

Science Education and Quantitative Literacy: An Integrated, Inquiry-Based Approach

Project Title: Science Education and Quantitative Literacy: An Integrated, Inquiry-Based Approach

Project Director: Dr. V.A. Samaranayake

Lead Institution: Missouri University of Science and Technology

Duration of Project: Three years (Cycle-9 is the first year for this project)

Grade Level Focus: 5-7

Credit Hours to be Provided: 4 graduate credit hours

Project Summary:

This three-year project will provide professional development in inquiry-based methods to 40 mathematics and science teachers from the south-central region of Missouri, with 75% from high-needs schools. An integrated approach will be employed that highlights the synergy between science experiments and use of mathematics to understand experimental data. Participants will conduct hands-on activities to explore scientific and mathematical concepts and develop their own problem solving strategies so that their students will apply mathematical concepts when learning science and use scientific data in learning mathematics. A learning cycle approach based on the 5E instructional model will form the foundation of these instructional activities. The same set of teachers will attend all three years of the project, allowing for an in-depth and sustained professional development experience. Any vacancies will be filled by teachers from the same school, thus maintaining an uninterrupted partnership with the participating schools. An environmental theme focused on renewable energy and conservation will form an integral part of the project. Missouri Department of Conservation, a project partner, will collaborate in developing conservation related activities. Presentations by Missouri S&T solar car and solar house design teams will provide a segue to renewable energy themed learning modules. Mathematics and science GLEs identified as problematic areas for students in the participating schools via recent MAP performance data will form the core of the first year program. The target GLEs will be revised on a yearly basis based on new student performance data as well as feedback and assessment data from participants. Instructional materials will be developed through a cooperative effort between the Director of the S&T Teacher Education Program, faculty members from S&T's Biology, Mathematics, and Physics Departments, education consultants from the Missouri Department of Conservation, school coordinators from participating schools, and master teachers from our previous ITQG projects.