

\*\*\*DRAFT: This is an unfinished document --- a work in progress . . .

## **Earth Science Curriculum Sequence and Links**

CA Earth Science Standards: <http://www.cde.ca.gov/be/st/ss/scearth.asp>

Earth Guide (SIO): <http://earthguide.ucsd.edu>

SDSU Geological Department: <http://www.geology.sdsu.edu/>

The study of Earth Science (which has historically been known as Physical Geography from time immortal) utilizes the traditional sub-disciplines of Astronomy, Physical Geography, Geology, Meteorology/Climatology, Oceanography, and Environmental Science in the pursuit of understanding the Universe (the Cosmosphere) and the Planet Earth (the Geosphere) and how all of the following physical spatial spheres relate and interact with one another:

The Cosmosphere (The Universe)

The Geosphere (including the biogeochemical cycles)

The Lithosphere (and the Earth's interior)

The Hydrosphere

The Atmosphere

The Biosphere

The Human/Cultural Sphere (as it relates to Resources and Environmental Impacts)

SDSU Geography Department:

<http://geography.sdsu.edu/>

<http://geography.sdsu.edu/Quick/physical.php>

Here is the course curriculum sequence:

Unit 1: Earth Science

Science Fundamentals Unit: (covered mostly by lab from a Physics pdf file) Lab Safety, The Metric System, Unit Analysis/Dimensional Analysis, Scientific Notation, Significant Figures, How to Measure with Accuracy and Precision, Methods of Science (The Scientific Method), Matter/Energy, and the following thematic units of study in the following sequence:

CH 1: The Nature of Science (mostly covered in Science Fundamentals Unit + what is Earth Science --- the Cosmosphere and Geosphere interrelated/interconnected spatial model)

--- Use first lab from Physics on-line pdf labs for Science Fundamental Review:

<http://henry.sandi.net/staff/gsimpson/root/printableformsandlessonplans.html>

CH 2: Mapping our World (my dream and what I want to do eventually is to cover this mostly by labs done within ESRI's GIS ArcView along with remote sensing from Google Earth as background imagery or ERDAS imagery)

2.1 Lat and Long

2.2 Types of Maps

--- On-line Map Resources:

--- Topozone.com

<http://www.topozone.com/>

--- Google Earth

(Have on hard-drive)

--- Google Map

<http://maps.google.com/maps>

--- Terraserver.com

<http://www.terraserver.com/>

--- Mapquest.com

<http://www.mapquest.com/>

--- USGS guide to reading, and understanding Topo maps as well as topographic map symbols:

<http://erg.usgs.gov/isb/pubs/booklets/symbols/>

--- GIS by ESRI:

<http://www.esri.com/>

ArcGIS Explorer (like Google Earth on Steroids - a true GIS)

<http://www.esri.com/software/arcgis/explorer/index.html>

<http://www.esri.com/flashmedia/arcgisexplorer/arcgisexplorer.html>

<http://resources.esri.com/arcgisexplorer/>

<http://arcgisonline.esri.com/index.cfm?fa=download.arcgisexplorer&ESRISessionID=4Z7dzEbGvGvLCwSM67vzaM0K2hA4GTiCiXCN4ug27QJvM0FB%5FuROz1zZTGhcQsbt>

<http://arcgisonline.esri.com/>

--- Students view the DVD “NGS: Taller than Everest?”:  
a very good summary of the science and art of Cartography.

### 2.3 Remote Sensing

--- Do the Spectrum Line Analysis Lab --- Spectroscopy. This is a great lead into Astronomy. Now the students know how we get data remotely about the Universe from EM waves whether reflected or emitted .

--- ERDAS:

<http://gi.leica-geosystems.com/default.aspx>

--- GeoEye:

<http://www.geoeye.com/>

--- A real world application utilizing RS: What is our Government hiding in Area 51?

<http://www.fas.org/irp/overhead/groom.htm>

## Unit 8: Beyond Earth

### CH 28: The Sun-Earth-Moon System

--- also covers the Coriolis effect very well, and we will need it later again!

--- The Coriolis Effect (the Coriolis Force):

[http://www.classzone.com/books/earth\\_science/terc/content/visualizations/es1904/es1904page01.cfm?chapter\\_no=visualization](http://www.classzone.com/books/earth_science/terc/content/visualizations/es1904/es1904page01.cfm?chapter_no=visualization)

[http://ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/fw/crls.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/fw/crls.rxml)

<http://www.physics.orst.edu/~mcintyre/coriolis/>

<http://www.physics.ohio-state.edu/~dvandom/Edu/newcor.html>

The Moon:

--- “Apollo Over the Moon” (online historical book) with incredible B&W images in high resolution of the Moon surface:

<http://www.hq.nasa.gov/office/pao/History/SP-362/cover.htm>

--- Did we really go to the Moon?

[http://science.nasa.gov/headlines/y2005/11jul\\_lroc.htm?list159028](http://science.nasa.gov/headlines/y2005/11jul_lroc.htm?list159028)

--- Origin of the Moon:

<http://www.lpl.arizona.edu/outreach/origin/>

--- All about the Moon:

<http://www.lpl.arizona.edu/SIC/moon/>

--- Lunar Meteorites:

[http://meteorites.wustl.edu/lunar/moon\\_meteorites.htm](http://meteorites.wustl.edu/lunar/moon_meteorites.htm)

[http://www.lpl.arizona.edu/SIC/moon/lunar\\_meteorites/](http://www.lpl.arizona.edu/SIC/moon/lunar_meteorites/)

## CH 29: Our Solar System

--- The Meteorite and Moon Rock demonstration and guest lecturer (send for NASA samples)

--- Very good lab on collecting Micrometeorites. How often do students or teachers get to hold a object that is possibly Nebular (predates the formation of the Solar system) or is as old as our Solar System (4.5 - 5 billion years old)? They even get to learn how to collect, sort, and classify the micrometeorites, make microscope slides, and even take some micrometeorites home!

--- Astronomy:

<http://www.enchantedlearning.com/subjects/astronomy/>

--- San Diego Astronomy Association:

<http://www.sdaa.org>

--- Sky and Telescope Magazine:

<http://www.skyandtelescope.com/>

<http://www.skyandtelescope.com/observing/ataglance>

--- The age of the Universe

The age of the Milky Way Galaxy

The age of the Solar System

The age of Earth

<http://geology.wr.usgs.gov/parks/gtime/ageofearth.html>

--- SDSU Professor Gary L. Peterson, Planetary Geology

<http://www-rohan.sdsu.edu/~3gleep6/planets.html>

--- A Multimedia Tour of the Solar System:

<http://seds.lpl.arizona.edu/nineplanets/nineplanets/nineplanets.html#toc>

--- How did the Solar System and planets form? The importance of Meteoritics, the science of studying meteorites:

<http://www.amnh.org/exhibitions/permanent/meteorites/origins/oldest.php>

<http://www.amnh.org/exhibitions/permanent/meteorites/>

[http://solarsystem.nasa.gov/scitech/display.cfm?ST\\_ID=446](http://solarsystem.nasa.gov/scitech/display.cfm?ST_ID=446)

--- Educational Resources on Meteoritics/Meteorites:

<http://www.amnh.org/education/resources/halls/meteorites/educators.php>

--- Meteorites from Mars:

<http://www2.jpl.nasa.gov/snc/>

## CH 30: Stars

--- + we cover Heat and the 3 ways heat transfers (conduction, convection, and

radiation. Now they know convection really well for other topics to come)

--- Stars are Fusion Nuclear Reactors releasing enormous amounts of energy. The Sun is our primary source of energy for Earth. Through this type of nuclear reaction (fusion), Stars form all the elements including the heavy elements through Star's life cycles.

--- General Atomics, San Diego, CA, Fusion Reactor "The Tokamak":

<http://fusion.gat.com/global/Home>

<http://fusion.gat.com/global/Basics>

<http://fusioned.gat.com/>

--- Very nice EM Spectrum Poster from GA:

[http://fusioned.gat.com/education\\_notebook/images/pdf/electromagnetic.pdf](http://fusioned.gat.com/education_notebook/images/pdf/electromagnetic.pdf)

--- The National Atomic Museum:

<http://www.atomicmuseum.com/>

--- The World's first Atomic Bomb (Fission nuclear reaction) Site – Trinity, NM:

<http://www.atomictourist.com/trinity.htm>

<http://www.wsmr.army.mil/pao/TrinitySite/trinst.htm>

<http://www.wsmr.army.mil/pao/TrinitySite/trinph.htm>

--- Trinitite:

CH 31: Galaxies and the Universe

--- When I finished this unit I went in reverse quickly and went from the Big-Bang all the way back to formation of planet Earth, so they got a review, and got it in the proper sequence.

--- This Unit is where the students also get Fusion, Fission, and what we are able to do with particle accelerators and Fusion reactors such as the one at GA --- the Tokomak

--- Lots of observational labs possible in this entire Unit with reflective telescopes, refractive telescopes, as well as Solar filters to view the Sun, as well as Moon observations during the day.

--- It would be great to do a lab of evening observations at the school at night using the Astronomy contacts at SDSU or OPT (Oceanside Photo and Telescope).

--- The San Diego Astronomy Association:

<http://www.sdaa.org/>

--- John Mood's SkyWatch:

<http://www.sdaa.org/index.cfm?fuseaction=skywatch.thismonth>

--- SDAA Educational Outreach:

<http://www.sdaa.org/index.cfm?fuseaction=outreach.info>

--- Sky and Telescope Magazine:

<http://www.skyandtelescope.com/>

<http://www.skyandtelescope.com/observing/ataglance>

--- Is there any other life out there? Is there intelligent life out there beyond Earth?

## Unit 2: Composition of the Earth

### CH. 3: Matter and Atomic Structure

(the basic chemistry unit and also serves as the foundation for the biogeochemical cycles and the environmental impacts that man causes)

#### --- The Periodic Table of the Elements

3.1 What are Elements?

3.2 How Atoms Combine?

3.3 States of Matter

#### Additional Topics:

##### Periodic Table of the Elements

<http://periodic.lanl.gov/default.htm>

##### Elements mined in CA (some of the more famous examples):

Note: Use Google Earth and Topo! for locations

“Everything we need and use is mined, pumped from the ground, or grown.”

##### Gold

##### Gold! The CA Geological Survey

[http://www.consrv.ca.gov/cgs/geologic\\_resources/gold/index.htm](http://www.consrv.ca.gov/cgs/geologic_resources/gold/index.htm)

##### Historic Gold Mine Map:

[http://www.consrv.ca.gov/cgs/minerals/images/Big\\_AUMap.pdf](http://www.consrv.ca.gov/cgs/minerals/images/Big_AUMap.pdf)

##### Active Gold Mine Map (2000 – 2001)

<http://www.consrv.ca.gov/cgs/minerals/images/YellowAu.pdf>

##### Gold: CA State “Native” Mineral

[http://www.consrv.ca.gov/cgs/information/publications/cgs\\_notes/note\\_12/Note%2012.pdf](http://www.consrv.ca.gov/cgs/information/publications/cgs_notes/note_12/Note%2012.pdf)

A. Coloma, CA. (Start of CA “Gold Rush”)

Throughout the Sierra Mtns. Of CA

B. Klamath Mtns. and Klamath River Water Shed

C. Bodie, CA

[http://www.parks.ca.gov/?page\\_id=509](http://www.parks.ca.gov/?page_id=509)

- D. Randsburg, CA
- E. Grass Valley, CA (The 16 to 1 Mine)  
<http://www.origsix.com/>

#### Tungsten

- A. Pine Creek Mine, the famous “Mine in the Sky”  
Rovana, CA
- B. Tungsten City, Tungsten Hills, Bishop, CA.
- C. Atolia, CA (Near Johannsburg and Randsburg)

#### Boron

- A. Boron, CA, the famous Borax Open Pit Mine

Bastnasite (from this mineral approx. 7 elements from Lanthanide Series are extracted)

- A. Mountain Pass, CA, (Molycorp, Inc.)  
<http://www.molycorp.com/>

Gypsum (actually a mineral): Chemistry ---  $\text{CaSO}_4 \cdot 2(\text{H}_2\text{O})$ , Hydrated Calcium Sulfate Class: [Sulfates](http://www.galleries.com/minerals/sulfates/gypsum/gypsum.htm)  
<http://www.galleries.com/minerals/sulfates/gypsum/gypsum.htm>

- A. Plaster City (aka Gypsum City), CA (Near Ocotillo and El Centro)

The California Geological Survey:

<http://www.consrv.ca.gov/cgs/>

Mineral Resources:

[http://www.consrv.ca.gov/cgs/geologic\\_resources/mineral\\_resource\\_mapping/index.htm](http://www.consrv.ca.gov/cgs/geologic_resources/mineral_resource_mapping/index.htm)

The Carbon Cycle:

<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/C/CarbonCycle.html>

Photosynthesis, Respiration, and Combustion:

<http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookPS.html>

The Global Warming gases:

CO<sub>2</sub>, Methane, CO?, others?

DVD: “An Inconvenient Truth” the official website:

<http://www.climatecrisis.net/>

Materials for educators: <http://www.participate.net/educators/>

--- Here I cover photosynthesis, respiration, and combustion, as well as the Carbon Cycle.

--- The Carbon Cycle:

<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/C/CarbonCycle.html>

--- Photosynthesis:

<http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookPS.html>

--- The Ozone Hole (Depletion):

<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/O/Ozone.html>

--- From this point on as I'm covering the Units, I can talk about any of the other biogeochemical cycles at the appropriate time as well as the devastating environmental affects due to man's activities.

#### CH 4: Minerals

--- Show and tell with Mr. Knapik as well as show off my fluorescent mineral collection. This is a big wow event for students.

--- A wonderful resource for ES teachers and they offer really good workshops, and I'll probably attend again when they come down to SoCal, is The California Mineral Education Foundation:

<http://www.calmineraled.org>

--- I just checked and they are going to be here in San Diego this summer: August 1 – 2, 2007. I'll be signing up again.

---Great mineral database resource:

<http://www.mindat.org/>

--- Gemological Institute of America (GIA), Carlsbad, CA:

<http://www.gia.edu/>

--- Gemstones:

<http://www.gemstone.org/gem-by-gem/gem-by-gem-by-variety.html>

<http://www.gemstone.org/gem-by-gem/english/coral.html>

--- Also don't miss the annual opportunity to go to the 2 week world famous Tucson Gem and Mineral Show (TG&MS) for specimens to share with your

classroom. You can purchase wonderful specimens of minerals, fossils, and even meteorites for really good prices. It is an incredible scene to experience.

--- I'm showing a little DVD clip from my family trip to Tucson to my ES students this year. Very exciting and interesting stuff.

--- SDSU Geological Department:

<http://www.geology.sdsu.edu/>

Great resources for Minerologists:

<http://www.mineralogie.uni-wuerzburg.de/links.html>

## CH 5: Igneous Rocks

CH 6: Sedimentary and Metamorphic Rocks (At the same time I'm talking about the formation of Sedimentary Rocks, I bring in all the surface processes of Earth: Erosion – Transportation – Deposition)

--- CH 4, 5, and 6 I do together and do as quickly as possible.

--- Hands on lab with many common igneous, sedimentary, and metamorphic rocks. The minerals I have are just too fragile and rare, although many common minerals are included that they can pick-up and handle.

--- Cover the Rock Cycle in detail. Why aren't there any rocks on Earth as old as Earth? The Rock Cycle shows them why.

--- By the way, do you know the official mineral of CA? Ans: Native Gold

--- Do you know the official Gemstone of CA? Ans: Benitoite, a very beautiful, rare (expensive) mineral/gem, and it fluoresces an incredible bright blue. This mineral has a very interesting history and the crystal shape is stunning.

--- What is the official Rock of CA? Ans: Serpentine

See:

[http://www.consrv.ca.gov/cgs/geologic\\_resources/mineral\\_resource\\_mapping/index.htm](http://www.consrv.ca.gov/cgs/geologic_resources/mineral_resource_mapping/index.htm)

Discussion on ST regarding Geology with great links:

[http://www.supertopo.com/climbing/thread.html?topic\\_id=64627&msg=356458#msg356458](http://www.supertopo.com/climbing/thread.html?topic_id=64627&msg=356458#msg356458)

--- I also bring in the idea of what resources are and environmental affects from mining.

--- The students learn, "Everything we need is either grown or mined," that mining is a necessary evil, and the different methods of mining. They learn which methods are destructive and environmentally unsafe, and which methods are environmentally safer and less destructive, as well as the importance of reclamation.

Unit 3: Surface Processes on Earth (Already mostly covered when we learn about Sedimentary Rocks. I teach it in context.)

- Weathering
- Erosion
- Sediments
- Transportation
- Deposition
- Burial
- Lithification

#### Unit 5: The Dynamic Earth

CH 17: Plate Tectonics (once PT is covered really well, volcanism, earthquakes, and Mtn. building practically teaches itself.)

--- Animations showing plate tectonics along the Western US and Pacific Ocean region.

<http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/>

[http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/Animation\\_Text.pdf](http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/Animation_Text.pdf)

Copy/paste the following GIF animations into a browser window to run:

[http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/PacHist\\_Big.gif](http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/PacHist_Big.gif)

[http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/Pac-NoAm\\_Intro\\_Big.gif](http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/Pac-NoAm_Intro_Big.gif)

[http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/Pac-NoAm\\_Tech\\_Big.gif](http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/Pac-NoAm_Tech_Big.gif)

[http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/TransRanges\\_Big.gif](http://www.seismo.unr.edu/ftp/pub/louie/class/333/atwater/TransRanges_Big.gif)

#### CH 18: Volcanic Activity

--- Make sure all the volcano types are covered (Pacific NW and Hawaii) and examples given throughout CA, to include the Cascade volcanoes --- Mt. Shasta and Mt. Lassen, Long Valley/Crowley Lake Caldera, the volcanism throughout Owens Valley, Mammoth, as well as the Mono Craters.

--- Point out past volcanic activity in SoCal as well as in San Diego County, and nearby in Baja.

--- How Volcanoes Work:

[http://www.geology.sdsu.edu/how\\_volcanoes\\_work/](http://www.geology.sdsu.edu/how_volcanoes_work/)

#### CH 19: Earthquakes

--- See detailed fault map of CA.

--- Fly up the San Andreas Fault from the Rift Zone of Baja and the Sea of Cortez North all the way to Tomales Bay NW of SF via Google Earth. Very exciting to do.

--- Good Resources:

<http://earthquake.usgs.gov/>

<http://earthquake.usgs.gov/eqcenter/recenteqsus/>

<http://earthquake.usgs.gov/eqcenter/recenteqsus/Maps/US2/32.34.-118.-116.php>

<http://www.geology.sdsu.edu>

--- On-line Earthquake Location lab and how to find the Epicenter and Focus:

<http://www.sciencecourseware.org/eec/Earthquake/>

<http://www.sciencecourseware.org/eec/Earthquake/EpicenterMagnitude/>

CH 20: Mountain Building

--- Make sure the Geomorphic/Physiographic Provinces of CA are covered.

See CA Geological Survey:

<http://www.consrv.ca.gov/cgs/>

[http://www.consrv.ca.gov/cgs/information/publications/cgs\\_notes/note\\_36/note\\_36.pdf](http://www.consrv.ca.gov/cgs/information/publications/cgs_notes/note_36/note_36.pdf)

--- Geologists to map the world (Reuters/CNN)

[http://www.democraticunderground.com/discuss/duboard.php?az=view\\_all&address=228x28299](http://www.democraticunderground.com/discuss/duboard.php?az=view_all&address=228x28299)

--- Also great time to discuss Geologic/Environmental Natural Hazards:

<http://www.usgs.gov/hazards/>

--- Syllabus and Text on Natural Disasters with interesting facts:

[http://72.14.253.104/search?q=cache:hwcZH5JJE44J:www.pitt.edu/~mabbott1/climate/mark/Teaching/GEOL\\_820\\_Natural\\_Disasters/07NDlec1.pdf+Mark+Abbott+Natural+Disasters&hl=en&ct=clnk&cd=1&gl=us](http://72.14.253.104/search?q=cache:hwcZH5JJE44J:www.pitt.edu/~mabbott1/climate/mark/Teaching/GEOL_820_Natural_Disasters/07NDlec1.pdf+Mark+Abbott+Natural+Disasters&hl=en&ct=clnk&cd=1&gl=us)

--- By the way, hurricanes do make it into CA, especially SoCal from Baja. They are called “Chubascos.” Remember what happened in 1977 or so, in Anza Borrego and Ocotillo? Washed out the train tracks and then some.

<http://www.baja.com/cabobob/pages/050hur.html>

[http://visibleearth.nasa.gov/view\\_rec.php?id=3658](http://visibleearth.nasa.gov/view_rec.php?id=3658)

[http://www.nasa.gov/mission\\_pages/hurricanes/archives/2006/h2006\\_paul.html](http://www.nasa.gov/mission_pages/hurricanes/archives/2006/h2006_paul.html)

Volcanic Eruptions:

Earthquakes:

[http://www.consrv.ca.gov/CGS/geologic\\_hazards/earthquakes/index.htm](http://www.consrv.ca.gov/CGS/geologic_hazards/earthquakes/index.htm)

Landslides:

[http://www.consrv.ca.gov/CGS/geologic\\_hazards/landslides/index.htm](http://www.consrv.ca.gov/CGS/geologic_hazards/landslides/index.htm)

Tsunami:

[http://www.consrv.ca.gov/CGS/geologic\\_hazards/Tsunami/About\\_Tsunamis.htm](http://www.consrv.ca.gov/CGS/geologic_hazards/Tsunami/About_Tsunamis.htm)

--- Preparing for Natural Disasters:

<http://www.fema.gov/index.shtm>

<http://www.fema.gov/areyouready/>

<http://www.dhs.gov/xcitizens/>

<http://www.ready.gov/>

<http://www.ready.gov/america/index.html>

<http://www.bt.cdc.gov/disasters/foodwater.asp>

--- Great time to cover all what makes CA so wonderful:  
Worksheet/Activity Guide to the Physical Geographic Uniqueness, Diversity, and Superlatives of the State of California  
--- Show the IMAX DVD “California Alive” and another DVD that celebrates the uniqueness of CA.

## Unit 6: Geologic Time

CH 21: Fossils and the Rock Record (Keep it short and sweet)

--- The Geologic Time Scale

[http://vulcan.wr.usgs.gov/Glossary/geo\\_time\\_scale.html](http://vulcan.wr.usgs.gov/Glossary/geo_time_scale.html)

<http://www.enchantedlearning.com/subjects/Geologictime.html>

<http://www.ucmp.berkeley.edu/exhibits/geologictime.php>

<http://www.geosociety.org/science/timescale/timescl.pdf>

<http://geology.com/time.htm>

<http://www.earthscienceworld.org/timescale/>

<http://geology.wr.usgs.gov/parks/gtime/Gtimescale.pdf>

--- Again, I bring in Mr. Knapik for fossils. He has an amazing collection, he has been collecting from his youth, and the kids get to touch (gently) ancient life fossil remains --- they love it!

--- How do we know geologic age? Ans: Relative and Absolute (Radioactive) Dating.

--- Radioactive Decay Simplified:

<http://www.youtube.com/watch?v=IfY6QJuff0k>

--- Workshops offered by American Nuclear Society for teachers to get common radioactive samples and a free Geiger Counter (I attended their workshop a number of years ago at GA and it was one of the best workshops I've ever attended):

Reactions: From the American Nuclear Society to Teachers interested in the Nuclear Sciences

<http://www.ans.org/pi/teachers/reactions>

<http://www.ans.org/pi/edu/teachers/workshops/>

--- Generalized Geologic Map of CA with Geologic Time Scale:

[http://www.consrv.ca.gov/cgs/information/publications/cgs\\_notes/note\\_17/note\\_17.pdf](http://www.consrv.ca.gov/cgs/information/publications/cgs_notes/note_17/note_17.pdf)

--- More detailed Geology Map of CA with the relative ages of the formations:

[http://www.consrv.ca.gov/CGS/information/geologic\\_mapping/maps/geology/sm\\_all\\_geo.pdf](http://www.consrv.ca.gov/CGS/information/geologic_mapping/maps/geology/sm_all_geo.pdf)

## Unit 4: The Atmosphere and the Oceans

CH 11: Atmosphere

CH 12: Meteorology

--- See exhaustive list of links in Mr. Simpson's Favorite Links  
[http://ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/hyd/home.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/hyd/home.rxml)

--- The Hydrologic Cycle

[http://ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/hyd/smry.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/hyd/smry.rxml)  
<http://www.und.nodak.edu/instruct/eng/fkarner/pages/cycle.htm>  
<http://www.iwr.msu.edu/edmodule/water/cycle.htm>

CH 14: Climate

CH 15: Physical Oceanography

## Unit 7: Resources and the Environment

CH 25: Earth Resources (mostly covered by this time in the context of other units, but for review and emphasis, hit it again quickly)

--- Air

--- Water

--- The Hydrologic Cycle

[http://ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/hyd/smry.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/hyd/smry.rxml)  
<http://www.und.nodak.edu/instruct/eng/fkarner/pages/cycle.htm>

--- Soil for growing food

--- Elements, Minerals, and Rocks

--- Energy

--- Biomass for construction materials and more . . .

CH 26: Energy Resources (cover Conventional/Non-Renewable Energy Resources and especially Alternative/Renewable Energy Resources).

--- Conservation, Recycling, and clean Alternative/Renewable Energy Resources is the name of the game, and the only way we are going to get out of the mess we have made of the planet.

--- DVD Ed Begley's HDTV show on Alternative Energy and Conservation:  
Transfer these shows to DVD

--- DVD "Who Killed the Electric Car?"

<http://www.sonyclassics.com/whokilledtheelectriccar/>

[http://www.sonyclassics.com/whokilledtheelectriccar/teachers\\_guide.pdf](http://www.sonyclassics.com/whokilledtheelectriccar/teachers_guide.pdf)

CH 27: Human Impact on Earth Resources (Very important chapter, but again I have covered many of these ideas in context with other units, but for review and emphasis, I do it again for thoroughness)

- Global Warming (Greenhouse Gases → the Greenhouse Effect → Global Warming)
- Acid Rain
- Ozone Depletion
- Air Pollution
- Water Pollution
- Waste Pollution
- Radiation (un-natural forms produced by man) and Radioactive Waste that we generate.
- Depletion of Non-Renewable Resources

--- 2<sup>nd</sup> Semester Review just before the CA State Standards testing: using “The Earth Science and Physical Geography of CA” review unit and lab handout. This unit goes through all of the important Earth Science topics and physical geography as it relates to CA, along with the very diverse superlatives of our state that makes CA so wonderful and interesting and such a great region to live.