

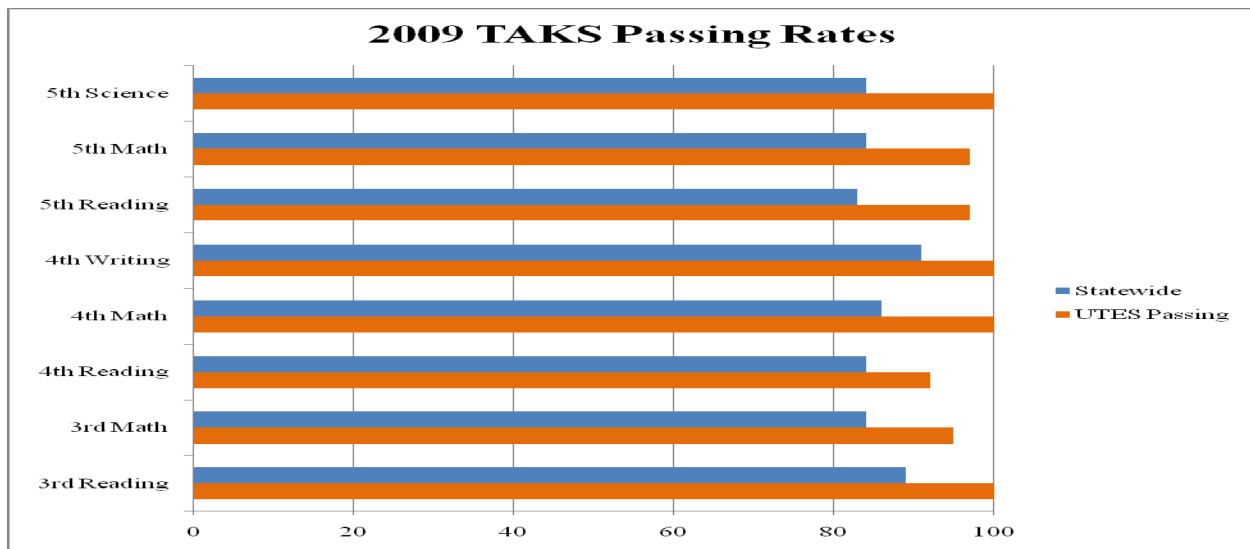
Creating a Science Demonstration Program

The National Science Foundation notes that by 2011 demand for scientists and engineers will have increased at least 70 percent faster than the overall growth rate for all occupations in the United States. In order for our country to produce more scientists and engineers to keep up with human capital demands in the Science, Technology, Engineering and Math (STEM) fields, quality math and science education must begin in elementary school and be reinforced through post-secondary education.



The incorporation of science curriculum in earlier grades and subjects will build the foundation to encourage learning in STEM fields for the future workforce. For many elementary schools, it is a constant struggle to develop an aligned, rigorous and engaging science program for all students. As students progress through grade levels, large gaps in conceptual science knowledge widen, and students continue to struggle throughout their educational careers. The reasons for this common program deficiency are numerous. Primary grade teachers are focused on the development of reading and math skills and are often not science content specialists; therefore, many elementary teachers lack the core science knowledge necessary to foster a deep and powerful foundation in science for all students. Without opportunities for specialized training and development, teaching science is an intimidating endeavor. Schools are seldom able to provide the same resources and continued education in science instruction that are available for reading, writing, and math. Science is often compartmentalized and separated from other main subjects. However, best-practice research indicates that the integration of science curriculums across subjects is most effective for student learning.

UT Elementary- Ahead of the Curve



UT Elementary School consistently outperforms their peers on Texas Assessment of Knowledge and Skills (TAKS) tests. This success is largely attributed to the powerful methodologies used to instruct each individual child- including "Response to Intervention" or RTI . Since its inception UT Elementary has embraced the 3-Tier Reading Model with great success, and has now adapted its use in mathematics instruction, science instruction, physical education, and social and emotional learning.

UT Elementary School partnered with the Texas Regional Collaboratives (TRC) to create a science demonstration program with the support of the KDK-Harman Foundation. In 2008-09, UT Elementary employed a science demonstration teacher and instructional coach who extended and integrated science curriculum into earlier grades and connected it with subjects such as reading, writing, and math. An example of interconnecting science with other subjects is student participation in hands-on science experiments followed by "science journaling," which builds literacy skills. This coach also built the foundational skills in science instruction of primary grade teachers at UT Elementary and Urban Education

Project partners Metz Elementary and Govalle Elementary through modeling and ongoing professional development. Reaching out to our partner schools with these opportunities furthers the school's mission to engage the community. The science demonstration teacher and instructional coach, Kelly Mullin, worked with UT Austin College of Education faculty member Dr. Jim Barufaldi to incorporate training into the pre-service curriculum for elementary teachers in science. In addition to creating effective science learning for teachers and students, the goal is to foster an enthusiasm for learning science in elementary school that continues throughout students' academic and possibly vocational careers.



An important aspect of fostering an enthusiasm for STEM fields and interest in STEM careers in urban students is making science fun and enjoyable by learning through experiences. The students participate in science-related field trips such as the McKinney Roughs Nature Park operated by the Lower Colorado River Authority (LCRA). Each fall, UT Elementary School hosts "Science Exhibition Week." During that week, students present a variety of self-selected projects and take part in special programs and demonstrations. Parents are encouraged to be involved by assisting their children with science projects. In addition, the Parent Forum hosts the family science information night to further encourage parents' involvement in their students' scientific education. In the spring, students participate in Engineering Day; listening to presentations by science and engineering professionals.

Broadening the Scope

UT Elementary's science demonstration program was the basis for a Curriculum of Excellence created by a think tank committee. The elementary chemistry curriculum will serve as a model to other schools throughout Texas through its partnership with the Texas Regional Collaboratives (TRC). The TRC, housed within the UT College of Education's Center for Science and Mathematics Education, is a statewide network of sixty-one P-16 partnerships that provide sustained and high intensity professional development to P-12 teachers of science and mathematics across the state.

In October 2009, the curriculum developed by the think tank committee will be used to "train the trainers," who will then disseminate the best practices in science instruction developed in the UT Elementary classroom to science teachers across Texas through their established network of regional collaboratives. Disseminating best teaching practices information among their many constituents is the primary purpose of the TRC. TRC does this by providing two tiers of training: 105 hours of training to one science teacher mentor in each participating school, and five hours of training to other teachers within those schools, called cadre members. The science teacher mentor then leads the cadre members in team teaching. This integration and alignment at all elementary grade levels will ensure that elementary students are well-prepared for the science and math portions of the Texas Academic Knowledge and Skills (TAKS) test, and that they will go on to middle school and high school with a solid foundation in STEM subject areas.

Through the creation of this model and the dissemination networks, teachers across Texas will be given the proper training, modeling, and team coaching necessary to foster enthusiasm for STEM subjects in their students. As a result of the lessons learned through the science demonstration program, we expect that fifth-grade science scores across Texas will improve incrementally each year, and those students will have a solid foundation to continue into STEM classes in middle school and beyond.



Building the Foundations

In addition to ensuring high-level comprehension of core science concepts in elementary students, UT Elementary is committed to fostering enthusiasm for learning in science that will continue into higher grade levels and interest in STEM careers. This is accomplished through field trips, demonstrations, and on-site programs and activities. With this type of learning environment, we are building the scientists, engineers, and mathematicians for the future