CHESAPEAKE MONITORING COOPERATIVE

Chesapeake Monitoring Cooperative

2025

CASE STUDY: DEEP RUN CREEK, VIRGINIA
SCIENCE IN ACTION AT FREDERICKSBURG ACADEMY

Deep Run Creek, a small tributary that feeds into the Rappahannock River and ultimately the Chesapeake Bay, winds through the landscape near Fredericksburg, Virginia. Close to its headwaters, the creek has become more than a natural feature: it serves as a living laboratory for the students of Fredericksburg Academy.

At the heart of this program is David Steinberger, who has taught middle and upper school science at Fredericksburg Academy for over 12 years. Steinberger partners with the Alliance for the Chesapeake Bay's RiverTrends program, bringing community-based water quality monitoring directly into the school's curriculum. Through this partnership, students experience the scientific process in a way that textbooks alone cannot capture, and having a dedicated teacher in the school's community has allowed the program to thrive for years.

The bulk of the monitoring is carried out by Steinberger's 8th-grade Earth Science class. The class's first unit of the year covers watershed science and culminates in a three-day, two-night field trip to Smith Island, MD or Tangier, VA, with the Chesapeake Bay Foundation. In preparation, students learn about the Chesapeake Bay watershed and the RiverTrends testing protocol, then assist with data collection once a month, learning what each measurement reveals about the watershed health along the way. Supporting lessons include the Chesapeake Bay Foundation's "Schoolyard Report Card," which has students examine how impervious surfaces on campus affect runoff, a review of CBF's "State of the Bay" report, an exercise mapping how water moves through the local community, and a lab challenging students to purify dirty water using household materials.

David Steinberger leading water sampling.

The program extends beyond 8th grade as well. Depending on student interest, upper school Environmental Science students have used Deep Run's long-term data trends as the basis for their final independent research projects, and the upper school statistics class has drawn on the dataset for statistics-based labs.

The data collected at Deep Run Creek does more than serve the classroom. It feeds into the broader Chesapeake Monitoring Cooperative (CMC) network, where it complements volunteer and non-traditional monitoring datasets from across the watershed. This shared effort ensures that even a small tributary like Deep Run contributes to the larger picture informing

management decisions for the Bay, and it gives students a tangible sense that their work has value beyond the classroom.

One of the most powerful aspects of the program is its long-term approach. Students do not collect data just once; they return to the creek month after month. This repeated engagement helps them understand science as an ongoing process rather than a single experiment, and over time they begin to recognize patterns, such as how dissolved oxygen levels shift between summer and winter, or how rainfall can trigger spikes in bacteria. Students build not just knowledge but a relationship with the creek.

For Steinberger, part of the program's success lies in demystifying science. Many students arrive intimidated by chemistry, titrations, or water quality concepts they have never encountered. Through repeated, hands-on practice, these tasks become accessible, building both skill and confidence. Students begin to see themselves as scientists capable of contributing to knowledge and stewardship in their own community.

The monitoring program is one piece of a broader relationship between Fredericksburg Academy and its watershed. The school partners with Friends of the Rappahannock on a 6th-grade field trip and on tree plantings, reinforcing for students the connection between their campus creek and the wider Chesapeake Bay watershed.

The case of Deep Run Creek illustrates the value of collaboration between schools, nonprofits, and community science programs. By integrating hands-on monitoring into the classroom, Fredericksburg Academy gives its students an unforgettable learning experience while contributing valuable data to better protect the Chesapeake Bay.

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Students collect and analyze water samples from the field.