

Bay Area Earth Science Institute
Global Warming Workshop
April 14th, 2007

Eugene Cordero and Emerson LaJoie, Dept of Meteorology, SJSU
Anne Marie Todd, Communication Studies, SJSU

8:30 – 9:00am	Welcome, Introduction, Quiz and KWL
9:00-10:00	Earth's atmosphere (ENL) Energy in the atmosphere The greenhouse effect Activity: Drawing the Earth's energy balance (Introduce) Activity: Albedo
10:00 – 10:15	Break
10:15- 11:00	Natural Climate Change (ECC) Past records Solar cycle and orbital variations Activity: Sunspot (Introduce) Activity: Tree ring (Introduce) Activity: Climate variability
11:00-12:00	Global Warming: 20th century (ECC) 20 th century observations (CO ₂ , temperature etc.) Climate Models: Detection and attribution Why is global warming 'misunderstood?' (AMT) Activity: Weather versus Climate
12:00-1:00	Lunch
1:00-2:15	Global Warming: Future prediction/impacts (ECC) Climate Models/Emissions California potential impacts Activity: Current and future temps (computer based)
2:15-3:15	Energy and global warming (AMT) Energy and our lives Ecological Footprint Activity: Ecological Footprint
3:15 – 3:30	Break
3:30-4:30	Global warming connections and misc (ECC) Ozone depletion Renewable Energy Agriculture Review of potential 'good activities' Review of Quiz
4:30-4:45	Wrap up-Evaluation

Pre-assessment: KWL Chart

This exercise will give you a chance to access your prior knowledge of global warming and to identify things you are curious about. You'll return to the KWL chart at the end of the workshop to correct any misconceptions you may have had, ask any unanswered questions and reflect upon what you've learned.

K – What I <u>K</u> now	W – What I <u>W</u> ant to Know	L – What I <u>L</u> earned

Activities

Sun/climate – sunspots: Plotting changes in sunspots

http://www.eo.ucar.edu/educators/ClimateDiscovery/LIA_lesson7_9.28.05.pdf

Tree Ring: Looking at how tree rings can be related to changing temperatures

http://www.eo.ucar.edu/educators/ClimateDiscovery/LIA_lesson5_9.28.05.pdf

Albedo: Activity using thermometers and the sun!

http://www.eo.ucar.edu/educators/ClimateDiscovery/ESS_lesson4_10.19.05.pdf

Climate Variability: Using deck of cards, study climate variability and change.

http://www.ucar.edu/learn/1_2_2_9t.htm

Current and future temperatures: IPCC portal to observations and model data.

http://www.ipcc-data.org/ddc_visualisation.html

Climate vs weather: Activity asks student to track weather for a few weeks by looking at local paper or website.

http://www.eo.ucar.edu/educators/ClimateDiscovery/LIA_lesson1_9.28.05.pdf

Human Activity and Climate Change: Students relate to personal energy consumption.

http://www.ucar.edu/learn/1_4_2_20t.htm

Carbon Cycle Online Game: Early age online game looking at how carbon moves around earth/atmosphere system.

http://www.windows.ucar.edu/tour/link=/teacher_resources/teach_carbongame.html

EPA Climate change kids site: Good site.

<http://epa.gov/climatechange/kids/index.html>

Melting Ice/Sea level: Activity One of this website relates to melting ice and sea level. Nice hands on.

<http://www.urbanext.uiuc.edu/weather/5.html>

Plotting greenhouse gases: This activity asks students to plot out data of various greenhouse gases.

<http://topex-www.jpl.nasa.gov/education/activities/tslpcac1.pdf>

Global warming/greenhouse effect skit: Lower grades, nice to get kids physically involved.

http://epa.gov/climatechange/wycd/downloads/SA_Skit.pdf

Create a habitual environment board game... interesting idea

http://www.lpi.usra.edu/education/explore/our_place/activity_1.shtml

supplies: http://www.lpi.usra.edu/education/explore/our_place/activity_glace.shtml

Online Game: Switch 'Em Off is a kinda fun one turning off coal fired power plants.

http://www.panda.org/news_facts/multimedia/fun_games/index.cfm

Energy lesson plans http://www1.eere.energy.gov/education/lesson_plans.html#middlehigh

Climate Change Questionnaire

Indicate on the scantron the letter for the response that best matches how you feel about each statement.

A) Strongly agree B) Somewhat agree C) Not sure/Neutral D) Somewhat disagree E) Strongly disagree

- 1) Automobile and factory emissions contribute to global warming.
- 2) Greenhouse gases including CO₂ come from the burning of fossil fuels like coal and oil.
- 3) The Earth's temperature has not warmed significantly over the last 100 years.
- 4) There is general agreement among scientists that humans are responsible for global warming.
- 5) Global warming will melt the ice caps and cause the sea level to rise.
- 6) Ozone depletion will increase if more CFC's (chlorofluorocarbons) get into the atmosphere.
- 7) Ozone depletion will produce higher amounts of UV radiation at the Earth's surface.
- 8) Ozone in the upper atmosphere protects the Earth, while ozone at the surface is harmful to humans.
- 9) The ozone hole is largest during summer.
- 10) The size of the ozone hole has been growing rapidly over the last decade.
- 11) Once an ozone hole appears, it can never be repaired.
- 12) A sizeable portion of the "ozone hole" resides over the United States.
- 13) Summertime ultra-violet (UV) radiation over the United States is dangerous due to the ozone hole.
- 14) The high rate of skin cancer in the United States is primarily due to ozone depletion.
- 15) Holes in the ozone layer are caused by global warming.
- 16) Holes in the ozone layer allow extra sunlight to pass through and thus cause global warming.
- 17) Holes in the ozone layer cause the polar ice caps to melt.
- 18) Ozone depletion is directly caused by the increase in carbon dioxide (CO₂).
- 19) Ozone is a greenhouse gas.
- 20) Automobile pollution causes ozone depletion.
- 21) Global warming is caused by the ozone layer trapping the extra heat entering through its 'holes'.
- 22) Global warming will cause higher rates of skin cancer.
- 23) Global warming is related to more sunlight reaching the Earth's surface.
- 24) As the ozone hole gets larger, the earth will get warmer.
- 25) As the ozone layer gets thinner, more people will be at risk to skin cancer.
- 26) An increase in the greenhouse effect will cause more skin cancer.
- 27) An increase in the greenhouse effect will cause the earth to warm up.
- 28) Heat from automobile exhaust contributes to global warming.
- 29) Global warming is one of the most pressing environmental issues facing the world today.
- 30) Ozone depletion is one of the most pressing environmental issues facing the world today.
- 31) Scientists believe that the Earth's temperature will continue to warm during the next century.
- 32) Damage to the ozone layer can never be repaired.
- 33) Buying bottled water instead of drinking water from a faucet contributes to global warming.
- 34) Putting litter in the trash can reduce global warming.
- 35) The removal of large forests contributes to global warming.
- 36) Energy saving light bulbs can save money, but have no effect on global warming.
- 37) Electric automobiles do not contribute to global warming.
- 38) Electricity is generally clean energy and does not contribute to global warming.
- 39) Eating a vegetarian diet can reduce global warming.