Agenda

• Introductions
• Project Overview
• Accomplishments
• Challenges / Modifications
• Duration of the Project
• Recommendations
Dr. Rafael Lara-Alecio, Principal Investigator
Dr. Beverly J. Irby, Principal Investigator
Dr. Fuhui Tong, Internal Evaluator
Dr. Linda Rodriguez, Aldine Area-Superintendent
Cindy Guerrero, M.Ed., Coordinator
Tracy Mansfield, M. Ed., Coordinator
Belinda Enojado, M. Ed., Coordinator
Research Questions

1. How effective is the enhanced science program model in developing science achievement and academic English for non-ELLs or for ELLs whose first language is Spanish?

2. Are there student or teacher characteristics that predict academic success in the model in science achievement for non-ELLs or for ELLs whose first language is Spanish?

3. Do student characteristics interact with program type (experimental or typical), and/or teacher characteristics to predict academic success in the science model for non-ELLs or for ELLs whose first language is Spanish?
# Research Design

<table>
<thead>
<tr>
<th></th>
<th>5th</th>
<th>6th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Science Enhanced Program (SEP)</td>
<td>Science Typical Program (STP)</td>
</tr>
<tr>
<td>English Language Learners (ELLs)</td>
<td>2 teachers, 4 classes, 100 students</td>
<td>2 teachers, 4 classes, 100 students</td>
</tr>
<tr>
<td>Non-ELLs</td>
<td>2 teachers, 4 classes, 100 students</td>
<td>2 teachers, 4 classes, 100 students</td>
</tr>
</tbody>
</table>
Evaluation Model

**Inputs**
- NSF funds
- Partnership among TAMU, SHSU, and Aldine ISD
- Potential contribution from local resources

**Activities**
- Establish advisory board
- Develop instructional intervention in two schools and 8 classrooms
- Recruit and train teachers and paras
- Pilot the intervention in one school in Year 1
- Revise the interventions based on findings of the pilot test
- Implement the intervention in Year 2 & 3

**Outputs**
- Two-level/Three Tiers intervention developed
- On-going professional training for 4 teachers and 4 paras
- 25 students selected for pilot
- Report on pilot test
- Revised plan

**Short-Term Outcomes**
- Increased performance in benchmark assessment
- Higher passing rate in science TAKS
- Increased family attendance in science activities

**Long-Term Outcomes**
- Higher achievement in science
- Higher academic language proficiency in English
- More instructional time devoted to science vocabulary and problem-solving skills development
- Increased family involvement
Modifications suggested by External Evaluator
**Suggestion 1:** Increase the number of schools, necessary to allow estimates of within treatment variability
Research Design

**Figure 1.** Revised research design (Ns are shown for the pre-testing)
Breakdown of students by condition and language status

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Non-ELL</td>
<td>71</td>
<td>30%</td>
<td>91</td>
</tr>
<tr>
<td>ELL</td>
<td>166</td>
<td>70%</td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td>237</td>
<td>100%</td>
<td>171</td>
</tr>
</tbody>
</table>

Note. All students with consent
To adjust for potential selection bias and the need to evaluate its scope and magnitude

**Suggestion 2a:** Check the distribution of ELL and non-ELL students across all rotations.

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Non-ELL</td>
<td>86</td>
<td>29%</td>
<td>248</td>
</tr>
<tr>
<td>ELL</td>
<td>210</td>
<td>71%</td>
<td>171</td>
</tr>
<tr>
<td>Total</td>
<td>296</td>
<td>100%</td>
<td>419</td>
</tr>
</tbody>
</table>

Note. All students with/without consent
To adjust for potential selection bias and the need to evaluate its scope and magnitude

**Suggestion 2b**: Compare language proficiency using 4th grade TAKS reading (either English or Spanish) between students who agreed to participate and those who declined to participate

*Data collection in progress*
**Suggestion 3**: Include data for students in all rotations, such as 6-week benchmark test given by the district and 5th grade science and reading TAKS.

\[
\text{6-week benchmark test data are collected (4 time points) on all students}
\]
Trained Paraprofessionals

Four Dimensional Bilingual Pedagogical Theory

Mentoring from Scientists

Family Involvement

Academic Oral Language in Science

Two Levels / Three Tiered Approach

District / University Leadership & Support

Trained Paraprofessionals

Ongoing Staff Development, Reflection, and Feedback

Ongoing Mentoring from Campus Science Mentors & MSSELLCoordinators

Clarifications in Science Academic Language

Structured Science for Program Types

Integrated Structured English as Second Language Strategies in Science

MSSELL Model
Two Levels, Three Tiers

Level I
Teacher Professional Development

Level II
Student Instructional Intervention

Tier I
District curriculum in all areas except science

Tier 2
Academic science intervention components

Tier 3
Tutorials for lowest achieving students
Level I: Teacher Professional Development

- Systematic and structured training, monitoring, mentoring, feedback, and self-assessment through reflection via professional portfolio
- Bi-weekly staff development sessions:
  - English science vocabulary building and fluency
  - Oral and written academic science language development
  - Integrated science content reading comprehension
  - Imbedded ESL strategies in science
  - Enhanced instruction for science teaching
    - 5E Instructional Model
    - Questioning strategies
- Monthly staff development for paraprofessionals
Teacher Training
Two Levels, Three Tiers

Level I
Teacher Professional Development

Level II
Student Instructional Intervention

Tier I
District curriculum in all areas except science

Tier 2
Academic science intervention components

Tier 3
Tutorials by trained paraprofessionals for lowest achieving students
Level II: Student Instructional Intervention

- Tier 1: District curriculum in all content areas except science
Two Levels, Three Tiers

**Level I**
Teacher Professional Development

**Level II**
Student Instructional Intervention

**Tier I**
District curriculum in all areas except science

**Tier 2**
Academic science intervention components

**Tier 3**
Tutorials by trained paraprofessionals for lowest achieving students
Level II: Student Instructional Intervention

• Tier 2: Academic in-class science intervention (85 minutes daily) using 5E Model of instruction:
  - **Engage**: make connections between past and present learning, focus students’ thinking
  - **Explore**: provides students with common base of experience through manipulating materials or exploring environment
  - **Explain**: students verbalize understandings, teachers introduce formal definitions, explanations for concepts
  - **Elaborate**: students develop deeper and broader understandings by practicing skills or learning more information
  - **Evaluate**: students and teachers evaluate understandings of concepts
Level II: Student Instructional Intervention

- Integrated curriculum components:

  - 5E Model
    - Engage
    - Explore
    - Explain
    - Elaborate
    - Evaluate

  - CRISSELLA
  - FIS
  - WAVES
  - TIELLAS
  - SRM2
• Supporting science and reading skills with expository (informative) text:
  – Vocabulary development and extensions
  – Word reading instruction
  – Partner reading
  – Using text from Scott Foresman ©2010 series and ScienceSaurus that directly align to 5th grade science TEKS (Texas Essential Knowledge and Skills, state guidelines)
Changing Size

Materials: change size under temperature changes. The movement of the particles in the solid form, the particles in the gas form, and the particles in the liquid form. They are more closely spaced in the solid form, more spaced out in the gas form, and in between in the liquid form. The number of particles in each form is different. Solid particles are packed tightly together, liquid particles are spaced out, and gas particles are spaced the farthest apart.

Table: Freezing Water

<table>
<thead>
<tr>
<th>Material</th>
<th>Freezing Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>273°C</td>
</tr>
<tr>
<td>Ice</td>
<td>273°C</td>
</tr>
<tr>
<td>Solid</td>
<td>273°C</td>
</tr>
<tr>
<td>Liquid</td>
<td>273°C</td>
</tr>
</tbody>
</table>

How do phase changes occur?

In this activity, you will explore the concept of phase changes. You will observe the changes that occur when a substance changes from one phase to another. You will also learn about the energy changes that occur during these phase changes.

Solids and Liquids

Solids are substances that have a definite shape and volume. They are more tightly packed than liquids. Liquids are substances that have a definite volume but no definite shape. They are less tightly packed than solids.

Partners: Get ready to work on this activity together.
WAVES
Written and Academic oral language
Vocabulary development in English in Science

• Individual science notebooks to help students process science content by:
  • Predicting
  • Recording
  • Organizing
  • Drawing
  • Questioning
  • Reflecting
1. Battery, bulb, and wires
2. My answer is B because it connects to the red wire.
3. Wire
• Technology integrated into intervention:
  – Equipping classrooms with instructional technology (ELMO document camera, projector, Mimio interactive white-board, science learning tools)
  – Integration of educational software (EduSmart)
  – Exploring internet resources to support learning
  – Suggesting related websites in Family Involvement take-home books
Weekly Lesson Plan
Earth's Changing Surface (Rapid)

**Science Objectives:**
- **Day 1 (Monday)** – The student will describe how an earthquake can change the surface of Earth using a foldable.
- **Day 2 (Tuesday)** – The student will identify and describe how forces can change the surface of Earth using a news report.
- **Day 3 (Wednesday)** – The student will describe how forces can change the surface of Earth using a foldable.
- **Day 4 (Thursday)** – The student will interpret how land forms are the result of constructive forces using a foldable.
- **Day 5 (Friday)** – The student will interpret how land forms are the result of destructive forces using a foldable.

**Reading Objectives:**
- The student understands explicit ideas and information in fifth-grade or higher texts (for example, main idea, implied message, relevant supporting details and facts, chronological order of events).
- The student uses simple strategies to determine meaning and increase vocabulary for reading, including the use of prefixes, suffixes, root words, multiple meanings, antonyms, synonyms, and word relationships.

**ESL Strategies:** Academic Language Scaffolding, Cooperative Learning, Leveled Questions, Modeled Talk, Think Aloud, Visual Scaffolding

**TEKS:**
- **Science:** 3.6B, 5.12A, Process Skills
- **Language Arts:** 5.4A, 5.5F, 5.6A, 5.7A, 5.8B, 5.9B, 5.9E, 5.10A, 5.10G, 5.10L, 5.11B, 5.13B, 5.15A
- **ELPs:** 1A, 1E, 2C, 3D, 4A, 4J, 5B

**Target Vocabulary:**
- Verbs: identify, interpret
- Content: force, constructive force, destructive force, earthquake, volcano, tsunami, landslide, flood, glacier, weathering erosion, deposition of sediment

**Materials:**

<table>
<thead>
<tr>
<th><strong>Day 1</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm Up: Forces that change the Earth's surface</td>
</tr>
<tr>
<td>Engage: W20D1.ppt</td>
</tr>
<tr>
<td>Explain: EduSmart 3.6B #1 &amp; 2, Week 20 Vocabulary.ppt, SF Textbook p. 268-269, Partner Reading Discussion Card W20D1</td>
</tr>
<tr>
<td>Copy of Week 20 homework</td>
</tr>
</tbody>
</table>
Daily Activities

Day 1: 83 minutes

DOWLS: Forces that change the surface of Earth [Pocket Folders] (7 – 10 minutes)
- Each student receives a half sheet for warm-up.
- Display warm-up on ELMO.
- Read prompt with the students. Students explain how they decided which forces change the surface of Earth quickly. Let students discuss their answers with their group. Call on students randomly to share their answers.

*Have students change and add answers as you review the warm-up with the class.

Engage: Power point – Earthquake (5 minutes)

Have students observe the slides. Discuss with students that earthquakes not only damage and destroy buildings, but they also change the surface of Earth.

Questions: Describe the damage to buildings by the force of the earthquake. Describe the damage to the surface of the Earth by the force of the earthquake. Draw a conclusion about the force of earthquakes.

Call on students to share their responses.

Refer to the objective for the day.

Identify the cognitive verb for today. What does it mean to describe?

Explore: Fault boxes - model (15 minutes)

Have students observe the fault boxes when they are together. Shift the boxes. Have students observe power point slides. Discuss slides with the students.
Questions: Describe how the earthquake changed the surface of Earth. Explain how this model is different than a real earthquake. Explain why we use models.

Explain: EduSmart 3.6.B #1 & #2 and Textbook 268-269

EduSmart – Glaciers (15 minutes)
Students will view this section of EduSmart. At each section break, ask the appropriate questions using the questioning strategies.

CRISELLA
Vocabulary Preview [Power Point] (4 minutes)
Show students Week 20 Vocabulary powerpoint slides 1-5, stop where designated

Textbook p. 268-269 – Earthquakes (6 minutes)
Set timer for 4 minutes as students partner-read the selection.
Partners will read the discussion questions on the Partner Reading Discussion Card and then re-read the selection a second time, looking for the answers.
After re-reading, partners will discuss answers.
Define earthquake.
Define fault.
Identify the cause of earthquakes.
Describe the effects of earthquakes.

Evaluate / Product: Notebook Foldable – Earthquake [Journal] (20 minutes)

Foldable – Students will identify earthquakes as a force that can change the surface of Earth. Students will describe how an earthquake can change the surface of Earth.

Explain to the students they are creating a foldable to show their knowledge of the forces of earthquakes. This is the assessment for today. Students need to work on foldable individually.

Review power point with students before they begin to work on the product.

Closure: (3 minutes)
Identify the force that can cause land to rise or fall down.
Identify the cause of earthquakes.
Identify the effects of earthquakes.
Explain why we do not have earthquakes in Texas.

Homework: (5 minutes) Briefly preview weekly homework.
Level II: Student Instructional Intervention

- Integrated curriculum components:
Scientists as Role Models and Mentors

• Mentoring program involving science professors and graduate students
  – Assist with teaching specific topics
  – Science Saturdays at Sam
    • students visit SHSU science labs and mentored on various science topics
FIS
Family Involvement in Science

• Take-home science materials developed for students to work with parents/family
• Goal is to develop citizen scientists
• Materials in both English and Spanish
  – Materials lists
  – Safety information
  – Reference reading materials
• Families will be offered two 45-minute sessions on how to implement FIS at home
Dear Family,

Your child is learning about forces in motion. We are learning how to describe motion and to measure and record the position and direction of an object’s motion. We are looking at a simple machine, the bicycle, to learn about the kinds of forces that cause motion, such as gravity and friction.

Your child is also learning many new vocabulary words that describe forces. Help your child to make these words a part of his or her own vocabulary by using them when you talk together about the forces you see and use every day.

<table>
<thead>
<tr>
<th>WORD</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>measure</td>
<td>to find the size, amount, capacity, or degree of something</td>
</tr>
<tr>
<td>record</td>
<td>to make a written note, to put in writing</td>
</tr>
<tr>
<td>direction</td>
<td>the line or course something follows or points to</td>
</tr>
<tr>
<td>force</td>
<td>a push or pull that acts on an object</td>
</tr>
<tr>
<td>friction</td>
<td>a force between two surfaces rubbing against each other</td>
</tr>
<tr>
<td>motion</td>
<td>change in an object’s position; movement</td>
</tr>
<tr>
<td>gravity</td>
<td>the force that pulls objects toward each other</td>
</tr>
<tr>
<td>pendulum</td>
<td>a weight hung, as in a clock, so that it can swing in a back and forth motion</td>
</tr>
</tbody>
</table>

The following pages include activities that you and your child can do together. By participating in your child’s education, you will help to bring the learning home.
FIS - Family Involvement in Science

Vocabulary Practice
Unscramble the letters to find a vocabulary word.
Use the circled letters to answer the riddle.

O F E C R
1 7 4

TIMOON
5 6 8

R V T I A G Y
2 3

What type of force causes a bicycle to stop or slow down?
1 2 3 4 5 6 7 8

Family Science Activity
Balancing Ball
Try this experiment at home with a family member. It shows the force of air pressure.

Materials:
• a hair dryer (blower)
• a ping pong ball

Steps:
a. Hold the hair dryer so it blows a stream of air straight up.
b. Carefully balance the ball above the airstream.
c. Now, pull the ball slowly out of the flow. Notice that when only half the ball is out of the airstream, you can feel it being sucked back in.
d. Let go of the ball and notice that it hovers back and forth and then settles down near the center of the airstream.

Talk About It
When the ball is suspended, the air flowing upward hits the bottom of the ball and slows down, generating a region of higher pressure. The high-pressure region of air under the ball holds the ball up against the pull of gravity.

When you pull the ball partially out of the airstream, the air flows around the curve of the ball and then continues outward above the ball. This outward-flowing air exerts an inward force on the ball, just like the downward flow of air beneath a helicopter exerts an upward force on the blades of the helicopter. This force is what makes the ball feel like it is getting sucked back in.

Check out these online games to have more fun with Science:
http://www.quia.com/cc/361075.html
http://wsgfl2.westsussex.gov.uk/aplaws/intergames/science/v5_Cyril'sCheese2.swf
Project MSSELL
Family Involvement in Science
Two Levels, Three Tiers

Level I
Teacher Professional Development

Level II
Student Instructional Intervention

Tier I
District English curriculum in all areas except science

Tier 2
Academic science intervention components

Tier 3
Tutorials by trained paraprofessionals for lowest achieving students
Level II: Student Instructional Intervention

• Tier 3: Additional tutorials provided by trained paraprofessionals for lowest achieving students:

  – **MSSELL-X** (Middle School Science for English Language Learners – eXtra)

  • Daily tutoring focusing on science concepts and vocabulary, oracy, and writing development
Data Collection

• Qualitative Measures
  – Factors that facilitate or impede the implementation, effectiveness, and sustainability of the interventions will be investigated through:
    • Interviews (principals, intervention teachers, parents)
    • Surveys (intervention teachers, university scientists)
    • Teacher portfolios
    • Field notes from classroom observations

• Quantitative Measures
  – Transitional Bilingual Observation Protocol
  – Science Teacher Observation Record
## Data Collection

<table>
<thead>
<tr>
<th>Construct</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem Solving/Intelligence</strong></td>
<td>Naglieri Nonverbal Ability Test (NNAT); Verbal Ability, WLPB-R; Hispanic Bilingual Gifted Screening Instrument</td>
</tr>
<tr>
<td><strong>Oral Language Proficiency</strong></td>
<td>Woodcock Language Proficiency Battery-Revised (WLPB-R): Picture Vocabulary, Oral Vocabulary, Listening Comprehension, Memory for Sentences IDEA Proficiency Test (IPT)</td>
</tr>
<tr>
<td><strong>Literacy Skills/Written Language Proficiency</strong></td>
<td>WLPB-R: Letter-Word Id, Word Attack, Passage Comprehension, Dictation Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Oral Reading Fluency</td>
</tr>
<tr>
<td><strong>Science Skills</strong></td>
<td>Iowa Tests of Basic Skills (ITBS) Texas Assessment of Knowledge and Skills (TAKS) Science District Six Weeks Benchmark Assessments</td>
</tr>
<tr>
<td><strong>Curriculum Based Measures</strong></td>
<td>Rubric based science activities and projects Science Journal</td>
</tr>
</tbody>
</table>
Accomplishments

• Project MSSELL has completed 26 weeks of rigorous and relevant intervention
  – Daggett (2009) defined rigor as “learning in which students demonstrate a thorough in-depth mastery of challenging tasks to develop cognitive skills through reflective thought, analysis, problem solving, evaluation or creativity.”
  – “Relevance refers to learning in which students apply core knowledge and concepts to solve real-world problems”
• MSSELL incorporates rigor and relevance through designing and delivering quality science instruction where standards, curriculum, instruction, and assessment are aligned.
<table>
<thead>
<tr>
<th></th>
<th>Typical</th>
<th>Enhanced (MSSELL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Cycle</td>
<td>• District science lessons include one 5E lesson <em>weekly</em></td>
<td>• MSSELL science lessons include 4-5 E’s <em>daily</em></td>
</tr>
<tr>
<td>5 E’s: Engage, Explore,</td>
<td></td>
<td>Daily objective is introduced</td>
</tr>
<tr>
<td>Explain, Elaborate,</td>
<td></td>
<td>Cognitive verbs are identified</td>
</tr>
<tr>
<td>Evaluate</td>
<td></td>
<td>Student product aligns to objective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lesson ends with closure</td>
</tr>
<tr>
<td>ESL Strategies</td>
<td>• Varied and inconsistent</td>
<td>ESL Strategies:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Academic language scaffolding (visual scaffolding, modeling academic language)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Leveled questions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cooperative learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Think Aloud</td>
</tr>
<tr>
<td>Vocabulary Instruction</td>
<td>• Word walls</td>
<td>• Direct instruction of vocabulary that includes pronunciation of words, student friendly definitions, visual scaffolding</td>
</tr>
<tr>
<td></td>
<td>• Students look up definitions in glossary</td>
<td>• Students enter vocabulary words and definitions into their science journals weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Teachers model academic language</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Teachers encourage students to use academic language and answer in complete sentences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Selected vocabulary is supported with a L1 (Spanish) clarification</td>
</tr>
<tr>
<td></td>
<td>Typical</td>
<td>Enhanced (MSSELL)</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Leveled Questioning</td>
<td>• Varied and inconsistent</td>
<td>Model Classroom Questioning Strategies are incorporated throughout daily lessons:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Questions include cognitive verbs (identify, describe, explain, analyze, draw conclusions)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Alternate among answering techniques (randomness, quick write, pair-share, choral response, visual cues, timed thinking)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Students are not allowed to say “I don’t know”</td>
</tr>
<tr>
<td>Integration of Reading</td>
<td>• Students read textbook or supplemental reading</td>
<td>• Reading is used during the Explain part of the lesson</td>
</tr>
<tr>
<td></td>
<td>• Students answer questions at the end of the reading</td>
<td>• Vocabulary definitions and pronunciations are introduced before reading</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Students partner-read and ask each other comprehension questions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Students re-read to increase fluency and comprehension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Teacher reviews questions and answers with class</td>
</tr>
<tr>
<td></td>
<td>Typical</td>
<td>Enhanced (MSSELL)</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Integration of Writing</td>
<td>• Limited use of science journals</td>
<td>• Students write daily</td>
</tr>
<tr>
<td></td>
<td>• Complete worksheets / handouts</td>
<td>• Science journals are structured to be used daily (record observations, illustrate and label concepts, design, predict, complete notebook foldables as evaluation, record vocabulary in journal glossary)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Science journals are interactive and used as study guides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Students are provided with various writing activities (perspective-based writings, post-cards, newspaper article, reflection about Saturday at Sam)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Teachers and paraprofessionals provide writing feedback</td>
</tr>
<tr>
<td>Integration of Technology</td>
<td>• technology equipment varies (computers, projectors, ELMO document cameras, science software)</td>
<td>• Daily use of computers, projectors, ELMOs, Mimio interactive whiteboard, science software for science instruction</td>
</tr>
<tr>
<td></td>
<td>• use of technology for instruction varies</td>
<td>• Power point presentations used daily throughout the lesson to support instruction</td>
</tr>
<tr>
<td></td>
<td>• power point presentations</td>
<td>• EduSmart with scripted leveled questions</td>
</tr>
<tr>
<td></td>
<td>• science models</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• science manipulatives</td>
<td></td>
</tr>
<tr>
<td>Time Management</td>
<td>• Time on task varies</td>
<td>• Each activity has allotted time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Every minute is utilized</td>
</tr>
</tbody>
</table>
Accomplishments

• Project MSSELL is changing the teaching of middle school teachers and learning of students
Accomplishments

- Project MSSELL has adapted data collection tools for use in science classrooms
- Transitional Bilingual Observation Protocol (TBOP)
- Sixty 20 second observations, 4 times throughout year to measure
  - frequency of ESL strategies
  - physical group
  - activity structure (lecture/listening, demonstration/performance)
  - mode (listening, speaking, reading, writing)
  - language content
  - language of instruction
  - language of student
Accomplishments

• Project MSSELL has adapted data collection tools for use in science classrooms

• **Science Teacher Observation Record (STOR)**

• Fidelity measure used to rate if teachers are delivering intervention as proposed

• Each “E” is rated in the following categories:
  - Material Usage and Material Preparation
  - Student Involvement
  - Academic Language Scaffolding
  - Affective and Cognitive Feedback
  - Writing Feedback
  - Pacing
Preliminary Findings from District Benchmark Science Tests

• Aligned with the state science curriculum
• Given every 6 weeks
  • 1st – Physics
    18/24 items → passing; 22/24 → commended performance/true mastery of the science objective)
  • 2nd – Chemistry
  • 3rd (midyear test) - Cumulative of physics, chemistry, and space
    24/32 → passing; 29/32 → commended performance
  • 4th - Earth/Space
  • 5th - Life Science

• Chi-square test of distribution was performed to compare the % of passing and CP by condition and by language status
## Preliminary Findings from District Benchmark Science Tests

- **Non-ELLs**

<table>
<thead>
<tr>
<th>BST</th>
<th>Passing</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E=T</td>
<td>E=T</td>
</tr>
<tr>
<td>2</td>
<td>E&gt;T ((p &lt; .001))</td>
<td>E&gt;T ((p &lt; .001))</td>
</tr>
<tr>
<td>3</td>
<td>E&gt;T ((p &lt; .001))</td>
<td>E=T</td>
</tr>
<tr>
<td>4</td>
<td>E&gt;T ((p &lt; .001))</td>
<td>E&gt;T ((p &lt; .001))</td>
</tr>
</tbody>
</table>

Note. E=experimental, T=typical/control
Preliminary Findings from District Benchmark Science Tests

- **ELLs**

<table>
<thead>
<tr>
<th>BST</th>
<th>Passing</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E=T</td>
<td>E=T</td>
</tr>
<tr>
<td>2</td>
<td>E&gt;T ( (p =.002) )</td>
<td>E&gt;T ( (p &lt;.001) )</td>
</tr>
<tr>
<td>3</td>
<td>E=T</td>
<td>E&gt;T ( (p =.05) )</td>
</tr>
<tr>
<td>4</td>
<td>E&gt;T ( (p &lt;.001) )</td>
<td>E&gt;T ( (p &lt;.001) )</td>
</tr>
</tbody>
</table>

Note. E=experimental, T=typical/control
Comparison of % of passing and commended performance from District Benchmark Science Tests (BST3)

![Bar Chart]

- **ELLs**
  - Passing-Control
  - Passing-Experimental
  - CP-Control
  - CP-Experimental

- **Non-ELLs**
  - Passing-Control
  - Passing-Experimental
  - CP-Control
  - CP-Experimental
Comparison of % of passing and commended performance from District Benchmark Science Tests (BST4)
<table>
<thead>
<tr>
<th>Challenge</th>
<th>Action / Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design (reality in school district)&lt;br&gt;Concern with having both control and experimental on same campus – bleed over&lt;br&gt;Project is now bleeding over on exp campuses</td>
<td>Separated control and experimental campuses&lt;br&gt;External evaluator, Dr. Francis, suggested more than 1 campus per condition&lt;br&gt;Changed level of analysis from teacher to rotation, therefore strengthens study</td>
</tr>
<tr>
<td>Instruction in control classrooms is varied</td>
<td>Observe each teacher and take field notes</td>
</tr>
<tr>
<td>Retention of participants in project (mobility, scheduling)</td>
<td>Request principals to move participants in clusters when scheduling for 6th grade</td>
</tr>
<tr>
<td>Decrease of district resources caused reduction in district administered assessments</td>
<td>ITBS was not administered in Fall 2009</td>
</tr>
<tr>
<td>Challenge finding standardized problem solving test for ELL students</td>
<td>Administered Naglieri Nonverbal Ability Test (NNAT), Verbal Analogies subtest of Woodcock (WLPB-R), and Hispanic Bilingual Gifted Screening Instrument (HBGSI)</td>
</tr>
</tbody>
</table>
Duration of Project

• Continue intervention as proposed under the three-year grant
  • Complete 5th grade intervention
  • Develop and implement 6th grade intervention for the final and third year of the project
    • Adapt lessons to fit 45 minute science blocks
    • Incorporate newly revised state standards, TEKS
    • Continue teacher and paraprofessional training
    • Continue data collection
    • Analyze and disseminate findings
  • Create overlay of strategies
• Continue to work with CADRE on collaborative efforts
Recommendations

• Implement Project MSSELL in additional 5th-6th grade classrooms within the district to test stability of the intervention

• Continue researching and implementing a similar intervention with quality science instruction in 7th-8th grades to build the academic language of science for ELLs and low SES students
Dr. Lopez-Ferrao for your guidance and support during our work with Project MSSELL, NSF, DRK-12.