

Typically, elementary and secondary school students study mathematics and science as separate subjects. Although mathematics teachers use science examples in problems (e.g., determine when trains traveling at different speeds from opposite directions will meet) and science teachers use mathematics as a tool in science (e.g., $E=mc^2$), each subject has its own vocabulary, thought process, and conventions for presenting information. For example, students must not only learn mathematics and science concepts using different words for what seems like the same thing (e.g. *distance* in mathematics and *displacement* in physics), but also the subtle difference in the words' meanings (distance refers to how much ground is covered, and displacement refers to how far an object moves from its original location; someone walking a complete circle could travel a distance of one mile but have zero displacement). Because studying these subjects is like learning a foreign language, students may become confused and/or not perform well. English language learners – students learning mathematics and science “foreign languages” in a foreign language – understandably may experience more severe difficulty.

The Cubic Academy's goals are to (1) infuse science and technology topics into pre-service mathematics teacher courses to foster conceptual understanding of both mathematics and science and (2) recruit, strengthen, and maintain mathematics, science, and technology teachers. Capitalizing on the strengths of both Tarleton State University, the pervasive nature of mathematics in science (agriculture), engineering (environmental engineering) and technology (engineering technology) will form the foundation for creating a culturally responsive learning environment in pre-service mathematics courses. The Academy also will offer seminars for in-service teachers, a mentor/induction experience, and a teacher career awareness outreach program.

Teams consisting of mathematics, science and technology faculty will transform the content of degree-required mathematics courses to correlate mathematics and science concepts and vocabulary to foster pre-service mathematics teachers' conceptual understanding of both mathematics and science. The transformed courses will incorporate culturally responsive teaching, real-world experiential learning, problem-based learning, and technology. Course topics will be aligned to state and national standards -- especially the TEKS and CCRS. As a course requirement, participants will be asked to develop their own correlated lessons in teams and to incorporate existing, state sponsored TEKS-based curriculum.

Participants will receive tuition for correlated mathematics courses and education courses (2 or 3 courses per semester, depending on the number of participants.) books for the courses, support to attend professional development conferences, graphing calculators, and other materials to support them while working toward certification.

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