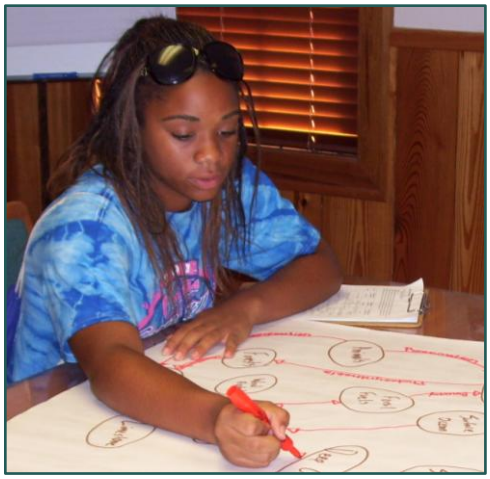
Climate Change and Southeastern Forests: A New PLT Secondary Module

Project Learning Tree® (PLT) partnered with PINEMAP to develop a new secondary module on climate change impacts on southern forest ecosystems, forest impacts on climate, and ways people can affect these relationships. PINEMAP is an integrated research, education, and extension project focused on climate change adaptation and mitigation in southern pine forests (www.pinemap.org). The module will include approximately 12 engaging activities, with each activity including concepts or research related to PINEMAP.

By completing the activities in this module, students will be able to meet the following objectives:

- Gain an appreciation for the role of forests in models of climate change.
- Increase understanding of climate and change, carbon cycle, and carbon sequestration.
- Increase understanding of how forest management can remove carbon dioxide from the atmosphere and improve resilience of southern pine forests.
- Explore the role of consumer choices in climate change mitigation through life cycle analysis and product comparisons.

The module is being developed for use in life science, environmental science, and agriculture courses in grades 9-12, with potential use in middle school or community college courses. Following the PLT Secondary Module format, the module will contain teacher background information and each activity will include teacher pages, student readings, handouts, or worksheets; media and technology connections; supplemental extensions; assessment ideas; and additional resources. Activities will be supplemented with slide presentations, videos, web links, and an online teacher workshop.



The module is currently in development and an Education Advisory Committee is providing critical feedback and guidance to ensure creation of high-quality materials that are both relevant and useful. We expect to begin regional pilot testing of the module in fall 2013.

If you are interested in pilot testing this module or in reviewing draft activities, please go to: www.pinemap.org/education/secondary and complete the pilot test sign-up form.

For questions or more information, contact: Martha Monroe, mcmonroe@ufl.edu.

The Pine Integrated Network: Education, Mitigation, and Adaptation project (PINEMAP) is a Coordinated Agricultural Project funded by the USDA National Institute of Food and Agriculture, Award #2011-68002-30185.

Activity Outline

Section 1: Climate Change and Forests

Projected climate changes will likely affect forest ecosystems.

1. **Clearing the Air.** Students learn about evidence supporting climate change, use this information to evaluate different climate change conclusions, and participate in a role-play to negotiate local solutions.
2. **The Changing Forests.** In small groups, students learn about USFS research that is exploring climate change impacts on southeastern forests.
3. **Atlas of Change.** By using the USFS Climate Change Tree and Bird Atlas, students will explore the effects of climate change on the future distributions of tree and bird species.

Section 2: Forest Management and Adaptation

Forests can be managed to thrive in a changing climate.

4. **Managing Forests for Change.** Student teams learn from forest management case studies in the Southeast and predict what might happen to each forest given projected climate changes and potential forest disturbances.
5. **Mapping Seed Sources.** Students use growth and yield data from loblolly pine forests to map genetically different populations and project where trees with certain characteristics are likely to thrive in changing climatic conditions.

Section 3: Carbon Sequestration

Forests can be managed to reduce atmospheric greenhouse gas and to prevent greenhouse gas emissions.

6. **Carbon on the Move.** By becoming a carbon atom, students learn how carbon cycles through biological and physical systems. Group work and class discussions allow students to better understand the full carbon cycle.
7. **Counting the Carbon.** After measuring the carbon in one tree, students calculate the carbon in a forest and in other land-use types, and then estimate the acres needed to sequester their carbon emissions for a year.

Section 4: Life Cycle Assessment

Consumer choices can play a role in reducing and preventing carbon emissions.

8. **The Real Cost: Shopping for Externalities.** Through a simulated shopping activity students will learn about the impact of their consumer choices on the environment.
9. **Adventures in LCA.** Students perform a play to investigate and compare life cycle data for aluminum, plastic, and pine lawn furniture.
10. **LCA Debate.** Students debate the environmental costs and benefits of common products they consume and generate a set of life cycle questions that can be used to guide consumer choices.
11. **Create Your Own LCA.** This tutorial shows students how to use the National Renewable Energy Laboratory U.S. Life Cycle Inventory Database to investigate and calculate greenhouse gas emission data for a product of their choice.

Putting It All Together

12. **Climate, Forests, and Communities.** Students will explore forest management on a landscape scale, while considering climate change mitigation and adaptation strategies.

Activity 6 and 7 drafts available at:
www.pinemap.org/education/secondary