



# Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching

TRC At-A-Glance

## THREE-YEAR OVERVIEW (2008-2011)

### WHO WE ARE

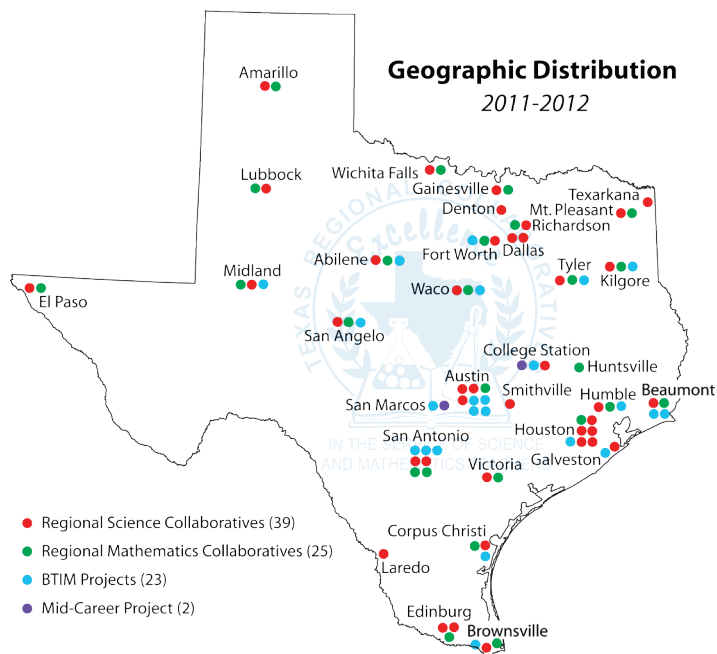
The Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching (TRC) is an award-winning statewide network of 64 P-16 partnerships (Regional Collaboratives) that provide sustained and high intensity professional development to P-12 teachers of science and mathematics across the state. This infrastructure of over 58 institutions of higher education collaborating with the Texas Education Agency, Education Service Centers, school districts, and business partners, has a 20-year track record of designing and implementing exemplary professional development using research-based instructional models, materials, and best practices. In addition, the TRC network includes 25 projects (BTIM and Mid-Career) that focus on teacher mentoring, recruitment, and preparation.

### OUR MISSION

To provide Texas science and mathematics teachers with support systems of scientifically researched, sustained, and high intensity professional development and mentoring to assist them in the successful implementation of the Texas Essential Knowledge and Skills (TEKS). TRC programs equip teachers with the knowledge and skills to engage students in meaningful science and mathematics learning experiences. Activities are designed to improve students' scientific, mathematical and technological literacy, and inspire them to pursue science and engineering related careers.

### ACTIVITIES

- **Professional Development Academies (PDAs)** are provided to Instructional Teams that consist of professors of education, science, mathematics, and engineering, instructional specialists and master teachers.
- **Professional Development Programs (PDPs)** are designed by instructional teams at each Regional Collaborative to provide 85-105 contact hours of TEKS-based professional development to prepare teachers to become Science Teacher Mentors (STMs), and Mathematics Teacher Mentors (MTMs).
- **Honoring the Teachers** events recognize and honor participating teachers and engage policy makers, legislators, and state leaders in the program.
- The **Annual Meeting** brings together teacher leaders, education and business leaders, policy makers, and legislators to share, network, communicate, and celebrate the achievements of the Collaboratives.



### ACHIEVEMENTS

- Over two million students across Texas have benefited from the improved instruction and performance of participating teachers. The program has developed the knowledge, skills, and leadership capacity of approximately 30,000 science and mathematics teachers through sustained and high intensity professional development. Many of these teachers serve as Science Teacher Mentors (STMs) and Mathematics Teacher Mentors (MTMs), and share their experiences with other teachers through mentoring, peer coaching, technical assistance, and workshops at the campus, district, and regional levels. Science and mathematics teachers in almost all of the state's 254 counties have been the beneficiaries of this extensive statewide network.
- Received commendation from U.S. Department of Education, National Science Foundation, policy makers, legislators, and business partners; inducted into the *Texas Science Hall of Fame*, and recognized by the Governor, the Senate and House of Representatives for distinguished achievements and contributions to supporting excellence in science education.

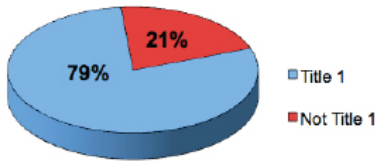
# 2008-2009 DATA

SCIENCE	2008-2009	MATHEMATICS
36	← COLLABORATIVES →	24
746	← DISTRICTS →	778
2,371	← CAMPUSES →	2,244
1,306	← TEACHER MENTORS →	929
5,781	← TEACHERS →	6,124
474,829	← STUDENTS →	373,809

One Year Data: August 1, 2008 - July 31, 2009

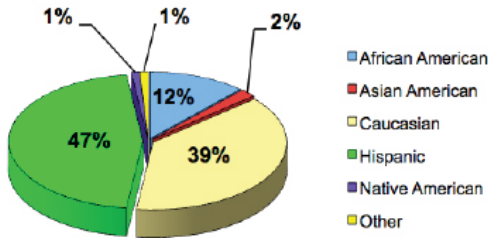
Student numbers based on an average student/teacher ratio of 67:1 in science and 53:1 in mathematics

## Title 1 Status of Participating Campuses



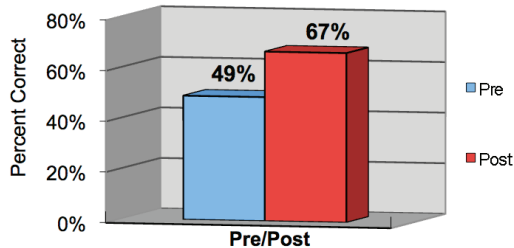
Based on a sample of 10,106 teachers who provided campus poverty level data from September 2008–July 2009

## Ethnicity of Students Served by Collaborative Teachers



## CONTENT KNOWLEDGE

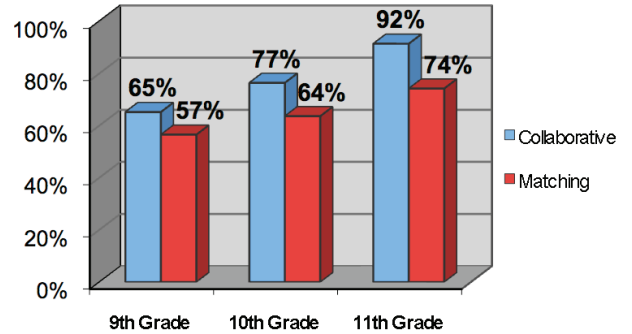
### Average Science Teacher Mentor Content Knowledge Gains (2008-09)



Many of the Regional Collaboratives developed formal procedures for identifying changes in teacher science content knowledge as a result of TRC training. These 36 Collaboratives administered 77 different tests in a pre/post test format. Test content covered a range of topics including physics, chemistry, biology, earth science, and science process skills. Pre/post test data comparison shows a significant 18-point gain in teacher content knowledge.

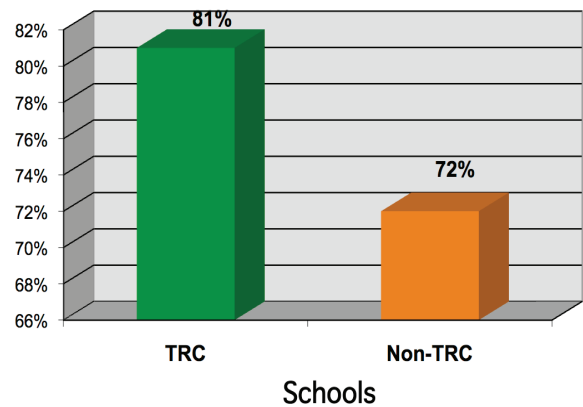
## STUDENT IMPACT

### Math TAKS (2008-09) UT Tyler Regional Mathematics Collaborative



The example above illustrates that students in classrooms of teachers at UT Tyler Regional Mathematics Collaborative outperformed a matched group of students on high school mathematics TAKS by significant percentages at every grade level tested.

### 5th Grade Science TAKS (2009) Percent Passing Region 19 Science Collaborative



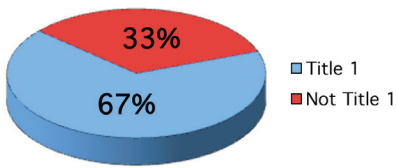
Region 19 Science Collaborative collected data from 17 TRC campuses and 124 Non-TRC campuses. The data demonstrate that the TRC campuses have a higher percent passing rate than Non-TRC campuses.

# 2009-2010 DATA

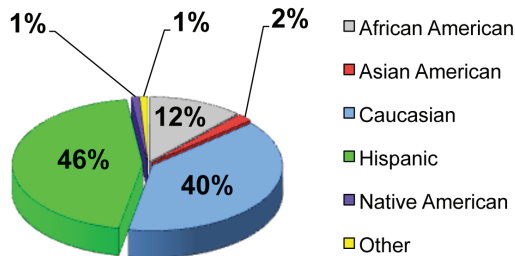
SCIENCE	2009-2010	MATHEMATICS
36	← COLLABORATIVES →	24
632	← DISTRICTS →	675
2,062	← CAMPUSES →	1,862
1,446	← TEACHER MENTORS →	921
6,692	← TEACHERS →	5,761
451,206	← STUDENTS →	347,072

*One Year Data: August 1, 2009 - July 31, 2010*  
*Student numbers based on an average student/teacher ratio of 64:1 in science and 59:1 in mathematics*

## Title 1 Status of Participating Campuses



## Ethnicity of Students Served by Collaborative Teachers

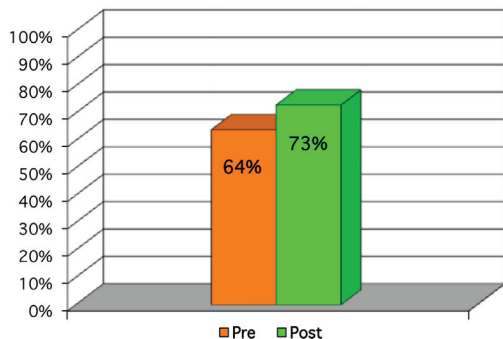


*Based on a sample of 14,820 teachers who provided campus poverty level data for 2009-2010*

## CONTENT KNOWLEDGE

### Physics Assessment 2009-2010

The impact of TRC professional development on content knowledge of the teachers is statistically significant with an average 9 percent point gain.

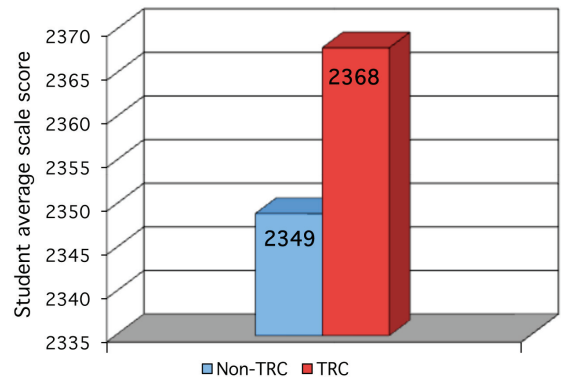


*Measured across four Regional Collaboratives for a total of 60 teachers*

## STUDENT IMPACT

### Rice University Regional Collaborative 5<sup>th</sup> Grade Science 2009-2010 TAKS

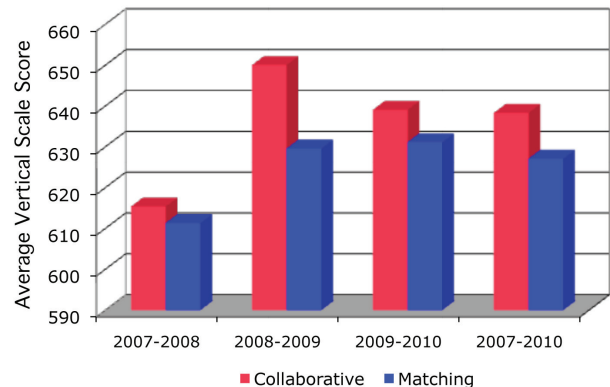
The impact of professional development on 5th grade science student achievement is statistically significant. The figure below demonstrates that students who have TRC teachers, on average scored 19 points higher on the 5th grade TAKS.



*Number of Non-TRC Students = 3114;  
 Number of TRC Students = 2786*

### UT Tyler Regional Collaborative 4<sup>th</sup> Grade Math 2007-2010 TAKS

The impact of TRC professional development on 4th grade math student achievement is significant. The figure below demonstrates that students who have TRC teachers, on average score higher on 4th grade TAKS.

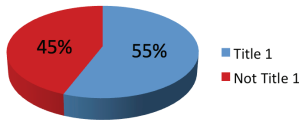


# 2010-2011 TRC DATA

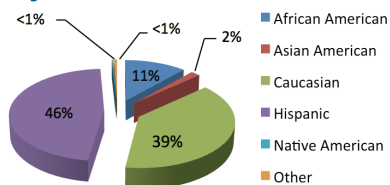
SCIENCE	2010-2011	MATHEMATICS
38	← COLLABORATIVES →	27
779	← DISTRICTS →	816
2,800	← CAMPUSES →	2,485
1,545	← TEACHER MENTORS →	1,036
5,450	← TEACHERS →	5,267
509,056	← STUDENTS →	426,360

*One Year Data: August 1, 2010 - July 31, 2011*  
*Student numbers based on an average student/teacher ratio of 64:1 in science and 57:1 in mathematics*

## Title 1 Status of Participating Campuses



## Ethnicity of Students Served by Collaborative Teachers

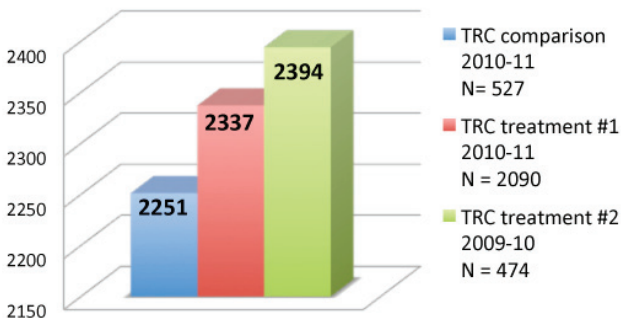


*Based on a sample of 3,418 teachers who provided campus poverty level data for 2010-2011*

## STUDENT IMPACT

### Rice University Science Mean Scale Score Grade 5 Science TAKS 2011

The Rice University Collaborative examined student data from three groups of teachers. Students of TRC comparison group teachers received no professional development from the TRC in 2010-11 and achieved a mean scale score of 2251 on the Grade 5 TAKS in 2011. Students of TRC treatment #1 teachers (who received weekly professional development in 2010-11), demonstrated a higher average scale score of 2337. The greatest impact was seen in TRC treatment #2 teachers. These students, who benefitted from being assigned to teachers that had received a full year of TRC training in 2009-10, showed an average scale score of 2394 in 2011, exceeding the comparison group by 143 points.

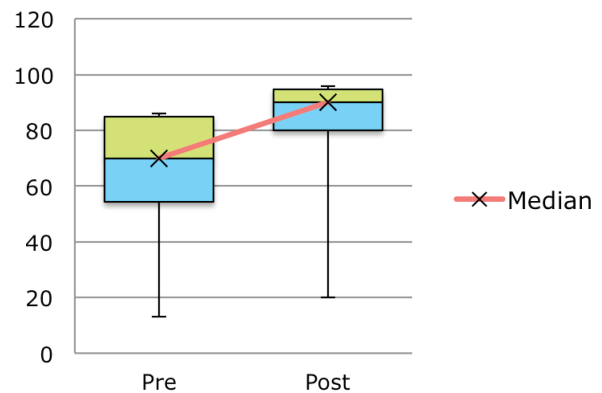


## CONTENT KNOWLEDGE

### Biology Assessment 2010-2011

The biology pre and post-test scores were analyzed across 12 Collaboratives for a total of 367 teachers. The difference between the pre and post-test was significant with an effect size of 0.9, which is considered as a large effect.

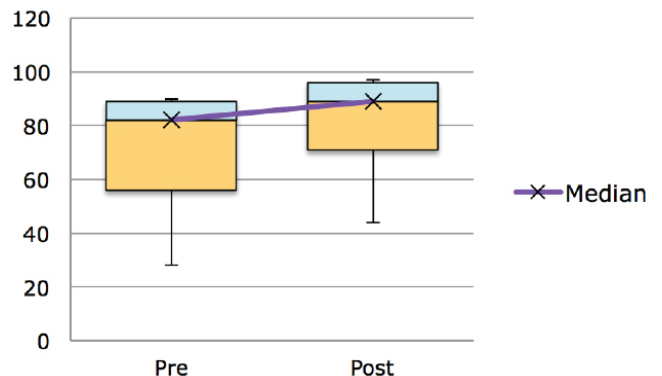
#### Boxplot of Biology Pre and Post-Tests Data



### Algebra Assessment 2010-2011

The algebra pre and post-test scores were analyzed across 2 Collaboratives for a total of 52 teachers. The difference between the pre and post-test was significant with an effect size of 0.4, which can be considered as a medium effect.

#### Boxplot of Algebra Pre and Post-Tests Data



# 2011-2012 TRC PROGRAM COMPONENTS

## Sixty-four Regional Collaboratives



**Thirty-nine Science Collaboratives**



**Twenty-five Mathematics Collaboratives**

Each Regional Collaborative focuses on participating teachers by:

- Enhancing their science or mathematics content knowledge,
- Improving their instructional skills, and
- Building their leadership capacity so that they can serve as a resource to improve student achievement and mentor other teachers at their school or district.

## Beginning Teacher Induction and Mentoring Program (BTIM)

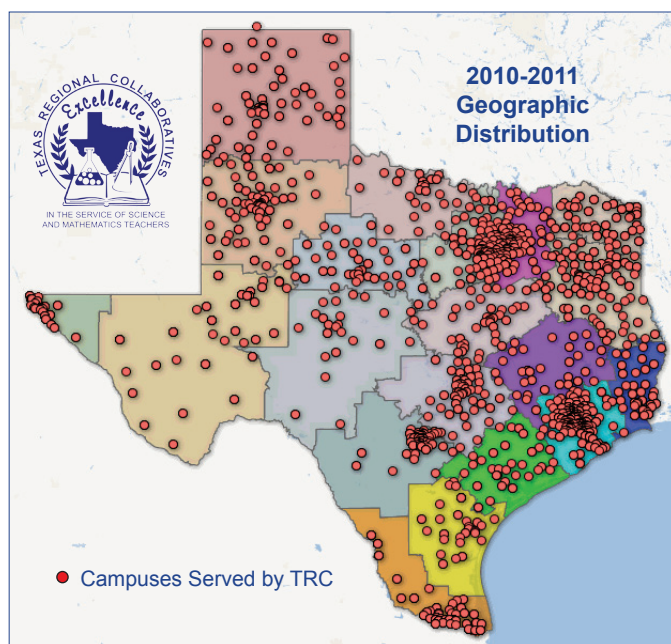
Initiated in September 2008 with funding from the Texas Education Agency, the BTIM program is designed to increase retention of beginning science and mathematics teachers by assigning a qualified mentor teacher to each classroom teacher who has less than two years of teaching experience. Mentors provide weekly support to novice teachers through coaching, team teaching, observations, and sharing of resources.

## Mid-Career Teacher Recruitment Program

The goal of this program, implemented in September 2009 with funding from the Texas Education Agency, is to increase the number of certified science and mathematics teachers in Texas through recruitment of mid-career professionals with degrees in science, mathematics, engineering, and technology fields to teach in Texas schools. Mid-Career projects recruit, train, certify, place, and mentor those STEM professionals in high-need schools across the state.

## Early Childhood Science Research

The NSF-funded *Building BLOCKS for Science* research study involves extensive classroom observation by teachers and researchers of prekindergarten children's ability to learn science processes and content, delivery of intensive professional development and mentoring support for prekindergarten teachers to learn science, and development of qualitative and quantitative assessment strategies.



In 2010-2011 the Texas Science Regional Collaboratives served teachers in **779 school districts and charter schools** and **2,800 campuses** and The Texas Mathematics Regional Collaboratives served teachers in **816 districts and charter schools** representing **2,485 campuses**. The red markers in the TRC Campus map represent all **5,285 campuses** served by the TRC in 2010-2011.



# TRC Collaboratives and Projects At-A-Glance (Project Year 2011-2012)

## Regional Mathematics and Science Collaboratives

R	M	S	REGIONAL COLLABORATIVES
1	▲	▲	Region 1 Collaborative/ <i>Edinburg</i> UT Pan American Regional Collaborative/ <i>Edinburg</i> UT Brownsville Regional Collaborative/ <i>Brownsville</i> TAMU International Regional Collaborative/ <i>Laredo</i>
2	▲	▲	Region 2 Collaborative/ <i>Corpus Christi</i> Texas State Aquarium-ESC 2 Regional Collaborative/ <i>Corpus Christi</i>
3	▲	▲	Region 3 Collaborative/ <i>Victoria</i>
4	▲	▲	Region 4 Collaborative/ <i>Houston</i> Rice University Regional Collaborative/ <i>Houston</i> Galveston County Regional Collaborative/ <i>Galveston</i> Lake Houston Regional Collaborative/ <i>Humble</i> UHCL Regional Collaborative/ <i>Houston</i> UH-Downtown Regional Collaborative/ <i>Houston</i> Aldine ISD Regional Collaborative/ <i>Houston</i>
5	▲	▲	Region 5 Collaborative/ <i>Beaumont</i>
6	▲	▲	Region 6 Collaborative/ <i>Huntsville</i> TAMU-College Station Regional Collaborative/ <i>College Station</i>
7	▲	▲	Region 7 Collaborative/ <i>Kilgore</i> UT Tyler Regional Collaborative/ <i>Tyler</i>
8	▲	▲	Region 8 Collaborative/ <i>Mount Pleasant</i> TAMU-Texarkana Regional Collaborative/ <i>Texarkana</i>
9	▲	▲	Region 9 Collaborative/ <i>Wichita Falls</i>
10	▲	▲	Region 10 Collaborative/ <i>Richardson</i> Southern Methodist University Regional Collaborative/ <i>Dallas</i> UT Dallas Regional Collaborative/ <i>Dallas</i>
11	▲	▲	Region 11 Collaborative/ <i>Fort Worth</i> North Central Texas College Regional Collaborative/ <i>Gainesville</i> University of North Texas Regional Collaborative/ <i>Denton</i>
12	▲	▲	Region 12 Collaborative/ <i>Waco</i>
13	▲	▲	Region 13 Collaborative/ <i>Austin</i> Capital City Regional Collaborative/ <i>Austin</i> UT MD Anderson Regional Collaborative/ <i>Smithville</i> UT Austin-College of Nat. Sci. Regional Collaborative/ <i>Austin</i>
14	▲	▲	Region 14 Collaborative/ <i>Abilene</i>
15	▲	▲	Region 15 Collaborative/ <i>San Angelo</i>
16	▲	▲	Region 16 Collaborative/ <i>Amarillo</i>
17	▲	▲	Region 17 Collaborative/ <i>Lubbock</i>
18	▲	▲	Region 18 Collaborative/ <i>Midland</i>
19	▲	▲	Region 19 Collaborative/ <i>El Paso</i>
20	▲	▲	Region 20 Collaborative/ <i>San Antonio</i> OLLU Regional Collaborative/ <i>San Antonio</i>
25	39		

R: Region M: Mathematics S: Science

## BTIM (Beginning Teacher Induction and Mentoring)

R	M	C	S	INSTITUTIONS
1		▲		UT Brownsville/ <i>Brownsville</i>
2		▲		Texas State Aquarium-ESC 2/ <i>Corpus Christi</i>
4			▲	Galveston County/ <i>Galveston</i> Humble ISD/ <i>Humble</i> University of Houston-Downtown/ <i>Houston</i>
5	▲		▲	Region 5 ESC/ <i>Beaumont</i>
6		▲		Texas A&M University System/ <i>College Station</i>
7		▲		Region 7 ESC/ <i>Kilgore</i> UT Tyler/ <i>Tyler</i>
11		▲		Region 11 ESC/ <i>Fort Worth</i>
12		▲		Region 12 ESC/ <i>Waco</i>
13		▲	▲	Austin Community College/ <i>Austin</i> Region 13 ESC/ <i>Austin</i> Texas State University/ <i>San Marcos</i> UT Austin - UTeach/ <i>Austin</i> UT Austin - UTeach Institute Expansion/ <i>Texas</i>
14		▲		Region 14 ESC/ <i>Abilene</i>
15			▲	Region 15 ESC/ <i>San Angelo</i>
18			▲	Region 18 ESC/ <i>Midland</i>
20	▲	▲	▲	Region 20 ESC/ <i>San Antonio</i> OLLU/ <i>San Antonio</i>
		23		

R: Region M: Mathematics S: Science  
C: Combined Science/Math

## Mid-Career

R	INSTITUTIONS
6	Texas A&M University System/ <i>College Station</i>
13	Texas State University/ <i>San Marcos</i>

R: Region

**The Louisiana Outreach Project**

**Two Louisiana Regional Collaboratives are supported by the Shell-TRC Partnership:**

Louisiana State University/Southern University Regional Collaborative  
Louisiana Tech University/Grambling State University Regional Collaborative

**TRC Partners**

**State and Federal Partners**  
Texas Education Agency  
U.S. Department of Education  
National Science Foundation  
Texas Higher Education Coordinating Board  
The University of Texas at Austin  
State Energy Conservation Office (SECO)

**Statewide Corporate and Foundation Partners**  
Shell  
El Paso Corporation  
AT&T Foundation  
The Cynthia and George Mitchell Foundation

**Project Contributors**  
Fluor  
IBM

# TRC BRIEF HISTORY

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In 1991, tremendous science education reform activities were underway across Texas and the nation. Changes necessitated that teachers provide science instruction in fields for which they were not prepared. Dr. Kamil A. Jbeily, then at the Texas Education Agency, initiated a series of regional meetings across the state to explore ways to create support systems of professional development for Texas science teachers. The meetings included representatives from education service centers, colleges and universities, school districts, business and industry, and institutions of informal education. The goal was to create regional partnerships built on collaboration and cost-sharing that provided science teachers with relevant, sustained, and high-intensity professional development. These P-16 partnerships, with initial federal funding from the Dwight D. Eisenhower Science Professional Development Program developed into the statewide network that is now the Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching.

On March 2, 1996, with the reorganization of the Texas Education Agency, the statewide administrative office of the Texas Regional Collaboratives (TRC) was moved, under a TEA-UT partnership agreement to the Science Education Center, now the Center for STEM Education at The University of Texas at Austin. The program has enjoyed support from a wide range of partners including the U.S. Department of Education Eisenhower Grants Program, the Texas Education Agency, the National Science Foundation, and a number of corporate supporters including AT&T Foundation, Shell, Toyota USA Foundation, The Cynthia and George Mitchell Foundation, El Paso Corporation, and others. In addition, over fifty business and community partners support activities of the Collaboratives at the regional level.

In March 2006, as per a historic \$1.0 Million gift from Shell Oil Company, two Louisiana Regional Collaboratives prototypes modeled after the TRC, commenced their activities in the service of Louisiana science teachers. In July 2006, the TRC launched a new initiative supported by Math and Science Partnership funding through the Texas Education Agency to provide high quality professional development to mathematics teachers across Texas through a network of Mathematics Regional Collaboratives.

To date, the TRC has served over 2 million students across Texas through improved instruction and performance of participating teachers. The program has developed the knowledge, skills, and leadership capacity of approximately 30,000 teachers of science and mathematics through sustained and high intensity professional development. Many of these teachers serve as Science Teacher Mentors (STMs) and Mathematics Teacher Mentors (MTMs), and share their experiences with other teachers through mentoring, peer coaching, technical assistance, and workshops at the campus, district, and regional levels. Science and mathematics teachers in almost all of the state's 254 counties have been the beneficiaries of this extensive statewide support system. The long-range goal of the Regional Collaboratives is to continuously (1) enhance the quality of science and mathematics teaching in Texas through Professional Development Academies and inter-regional collaboration; (2) increase the number of qualified science and mathematics educators by building the leadership capacity of teachers to mentor and serve a larger number of teachers; and (3) improve accountability of the system by evaluating the impact of the professional development on teachers' knowledge and skills, their performance in the classroom, and on student achievement.

The Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching program has received commendations from the U.S. Department of Education, policy makers, state legislators, and business partners. The Program was inducted into the Texas Science Hall of Fame on January 17, 2000, and was recognized by the Governor, the Senate, and House of Representatives on January 16, 2001 for distinguished achievements and contributions to supporting education reform.



**Texas Regional Collaboratives  
for Excellence in Science and Mathematics Teaching**

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