PROJECT LEARNING TREE® *AND* THE VERMONT FRAMEWORK OF STANDARDS

A Guide for Educators
2006

PLT

Grades 7-8

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Project Learning Tree® and Vermont's Framework of Standards
Grades 7-8

Contents:

Project Learning Tree®and the Vermont Framework of Standards

What It Is- Project Learning Tree® (PLT) is a multi-disciplinary environmental education curriculum resource with nearly 100 activities tailored to grade levels and learning objectives. The program's activity guide is based on a conceptual framework. The main guide contains activities appropriate for grades Prek-8 with activities arranged thematically. PLT materials are used in every US state, Canada, Mexico, Japan, the Philippines, and several European countries.

Secondary level modules appropriate for grades 6-12 are available on specific topics. These include: forest ecology, environmental issues, municipal solid waste, environmental risk, and placed-based (community) issues related to natural resources. In addition, PLT has a multi-media kit on "Energy and Society" appropriate for elementary students, and a community service piece entitled "Greenworks!" that is connected to a grants program for schools.

 PLT materials are distributed in Vermont by the Department of Forests, Parks, and Recreation. Educators can attend 6-hour workshops that provide them with the activity guide or shorter workshops for the modules and kits. The workshops offer other valuable resources such as posters, booklets and Vermont-specific materials in addition to PLT.

Framework Correlations- Vermont Project Learning Tree has developed correlations with the Project Learning Tree Prek-8 Activity Guide and the Project Learning Tree Secondary materials to help educators who wish to use the materials to address these new standards. PLT aligns Particularly well with Fields of Study elements in Social Studies & History, and Science. But it has strong correlations in Vital Results Standards for Sustainability (3.9) and Continuity and Change (4.5), and Understanding Place (4.6). The activities link to other Vital Results standards as well. For example, each activity includes a literacy connection and suggestions for activities for technology applications.

New Natural Resources and Agriculture Standards-In September of 2005, the Vermont State Board of Education adopted new wording for 7.16, a Standard in the Design and Technology portion of the Vermont Framework of Standards and Learning Opportunities. This standard was added to the Science Framework, with the understanding that Grade Expectations will be developed for them in the future. The alignment in this document will be revised to conform to the Grade Expectations when they are completed and will be broken out into several documents to reflect grade levels. Until then, the correlations will cover the three basic grade ranges used in the main Framework document.

Assessment and Learning Opportunities- Each activity includes suggestions for student assessment of that activity and ideas for extensions and/or enrichment.

For more information about PLT and its mission, log onto www.plt.org

To schedule a PLT workshop in your community, or get more information about trees and forests in Vermont, call 802-241-365

PLT Connections to Instruction, Literacy and Technology
All Grade Levels

Differentiated Instruction
PLT Activities apply Best Practices for instruction through differentiation techniques that are listed in the front of each activity for ease in use. These include:

- Highlighting key vocabulary.
- Creating links to prior knowledge.
- Using paired/cooperative learning.
- Providing nonlinguistic representations.
- Using realia and hands-on learning.
- Making curricular and personal connections.
- Developing oral, reading, and writing skills.
- Incorporating higher order thinking opportunities.

Literacy/Reading

Each activity listed in the Guides include suggested "Reading Connections." These are fiction and nonfiction books that include:
Folktales, myths/legends, poetry, chants/songs, maps and charts, and content –based books and articles that relate to culturally-diverse topics and include global connections.

Some PLT activities include "read-aloud" sections. There are opportunities for writing, role playing and vocabulary building. The Guide contains an excellent glossary with a variety of words essential for building environmental literacy skills.

PLT offers teachers a reading list on-line at www.plt.org that is correlated to the activities in the guide. PLT's web site makes some of these materials available for on-line purchase, giving educators an easy way to acquire the materials.

Technology

PLT recognizes the importance of technology at the same time it advocates strongly for outdoor student experiences learning in the natural world. The activity planning sections point out appropriate technology opportunities in applicable activities. One appendix in the guide is devoted to technology tips including ethical considerations when using web-based research.

Project Learning Tree® Alignment With Vermont's Framework of Standards
Vital Results

Sustainability

3.9   Students make decisions that demonstrate understanding of natural and human communities, the ecological, economic, political, or social systems within them, and awareness of how their personal and collective actions affect the sustainability of these interrelated systems. This is evident when students:

Prek-4	5-8	9-12
3.9.a. Identify items that they consume on a daily basis and analyze the resources used in producing, transporting, using, and disposing of these items, including the origins of the resources;	3.9.aa. Conduct a life-cycle analysis (e.g., production, distribution, consumption, disposal) for both synthetic and natural products (e.g., toothbrush, maple syrup, automobile), including the effects of these life-cycles on the sustainability of a natural and human community;	*Evidence cc. and dd. Applies, plus-* 3.9.aaa. Prepare an impact assessment (which includes ecological, economic, political, and social factors) that analyzes the effect of a particular product's or project's life-cycle

3.9.b. Distinguish between personal wants and needs and identify how marketing and advertising inform their consumption patterns; 3.9.c. Identify and practice ways to repair, re-use, recycle, and (e.g., use both sides of paper), and design and implement a plan to monitor personal resource consumption; 3.9.d. Explore local natural and human communities (e.g., vernal pools, farms, mines, cities), identify the systems within them, and what is required for these communities to be sustained.	3.9.bb. Collect data in order to investigate and analyze how personal consumption patterns affect the sustainability of natural and human communities (e.g., buying local and imported apples in Vermont); 3.9.cc. Identify and practice ways to repair, re-use, recycle (e.g., collect and distribute leftover household paint), and design and implement a plan to monitor community resource consumption (e.g., survey community water, electric, and/or fuel use); 3.9.dd. Demonstrate understanding that natural and human communities are part of larger systems (e.g., farms as part of the regional watershed and food systems for cities, a mine as part of the regional economy) and that the interrelationships between all systems.	on the sustainability of a natural and human community; 3.9.bbb. Collect data in order to investigate and analyze the sustainability of societal consumption patterns that have direct and indirect impact on the local and global environment, economy, and society (e.g., fuel efficiency of vehicles).

PLT Activities that correlated with 3.9:
Prek_8 Guide:

(Topic Area= Renewable, Recyclable, choosing products)
Grades Pre-4. *14. Renewable or Not?, 15. A Few of My Favorite Things, 69. Forest for the Trees, 82. Resource-Go-Round, 89. Trees for Many Reasons.*

Grades 5-8 (see above as well as the following) *37, Reduce, Reuse, Recycle, 39. Energy sleuths, 52. A Look at Aluminum 69. Forest for the Trees, 83. A. Peek At Packaging, 84. The Global Climate, 85. In the Driver's Seat, 92. a Look at Lifestyles, 93. Paper Civilizations*

Note: For the portion of this standard that deals with systems, *PLT Activities 41-60* deal with **"Environmental, technological, and social systems that are interconnected and interacting."** All of these activities are appropriate for discussing the systems in this standard. Among recommended PLT activities by grade level are:

Grades PreK-4. 41. *How Plants Grow,42. Sunlight and Shades of Green, 43. Have Seeds, Will Travel, 44. Water Wonders, 45. Web of Life, 48. Field, Forest, and Stream, 53. On the Move, 54. I'd Like to Visit a Place Where--, 55. Planning the Ideal Community*

Grades 5-8 (See above as well as the following) *29. Rain Reasons, 35. Loving It Too Much, 38. Every Drop Counts, 39. Energy Sleuths, 50. 400-Acre Wood, 53. On the Move, 55. Planning the Ideal Community, 56. We Can Work It Out, 57. Democracy in Action, 73. Waste Watchers, 80. Noting Succeeds Like Succession*

PLT Secondary Modules

Grades 7-12 *Exploring Environmental Issues in the Places We Live* explores local systems, development and planning for sustainable communities. *Exploring Environmental Issues in Municipal Solid Wast*e gives a perspective on the economics, infrastructure and alternatives in our waste systems. In the module *Exploring Environmental Issues: Focus*

on Forests, Activity #3. Tough Choices, and #5 Balancing America's Forests discuss human use of forest resources and the ways we deal with them as citizens and professional resource managers.

Continuity and Change

4.5   Students understand continuity and change. This is evident when students:

Prek-4	5-8	9-12
4.5.a. Demonstrate understanding that change results from new knowledge and events; and 4.5.b. Demonstrate understanding of the patterns of change (steady, cyclic, irregular) and constancy.	*Evidence b applies, plus-* 4.5.aa. Demonstrate an understanding that perceptions of change are based on personal experiences, historical and social conditions, and the implications of the change for the future.	*Evidence b applies, plus-* 4.5.aaa. Analyze personal, family, systemic, cultural, environmental, historical, and societal changes over time - both rapid, revolutionary changes and those that evolve more slowly.

PLT Activities that correlated with 4.5:
Prek-8 Guide:

(*Patterns of Change* is an entire thematic section within this guide . The following are storylines with activities that relate to this standard by grade level.)

***Trees and forest ecosystems change over time* Grades Pre-4.** *76. Tree Cookies, 77. Trees in Trouble, 78. Signs of Fall, 79.Tree Lifecycle,*

Grades 5-8 (See also PreK-4 Activities) *80. Nothing Succeeds like Succession, 81. Living With Fire.*

***Humans may change their attitudes and behaviors with regard to natural resources and the environment.* Grades Pre-4-**82- Resource-Go-Round

Grades 5-8- (See also PreK-4 Activities) *83. A Peek at Packaging, 84. Global Climate, 85. In the Driver's Seat, 86. Our Changing World.*

***Human attitudes and behaviors have changed over time with regard to the environment.* Grades Pre-4-** *87. Earth Manners, 88. Life on the Edge, 89. Trees for Many Reasons, 90. Native Ways*

Grades 5-8- (See also PreK-4 Activities) 91. In the Good Old Days, 92. A Look at Lifestyles,

***Changes in resource use and the environment can be analyzed from a historical perspective.* Grades Pre-4-** *95. Did You Notice?*

Grades 5-8- (see also PreK-4 Activities) *93.Paper Civilizations, 94. By the Rivers of Babylon, 96. Improve Your Place*

PLT Secondary Modules

Grades 7-12 *Exploring Environmental Issues in the Places We Live* explores local systems, development and planning for sustainable communities Activity # 6 is A Vision for Your Community which discusses community change and planning for it.

  Exploring Environmental Issues Focus on Environmental Risk predicting changes in the context of risk to humans and the environment is explored through various assessment techniques. In the module *Exploring Environmental Issues: Focus on Forests*, Activity #3. Tough Choices, and #5 Balancing America's Forests discuss human use of forest resources and the ways we deal with them.

Exploring Environmental Issues: Forest Ecology, change is explored through natural and introduced ecologic processes, including fires, invasive species, and forest succession.

Grades PreK-4. *41. How Plants Grow,42. Sunlight and Shades of Green, 43. Have Seeds, Will Travel, 44. Water Wonders, 45. Web of Life, 48. Field, Forest, and Stream, 53. On the Move, 54. I'd Like to Visit a Place Where--, 55. Planning the Ideal Community,*

Grades 5-8 (See also PreK-4 Activities) *50.400-Acre Wood, 56. We Can Work It Out, 57. Democracy in Action.*

PLT Secondary Modules Correlations to 4.5

Grades 7-12 *Exploring Environmental Issues in the Places We Live* explores local systems, development and planning for sustainable communities. *Exploring Environmental Issues in Municipal Solid Wast*e gives a perspective on the economics, infrastructure and alternatives in our waste systems. In the module *Exploring Environmental Issues: Focus on Forests*, *Activity #3. Tough Choices, and #5 Balancing America's Forests* discuss human use of forest resources and the ways we deal with them as citizens and professional resource managers.

Understanding Place

4.6   Students demonstrate understanding of the relationship between their local environment and community heritage and how each shapes their lives. This is evident when students:

Prek-4	5-8	9-12
4.6.a. Demonstrate knowledge and history of local environments, (e.g., soils, forests, watersheds) and how their community relies on its environment to meet its needs (e.g., nutritional, recreational, economic, emotional well being); 4.6.b. Describe the role of agriculture, forestry, and industry on the development of their local community over time; 4.6.c. Demonstrate knowledge of past and present community	4.6.aa. Apply knowledge of local environment though active participation in local environmental projects (e.g., work with local planning board to analyze existing agricultural land use from a variety of perspectives); 4.6.bb. Explore the interrelationship between the local environment and the local community culture (e.g., settlement patterns, tourism, hunting, agriculture);	*Evidence aa. And cc. applies, plus-* 4.6.bbb. Evaluate and predict how current trends (e.g., environmental, economic, social, political, technological) will affect the future of their local community and environment.

heritage (e.g., traditions, livelihoods, customs, stories, changing demographics, land use) and recognize ways in which this heritage influences their lives.	4.6.cc. Explore and participate in sustaining or building on unique and valued elements of past and present community heritage (e.g., survey community to improve access to town meeting);	

PLT Activities that correlated with 4.6:
Prek-8 Guide:

Grades PreK-4. *1. Shape of Things, 2. Get in Touch with Trees, 3. Peppermint Beetle, 4. Sounds Around,5. Poet-Tree, 20. Environmental Exchange Box, 21. Adopt a Tree, 32., A Forest of Many Uses, 43. Who Works in this Forest?, 45. Web of Life, 46. Schoolyard Safari, 53. On the Move, 54. I'd Like to Visit a Place Where---.55. Planning the Ideal Community, 69. Forest For the Trees, 74. People, Places, Things, 87. Earth Manners*

Grades 5-8 (See also PreK-4 Activities *33. Forest Consequences, 50. 400 Acre Wood, 56.We Can Work It Out71. Watch on Wetlands,*

PLT Secondary Modules Correlations to 4.6

Grades 7-12 *Exploring Environmental Issues in the Places We Live* explores local systems, development and planning for sustainable communities using place-based activities to encourage students to think about their communities   In the module *Exploring Environmental Issues: Forest Ecology*, explores local and national forest ecology issues and conditions using local forests as the laboratory.

Project Learning Tree® Alignment: Grade 7-8, Social Studies & History GE's
Inquiry

H&SS7-8:1	• **Students initiate an inquiry-**
H&SS7-8:2 H&SS7-8:3	• **Students develop a hypothesis, thesis, or research statement** • **Students design research**
H&SS7-8:4	• **Students conduct research**
H&SS7-8:5	• **Students develop reasonable explanations that support the research statement**
H&SS7-8:6 H&SS7-8:7	**Students make connections to research** **Students communicate their findings** .

Project Learning Tree® Alignment: Grade 7-8, Social Studies & History GE's

H&SS7-8:12	**Students show understanding of human interaction with the environment over time by…** • Describing how human activity and technology have changed the environment in the U.S. and world for specific purposes (e.g., development of urban environments, genetic modification of crops, flood control, reforestation). ❚
	PLT Activities – *4. Sounds Around,17. People of the Forest 20. Environmental Exchange Box, 32. A Forest of Many Uses, 33. Forest Consequences, 35. Loving It Too Much, 40.Then and Now, 47. Are Vacant Lots Vacant? 49. Tropical Treehouse, 50. 400-Acre Wood, 52. A Look at Aluminum, 53. On the Move, 54. I'd Like to Visit A Place Where--, 55. Planning the Ideal Community, 56. We Can Work It Out, 69. Forest for the Trees, 70. Soil Stories,,75. Tipi Talk, 89. Trees for Many Reasons, 92. A Look At Lifestyles, 94. By the Rivers of Babylon, 95. Did You Notice?*
	• Generating information related to the impact of human activities on the physical environment (for example, through field studies, mapping, interviewing, and using scientific instruments) in order to draw conclusions and recommend actions (e.g., damming the Yangtze River). ❚
	PLT Activities - *4. Sounds Around,, 14. Renewable or Not? 36. Pollution Search, 40.Then and Now, , 41. How Plants Grow, 47. Are Vacant Lots Vacant? 55. Planning the Ideal Community. 70. Soil Stories, 80. Nothing Succeeds Like Succession, 89. Trees for Many Reasons, 56. We Can Work It Out, 82. Resource-Go-Round, 84. The Global Climate, 85. In the Driver's Seat, 86. Our Changing World, 94. By the Rivers of Babylon, 95. Did You Notice?*

- Evaluating different viewpoints regarding resource use in the U.S. & world (e.g., debating drilling for oil in a national wildlife refuge). ❙
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PLT Activities - *17. People of the Forest, 18. Tale of the Sun, 19. Viewpoints on the Line, 33. Forest Consequences, 40.Then and Now, 50. 400-Acre Wood, 53. On the Move, 54. I'd Like to Visit A Place Where--, 55. Planning the Ideal Community, 56. We Can Work It Out , 90. Native Ways, 91. In the Good Old Days, 92. A Look At Lifestyles*

- Examining multiple factors in the interaction of humans and the environment (e.g., population size, farmland, and food production). ❙

PLT Activities - *14. Renewable or Not? 15. A Few of My Favorite Things, 35. Loving It Too Much, 39. Energy Sleuths, 40. Then and Now, 71. Watch on Wetlands, 92. A Look At Lifestyles, 84. The Global Climate, 88. Life on the Edge, 93. Paper Civilizations, 94. By the Rivers of Babylon, 95. Did You Notice?*

- Recognizing patterns of voluntary and involuntary migration in the U.S. and world.

PLT Activities- *14. Renewable or Not? 90. Native Ways, 17. People of the Forest, 75. Tipi Talk, 92. A Look at Lifestyles, 94. By the Rivers of Babylon, 95. Did You Notice?*

- Using information to make predictions about future migration.

PLT Activities-*14. Renewable or Not? 15. A Few of My Favorite Things, 35. Loving It Too Much, 39. Energy Sleuths, 40. Then and Now, 71. Watch on Wetlands, 92. A Look At Lifestyles, 84. The Global Climate, 88. Life on the Edge, 94. By the Rivers of Babylon, 95. Did You Notice?*

Grade Expectation Number	Civics, Government, and Society
H&SS7-8:14	**Students act as citizens by…** - Comparing the rights and responsibilities of citizenship in another country to those of the U.S (e.g., after reading accounts of elections in news articles, compare voting rights) **i** - Identifying the various ways people become citizens of the U.S. (e.g., birth, naturalization). - Giving examples of ways people act as members of a global community (e.g., collecting used textbooks for countries in need). - Demonstrating positive interaction with group members (e.g., working with a group to design a lesson teaching younger students about rights and responsibilities). - Identifying problems, proposing solutions, and considering the effects of a course of action in the local community, state, nation, or world. - Explaining and defending their own point of view on issues that affect themselves and society, using information gained from reputable sources (e.g. communism vs. democracy; war vs. economic sanctions). **i** - Explaining and critically evaluating views that are not one's own. **i** - Giving examples of ways in which political parties, campaigns, and elections provide opportunities for citizens to participate in the political process. **i** - Illustrating how individuals and groups have brought about change locally, nationally, or internationally (e.g., interview someone involved in civil union legislation). **i** - Demonstrating how identity stems from beliefs in and allegiance to shared political values and principles, and how these are similar and different to other peoples (e.g. Northern Ireland/Republic; socialism; capitalism). **i** - Establishing rules and/or policies for a group, school, or community, and defending them (e.g., dress code

	policies, establishing a skate board park). ▌
	PLT Activities-*19, Viewpoints on the Line, 55. Planning the Ideal Community, 56. We can Work It Out, 57. Democracy in Action, 58. There Ought to Be A Law, 59. The Power of Print, 60. Publicize It! 96. Improve Your Place.*

Project Learning Tree® and Grade Expectations for Grades 7-8: Inquiry GE's

Scientific Questioning

S7-8:1

Students demonstrate their understanding of SCIENTIFIC

QUESTIONING by…

· Developing questions that reflect prior knowledge. **AND**

· Refining and focusing broad ill-defined questions.

PLT Activities that Address these Skills-20.Environmental Exchange Box, 25. Birds and Worms, 27. Every Tree for Itself, 86. Our Changing World, 83. A Peek at Packaging, 31. Plant A Tree, 40. Then and Now, 34. Who Works in This Forest? 41. How Plants Grow

Predicting and Hypothesizing

S7-8:2

Students demonstrate their understanding of PREDICTING

AND HYPOTHESIZING by…

· Predicting results (evidence) that support the hypothesis. **AND**

· Proposing a hypothesis based upon a scientific concept or principle, observation, or experience that identifies the relationship between variables.

PLT Activities that Address these Skills- 28. Air Plants, 25. Birds and Worms, 11. Can It Be Real? 27. Every Tree For Itself, 38. Every Drop Counts, 84. The Global Climate ,41. How Plants Grow, 35. Loving It Too Much, 29. Rain Reasons, 14. Renewable or Not? 22. Trees as Habitats, 44. Water Wonders, 45. Web of Life.

Designing Experiments

S7-8:3

Students demonstrate their understanding of EXPERIMENTAL

DESIGN by…

· Writing a plan related to the question, hypothesis, and prediction that includes:

a. A diagram labeled using scientific terminology that supports procedures and illustrates the setup .

b. A procedure that lists significant steps that identify manipulated (independent) and responding (dependent) variables.

c. A control for comparing data when appropriate.

d. Identification of tools and procedures for collecting data and reducing error.

PLT Activities that Address these Skills-   42. Sunlight and Shades of Green, 41. How Plants Grow, 44. Water Wonders, 47. Are Vacant Lots Vacant? 66. Germinating Giants, 70. Soil Stories,

Conducting Experiments

S7-8:4

Students demonstrate their ability to CONDUCT EXPERIMENTS by…

· Accurately quantifying observations using appropriate measurement tools. **AND**
· Using technology to collect, quantify, organize, and store observations (e.g., use of probe). **AND**
· Drawing scientifically: Recording multiple perspectives to scale (e.g., magnification,
cross section, top view, side view, etc.).

PLT Activities that Address these Skills- 3. Peppermint Beetle, 28. Air Plants, 25. Birds and Worms, 42. Sunlight and Shades of Green, 41. How Plants Grow, 44. Water Wonders, 47. Are Vacant Lots Vacant? 66. Germinating Giants, 70. Soil Stories,

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Representing Data and Analysis
S7-8:5
Students demonstrate their ability to REPRESENT DATA by…
· Representing independent variable on the "X" axis and dependent variable on the "Y" axis. **AND**
· Determining a scale for a diagram that is appropriate to the task. **AND**
· Using technology to enhance a representation. **AND**
· Using color, texture, symbols and other graphic strategies to clarify trends/patterns within a representation.

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*PLT Activities that Address these Skills-*20.Environmental Exchange Box 32. A Forest of Many Uses, 41. How Plants Grow, 43. Have Seeds, Will Travel, 64. Looking At Leaves, 67. How Big Is That Tree? 68. Name That Trees

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Representing Data and Analysis
S7-8:6
Students demonstrate their ability to ANALYZE DATA by…
· Identifying, considering and addressing experimental errors
(e.g., errors in experimental design, errors in data collection procedures).**AND**
· Identifying limitations and/or sources of error within the experimental design.

PLT Activities that Address these Skills- 12. Invasive Plants, 33. Forest Consequences, 42. Sunlight and Shades of Green, 41. How Plants Grow, 44. Water Wonders 47. Are Vacant Lots Vacant? ,67. How Big Is Your Tree? 69. Forest for the Trees, 72. Air We Breathe, 66. Germinating Giants, 70. Soil Stories, 80. Nothing Succeeds Like Succession,81. Living With Fire, 85. In The Driver's Seat, 94. By the Rivers of Babylon

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S7-8:7
Students demonstrate their ability to EXPLAIN DATA by…
· Using scientific concepts, models, and terminology to report results, discuss relationships, and propose new explanations. **AND**
· Generating alternative explanations. **AND**
· Documenting and explaining changes in experimental design. **AND**
· Sharing conclusion/summary with appropriate audience beyond the research group. **AND**
· Using mathematical analysis as an integral component of the conclusion.

PLT Activities that Address these Skills., 40.Then and Now, 42. Sunlight and Shades of Green, 41. How Plants Grow, 44. Water Wonders, 47. Are Vacant Lots Vacant? 69. Forest for the Trees, 72. Air We Breathe, 66. Germinating Giants, 70. Soil Stories, 80. Nothing Succeeds Like Succession, 94. By the Rivers of Babylon, 95. Did You Notice?

Applying Results
S7-8:8
Students demonstrate their ability to APPLY RESULTS by…

· Identifying additional data that would strengthen an investigation. **AND**
· Explaining limitations for generalizing findings. **AND**
· Explaining relevance of findings (e.g., So what?) to local environment (community, school, classroom) **AND**
· Devising recommendations for further investigation and
making decisions based on evidence for experimental results. **AND**
· Citing experimental evidence within explanation. **AND**
· Including logically consistent position to explain observed phenomena. **AND**
· Comparing experimental conclusion to other proposed explanations
by peer review (e.g., students, scientists or local interest groups). **AND**
· Conducting objective scientific analysis, free of bias. **AND**
· Identifying and evaluating uncontrolled variables inherent in experimental models.

PLT Activities that Address these Skills- 36. Pollution Search, 40.Then and Now, 42. Sunlight and Shades of Green, 41. How Plants Grow, 47. Are Vacant Lots Vacant? 70. Soil Stories, 80. Nothing Succeeds Like Succession, 94. By the Rivers of Babylon

Project Learning Tree® and Grade Expectations 7-8: Life Science GE's

S7-8:33 **Students demonstrate their understanding of how Energy Flow Within Cells Supports an Organism's Survival by…** • Recognizing that energy from the sun is transferred and utilized in plant and animal cells through chemical changes and then transferred into other forms such as heat (e.g., using word equation).	Science Concepts: a. Plant cells take in carbon dioxide and water and use the energy from sunlight to chemically change them to food (sugar) and oxygen. b. All cells chemically change sugar (food) and oxygen into energy required to survive. c. Energy is used by all cells to carry out functions for survival and some energy is transferred to the environment as heat.
S7-8:34 **Students demonstrate their understanding of Energy Flow in an Ecosystem by…** • Describing how light is transformed into chemical energy by producers and how this chemical energy is used by all organisms to sustain life (e.g., using a word equation).	Science Concept: a. Plants transform energy from the sun into stored chemical energy by changing carbon dioxide and water into sugar (food). Plants use or store the sugar they produce to satisfy their energy needs. b. All organisms release the energy stored in sugar (food) through a chemical change that requires oxygen and produces carbon dioxide and water in addition to energy. Some consumers eat plants directly (herbivores). Some consumers eat other animals (carnivores) and use the energy from the plant's sugar food that was stored in the animal's cells. Some consumers eat both plant and animal material (omnivore).

PLT Activities for Energy Flow : *23. The Fallen Log, 41. How Plants Grow,42. Sunlight and Shades of Green, 48. Field, Forest, Stream, 71. Watch on Wetlands, 76. Tree Cookies*

S 7-8: 36 **Students demonstrate their understanding of Equilibrium in an Ecosystem by…** • Identifying an abiotic or biotic change in a local ecosystem and predicting the short and long-term effects of t his change (e.g., local river study).	Science Concept: a. Given adequate biotic and abiotic resources, an ecosystem will maintain equilibrium and continue indefinitely. b. Factors that affect biotic or abiotic resources such as disease, predation, climate, and pollution can change the dynamics of an ecosystem and the interdependent relationships among populations of organisms. until a new equilibrium is reached (e.g., Members of a species that occur together at a given time are referred to as a population).
PLT Activities, 12. Invasive Species, 22. Trees as Habitats 23. The Fallen Log, 24. Nature's Recyclers, 29. Rain Reasons 41. How Plants Grow, 42. Sunlight and Shades of Green, 72. Air We Breathe	*45. Web of Life, Are Vacant Lots Vacant? 48. Field, Forest, and Stream, 70. Soil Stories, 77. Trees in Trouble, 81. Living With Fire, 86. Our Changing World, 88. Life on the Edge*
S7-8:37	Science Concept:

Students demonstrate their understanding of Recycling in an ecosystem by… • Explaining how products of decomposition are utilized by the ecosystem to sustain life while conserving mass (e.g., worm farm, compost).	a. When decomposers break down the matter contained in plants and animals, the molecules of matter can be recycled through the ecosystem and used by plants to produce food or as building material for all organisms. b. As matter is transferred from one organism to another in an ecosystem, the total amount (mass) remains the same. [See S :15— Physical Science Chemical Change.]
PLT Activities *22. Trees as Habitats 23. The Fallen Log, 24. Nature's Recyclers, 26. Dynamic Duos, 27. Every Tree For Itself,*	*41. How Plants Grow, 45. Web of Life,*
S7-8:38 **Students demonstrate their understanding of Classification of Organisms by…** • Comparing and sorting organisms with similar characteristics into groups based on internal and external structures recognized by scientists. **AND** • Recognizing that individuals that can reproduce with one another and produce fertile offspring are classified as a species.	Science Concepts: a. Scientists organize the vast diversity of organisms by describing similarities and differences among living things. Details of internal and external structures of organisms are more important for scientific classification than behavior and general appearance. b. Individuals that can reproduce with one another and produce fertile offspring are classified as a species.
PLT Activities*: 9. Planet Diversity, 32. A Forest of Many Uses, 43. Have Seeds, Will Travel, 64. Looking at Leaves*	*13. We All Need Trees, 68. Name That Tree,*

Project Learning Tree® and Grade Expectations 7-8: Universe, Earth, Environment

S7-8:48 **Students demonstrate their understanding of Processes and Change over Time within Earth Systems by…** • Diagramming, labeling and explaining the process of the water cycle (precipitation, evaporation, condensation, runoff, ground water, transpiration).**AND** • Identifying the major gases of earth's atmosphere. **AND** • Explaining how differential heating can affect the earth's weather patterns .**AND** • Creating a model showing the tilt of the earth on its axis and explaining how the sun's energy hitting the earth surface creates the seasons.	Science Concepts: a. The cycling of water in and out of the atmosphere plays an important role in determining climatic patterns. Water evaporates from the surface of the earth, rises and cools, condenses into rain or snow, and falls again to the surface. Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate, because water in the oceans holds a large amount of heat. b. The entire planet is surrounded by a relatively thin blanket of air composed of nitrogen, oxygen, and small amounts of other gases, including water vapor. c. Heat from the sun is the primary source of energy for changes on the earth's surface. The differences in heating of the earth's surface produce the planet's weather patterns. d. Seasons result from variations in the amount of sun's energy hitting the earth's surface. This happens because of the tilt of the earth's axis and the orbit of the earth around the sun.
PLT Activities *: 44. Water Wonders, 29. Rain Reasons, 48. Field, Forest and Stream, 70. Soil Stories,71. Watch on Wetlands, 86. Our Changing World, 76. Tree Cookies*	

Project Learning Tree Correlations 2006
Natural Resources and Agriculture

PreK-4	5-8	9-12

Natural Resources <u>and Agriculture</u>		

7.16   Students demonstrate an understanding of natural resources and agricultural systems why and how they are managed. This
7.17   Is evident when students:

a. Identify natural and agricultural resources and where they come from (e.g. wildlife, fish, plant, rock, water, soil, minerals, sunlight, and air), and distinguish between natural resources and things made by humans (e.g. sand vs. cement, milk vs. ice cream, wheat vs. bread, sap vs. syrup, wildlife vs. domesticated animals).	**aa.**÷ Identify and investigate the natural resource and agricultural areas in Vermont and the products and markets for each (e.g., interaction of major natural communities, fish and wildlife, water and earth resources; locate farming regions and products).	**aaa.**: Identify, investigate, and analyze the major natural communities and resources that exist within Vermont and the New England region, and evaluate the attributes, distribution, and current issues related to each (e.g., regional processes that influence our natural resources, such as the introduction of zebra mussels into Vermont waters; watershed issues; acid rain).

PLT PreK-Grade 8 Guide Activities- **a**. **Grades Prek-4** -*13. We All Need Trees, 15. A Few of My Favorite Things, 16. Pass the Plants, Please, 22. Trees as Habitats, 27. Every Tree For Itself, . 28. Air Plants , 30. Three Cheers For Trees, 31. Plant a Tree, 32. A Forest of Many Uses, 38. Every Drop Counts, 39. Energy Sleuths, 41. How Plants Grow, 42. Sunlight and Shades of Green, 43. Have Seeds, Will Travel, 48. Field, forest, and Stream, 70. Soil Stories, 51. Make Your Own Paper, 79. Tree Life Cycle, 82. Resource-Go-Round,*

aa. Grades 5-8 PreK-4, *plus the following) 14., Renewable or Not?, 37. Reduce, Reuse, Recycle. 44. Water Wonders, 50. 400-Acre Wood, 52. A Look at Aluminum, 71. Watch on Wetlands, 72. Air We Breathe, 83. a Peek at Packaging, 93. Paper Civilizations,*
aaa. +Above, PLT Secondary Modules-*Exploring Environmental Issues: Focus on Risk, The Changing Forest: Forest Ecology and Focus on Forests*

b. Identify the; benefits of agriculture and natural resources (e.g., **public health, public welfare,** recreation, safe food.	**bb.** Describe the effects of the interrelationships among multiple natural resources and agricultural practices (e.g., forestry management, wildlife population management, nutrient and pesticide use).	**Bbb** Evaluate how science and technology are used to maximize benefits and understand natural resource and agricultural systems (e.g., genetic diversity of species promotes disease resistance in natural populations, bioengineering of seeds provides improved crop production).

PLT PreK-Grade 8 Guide Activities – b. Grades Prek-4 *13. We All Need Trees, 15. A Few of My Favorite Things, 16. Pass the Plants, Please, 22. Trees as Habitats, 27. Every Tree For Itself, . 28. Air Plants , 30. Three Cheers For Trees, 31. Plant a Tree, 32. A Forest of Many Uses, 38. Every Drop Counts, 39. Energy Sleuths, 41. How Plants Grow, 42. Sunlight and Shades of Green, 43. Have Seeds, Will Travel, 48. Field, forest, and Stream, 70. Soil Stories, 72. Air We Breathe, 51. Make Your Own Paper, 79. Tree Life Cycle, 82. Resource-Go-Round, 87. Earth Manners*

bb. Grades 5-8PreK-4, plus the following) 14., Renewable or Not?, 37. Reduce, Reuse, Recycle. 44. Water Wonders, 50. 400-Acre Wood, 52. A Look at Aluminum, 71. Watch on Wetlands, 72. Air We Breathe, 83. A Peek at Packaging, 93. Paper Civilizations, 86. Our Changing World, 88. Life on the Edge. 92. A Look at Lifestyles.94. by the Rivers of Babylon, 96. Improve Your Place

bbb. Above +PLT Secondary Modules-*Exploring Environmental Issues: Focus on Risk, The Changing Forest: Forest Ecology and Focus on Forests and Exploring Environmental Issues: Municipal Solid Waste*

c.÷ Identify actions individuals and families can take to help manage natural resources and agriculture (e.g., walking on established trails, fishing and hunting in season, picking up litter, recycling, purchasing locally grown agricultural products).	**cc.;** Describe how management and development practices affect resource conservation and agricultural systems (e.g., People decide when and how to harvest trees, fish, and wildlife; where to plant and how to grow crops; where to preserve wild areas; where to locate businesses and homes; and how farm practices can reduce their impacts on streams).	**ccc.÷** Evaluate how science, technology and social/economic principles are used by individuals, private groups and governments to make informed decisions about natural resources and agricultural management (e.g., purchasing a fuel efficient car, managing farm and urban nutrients/crops; establishing town zoning, pollution emission standards, hunting and fishing regulations; or adding /removing a species – like the peregrine falcon – from Vermont's endangered and threatened species list).

PLT PreK-Grade 8 Guide Activities - **c. Grades Prek-4.** *4. Sounds Around, 15. A Few of My Favorite Things, 16. Pass the Plants, Please, 22. Trees as Habitats, 27. Every Tree For Itself, . 27. Every Tree for Itself, 28. Air Plants , 30. Three Cheers For Trees, 31. Plant a Tree, 32. A Forest of Many Uses, 36.Pollution Search, 38. Every Drop Counts, 39. Energy Sleuths, 41. How Plants Grow, 42. Sunlight and Shades of Green, 43. Have Seeds, Will Travel, 48. Field, forest, and Stream, 77. Trees in Trouble, 81. Living With Fire, 82. Resource-Go-Round,*

cc. Grades 5-8 (PreK-4, plus the following) *73. 12. Invasive Species, 14., Renewable or Not?, 19. Viewpoints on the Line, 33. Forest Consequences, 35. Loving It Too Much, 37. Reduce, Reuse, Recycle., 50. 400-acre Wood, 52. A Look at Aluminum, 53. On the Move, 55. Planning the Ideal Community, 56. We Can Work It Out, 59. Power of Print, , 60. Publicize It!, 67. How Big Is Your Tree?, 69. Forest For the Trees, 70. Soil Stories 71. Watch on Wetlands, 72. Air We Breathe, Waste Watchers, 83. A Peek at Packaging, 84. The Global Climate, 85. In the Driver's Seat, 93. Paper Civilizations,*

ccc. Above+ PLT Secondary Modules-*Exploring Environmental Issues: Focus on Risk, The Changing Forest: Forest Ecology and Focus on Forests*