Photo credit: Robert Cichowski

# Taking Students into the Forest

*Right-brain activities make left-brain progress.*

By **Christine Heinrichs**

GETTING STUDENTS OUT of the classroom and into the forest activates their creative spark and engages them in acquiring solid scientific knowledge. Being in the forest enlivens students on many fronts. They return from the experience with vivid, tactile, visual, aural, and personal memories as well as ecological understanding of the forest system.

In Cambria, California, the organization Greenspace - The Cambria Land Trust, partners with the Harold J. Miossi Charitable Trust, to connect students with nature by inviting sixth-, seventh-, and eighth-grade students out into the forest to be learners and researchers. The Greenspace Environmental Education Field Program uses nature as a means of teaching students about the relationships within the forest, namely those concerning its animals and plants. It is led by Greenspace board member Ann Cichowski and her husband Robert Cichowski, Greenspace Education Program Coordinator and retired California Polytechnic State University (Cal Poly) professor of chemistry.

What follows is the story of Santa Lucia Middle School students' experiences with the Greenspace program as part of an elective Environmental Education class taught by Danielle Narzisi.

## Engaging students' brains

The brain has two hemispheres that correspond to the right and left sides of the body. Each hemisphere controls the opposite side of the physical body — the left hemisphere controls the right side; the right hemisphere, the left side.

The two hemispheres are well-connected by the thick fibers of the corpus callosum. They operate together, but are not identical in function. The left hemisphere dominates in tasks related to logic — specifically, those that are analytical, reality-based, linear and logical, sequential and symbolic, and objective and verbal. The right hemisphere dominates in tasks related to creativity and the arts, so it processes fantasies, holistic experiences, intuition, visuals, subjectivity, and non-verbal communication. It is misleading to consider individuals as being driven by one hemisphere over the other; neuroimaging research suggests that people use both cerebral hemispheres to perform most activities. The Greenspace program allows students to absorb left-brain factual material, while immersed in right-brain activities. The forest experience, in particular, is an ideal context for maximizing left- and right-brain functions to help every student learn.

## Preparation

The purpose of the forest visit is to allow young people to learn about the species the Monterey Pine forest harbors as well as some science about this unique habitat, while

instilling in students the desire to protect and enhance it.

Some students have never been in a forest before. It's unfamiliar, but the support of their classmates, teacher, and a team of engaged adults will allow them to relax and enjoy the new experience.

In class before the field trip, Greenspace board members give students the materials they need to effectively engage with the forest, including vocabulary like *ecosystem*, *symbiotic relationship*, *seedling*, and *sapling*. While not on a test, these words appear in pictures, and students use the words by writing sentences that each include accurate usage of one or more of the words.

"Some of the words are [part of] basic Environmental Ed. vocabulary, and some are very specific to our… field trip," says Ms. Narzisi.

Their assigned weekend homework is to do something outside. Back in class, they spontaneously report on their activities, such as camping, going to the beach, hiking, or riding a bike.

There are also two days of instruction on soil testing to prepare students for one of the more complex in-forest activities.

## Down the forest path

Ms. Narzisi and her students arrive by school bus and gather at the entrance to Strawberry Canyon, Greenspace's 21 acres of Monterey Pine forest. Greenspace founder and Monterey Pine forest expert Rick Hawley greets the group and leads them down the trail.

While this setting offers much that is distracting, it is also peaceful. The walls are gone. Students can gaze around at their surroundings, smell the pines, and listen to the birds calling.

"It's wonderful to see the kids put down their cell phones and get engaged in nature," Hawley says.

The trail passes five learning stations, each one holding scientific materials specific to forest research. The group arrives at the first station, *Seeds and Insects*.

## Crawly critters

At *Seeds and Insects*, the students experience how a heat-treated Monterey Pine cone releases its seeds, and then they get to plant these seeds in germination cones. They let out a big "Yuck!" followed by a smile when they are introduced to the pine forest's beetles, including the larva of a California Fivespined Ip (a wood-borer). As they stroll along the forest path, they collect insects. The insects, particularly certain beetles, can be carriers of pine tree diseases.

One budding seventh-grade Entomologist lifts up tree bark to find termites, bark beetles, and sow bugs, also known as "roly-polies." "He [is] totally enthralled with taking apart a dead log," says Education Project leader Robert Cichowski, also along with the group at this point.

As Mr. Hawley leads them, they take note of other plants that are growing in the forest, including native Poison Oak. "Leaf of three, let it be!" Another native plant is Dwarf Mistletoe, a parasitic species that reduces the growth, wood quality, seed production ability, and life span of the trees it infects.

### A rare woodland

The Monterey Pine forest is one of the Central Coast's rarest habitats. Only five native stands still exist globally, three in California and two on islands off the coast of Mexico. The cones are fire-dependent, meaning they only open and release seeds when triggered by the heat of fire. The forest's understory typically consists of shrubs like Salal, Coyote Brush, Mock Heather, and Huckleberry.

"Learning some basic forest pathology facts about the [Monterey] Pine forest is essential to understanding the forest ecosystem," Mr. Hawley says.

## Art under the trees

Bringing their collected insects in magnifying boxes to the *Insect Art* Station, local artists Sarah Blair Field and Art Van Rhyn give the students pointers on how to draw them.

"The kids draw just fine," says Mr. Van Rhyn. "Mine is a small part. I just give them a piece of paper and a pencil and step back."

Director Ann Cichowski observes that after walking through the pine forest, the students draw Monterey Pine trees as tall, slender trees with that distinctive rounded top, rather than the cone-shaped Christmas trees kids usually think of as pine trees. "Their artwork reveals a lot about what they are learning and how they see the world."

"The kids become aware of the replenishment of the ecosystem," says Mr. Van Ryhn. "Big things die and little things come along."

Including local artists encourages students to engage their non-verbal skills. Through their drawing, students combine the facts they have learned with their creative sides. The factual material becomes more vivid to them through engaging all aspects of learning in the experience.

## Taking a breath

After *Insect Art*, everyone is glad to meet at the *Lunch* station. The middle school students have been constantly in motion since arriving at Strawberry Canyon, and now they eat and chat. Early Childhood Educator Sue Davis marshals the forest's healing powers to take the chatty tone down a notch. This recalls the Japanese practice of "Shinrin-yoku" or, in English, "forest bathing," which is meant to allow people to slow down and become wholly immersed in the natural environment.

"Quiet time made me relax, and I almost slept," one student would write later.

"Thank you for letting all of us calm down," from another student.

"Nature is peaceful," from another.

## Chemistry in the forest

At the third station, *Soil Testing*, the students work with soil samples from planting areas in Strawberry Canyon. Cambria's forest soil is the natural bed for the Monterey Pine. The species has occupied this part of the landscape for millennia. Primed by their two days of classroom instruction, the students test the soil for pH (acidity/alkalinity), which affects pine growth. A teaspoon of soil in a measured amount of distilled water with an indicator dye tablet produces a colored solution. The color is then compared to a color chart of pH levels.

The students learn basic chemistry, specifically how elements combine to provide important soil macronutrient levels of nitrogen, phosphorus, and potassium to the trees.

"Eighth-graders make connections with the soil chemistry to the chemistry they are doing with me in their physical science classes," Ms. Narzisi says. "They help the sixth-graders with the periodic table, pH scale, and other basic chemistry."

The students develop ideas on making changes in the forest. For example, if their data shows that Strawberry Canyon's soil is too alkaline, they might recommend that the soil become more acidic since Monterey Pines need more acidic soil.

## Ready to plant!

At the final learning station, *Planting*, the students get their hands in the dirt. They plant native pine seedlings grown from seeds collected in the forest. These seeds are from trees that have resisted the Pitch (Pine) Canker that has infected many trees. Each student's seedling is marked by a stake with his or her first name. Santa Lucia's 2016 sixth-graders returned as seventh-graders in 2017 to visit the trees they planted the year before. One student had written, "I really liked taking a picture next to my tree."

It's a long day in the forest. A local business, Harvey's Honey Huts, provides a clean restroom.

"The wonder of it is getting out in the open, in the air, like we used to play as kids," says Mr. Van Rhyn, now in his 80s. "It's very exciting for me to see the wonder of growing things that Rick [Hawley] implants in them."

## Looking back

Back in the classroom, the students spend the next two days making their own paper out of used and discarded paper. The new paper is used to record original poems about the forest. The use of a Poet-Tree adds another dimension to the learning.

Thank-you notes to the Greenspace Volunteers follow. "I might have been in a bad mood that day, but you helped it get better," one writes in a thank-you, illustrated with his drawing of a Red-and-green Macaw—not a native species, but listening to bird calls was part of the field trip. The students had heard jays squawking at each other, calling warnings about the people in the forest, and Wild Turkeys gobbling.

## On-campus gardening

Santa Lucia Middle School has its own garden with eight beds and a greenhouse. Students are always eager to spend the class period in the garden. "I actually hear them say, 'Yessss!' every single time!" Narzisi says. Students start plants from seed in the greenhouse. With Environmental Education being a year-long class, students can follow their plants from seed to plate. "They love seeing their projects through." They take care of the plants in the greenhouse until they are ready to be transplanted outdoors into the beds, and then they continue caring for the plants until they are ready to be harvested. "Then we eat them!"

Typically, the students work independently in the garden planting seeds and transplanting greenhouse plants to beds. One group project involved the students' creating a proposal for a succulent garden at the school. To learn about succulents, Ms. Narzisi had taken the class to Ganna Walska Lotusland, a botanical garden in Montecito, earlier in the year. Ms. Narzisi directed the students to pay particular attention to the succulents there. "[They] were amazed and inspired by the plants and gardens. I was blown away by their level of appreciation of this experience." She had overheard one sixth-grader say, "This bed [of succulents] is so beautiful!" One eighth-grade student who had taken the class three times held a weed up to the sunlight exclaiming, "Look at this! Its roots are so beautiful."

"The level of appreciation for nature, including the roots of a weed, has increased so much by interacting with nature in such a hands-on way," remarks Ms. Narzisi.

The students then worked in small groups to design the succulent garden, which they presented to the principal, before working together to plant the garden, take cuttings of succulents, and complete other garden tasks.

Students even started a new native plant garden on campus, behind the main office. In preparation, they worked independently to research a native plant that they intended to plant on campus. Using this information, they created an informational interpretive plate for each plant.

## Human impacts


The Greenspace program impresses on students the importance of the relationships among all the plants and animals, large and microscopic, which support forest ecology and foster a healthy ecosystem. Students then make connections to how consuming and disposing of so many materials in our society and using so much plastic is harmful for the environment. They are able to be specific in citing examples, and they make suggestions to reduce plastic in their lives, such as buying items that will last so they don't have to throw them away; choosing to buy items that have less plastic, including the packaging; reusing items; and buying items that are reusable, such as refillable water bottles.

They work on an upcycling project, a creative reuse of turning seemingly useless or unwanted waste products into new materials, products of better quality, or items with better environmental value. Students aren't allowed to spend any money or buy anything in the process, and they need to turn their item into a different type of item. "Hopefully, it will be something that they actually use," Ms. Narzisi says.

One student attaches an old remote-control car to the bottom of an old trash can. The result looks like R2D2 from Star Wars, and it allows him to control the trash can remotely. Another student makes a phone case that incorporates pockets for his house key and money out of cardboard and old maps. Students have also built succulent planters out of discarded materials, a desk organizer, and piggy banks.

"They usually say in their reflection portion that they never thought of doing this kind of thing, but they will in the future," says Ms. Narzisi.

**Christine Heinrichs** is the Vice-President of Greenspace's Board of Directors. The Greenspace Environmental Education Field Program now includes two school districts, Coast Union and Cayucos.

## Community support and expansion

Greenspace Environmental Education Field Program is the result of a partnership between Greenspace and the Harold J. Miossi Charitable Trust, which supported the education program with a generous grant. Projects to protect the environment are among its six program focus areas along with projects involving environmental science, green technology, promoting open spaces, sustainable agriculture, and land preservation.

"Greenspace plans to continue to expand our education outreach in the North Coast of SLO County," says Mary Webb, President of the Greenspace Board of Directors. "We very much look forward to our continued partnership with the Harold J. Miossi Charitable Trust."

In Spring 2018, the Greenspace Environmental Education Field Program expanded to Cayucos Elementary seventh-grade students.

The Santa Lucia students who were sixth-graders when they first enjoyed the program returned as seventh-graders for more advanced studies, such as research on the pine and oak populations as well as the dominance of Dwarf Mistletoe. They collected data in three transects in the forest to compare how the trees are faring.

In Fall 2018, Greenspace Environmental Education Field Program reached out to Cambria Grammar School's fifth-grade classes. Those students are working on a seed research project to test the viability of Greenspace's seed bank, archived seeds that have been collected for 18 years.

Videos showing the kids and the forest are posted on the Greenspace website, https://greenspacecambria.org/ and on YouTube at https://www.youtube.com/channel/UCR-o_PIEGPXdnDh1vuKSxeQ?view_as=subscriber.