How PLT Supports STEM

According to one definition, STEM education is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise.[1]

As an environmental education program, PLT also emphasizes an interdisciplinary approach to learning. It incorporates real-world lessons that help students make connections between school, community, and the natural world. PLT's award-winning activities engage students in hands-on learning about trees, forests, and the broader environment, both inside the classroom and outdoors. In addition, PLT teaches students how to think about complex issues, employing a problem-solving orientation that helps them seek solutions.

PLT Engages Students in STEM Learning

- PLT uses instructional strategies that model STEM practices, including hands-on activities, promoting teamwork, building investigation and research skills, problem-solving, and so on. For example, PLT's *PreK-8 Guide* activity entitled "Nature's Recyclers" (# 24) involves teams of students devising experiments using sow bugs, through which they learn first-hand about the cycling of energy and matter in ecosystems.
- PLT provides instruction that builds on and encourages the natural curiosity of youth. Its interdisciplinary approach helps students experience the world in new ways and encourages them to explore their own questions about it. For example, in PLT's GreenSchools! High School Water Investigation, students "learn-by-doing" an environmental improvement project.
- PLT activities help students see connections among cross-cutting concepts and core disciplinary ideas through real-world investigation and problem-solving. For example, by conducting a check-up of trees in their neighborhood in the *PreK-8 Guide* activity entitled "Trees in Trouble" (# 77), students explore the concept of cause and effect, while also learning about the core idea of growth and development in organisms.
- The PLT program reveals the beauty and significance of the world we inhabit, providing students with an inherent motivation to learn more about it. For example, in the *PreK-8 Guide*'s "Field, Forest, and Stream" activity (# 48), students conduct a field study of three different environments, comparing the soil, temperature, sunlight, and animal and plant life in each.

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[1] Tsupros, N., Kohler, R., & Hallinen, J. (2009). *STEM education: A project to identify the missing components*. Intermediate Unit 1: Center for STEM Education and Leonard Gelfand Center for Service Learning and Outreach, Carnegie Mellon University, Pennsylvania.

- PLT demonstrates to students how fun and fascinating STEM can be. For example, in the *PreK-8 Guide*'s "Make Your Own Paper" activity (# 51), students explore the papermaking process using different types of materials.

PLT Supports STEM Teaching

- Through its comprehensive, classroom-tested materials, PLT supports effective STEM teaching. For example, every activity in the *PreK-8 Guide*, eight secondary modules, and five GreenSchools! investigations:
    - Specifies the process skills students will practice in the activity, such as analyzing or predicting.
    - Offers suggestions for authentic assessment of skills and content.
    - Provides background information to bolster teacher understanding of the content.
    - Provides step-by-step procedures for leading investigations.
    - Identifies potential ways to incorporate technology use in the lesson.
    - Includes student pages to support data collection and analysis.
- PLT provides PreK-12 classroom teachers with high-quality professional development for classroom teachers and non-formal educators.
- PLT's quarterly e-newsletter *The Branch* has a new "STEM Connections" column, which highlights specific ways educators can use PLT activities to engage their students in real-world applications of STEM education. Visit the PLT website to view the first installment: https://www.plt.org/newsletter-stem-connection-pass-the-plants-please.
- PLT has also identified STEM resources and lesson plans to accompany its *Energy and Society* materials, enabling educators to enhance STEM learning with their students. These STEM resources are available at https://www.plt.org/energy-curriculum-stem-connections.

PLT Helps Meet Underserved Populations through STEM Engagement

- PLT incorporates strategies that are effective with traditionally underserved populations, including:
    - cooperative learning,
    - hands-on experiences, and
    - relevant and real-world problem-solving.
- PLT activities incorporate differentiated instruction techniques so educators can readily integrate PLT's hands-on, investigative pedagogy for a wide range of grade levels, learning styles and abilities. The *PreK-8 Environmental Education Guide* uses an icon and appendix to easily identify the strategies teachers can apply to differentiate their teaching.

- PLT's GreenSchools! Investigations, in particular, are specifically designed for diverse and urban audiences.
- PLT's GreenSchools! Investigations help to reach diverse and urban audiences. GreenSchools! is popular with educators of urban and minority students because these PLT lessons do not mandate a class visit to a wooded area or park; these PLT lessons take place right within the school or on the school grounds. Additionally, teachers in densely populated urban areas don't often have wooded areas easily accessible, and PLT's GreenSchools! program allows these educators to teach about the environment using the resources they already have.