The Promise of Successful STEM Practices and America’s Forgotten Children
Central Valley of California

- 450 miles long – 60-70 miles wide
- San Joaquin Valley is southern part
- Fresno County is most productive agriculture area in state and Nation.
- High poverty
- Environmental issues
  - Water
  - Air
- 40% of land government owned
Rural San Joaquin Valley
San Joaquin Valley - National Comparison

- Larger in area than ten states ( 8 counties).
- Ranked 31\textsuperscript{st} in population, exceeding 20 states.
- Ranked 9\textsuperscript{th} in population growth.
- Ranks 8\textsuperscript{th} in population of Asian ancestry (and second, following only California itself, in population of Cambodian, Hmong, and Laotian origin).
- Ranks 6\textsuperscript{th} in Hispanic population (following the states of California, Florida, Illinois, New York, and Texas).
Orange Groves & Cotton
San Joaquin Valley National Comparison

- Ranks 3rd in persons of Mexican origin or descent, after only California and Texas.
- Ranks 40th in per capita household income, between South Carolina and Alabama.
- Ranks 4th in the number of persons involved in farming, forestry, and fishing, surpassed only by California, Florida, and Texas.
Irrigated Desert
Why STEM Is Important In Out-of-School Programs?
The National Perspective

- 8.4 million children participate in after school program approximately 14.5 hours weekly.
- 3 million in California (only 48% of all students in CA)
- After school programs are one place where disadvantaged children have access to the kinds of activities and opportunities that more advantaged peers take for granted.
- Most children from low income homes are below grade level in reading and mathematics. INTERVENTIONS
- After school programs provide more expanded opportunities (TIME) for STEM learning.
Sanger Community Science Workshop
Mobile Learning Lab & CSW Drop-in

- Located in areas with high underserved populations and high poverty
- Sanger located in area of San Joaquin Valley referred to as Appalachia West
- 75-96% Latino
- 80-100% Free/Reduced Meals
Sanger Community Science Workshop
Mobile Learning Lab & CSW Drop-in

- Youth serving non-profit with support structures for parents and families
- No registration required
- Member of CSW Network – San Francisco, Watsonville, Greenfield, Fresno, Sanger
  (www.cswnetwork.org)
Community Science Workshops
San Francisco, Watsonville, Fresno, Sanger, Greenfield
Sanger SAM Academy
Science, Art & Music
STEM Skills Are In Demand
California

• 1.4 STEM jobs for every unemployed person.
• Non-STEM – 4.9 unemployed people for every job.
• 71% of high school students graduate
• 38.2% of students entering 2-year degree program graduate.
• 63.9% of students entering 4-year college degree graduate.
• 10% of college degrees STEM related.
• Only 8% of these degrees earned by Hispanics (.8%)
National Crisis in STEM Education

(Science, Technology, Engineering, Mathematics)

• U.S will need to produce 1,000,000 more STEM professionals over next 10 years (35% additional STEM degrees annually).
• Hispanics will comprise 30% of U.S. population by 2040 – the majority in California.
• Approximately 60% of students in California after school programs.
• Hispanic students underrepresented in STEM.
  – Less likely to persist (only 16% complete degree)
  – Less likely to earn STEM degree
Whose world view is it?

• How welcome do students feel in your classroom?
• Are we preparing them for the world they will be part of in their time?
• Do they believe that you know what’s best for them?
Students want to know who you are.

Historical and cultural perspective is an important element of teacher knowledge.
They want to know about your parents.
From Immigrants
Each generation has it’s war.
Then continues at home.
Way of Life
America’s Forgotten Children
America’s Forgotten Children

Got Food?
THANK A FARMWORKER!

Image 1: Child holding a sign saying, "Got Food? Thank a Farmworker!

Image 2: Child working in a field with vegetables.
Growing up I had imagined space.

- Sputnik
- Space Race
- Man in space
- Travel to another planet
And also this...

- Civil rights protests
- Vietnam war demonstrations
- 1968
  - Lincoln HS in Los Angeles
  - Dr King
  - Robert Kennedy
  - Tet Offensive
Equity Issues persist

• Myth - Students must learn English before they can learn science.
• Myth - Students must learn to read before they can learn science.
• Social and class perceptions of the American classrooms (low expectations for non-English speakers, students of color, children of poverty, and girls).
Does a rising tide lift all boats?

• Hispanic students most likely to be taught science by teachers who are not certified and have less experience.
• Less likely to have access to challenging, high-quality math instruction.
• Less likely to have research experience in high school.
• 68% of Hispanic students attend a junior college (lower odds of majoring in STEM).
Predictors

• Student’s self efficacy - the students believe that he or she has a solid science/math background and ability to perform well in those courses.

• Hispanic students have lower levels of self-efficacy.

• Hispanic students have difficulty perceiving themselves as scientists.
Predictors

• Peer influence shown to inspire students’ decisions to major in a STEM field.
• Latina students’ patterns of socialization.
• Family support systems for all minority students in developing and encouraging interest in STEM.
• Student interest - academic experiences with math and science at elementary and secondary levels.
• High academic self-concept increases Hispanic and African American students’ odds of persisting in a STEM major.
Recommendations

• Early intervention to emphasize the affective sphere of influence on student attitudes, aspirations, and self-esteem related to STEM areas.

• Participation and success with STEM from earliest levels – pre-elementary-middle-high school. Increasing overall competency.

• Family support and encouragement

• Peer influence

• Institutional capacity of both HSI’s and community colleges.
Learning Is Fun With SAM Academy
SAM Academy Programs

• Out – of – School STEM Initiative
• After School Programs
• Family STEM + Arts Days
• Festivals and Carnivals
• Special Events (Maker Faire, Science Olympiad)
• Young Maker Network Pilot Site
• Arts and Science Academy (summer, winter, spring)
Engineering and testing the aerodynamics of rockets excites and motivates kids to dream of future adventures in space.
THANK YOU

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