

Taking the Classroom Outdoors

by Amanda Sullivan

What began as an idea to connect students in Maryland with their local streams has grown into a rigorous course of study. The Explore and Restore Maryland Streams program has been building up steam across the state over the last three years. Students and teachers are asked to visit a local stream, ideally within walking distance of their school, and measure how healthy it is.



Taking the classroom outside

The student investigation techniques developed by the Chesapeake and Coastal Service Education division are directly based on the scientific monitoring the Department of Natural Resources biologists conduct around the state. This allows students to experience current scientific practices and gain the confidence to arrive at a conclusive assessment of the health of their local stream and watershed. Ultimately, students are able to use their findings to take appropriate action to improve the health of the stream.

Department biologists present to teachers in one-day professional development workshops on a range of topics: stream ecology, how land use influences streams, and about the animals who call these ecosystems home. Teachers then conduct biological, chemical, and physical assessments of the stream with the scientists, allowing teachers to grow their content knowledge as well as their confidence working in outdoor environments.

According to Traci Schneider, a science advisor from Somerset County, "from my perspective, it is experiences like these that mean the difference between teachers asking students to just read and study science phenomenon within the classroom walls versus allowing students to truly experience science in an authentic way."

Seeing the big picture

The program uses the diversity of life within a stream—fish, salamanders, macroinvertebrates—as an indication of its current health. Protocols for measuring the geomorphological changes of a stream over time allow students and teachers to identify the effects of large storms or increased development in their watershed. Lessons about the microhabitats found within a stream encourage students to develop their own investigations about those features and the aquatic life that depend on them. All of these activities include outdoor exploration in the students' local natural areas, which is an important experience lacking for many of today's youth.

Environmental educator Joe Davis of the Baltimore County who is working to integrate these materials into the curriculum of Baltimore County schools is convinced that they are critical.

"Getting kids outdoors to learn can be a key strategy for hitting our systemic goals," he says. "It's a heavy lift with a system as big as our county's, but we are building a solid team and are making progress. Seeing thousands of kids each year knee-deep in a stream or watching bald eagles from a canoe is so important. I'm going to do whatever I can to ensure that as many kids get that experience as possible."

Because assessments can be conducted near the school, the investigations have the potential benefit of eliminating the need and cost of buses and substitute teachers. This variety of teaching resources allow teachers and students to use the materials that best fits their course of study, and gives them the flexibility to conduct rich, meaningful investigations of their own watershed.

Empowering students to take action

After students investigate and analyze their data, they are asked to propose and implement an action to improve the conditions: perhaps building a rain garden or swale, or developing a plan for community outreach. Because the stream assessment and restorative actions are happening in the students' own community, they can make a difference and improve the environment where they live. This meaningful experience can lead to a long lasting connection to nature, creating the next generation of environmental leaders and stewards.

Pat Benner, a veteran middle school science teacher at the Somerset Inter-



mediate School, hosted a workshop in her classroom.

"Natural Resource staff did an amazing job modeling how to use various equipment and citizen science tools to assess stream habitat quality to our staff," she says. "The program encouraged us to facilitate experiences for our students that foster stewardship of our ecosystems as well as action research projects to empower them to effect change."



A win-win for all involved

Explore and Restore has been well-received in large part because of its unique capacity to meet a variety of current educational needs in the state. New science and environmental literacy standards require Maryland students to research an environmental issue and develop and implement an action plan to improve the conditions found. The program provides a means for students to meet those standards and to participate in the Meaningful Watershed Educational Experiences called for in the 2014 Chesapeake Bay Watershed Agreement.

Since its onset, the program has reached teachers in 22 counties plus Baltimore City, over 150 schools, and 283 teachers. Through the Chesapeake Bay Implementation Grant program, the department is administering grants to six non-governmental organizations that have each partnered with one or more school systems to deliver Explore and Restore materials to teachers across Maryland. Through these efforts, the program's stream and watershed content is projected to be delivered to an additional 77 schools with a reach of over 12,000 students this academic year.

As teachers and schools continue to grow in their capacity to embrace an investigative approach to learning, the Department of Natural Resources will continue to strengthen the relationship between Maryland's students and their environment.