Crustal Deformation

Reading: Chapter 10
Pages 283-294

FINAL EXAM

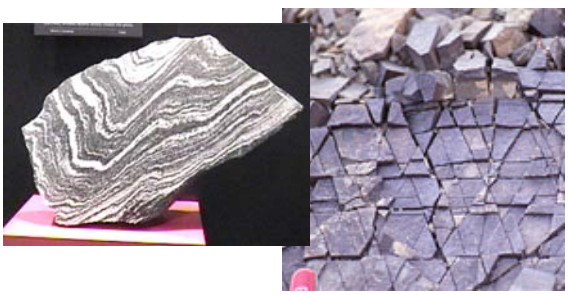
- 8 to 10 AM, THURSDAY DEC. 6
- HERE: Natural Science 101
- BRING A SCAN TRON
- TURN IN YOUR REVIEW QUESTIONS BEFORE THE TEST, PICK UP WHEN YOU ARE DONE WITH THE TEST
- IF YOU WANT YOUR RESULTS, E-MAIL ME AND REQUEST YOUR GRADE

Plate Tectonic Settings and Magma

- The type of magma generated in different plate tectonic settings is different
- **DIVERGENT PLATES** and **MANTLE PLUMES** produce magma by partial melting of mantle material due to pressure release
- This magma is **BASALTIC** (mafic) in chemical composition, and the resulting volcanism has distinct characteristics.

Plate Tectonic Settings and Magma

- Where plates **CONVERGE**, water is driven off the subducting plate, and added to the overlying lithosphere
- This water acts as a **FLUX** to reduce the melting temperature, and cause hot solid rock to melt without a change in temperature
- The lithosphere here is continental (granitic) in character, and the magma generated is **GRANITIC** (felsic) in chemical composition.



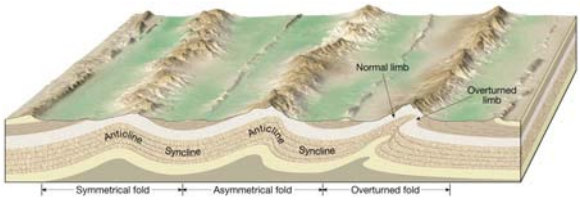
http://www.geology.wisc.edu/courses/g112/lecture3.html

Isoclinal 1C folds in Quartzite of Maria Mountains, Riverside County, California. Photo by Warren B. Hamilton USGS

http://www.uwsp.edu/geo/faculty/hefferan/geol320/folds.html

http://www-class.unl.edu/geol101i/09_structural.htm

Names of fold types

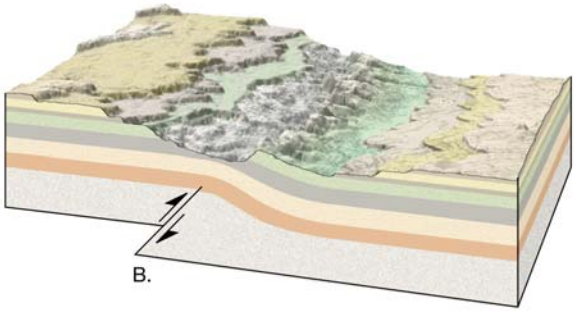


http://www.whbschools.org/Teachers/Cohen/sciweb/earthscience/geologichistory/folding.htm

http://www.uwsp.edu/geo/faculty/hefferan/geol320/folds.html

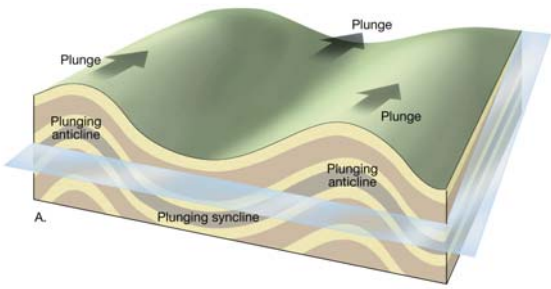
http://home.barton.ac.uk/curriculum/sc_env/geology/Structural%20Geology/RecumAnt.htm

Monocline

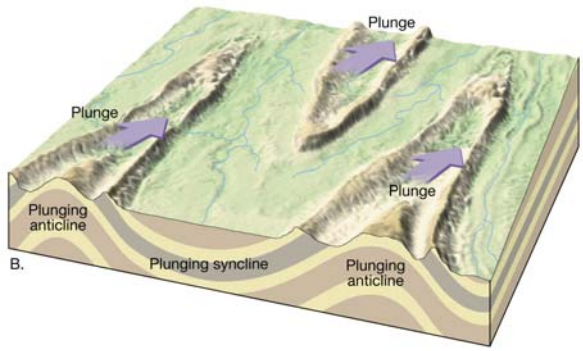


http://www.eas.purdue.edu/physproc/HTM%20Files/monoclines.htm

Plunging fold geometry

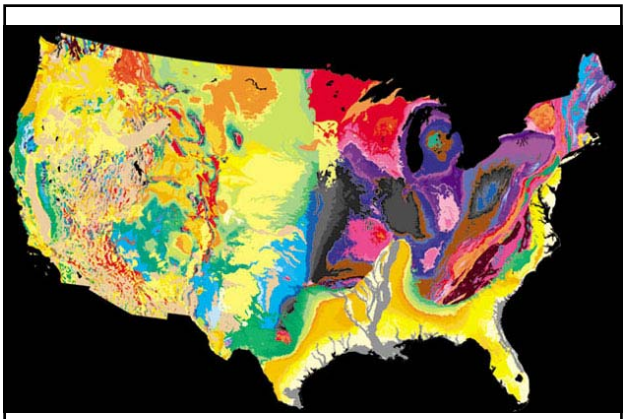


Plunging fold outcrop pattern



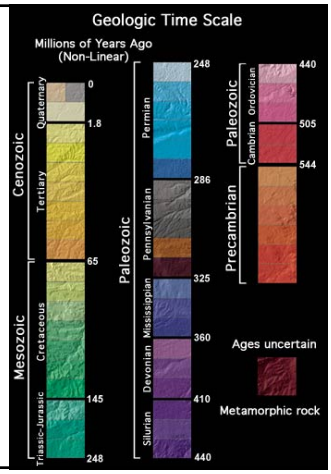
http://www.geosciences.ou.edu/~msoreg/structure/structureintro.html

http://www.geology.wisc.edu/~rschott/g112/lecture3.html

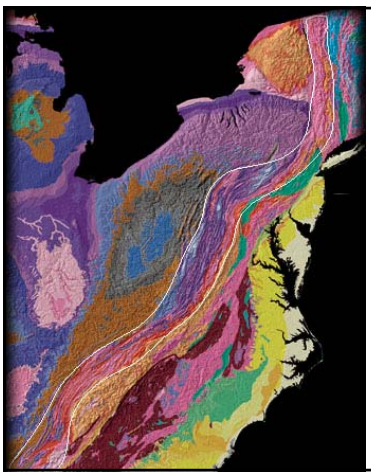


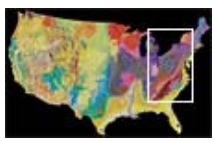
http://pubs.usgs.gov/of/2000/of00-443/

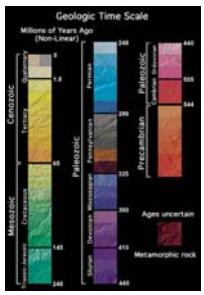
Legend for Tapestry of Time and Terrain Map



http://tapestry.usgs.gov/ages/ages.html







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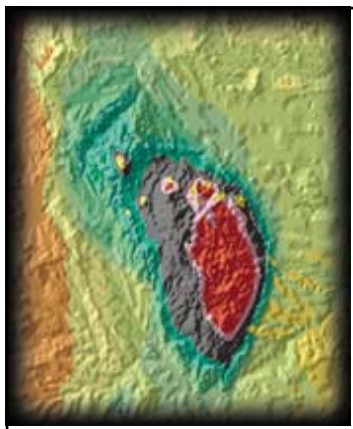
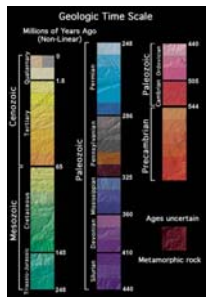
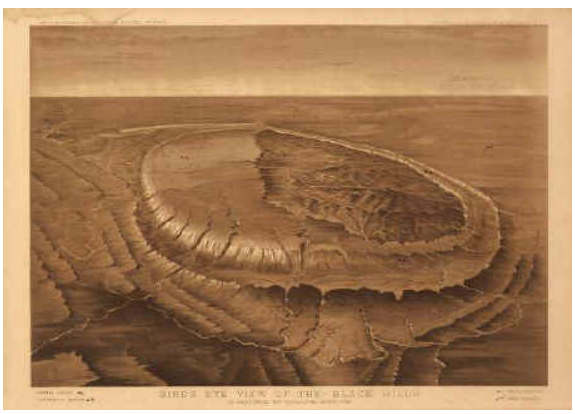
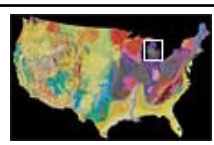


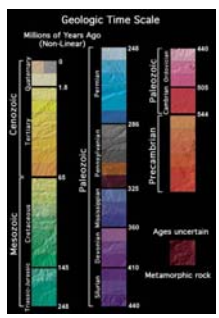


http://tapestry.usgs.gov/features/16blackhills.html



http://www.dakotamatrix.com/South_Dakota_Geology.asp

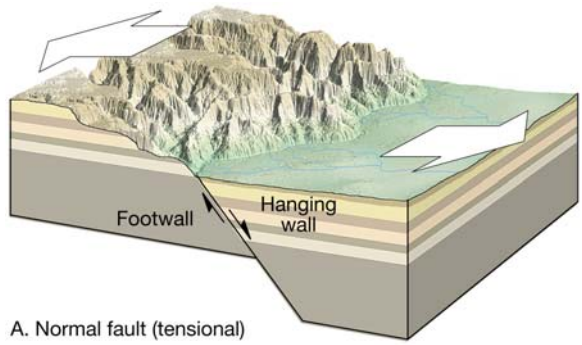




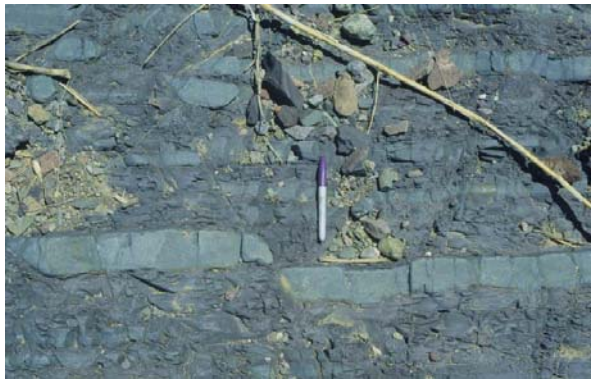
http://tapestry.usgs.gov/features/09michigan.html

http://www.aucegypt.edu/faculty/hamroush/CE331/CE331-%20Rock%20Deformation%20and%20Unconformities.htm

Normal fault formation

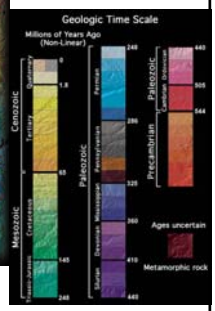


A. Normal fault (tensional)

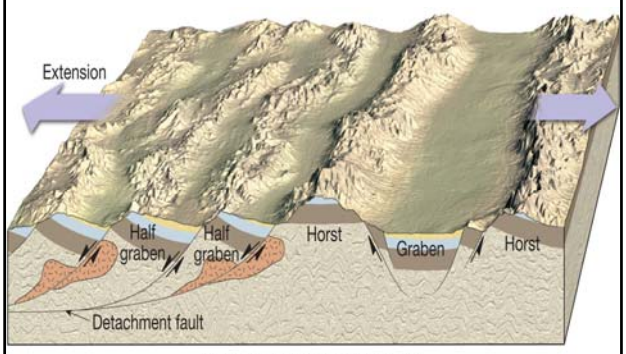


http://www.uwsp.edu/geo/faculty/hefferan/geol320/normalfaults.html

http://www.geology.wisc.edu/courses/g112/lecture3.html



http://tapestry.usgs.gov/features/22basinrange.html



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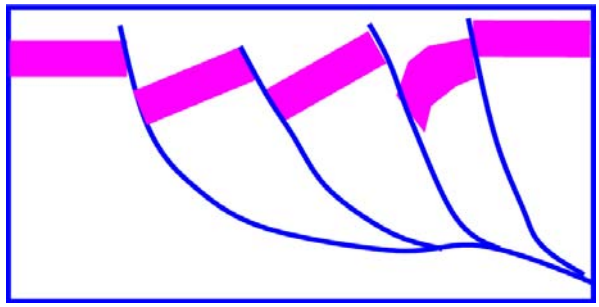

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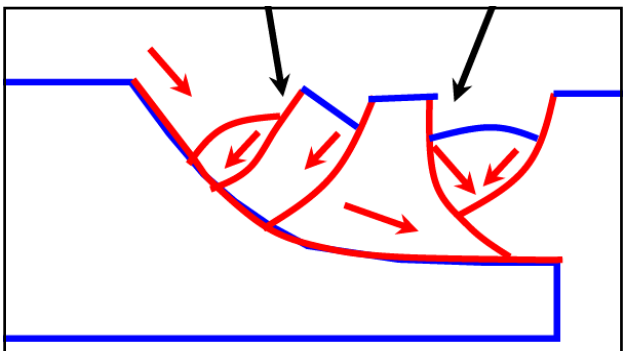
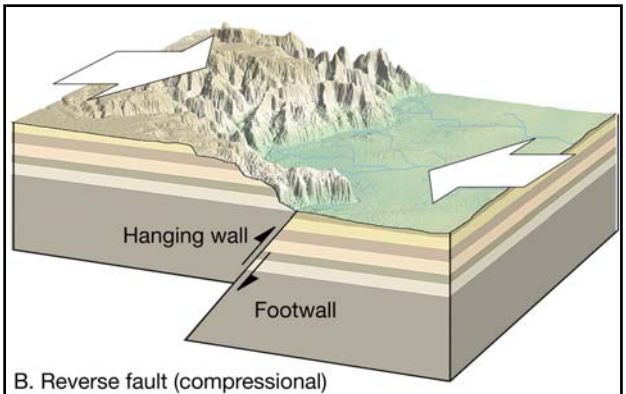


http://www.uwsp.edu/geo/faculty/hefferan/geol320/normalfaults.html

http://www.uwgb.edu/dutchs/EarthSC202Slides/EQKSLIDE.HTM

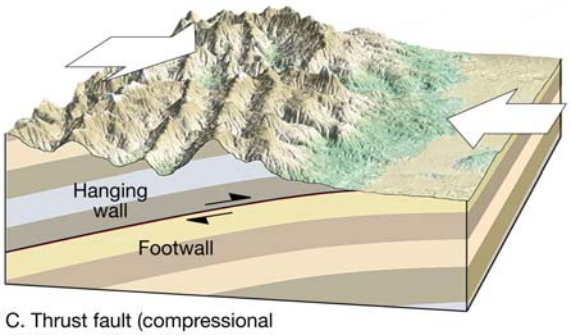
http://www.uwgb.edu/dutchs/EarthSC202Slides/EQKSLIDE.HTM

http://www.geosci.unc.edu/faculty/glazner/Images/Structure/Faults.html



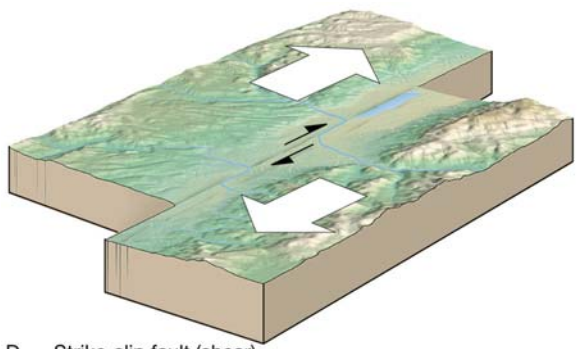
B. Reverse fault (compressional)

http://www.uwsp.edu/geo/faculty/ritter/glossary/o_r/reverse_fault.html

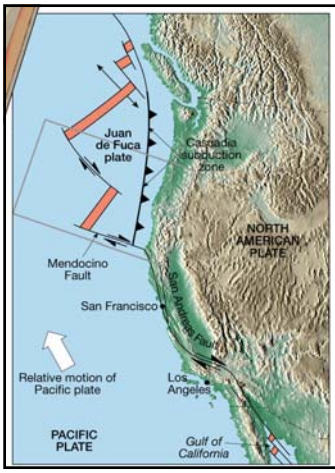


C. Thrust fault (compressional

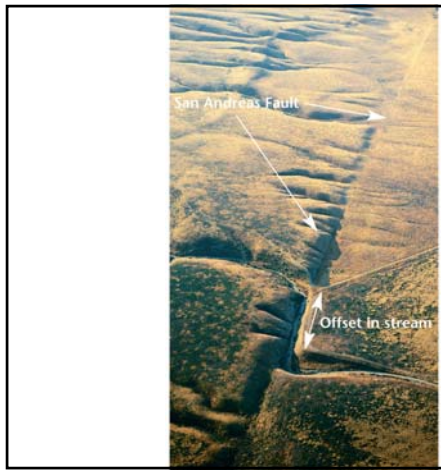
http://earth.leeds.ac.uk/assyntgeology/geology/deformation/gallery/thrust1.htm

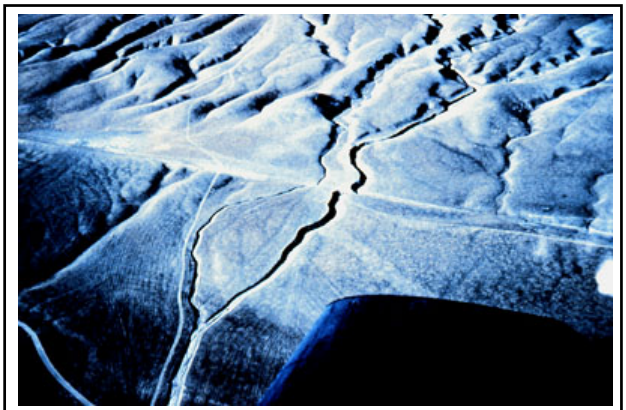


D. Strike-slip fault (shear)



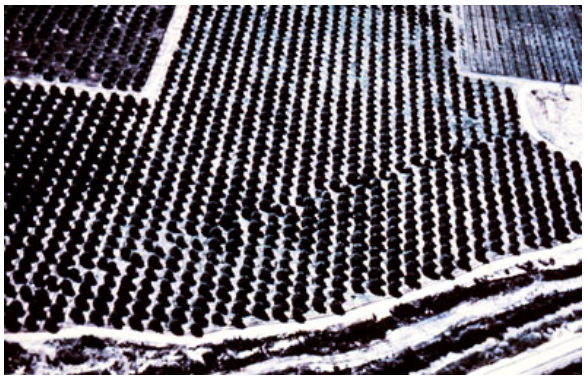
Tectonics of Western North America





http://www.geology.wisc.edu/courses/g112/lecture3.html

http://quake.wr.usgs.gov/info/1906/images/fenceoffset_big.html



http://www.geology.wisc.edu/courses/g112/lecture3.html

http://www.geology.wisc.edu/~maher/air/air05.htm

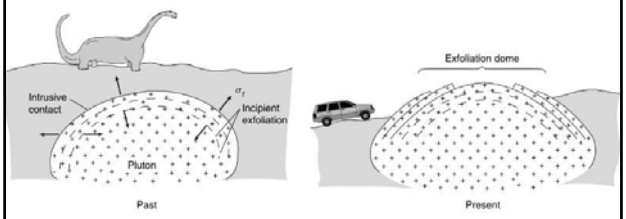
http://maps.unomaha.edu/Maher/geo117/part3/structures/structureatlas.html

http://www.ce.berkeley.edu/~nsitar/ce281/Sierra%20Nevada%202000/Attitude%20Measurement%20Lake%20Spaulding.jpg

http://www.cs.biu.ac.il/~plot/USA/

http://www.ic.ucsc.edu/~casey/eart150/Lectures/Joints/JointsPics.html

http://darkwing.uoregon.edu/~millerm/exjoints.html



http://www.ic.ucsc.edu/~casey/eart150/Lectures/Joints/joints.htm

http://www.ic.ucsc.edu/~casey/eart150/Lectures/Joints/joints.htm

http://www.wooster.edu/geology/bjordan/Iceland2003PK.html

Tectonic environment of Magma

- Draw a diagram showing the relationship of tectonic plate interaction and the location of magma formation. Indicate the chemistry of the magma likely to form.