

Lesson Title: Ecology & Global Change Unit

Class: College Biology (11-12th Grade)

Developed by: James DePue, April 3, 2010

Unit Timeframe: Designed for 48 minute class period (15 class periods)

Learning Objectives & Unit Goals:	<ol style="list-style-type: none">1. Assess current scientific thinking in regards to global change.2. Assess current social and public thinking in regards to global change.3. Introduced global change concepts including the roles of ice sheets, glaciers, polar ice, vegetation, deforestation, oceans, and humans.4. Form definitions of the greenhouse effect based on prior knowledge, class discussion, assigned readings and lab/field research.5. Analyze global warming diagrams and resources to obtain a clear understanding.6. Evaluated a variety of primary sources and perspectives in the global warming debate.7. Apply global change models/scenarios to an observable ecosystem and predict how abiotic and biotic factors would be influenced.8. Develop a position on global change and support this viewpoint with reasons, facts, and examples gathered during unit activities, readings and lab/field research.
High School Standards & Expectations	Standard 1: Physical Science 1.5, 1.6 Standard 2: Life Science 2.1, 2.2, 2.4, 2.7, 2.9 Standard 3: Earth Systems Science 4.4, 4.5, 4.6, 4.7
Engage	<p>KWL—Day 1</p> <ul style="list-style-type: none">• Students use a large piece of paper divided into three columns and work in pairs to begin discussing and writing down all the things they know, or thin they know (K) about global change. They may include drawings if they are able. They may not use their text book or the computer to generate this list. Each pair must have at least 20-25 knows.• Students then develop a list of questions they want to know (W) about global change. Initially students must have at least 10-15 things they want to know. Their KWL will be posted on the wall and as they will update their want to know list daily adding new questions that arise.• Students will leave the final column empty for now and will add the things they learn (L) as the lesson proceeds. They will update their learned column daily throughout the lesson. <p>Show the video “An Inconvenient Truth” by Al Gore—Day 2</p> <ul style="list-style-type: none">• Students write down the key points outlined which they will further explore throughout the unit.• Students evaluated the video for reliability and/or probability.• Students begin forming perspectives on global change.• Students will be provided with a teacher developed list of key points to compare to their list• Homework Assignment: To conduct a web search on global change, create a list of sources to support or refute key points of the video.

	<p>Show the video “An Inconvenient Truth...or Convenient Fiction?”—Pacific Research Institute's documentary examining the issues of global warming discussed in Al Gore's movie "An Inconvenient Truth"—Day 3</p> <ul style="list-style-type: none"> • Students will then present the findings of their web search on global change • Class discussion about the two video’s and climate change <p>Daily Journal questions—Throughout Unit</p> <ul style="list-style-type: none"> • Questions designed to check student understanding and application of previously discussed topics • Questions designed to pre-assess student knowledge for future classroom topics • Questions designed to promote writing <p>Notes: This activity will help the teacher to do the following:</p> <ol style="list-style-type: none"> 1. Pre-assess student knowledge of the subject. 2. Guide instruction.
<p>Explore</p>	<p>After watching the video “An Inconvenient Truth” –Day 4</p> <ul style="list-style-type: none"> • Students conduct a web search on global change, create a list of sources to support or refute key points of the video. <p>Field Research—SEE ECOLOGICAL RESEARCH LESSON</p> <ul style="list-style-type: none"> • Students will collect observations of biotic and abiotic factors in a number of ecosystems. • The ecosystems will include: <ul style="list-style-type: none"> ➤ Sandy prairie zone (Division of Wildlife (DOW) Fish hatchery Site)—Days 7-9 ➤ Wetland zone (DOW Fish hatchery Site)—Days 7-9 ➤ River/Riparian zone (Republican River—Rainbow Park Site)—Days 11-12 ➤ River/Riparian zone (Republican River—City of Wray Water Reclamation Site)— Days 11-12
<p>Explain</p>	<p>Class Notes—Days 5, 6, 10</p> <ul style="list-style-type: none"> • Discussion and lecture on the following topics: <ul style="list-style-type: none"> ✓ Introduction to Global Change—components of the Earth system, energy exchanges, evidence for concern— Day 5 ✓ Global change forcing factors—analyze data of various factors on earth’s climate— Day 6 ✓ Roles of deforestation, oceans, ice sheets on global change— Day 10 • Student note-taking skills. • Students are assigned reading including but not limited to: (Reading throughout unit) <ol style="list-style-type: none"> 1. The World Without Us—Alan Weisman 2. A Short History of Nearly Everything—Bill Byson 3. State of the Planet--http://www.time.com/time/2002/greencentury/state/ 4. State of the World Report--http://www.worldwatch.org/node/5982 5. UCAR Windows to the Universe: Warming of the Polar Regions— http://www.windows.ucar.edu/tour/link=/earth/polar/polar_climate.html&edu=high 6. NOAA Arctic Theme Page—http://www.arctic.noaa.gov/ 7. NOAA Ice Core Gateway—http://www.ncdc.noaa.gov/paleo/icgate.html

	<p>8. State of the Worlds Forests 2007: Part 2 – Selected Issues in the Forest Sector at: http://www.fao.org/docrep/009/a0773e/a0773e00.htm</p> <p>9. State of the Worlds Forests 2009 at: http://www.fao.org/docrep/011/i0350e/i0350e00.htm</p> <p>10. Wood’s Hole overview of Amazon Deforestation: http://www.whrc.org/southamerica/index.htm</p> <p>11. Union of Concerned Scientists Overview of Deforestation— http://www.ucsusa.org/global_warming/solutions/recognizing-forests-role-in-climate-change.html</p> <p>12. Windows to the Universe: Summary on Oceans— http://www.windows.ucar.edu/tour/link=/earth/Water/ocean.html&edu=high</p> <p>13. Role of the Oceans in Weather and Climate: http://oceanworld.tamu.edu/students/weather/index.html</p>
Elaborate	<p>Research Paper— Days 13-14 (only 1 day in class provided)</p> <ul style="list-style-type: none"> • Students write and submit a paper communicating their data from field research and proposing how global changes might impact each ecosystem. • Current biotic and abiotic factors and how those might be influenced by global change <p>Portfolio Project—To be completed in conjunction with field research, 1 day in class provided for questions and feedback—Days 13-14</p> <ul style="list-style-type: none"> • Students will complete a portfolio outlining each ecological zone and addressing global changes to be reviewed by peers. • SEE PORTFOLIO DIRECTIONS ON ECOLOGICAL RESEARCH LESSON/HANDOUT
Evaluate	<ul style="list-style-type: none"> • Written Exams & Quizzes—Final Exam Day 15 • Daily informal assessment • Written Lab reports—Due Day 15 • Ecological Field Research Portfolio—Due Day 15 • Final “Opinion Paper” state student perspective with data to support—Homework assignment due on Day 15