

# California Geology Outline

- Science:** Body of Knowledge  
Way of Solving Problems  
Scientific Method:  
    Observation, Gathering and Organizing Data,  
    Hypothesis, Theory and Law
- Geology:** Study of the Earth  
Physical Geology: Materials and Processes that affect the Earth  
Historical Geology: The sequence of events that formed a landscape
- Geologic Provinces:**
- |                   |                   |
|-------------------|-------------------|
| Great Valley      | Sierra Nevada     |
| Basin and Range   | Cascades Ranges   |
| Modoc Plateau     | Klamath Mountains |
| Mojave Desert     | Colorado Desert   |
| Peninsular Ranges | Transverse Ranges |
| Coast Ranges      |                   |
- Earth Materials:** (Harden, chap. 2)  
Crustal Elements: OSiAlFeCaNaKMg  
Rock-forming Minerals: Quartz, Feldspar, Mica, FerroMags, Olivine  
Rock Cycle  
Igneous Rocks  
    Plutonic: Peridotite, Gabbro, Diorite, Granite  
    Volcanic: Basalt, Andesite, Rhyolite, Obsidian, Pumice  
    Plutons: Dike, sill, batholith, stock  
Sedimentary Rocks:  
    Clastic: Conglomerate, Sandstone, Shale  
    Biogenic (Biologic): Limestone, Coal, Diatomite  
    Chemical (Inorganic): Rock Salt, Gypsum  
Metamorphic Rocks  
    Foliated: Slate, Schist, Gneiss  
    Granular: Quartzite, Marble
- Geologic Time:** (Harden, chap. 3)  
Relative Dating:  
    Uniformitarianism, Faunal Succession  
    Superposition, Original Horizontality  
    Cross-cutting Relationships, Inclusions  
Absolute Dating:  
Geologic Time Scale:  
    Proterozoic 2.5 billion to 545 million years  
    Paleozoic 545-245 million years  
    Mesozoic 245-65 million years  
    Cenozoic 65-0 million years
-

---

**Structure of the Earth** (Harden, chap. 1)

Inner Core; Outer Core; Mantle; Crust

Lithosphere: Continental Crust, Oceanic Crust, Upper Mantle

Asthenosphere

**Plate Tectonics:** (Harden, chap. 1)

Evidence for Continental Drift:

Matching coastlines

Matching rock and structures (i.e. mountain ranges)

Matching fossils

Paleoclimatic evidence

Paleomagnetism

Age and thickness of seafloor sediments

Satellite measurements

Plate Boundaries:

Divergent: Oceanic and Continental

Convergent:

Ocean - Ocean

Ocean - Continent

Continent - Continent

Accretionary wedge, fore-arc basin, magmatic arc

Transform: Strike-slip faults

Hot Spots and Mantle Plumes

**Plate Motions Throughout Geologic Time**

Rodinia and Pangaea

Tethys Sea

**Tectonic events in California** (Class handouts; Harden, chap. 18)

Mazatzal Orogeny 1.7 by

Continental Rifting 1.2 - .85 by

Atlantic Style Margin 800 - 400 my

Antler Orogeny 400-360 my

Japanese Style Margin 400 - 200 my

Sonoma Orogeny 245 - 200 my

Andean Style Margin 200 - 28 my

Nevadan Orogeny 140 my

Override of East Pacific Plate by North American Continent

California Style Margin 28 my to present

---