



TXESS Revolution

Teacher Professional Development for the New Texas Earth and Space Science Capstone Course

TXESS Revolution Goals

1. Prepare teachers for the new Earth and Space Science capstone course.
2. Increase diversity in the geosciences by working with minority and minority-serving Texas teachers.
3. Establish the TXESS Revolution as a model for other states.

The *Texas Earth and Space Science (TXESS) Revolution* is a rigorous, high-quality, 5-year geoscience professional development program for 8th – 12th grade minority-serving science teachers and teacher mentors in Texas.

Funded by the National Science Foundation's Opportunities to Enhance Diversity in the Geosciences and The Texas Regional Collaboratives with support from the Shell Oil Company, and the Jackson School of Geosciences, the project will prepare teachers for the new capstone Earth and Space Science (ESS) course in Texas.

This innovative program is offered by the Jackson School of Geosciences, Department of Petroleum and Geosystems Engineering, and the Texas Regional Collaboratives for Excellence In Science and Mathematics Teaching at The University of Texas at Austin, in collaboration with TERC (a not-for-profit company in Massachusetts with 30 years of experience in science and mathematics teaching).

Who Should Participate?

Minority or minority-serving teachers who will teach the new Earth and Space Science capstone course, TRC Project Directors and ESC Science Specialists.

Responsibilities and Benefits

TXESS REVOLUTION PARTNERS

The University of Texas at Austin Jackson School of Geosciences (JSG)

The Texas Regional Collaboratives for Excellence in Science and Mathematics Teaching (TRC)

The University of Texas at Austin Department of Petroleum and Geosystems Engineering

TERC

The University of South Florida

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Participants will:

- Attend 4 professional development academies (PDAs) over a 2-year academic period (2007 – 2009) as part of a TRC instructional team.
- Receive 24 hours of training during each PDA.
- Present a six hour training to at least 25 other TRC teachers each year.
- Participate in the online "virtual café."
- Assemble a portfolio to chart progress and demonstrate competence to teach ESS.
- Take tests to demonstrate proficiency and gains in knowledge and skills.
- Earn State Board Education credits

Participants will benefit by:

- Developing knowledge and skills competency in ESS.
- Establishing themselves as leaders in ESS implementation and training.
- Meeting scientists and establishing a professional relationship with them.
- Receiving rigorous training and rich instructional materials.
- Creating a professional portfolio that can be used for career advancement.
- Participating in optional summer institutes, PDAs and field programs.
- Receiving *Certificates of Participation* from the Jack-

son School of Geosciences and the Texas Education Agency.

School administrators will:

- Be able to offer ESS as an option for the 4th year of science at their schools.
- Have a teacher on staff who is a leader in ESS implementation and training.
- Be able to reach out with a rigorous and relevant science curriculum to minority students who are typically underrepresented in the sciences.



Example of a TXESS Revolution PDA Topic organized around a *Big Idea*—W A T E R

Learning Activities/Processes:

1. Research the role of water in the rise and fall of civilizations by drawing connections between Maya population collapses and drought—an inquiry-based learning activity using authentic Ocean Drilling Program (ODP) core geochemical data from the Carioca Basin (Leg 165).
2. Learn about ocean drilling technology and the collaborative nature of Earth and Space Science through the retired drill ship, The *JOIDES Resolution*.
3. Research the importance of water in your region. Where does it come from? What is the use-rate over time? Record your own use, precipitation patterns, and the influence of weather and climate events.
4. Examine groundwater/surface flow interaction in Barton Springs—an inquiry-based learning activity using real USGS data.
5. Present results and interpretations.
6. Explore water with tools that allow data comparisons and visualiza-

tions—examples are: My World GIS, Google Earth, NOAA or NASA satellite imagery and web-based visualizations, maps, etc.

7. Interact with guest scientists who will present on their respective areas of expertise and the connection to the “Big Idea.”
8. Participate in a field trip such as to Inner Space Cavern, Natural Bridge Cavern, or Barton Springs.

Assessment Example:

Participate in a role-playing scenario to apply knowledge to address a real-world situation. For example, water-management—predict water use in the future and design a water and environment 10-year management plan.

Extension:

Design an experiment for the exploration of water on Mars.

TXESS Revolution PDAs Components

Teachers establish and review prerequisites for the topic—i.e., basic knowledge of water cycle, fundamentals of chemistry, physics, technology such as Excel, GPS-GIS, spatial skills, etc.

Activities promote:

- Collaboration (with other learners, teachers and scientists) and teamwork.
- Implementation of 21st Century technology
- Reflective journaling.
- Scientific writing and peer review, including web-based peer review tools.
- Critical use and analysis of scientific information.

- Application and integration of physics, chemistry, biology, mathematics, technology, writing and oral presentation skills.
- Development of inquiry skills through a strong field/lab component that includes hands-on activities, the use of authentic data, and computer-based data retrieval and analysis.
- An understanding of Earth as a system characterized by myriad interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
- A basic understanding of the universe and Earth as a planet in the solar system.

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www.thetrc.org/txess

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