

STREAMS, RIVERS, AND LAKES, OH MY!

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In southwest Tulsa, Oklahoma, there exists Camp Loughridge (CL). Founded in the early 1900s as a Girl Scout camp, this 188-acre property has cycled through various owners and missions, and now has three primary roles: Christian summer day camp; building and facility rentals; and the Camp Loughridge Outdoor Classroom (CLOC), which will be introduced in this article.

Camp Loughridge Outdoor Classroom staff members bring students to their urban wilderness (in the Cross Timbers Eco-region) for the purpose of involving children in REAL science in the REAL world. Fifth grade is the targeted age group. CLOC naturalists work with teachers to design the perfect outdoor day for the students, a day rich in STEM (science, technology, engineering, and math) activities. A journal (which the students use while here and then again in the classroom) is tailor-made for each visiting class.

Nearly 1,500 students participated in CLOC from September through mid-December 2017. Activities and experiments frequently requested by teachers include those that introduce watershed assessment, stream health, and aquatic ecosystems (Figure 1). This gives CLOC naturalists a great opportunity to help students make the connection that clean streams, rivers, and lakes support life, and all citizens (including 5th grade students!) can act to protect these waterways.

One of Camp Loughridge's main benefits to children is the opening of their eyes to aquatic ecosystems and the

creatures to be found within them. The lesson begins with students crossing over a small stream that flows into Lake Parthenia, one of CLOC's three lakes. The view of the lake below and the stream coming from "somewhere up there" offers a clue of why the word "basin" can be interchanged with the word "watershed." Then students play the role of *everyday citizens* as they contribute to water pollution with mock chemicals, paint, soil, etc. Next comes discussion on how pollution can be reduced and even prevented (Figure 2).

The highlight of the lesson for the majority of the students is the chance to meet some of the small creatures from the CLOC property. Small native fishes and larval aquatic insects are the life of the party as children learn how to hold them without harming them (Figure 3). It is difficult to say who is the favorite—the fishes or the insects—as children learn what it means to be a vertebrate or an invertebrate, and how clean water is needed not only by humans, but by aquatic creatures and other wildlife.

To hike through ecosystems while stopping to examine the plants and animals (or animal signs) along the way is of value to all fifth graders, and even much younger students. Many children seem to have never considered that their drinking water comes from a lake, which is the case in northeast Oklahoma. Students in fifth grade readily grasp that finding creatures in the water means the water is clean enough to support life. A waterbody with no little animals is just not quite right.

CLOC naturalists, teachers, and parent volunteers love seeing the joy the children get from handling and studying the small creek animals. Even on a cold day, when the moment comes for the students to meet the stream inhabitants, sleeves get rolled up and hands dip in the water. Every child is instructed that only moist hands get to hold creatures (Figure 4). This makes a good lesson in empathy, as these little aquatic animals are more likely to survive this fifth grade "show and tell" if all hands are wet.

Most of the schools invited to Camp Loughridge fall into the category of Title One, meaning that the schools have a large percentage of students from families that qualify for free or re-

Photos by the author unless otherwise indicated.

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Figure 1. Watershed Model. With a “hands on” watershed model, students get a feel for the way life in “Any Town” America can contribute to stream, river, and lake pollution. Eroding soil (agriculture or development), chemicals (like fertilizer or pesticide), paint, and pet waste can result from day to day life, and can be carried in stormwater to nearby waterbodies. Discussion and demonstration go beyond recognizing common pollutants to listing ways that these pollutants can be reduced and even prevented. It is during this part of the lesson that the fifth graders see that aquatic insects are a critical component of the food chain for fish and other animals, plus they serve as bio-indicators for water quality.



Figure 2. Riparian zone. With a small homemade runoff model, students get to see how healthy riparian area soils capture rainfall, slow flow, make water available to plants, and filter pollutants. In addition to healthy forest and grassland soils, students get to see the impact of impervious surfaces (like parking lots) and bare soil (as in freshly cleared land). The small runoff model is especially meaningful since the fifth graders also take a stroll through the riparian zone as part of their journey along the lake trail.



Figure 3. Many hands: It is easy to find eager young scientists willing to do a close inspection of tiny insects from the stream. Most of the students coming to Camp Loughridge are from the greater Tulsa area, and often the urban streams in their neighborhoods are boxed into concrete and/or channelized. Urban streams often lack both species diversity and abundance.



Figure 4. Three children with mayflies: Tiny as they are, larval mayflies from the stream bring big smiles to children's faces and genuine curiosity to their minds. They find the gills and learn that these creatures, like fishes, breathe oxygen from the water. Just as fascinating is the fact that the greatest percent of their lives are lived as juveniles in the stream, and as adults they gain the gift of flight!


duced cost lunches. Often these are children who particularly benefit from the time outdoors, hands-on experiences, and the chance to problem solve outside classroom walls.

The CLOC program naturalists facilitate activities that help children gain resiliency and develop self confidence. Like fellow professionals who work in natural resource protection or outdoor education, the naturalists know that we live in a moment when spending quality time outdoors is not a priority for most families. Hectic schedules, changing family dynamics, and an overload of screen time means children are more and more likely to spend the bulk of their days indoors. Children who do not have good out-



door experiences are probably not going to become adults who recycle, support renewable energy, and see the value in wilderness areas.

CLOC is working toward a pattern of repeat visits within the same year for schools, perhaps even to include a naturalist visit to the school in between for reinforcement. This will add a few more caring adults to the palette of people in the children's lives, will offer even more of what STEM looks like in the real world, and will be a stepping stone to add resiliency and self confidence, as mentioned previously. The quality time spent outdoors at Camp Loughridge will help these students attain a level of ecological literacy that is needed now and will be needed even more in years to come. Based on the joyful smiles and laughter observed during fish and insect inspection time, the children are also getting that quality outdoor experience that is essential to the making of a steward.

Footnote: Camp Loughridge is a nonprofit organization that relies on charitable donations to bring children to the outdoor classroom. Camp Loughridge naturalists have developed a program to immerse students in the sciences naturally, through the woods, water, and wildlife. Donations are tax deductible and more information can be found at www.CLcamps.org and at www.facebook.com/CLOCstem.


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