

Project Learning Tree

Facilitator Handbook

(Revised, 2002)

Alaska

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Introduction

This handbook is a guide for conducting Project Learning Tree (PLT) educator workshops. It explains PLT's mission and objectives, the goals of a PLT workshop, your responsibilities as a facilitator, how to find a workshop site, how to publicize your workshop, and what to include in the workshop itself. It discusses workshop materials and equipment, how to involve resource specialists, as well as suggestions for workshop follow-up. It also examines topics you may want to model and discuss, including cooperative learning and teaching outdoor and/or environmental education.

You may use this handbook as a step-by-step guide for planning and conducting your workshops. If you are a "seasoned" PLT facilitator, you may use it to find new ideas to enhance your workshops. The table of contents will help you locate the specific information you need.

Why Be A Facilitator?

Workshop facilitators have been the lifeblood of PLT for more than a quarter century. They have successfully trained hundreds of thousands of educators to use PLT, and continue to assist in expanding the reach of PLT across the country and around the world. Without the time and energy they provide to the program, PLT would not have attained the status it enjoys within environmental education circles as one of the oldest, finest, and most widely used national environmental education programs.

Now that you have joined the ranks of these very important facilitators, you will benefit from their experiences. First of all, you already know that you can schedule, plan, and conduct an educator workshop -- just look at how many have already done so! And, this handbook is the direct result of what we have learned by experience: what works, what doesn't, and what can be done a better way in conducting workshops. Add to this handbook your own experiences, things you want to try at future workshops, and ideas you pick up along the way. If you find an approach that works that you would like to share, please do so with your State Coordinator.

Our sincere thanks to all of you who have chosen to become an integral part of the Project Learning Tree network!

Alaska PLT

PLT in Alaska is provided by the Alaska State Division of Forestry. Sponsors within the Division are the Resources Forestry Section, in particular Urban and Community Forestry, and the Fire Program.

PLT Alaska is also supported by a grant from the Natural Resources Conservation Service.

PLT is also supported by and partners with the USFS, the NPS, the BLM, and the USFWS to provide natural resources and fire education to Alaskan formal and non formal educators.

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I. About PLT and PLT Workshops

What is PLT?

Project Learning Tree (PLT) is an award-winning environmental education program designed for educators working with students from pre-kindergarten through twelfth grade. PLT helps students learn about the world around them, their place within that world, and their responsibility for it. Through its many hands-on activities, PLT helps students become:

- personally aware of their presence in the environment;
- personally aware of the multiple values of natural resources, including ecological, economic, cultural, and societal;
- better able to understand their impact on and responsibility to the environment;
- equipped with the skills and knowledge to make informed decisions regarding the management and use of the environment; and
- increasingly confident in their ability to take action on their decisions.

PLT is designed to work in rural, suburban, and urban areas; in formal and nonformal educational settings; and both indoors and outdoors. The PLT activities emphasize conceptual learning and skill building and use effective, student-centered, instructional strategies, such as hands-on and cooperative learning, multiple intelligences, and others.

An Elementary activity guide is available for educators for grades PreK-8. Also available for these grades is an Energy & Society module, which provides information and activities about energy and supplements the PreK-8 guide. Secondary modules on the topics of forest ecology, forest issues, municipal solid waste, and risk, are available for educators of grades 9-12. Additional secondary module topics now in development include biodiversity, world forest ecology, and building sustainable communities.) The PLT activity guides and modules are not for sale, but are provided free or at a nominal charge to educators when they participate in a PLT workshop.

PLT promotes the *process* of education and advocates sound principles of teaching. The activities encourage educators to provide students with opportunities to gather information, communicate, cooperate, assess values, solve problems, and use critical thinking skills. Because many PLT activities are hands-on and invite students to **APPLY** their knowledge and skills, educators can use them as evidence of students' learning and practice for "performance-based" assessments.

PLT is balanced on value-sensitive topics. It is especially important for workshop facilitators to keep this in mind and always maintain a balanced perspective in facilitation. The PLT activities and materials are designed to treat issues fairly and do not advocate any one particular point of view. PLT recognizes that people need information from a variety of sources in order to make their own informed decisions.

PLT's Mission

PLT uses the forest as a "window on the world" to increase students' understanding of our complex environment; to stimulate critical and creative thinking; to develop the ability to make informed decisions on environmental issues; and to instill the confidence and commitment to take responsible action on behalf of the environment.

PLT's Goals

PLT's goals are to:

- Provide students with the awareness, appreciation, understanding, skills, and commitment to address environmental issues.
- Enable students to apply scientific processes and higher order thinking skills to resolve environmental problems.
- Help students acquire an appreciation and tolerance of diverse viewpoints on environmental issues, and develop attitudes and actions based on analysis and evaluation of the available information.
- Encourage creativity, originality, and flexibility to resolve environmental problems and issues.

- Inspire and empower students to become responsible, productive, and participatory members of society.

The Five Themes

The PLT conceptual framework is built around five major themes: Diversity, Interrelationships, Systems, Structure and Scale, and Patterns of Change. (The conceptual framework can be found in the PreK-8 Activity Guide on page 375, in all of the Secondary Modules, and in Appendix G of this document on page **xx**.) Each theme covers the areas of Environment, Resource Management & Technology, and Society & Culture. PLT activities integrate the themes within science, language arts, social studies, art, music, and physical education.

The conceptual framework lets the users of this program know what kinds of knowledge students can expect to acquire while participating in PLT activities. Without a conceptual framework, the activities in the PreK-8 guide and secondary modules have no real purpose or direction. Anyone can do fun things, but teachers have to actually teach something while doing these fun things. The framework provides the structure, direction, and purpose for the activities. Though conceptual frameworks are provided, educators may develop their own frameworks based on the curricula already in place in their classrooms. It is important to remember that PLT's materials are supplementary, and as such, can and should be adapted as needed to best suit the needs of the teacher.

Although the guide contains in-depth information on specific topics, it is not designed to be an all-inclusive or comprehensive curriculum. Teachers are encouraged to fill in any gaps that they perceive with content (newspaper clippings, brochures, and other supplemental information) that relates to their community, expertise, or interests.

Appropriate activities can be used as thematic, conceptual, or storyline units. Each activity can also be used individually to teach a particular topic or reinforce the concepts indicated on the activity.

Following is a description of the five PLT themes:

1. ***Diversity***--demonstrating the wide array of habitats, societies, technologies, and cultures.
2. ***Interrelationships***--highlighting ecological, technological, and social-cultural systems as interactive and interdependent.

3. **Systems**--teaching how environmental, technological and social systems are interconnected.
4. **Structure and Scale**--demonstrating how technologies, societal institutions, and components of natural and human-built environments vary.
5. **Patterns of Change**--showing how structures and systems change over time.

The knowledge that students acquire is not limited to the knowledge that is described in this conceptual framework. Teachers may choose to add other concepts and generalizations as they see fit through the use of variations or by providing a different emphasis.

Constructivism and Whole Language

Central to the curriculum activities is an emphasis on constructivist learning theory and whole language teaching strategies.

Constructivism is based on the principle that students construct new understandings by combining previous understandings with new discoveries. Constructivism, also known as constructivist learning, is the learning philosophy that has been guiding the revision of today's education. Its teaching-learning strategies are aligned with how educational researchers now believe students learn best.

In contrast to more "traditional" classroom instruction, which emphasizes that students learn because teachers teach, the responsibility for learning lies with the student. Educators are responsible for facilitating learning experiences which enable students to manipulate materials, consider points of view, participate in group work, and focus on learning concepts.

Using this technique, PLT teachers can guide their students toward new discovery and scientific understanding while helping them develop critical thinking and creative problem solving skills. *See Appendix H for Constructivism: A List of Teaching Strategies.*

PLT activities are designed using a constructivist approach: Each activity guides the student through a process that begins with awareness, moves students toward understanding, enables them to challenge preconceived notions, and motivates them to seek

constructive avenues for environmental action. For example, step one in the activity is designed to create student awareness and find out what students already know about the topic. It serves as the "hook" to develop their interest. Step two develops their knowledge and skills. Step three challenges their preconceived notions about the topic, helps them come to consensus, or builds new knowledge. Finally, step four encourages them and provides ideas on how they can take positive action regarding the new information and knowledge they have gained on this topic. The final step may also show how they can apply this new learning to other situations.

Whole language, teaching holistically rather than in "bits" and "pieces", allows teachers to integrate connecting themes, conceptual understandings and critical thinking skills rather than simple transfer of bits of information. In this way, students can engage in writing and oral language activities related to experiential learning. Teachers who successfully employ the constructivist and whole language theories to the PLT curriculum can maximize effective teaching strategies including cooperative learning--team or group approaches to learning--and problem solving--identifying problems, determining desired outcomes and testing solutions.

Using these approaches, teachers will find that PLT activities can guide learners through the process of awareness, understanding, challenge, motivation, and action using active involvement and hands-on experience.

History of PLT

The PLT program began in the mid-1970s as a joint venture between the American Forest Institute (AFI), a forest products industry trade association dedicated to improving the management of America's forests, and the Western Regional Environmental Education Council (WREEC), a non-profit organization composed of representatives from state departments of education and natural resources agencies from 13 western states. The founders of PLT had an idea for developing an effective environmental education program. To build an effective program, the founders established two goals. The first goal was to design an environmental education program that would gain the confidence of the education community—educators must like it, trust it, and use it. The second goal was to develop partnerships between public and private sectors that ensured the curriculum was balanced, fair, and accurate—and that the curriculum encouraged students to

consider all sides and factors when making decisions about the environment. In addition to creating quality materials, they also created a system of implementation. They believed that for the curriculum to be used effectively, it should only be available through workshops.

The first edition of the PLT materials was published in 1976. They were developed by a team of writers and were thoroughly tested and evaluated. Two activity guides were available, one for K-6 grade educators and one for 7-12 grade educators. Those two guides were in use until 1993 when the materials were revised into the current PreK-8 Activity Guide and topic-specific secondary modules.

Today, Project Learning Tree is one of the most widely used preK-12 environmental education programs in the United States and abroad. PLT is available in all 50 states and the District of Columbia, as well as in several U.S. territories. It has also been formally adopted in Brazil, Canada, Chile, Finland, Japan, Mexico, Philippines, and Sweden – and is informally used in a host of other countries. It has a nationwide network of nearly 100 State Coordinators, each of whom implement PLT through a variety of different organizations and agencies in their respective states, and more than 2,500 volunteer workshop facilitators. Through workshops, more than a quarter of a million educators have received PLT and, in turn, have reached millions of young people.

PLT owes much of its success to its original development through the cooperative efforts of the industrial, scientific, and education communities. Through its commitment to balanced environmental education, PLT has enjoyed the continued full support of these communities.

Administration and Sponsors

Today, PLT is administered nationally by the American Forest Foundation (AFF) AFF is a 501(c)(3) charitable education foundation supported by grants from individuals, foundations, and industries. PLT's partners include the Council for Environmental Education (CEE), the National Association of Conservation Districts, Society of American Foresters, the USDA Forest Service, the USDI Bureau of Land Management, the National Association of State Foresters, the National Association of Professional Forestry Schools and Colleges, and the World Forestry Center to name just a few.

In **Alaska**, PLT coordination and implementation is supported by the **Alaska State Division of Forestry of the Department of Natural Resources**.

Funding for educator workshops varies from state to state and program to program, but typically is provided through the support of individual agencies, school districts, private organizations, and participant workshop fees. The PLT activity guides and other support materials are provided by the **Division of Forestry**.

Associated Programs

Building on the success of PLT, WREEC (now CEE) developed a similar program in the 1983 that uses wildlife as a focus for teaching environmental principles. This program, Project WILD, has also been tremendously successful in the United States and abroad. Recently, WREEC became the cosponsor for Project WET, an environmental education program created in 1991 designed to promote the stewardship of water resources.

Evaluating PLT

After serving as one of the most widely used environmental education programs in the nation for over 20 years, the Project Learning Tree Education Advisory Board and the PLT staff decided that it was time to take a careful look at the PLT Activity Guides in order to ensure that PLT continued to serve as a premier environmental curriculum. Thus, an extensive multi-year revision process was initiated in 1990 with a survey of more than 50,000 teachers, environmental educators, teams of scientists, natural resource managers and technical specialists. Over 3,000 students from across the nation participated in the formal evaluation of the new curriculum.

The Evaluation Process

In planning the evaluation of PLT, the advisory board and the national staff wanted to ensure that the evaluation design represented the "state-of-the-art" in evaluation studies. Thus, in addition to a summative evaluation, the PLT evaluation design also included a planning evaluation and a formative evaluation.

The "**planning evaluation**" helped to answer such questions as: Who should be involved in the revision of PLT? How should the revision process be done? What should the new PLT activity guide look like? What educational philosophy should be emphasized? Should the curriculum framework be revised? If yes, how? As a result of the planning evaluation, it was agreed that high on the list of key characteristics of the "new" PLT would be: teaching children "how to think, not what to think;" developing higher order thinking skills, critical thinking skills, problem-solving skills, and decision-making skills; the use of "state-of-the-art" teaching philosophy and strategies relying on constructivist learning theory, cooperative learning, case studies; and, activities that actively involve students in the teaching/learning process.

In order to assess the ongoing activities of the revision, a "**formative evaluation**" was initiated at the beginning of the evaluation process and was continued throughout the life of the project. This component of evaluation provided evaluative information on an on-going basis to improve both the process and the end product as well. Writing workshops were conducted which involved hundreds of PLT teachers, coordinators, and environmental education leaders. After content reviews, and accuracy reviews, the new PLT was then pilot tested by educators across the country. (Pilot testing involves teachers administering the activities with their students and providing feedback to the PLT curriculum staff and evaluator as to what worked and what did not work.) The purpose of the pilot test was to make sure that the new PLT actually worked in the "real world." On the basis of the pilot test results, the new PLT was revised again and the evaluation process then moved into the third and final phase.

The "**summative evaluation**" stage was to formally evaluate the effectiveness of the "end product" -- the new PLT in the classroom. This field test was conducted to determine if the new PLT was meeting the goals and objectives established for the program and whether or not the students who participated in the program benefited from it. (Field testing involves the formal evaluation of the activities including pre-test, implementing the activities, and post-test; control groups are used for comparisons.) Both qualitative and quantitative data were collected to assess the overall effectiveness of the new PLT.

The results of this extensive and comprehensive evaluation indicated that the new PLT program works! PLT **can** be an effective program for increasing environmental knowledge and effecting positive attitudinal growth in students in grades PreK through 12. In addition, teachers

who complete at least one PLT Educator Training Workshop, and who implement the new PLT activities as intended, are likely to observe knowledge gains and attitudinal change in their students. This appears to be particularly true when students are exposed to a series of new PLT activities over a relatively short period of time.

Awards and Endorsements

In 1985, President Ronald Reagan presented the prestigious President's Citation Program "Crystal Award" to the American Forest Foundation. This award recognized PLT as an outstanding private sector initiative.

PLT has also received other awards and recognition over the years from:

- North American Association for Environmental Education
- The National Arbor Day Foundation
- The Conservation Education Association
- National Wildlife Federation, and its affiliate, the California Natural Resources Federation
- National Association for Industry-Education Cooperation
- American Society of Association Executive
- Keep America Beautiful
- Solid Waste Association of North America

What is a PLT Educator Workshop?

Workshop Goals

PLT workshops vary widely depending on the presenter's style and the audiences' needs. However, the main goals of any PLT workshop are always the same:

- To encourage educators to approach learning and teaching from an environmental and multi-disciplinary perspective.
- To prepare educators to use PLT materials with young people by providing a sampling of teaching strategies and activities that will help young people become aware of the environment, their impact upon it, and their responsibilities for it.

- To create a setting in which educators, resource personnel, and others can meet and share information, and encourage continued communication and support for environmental education, using the environment as a focus.
- To provide a fun and motivating forum that encourages educators to enjoy their own learning processes.

The workshop format was established during PLT's organizational stage because it has been shown that educators will more readily use educational materials if they are shown how such use will actually enhance what they are already teaching. In the workshop setting, educators experience the modeling of various styles of activities and even select activities to present themselves. In this way, they see for themselves how activities can be adapted to fit their own curricula and styles. During the activity wrap-ups, where attendees are encouraged to share ideas, learning takes place from participant to participant, as well as from workshop leaders.

Workshop Format

The workshop format should show participants how to use PLT to teach science, math, language arts, social sciences, art, health, and even physical education. Non-formal educators—such as naturalists, outdoor school teachers, interpreters, docents, home school instructors, or youth organization leaders—should be shown how PLT can be used as a resource of activities to enhance or complement their work with both students and adults.

Workshop Design

Workshops should model effective teaching strategies and encourage educators to explore new ways of teaching. Wherever possible, use hands-on instructional methods and help participants work out any problems they foresee using new methods with their students.

The entire workshop structure should follow the "AKCA" model, just as you would structure leading individual activities. The AKCA model leads students from awareness, to knowledge, to challenge, and finally to action. When applied to the workshop setting the same model will lead the educators from an awareness of PLT, to adding to what they know about PLT, to challenging them to experience PLT, and finally to them actively leading activities and exploring ways to use the activities with their students. For more information on this topic, see the Activity

Components section in the PreK-8 Activity Guide or the Module Components section of the Introductory Handbook for the Secondary Modules.

Suggested Time Requirements

When planning your workshop, keep in mind that educators attend a workshop that is typically at least **six hours** in length to receive the PreK-8 Activity Guide, and typically a minimum of **two hours** (per module) in length to receive a secondary module.

If you are also a Project WILD or Project WET facilitator, you may wish to combine two (or possibly three in some instances) programs into one workshop. You should consult with your PLT state coordinator before deciding to do so, however – combined workshops are quite involved and must be planned and executed very carefully to give each program being presented the appropriate amount of time and attention. Still, the extra work can be well worth it, as participants can gain an understanding of how these education programs can be effectively integrated with one another, as well as with their teaching in general.

Fees

PLT workshops are typically conducted at either no charge or a nominal fee to participants. Because it is sometimes easy for workshop participants to sign up for a “free” workshop and then not attend, you may wish to pursue the idea of charging a workshop fee which can be refunded (in full or in part) if an enrollee actually attends the workshop, if you would prefer not to charge for training. Income from workshop fees is intended to be used to cover the costs of snacks, special materials, meeting room fees, and any other direct costs that you or the sponsoring organization incur in conducting the workshop. If you provide college or university credit, or “continuing education credits” for teachers, additional fees may be required by the specific college, university, or state education system.

PLT Facilitator Responsibilities

Role of the Facilitator

Being a PLT facilitator means that you are not really a teacher nor are you a leader. A facilitator serves as a guide, helping workshop participants gain a better understanding about the PLT program, its use, and potential impacts on children's environmental awareness and understanding.

The role of the Project Learning Tree workshop leader is to help the participants make their own observations, interpretations, and conclusions about PLT, and to assist the group in discovering and realizing the potential PLT holds for them.

As a facilitator, you set the stage for learning and encourage participants to explore and develop as professionals. See Appendix A for a list of facilitator skills. The PLT facilitator is responsible for:

- Structuring a positive, hands-on experience that allows each member of the group to participate in activities, and as much as possible, achieve his or her reason for being at the workshop.
- Modeling the PLT philosophy of "awareness" (what is PLT, and what does it contain) to "action" (participants make plans for use of PLT, then return home and use it).
- Motivating (through an enthusiastic presentation) and assisting the participants in developing applications of PLT for their own settings.

A PLT workshop facilitator also *must* put his or her biases and interests aside. This is particularly difficult since many of the issues we talk about and many of the PLT activities we work with touch important aspects in our own lives. For more ideas on this topic see "Two Hats" on page 377 of Appendix 2 in the PreK-8 Activity Guide.

Conducting Workshops

As an active PLT facilitator, you are typically expected to plan and conduct a minimum of one six-hour workshop each year, (*this*

requirement may vary from state to state). We encourage you to team with other facilitators and resource specialists, and we welcome alternative workshop styles.

Other Ways to Become Involved

In addition to conducting workshops, consider becoming involved in PLT in other areas such as promotion, networking, and recognition. For example, you might:

- **Encourage the use of PLT and the development of additional PLT workshops in your region.** Possible settings might include booths or displays at conferences, fairs, and other gatherings. These are good opportunities to promote workshops in your area.
- Serve as one of PLT's resource people in your region. **Help find participants for workshops and promote media coverage of PLT events.**
- Enrich your state PLT program by sharing your ideas, techniques, resources, and other information in your facilitator newsletter, and in the national PLT newsletter, the *Branch*. **Send your ideas to the State Coordinator.**
- Help us recognize important contributions made to PLT. **Share your recommendations to the State Coordinator for nomination of individuals and organizations for PLT recognition.**
- **Follow up** with a team of teachers to integrate PLT activities across grade levels with a particular school or district.
- Support a teacher in writing a **GreenWorks! grant** by offering feedback or a letter of support.
- As a certified Project Learning Tree facilitator you may be asked to make a presentation to a local school board, a teacher's meeting or other informal gathering as to what PLT is, what it offers, and how it may be helpful to educators. Listed below is a suggested agenda for such an occasion. Remember, it is only a suggestion, feel free to alter or change it to fit the group you are speaking to.

Suggested Agenda for a 1-2 hour Presentation:

- *Introduction and Get Acquainted:* You might have people introduce themselves (if necessary), and have each person name one thing in which a conservation education program could provide for them. Make a list of their needs (you may want to refer to this later).
- *Explain what PLT is and describe the guides.* Distribute a promotional brochure and copies of the *Branch*.
- *Do a PLT activity with the group.*
- *Give an overview on selected PLT activities.*
- *Refer to the needs they expressed earlier and see how PLT may fit their particular needs.*
- *If time permits you may want to do another PLT activity.*
- *Explain how they can schedule a PLT workshop.*

II. Planning for the Workshop

Most of the work for a successful workshop is done before the workshop day. Here are suggestions for planning and preparing for your workshop to ensure success.

Arranging a PLT Educator Workshop

PLT workshops may happen in a variety of ways. Sometimes a sponsoring organization or the PLT State Coordinator identifies a need and then arranges with a facilitator to plan and present the workshop. More often, a PLT facilitator decides to do a workshop where he or she sees a need and arranges the workshop through a sponsoring organization.

To arrange a workshop, begin by checking with your school, school district, state office of education, teaching colleges or universities or other such organizations to find out whether they would be interested in sponsoring a workshop. Other possibilities could include contacting local nature centers, museums, county parks, or conservation-oriented organizations (such as an urban forestry organization, Girl Scouts, or 4-H) to gain their interest in sponsoring a workshop. The best people to talk to include community relations directors, curriculum directors, principals, department chairs, and lead teachers.

Although sponsors are not required to offer a PLT workshop, some workshop sites require proof of liability and accident insurance before you can hold a workshop there. *PLT cannot insure PLT facilitators.* Therefore, we recommend that you find a sponsor for your workshop that can provide you with insurance protection. Consult your State Coordinator for more information.

Co-Facilitating

We highly recommend that you co-facilitate your workshop, especially if you are a new workshop facilitator. You may co-facilitate with one or two others who attended your facilitator training or with an experienced PLT facilitator (lists of facilitators are available from the State Coordinator). If possible, you might co-facilitate with a resource specialist trained in PLT (for more information, see *Inviting a Resource Specialist* on page II-x). One of the best co-facilitation strategies is to

pair an educator with a natural resource specialist – in this way, the expertise of each can be tapped for the workshop.

Co-facilitating has many advantages, both for you as the facilitator and for the participants. It is extremely helpful to have someone to share ideas with, to help plan the agenda and your delivery, to help gather necessary materials, to help promote the workshop, and to share the responsibility for presenting activities and for fielding questions. Participants will have the advantage of seeing varying teaching styles and will learn from presenters with different areas of expertise.

If you do work with a co-facilitator, be as explicit as possible with each other *before* the workshop. It is important to identify what each of your roles will be. You may find it useful for each of you to complete the “Co-Facilitating Worksheet” questions on page II-xx, and discuss your responses. This cooperative planning early on will allow for smooth transitions and will also enhance your working relationship.

Arranging for Credit

Offering some kind of credit can be a big selling point to potential workshop participants. If you are affiliated with a college or university, you may be able to offer graduate or undergraduate credit. If you are interested in doing this, you will need to make all arrangements with the school. Depending on the school’s specific requirements, your workshop may need to be longer than is required by PLT (fifteen hours for one credit) and participants may need to complete a written assignment. In Alaska, we partner with **Project WILD to offer credit workshops**. Also, participants will usually need to pay a fee to the college or university to cover the cost of credit. Depending on your credentials, it may also be possible for you to apply as an adjunct instructor and offer credit. **Contact your State Coordinator for more information on this.**

Even if you do not offer college credit, you may be able to arrange for continuing education credit through your state office of education or school district office. In some states, PLT is actually a provider of credit.

Foresters and other resource professionals participating in the Society of American Foresters’ (SAF) “Continuing Forestry Education and Professional Development Recognition Program” (CFE) may be able to earn credit by participating in a PLT workshop. Contact the State

Coordinator for the name of the SAF person in your area to verify or document CFE credit.

Deciding Where and When

Two important considerations you will need to make for designing your workshop are the workshop site and time frame. Everything you do during the workshop will depend to some degree on these two factors.

Workshop Site

Successful workshops have been conducted in a variety of settings: from school sites to city parks, from museum classrooms to wooded retreats. Before selecting a site for the workshop, think about its advantages and disadvantages and compare these to the workshop goals. For example, a workshop at an environmental education center in a regional park can acquaint teachers with resources available to them in their area, while one held at the school site might help teachers see how PLT activities can be used in their own classrooms and will show them that the environment is wherever we are!

Think about ways you might overcome any disadvantages or constraints the space presents. For example, a retreat location may be wonderful for the spirit, but consider ways to include activities and discussion that help teachers relate to the day-to-day classroom setting. A meeting room can help participants focus on the day's task, but can be stifling for nature lovers; plan a way to get participants outside for at least some of the day.

Wherever you plan to conduct the workshop, be sure to reserve the facility well in advance. Some facilities may book up quickly. Visit the site personally prior to the workshop date to check the room size, layout, etc.

Time

Although a PLT workshop needs to be at least six hours long for the PreK-8 Guide, and at least two hours for a secondary module, you have a lot of flexibility about how this time is distributed. For the six-hour workshops, you may wish to conduct a one daylong workshop. This type of workshop enables participants to become proficient in the materials through hands-on involvement with the PLT activities.

For the six-hour or longer workshops, there are also advantages to two shorter sessions spaced over a one- to four-week period. One approach to take with these shorter sessions is to offer an initial after school session of an hour or two and concentrate on activities that fit into the teachers' curricula. A great selling point to gain participants is to show how PLT is already going to fit into what they now do without more work on their part. Between sessions, you may ask participants to conduct with their students the activities you presented during the first workshop session (or other activities they select). At the following workshop session they can share what happened, and discuss adaptations or extensions they developed. Also, participants are able to review the PLT activity guides and prepare additional activities for classroom use or for presenting to other participants at the next workshop session. This two-session format provides a wonderful opportunity for the participants to try out activities while they are curious and excited about PLT. If you decide to use this format, be sure that participants have an incentive and are accountable for attending *both* sessions.

The secondary module workshops must be a minimum of two hours, with an additional hour added for each module introduced at the workshop. For shorter workshops, (three hours or less), it is best to hold them in one time block.

If you decide to hold after-school sessions, you will need to consider ways to help teachers make the transition from school mode to workshop mode. You may also want to provide high-energy snacks or dinner.

Publicizing Your Workshop

Pre-workshop publicity announces your workshop to those who may be interested in attending. Effective publicity gives potential participants enough information in advance so they know what to expect, including:

- a brief summary statement about PLT
- the goals of the workshop and key concepts to be covered
- who will be conducting the workshop
- the sponsors
- the date, time, and location (including a map and directions, if necessary)

- if the workshop is two sessions, that attendance is required at both sessions
- the registration fee, if any (see Fees, page I-**x**)
- whether college or district credit is available
- what participants will receive: PLT activity guides — at no charge!
- contact person, including address and phone number for further information
- appropriate clothing, i.e. outdoor dress
- whether a bag lunch is needed
- registration deadline

Use your imagination to create a flyer, poster, or announcement that conveys the above information (see "Helpful Hints for Making Flyers" on page II-**xx** and the sample flyers in Appendix E.) Use whatever format works well in your setting. Whenever possible, make use of existing communication channels within your organization or within your school, district, or county education system. Flyers may often be sent by mail or fax to local schools, addressed to the principal or curriculum coordinator. **The Coordinator will assist you advertising workshops through contacts at schools and agencies.** You may also want to include the workshop on your county or district calendar. Also, the PLT national website (www.plt.org) has a calendar on which you can post upcoming workshops.

As with most advertising, word-of-mouth is usually best. For example, if you are inviting educators from more than one school site, ask one person at each site to help spread the word and send extra announcements for that person to share. Many department chairs and lead teachers are willing to forward workshop announcements to groups of teachers they commonly work with.

Another possibility is to announce your workshop through the newsletters and web sites of various local educational associations, such as local science, social science, or math councils, or environmental education or outdoor education organizations. Press releases may also be sent to local daily or weekly newspapers that feature a spotlight or regular section on education. Your State Coordinator may also be able to post a workshop announcement to your state's PLT web site and possibly take registrations by e-mail.

It will be helpful if you know in advance the number of people who will be attending your workshop. You may want to include a tear-off registration form at the bottom of your flyer. Besides letting you know how many people to expect, a pre-registration form can also help you

structure the workshop to accommodate the participants' specific grade level interests. To encourage early sign-ups, you may also state "Enrollment is limited," "Registration will be accepted on a first come, first served basis," or "Register by (date)."

In order to make the workshop experience as positive as possible for those attending, you might consider setting a minimum and maximum number of participants. If you do this, make sure you have a way to contact participants before the workshop to let them know they are registered or to inform them if the workshop is canceled.

Considering the Audience

Before you plan the specifics of your workshop, it is helpful if you know some of the needs and interests of your participants. If you have enough lead time, you might prepare a pre-workshop questionnaire to find out their expectations for the workshop, what grade level and types of young people they work with, and any special needs they have. If you know beforehand that the group you will be working with has a special area of interest, you may want to tailor the entire workshop to suit their needs. For instance, you might announce the workshop as "PLT — Improving Elementary Science Instruction," "PLT and Basic Skills," "PLT for the High School Biology Teacher," "PLT and the Urban Environment," or "PLT in Outdoor Schools." You could then plan a workshop agenda to fit the special interests of the audience. Even if you do not know the specific needs of your audience before you begin planning, try to visualize what the audience would want from the workshop. Is their attendance mandatory or voluntary? If it is mandatory ask yourself, "Why would the participants *want* to attend?" and be prepared to show what they can gain from using PLT with their students. For information about ways to meet the needs of your audience as adult learners, see "Adults as Learners," page II-xx.

You might also consider whether there are any local issues or current movements in education the participants might be concerned about or interested in discussing. If you identify possible issues or trends, think about how you could address these during the workshop so that each person has an opportunity to participate. For ideas on topics you might model and discuss, see Section V: Topics to Model and Discuss.

Selecting PLT Activities

After you have considered your audience, you are ready to select PLT activities to present. Do this while you are planning the agenda (see Planning the Agenda, page II-**x**) so that you get an idea of how much time you will have for modeling activities. Keep in mind, however, that a six-hour workshop typically includes participants' experiencing a minimum of *five* PLT activities in order to get a good sense of the nature of those activities.

The PLT activities you choose for the workshop should depend on the goals of your workshop, the interest areas of the participants, the time and space available, and your own personal preference. For a diverse group of educators select activities that reflect the interdisciplinary nature of the materials, their usefulness in many subject areas and at all grade levels, and, if possible, the range of concepts addressed by PLT. If you know that your audience has a special area of interest, select activities to meet their needs. If the workshop focuses on a particular theme, choose activities that tie in with that theme.

Select activities that involve a variety of learning strategies, for example, creative writing, simulation games, drawing, outdoor investigations, and mathematics. You might also want to select activities that demonstrate PLT's ability to help students move from awareness of environmental issues to action.

Give participants an opportunity to participate in action-oriented activities, as well as a chance to sit periodically during other activities. By providing this variety, you give participants a nice sampling of the activities in the guides, and create a more enjoyable and well-rounded workshop. Also allow for a mix of indoor and outdoor settings, weather permitting. Educators can see first-hand how flexible PLT is and they get a chance to enjoy the outdoors, too.

In general, plan to include activities *you* find exciting — your enthusiasm and excitement will be contagious. Many facilitators are more comfortable using PLT activities they have experienced themselves or have done with students. Trying out an activity before the workshop will help you in several ways: you will know first-hand how the activity works; you may develop interesting extensions or

variations or locate valuable resource materials you can share; and you can bring in student work to demonstrate the activity's effectiveness.

Feel free to modify any of the PLT activities with your own ideas and adaptations to fit local issues or interests, the time and space available for the workshop, and your own leadership style. Through your variations, you will be emphasizing an important idea: the PLT activities are useable as written, and they can also serve as points of departure for new explorations. It is also helpful to point out that the activities use materials that can easily be found in the home or school. Clearly convey this flexibility during your presentations.

If you plan to have the workshop participants present activities to each other, keep in mind that they will also be selecting some activities during the workshop. You might lead participants through a few activities, then form small groups in which participants select, prepare, and present an activity. One approach to doing this is to have three or four activities on a list that all relate to the same topic. Groups select one of these to present, but they gain the experience of looking at two or three more activities than they would have otherwise seen.

To tie-in with current practices of teaching conceptual learning, you may want to plan your workshops in a way that will show how PLT does this. For example, use a storyline to connect the activities you choose to demonstrate. These activities can be built around one of the PLT themes, or focus on a special interest in your community.

Planning the Agenda

After you have considered your audience and have begun selecting activities to present, you are ready to plan the workshop agenda. The following sections and the "Agenda Highlights" on page III-xx will give you some ideas about elements to include. Also look at the sample agendas in Appendix D for approximate times to allow. PLT workshops should follow these steps to lead the workshop participant from 1) an *awareness* of PLT, 2) to *knowledge* on the specifics of the PLT program, 3) to an opportunity to *challenge* the ideas and/or come to *consensus* on the new ideas, 4) then finally to *action* -- to use PLT materials in their teaching! (See the "Workshop Design" section on page I-x for more information.)

The most critical elements when planning an agenda are:

- Welcome, Agenda overview, Workshop goals
- Getting Acquainted
- History of PLT
- PLT Activities experienced by participants (minimum of 5)
- “Hike Through the PLT Guide”
- Other Resources
- Individual Classroom Planning
- Discussion of how to tie PLT into a variety of subjects and standards for classroom teachers
- Workshop Endings
- Evaluation, Certificates, and Feedback

Planning and Presentation of Agenda Items

Following are things to consider when planning each of the above workshop elements.

Welcome, Agenda overview, and Workshop goals. Plan how you will welcome the participants, introduce yourself and other presenters, and give a brief overview of the agenda. No matter how clearly you have stated the workshop purposes and time frame in your pre-workshop publicity, it is a good idea to restate them when you begin the workshop. People feel more comfortable if they know what to expect — and when.

Next, you may want to state the objectives for the workshop, then ask participants to briefly write their individual and professional goals for being there. This should be something that they keep to themselves. Later in the workshop, take a moment to check in with them -- how are they coming along in meeting their goals? You may also want to add that while it is the facilitator’s responsibility to meet the goals of the workshop, it is the participants’ responsibility to make sure that they leave the workshop having met their own goals.

Getting Acquainted. Plan how you will have participants introduce themselves. They are coming together for the workshop as learners and, especially if they do not know each other beforehand, the learning environment can be enhanced by creating a friendly and informal atmosphere at the beginning of the workshop. Nametags are very helpful here! If appropriate, you may do a quick needs assessment to pinpoint the specific needs and expectations of each participant. For example, each participant might say, “My name is _____, I teach at _____, and I am particularly interested in _____ about

PLT.” If you would prefer something lighter, you might plan an icebreaker activity. For sample icebreakers that are adapted from the PLT activities, see page VI-xx.

PLT History. The PLT organization is proud of its beginnings and feels that explaining those beginnings to educators helps give them a better understanding of PLT's goals and purposes.

The history should include:

- when, why and by whom the idea for PLT was initiated
- an explanation of PLT's co-sponsors, CEE and AFF -- who they are and their role in the PLT program
- how the PLT texts were developed and evaluated
- how PLT is adopted by states and foreign nations on a volunteer basis and statistics on how many states and countries are currently involved
- a mention of PLT's national associate sponsors
- a mention of the awards PLT has received
- PLT's history within your own state -- how long has it been there, who are its sponsors, etc.

All the information you need to present PLT's history is provided on Page I-x. See Appendix x for sample overheads to explain the history.

PLT Activities Presented by You. Plan how you will present each activity. If you have invited a resource specialist, consider asking that person to lead appropriate activities (see page II-xx, Inviting a Resource Specialist).

Plan to present PLT activities in a way that engages the participants as learners first, then allows them to reflect on the activities from their perspective as educators (see “Adults as Learners” on page III-xx.) To help participants reflect on the activity, you should have a quick debriefing after each activity. ***Debriefing is often the most important part of leading an activity. For debriefing, you might invite participants to share:***

- **what they learned through the experience;**
- **what they would like their students to learn;**
- **how they might adapt the activity to fit the needs of their students (for example, to fit a particular grade level or to accommodate students with special needs) or curriculum;**
- **ways that the activity could be enriched or extended**

- **any classroom management ideas or other suggestions they might have.**

Depending on your audience, you should have them share in small groups or in the group as a whole. You might also consider modeling the learning cycle in your activity presentation and debriefing. For more ideas on how to do this, see “The Learning Cycle,” on page III-xx.

“Hike Through the PLT Guide.” Plan how you will help participants become familiar with the contents of the activity guide. You may choose to conduct a walk-through using questions in a competition between small groups or in a “Jeopardy” game format. Or, you might prefer to lead the whole group through the guide pointing out important elements along the way. See Appendix F for Sample “Hike” ideas. Another option here is to use an activity that has already been presented as a reference point for your hike.

Other Resources. Consider how you will introduce participants to books, materials, or local resources that can supplement the PLT activities. You could display books and materials at a resource center throughout the day. For resources such as parks, arboretums, nature centers, museums, local conservation groups, you might make a “resource list” chart that participants add to throughout the day — then copy and send the ideas to participants afterwards. If your workshop is held at a park or nature center, consider having a staff member welcome the group and take a few minutes to discuss the setting, what offerings may be available to school groups, and other resources they may have available for educators.

Individual Classroom Planning. One of the initial questions participants are most likely to ask when they attend the workshop is “How can I use PLT in my classroom (or other setting)?” Individual classroom planning is an important component to include. Once your workshop participants have become familiar with PLT and some of the activities, they need time to directly connect these new materials to the needs of their students and to their own teaching goals.

Plan adequate time for this component, even if you have to shorten something else. You might lead a brainstorming session and ask everyone to share their ideas. Another approach would be to have participants form groups and devise plans for implementing PLT in their classrooms, and then come together for discussion with the whole group at the end. Clustering participants by grades or subject

areas is often helpful here. You might also consider asking them to select lessons that they might use in the next week, month, or school term. This helps to emphasize the point that PLT is not “something extra” for them to do, but actually can help participants teach what they already have to teach.

Participants might also work independently to prepare specific plans for using PLT in their everyday teaching. If you want to include this individual planning, you might ask participants in advance to bring textbooks and lesson plans to the workshop. This works particularly well in a school or in-service setting. Also, make a copy of the PLT Curriculum Planning Worksheet handout on page III-**xx** for each participant.

School or District Curriculum Integration.

Coordinators have discovered that teachers trained through PLT workshops have consistently used the activities they participated in while attending the workshop. This speaks highly of those facilitating the workshops, but also creates potential repetition for students if multiple teachers representing different grade levels from the same school choose to attend a similar workshop. Students might inadvertently repeat and activity in successive years.

The opportunity to partner with a team of teachers from a school or district across grade levels provides unique advantages to “integrating” PLT Activities as part of the adopted curriculum. By using activities as part of an overall plan for integration of the environment in to all subject areas, students have access to a more coherent learning experience. For more information about one process for integration, an environmental curriculum inventory worksheet and essential question planner, refer to pages III-**xx-xx**.

Workshop Endings. Workshop endings are just as important as workshop beginnings. The emphasis here is less on fun, more on developing a renewed spirit of responsibility toward the environment. Some suggestions for “wrap-ups” include:

A group reading. Ask educators to form a circle then have each person read a line or two from a passage that reflects an attitude about the environment, self-worth, being a part of a larger picture, etc.

A Web of Life. PLT activity #45, this activity brings home the point that we are all connected.

Memory Circle is also a good way to end a workshop. Get participants to share something they learned or experienced at the workshop. If you present certificates to show completion of PLT training, incorporate their distribution into the circle activity by asking educators to present the certificate to each other with a few complimentary words.

Use your imagination!

Evaluation, Certificates, and Feedback. Plan time for each participant to complete a Participant Survey Form at the end of the workshop. It is very important that the evaluation forms are turned in since this is how PLT trained educators are added to the national PLT database and how State Coordinators keep track of trained teachers. Once participants have turned in their evaluation forms, you may want to give them a certificate of completion (see Appendix C for a sample). You might also allow time for verbal feedback and suggestions for improving future workshops. Finally, it is a good idea to let participants know how they can encourage other teachers and administrators to get involved with PLT.

Arranging the Agenda Items

Once you have thought about how you will present the different workshop elements, you will need to decide how much time to allow for each element and on the order of the elements. An agenda planning sheet like the sample on page III-xx may be helpful to you.

When planning the agenda, remember that the pacing of workshop activities is important. Offering a variety of activities will help participants stay interested in the materials and ideas you present. Keep in mind that certain modes work better at certain times of the day. For example, after lunch — when many of us tend to get sleepy — you might consider physical movement or visual activities that can be more stimulating than making lists or watching a video. It is important to also think about ways to make the activities you plan to use accessible to all of your workshop participants. If possible, try to include some “alone time,” when individuals can reflect on the ideas or events of the workshop, as well as small group time, when they can share ideas with each other.

Be sure to include time for breaks. Short, frequent breaks can do wonders for reviving everyone's energy levels.

Involving a Resource Specialist

If your state does not train resource specialists as PLT facilitators, you may consider inviting a resource specialist — someone involved in the field of resource management or conservation — to the workshop you are planning. Resource professionals include individuals with expertise in such areas as forestry, air quality, solid waste management, soil science, risk, or wetlands. This person can work with teachers on the activities you lead, help with specific content information, or provide technical assistance in hands-on activities. The resource specialist may also be able to supply workshop materials and equipment, supplemental handouts and other resources, and may be able to provide follow up to teachers as a classroom speaker.

Adding a resource specialist to your workshop can complement your expertise and provide participants with two perspectives during one workshop. Meeting and working with a resource specialist can also give participants a local resource contact who may help them plan classroom visits or identify field trip sites, resources for borrowing equipment or tools, and sources for materials like tree cookies or water test kits.

Once you have identified a resource specialist, clarify your expectations for his or her involvement in the workshop. Help the specialist understand that the objective of the workshop is to help educators feel confident in using PLT with their students, so they must not be overwhelmed by the activities or information presented. Encourage them to invite questions and regularly check for understanding with the workshop participants. Send the specialist a copy of the workshop agenda and review the specialist's roles during different times. For example, discuss whether the specialist will participate with educators in a particular activity or whether he or she will provide expert commentary to introduce the activity.

Again, the value of having a resource professional share facilitating responsibilities with an education professional cannot be understated. The synergy created two such facilitators who work well together makes for an excellent workshop experience!

Planning for Food and Beverages

Snacks and beverages will help participants feel comfortable and welcome. Find out ahead of time whether the sponsoring organization will provide snacks and beverages or whether you will be responsible. Remember to provide a choice of beverages and food to accommodate different dietary requirements. Also find out whether the workshop site has equipment for serving food and beverages such as a hot water pot, cups, spoons, or serving trays. If not, you may need to make arrangements for these items.

If the workshop will be an all-day session, you should also consider how much time to allow for the lunch break. If there are restaurants nearby, you will need to allow enough time for participants to get there and back. In this case, it is helpful to have a list of nearby restaurants and take out options available for review – and even better if the list has directions and sample menus. If there are no restaurants nearby, ask participants to bring a bag lunch or consider providing a simple catered lunch or buying groceries for a sandwich, fruit, and cookie smorgasbord. Whatever you decide for lunch, be sure to allow the time needed for the type of lunch you plan. In addition, remember that participants will need to know what to expect ***ahead of time***.

Gathering Equipment and Materials

Well before the workshop date, carefully plan what materials and equipment you will need for your workshop. Decide what you will need to present each agenda item and what participants will need. Find out what equipment is available at the workshop site and how you can reserve the equipment you need. You can also ask participants to bring some items for the workshop – everything from “lug a mug” to save on dishes and waste, to food for a group snack, to scrap paper, old magazines and newspapers if you expect to use those.

Materials from the State Coordinator

At least four to six weeks before your workshop, send a completed workshop proposal form (see page VI-**x**) to the State Coordinator. The coordinator will send you the following materials:

- PLT activity guides.
- PLT Participant Survey Forms (see page VI-**x**). During the workshop wrap-up, participants *must* complete this form. Survey responses are used to measure progress toward the statewide implementation goal and to add participants to the mailing list so they will receive the *Branch* newsletter. Return the forms to the State Coordinator as soon after the workshop as possible.
- PLT Facilitator Survey Form (see page VI-**x**). This form summarizes some pertinent facts about your workshop. Return it to the State Coordinator as soon as possible after your workshop.
- PLT certificates.
- Copies of the most recent issue of the national PLT newsletter, the *Branch* (if available).
- Other supplementary materials on hand.

Other Materials

In addition to the materials the State Coordinator will send, you may want to bring the following supplies as well as any other props for specific activities you are planning. If you conduct workshops often, you may wish to keep a workshop box full of miscellaneous items such as these:

- Masking tape
- Non-permanent marking pens, different sizes and colors
- Pens or pencils
- Scissors
- Name tags
- Paper clips, rubber bands, rulers, string or yarn, ziploc bags
- Supplies and props needed for specific activities such as blank paper, index cards, crayons, or instructions
- Resource materials for participants to peruse, including children's literature that supplements PLT activities and related environmental education curricula and guides
- Flip chart and easel
- Slide projector and screen, or any other audio-visual equipment needed, including extra light bulbs and an extension cord
- Computer and LCD projector
- Receipt book for workshop payments

Consider the group size when you choose audio-visual equipment. A video player and monitor work well in small groups, while a film projector is better suited for large groups. See “Visual Aides Compared” on page III-xx for more information on choosing visual aide media.

Preparing Necessary Visuals

Think about any visuals you will need, such as flip charts or overhead sheets, and prepare them before the workshop. Develop a written agenda and write it on a flip chart and/or reproduce copies for all workshop participants. Power point presentations may also be an effective way to provide visual aids throughout the training.

III. Supplemental Workshop Information

Workshop Tips

Circles, Not Squares - Whenever possible, arrange chairs (not desks) in a semi-circle. While we know people might be more comfortable behind a table where they can prop their elbows and have something to lean on, the semi-circle arrangement facilitates participation, which is all-important in the workshop. It also allows everyone to see everyone else's face and name tag. Everyone can hear better what others are saying. No one is looking at the back of someone else's head. Remember that we all learn from each other in a workshop, so it is important that all participants can see and hear everything that is going on.

Murphy's Law - Be prepared for the unexpected. For example, if you have chosen outside activities, be prepared to do them inside if it rains, or have an alternate activity prepared. You can never outguess what might happen, but if you have prepared carefully and stay flexible during your workshop, you can deal with whatever comes up.

Numbers - In general, you should require a minimum of 12 - 15 attendees for a PLT workshop. Because our activities are done in groups, it is difficult to do activities successfully for 10 or fewer people. A maximum of 35-40 attendees is the most you should try to handle. (If you get more than that, break them up into two groups and run two simultaneous workshops.) A good rule of thumb is to use one facilitator for every ten attendees.

Pack Your Own Bags - When you are putting your workshop equipment and supplies together, be sure to pack it yourself so you will know where everything is. Use a checklist! It's a good idea to put all your papers and workshop "goodies" out on a table when you first arrive. When you need them, they are right at your fingertips and you don't waste time or appear unprepared by searching through boxes. Another strategy is to pack everything you need for an activity in one container. Plastic storage bins are great for storing and keeping materials together from workshop to workshop.

PLT Partners - Never try to do a PLT workshop alone. First of all, what if you get sick or an emergency situation occurs? You lose the workshop, and will probably never be able to get it rescheduled. Second, the standard for PLT workshops is that each workshop have at least one resource person and one educator as facilitators. Third, it is simply better for your attendees if there is a variety in styles, voice levels, and personality in the facilitators.

The Spice of Life - Arrange your workshop agenda so the active parts are interspersed with the "sitting and listening" parts. Also, be sure to select activities that reflect a variety of learning styles. Change facilitators from section to section to provide even more variety. If you have a partner or team with whom you frequently do workshops together, change roles from workshop to workshop so that each of you learns each part, and you don't get stale.

Don't Preach to "Teach" - Always treat your participants like the adults and professionals they are. Never attempt to tell them how or what to teach! Let them make their own judgements about PLT. Urge them to think about how they might use PLT in the context of what they teach.

Be Not Afraid - At the same time, there is no need to be afraid to work with educators. Your job is to provide them with a valuable resource, and to demonstrate its use.

Name Tags - Use 'em - Name tags are very important. Even if you are doing a workshop with teachers who all know each other, do you also know everyone? If you don't, you may find yourself pointing at people rather than using their names. Name tags can be of any variety, but should be large enough to read from the front of the room. First names are all that is necessary. It is best to have name tags made up ahead of time, but if this isn't possible, assign one person to make them so they are uniform and easily legible. If you ask people to make their own name tags, there will inevitably be some who write a tiny little name in the corner of the tag! Tree cookies are a great name tag idea.

Talk Out, Not down - Use common, everyday language that everyone will understand. If you're a forester, don't use forestry jargon unless you explain what you're saying. Use everyday names for trees. You don't impress anyone with your knowledge if they don't

know what you're talking about. Remember that you are dealing with educators. Watch your grammar and your spelling!

Can the Commercials - When you conduct a PLT workshop, your only job is to train the educators in using PLT. Do not use the opportunity to try to influence your audience about forest management practices, your employer, or your own personal agenda. Introduce yourself and your professional affiliation and let that be it. The fact that you are there, and your employer allowed you to be there, speaks for itself. If you do attempt to influence the opinions of your audience, it will backfire on you every time.

Teacher's Pets - Don't hone in on one or two participants because you are drawn to their personalities. Treat everyone equally. Don't pick on participants either, not even in fun.

Sex - Now that I have your attention ... There is no place in a PLT workshop for any vestige of sexism or racism! Ever! Do not make remarks about anyone's sex, color or religion. Do not refer to teachers in general as female. Do not make off-color remarks, even in jest. Do not use expletives. PERIOD.

Wrap Up, Wrap Up, Wrap Up! - After an activity has been done in a workshop, if you just end it without an appropriate wrap up, you haven't done your job. The wrap-up should include questions about what subjects the activity could be used in (ask, don't just tell them) and ask for volunteers to tell how they might use it in the context of what they teach. Also ask for ideas for extensions or variations. The purpose of the wrap-up is to get your audience to think about their own use of the activity. To just stand there and say, "Can you use this activity?" or "Did you like this activity?" is not an appropriate wrap-up. Remember the key is to have everyone learning from everyone else.

Questions? - Create an open atmosphere right from the start. Ask them to stop you any time they have questions. Be sure to answer all questions, even if the answer is "I don't know." (It usually won't be, in this setting.) You can eliminate many questions by briefly going over your agenda at the beginning of the workshop. Tell them what they can expect of the day. If a question is: "I have to leave right after lunch. Can I have the Guide before I go." The answer is no. They will have to make up the portion of the workshop they missed.

The Eyes Have it - Use good eye contact when facilitating. This makes you more personable, and helps prevent nervousness on your part. It allows you to read the body language of your audience. Are they yawning? They may be bored, or they may just be too warm. Are their arms crossed over their chests? They may be antagonistic, or they may just be cold! Watch the room temperature and watch the people temperature! If they are getting restless, change the pace.

Evaluations - When you pass out the evaluation forms, be sure to tell them that the evaluations are important both on state and national levels. They can omit their names if they wish, but they won't receive the newsletter, *The Branch*, unless we have a name and mailing address. Ask them to be honest in their assessment of the workshop, as we learn from their responses.

To Thine Own Self Be True - Be yourself. Don't try to adopt a workshop persona or mimic someone else's style. Use your own style and be comfortable with who you are.

Have Fun! – If you do, they will – and if you don't, they won't.

Hike through the guide "at-a-glance"

Tape, clip, or staple this to the back cover of the guide book to help you remember what to cover during the Hike Through the Guide...

HIKE THROUGH THE GUIDE TOPICS

COPYRIGHT

INTRODUCTORY PAGES

opening remarks
activity components
story lines (PreK-8)
acknowledgements

ACTIVITIES

overview/background information
getting ready
sidebar
end notes: assessment, related activities, references

REFERENCE PAGES

glossary
conceptual framework
appendices
additional resources
bibliography
indices: alphabetical, topic, grade, subject, time and skills (PreK-8)

Co-Facilitating Worksheet

As you begin to plan a workshop with a co-facilitator, think about questions such as these and share them with each other to help you clarify your roles.

Which parts of the workshop would you like to be responsible for? Which parts would you like your co-facilitator to handle?

What elements would you really like to include in the workshop because they are important to you, because they worked well in other workshops, or for another reason?

What signal could you use for interrupting when the other person is presenting?

How will you handle staying on task?

For each portion of the workshop, how will you field participant questions?

How will you make transitions between each of your presentations?

How will you get participants back from breaks in a timely manner?

Who will handle the creation and production of the agenda?

How will you manage the set up and clean up process?

Who will be responsible for collecting materials?

Helpful Hints for Making Fliers

General Rules:

Define the audience and make sure the flier is geared to that audience.

Keep the flier simple. Give just the information needed and avoid distractions.

Make sure the style of the flier and the information given are consistent.

Add a "Please Post" notice if you want the flier posted.

Things to think about when making a flier:

Who is the audience? What do they need to know?

What kind of heading will you use? How will it "catch the eye" and be recognized?

How will you inform? What is the right amount of information?

Be sure to include WHO to contact, WHAT to bring or expect (including lunch arrangements, dress for the day, etc.), WHEN to come, WHERE the workshop is to be held, and HOW to get there.

How can you group your information into chunks that inform and can be distributed nicely throughout the flier?

How do you want your audience to respond?

How will you format your flier? A symmetrical format is "calm" whereas an asymmetrical format communicates "action."

What typefaces will you use? Never use more than three different typefaces per piece — too many typefaces will look disorganized.

What art can you include? PLT logos are certainly good, and you can use "clip art" — non-copyrighted art available at art supply and book stores for cut and paste. Don't use others' art without permission.

Adults as Learners

One of the goals of PLT workshops is to help educators learn new ways of approaching their teaching tasks. Adults as learners are different than children as learners. The following characteristics of adult learners may help you plan and present your workshops.

Orientation to Learning

Adults will commit to learning something when they consider the goals and objectives of the workshop to be important to them — that is, job-related and perceived as being immediately useful. Adults want to initiate their own learning and be involved in selecting objectives, content, and assessment.

What you can do: State workshop goals early in the schedule and add participant goals not listed. Be prepared to help participants see the need for learning something new. Encourage and nurture the seeds of understanding and change. Assume that each person wants to understand or learn. When possible, try to customize the workshop to meet the needs of your audience.

The Learner's Self-Concept

Adult learning is ego-involved. Learning a new skill, technique, or concept may promote a positive or negative view of self. Adults may fear that others will judge them, which produces anxiety during new learning situations. Adults reject prescriptions by others for their learning, especially when what is prescribed is viewed as an attack on what they are presently doing.

What you can do: Provide an environment in which the participants feel safe to try something new or to consider new ideas. Never criticize participants, but be positive and affirm each person in some way. Admit your own short-comings and limitations to avoid projecting the image of "expert".

The Role of the Learner's Experience

Adults come to any learning experience with a wide range of previous experiences, knowledge, skills, self-direction, interests, and competencies. This means that the richest resource for learning is often the group of adult learners themselves.

Adults will resist learning situations they believe are an attack on their competence, thus they may resist imposed workshop topics and activities.

What you can do: Accept and value participants as individuals with their own experiences, knowledge, and skills. Provide ways for participants to contribute to each other's learning through techniques like group discussion, problem-solving, and peer-helping activities.

Motivation

Motivation is produced by the adult learner: all one can do is encourage and create conditions that will nurture what already exists in the adult.

Adult learning is enhanced by behaviors that demonstrate respect, trust, and concern for the learner.

What you can do: Show participants that you respect, trust, and are concerned for them. Do not blame participants who do not pay attention or are reluctant to participate, instead look for ways to adjust the workshop to increase interest. Consider questions like, "How would you do this in your setting? What would you see as some of the challenges of this activity? How would you overcome them?". Questions that acknowledge that each person comes with their own set of experiences and expertise help to value every workshop participant.

Resources:

Knowles, Malcom. *The Adult Learner: A Neglected Species*, 3rd ed. Houston: Gulf Publishing Co. 1984.

Sergiovanni, Thomas J. "Human Resources Supervision." *Professional Supervision for Professional Teachers*. Washington, D.C.: Association for Supervision and Curriculum Development, 1975.

Withail, John, and Wood, Fred H. "Taking the Threat Out of Classroom Observation and Feedback." *Journal of Teacher Education* (30), January-February 1979, pp. 55-58.

Agenda Highlights

Activity	Approximate Time
1. Welcome, introduce presenters, and give brief overview of the agenda and workshop goals.	10 minutes
2. Getting Acquainted Participants introduce selves and why interested in PLT Conduct icebreaker	20 minutes
3. Briefly discuss how PLT meets their needs (see the box "What Does PLT Offer Teachers and Students?" on page I-8).	15 minutes
4. Lead selected activities from PLT guide: Note match to local objectives, or ask participants to comment on this Ask how participants might adapt activity to meet needs Do one or two activities now and others later in workshop	2 hours
5. Distribute PLT guide.	5 minutes
6. "Hike" through the PLT guide: Point out themes Note activity components Demonstrate cross-referencing	15 minutes
7. Discuss other resources: Local parks, arboretums, conservation groups, etc. Reference books and children's literature	20 minutes
8. Small groups select and lead PLT activities (or facilitator leads additional activities).	1½ hours
9. Individual Classroom Planning: "How can I use PLT in my classroom?" Discussion format or individual planning sheets	45 minutes
10. Wrap-up Evaluation: Have participants complete Survey Form Hand out certificates of completion Feedback: Were needs met? Thank you to participants and follow up	20 minutes

PLT Curriculum Planning Worksheet

Name _____

Grade/Subject(s) taught _____

PLT was designed to provide students with concepts, skills, and attitudes in environmental education. Students learn these things best when PLT activities are integrated with the ongoing curriculum, rather than taught as isolated activities. This worksheet is designed to help you think about how you will apply PLT to your existing curriculum.

1. The unit in which I could begin integrating PLT activities is:

2. List the skills or concepts you would like your class to learn from this unit. Then, for each skill or concept listed, select several appropriate PLT activities.

Skills/Concepts	PLT Activities

School or District Curriculum Integration

In one school on the west coast, a new student from the east coast explained how grateful he was to be studying salmon after years of repeatedly studying a particular east coast tribe several years in a row. The response of the students from the west coast was less than enthusiastic as they explained that this was the third year in a row one teacher at the school decided to use a salmon theme.

Trusting to constructivist theory, repeating activities at successive grade level ensures deeper understanding, But, as noted in the students' experience above, repetition, especially inadvertent repetition, can fade student's interest in learning. Had the students' teachers intentionally constructed various aspects of their salmon or cultural unit together, they might have been more able to keep students' attention and deepen their understanding

Curriculum developers agree that the most important part of the integration process is selecting an "**essential question.**" The essential question is used as a filter through which every lesson passes. It leads students towards success in creating a final project that shows evidence of their understanding by defining what needs to be known. Essential questions are based on timeless concepts so teachers and students naturally cross disciplines in discovering possible answers. They are open-ended questions that have more than one way of being answered. A healthy process for crafting essential questions gives teachers the chance to use their best teaching expertise and understanding of child development. The question facilitators often pose to teachers at workshops is:

How can our schoolyard be used as a study site so students gain knowledge and skill that will allow them to demonstrate their understanding of the environment?

Challenging teachers to use the schoolyard to develop essential questions (or informal educators to use themes) provide the group with a common task as they define a continuous curriculum for their school or environmental center.

(With regards to non-formal educators, their professional training has often presented the idea of the "essential question" in terms of "thematic interpretation." Interpretive Naturalists develop talks based on themes that are designed to connect visitors of all ages to the area of interest. The theme essentially provides a context through which

the audience can associate various, fact, stories and observations. They are broad overarching statements which provide visitors with a connection or "sense of place" as they explore a natural area, monument, museum, etc.)

Here is an example of a process used with a cross grade level group at one school during a 6-hour PLT workshop. An hour was spent in the morning asking teachers to place as much relevant information as they could into the Inventory Matrix noting environment-related units and activities (particularly PLT Activities). Once completed, teachers shared their ideas beginning with kindergarten and advancing through 8th grade. The advantages of this kind of discussion include providing teachers with an opportunity to:

- ❑ See what teachers at other grade level are, or will be, teaching the same students with whom they work
- ❑ Recognize possible connections between each others units
- ❑ Prevent duplication of concepts and assignments at different grade levels
- ❑ Recognize background information and experiences students are bringing to their grade level

Another hour was set aside in the afternoon to develop essential questions, suggest a performance task and select activities that would provide students with experiences to help them be successful in completing the performance task. (See Essential Question Matrix)

For example, a teacher using a human body unit selected the concept of growth. Growth easily became the timeless concept for the essential questions, "How does the diet of a tree effect its growth and what kind of "healthy tree snacks" could students provide to help care for new trees planted at the school?'

The essential question explained the student would need to know about nutrients, sunlight, water and the process used by the tree to make food as well as how they would need to use that information to care for newly planted trees. Students learn a healthy diet for tree alongside their human nutrition unit. This kind of connection allows students to attach new information about tree health to what they are learning about their own health!

The essential question by definition points teachers towards the background knowledge (what the students need to know) and the performance task (what students need to be able to do with that

knowledge.) By using the essential question as a filter through which activities are selected, the activities selected for students become a reflection of the teachers' curriculum rather than an "extra" activity. Somewhere between 5-7 PLT activities usually provides enough background informant and hands on experience for students to successfully complete the task. Since students are aware of what they need to know, and be able to do from the essential question before completing the activities, the activities are more relevant, the connections between them more obvious, and the reason they are doing them is more clear. The index on page 388 -394 can be used to find activities that teacher related concepts as well.

The resulting overlap of activities provides an opportunity for teachers to explain their intentions in more detail and reach agreement about which activities they will use or how they might teach them in more depth so students' interest remains high.

When PLT Activities are selected around shared essential questions, teachers are encouraged to reflect on the students' entire learning experience at that school. It becomes clear what students will accomplish at each grade level, what they have to look forward to completing and how they can communicate their understanding to audiences who appreciate the real work they are doing with PLT.

As a student reflects over their elementary, middle or high school experience, they begin to recognize that teachers intentionally provided opportunities for them to gain knowledge and apply their skills using the environment in a variety of ways.

The student in the opening story might have explained,

"At this school, we study the environment in every grade. In kindergarten, we make bug collections and do experiments. In first grade, we looked at the wetlands behind our school and made graphs of the types of organisms we found in the fall, winter and spring. Here's the tree that I planted in 2rd grade. To be healthy, it needs, nutrients, sunlight and water. Last year, our class made models of watersheds for the fall open house. The tree roots in mine held the soil together! I have the new teacher this year so I am not sure what we will do. I hope it will be outdoors near the creek. In 6th grade, we get to write and perform a play about the forest floor. The mural from last year's play is on the wall. In middle school, we will get to make a video about the forest behind our school and share with students on a field trip from the city just like last year. I can hardly wait! "

The Learning Cycle

Learning is a cyclical process that builds on the learner's previous experiences and knowledge. By paying attention to the following phases of the learning cycle, you can help participants maximize their own learning, and in turn, the learning of their students.

Experiencing. The learning process usually starts with experiencing. The learner becomes involved in an activity by doing, observing, or saying something.

Processing. The processing phase involves learners in thinking about and sharing what happened. Learners first share their reactions, and then discuss and evaluate their reactions with others. Questions to help processing include: What was ___ like for you? What were your reactions to ___? How did others react to ___? What do you think the consequences of ___ were?

Generalizing. In this phase learners explore what they learned from the experience. They may also try to abstract generalizations from it. Questions to help generalizing include: What did you learn from this? How does this relate to other experiences? What was the most enlightening part? What would you do if you could do it again?

Applying. Building on the knowledge they have gained, learners in this phase confer personal meaning into the abstracted learning. Questions to help applying include: How could you apply or transfer that? How could you repeat this again? How will you use this activity when you get back to the classroom?

Visual Aides Compared

Item	Advantages	Disadvantages	Tips for Use
<i>Flip Charts</i>	Can store and use repeatedly Can use for display after presentation Can be prepared ahead	Bulky and awkward to handle Not legible for very large groups Time consuming to produce Paper can rattle, crease, rip, or smudge	Make charts simple to read and understand. Have them in correct order and set up ahead of time. Keep the number of charts to a minimum. Write information reminders or key points lightly in pencil on the chart. During the session you will be able to read these, but they won't be visible to participants. Cut pieces of masking tape beforehand for taping charts to walls.
Hand-outs	Good for reinforcement and review Good for presenting ideas for discussion Can eliminate necessity to take notes You can copy and use them again	Must prepare in advance Distribution can be distracting	Design handout clearly to promote understanding. Number the handouts beforehand, in case you want to refer back to a particular handout.
<i>Videos</i>	Compel attention, making presentation dramatic Room need not be darkened, permits note-taking	Don't work well with large groups	Set up beforehand and check machine operation. Brief participants — give them something to watch for. Preview thoroughly.
Over-head projector	Can use under normal lighting Can maintain eye contact Materials are easily prepared	Requires practice Facilitator may have difficulty seeing the projected image.	Set up equipment beforehand and check. Practice using overhead: Don't stand in front of image, don't look behind you at screen, and don't move the transparency.
Chalk-board	Familiar and convenient Allows spontaneity	Lettering may be hard to read Can lose eye contact when writing on board Bad for large groups Chalk dust is dirty	Plan use of space in advance — especially if you have drawings or charts. Write heavy and large. Use colors, if possible. Try writing some things on the board ahead of time, and covering until use. Keep the group talking while using — ask follow-up questions.
Computer/ LCD projector	Allows easy transfer of electronic documents	Technological expertise required Expensive	Set and practice the presentation ahead of time.

IV. Workshop Tasks

When you have finished planning and preparing for the workshop, you can focus your attention on setting up and conducting the workshop. When the workshop is over, do not forget a few essential post-workshop tasks that will need to be completed. These tasks are described below.

Setting Up

Allow yourself at least 60 to 90 minutes to set up the workshop space. If possible, you may want to set up the night before the workshop. By setting things up in advance, you will be more at ease.

If you are not already familiar with the workshop site, locate restrooms, the quickest or easiest way outside (for outdoor activities), and light switches and plugs for audio-visual presentations. If you will be using any audio-visual equipment, test and set it up in advance.

Remember, the arrangement of tables and chairs can help or hinder your workshop. Arrange the room in a way you feel will best accommodate your workshop goals. For example, if you will be presenting both small group and large group activities, arrange tables and chairs to promote small group activities and enable participants to get up and move around in larger groups. If it is a smaller group, a circle of chairs may be most appropriate. When possible, try to avoid the traditional "row of desks" arrangement!

Set up the materials you will be using so they will be easily accessible when you need them. You might want to establish one table as your "home base" and place on it the items you will need during the workshop such as handouts and materials for the PLT activities you will lead. It is a good idea to mark your resource materials as "PLT Property" or participants may assume them to be there for the taking! Consider setting up a separate table for resources which can be freely taken by participants.

Set up a table near the entrance with a sign-in sheet, name tags, and pens. If you like, make a sign that asks participants to make name tags for themselves and to print their names on the sign-in sheet as they would like them to appear on their PLT certificates. You may want to set up a separate table to display materials such as children's books

about trees and forests, sample student projects for specific PLT activities and other teacher resources.

Post the workshop agenda where everyone can see it or have copies available for each participant on the sign-in table. If beverages or snacks will be provided, set up a convenient, but separate snack area.

Conducting the Workshop

If possible, allow time before the workshop to greet individuals attending the workshop. This will help participants feel welcome and will also help you feel more at ease with the group as a whole, especially if you do not already know the workshop participants.

Begin and end the workshop on time to be fair to those who come on time. Throughout the workshop, keep in mind the checklist of facilitator skills (described in Appendix A). Keep an eye on the pacing of activities and when participants need a break or a change of pace.

For one-day workshops, some facilitators like to fill in the PLT certificates during the lunch break so that they can distribute them at the end of the workshop.

Be sure to reserve time at the end of the workshop for participants to fill out the Participant Survey Forms. In exchange for the completed forms, participants may receive their PLT certificates.

Post-Workshop Tasks

When the workshop is over, pat yourself on the back! Then take time to do the following tasks.

Sending Forms to State Coordinator

As soon after the workshop as possible, complete the Facilitator Survey Form and mail it to the State Coordinator, along with the completed Participant Survey forms. Without these forms, the State Coordinator cannot place participants on the mailing list to receive future mailings or provide needed participant data to the national PLT office.

Evaluating the Workshop

Spend some time evaluating the workshop for yourself: What went well and what things would you like to improve for the next workshop? Jot down your thoughts, or use the Facilitator Skills Checklist on page V-1 for a guide. You will find these personal notes helpful to you when planning future workshops.

Participant Feedback

Read the participant survey forms to find out what went well and what did not go so well from their perspective. This information provides a way to gauge the program's strengths and weaknesses and start the process of making improvements.

Additional Follow-Up (Optional, but very desirable)

The extent of your post-workshop follow-up will depend on your available time and resources. If time permits, a thank you note to each participant along with a summary of key concepts and a list of names and addresses of the workshop participants is helpful. This helps participants begin their own local PLT network. If you did not distribute the certificates during the workshop, you may send them with a thank you note.

If participants will be receiving college, university, or district credit for attending your workshop, provide the follow-up needed to secure their credits.

Teachers and curriculum specialists may appreciate additional follow-up to determine the long-term effectiveness of their in-service training programs. A few weeks after the workshop, you may decide to telephone a few of the participants to see how they are doing with the activities. If appropriate, suggest that they contact other workshop participants to compare notes regarding effective ways of using PLT. You might send a brief follow-up questionnaire to some or all of your group at the end of the school year to see what overall success they have had with the activities. This can provide you with good justification for future workshops, and indicate where your workshop might benefit from changes and modifications.

V. Topics to Model and Discuss

In addition to introducing the PLT materials, your PLT workshop should be a vehicle for helping teachers learn new teaching strategies and techniques. If you like, or if you think your audience would be interested, you may decide to use one of the following topics as the focus of a particular workshop:

- Thinking Processes
- Cooperative Learning
- Learning Styles
- Multiple Intelligences
- Addressing Controversial Issues
- Leading Successful Outdoor Activities
- PLT and Education Reform

PLT and Thinking Processes*

PLT activities incorporate thinking processes in a variety of ways. Teachers participating in your workshop will appreciate your helping them to:

Be aware of thinking processes that are involved in PLT activities. Emphasis on thinking processes, as well as content, will help educators in PLT workshops to teach PLT concepts more effectively and provide the necessary rationale for using PLT in meeting district or school curriculum objectives.

Identify thinking processes specifically. Being specific about the processes involved in a particular activity will help teachers identify how it fits into their curriculum. For example, encourage teachers to recognize when students will *compare* renewable to nonrenewable resources, *relate* the presence of trees to local temperatures, or *predict* the effects of deforestation on soil erosion.

Recognize nonverbal evidence of thinking and problem solving. While evaluating or assessing learning is an important part of teaching, results of written products and tests dominate student records of achievement. Teachers need assistance in identifying ways to give credit for and to record nonverbal behaviors that indicate thinking and learning. When debriefing PLT activities during

the workshop, ask teachers to list nonverbal behaviors students might exhibit that would indicate their understanding and learning.

Recognize ways to adapt activities to various cognitive levels. Children progress through cognitive stages acquiring the specific thinking processes. They do not skip stages. An awareness of general age ranges and their corresponding expectations for thinking ability is useful in adapting activities to specific grades. Teachers appreciate help in analyzing parts of an activity for thinking process requirements as well as knowledge requirements. "What's going on in the students' head?" should be a frequent question for teachers to ask when familiarizing themselves with PLT activities.

Appreciate knowledge students bring with them to a learning situation and help construct or reconstruct knowledge through experiences. Teachers know that students do not come to an activity, lesson, or unit with a blank slate. Students have ideas, notions, and explanations for the world around them. These ideas work for them even though the interpretations may be alternative forms compared to those you accept as logical or true. Teachers appreciate your experiences and examples of typical "alternate understanding" that students may have about concepts or issues and will want to explore with you experiences that can be provided to students that allow them to construct or reconstruct their knowledge.

* Adapted from a handout prepared by Dr. Karen Reynolds, Department of Education, San Jose State University for the "Advanced Training for PLT Facilitators" workshop, January 1989.

For a list of thinking processes and skills, see the "Skills Index" in the back of PLT's PreK-8 Activity Guide.

Cooperative Learning

Cooperative learning is a model of instruction in which students work together in small groups to achieve a common learning goal. PLT activities can help a teacher implement cooperative learning because many of the lessons are designed to be conducted with cooperative groups. There are many different models of cooperative learning, and teachers should set up and use it in the way they feel most comfortable. However, teachers who use or are interested in using cooperative learning will appreciate your addressing the following in the workshop:

The cooperative learning potential of PLT activities. Whenever possible, model using cooperative learning in a particular lesson by setting it up for teachers to experience it that way during the workshop. After presenting each lesson (as cooperative learning or not), have teachers discuss how the lesson could be modified to better facilitate cooperative learning.

Grouping issues. In cooperative learning, the teacher must decide on how the groups will be formed, how large the groups should be and how long groups should stay together. For example, the groups may be randomly formed or assigned by the teacher, and groups may stay together for only one class period, or for six weeks. Model different ways of grouping in the workshop, then discuss the advantages and disadvantages of various ways of grouping, of group sizes, and of the group duration.

Structuring the learning task. For each PLT activity experienced in the workshop, help teachers identify how the learning task could be structured so that it is truly cooperative, with successful completion of the task requiring each group member's participation.

For more information on Cooperative Learning, see PLT's PreK-8 Activity Guide, Appendix 1.

Learning Styles*

Learning style indicates how a person learns and likes to learn. Style characteristics reflect genetic coding, personality development, motivation, and environmental adaptation. Style is relatively persistent in the behavior of individual learners. It can change, but does so gradually and developmentally. Learning style has cognitive, affective, and environmental elements. No learning style is better than another, each is simply different.

There are many different models of learning styles, but in general most models identify four different learning styles. Bernice McCarthy, in her 4MAT system, characterizes the four learning styles as shown on the "Teaching to Learning Styles" handout at the end of this section.

During your workshop, you can help educators use PLT and learning styles in the following ways:

Model using the four different learning styles in your presentation. To be sure that you include all four different styles, when planning your workshop, identify the learning style most prominent for each workshop element. While you need not represent each learning style equally, be sure that you exemplify each one.

Using the Teaching to Learning Styles handout at the end of this section, help each of the participants identify which learning style seems to best describe him or her. Keep in mind that most learners use a combination of styles.

Suggest that participants identify a particular student or other person they know that seems to fit each of the learning styles. Make sure that participants understand that the point of this exercise is to help them have a concrete picture of each of the styles, not to stereotype their students.

Encourage participants to identify which styles are prominent in each PLT activity presented at the workshop. Ask participants to suggest ways to extend each PLT activity presented to get at some of the other learning styles.

During the curriculum planning time, have participants identify a group of lessons that focus on different learning styles to teach together as part of a unit.

- * For more information on learning styles, see the following references:
Keefe, James W. (ed.). *Profiling and Utilizing Learning Style*. Reston, VA: National Association of Secondary School Principals, 1988.
McCarthy, Bernice. *The 4MAT System: Teaching to learning styles with right/left mode techniques*. 2nd ed. Oak Brook, Ill: EXCEL, 1981.

Teaching to Learning Styles

Learning Style 1: Imaginative Learner

I like to: learn through personal experience; have meaning in what I learn; learn about things I value and care about; express my beliefs, feelings and opinions; and understand how what I learn affects me. I function best when interacting with others. My goal is to make the world a better place. My favorite question is "Why?"

Teach by: Giving them a reason; having them create and analyze an experience.

Learning Style 2: Analytic Learner

I like to: get new and accurate information; deal in facts and right answers; know what the experts think; formulate theories and models; and have things exact and accurate. I function best when adapting to experts. My goal is to add to the world's knowledge. My favorite question is "What?"

Teach by: Teaching it to them; integrating the experience and the material; giving them the facts.

Learning Style 3: Common Sense Learner

I like to: do things; have ideas clear and understandable; find out how things work; test theories in the real world; and make things useful. I function best using kinesthetic awareness. My goal is to make things happen. My favorite question is: "How?"

Teach by: Letting them try it; giving them prepared materials and have them add "something of themselves" to it.

Learning Style 4: Dynamic Learner

I like to: connect things together; do things that matter in life; teach other people what I know; take some risks; and make what is already working, work better. I function best by acting and testing experience. My goal is to challenge complacency. My favorite question is: "So what?"

Teach by: Letting them teach it to themselves and someone else; having them analyze for relevance and originality, then share with each other.

REFERENCE

McCarthy, Bernice. *The 4MAT System: Teaching to learning styles with right/left mode techniques*. 2nd ed. Oak Brook, Ill: EXCEL, 1981.

Multiple Intelligences

"The Theory of Multiple Intelligences,"

by Cindy Ybos and Patty Watts, 1998.

A different kind of smart—that's the hottest topic of discussion in classrooms across the country today. With the currently accepted theory of multiple intelligences, educators no longer focus on "how smart students are" but on "how students are smart."

The theory of multiple intelligences, developed by Howard Gardner and his associates, holds that every individual possesses several different and independent capacities for solving problems and creating products. Gardner has named these capacities "intelligences" and has scientifically identified eight of them which are grouped into three categories.

The language-related intelligences, verbal/linguistic and musical/rhythmic, reflect the structures of individual languages. These two intelligences are "object free," meaning that thoughts are represented through sound-based communication and symbolic representations of those sounds.

The second category, personal relationships, consists of interpersonal and intrapersonal intelligences. These are the people-centered intelligences. They reflect the personal vision of self, expectations of others, accepted norms of thinking and acting, and the cultural pressures that shape behavior.

The third category is object-related intelligences. These include bodily/kinesthetic, visual/spatial, and logical/mathematical. The designation of object-related means that the basic concepts and procedures are rooted in physical manipulation of concrete objects that results in a defined product. These intelligences are subject to the "rules of the game" for using the objects to solve a problem or make a product.

The newest intelligence to be identified is naturalist intelligence. Gardner describes this as an ability to differentiate the patterns and characteristics among natural objects in the environment, recognize flora and fauna, make distinctions in the natural world, and observe and classify plants. Charles Darwin is often cited as an example of a person who possesses a naturalist intelligence.

As with other instructional strategies, Project Learning Tree has already incorporated many of the key aspects of multiple intelligences theory into its activities.

One of the simplest ways to include multiple intelligences with your students is to ask them to "represent" the data they have collected during a PLT activity, such as "Water Wonders," using one of the eight intelligences. Each group can be invited to use the intelligence with which they are most comfortable or you can assign an intelligence to each group. By doing this, you encourage them to really let their personalities shine! We have found that groups will dance, sing, draw pictures, make models, create graphs, or do calisthenics to report their findings from PLT activities.

While all of this information about Multiple Intelligence Theory may seem overwhelming, the main idea we would like for you to get from this article is that PLT activities already incorporate a great deal of this theory. Just by doing the activities, you are modeling some aspects of Multiple Intelligence Theory in your classrooms and with some small modifications, you can model all aspects of it. And, if you are a PLT workshop facilitator, it also is important that you think about how combinations of activities will address all of the intelligences when planning your workshops.

Addressing Controversial Issues

When teaching about the environment, many educators avoid certain topics and issues because they are reluctant to deal with controversy in the classroom. If you wish, your PLT workshop can provide ways for educators to examine ways to teach and cope with controversial topics. For information on teaching controversial issues, see PLT's PreK-8 Activity Guide, Appendix 3. In your workshops, you can help educators examine dealing with controversial issues. You might, for example:

Help participants identify potential controversial issues imbedded in the PLT activities you present.

Lead a discussion about the benefits and pitfalls of teaching about controversial issues. Help participants identify ways for handling each of the pitfalls.

Invite resource specialists to the workshop to help explain their perspectives on the topic. Help participants discuss arguments for and against each perspective. See page II-**x** for information on inviting a resource specialist.

Encourage participants to brainstorm a list of possible concerns that parents, administrators, the community, or the participants themselves would have about teaching a particular controversial issue. Then help them brainstorm ways to address each of the concerns.

Leading Successful Outdoor Activities

Taking students outdoors allows them to personally examine and experience the natural world. These experiences are critical for helping students understand the world around them. However, many educators shy away from outdoor activities because these activities present management problems. For example, when students leave their familiar classroom for an outdoor activity, they often assume that the classroom rules no longer apply.

To help educators become more comfortable with leading successful outdoor activities, you can provide ways of addressing this issue in your workshop. Following are some suggestions:

At the workshop introduce participants to the outdoors, and help them see the importance and advantages of working outside. After each outdoor activity, discuss how the activity and the learning would have been different if it had been conducted indoors.

Have participants brainstorm a list of the pluses and minuses of leading outdoor activities. Divide participants into small groups and have them think of ways to turn the minuses into pluses.

For more information, see the section on "Teaching Out-of-Doors" in Appendix 6 of PLT's PreK-8 Activity Guide.

PLT and Education Reform

Educators need to know how PLT fits in with education reform. Discuss hands-on learning, constructivist teaching, using story lines, and so forth.

You might want to ask them to contribute examples or comments. You can also hand out copies of the PLT correlations to national education standards, as well as any state standards to illustrate the connection.

“How Does Project Learning Tree Support Systemic Reform?”

By: Bill Andrews, Education Programs Consultant, Office of Environmental Education, California Department of Education

Throughout the 1990's, environmental educators have been challenged to meet the needs of systemic reform. To meet this challenge and continue to provide a world-class environmental education curriculum for its nation-wide network of educators, the Project Learning Tree (PLT) staff conducted four writing workshops in different regions of the United States. These multi-day workshops were instrumental in capturing each region's interpretation of systemic reform in the context of environmental education. Over the last decade, proponents of systemic education reform have focused their efforts on the following basic elements: (1) **new approaches to teaching and learning**; (2) **site-based governance**; (3) **shifting roles of teachers and administrators**; and (4) **accountability**. Environmental educators in each of the regions helped weave these basic elements into both the Project Learning Tree Environmental Education Activity Guide (Pre K - 8) and the Project Learning Tree topic specific modules for secondary students, thereby ensuring the activities met their pedagogical and programmatic needs. Regardless of whether you are a curriculum writer or director, classroom or outdoor educator, elementary or secondary student, everyone benefits from the outstanding quality of the PLT activities that reflect all of the common components of systemic reform listed above.

PLT Activities Reflect All the Basic Elements of Systemic Reform

The pedagogical approach of PLT activities is largely constructivist. This approach supports educators in their systemic reform efforts to embrace **new methods of teaching and learning**. Each activity is designed to engage students in active learning and to promote conceptual understanding. PLT lessons challenge students to apply critical thinking skills as they share their preconceptions, investigate environmental concepts, explore viewpoints, and attempt personal or group action projects based on knowledge they have gained. This constructivist learning approach improves the students' abilities to synthesize, infer, problem-solve, and analyze. Thus,

the pedagogy used in many PLT activities reflects the new approaches to teaching and learning championed in systemic reform.

The PLT Activity Guide is ideal for teachers whose school or district embraces **site-based governance**. Teachers who are granted adequate flexibility in their instructional program to meet the content and performance standards of their district or state find the thematic storylines within the Activity Guide to provide valuable connectedness and continuity between various content areas. Every storyline is supported by four to six activities, and each activity provides a short overview, lesson plan, background information, and helpful enrichment and assessment opportunities. Through training workshops, teachers learn how easy it is to incorporate PLT activities into their existing curriculum and are encouraged to adapt the activities to their local environment. Because the Activity Guide is so user-friendly, educators have greater confidence in designing their instructional program and implementing their lessons.

The wide variety of PLT activities, which are structured around both natural and human-built environments, create an intriguing array of new, sometimes never explored **roles and responsibilities** for students and educators alike.

Educators acquire new ideas from the Guide which often transform the classroom into a stimulating learning environment for students. For example, in the activity "Every Drop Counts," students monitor their daily water use at school, analyze how water is wasted, and then design and implement a water conservation plan for the entire school. They determine the amount of water and money that is saved through their plan and share this information with their fellow students, faculty, and community. This activity clearly empowers students to take responsibility for conserving water on their campuses. The teacher's role is centered around facilitating better access to information and helping students use mathematical reasoning to draw conclusions about something students care about: saving water.

PLT lessons for older secondary students delve more deeply into complex environmental issues. The lessons encourage independent research and greater student **accountability** for project outcomes.

Lesson eight, "Take Action" in the secondary module, "Exploring Environmental Issues: Focus on Forests," guides students to research information about their local forests. Students examine a success story of what one class in New Mexico did to reclaim a state park. Then they design a project to improve a forested area in their region. Once they finish their action project, they evaluate their accomplishments, the problems they

encountered, and what they would change next time to be more effective. This kind of reflective assessment, which is performance-based, encourages students to be more accountable for their learning. Given this emphasis on authentic assessment, it is not surprising that a 1995 multi-age, pre-and post-test analysis of the educational effectiveness of PLT, conducted by an independent research arm of the North American Association for Environmental Education, concluded that the educators who had led their pupils through an entire storyline unit (4 to 6 lessons in length) were universally successful in enabling their students to develop deeper conceptual understanding about the environment and shared attitudes that reflect caring and respect for the environment.

Given these impressive statistically-derived results and the few short examples offered to illustrate the ways PLT activities reflect the basic components of systemic reform, educators can be confident that the PLT Activity Guide and the secondary modules will serve as useful tools to implement systemic reform in their schools.

VI. Appendices

Appendix A: Facilitator Skills Checklist

Important attributes for an effective workshop facilitator:

- Listening to and understanding participants' needs
- Developing a credible trust level with participants
- Having a composed and friendly manner
- Having a sense of humor
- Being willing to learn from mistakes and experiences
- Being flexible
- Projecting confidence
- Motivating
- Presenting information in an unbiased format

Important skills for leading a successful workshop:

Organizational:

- adequate planning and preparation
- timing & sequence of tasks, activities, and discussions
- balance between paperwork and verbalizing
- clear instructions

Logistical:

- physical setting
- equipment
- materials

Discussion:

To promote group interaction and involvement -

- accepting
- supporting
- encouraging
- handling errors

To contribute to the completeness and relevancy of the subject -

- extending
- lifting
- clarifying
- time for thinking

- focusing/refocusing
- summarizing content

Those that hinder participation:

- loaded questions
- multiple questions
- rewards
- no time to think
- tone of expression

Listening:

- being an active listener, not boxed in by own preconceived notions or answers

Reading a group:

- verbal feedback - questions and comments
- non-verbal feedback - noise level, restlessness

Interactive:

- promote each individual's participation
- encourage feedback and questions
- give value to processes and techniques of involvement
- avoid teacher dependency

Stage setting:

- rational
- objectives
- application
- involvement
- time allotted

Transitional:

- summarize where group has been
- identify where group is going
- tie activities together

Summary:

- gets closure
- application of process to other learning experiences

Timing and pace:

- identified time for each task
- keep momentum
- meet needs of participants

- focus participants in a positive way

Communication:

- convey key concepts without overwhelming participants
- communicate at level of understanding

Appendix B: Workshop Checklist

Planning for the Workshop

- ___ Find someone to co-facilitate the workshop.
- ___ Request permission from your school system or organization for approval (if necessary).
- ___ Select and reserve workshop site for the date, time, and number of hours needed.
- ___ Submit workshop plan to district or college for approval (if necessary).
- ___ Submit workshop proposal form to State Coordinator at least four to six weeks prior to the workshop date; this allows enough time for your PLT guide orders to be processed.
- ___ Develop and distribute promotional materials such as flyers, pre-registration forms, posters, or articles at least four weeks prior to the workshop date.
- ___ Develop workshop design, taking into consideration:
 - ___ the audience
 - ___ workshop objectives
 - ___ constraints (for example, space or time)
 - ___ strategies for overcoming constraints
 - ___ requirements for credit (district, college or university), if offered
 - ___ materials and equipment needed for activities
- ___ Outline workshop agenda.
- ___ If possible, contact/invite a resource specialist.
- ___ If planned, arrange for refreshments and snacks.
- ___ Gather support materials such as projector, VCR, paper, pens, and art materials.
- ___ (Optional) Send confirmations and maps to advance registrants.
- ___ If possible, visit the workshop site to check things out.

At the Workshop Site

- ___ Set up workshop space (if possible, the afternoon or evening before).
- ___ Check to be sure equipment is working.
- ___ Locate restrooms, light switches, plugs, and easiest access to the outdoors.
- ___ Select appropriate areas to conduct activities.
- ___ During the workshop, orient participants to the restrooms and refreshments.
- ___ Provide a brief overview of the agenda, including when breaks and lunch will be taken. Set expectations for the workshop.
- ___ At the end of the workshop, be sure each participant fills out a Participant Survey Form (evaluation).
- ___ Distribute PLT certificates in exchange for the Participant Survey Forms.

Post-Workshop Tasks

- ___ Complete the Facilitator Survey Form and send it and completed Participant Survey Forms to the State Coordinator.
- ___ Mail registration fee to the State Coordinator, invoice appropriate agency with copy to Coordinator or provide Coordinator with information to invoice appropriate agency, etc.
- ___ (Optional) Send thank you letters with a list of workshop participants, addresses, and phone numbers. Remind participants of any follow-up meeting.

Appendix C: Sample Forms

These are the forms you will need to plan and conduct your workshop. Multiple copies are available from the State Coordinator. These sample forms are provided primarily for your reference:

- Workshop Proposal Form
- Facilitator Survey Form
- Facilitator Expense Sheet
- Sample Workshop Receipt Forms
- Sample Sign-in sheet

PROJECT LEARNING TREE WORKSHOP PROPOSAL

Name:

Mailing Address:

City _____ State _____ Zip _____

Business phone (____) _____ Home phone (____) _____

Fax Number (____) _____

E-Mail Address _____

Date(s) of proposed Workshop _____

Times _____

Location _____

Facilitator(s) _____

Audience represented _____

Proposed number of participants _____

Number of PLT Guides needed:

PreK-8 _____

Spanish Translation of the Student Pages _____

Secondary:

Introductory Handbook for the Secondary Modules _____

Exploring Environmental Issues: Focus on Forests _____

The Changing Forest: Forest Ecology _____

Exploring Environmental Issues: Municipal Solid Waste _____

Exploring Environmental Issues: Focus on Risk _____

Proposed Workshop Format/Agenda. Please use this space and the back of this sheet to specify which PLT activities you plan to use.

Project Learning Tree Facilitator Survey Form

Name: _____

Business phone: (____) _____

Mailing address: _____

City: _____ State: _____ Zip: _____

PLT Workshop Information

Date(s) held: _____

Location: _____

Type of workshop: ____ PreK-8
 ____ Secondary
 ____ Combined PreK-8 and Secondary

PLT guides distributed: ____ Prek-8 Activity Guide
 ____ Secondary Modules:

If Secondary, please indicate the modules that were distributed at the workshop: _____

Length of time: _____ Number of participants: _____

Facilitator(s): _____

Please provide names and addresses of all other facilitators in attendance:

1. Briefly outline your workshop format, specifying which PLT activities from the PreK-8 or secondary modules you included.

2. Summarize expenses and/or revenues involved in your workshop. Include any in-kind support from local sources, for example, agency, community, or industry personnel or contributions.

3. Tell us your overall view of the workshop -- include problems/successes and your assessment of the participants' responses.

4. I would _____ would not _____ be interested in facilitating another PLT workshop because:

5. Number of Participant Survey Forms attached _____

Please complete one of these forms each time a different group of participants is involved. The PLT Staff would like to thank you for your time and effort in providing this information.

PLT Facilitator Expense Sheet

Name _____ Phone (____) _____

Address _____

City _____ State _____ Zip _____

Workshop Date(s) _____ Location _____

Facilitator Expenses:

Date	Mileage	From	To
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Total: _____ @\$(mileage rate) = \$ _____

Other Expenses: (Please attach receipts, i.e., supplies, food purchased...)

Amount

Total Other Expenses _____

Total All Expenses _____

Facilitator Signature

Approved

Sample Receipt for Workshop Fees

Project Learning Tree

Receipt for _____ Hour Workshop

Course _____
Day(s): _____ Date(s): _____ Time: _____

For: Workshop Fee(s) and/or Materials

Amount Tendered: _____ Credit:(Y/N)

Lead Facilitator: _____

Signature: _____

Sample Receipt for Workshop Fees

Project Learning Tree

Receipt for _____ Hour Workshop

Course _____
Day(s): _____ Date(s): _____ Time: _____

For: Workshop Fee(s) and/or Materials

Amount Tendered: _____ Credit:(Y/N)

Lead Facilitator: _____

Signature: _____

Sign-in Sheet
PLT Workshop Title
Date
Location

Please verify your contact info and make any necessary correction/additions.

Name: _____ **Social Security #:** _____
Home Address: _____
City, State, Zip _____
Home Phone: _____
Home Email: _____
District: _____
School/Program: _____
Subject Area/Grade: _____
Work Address: _____
City, State, Zip _____
Work Phone: _____
Work Email: _____

Signature _____ **Clock Hrs? (Y/N)** _____

Name: _____ **Social Security #:** _____
Home Address: _____
City, State, Zip _____
Home Phone: _____
Home Email: _____
District: _____
School/Program: _____
Subject Area/Grade: _____
Work Address: _____
City, State, Zip _____
Work Phone: _____
Work Email: _____

Signature _____ **Clock Hrs? (Y/N)** _____

Name: _____ **Social Security #:** _____
Home Address: _____

City, State, Zip

Home Phone: _____

Home Email: _____

District: _____

School/Program: _____

Subject Area/Grade: _____

Work Address: _____

City, State, Zip _____

Work Phone: _____

Work Email: _____

Signature _____

Clock Hrs? (Y/N) _____

Name: _____

Social Security #: _____

Home Address: _____

City, State, Zip _____

Home Phone: _____

Home Email: _____

District: _____

School/Program: _____

Subject Area/Grade: _____

Work Address: _____

City, State, Zip _____

Work Phone: _____

Work Email: _____

Signature _____

Clock Hrs? (Y/N) _____

Appendix D: Sample Agendas

The following pages contain sample agendas for your reference as you plan the agenda for your own workshop.

Appendix E: Publicity Ideas

This appendix contains sample flyers, announcements, and a confirmation letter, as well as PLT logos you can use in designing your own workshop announcements.

- Sample Fliers
- Sample Confirmation Letter
- Sample Press Release
- Tell the PLT Story Locally
- PLT Logo Clip Art
- Web pages

TO TELL THE PLT STORY LOCALLY...

When you return to your community, get acquainted with the media in your area. (You may already know them!) Call and obtain the names of staff members in the press, TV, radio who are most likely to report stories regarding community education and Project Learning Tree.

You don't need a news event to get acquainted. In person, or through a letter, introduce yourself, explaining briefly the training workshop you have attended, the local PLT team, Project Learning Tree, what it means for the local community and the team's tentative plans for a local/regional workshop.

Newspapers

Big daily newspapers, start with the city editor.

Small daily/weekly newspapers, ask for the editor.

Daily newspapers, contact morning papers in late morning or early afternoon; afternoon and evening papers, visit late in the afternoon.

For weekly newspapers, visit the day after publication

Radio, TV

Contact the news editor or program director and ask for deadlines and publication dates so you can provide your information on your PLT workshop at the most opportune time.

The Press Release

Prior to your PLT workshop, keep in mind deadlines and publication dates!

Provide a press release that tailors the story of PLT, the workshop and the educational value of the program to readers of the paper.

Keep the release to two pages or less, typewritten and double spaced.

Leave plenty of margin space and type the first line about a third of the way down the page.

The basics of a press release -- the who, what, where, when and sometimes why -- should appear in the early paragraphs.

If the story is for publication at any time, mark the top "immediate release": if there is a certain day for publication, mark "for release after (time/date).

Provide your name, phone number and mailing address on the top of the press release so someone can verify facts with you if necessary.

Current Environmental Education Workshops

[Information last updated on April 9, 2002]

(Please press your Refresh or Reload button to see the latest changes on this page)

Camp Silverton Training 02-W003 Camp Silverton, Everett

04/18 ~~04/26~~ 2002 9:00 am - 3:30 pm Facilitator: P. Otto

Camp Silverton training is for 5th grade teachers in the Everett School District going to camp. It involves activities, logistics and planning time for teachers. Teachers receive three environmental education activity guides to support their instruction.

Grant Writing for Environmental Projects 02-W019 Dry Creek Elementary School

04/27 2002 8:30 am - 3:30 pm Facilitator: J. Campbell

A great opportunity for individuals and teams to work on grants with facilitator Jeanene Campbell, an experienced, savvy grant writer. Come prepared with ideas--you could leave with a completed grant proposal! Teachers will receive helpful hints on where and how to secure both large and small grants. Sample grant proposals will be available for reference. One-on-one coaching, feedback, and follow-up are also available. Six clock hours and \$100 stipends are available for classroom teachers. **SPACE IS LIMITED** to allow for individual attention and use of computer. Please register ASAP to guarantee a space for you and your grant.

PLT Activities for School Gardens and Study Sites 02-W018 The Gardner School

05/04 2002 8:30 am - 3:30 pm Facilitator: W. Franzen

Join with educators from the Battle Ground and Vancouver area to learn engaging, hands-on environment-based activities for K-8 students to investigate the forest web of life. Activities are drawn from the Project Learning Tree activity guide, which includes 96 environmental education activities. Each activity can be integrated with existing units to teach skills in all subject areas. Participants will take home the PLT guide, ready-to-use activities for use on the school grounds, ideas for improving school study sites and a Forest Exploration Map. Teachers will also become eligible to apply for Greenworks! Grants ranging from \$50 - \$5,000 for service learning projects. [Click here](#) for directions on how to get to the facility. \$100 stipends for classroom teachers; 6 clock hours are available

Appendix F: Sample Workshop Items

This appendix contains sample workshop activity items that will help you plan the agenda for your workshop.

- Sample Icebreakers
- Sample Hikes through the Guide(s)

Sample Icebreakers

Icebreakers are an important part of your workshop. They set the tone for the workshop by getting everyone up and participating. They are also a great opportunity to model an additional PLT activity. Below are several PLT activities that can be adapted for icebreakers. You may have your own favorite that you wish to use in place of one of these. Make sure you include introductions.

For a PreK-8 Workshop:

“Forest Products in the Bag” - [variation of activity #2 Get in Touch with Trees] put matching pairs of forest products in small lunch bags and give each person a bag. (See PreK-8 activity #13 "We All Need Trees" for products ideas.) Using the sense of touch (not sight), they must mingle, trying to find a match to their item by feeling what's in everyone else's bag. After they find their "match," they will introduce each other to the group.

“Tree Treasures” (activity #12) - hand out a mystery product to each person by taping it to their back. Pair up the participants and have them work together to guess their product by asking “yes/no” questions. After all pairs have figured out their products, they will introduce each other.

“Tree Cookies (activity #76-variation) - explain what a tree cookie is. Hand out paper plates and instruct each person to create a “personal tree cookie” that would explain their age or number of years they have been at their current position (you can vary the instructions). They can put stickers on the rings to identify special events in that time frame. Have each person introduce himself or herself and explain their tree cookie.

“Poet-tree” (activity #5) - have participants look outside for a few minutes and then write a short poem about what they saw. Go around and have each person introduce themselves and share their poem.

“The Closer You Look” (activity 61) - have people draw their favorite tree, their ideal tree, or a tree that they can identify with. Go around and have each person introduce themselves and share their drawing.

“Our Changing World” (activity 86) - sit in a circle and give one person a ball of string. This individual will say their name and then name something in the environment. He/She will then roll the ball of string (but keep holding the end) to someone else (doesn't have to be the person next to them) who will say their name and then name something that connects to the first word. Continue passing the ball of string until everyone is connected.

For a Secondary Workshop (the PreK-8 suggestions can also be used):

“Word to Live By” (activity #7 from Focus on Forests) - cut out author descriptions on page 44, and the quotes - without their author” - on pages 45-46. Hand out either an author or a quote to each participant. Have them walk around and try to find their match (author + quote). After everyone has a match. Go around to each pair, do introductions, and find out if they were correct in their match.

The Risks We Face (see following page for an example) - create a list of risks that people take and hand out a copy to each person. Instruct them to find another member in the group who has taken one of the risks on the list and have them sign their name beside the risk. See if they can find a person for each risk listed. After, have a few people read their lists and as they go down, introduce the people who have signed their sheet.

The Risks Among Us

I have ...

- _____ Been sky diving
- _____ Had an x-ray
- _____ Driven a motorcycle
- _____ Played high school/college football, basketball, hockey
- _____ Worked with heavy machinery
- _____ Jay walked
- _____ Been skiing
- _____ Fought a wildfire
- _____ Had my home tested for radon
- _____ Used saccharin as a sweetener

I live ...

- _____ Near a nuclear power plant
- _____ Near electrical power transmission lines
- _____ Near a fault line or floodplain

Sample Hikes Through the Guide and Modules

PROJECT LEARNING TREE: HIKE THROUGH THE PreK-8 GUIDE [ANSWERS]

1. What are the goals of PLT? [pg vi]
2. What is a climax community and where can you find this information? [glossary, pg 371]
3. What is the role of the teacher in presenting controversial issues? [pg 378]
4. Find an activity which addresses diversity, can be done indoors and requires a semester to complete. [time considerations, pg 398]
5. What are common links between environmental education and multi-cultural education? [Appendix 4, pg 378]
6. How can you find information to help you evaluate the effectiveness of activities with your students? [End Notes...]
7. Where could you find tips for bringing nature indoors? [Appendix 8, pg 381]
8. How would color blindness put you at a disadvantage in using this guide? [activities are color coded; themes are delineated]
9. How many activities deal with the urban environment? [18, Topic index, pg 388-391]
10. What is the fastest way to find an activity in a particular subject area (e.g. math, language arts, etc.)? [Subject index, pg 392]
11. Find an activity that involves the skill "Comparing and Contrasting." [How Big is Your Tree?:Skills index, pg 401]
12. What are two ways to find activities that support each other? [Storylines, pg ix-xi; Related Activities in Sidebar: End Notes...]
13. Where could you find information on environmental organizations? [pg 382-383]

14. What are the 7 listings in the sidebar of each activity? [Levels, Subjects, Concept, Skills, Objective, Materials, Time Considerations: Any activity]

15. What is the fastest way to find an activity that you know the name of? [Alphabetical listing. pg 402]

16. How many ways are activities cross-referenced? [6, pg iii]

17. (extra) What is a suggested way to link activities? [Storylines, pg ix]

HIKE THROUGH THE GUIDE

1. COPYRIGHT: Point out that PLT materials are copyrighted and student pages should be copied for classroom use only.
2. INTRODUCTORY PAGES
 - A. Pages iv-vii: Opening statements by PLT sponsors, mission, goals, and description of methods used in PLT activities.
 - B. Page viii: Description of the activity components.
 - C. Pages ix-xi: Storylines

Storylines are broad generalizations that are supported by many PLT activities. These storylines are suggestions. Teachers may wish to expand on them.
 - D. Pages xii-xiv: Acknowledgements of all the people who contributed to the creation of this new guide. Emphasize the broad based support used to create this new guide.
3. ACTIVITIES
 - A. Are color-coded by theme: diversity, interrelationships, systems, structure and scale, and patterns of change.
 - B. Choose one activity and have everyone turn to that activity. Point out the following components of the activity.
 - 1) Overview and background.
 - 2) Sidebar: levels, subjects, concepts (related to conceptual framework in back), skills (complete listing in the back of the Guide), objectives, materials, and time considerations.
 - 3) Getting ready
 - 4) Enrichment/variations
 - 5) End notes: assessment, related activities, and references
 - C. There are 96 activities in all.
4. REFERENCE PAGES AT THE END OF THE GUIDE

A. Glossary: pages 371-374

- 1) The activities are written so that extensive knowledge of forestry, biological or ecological sciences is not necessary. The few technical terms that are used, are defined in the back of the book.
- 2) All terms are listed alphabetically.

B. PLT Conceptual Framework: page 375-376

- 1) All PLT activities are built around five major themes: diversity, interrelationships, systems, structure and scale, and patterns of change. Each theme covers the areas of environment, resource management, technology, and society and culture.
- 2) These concepts are defined on these pages.
- 3) This is the knowledge that students will gain from participating in these activities.

C. Appendices: pages 377-382

- 1) These appendices cover a wide range of issues and topics that seem to occur whenever teachers deal with environmental issues in the classroom.
- 2) The authors of this guide have put together some insights and suggestions that you may wish to incorporate when you deal with some of these issues in your classroom.
- 3) Topics covered in the appendices include teaching for conceptual understanding, cooperative learning, roles of environmental educators, teaching controversial issues, multicultural education, working with exceptional students, organizing environmental clubs and outdoor classrooms, and bringing nature indoors.

D. Additional resources: pages 382-383

- 1) Teachers should request information from local sources first before contacting national sources.
- 2) Emphasize the guidelines for requesting information.

E. Bibliography: pages 384-386 (This is a list of reference books, children's books, field guides, directories, articles, pamphlets, and

other curricula, videos and posters that can be used with PLT activities).

F. Indices: pages 387-401

- 1) All PLT activities are cross referenced a number of ways to help teachers access information quickly.
- 2) Topic index
- 3) Subject index
- 4) Grade index
- 5) Time consideration
- 6) Skills index (This is a list of thinking processes and skills used in PLT activities.)
- 7) Alphabetical listing of activities: Titles are catchy to help you remember them.

**WALK THROUGH THE SECONDARY HANDBOOK
AND FOCUS ON FORESTS MODULE (DISCOVERY QUIZ)**

1. Q. The Introductory Handbook for the PLT High School Modules provides background information in six main areas - name them.

A. History; Revision Process; Mission, goals, and methods; Conceptual Framework and Themes; Module components, and teaching tools and resources. - Page 4.

2. Q. What did the evaluation of PLT involving more than 3,000 students in North America discover?

A. That teachers who complete at least one 6-hour PLT Workshop and use the new PLT activities as intended are likely to observe knowledge and attitudinal change in their students. - Page 2.

3. Q. What are the five main goals of PLT listed in the Secondary Module Handbook?

A. Page 5 - "Goals"

4. Q. What are the three major sections of the Secondary Modules?

A. Teacher background info., student activities, and appendices. - Page 4.

5. Q. What are the five major themes featured in both Pre K-8 and the secondary modules?

A. Diversity, Interrelationships, Systems, Structure and Scale, and Patterns of Change. - Page 7 & 8 (secondary).

6. Q. In the secondary handbook discussion of the instructional method called "cooperative learning", what are the eight steps listed?

A. Form cooperative groups, assign roles, develop and post rules, etc. Page 11-12.

7. Q. The article on use of PLT secondary module activities with exceptional students (Both mentally challenged and gifted) was written by a special education teacher. What was her name?
- A. Karen Blodgett. - Page 15.
8. Q. In the secondary Handbook section on "Bringing Nature Indoors", what are the three main types of terrain mentioned?
- A. Desert, Woodland, and Tropical - Page 20.
9. Q. A number of activities in the Pre K-8 PLT guide and in the Secondary Handbook can be modified for use with High School students. The Handbook lists ten of them. On what page is this list found?
- A. Student Activities. - Page 25.
10. Q. Six key benefits from the forests are highlighted in the "Focus on Forests" Secondary Module. Name them.
- A. Oxygen Recharge, Nutrient Recycling, Soil Protection and Flood Control, Climate Control, Wildlife Habitat, and Forest Resources. - Page 7.
11. Q. Four important categories of products and by-products from trees are listed in the "Focus on Forests" module activity "What's a Forest to You?" Name these.
- A. Paper, Bark, Cellulose, Gums and Resins. - Page 14.
12. Q. What are the skills to be learned from activity #5 in the "Focus on Forests" module?
- A. Side Bar. - Page 34.
13. Q. What's the definition of the word "deforestation"?
- A. The permanent removal of trees from a forested area. - Page 53 (Glossary)
14. Q. Where in the "Focus on Forests" secondary module is mention made of a book titled "American Forests, A History of Resiliency and Recovery"?
- A. Appendix 1 - Bibliography. - Page 50.

15. Q. A federal Act designating funds for forestry research at land grant schools and state supported forestry schools was co-sponsored by a famous Mississippi Senator. Who was he?
- A. Senator John C. Stennis. - Page 54 Appendix 3.
16. Q. What percent of the U.S. is still covered by forests?
- A. 32 percent - Appendix 5 pie chart.
17. Q. Who owns most of the timberland in the U.S.?
- A. Non-Industrial Private Landowners (59%) - Page 68.

CORRELATION BETWEEN OLD AND NEW PLT ACTIVITIES

<u>Old K-6 Activities</u>	<u>New PreK-8 Activity & Page # Within Activity</u>
Adopt a Tree	Adopt a Tree p.65
Sounds in the City & Forest	Sounds Around p.9
An Individual Experiment	Poet-Tree p.13
The Closer You Look	The Closer You Look p.217
Leaf Hunt Relay	Name That Tree p.246
Expanding Sensory Perception	Get in Touch with Trees p.5
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Appendix G: PLT Conceptual Framework

Appendix H: Facilitators

List of Active State Facilitators

Appendix I: Selected Readings

Constructivism: A List of Teaching Strategies by Dr. Darleen Stoner

Cooperative Methods by Scott D. Watson

Teachers and Students: Constructivists Forging New Connections by
Jacqueline Grennon Brooks

*Closing the Achievement Gap: Using the Environment as an
Integrating Context for Learning* by Gerald Lieberman, Ph.D. and
Linda L. Hoody, M.A. (www.seer.com)

Constructivism: A List of Teaching Strategies

by Dr. Darleen Stoner, Professor, Environmental Education
California State University, San Bernadino

Constructivism, also known as constructivist learning, is the learning philosophy that has been guiding the revision of today's education. Its teaching-learning strategies are aligned with how educational researchers now believe students learn best. Constructivism is in opposition to the more "traditional" classroom teaching model which emphasizes that students learn because teachers teach. Instead, the responsibility for learning lies with the student. Educators are responsible for facilitating learning experiences which enable students to manipulate materials, consider points of view, participate in group work, and focus on learning concepts.

Constructivism also includes another component: authentic assessment of student progress. Rather than paper-and-pencil tests as the only measure of student learning, assessment can include demonstrations of information, discussions, position papers, checklists of science process skills, and videotapes of presentations. Authentic assessment is certainly a component of Project Learning Tree since students participate in activities such as doing creative writing, evaluating lifestyle choices, writing a letter for information, participating in a simulation, and justifying a response to an environmental issue.

As an educator you can review your own teaching practices to ensure that your students are "constructing" attitudes, knowledge, and skills while participating in Project Learning Tree activities. The following is a list of teaching strategies in employing constructivist learning techniques.

Adapt the activities to have a local emphasis, whenever possible.

Ask students about their ideas about concepts before teaching these concepts in order to assess students' prior knowledge.

Guide students' learning with words such as "classify," "analyze," and "predict." (You are a model for the type of learning that your students will demonstrate.)

Allow students' thinking to guide lessons. Adapt curriculum based on needs of and responses by students.

Have students use primary sources, as well as manipulative materials, whenever possible.

Encourage inquiry by asking open-ended questions and encouraging students to ask questions of other students. Interacting with peers is important, both in large and small groupings.

Utilize authentic assessment to measure students' learning.

Cooperative Methods by Scott D. Watson

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National Science Teachers Association, 1840 Wilson Boulevard, Arlington, VA 22201-3000.

Enter my classroom and you'll see groups of preservice teachers working together as they design and build balloon rockets. Later, they'll compete to see which rocker travels the greatest distance. Learning by doing is an important part of my methods classes, and preservice elementary teachers can best discover the benefits of cooperative learning by practicing the techniques themselves.

A Group to Remember

On the first day of class, students complete a short pretest on their knowledge of science process skills; I rely on the scores to form heterogeneous cooperative groups. Groups include four students—one student with a high score, one with a low score, and two who score in between. Adjustments to groups can be made according to such factors as racial or ethnic background, gender, or age. Attitude toward science (Jones, 1989) and leadership ability are other factors to consider when establishing groups, but the objective is to make the groups as heterogeneous as possible. The students then work in the assigned group for the entire semester.

Students complete several projects and laboratory activities for which they receive both group and individual scores. One activity involves growing two sets of plants from seeds, each under different conditions. I divide the project into eight components, asking each student to be responsible for two of the following:

- Obtain the pots and soil.

- Obtain the seeds and other materials.

- Keep a log of plant growth.

- Write a report of the results.

- Graph the growth of the plants.

- Determine and describe possible treatments.

- Describe all manipulated, responding, controlled, and extraneous variables.

- Present the final report to the class.

Students are given a group score based on the quality of the project. In addition, they are quizzed individually.

More Cooperative Learning

Toward the end of the semester, students receive special instruction in cooperative learning, starting with the simplest definitions: Cooperative learning is a classroom learning environment in which students work together in small heterogeneous groups on academic tasks (Parker, 1985).

I follow the definition with a general introduction to cooperative learning, discussing various research findings and underlying theories. For example, Slavin (1983) identifies two components of cooperative learning-cooperative task structures and cooperative incentive structures. Cooperative task structures are situations in which two or more students must work together in order to complete a task. Cooperative incentive structures provide group rewards based on group products or individual learning (Slavin, 1984). Both are necessary for true cooperative situation.

Next, students discuss the basic elements of cooperative learning, as proposed by Johnson and Johnson (1987). They include:

Positive Interdependence. In order for cooperative learning to succeed, students must understand the importance of the interdependence or that they will "sink or swim together."

Face-to-Face Interaction. Cooperative learning requires that students face each other and interact directly. They must develop efficient communication skills.

Individual Accountability. Every group member must learn the material. In this way cooperative learning is similar to mastery learning, so it is important to know individual student capabilities.

Interpersonal and Small Group Skills. Many students must be taught the appropriate use of skills needed in cooperative situations and they must practice them.

It's All in the Method

Here are some methods of cooperative learning to discuss with prospective elementary teachers.

The Jigsaw Approach. In this method, each student is given a topic on which to become an expert. These students meet with experts from other groups, and they return to teach their teammates. After the material is studied, students are quizzed individually (Aronson, Blaney, Stephen, Sikes and Snapp, 1978).

Jigsaw II. Similar to the Jigsaw Approach, at the end of a task, individual scores are combined to yield a team score (Slavin, 1986).

Student Teams Achievement Division (STAD). In this approach, the teacher prepares a lesson; students study worksheets, quiz each other, take individual test. The teacher then combines the test results for a team score (DeVries and Slavin, 1987).

Team Games and Tournaments (TGT). This method is similar to STAD, except that a competition (tournament) at the end of the unit helps determine the team scores (DeVries and Slavin, 1978).

Learning Together. Groups of students study the topic and produce a worksheet or test, which becomes the basis for evaluating the group (Johnson and Johnson, 1987).

Coop-Coop. Teams of students choose topics for study, which they then break into subtopics. Each individual is responsible for learning and teaching about one subtopic. The team then makes a presentation on the topic to the whole class (Kagan, 1985).

Group Investigation. Groups of students choose general topics to study. Individual or pairs of students then study subtopics, using approaches that they feel are appropriate. A class presentation on the subjects follows (Sharon and Hertz-Lazarowitz, 1980).

A key step in getting preservice teachers to understand the differences in these methods is to have them actually develop science activities based on the methods. For example, I discuss the basics of the Jigsaw Approach with my students. Then, I ask them to choose a topic and develop a related lesson modeled on that method. Similarly, after we discuss STAD, I ask students to develop a science lesson based on that technique.

Follow Logical Steps

Once preservice teachers feel comfortable with some of the methods, we discuss steps to follow in implementing a cooperative learning strategy in their classrooms. Here are some suggested steps, adapted from Johnson, Johnson, Holubec, and Roy (1984).

1. Specify clearly instructional objectives.
2. Specify the group size. Three to five students per group is best.
3. Organize the assignment of students to groups. Heterogeneous grouping for ability, sex, ethnic background has proven to be effective.
4. Arrange for each group to have appropriate materials.
5. Set the task and goal structure. Explain the principles of cooperative learning.
6. Monitor the groups. Serve as a resource person to cooperative groups.
7. Intervene with groups that have trouble. Clarify misunderstandings among group members and promote participation among all members.

8. Evaluate group products and post-tests.

As the semester ends, students practice additional cooperative learning activities and attempt to develop a set of science process skills activities for elementary students. By the end of the course, most students feel comfortable with teaching science. They often comment that they enjoyed the methods course because they were neither worried nor embarrassed by their level of scientific knowledge. It's this lack of stress and resultant positive attitude toward teaching science that most justifies teaching a methods course that features cooperative learning strategies.

Teachers and Students: Constructivists Forging New Connections by: Jacqueline Grennon Brooks

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As constructivists, teachers strike the delicate balance between teaching for fact and skill acquisition and teaching for independent and expert thinking.

There are two apparently opposing traditions in education, each with histories thousands of years long, each with distinct goals and practices, and each with passionate advocates who still fight with one another. Jackson (1986) still characterizes these traditions as (1) the mimetic, in which students are expected to acquire facts and skills from drill and practice exercises, and (2) the *transformative*, a type of teaching that seeks to influence the attitudes and interests of the learners, evoking changes in perspective. In the mimetic tradition, teachers disseminate knowledge, and students receive it. In the transformative, the student is the actor, and the teacher is the mediator.

I suspect that this dichotomy, which characterizes the current debate on teaching, is a mistaken conception. The key principle is to balance the extremes. Alone, either extreme is insufficient preparation for a world that demands specific knowledge and skills, but also attitudes and interest conducive to vision and creativity. To use a computer to solve complex problems creatively, for example, we must first load the software in precise accordance with the manufacturer's instructions. To decide whether to wrap a potato for baking with the shiny side of the aluminum foil in or out, we need to know some specifics about thermal absorption and radiation. Both instances require information *and* intellect, fact *and* interpretation.

The primary question for the teacher, therefore, is how to help students build a foundation of skills and information while they simultaneously use their creative, intellectual abilities to solve real problems and incidentally develop positive dispositions toward such endeavors. The powerful concept of *constructivism* can help us find solutions to this question.¹ By taking a constructivist approach,

¹The work of Jean Piaget, the most renowned proponent of constructivist theory, has formed the basis of countless early childhood programs (Copple et al. 1979, Kamii 1974), many tests of intellectual development (Lawson 1978, Arlin 1984), innumerable research designs (Linn et al. 1977, Groen 1978), and, more recently, investigations of constructivist approaches in educational programs for adolescents and adults (Lampert 1984, Marode and Lochhead 1985). Over the last few years, other educators have paid some attention to

educators can avoid the either/or syndrome and balance the two traditions.

Individual Constructions of Reality

Constructivists believe that knowledge is the result of individual constructions of reality. From their perspective, learning occurs through the continual creation of rules and hypotheses to explain what is observed. The need to create new rules and formulate new hypotheses occurs when the student's present conceptions of reality are thrown out of balance by disparities between those conceptions and new observations.

Constructivism describes an internal psychological process. In the classroom, students and teachers negotiate both their means of acquiring credibility as members of a group and their emerging understanding of the content of the curriculum. These negotiations occur as each participant actively seeks to learn about himself or herself, the other group members, and the content of the course.

In this process, each person is continuously checking new information against old rules, revising the rules when discrepancies appear, and reaching new understandings, or constructions of reality. In psychological terms, the old rules are the existing cognitive structures. When the old rules and the new information collide, the checking process generates cognitive disequilibrium. The revision is the accommodation that occurs when new rules or new internal cognitive structures are required to replace the old ones, which no longer explain reality. The new understandings are stops along the path of learning that occur when equilibrium is temporarily restored. This process occurs in both the teachers and the students, in both academic and social contexts.

Teaching as Research

Nevertheless, *constructivism* is not a euphemism for "anything goes." Learning content and skills is still the educational goal. But "the critical feature is *how* the knowledge is acquired," as Sigel reminds us (1978, p. 333). Students must develop the necessary content-bound understandings without sacrificing the intellectual autonomy essential for the construction of meaning.

A teacher's daily challenge, then is to transform ideas into action. The ideas often come from the district's philosophy statement, grade level or curriculum guidelines, teachers' manuals, the principal's yearly charge to the staff, and one's own vision. The transformations of these ideas into classroom practice are highly personalized endeavors. To make these transformations ably and with insight requires content area knowledge, communication skills, and a vision of

constructivism in the process of education (Copple et al. 1979, Labinowicz 1985, Blais 1988).

what intellectual autonomy in a developing thinker looks and feels like. Thus, the teacher's personal pedagogy is critical to the education of students as developing thinkers.

Sigel (1978) asserts our need to understand the role of social interactions in how teachers come to construe the practice of teaching. If teachers are to set up classrooms where inquiry is encouraged, then they must be educated in ways that encourage inquiry. The willingness and the competence of the teacher to seek and find meaning through direct experience and reflection influences how she or he will structure and mediate that learning environment.

Our abilities to foster student inquiry and research are enhanced by the degree to which we envision it--and to the degree that we ourselves inquire and research. The teacher's role, then, is twofold. First, teachers must continue to develop knowledge of content--of genetics, numeration, or political conflicts, as examples. Second, at the same time, teachers must continually analyze and reconstruct ideas of pedagogy--knowledge of how to teach these students.

Indeed, Duckworth (1987) observes that teachers are in a position to pursue questions about the development of understanding that no one else could pursue in the same way. She goes on to describe teaching as *research*:

This kind of researcher would be a teacher in the sense of caring about some part of the world and how it works enough to want to make it accessible to others: he or she would be fascinated by the questions of how to engage people in it and how people make sense of it...(p. 140)

What Constructivist Classes Look Like

The traditional way of structuring lessons is concept introduction, practice, application, and further exploration, if time allows. But models of learning based on constructivist principles most often suggest a sequence of lessons in which exploration comes first. The Learning Cycle Model (Arkin and Karplus 1962) of exploration-invention-discovery, which has a long history in the field of science teaching, is an example of constructivist-based education. Using this model, a teacher designs opportunities for students to experience the lesson concepts through direct encounters with materials or information (the exploration stage). The teacher next formally introduces the concept to be considered, usually using new terms and introducing new information and different ways of thinking (the invention stage). Finally, the teacher provides further activities that involve the same concepts (the discovery stage). The purpose of this sequence is to give students of subjects other than science the opportunity to express their points of views and grapple with important issues in the topic. This creates the intellectually fertile basis for the introduction of a new concept. Teachers are now using this model where they once used more mimetic plans; for example, to

teach students to use library resources, to develop physical education skills, and to play musical instruments (Kaplan et al. 1989).

Teachers in Shoreham-Wading River School District generated the descriptors of constructivist teaching practices listed in the sidebar as part of large-scale inservice education and research project. The project, originally called the Cognitive Levels Matching Project, is now known as the Child Developmental Study Seminar Series. The list is an evolving document that represents the most widely used practices of teachers who describe themselves as constructivists.

I would now like to highlight four critical dimensions of a constructivist classroom. One feature of constructivist-based education is the structuring of curriculum around primary concepts: the teacher enters the classroom with one or two big ideas, not with a long list of stepping stone skills and objectives. For an entire academic year, for instance, students in a 6th grade mathematics class studied ratios and proportions. The lessons were designed to develop students' proportional reasoning abilities. The objectives were explored--not "covered"--in the natural and spontaneous context of students' thinking. While comparing the radii of circles given the circumferences, for example, students *asked* for a review lesson on the division of decimals. They had come to the mature conclusion that to solve a real problem, they needed and arithmetic skill. They demonstrated, incidentally, that when students solve real problems, their thinking recapitulates the development of "expert" thought. Through inquiry into important concepts, the class achieves the objectives listed in the text or curriculum guidelines, and in a deeper, more memorable way.

Two additional related dimensions of a constructivist program are the uncovering of alternative conceptions--or "misconceptions"--and the attempt to understand the learner's point of view. *Misconceptions* refer to the theories students have generated to explain various phenomena, behaviors, interactions--theories that are wrong from the adult perspective. Although their thinking may be wonderful, it may be based on faulty assumptions, lack of information, or incorrect data. And, as most teachers know, the rendering of "correct" explanations does not necessarily change the child's misconception.

The teaching of a concept, therefore, is not effective unless the child's present understanding of the concept is explicitly explored. The students must confront any inconsistency between their notions and the data in front of them before they can entertain the teacher's ideas. Thus the task of the teacher, after coming to understand the nature of the students' present notions, is to structure a classroom in which students experience disequilibrium and, subsequently, self-regulation.

Again, remember that constructivism refers to an internal psychological process. The teacher cannot demand that a student see an inconsistency and accommodate his or her thinking by developing a

new mental scheme. Rather, the teacher offers intellectual opportunities carefully constructed as invitations that maximize the *possibility* that new conceptual learning will occur.

Another aspect of constructivism has to do with conflict. Within a context of growth and cooperation, conflict is the source of developmental progress. It is not the teacher's intent to structure a classroom in which conflict is avoided. Rather, it is the teacher's job to help students negotiate the frictions that inevitably arise in setting that provoke them to challenge ideas, most often their own.

Reinventing the Wheel

Although constructivism as a guiding principle in education is receiving more attention today than in the past, much confusion persists over its message and its implications. Suppes (1989), a critic of what he calls the romanticism of this approach, asks, "What are you going to do, rediscover the wheel?" (p. 909). The answer is "yes." In the ideal educational setting, students will rediscover the wheel, reinvent long division, rediscover the horrors of war, and reinvent government.

For an example of the usefulness of reinventing the wheel, consider this instance. Sixth graders were trying to determine whether there was any relationship between the radius of a circle and its circumference. After experimenting with construction paper, some string, a ruler, and a pencil, one student said: "I think I've come up with something. If you take the number around the circle and divide it by the line going across, no matter how big the circle is, you always get about 3!" The child, approximating the value of $[\phi]$, had seen it as a ratio of two other features of a circle. Who do you think will be more likely to understand and remember the meaning of $[\phi]$ --a child introduced to the concept as an element in a formula or this discovering child?

Constructivism *doesn't* say, as critics claim, that you can't teach people anything; it guides us in finding out *how* to teach them. Constructivism reminds us that order exists only in the minds of people, so when we as teachers impose our order on students, we rob them of the opportunity to create knowledge and understanding themselves. Our task, then, is to understand and nurture the learning and development of our students. We must not do for them what they can, and must, do for themselves.

Constructivist Teaching Practices

1. Encourage and accept student autonomy, initiation, and leadership.
2. Whenever possible, use raw data and primary sources, along with manipulative, interactive, and physical materials.
3. When framing tasks, use cognitive terminology like *classify*, *analyze*, *predict*, and so on.
4. Allow student thinking to drive lessons. Shift instructional strategies or alter content based on student responses.
5. Ask students for their theories about concepts before sharing your understandings of those concepts.
6. Encourage students to engage in dialogue, both with the teacher and with one another.
7. Seek elaboration of students' initial responses.
8. Pose contradictions to students' initial hypotheses and then encourage a response. (This process requires considerable diplomacy--an idea must be contradicted without attacking an individual's whole perspective.)
9. Encourage student inquiry by asking thoughtful, open-ended questions and encouraging students to ask questions of others.
10. Allow wait-time after posing questions
11. Provide time for students to discover relationships and create metaphors.
12. Encourage students to reflect on experiences and actions and then predict future outcomes.
13. When designing curriculum, organize information around conceptual clusters--of problems, questions, discrepant situations.
14. Both before and during class, adapt curriculums so that their cognitive demands match the cognitive schemes of students.
15. Look for students' alternative conceptions, and design subsequent lessons to address any misconceptions.
16. For selected tasks, group students according to their demonstrated cognitive complexity.

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Closing Thoughts for the Facilitator...

You've just digested a lot of material, but don't let that scare you. The workshop handbook is designed to be a helpmate as you plan and present PLT educator workshops. It's a reference book we want you to consult often.

We realize, though, that you can't really interact with a book. That's why it's important to remember that the Project Learning Tree organization is made up of a lot of individuals who are there to help answer your questions and address your concerns -- the national office staff members, your state coordinator, your state steering committee members, and your fellow facilitators. Conducting workshops takes a lot of time and hard work, but we want you to enjoy your association with PLT, too. If you need help, just let us know. You're an invaluable part of the environmental education effort and we appreciate your dedication. Good luck!