The Branch

TOOLS FOR EDUCATORS

In this Issue: PLT's new Energy Resource Center provides a wealth of resources and links to help you teach about energy. In other articles, teachers share their tips for using nature journals, studying fire, teaching outdoors in an urban environment, and using PLT activities with Girl Scout programs. We've also launched a "STEM Connections" short feature, similar to our popular "Literature Connections" series.

New Energy Education Resources

By Jaclyn Stallard

Want to teach your students about energy and energy-related issues? PLT's comprehensive new Energy Resource Center can help! Page 3

News & Updates

Girl Scout Correlations

By Sheri Soyka

PLT activities can enhance scout programs. Our new Girl Scout Correlations show you how.

Page 4

Have You Seen PLT's Blog?

By Vanessa Bullwinkle

Enjoy, follow, and share our newly redesigned blog.

Page 7

Taking Action

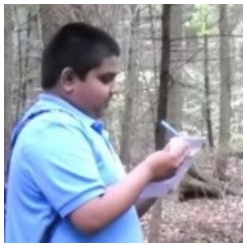
Triple Green Status and Still Going Forward

By Paula Tarnapol Whitacre

"Kids can always make a difference in society" exclaimed a student from this exceptional green school. Learn how teachers at Gwin Elementary are inspiring their students to make our world a greener place to live.

Page 7

Project Learning Tree · A Program of the American Forest Foundation
2000 M Street, NW · Suite 550 · Washington, D.C. · 20036
P 202.765.3641 · F 202.827.7924 · Email information@plt.org
www.plt.org · www.forestfoundation.org



Students = Scientists with PLT's Focus on Forests

By Lise Letellier

Teaching outside is not always easy in an urban environment but with PLT's curriculum and supporting partners, my students were able to make the grade.

Page 9

Educator Tips

The Nature of Fire

By Donna Rogler

From the devastation caused by wildfires to the rebirth of the forest, let's take a deeper look at this year's fire occurrences and the nature of fire.

Page 12

Nature Journaling with PLT

By Rob Beadel

Discover how experiential learning across all subjects can be achieved by encouraging your students to use a nature journal.

Page 15

Resources

Literature Connection – Nature Recycles, How About You?

By Jaclyn Stallard

Explore how different animals in different habitats use recycled material to build homes, protect themselves, and nourish their bodies. This fun collection of animal facts just might inspire you to recycle in your own way.

Page 18

STEM Connections – Pass the Plants, Please

By Kris Irwin, Ph.D

Show your students how many of their favorite foods come from plants and engage them in real-world STEM learning.

Page 18

EE Resources – Fall 2013

By Jaclyn Stallard

Grant opportunities, contests, webinars, professional development opportunities, videos and more in our latest compilation of EE Resources

Page 19

New Energy Education Resources

By Jaclyn Stallard

On September 30th, The White House issued a Presidential Proclamation declaring October National Energy Action Month to encourage smart energy choices that will boost the economy, protect the environment, and support energy independence.

As educators, we need to teach the next generation about energy and responsible actions we can all take to help balance the fiscal and environmental costs of producing and consuming energy.

PLT has a variety of curriculum materials to help you teach about energy. For example,

- PLT's Energy & Society Kit is filled with activities, music, videos, classroom posters, and other resources to help students learn about energy sources and uses. This award-winning kit can be purchased directly from Acorn Naturalists. Buy it now!
- PLT's GreenSchools! Energy Investigation can be downloaded from our website (registation required). It helps students evaluate their school's energy consumption, and develops their critical thinking skills as they generate ideas to conserve energy and reduce operational costs.
- We also have an energy survey and a set of family activities for use at home.

PLT's New Energy Resource Center - An Overview

To supplement these teaching materials, we've created a new Energy Resource Center to higlight specific connections to STEM (science, technology, engineering, and math), Next Generation Science Standards, Common Core State Standards, children's literature books, careers, and much, much more!

It's a comprehensive tool kit of energy education resources.

The Center includes:

- PLT materials for specific grade levels and subject areas
- correlations to academic standards, connections to STEM
- up-to-date background information and resources on topics such as "fracking" and climate change
- technology connections
- recommended children's books
- careers in energy, and
- links to a wealth of other student and teacher resources.

Explore PLT's Energy Resource Center

PLT's Energy Resources – Find out how you can get PLT energy materials for use in your classroom or at home. PLT's *Energy & Society Kit*, GreenSchools! Investigations, *PreK-8 Environmental Education Activity Guide*, and family activities all contain fun, hands-on lessons that help students understand how individual and collective choices about energy use affect their lives and the whole planet. *Energy & Society* integrates music and dance to enhance the study of energy issues.

STEM, NGSS, and Common Core State Standards
Discover how PLT's energy materials can meet local, state, and national academic goals and standards, and education trends. We have developed activity connections and correlations to

- Science, Technology, Engineering, and Math (STEM) Education
- Next Generation Science Standards
- Common Core State Standards

Additional Energy Links – Throughout this section, you'll find informational websites, student and teacher resources, as well as audiovisual and interactive media options to help enhance your lesson plans.

- Hydraulic Fracturing (hydrofraking)
- Biomass
- Climate Change
- Technology Recommendations
- Additional Energy Education Resources

Literature Connections – View book titles and descriptions of recommended energy-related children's books. We have arranged these books by grade band (K-2, 3-5, and 6-8) so you can easily find appropriate materials for your students.

Careers in Energy – There are many career opportunities that require a critical understanding of energy issues and related fields. Prepare your students to meet the energy challenges of the 21st century and support them in exploring potential career paths.

Visit PLT's new Energy Resource Center to help teach your students about energy's role in society, develop students' understanding of energy production, consumption, and sustainability, and actions they can take to save energy (and money) at school and at home. Working together, we can have a clean, safe, and sustainable energy future.

If you have any questions or comments about PLT's new Energy Resource Center or would like to suggest additional resources, please comment below or contact Jaclyn Stallard, jstallard@plt.org.

News & Updates

Girl Scout Correlations

By Sheri Soyka

Scout troop leaders and volunteers, and those who provide Girl and Boy Scout programs at nature centers, parks, and community recreation facilities, can now quickly identify PLT activities that support and strengthen scout projects.

New Girl Scout Correlations highlight PLT activities that meet the requirements released in 2011 for Girl Scout Badges and Journeys for each level: Daisies, Brownies, Juniors, Cadettes, Seniors, and Ambassadors.

The correlations include PLT's *PreK-8 Environmental Education Activity Guide*, Secondary Modules (9-12), and GreenSchools! Investigations (K-12). PLT activities also provide ideas for action projects which may

be implemented with the help of a grant from PLT.

Boy Scout Correlations for two Merit Badges are also available.

The Girl Scout Program

Girl Scouts of the USA is a leadership development organization for girls, with 3.2 million girl and adult members worldwide. The current Girl Scout program utilizes two resources: *National Leadership Journeys* and *National Proficiency Badges*.

The **Journeys** encourage girls to discover what they care about and ways they can change the world. Girls explore a variety of interests along a Journey, everything from animals, cooking, and the arts, to the outdoors and STEM (science, technology, engineering, and math).

Girl Scouts can earn **Badges** in a variety of topic areas. A few examples are gardener, camper, naturalist, trees, flowers, animal helper, healthy living, first aid, citizen, financial literacy, and digital arts.

PLT and Girl Scouts in Practice

As the correlations show, there are many opportunities to use PLT activities with Girl Scout Journeys and Badges. PLT's background information and student pages are great resources for troop leaders who want more information on specific Journey and Badge topics, such as water, air, flowers, insects, and trees.

"When my troop worked on their *Trees* Badge, I used several activities in PLT's PreK-8 Guide to help them learn first-hand about trees and how they can help trees in our community," said Cadette Girl Scout leader, Vicki Watson from Michigan. "[Activity 31] Plant a Tree was one of my favorites because the girls discovered the benefits of trees and the activity gave the steps they needed to do a tree planting project. The Student Page was a great reproducible resource."

Dr. Katie Brkich, a professor of Elementary Science Education at Georgia Southern University, believes PLT activities work so well with Girl Scout programs because both programs embrace teaching environmental stewardship and contributing to the improvement of society.

Katie has used many PLT activities with her Junior troop including Activity 81, Living with Fire when teaching fire safety for their *Camper* badge. She has also used Activity 23, The Fallen Log paired with exploring a giant log replica during a night hike (pictured right). PLT's Activity 38, Every Drop Counts and Activity 1, The Shape of Things are other favorites that she uses with her Scout troop.

Troop leader Shaileen Backman from Virginia recalled some of the fun PLT activities she's done with scouts, including Activity 62, To Be a Tree and Activity 76, Tree Cookies. Her daughter, Libby, remembers doing Activity 23, The Fallen Log on a Girl Scout camping trip. She said, "At first we weren't too sure we wanted to poke around the rotting log, but once we saw all the

interesting insects and tiny plants on it, we were fascinated!" The activity can help scouts earn their *Animal Habitats* and *Digital Photographer* Badges.

PLT's activities can be used in an indoor setting, as well as during outdoor adventures. They can be used in an urban or rural environment. For an indoor meeting, Activity 51, Make Your Own Paper is a great resource to go along with the recycled paper activity in the Girl Scout *Get Moving!* Journey. It provides background information and additional ideas for making recycled paper. Shaileen's troop took this idea further by making their own recycled paper notebooks to sell at fundraisers.

PLT's GreenSchools! Investigations are a great resource for Scouts looking for action projects to go along with their Journeys. For example, PLT's GreenSchools! Energy Investigation works well with the Juniors *Get Moving!* Journey by providing additional background information and details on how to carry out energy-saving action projects, and it engages girls in hands-on STEM learning.

Vicki's Girl Scout toop in Michigan used the PLT GreenSchools! Environmental Quality Investigation with the *Breathe* Journey. "The Fact Sheets were a nice resource for the girls and they got lots of ideas for action projects," she said.

Why is PLT Appropriate for Scouts?

Project Learning Tree and the Girl and Boy Scout programs focus on developing citizens who can take responsible action to help others and help the environment. The new Girl Scout Correlations show how the two programs can be used together to develop the next generation of responsible leaders. To join a Girl Scout troop, become a volunteer or scout leader, visit the Girl Scout's website to find your local Council.

The Boy Scouts of America have a similar focus. They help build future leaders of this country by combining educational activities and lifelong values with fun. Learn more about how to incorporate PLT activities with boy scouts by downloading the Boy Scout Correlations. The correlation is for two Merit Badges, with a separate detailed description for the Forestry Merit Badge Program. If you're interested in a more in-depth Boy Scout-PLT correlation, please contact jstallard@plt.org.

By looking at the correlations, you can see how PLT activities can be used at your site to meet scouts program requirements. The correlations also illustrate how you might partner with the Girl or Boy Scouts to achieve common goals.

Share Your Programs and Ideas

We'd love to hear how you're using PLT activities with scouts. Please take a moment to share your programs and ideas by commenting below.

Project Learnng Tree would like to give special thanks to the following authors and reviewers of the new Girl Scout Correlations:

- Katie Brkich, Ph.D, Assistant Professor, Science Education, Georgia Southern University
- Meg Burgett, Alaska Project Learning Tree Coordinator, UAF-Cooperative Extension Service
- Sheri Soyka, Soyka Consulting, Vienna, VA

PHOTO 1: Girl Scouts engaged in PLT's The Fallen Log Activity. Photo taken by Alexandria Dannhardt.

PHOTO 2 & 3: Girl Scouts in GA. Photos provided by Katie Brkich.

Have You Seen PLT's Blog?

By Vanessa Bullwinkle

Reformatted and now located on the PLT website, PLT's Blog offers more frequent and timely PLT and environmental education news, resources, success stories, and professional development opportunities.

Get tips from other educators who use PLT activities to meet new education trends and standards like STEM, Next Generation Science Standards, and Common Core State Standards. Learn how students and teachers across the country are taking action to green their schools and communities.

Similar to PLT's quarterly e-newsletter, the Branch, our blog posts are mostly written by educators for educators. Their stories are meant to empower, inspire, and connect you with PLT's vibrant nationwide network. For example,

- Stacey in Illinois writes, "Don't Leaf Out Technology" in her blog about environmental applications of STEM.
- Jackie in Washington, DC says, "If one thing is for sure, change is not easy, but it is certain" in her blog about PLT's Next Generation Curriculum.
- Liz in Georgia helps students discover the answer to "What do chocolate sprinkles, Parmesan, and pinecones have in common?"
- Michael in Kansas describes how his students used PLT's GreenSchools! Energy Investigation to launch a 'Save the Teacher' Campaign.
- Lori in California says "students do more than just pull weeds" in her blog about a PLT GreenWorks! service-learning project.

Please enjoy, follow, and share PLT's Blog.

Share Your Story

Would you like to be a guest author and share your PLT story? Contact Vanessa Bullwinkle, vbullwinkle@plt.org for more information.

We encourage you to comment on blog posts and ask questions. You can also use our social media buttons to quickly share a post that's of interest to you, your friends, and colleagues. Together, we can learn from each other to continue to inspire today's youth.

… AND don't forget, you can also follow PLT on Facebook!

Taking Action

Triple Green Status and Still Going Forward

By Paula Tarnapol Whitacre

Last school year, Harriette Gwin Elementary achieved an Environmental Education (EE) "trifecta." The school in Hoover, AL, near Birmingham, became one of the first in the country to earn recognition as a certified PLT GreenSchool, a U.S. Department of Education Green Ribbon School, *and* a National Wildlife Federation Green Flag Eco-School.

"Gwin Elementary School is a school that focuses on the present and future lives of our students," said Principal Dr. Kimberly White in explaining why the school pursues EE. "We strive for excellence and to broaden the scope of influence our students will have on their communities and environment. Our students strive to make Hoover and our world 'greener' places to live."

A school often needs an EE champion, and Gwin is no exception. For the past eight years, enrichment teacher Traci Knight Ingleright has helped channel the interest of other teachers, staff, students, and families at all grade levels by integrating PLT and other activities into Gwin's curriculum.

"Reconnecting with nature in a suburban landscape can be a challenge, but is a priority to our staff and administration," noted Ingleright when she submitted the school's application to become a Certified PLT Greenschool. "We have many different gardens that students created and use as places to explore natural habitats, such as the native bird sanctuary. This is just one example of an outdoor project, but many others have been utilized."

The daughter and sister of foresters, Ingleright first became PLT-trained in 1994. She introduces PLT to pre-service teachers at Auburn and the University of Alabama. In return, the new and future teachers help her put on a two-day science camp or commit to working with other schools in the state.

Student Interests

Ingleright teaches grades 3 through 5 in pull-out classes, but she stresses that PLT meets the needs of "all learning styles and students of all ages."

"My favorite part of the PLT investigations is that they allow students to take an active leadership role in their future while reinforcing the importance of their 'voice,'" she said. "It's a beautiful process to watch."

A group of students who named themselves "Eco-Brains" took the lead in carrying out the Energy, Waste and Recycling, Water, School Site, and Environmental Quality investigations to become a Certified PLT GreenSchool. They also have mentored younger students. Meanwhile, Ingleright noted, several other grades are also active users of PLT.

"Any kid can do it, as long as you're ready to get outdoors," said Blaine Cook, a student transitioning from Gwin to middle school this year. Looking back, he said the experiences that stuck with him most were assisting the Wehle Nature Conservation Center with a bird-tagging project by creating safe bags for the birds, and investigating the air-quality impacts of car and bus idling and suggesting solutions.

But perhaps the main lesson it taught him: "Kids can always make a difference in society."

He is far from the only Gwin student who gains that insight. Ingleright administers a short questionnaire to students in third grade and again in fifth grade, asking them if they feel they can make a difference in the world. Typically, the positive response is about 30% in the beginning and 100% by fifth grade.

Blaine's mother Lyric Crook also pointed to the role that EE has played in her son's and other children's development. "It teaches kids about working together, research, problem solving, and asking questions," she said, adding that Blaine has spurred interest among the rest of his family.

When students realized that the school's watering hoses could not reach a garden they planted, they problem-solved a solution by constructing 15 rain barrels. The barrels eliminated the need for irrigation systems for that garden plot and other native species gardens on the school grounds.

Chris Erwin, Alabama PLT Coordinator, praised the Gwin teachers and staff, but also stressed the initiative of the Eco-Brains and other students. "Teachers will teach, but the students took the action to address it," he said. "It's not good enough to know something is wrong. You've got to do something to fix it."

Tapping into Community Resources

Ingleright already realized that resource managers, planners, and others in the community want to work with schools and are often looking for how to do that. The level of community interest, however, was even higher than she expected.

Outside experts are often thrilled to work with students—they just need to be asked, she noted. Case in point: An Energy Star Portfolio specialist has helped students research and find ways to reduce energy usage. She had offered to provide assistance to Alabama schools, but had not yet been contacted before working with Gwin. Through turning off unnecessary lights and other measures, the school reduced non-transportation energy use by 8.4% over the period of a year—and students gained valuable skills in data collection and analysis, as well as how to learn from and collaborate with a technical expert.

Gwin partners with the Alabama Department of Public Health, Environmental Protection Agency, Clean Air Campaign, Alabama Department of Transportation, and other stakeholders to promote the GES No Idling program. Other partnerships and support include Environmental Education Association of Alabama, Birmingham Audubon Society, Hoover City Schools Foundations, Home Depot, Alabama Wildlife Federation, and National Wildlife Federation.

This year, Ingleright is also working with Brocks Gap Intermediate to start an Outdoor Classroom Program at that school.

Tips from Gwin Elementary

- **Questions, not answers**: Ingleright does not give her students the answers—instead, she encourages them to find the answers on their own. It can lead to surprising opportunities. For example, they learned that Alabama does not have an Environmental Literacy Plan and Ingleright, who sits on the Governor's Task Force to develop one, passed on their concerns. Several Gwin students are now involved in this effort.
- **Start with the School Site investigation**: If your school is trying to figure out its "entry point" into PLT GreenSchools certification, Ingleright recommends looking at the School Site investigation first. "Students love it," she says, "and you'll find many teachers start to utilize the outdoors more for their science, math, and other lessons."
- **Look at what you are already doing**: Ingleright acknowledged that she initially found the applications for the various national programs daunting. But then she realized that Gwin was already doing a lot that met the criteria. Her suggestion: Look around and inventory what your school is already doing.
- **Involve everyone**: In addition to teachers, administration, students, and parents, Ingleright said the custodians, lunchroom staff, maintenance personnel, and school police are

enthusiastic supporters of PLT GreenSchools and other EE activities.

Want to Become a Certified PLT GreenSchool?

Learn more about PLT's GreenSchools! program

- Register your school
- Complete all five PLT GreenSchools! Investigations
- Apply for school certification (application available to registered schools)
- Get ideas for action projects from Harriette Gwin Elementary and other PLT GreenSchools! case studies published on the PLT website

Students = Scientists with PLT's Focus on Forests

By Lise Letellier

"In the end we will conserve only what we love. We will love only what we understand. We will understand only what we have been taught."

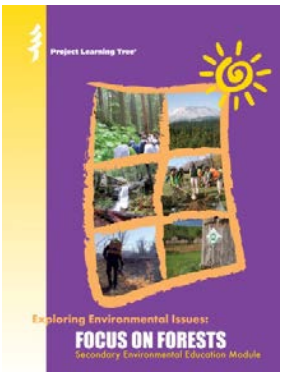
– Environmentalist, Baba Dioum, in a speech to the general assembly of the International Union for Conservation of Nature (New Delhi, India. 1968).

I love the outdoors, always have and always will, but what about my students? How do I instill a love for the outdoors in them?

I had been searching for a way to do this; then I came across Project Learning Tree. In my usual teacher mode, I investigated it between classes and late at night. I found an introduction to Activity 1, Monitoring Forest Health in PLT's high school module *Exploring Environmental Issues: Focus on Forests*. In this activity, students take measurements to determine the health of a local forest, and evaluate the ecological services provided by trees and forests. My curiosity was piqued.

Working in an Urban Environment

I teach at Holyoke Catholic High School, a newly built small urban school in western Massachusetts. All we have access to are city streets and individual trees to study, no forestland.



After finding PLT's Student Page "Evaluating Tree Benefits" from Focus on Forests, I successfully used it with students on the trees we were already studying. The students were amazed at how important these small trees were. I posed the question, "If these few trees are important, what about a whole forest?" Now my students were curious.

Making Connections

When I began teaching at Holyoke, my students were working on phenological studies using the Harvard Forest Schoolyard Long Term Ecological Research (LTER) Program. In this program, students learn to collect ecological data, share it with other schools and working scientists, and participate in authentic, field-based research

projects that address current environmental issues.

I quickly realized that the Harvard Forest Schoolyard LTER program was a perfect fit with Project Learning Tree and I asked my PLT State Coordinator if she could host a PLT Focus on Forests professional development workshop in conjunction with Harvard Forest. The combined workshop took place in June 2012. Many educators attended and we each received PLT's 176-page *Exploring Environmental Issues: Focus on Forests* activity guide.

As excited as I was, I desperately wanted to find a forest for seventy students to study. I contacted the Appalachian Mountain Club (AMC), a group that cares for the outdoors as much as I, and who are experts at introducing it to young people. Their educational outreach program is called "A Mountain Classroom" and though students usually travel to visit forests in New Hampshire, I asked if AMC would help me implement a three-plot forest study using PLT's Monitoring Forest Health activity at their small outdoor center nearby. I told them I would commit to a long-term study and provide them with the data we collected.

From the Classroom to the Outdoors

So how did I teach it? We spent two weeks in the class and lab studying content on forests, soils, and water and the connections among them. I introduced forest disturbances to my students using Activity 7, Forest Invaders and Activity 2, Story of Succession from PLT's Focus on Forests. I used classroom lectures to teach about indicators of forest health, and performed soil porosity labs as well as other activities to emphasize the

importance of each indicator.

After our two-week classroom study, we spent an entire day in the field at our plot sites at the AMC Nobleview Outdoor Center. This is where the collaborative effort finally paid off. The AMC Mountain classroom team met us at our plot site and each staff member led one of six different teams of twelve students. Each team spent four hours collecting data on their plots. We also conducted water quality tests on a nearby stream. We incorporated team building activities and lunch in the woods. It was a great learning opportunity for my students…and it was a lot of fun!

Once we returned to school, we spent three 45-minute periods compiling the groups' data into a full class dataset and verified our findings. This emphasized the importance for collaboration and communication skills among scientists. Once the final Excel spreadsheet was made in class, I made it available to students online. They could access the file, adjust the format, and make graphs. I gave them one week at home to do the analysis and put a final report together. The final lab report consisted of an introduction, background information on forests, soils, and watersheds, data tables, graphs with results statements, and a final discussion and conclusion. Through this collaboration, classroom study, field survey, and

reporting process, my students explored the overall health of the forest.

This first study established a baseline assessment of the health of the forest. Now, each year following this study, future classes will compare the results of their forest health survey with this baseline data to determine if the forest is in decline or not. In addition, the students are collecting data as part of a citizen science Harvard Forest research project to help forest ecologists in the Northeast monitor the spread of the hemlock woolly adelgid, and investigate forest response to this exotic pest.

Making the Grade

Overall, my class did very well on their reports. Their understanding of trees, forests, and the outdoors improved. To quote one of my students; ". . . I had so much fun in science this year. The field study was really fun, even though that lab report was kind of scary! . . . never, ever, ever stop the way you teach, because even though it's a lot of work, it's preparing us for the real life."

The Harvard Forest program equipped us with the skills to begin ecological research and our collaboration with Project Learning Tree and the Appalachian Mountain Club offered us the opportunity to grow. According to the Next Generation Science Standards this is the type of long-term, investigative, hands-on, and collaborative learning that our students should be engaged in. We are no longer individual students learning in a single classroom, we are all collaborating "scientists," teachers and children alike working to achieve a higher goal—and learning to love the outdoors.

Educator Tips

The Nature of Fire

By Donna Rogler

Ash, charred trees, and the smell of smoke still linger in areas affected by this season's wildfires. After the news reports, it's hard to believe that life is already returning. From the devastation caused by wildfires to the rebirth of the forest, let's take a deeper look at the nature of fire and PLT resources you can use to discuss this topic with your students.

By the Numbers

According to the National Interagency Fire Center, as of October 21, a total of 40,588 wildfires occurred in the U.S. in 2013. These wildfires burned a total of 4.1 million acres which is approximately the size of Hawaii. Coincidentally, Hawaii is the only state in the U.S. that did not

experience a wildfire this year. California recorded the most wildfires (8,762) while Alaska had the most acreage burned (1,319,234).

Though fires ignited much media attention, the burn area totals were actually lower compared to recent years. By this time in 2012, approximately 9 million acres burned and in 2011, 8.2 million acres burned. In fact, over the last ten years, wildland fires burned 6.8 million acres on average by this time each year (2004-2013). So, why the increased media attention?

While wildfires have many natural benefits, they can be a serious threat to homes, communities, and human life. This year was particularly devastating as over 30 firefighters lost their lives combating wildland fires across the country. Many homes and businesses were also destroyed. Certain wildfires also threatened some of America's most treasured natural areas such as the Rim Fire in California which burned parts of Yosemite National Park.

The Rim Fire was the largest in the U.S. for 2013 and in recorded history for the Sierra Nevada. However, it is only the third largest in California's history. This fire continued for over two months burning a total of 257,171 acres of land and costing over $127 million dollars to fight. Though Yosemite Valley was not in danger, many back-country areas in the park succumbed to the flames.

The Nature of Fire

Fire is a natural and ecologically restorative process. Fire clears dead trees and leaf litter, opens the canopy to allow sunlight to reach the forest floor, and helps prepare soil for new growth by recycling nutrients. Mineral-rich ash produced by fire infuses nutrients into the soil creating an ideal environment for the regeneration of plants and germination of seeds. Fire also removes weak, unhealthy, and insect ridden trees while removing competition, potential infestations, and promoting the growth of stronger and healthier forests.

Many trees have adaptations including thick bark, high moisture content, or underground structures that can help them survive after a fire event. While some trees are built to survive fires, some are also built to depend on fires. Certain species of conifers, including giant sequoia, table mountain pine, lodgepole pine, pitch pine, and jack pine rely on the heat from fire to open their cones to release the seeds inside. Their serotinous, or closed cones have a layer of woody tissue and resin that hold the scales together. With seeds tightly sealed inside, only high temperatures produced by fire can open the cones to release the seeds.

Wildflowers, such as fireweed, a beautiful pink flower, often flourish in the years following a fire. Fireweed earned its name by quickly sprouting after fire and other disturbance events. This flower is common throughout most of the U.S. (except southeastern states and Texas) and is considered a pioneer species that thrives in open areas, taking advantage of reduced tree canopies. Other wildflowers including Indian paintbrush, lupine, and columbine can sprout from their existing, underground root structures if a fire strips the land of its vegetation. These structures allow the flowers to blossom quickly following a fire. Each of these fire dependent flowers burst with color, filling burn areas with the promise of new life.

Understanding Fire

It's important to understand the nature of fire to help keep you and your community safe but also to support this natural, restorative process. Fire seasons and wildfire safety, are key elements of this.

In the U.S. we have what is known as a "fire season." The western fire season typically extends from June through October. In the Northeast, Midwest, and Southeast there are literally two fire seasons –before vegetation greens up in the spring and again in the fall after deciduous leaves have fallen from the trees. Dry conditions, high temperatures, and winds increase the instances of wildfires during these seasons.

To manage fuel build-up, encourage tree and other fire dependent species regeneration, restore prairie and grasslands, along with other management goals, controlled or prescribed fires are intentionally set by forest management experts under controlled conditions. This year, 15,872 prescribed burns were set, covering a total of 1,859,279 acres (in addition to what burned through wildfires). Hawaii, New Jersey, and Rhode Island were the only states that did not set prescribed fires this year. Some areas, such as the Albany Pine Bush in New York, are burned annually to encourage the growth of lupine. This, in turn, provides the exclusive food source for the endangered Karner blue butterfly.

Whether there is a wildfire near your community or a prescribed burn, it is important to understand the nature of fire. While it can be devastating, it is also a natural process. To learn more about fire, what you can do to keep your homes and communities safe, and how you can teach others about fire ecology, explore PLT's Recommended Activities on Fire.

Recommended PLT Activities on Fire

- PLT's *PreK-8 Environmental Education Activity Guide*
  - **Activity 69: Forest for the Trees** (Student pages and resources available online)
    In this activity, students will role-play managing a Tree Farm. By using a piece of land as a Tree Farm, they will begin to understand the economic factors that influence management decisions for private forest lands.
  - **Activity 80: Nothing Succeeds Like Succession** (Student pages and resources available online)
    Succession is a natural pattern of change that takes place over time in a forest or other ecosystem. In this activity, students will read a story about succession, and investigate the connection between plants, animals, and successional stages in a local ecosystem.
  - **Activity 81: Living with Fire** (Student pages and resources available online)
    Students learn about the three elements a fire needs to burn and find out how an understanding of this "fire triangle" can be used to both prevent and manage wildland fires.

- PLT's *Exploring Environmental Issues: Focus on Forests*
  - **Activity 5: The Nature of Fire** (Student pages and resources available online)
    Students will learn about the role of fire in forest ecosystems, will examine issues of fire in the wildland-urban interface, and will conduct a wildfire safety assessment in their community.
  - Wildfire Safety Checklist – a one page handout you can use to determine potential fire risks.

- PLT's *Exploring Environmental Issues: Focus on Risk*
  - **Activity 7: Decision Making: Ecological Risk, Wildfires, and Natural Disasters** (Student pages and resources available online)
    In this activity, students will develop and apply decision making skills to various environmental risk scenarios including wildland fires, natural hazards, and threats to coral reefs and mangrove swamps.

Also, discover how educators in Colorado developed their understanding of fire ecology through the Fire Ecology Institute this summer. View their lesson plans, reflections, and photos from this powerful professional development opportunity.

External Links

- National Interagency Fire Center - the nation's support center for wildland firefighting. Find up-to-date fire statistics as well as prevention education resources.
- Firewise Communities - offers workshops and training on a variety of wildfire safety topics.
- InciWeb the Incident Information System - find up-to date fire incident related information, closures, and news.
- Wildland Firefighter Foundation - helps support families of injured or fallen wildland firefighters.

PLT would like to thank all of the firefighters, volunteers, natural resource professionals, and many others who travel across the country to contain wildfires, manage prescribed burns, and provide fire education information each year.

PHOTO 1: Rim Fire in California. Photo taken by Mike McMillan with the U.S. Forest Service.

PHOTO 2: Fireweed and other flowers quickly grow after Yellowstone fire. Photo taken by Jim Peaco with the National Park Service. Image retrieved from the public Yellowstone Digital Slide Files.

PHOTO 3: Prescribed fire in Indiana. Photo taken by Donna Rogler, Indiana PLT State Coordinator.

Donna Rogler is the Indiana PLT State Coordinator with the Indiana Department of Natural Resources, Division of Forestry. She was trained as a professional forester at Purdue University and is certified in wildland fire. She has been on several assignments as an Information Officer on both wildland and prescribed fire.

Nature Journaling with PLT

By Rob Beadel

A journal is a powerful tool. It unlocks creativity; hones observation skills; provides a window into the past; and is the data collection backbone of the scientific process – all while reinforcing important record-keeping skills such as reading, writing, and drawing.

Did you know?

Notable scientists, naturalists, and philosophers such as Charles Darwin, Henry David Thoreau, Ralph Waldo Emerson, Aldo Leopold, Rachel Carson, and John Muir were all known for keeping journals of their observations, poems, and discoveries. Many of their famous literary works and groundbreaking observations were published from their journals. Charles Darwin's *Voyage of the Beagle* was his field journal that detailed his observations of the ecology in the Galapagos Islands.

Nature Journaling with PLT

The next time you lead a PLT activity, ask your students to record their observations of nature in a journal and watch as experiential learning is taken to a whole new level. Science, technology, engineering, math (STEM), language arts, art, history, and even music can be addressed using PLT activities and nature journaling practices.

Activity 4, Sounds Around from PLT's *PreK-8 Environmental Education Activity Guide* is one of my favorite examples of the versatility and cross-curricular nature of PLT and journaling. The activity can be conducted inside or outside, and there are four different parts which all have recommended grade level ranges.

Here are a few ideas for incorporating multiple disciplines with Activity 4, Sounds Around for all ages:

Music –
Have your students make a sound map by drawing an "X" in the middle of a page of their journal to represent where they are sitting. Then have them use pictures, shapes, or words to show the relative locations of the sounds around them. Students can create multiple maps by sitting in different locations. Have students present their sound maps and describe the sounds they heard.

Science –
Have students research the sounds that they observed. What made these noises? How do animals (or objects) produce those sounds?

Technology –
Have your students record all of the sounds they hear in any given area. If available, you can also use a sound meter to measure the sound level in decibels. (Need a sound meter? There's an app for that! Google Play or iTunes) Have students compare the "loudness" of the sounds they heard in different areas and write about the sounds in each location. Is there a reason why certain sounds are louder in some areas versus others? For example, discuss why you might hear more natural sounds in a remote area, such as a field or forest (birds, streams, leaves rustling, etc.) and other mechanical sounds near a busy intersection (cars, air traffic, construction, etc.).

Engineering –
Choose a location such as a park or open area on the school grounds or in the community that is greatly affected by noise. Determine sources of noise and discuss ways to mitigate the impact, such as planting trees or building another type of noise barrier. Encourage students to sketch the area and propose ways to reduce the noise. Help students plan and carry out a service-learning project based on their proposals.

Math –
Have your students graph the sounds they heard, comparing how loud each noise was. You can also have students attempt to calculate the distance to the source of a sound. Here's a classic example of how to calculate how far away lightning struck by calculating how long it takes to hear the thunder.

Language Arts –
Have students pick a sound they heard and write a poem or short story about the sound itself or what produced it. You can also have students explore the following questions as writing prompts:

- What were the sources of the sounds you heard?
- Which sounds did you like?
- Which sounds did you dislike?

Art –
Encourage students to draw or illustrate their observations in their journals during each activity component. You can also have your students create their own nature journal.

History –
Have your students draw or write about an area in or around your school and imagine what that area was like 100 or 1,000 years ago. What might you hear now that you wouldn't have heard then? Students can then research the local area to find out its history.

Other PLT Activities with Nature Journaling Applications

Try the following activities from PLT's *PreK-8 Environmental Education Activity Guide* as they are ripe with practical examples for nature journaling:

- Activity 1: The Shape of Things
- Activity 2: Get in Touch with Trees
- Activity 4: Sounds Around

- Activity 5: Poet-Tree
- Activity 20: Environmental Exchange Box
- Activity 21: Adopt a Tree
- Activity 29: Rain Reasons
- Activity 78: Signs of Fall
- Activity 80: Nothing Succeeds like Succession

Technology Expansion

Traditional journaling has expanded beyond paper. With social media, blogs, and photo and video sharing platforms, teachers are finding new ways to record and share their writings, discoveries, and class achievements. Consider starting an online nature journal with your students, and detail your discoveries in the natural world through a classroom blog. This way you can share your stories with other teachers around the country or the world and see what other virtual pen pals are finding as well.

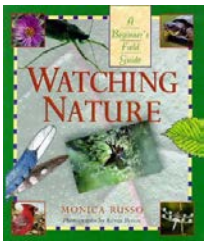
Check out "Ms. Venti's Class" blog, an online journal written by a teacher at Paul Public Charter School, a PLT GreenSchool!

Resources:

- Nature Journaling with PLT – Here's a handout I developed to teach the basics of nature journaling with students using PLT and other recommended resources. View beginning drawing exercises, tips for improving observation skills, and ideas for student craft projects to create personalized journals.
- **John Muir Laws - Nature Stewardship through science, education, and art.** Follow their blog for helpful tips on nature drawings or visit this website and download "Opening the World Through Nature Journaling: Integrating art, science, and language arts."

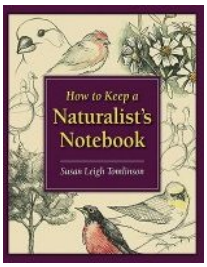
Keeping a Nature Journal: Discover a Whole New Way of Seeing the World Around You
All ages. ISBN: 978-1580174930
Published by Storey Publishing, 2000
Authored by Clare Walker Leslie and Charles E. Roth

This book is by far my #1 pick for reconnecting with and discovering nature through journaling. It's beautifully illustrated and offers simple techniques, exercises, and prompts for all ages. I highly recommend this if you or your students are interested in starting a nature journal.



Watching Nature
Ages 9 and up. ISBN: 978-0806995151
Published by Sterling Publishing Co., Inc. 1998
Authored by Monica Russo

Learn new ways to experience nature and find hidden natural treasures, while developing your observational skills. Inside this book, you'll find photos, illustrations, and descriptions to help you find animals, recognize sounds, or even attract wildlife to your backyard. This book offers many tips for recording your outdoor adventures, sketching, and improving your outdoor photography.



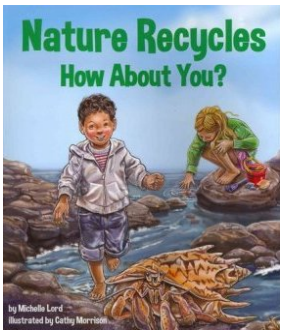
How to Keep a Naturalist's Notebook
ISBN: 978-0811735681
Published by Stackpole Books, 2010
Authored by Susan Leigh Tomlinson

This guide offers tips on getting started with keeping a nature journal. Inside, you'll find tips for beginning nature journal keepers, equipment recommendations, and instructions for setting up a journal.

Resources

Literature Connection – Nature Recycles, How About You?

By Jaclyn Stallard



Grades K-5
ISBN: 9781607186274
Sylvan Dell Publishing, 2013
Authored by Michelle Lord
Illustrated by Cathy Morrison

Nature Recycles is an ideal book to introduce reuse and recycling to young children. By showcasing the various methods animals use to repurpose materials in their natural habitats, this book provides examples of recycling that will inspire youngsters to creatively reuse their own objects. For example, readers learn that poison dart frogs reuse bromeliad plant leaves and nut pods from the rainforest as cradles for their young. The full-page illustrations provide accurate depictions of the ingenious ways creatures use materials they find.

Explore the many ways that you and your family might begin to **reduce** waste, **reuse** items, and **recycle** materials. Consider these ideas today:

- Reduce electricity by turning off lights whenever they are not in use
- Reduce plastic and paper consumption by shopping with reusable bags
- Reuse paper towel tubes to make a pair of "binoculars"
- Reuse coffee grinds as garden or soil compost
- Recycle glass so it can become a future countertop
- Recycle plastic so it might become someone else's carpet

PLT's Activity 15, A Few of My Favorite Things, challenges children to come up with new inventions or alternative uses for broken items. These ideas can be showcased in "Trashion Show," where children can exhibit their new creations from items formerly viewed as trash.

Explore the following PLT Activities for additional ways to reduce, reuse, and recycle:

Environmental Experiences for Early Childhood
#9 – To Be a Tree
#10 – Trees as Habitats

PreK-8 Environmental Education Activity Guide
#15 – A Few of My Favorite Things
#23 – The Fallen Log
#24 – Nature's Recyclers
#37 – Reduce, Reuse, Recycle
#51 – Make Your Own Paper
#52 – A Look at Aluminum

GreenSchools!
Energy Investigation
Water Investigation
Waste and Recycling Investigation

Exploring Environmental Issues: Municipal Solid Waste
Eight activities in this PLT secondary module engage high school students in exploring waste generation, natural resource use, and waste disposal

STEM Connections – Pass the Plants, Please

by Kris Irwin, Ph.D

Engage your students in real-world applications of STEM education by using Activity 16, Pass the Plants, Please from PLT's *PreK-8 Environmental Education Activity Guide*.

STEM Connections

Science – Students learn about the science of dietary guidelines and the types of foods that promote a healthy lifestyle.

- Enrichment Question: Based on these dietary guidelines, what would you serve for lunch at

school so that you and your classmates have a balanced meal?

Technology – Students can use this web-based calorie calculator to find the calories consumed during a given period of time. Students can log their daily caloric intake for a 4-day period, as described in the activity. Have your students record this information in a spreadsheet and graph the results.

- Enrichment Question: Using the calorie calculator, list food items that students like to eat along with the calorie content for each food item. What foods have the highest and lowest calorie content?

Engineering – Part A of this activity challenges students to think about the plants found in the foods they love. Students love pizza, for example, and once students list and categorize the plants and parts of plants in the recipe, ask them how we get the ingredients from plants. For example, bread in the crust is made with flour, which comes from ground grain (or gluten free options). Ask your students how plants become ingredients and what tools they would use to turn plants into ingredients.

- Enrichment Questions: Have students discuss how they would prepare ingredients for their family. How would they scale up or improve the process to make enough ingredients for the whole school?

Students can extend this activity by investigating the subject of genetically engineered or modified foods. Share this video about how genetically modified food is made and discuss the difference between organic and engineered foods.

- Enrichment Questions: What do you think about genetically modified food? Would you eat it? Explain why or why not.

Math – Have your students record their intake of food and count the number of plant items found in their lunch each day. Students can log their findings in a spreadsheet, then create charts or graphs that track daily or weekly plant consumption. Students can also graph by plant type, nutrients in their foods, or compare their food intake with the recommended daily intake of food.

- Enrichment Questions: How might the daily consumption of plant foods change each season? Is there a difference in the frequency of plants in your students' lunches over the summer and fall vs. winter?

Get the Activity Guide
PLT materials are available through professional development workshops.
Contact your PLT State Coordinator for more information.

Resources
Supplemental activity resources are available in our curriculum resources database.
(Printable student pages in English and Spanish are available for download.)

EE Resources – Fall 2013

By Jaclyn Stallard

Grant Opportunities and Contests

American Honda Foundation Grants
Deadline: November 1, 2013
The American Honda Foundation awards grants of between $20,000 and $75,000 to youth education

programs focused on science, technology, engineering, and math (STEM) and the environment. Public and private elementary and secondary schools, public school districts, and nonprofit organizations are eligible to apply.

The Lawrence Foundation Grants
Deadline: November 1, 2013
The Lawrence Foundation provides funding to support the environment, human services, disaster relief, and other causes. Public schools, libraries, and nonprofit organizations may apply. Both program and operating grants are available. Grant amounts range from $1,000 to $100,000.

Dreyfus Foundation Educational Grants
Deadline: November 10, 2013
The Max and Victoria Dreyfus Foundation awards grants of between $1,000 and $20,000 to community-based nonprofit programs located in the United States. Schools; museums; environmental and wildlife protection activities; and programs for youth are eligible to apply.

America's Home Energy Education Challenge
Team Registration Ends: November 15, 2013
America's Home Energy Education Challenge is a national student competition designed to help families save money by saving energy. Administered by NSTA, the challenge encourages students in grades 3-8 to make smarter energy choices. Teams will compete for cash prizes that will be distributed at the regional and national levels of the competition. Register today! Also, teach your students about Energy using PLT's PreK-8 Guide Activity 39, Energy Sleuths as well as PLT's Energy & Society Kit and GreenSchools! Energy Investigation.

Samsung's Solve for Tomorrow Contest
Deadline: April 16, 2014
Win a share of $2,000,000 in Samsung technology and prizes for your schools through Samsung's Solve for Tomorrow Contest. This is an opportunity for teachers and students to show how Science, Technology, Engineering, and Math (STEM) can be used to improve your communities. Discover the power of technology and show your students how to apply STEM to real-world issues. Contest applicants will also be eligible for the Environmental Sustainability Innovation Award with an additional prize of $50,000 in Samsung technology.

Webinars and Professional Development Opportunities

ClimateChangeLIVE, a Distance Learning Adventure
Teach your students about climate science through "electronic field trips" led by climate experts and educators. The ClimateChangeLIVE program offers opportunities to learn about climate change through a series of webcasts, webinars, and online climate education resources.

Upcoming ClimateChangeLIVE webinars:

- **October 23, 2013 - 7:30-9:00pm ET**
  Teaching and Communicating About Climate Change
- **November 20, 2013 - 7:30-9:00pm ET**
  ClimateChangeLIVE Education Resources Highlights - Part 1
- **December 11, 2013 - 7:30-9:00pm ET – (PLT will co-present)**
  ClimateChangeLIVE Education Resources Highlights - Part 2
- **January 29, 2014 - 7:30-9:00pm ET**
  Professional Development Programs for Climate Change Education
- **February 19, 2014 - 7:30-9:00pm ET**
  GreenWorks! Action Grants for ClimateChangeLIVE Participants

The full list of webinars, descriptions, and registration information is available on the ClimateChangeLIVE website. PLT is a partner in ClimateChangeLIVE, a distance learning adventure of the U.S. Forest Service, Prince William Network, other federal agencies, and non-governmental organizations.

Other Resources

New Girl Scout Correlations for PLT Curriculum
PLT activities can enhance your Scout programs. Our new Girl Scout Correlations can show you how (Boy Scout Correlations are also available).

Why Would Anyone Cut A Tree Down?
Our partners at the USDA Forest Service's Northeastern Area State & Private Forestry recently published a book entitled "Why Would Anyone Cut a Tree Down?" This book, which primarily targets first to third grade students, explores this question in depth and also shares tree planting tips. The 41-page illustrated children's book was written by Roberta Burzynski and illustrated by Juliette Watts, two long-time Forest Service employees. Printed copies of "Why Would Anyone Cut a Tree Down?" are available for sale through the Government Printing Office, and a free digital PDF version of the book is available online.

Connect4Climate Student Video
(resource for PreK-8's "The Global Climate," "Democracy in Action," and "There Ought to Be a Law," as well as PLT's Focus on Forests and Forests of the World secondary modules)
Connect4Climate is an ongoing project between University of Maryland students and the World Bank. The video represents 50 sociology students' perspectives after visiting the World Bank in Washington, DC. The video shows students' passion and enthusiasm towards connecting other people, adults and students alike, to issues of climate change, "right here, right now, together."

EPA Climate Change Resources
(resource for PreK-8's "Rain Reasons," "The Global Climate," and "Our Changing World," as well as Focus on Forests' "Climate Change and Forests")
Did you know that thousands of measurements of the Earth's air, water, and land are taken every day? These measurements come from weather stations, airplanes, ships, satellites, and many other sources all around the globe. Taken together, these measurements and other observations tell us that the Earth's climate is warming, people are the main cause, and impacts on society and the environment are already happening. Visit EPA's climate change website for resources and more information.

The Hopeful Story of American Chestnut Recovery
(resource for PreK-8's "Invasive Species," "Trees in Trouble," and "Tree Lifecycle," as well as Biotechnology's "Forest Biotechnology")
This video blog post from Go Wood presents a clear summary of what happened to the American Chestnut *(Castanea dentata)*, what is being done in the scientific realm to make a recovery of the species possible, and how you can help bring the American Chestnut back to the American forest. Go Wood seeks to educate people on the value of wood in society and is supported by professors at Penn State University Extension.

Virtual Tour: Hershey's Chocolate Factory
(resource for PreK-8's "We All Need Trees," "Three Cheers for Trees," "A Forest of Many Uses," "Trees for Many Reasons," and more)
Help your students explore one of the most delicious forest products: Chocolate!! Thanks to step-by-step videos on its chocolate-making process, Hershey's offers students a fun virtual field trip for any classroom. After building his own milk-processing plant and working day and night for three years, Milton Hershey became the first American to develop a formula for manufacturing milk chocolate. It was affordable, tasted good, and remained fresh for a long time. No wonder it was an immediate sensation. Take some time to enjoy this special "taste" of Hershey's chocolate!

Into the Outdoors – Forest Ecology
(resource for PreK-8's "We All Need Trees," "Forest of Many Uses," "Forests for the Trees," and more, as well as PLT's Focus on Forests secondary module)
Into the Outdoors is an Emmy award-winning TV show with an emphasis on science education for middle school-aged students. The show's new website, intotheoutdoors.org, provides free videos and other resource links on many environmental topics to make outdoor learning exciting and fun. While there are many exciting topics to choose

from (such as sustainable forestry, biodiversity, and wetlands), Into the Outdoor's 4-part video series on Forest Ecology is a perfect fit with many Project Learning Tree activities. These 5-7 minute shorts feature middle school aged youth that inspire all of us to take learning outdoors!

Asian Longhorned Beetle Hunt
(resource for PreK-8's "Invasive Species," Focus on Forests' "Forest Invaders," and Biodiversity's "Global Invaders")
Students in grades K-12 can participate in the USDA's Asian Longhorned Beetle Hunt and help preserve our nation's forests. The Asian longhorned beetle, an invasive pest, destroys trees and has been found in several states across the country. Classroom resources, including videos and identification worksheets, are available to help teach what the beetle looks like, what the signs of infestation are, and what to do if an infestation is spotted.

A Green Take on *A Christmas Carol*
(resource for PreK-8's "Renewable or Not?," "Reduce, Reuse, Recycle," "A Peek at Packaging," and "Resource-Go-Round," as well as PLT's Solid Waste and Recycling GreenSchools! investigation)
Earth Day Carol is a green retelling of Charles Dickens' *A Christmas Carol.* In this version, Plastic Bottle Scrooge is visited by the ghosts Plastic Past, Plastic Present, and Plastic Future. You can download the free mobile app to convey the message of "reduce, reuse, and recycle" through animation, pop-up facts, and kid-friendly narration. Most appropriate for elementary and middle school students, this story can be a starting point for taking environmental action.

National Park Service Movies and Podcasts
(resource for PreK-8's "Loving It Too Much," "400-Acre Wood," "A Forest of Many Uses," and "Forest Consequences")
New NPS video and audio recordings show students what park scientists do and provide an inside look at some of the issues facing our national parks. Most appropriate for middle and high school students, teachers can use the clips to generate discussion about real-world problems in nature and how scientists and others work to solve them.

Ordinary Extraordinary Junco
(resource for PreK-8's "The Forest of S.T. Shrew," "Trees as Habitats," "Web of Life," and "Schoolyard Safari," as well as PLT's Biodiversity module)
Introduce yourself to one of North America's most common and abundant groups of songbirds, the Juncos. Readily observed in backyards, city parks, and forests alike, these little gray birds—sometimes called "Snowbirds"—can be easily overlooked. But for scientists who study animal behavior, ecology, and evolutionary biology, the Junco is a rockstar. Use these video shorts from The Junco Project and a pair of binoculars to get outside and make some Junco friends!