

Evaluators find summer program readies high school students for science



The Challenge

Getting high school students interested in science is challenging, but even more so for students with less background knowledge and confidence in science than their more-prepared peers. McREL, with funding from the Institute of Education Sciences (IES), undertook a three-year project to design, implement, and evaluate a two-week summer program whose goal was not to “catch up” students who were struggling but to proactively engage and prepare students who might not otherwise take chemistry.

Strategic Solution

McREL offered **Cosmic Chemistry**, a unique approach to summer learning, to 9th- and 10th-grade students identified by the district (Union Public Schools) as needing additional support. During the summers of 2010 and 2011, students met at Union Intermediate High School in Broken Arrow, Oklahoma, to engage in a real-world curriculum focused on science as a human endeavor, including units related to the NASA Genesis Mission, the sun and solar wind, how elements are made, and planetary diversity. McREL created student, facilitator, and program coordinator guides designed to support students and teachers with varying levels of knowledge.

Results

McREL researchers collected data to determine 1) changes in student background knowledge, 2) changes in student motivation and self-efficacy for science, and 3) the level of expectation teachers had for student success. Using pre- and post-tests and surveys, classroom observations, facilitator logs, and focus groups, McREL determined that Cosmic Chemistry improved all three areas, most notably the level of student background knowledge, which showed a significant effect size of 2.25 percent. In addition, 82 percent of students in the program went on to take pre-AP Chemistry.

Next Steps

Cosmic Chemistry builds not only student background knowledge but also student confidence to take higher level science courses. With tested and refined materials for students and facilitators and a research-based curriculum based on scientific inquiry, McREL will continue to offer the Cosmic Chemistry program and evaluation services to other schools with a need to raise achievement in high school science.