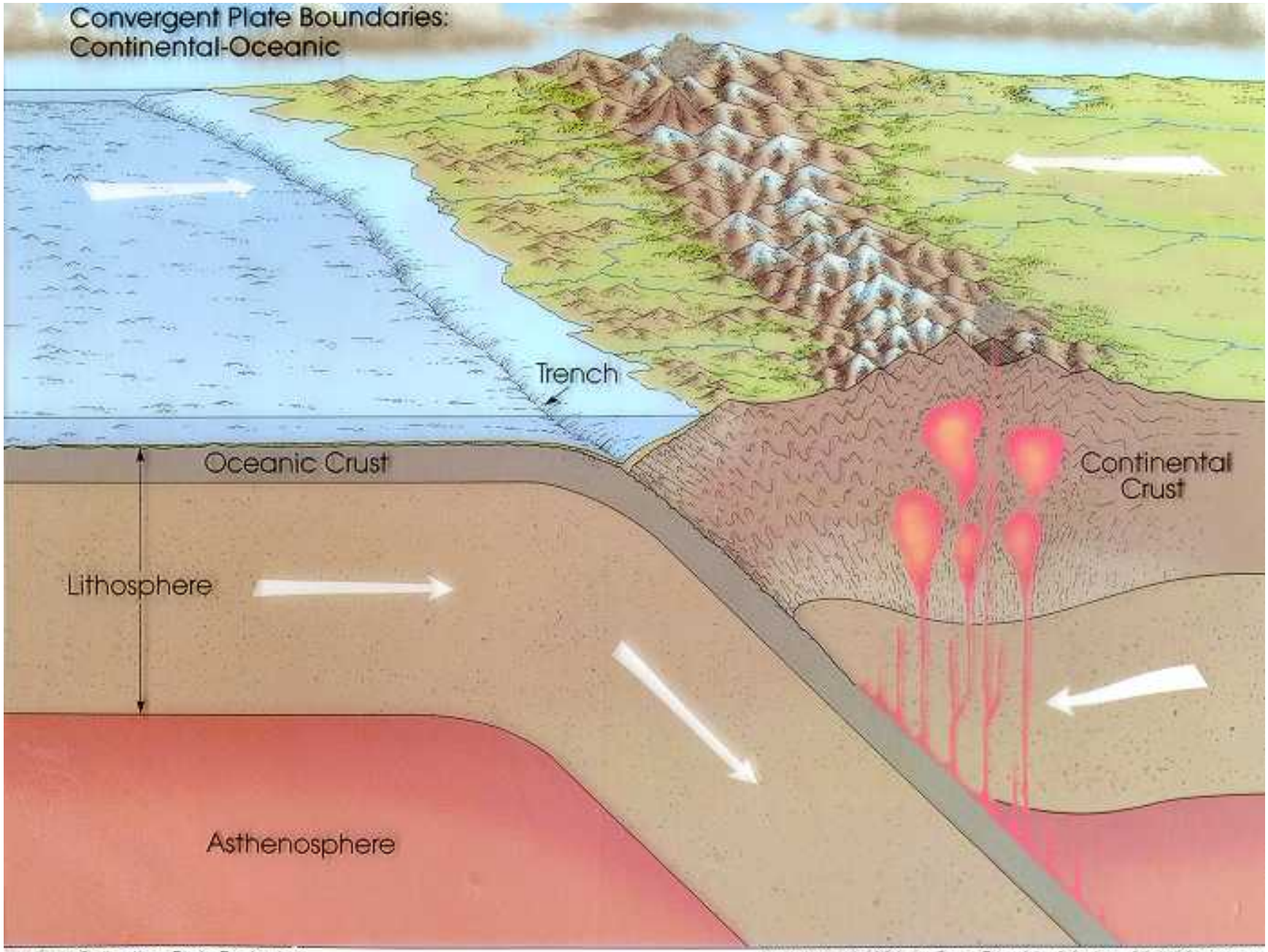
- Plates pull apart
- Magma rises into cracks and solidifies, creating new ocean floor.
- New rock is hot and floats high, creating a mid-ocean ridge
- Continents move apart as new ocean floor forms.

Animation

- http://earthguide.ucsd.edu/eoc/teachers/t_tectonics/p_seafloorspreading.html
- Notice how the spreading center is broken into short segments with offsets in between? The offsets are transform faults.

Convergent boundary: subduction

- Plates carrying ocean floor are denser than plates carrying continent.
- When an oceanic plate collides with another plate, the ocean floor sinks.
- Ocean floor can sink beneath a continent, or beneath other ocean floor.
- We call the process subduction, and the plate boundary is called a subduction zone.


Convergent Plate Boundaries:
Continental-Oceanic
Trench
Oceanic Crust
Continental Crust
Lithosphere
Asthenosphere
The Tasa Collection: Plate Tectonics
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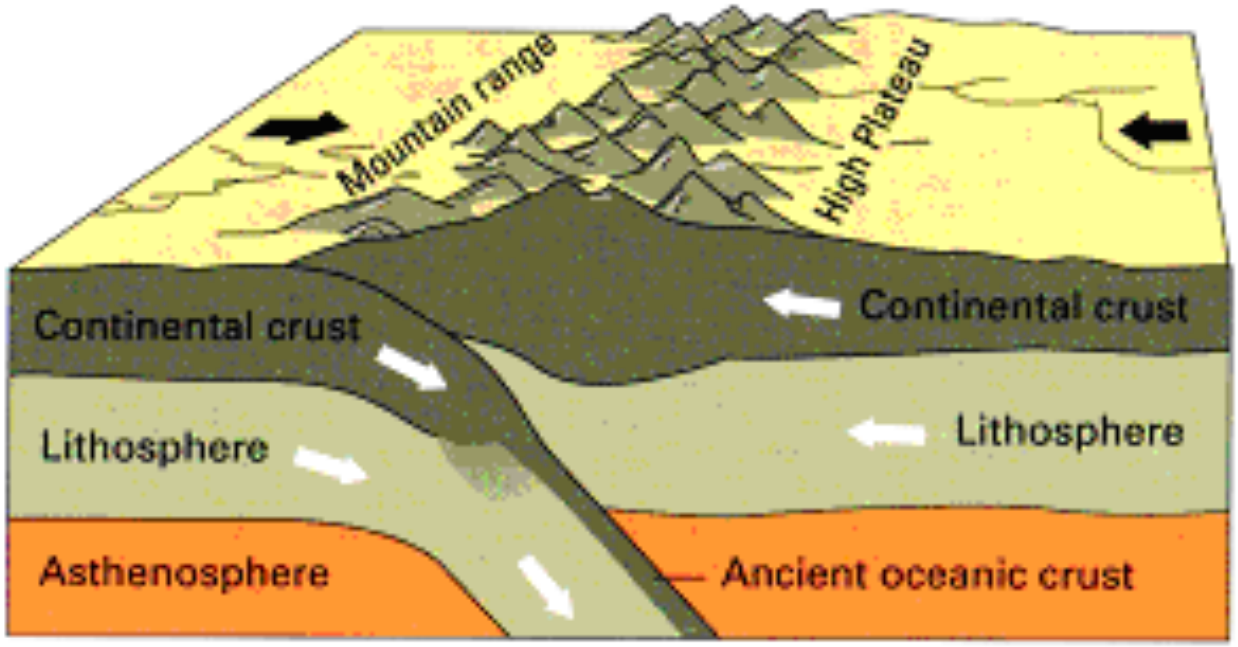
Animation

- http://earthguide.ucsd.edu/eoc/teachers/t_tectonics/p_subduction.html

Continental collision

Sometimes subduction leads to the collision of continents. Continents are not dense enough to sink into subduction zones, so instead the continents merge into one larger continent.



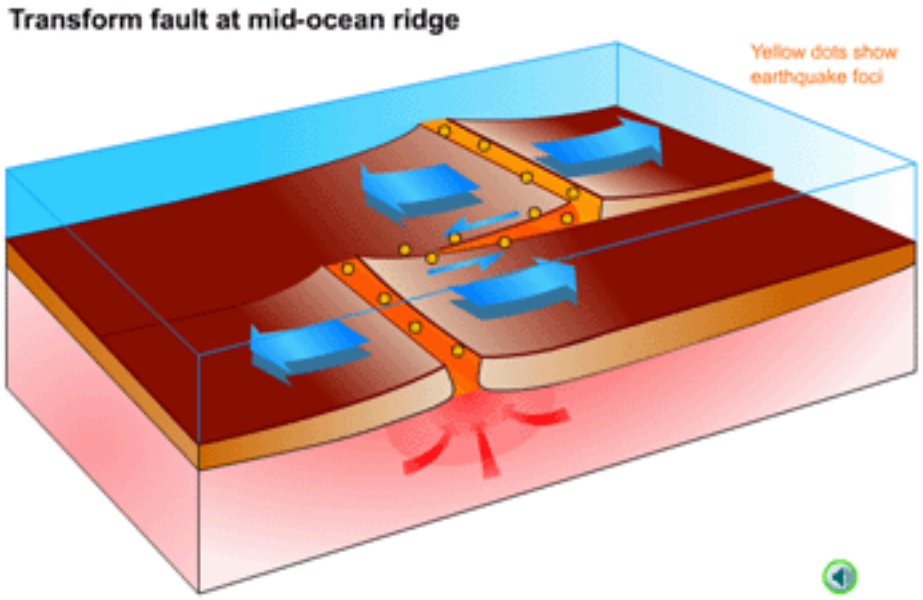
Continental-continental convergence

http://en.wikipedia.org/wiki/File:Continental-continental_convergence_Fig21contcont.gif

Judi, play the animation

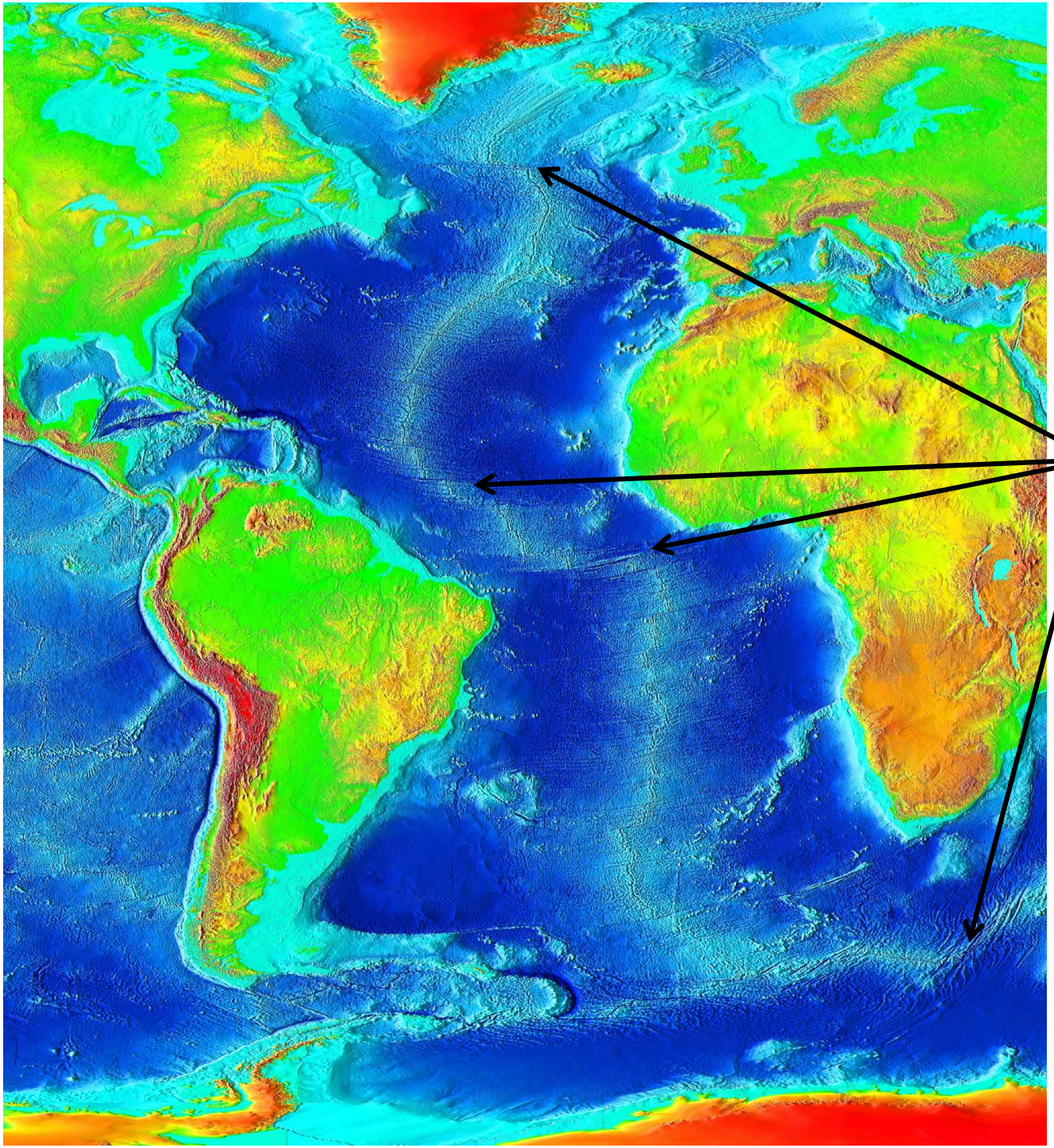
- Available at http://www.youtube.com/watch?v=i1tNHYX4R2o

Transform Faults



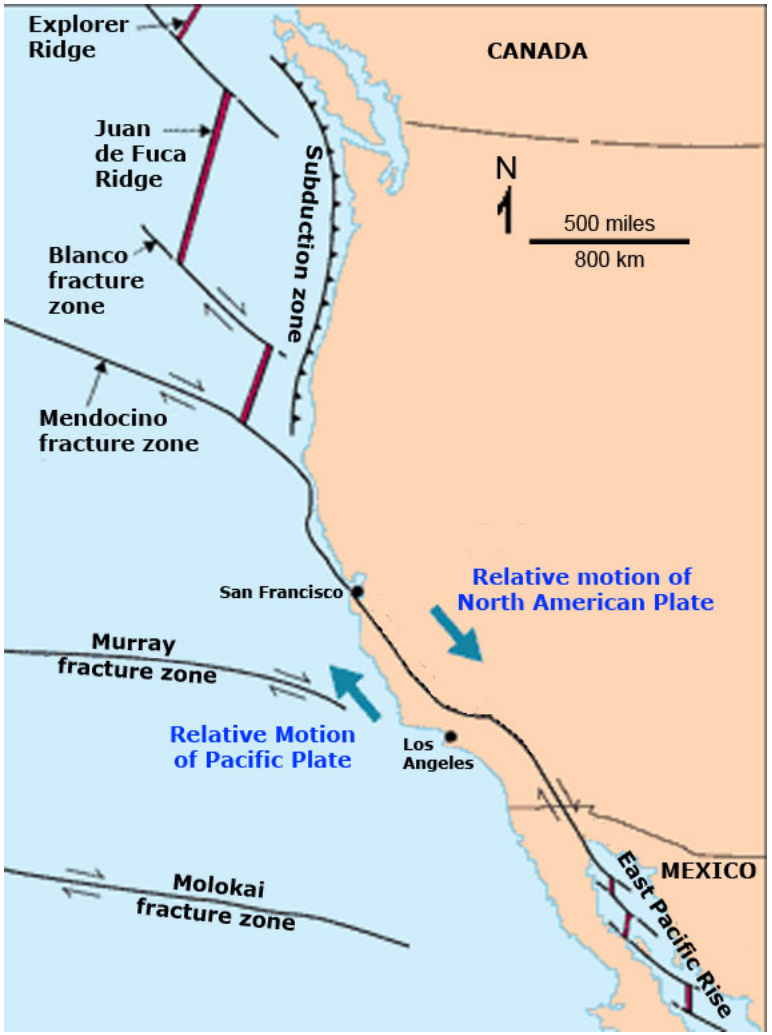
Most transform faults are on the ocean floor, between sections of the mid-ocean ridge.

http://earthquakesandplates.files.wordpress.com/2008/05/mid-oceanic-ridge.gif



Notice these transform faults on this map of the topography of the ocean floor.

http://upload.wikimedia.org/wikipedia/commons/c/ce/Atlantic_bathymetry.jpg



Rarely a transform fault cuts through land as happens in California and the Dead Sea.

http://geomaps.wr.usgs.gov/archive/socal/geology/geologic_history/images/figure1_03.jpg

http://www.geo.arizona.edu/geo5xx/geos577/projects/biryol/dfig1.jpg

Hazards & plate boundaries

1. Find the map of different plate boundaries.
   - Find an example of each kind of plate boundary (divergent, convergent subduction, convergent continental collision, transform)
2. Now find your maps of volcanoes and earthquakes.
3. For each kind of plate boundary, figure out:
   - How plates move there
   - Earthquake patterns (a lot? Few? Big? Small?)
   - Are there volcanoes there?
4. Finally, look for major population centers near each kind of plate boundary.

Diverging?

Transform?

Converging subduction?

Converging continental collision