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Brian McDowell

6th, 7th & 8th Grade Science Teacher

Mason County Middle School

Maysville, Kentucky

Ten years ago, Brian McDowell left an effective, suburban school to teach in his hometown in Kentucky, just outside of Appalachia. He discovered that the students lacked experience with activities that prompted scientific thinking. To meet this need, McDowell started creating "A Place for Inquiry" nature trail just outside the school.

After receiving a Toyota Tapestry Grant, McDowell created a dinosaur trackway. The trackway simulates a plant eater and meat eater walking toward one another and interacting. Students are asked to collect evidence by developing observations, taking measurements, and making inferences about the trackways. The activity initiates dynamic discussion and debate in the classroom.

McDowell also created a bird blind in cooperation with a zoologist from Miami University. Standing behind the blind, students are able to observe and analyze different behaviors of local birds or, using pictures and video, determine trends in the classroom.

Zoology professor at Miami University David E. Russell, Ph.D., comments, "The most important part of education at any age is the enthusiasm and excitement brought to the subject by the teacher. With his use of the bird blind and banded birds, [McDowell] is an educator that makes kids want to do science. It's fun and rewarding."

Most recently, McDowell created an authentic Martian Landscape. Students engineer Lego Mindstorm robots into rovers that will collect Martian soil and return it back to earth. Next, students create an experimental design and collect evidence necessary to determine is life is possible on Mars.

McDowell has worked with his colleagues to create a bone assemblage, stratigraphy column, rock cycle garden, flagpole shadow study, and a composting site. When McDolwell started at Mason County Middle School, cookbook labs and worksheets were the dominant strategies. Now, on a nice day, it is not uncommon to find most students outside practicing inquiry skills along the trail. The inquiry trail has become a place to challenge students' scientific thinking.

Each year, McDowell and his students embark on an exploration of science and its mysteries, wonder, and questions. He strives to takes his students to the margins whenever possible. The margins are areas in nature and society where diversity exists, where life is often riskier for the inhabitant, and where species, ideas, and actions have the freedom to flourish. This approach fosters excitement, spontaneity, and improvisation, prompting students to take risks.

The communication of a student's work from the margins is different from standard classroom practice. When students make claims, they must support that claim with evidence. Questions such as "How do you know?" and "What is the evidence?" spark scientific thinking. As students become more comfortable with this thought pattern, the class engages in thoughtful analysis, critique of methods, and general skepticism daily.

To evaluate student work, all investigations are accompanied by writing prompts that push students to share the scientific thinking behind actions taken during class. After a margins experience, reflection upon these writing prompts during self-evaluation promotes growth. McDowell also utilizes concept mapping to evaluation students, which allows for multiple correct answers.

The local community has positively benefited from McDowell's work. Since the creation of the inquiry areas, there has been a significant increase in students who choose STEM related college majors. The community has several STEM related businesses that struggle to recruit talent due to the eastern Kentucky location. McDowell is working daily to change that by growing STEM talent.

In addition to helping the community, McDowell works with education professionals to help them on the path to become National Board Certified. McDowell became certified in 2011 and enjoys sharing his experiences with other education professionals to help them grow into accomplished teachers.

McDowell uses active learning methods to keep students engaged and excited about the earth sciences. He has found success by focusing on inquiry, discovery, and scientific thinking.