



Engaging Youth in STEM

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STEM Education Coordinator
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Background

- 2005 Former Supervisors Mark Church & Rose Jacobs Gibson advised by the Blue Ribbon Biotechnology Task Force created a vision for youth
- Partnership between: Workforce Development, Labor Union, San Mateo County Office of Education, Community Colleges, County of San Mateo

Provide real- world math and science learning experiences that prepare youth to be inquisitive and innovative.



STEM Workforce Needs

1,148,000 California STEM* Jobs to fill for 2018 ²

STEM SKILLS ARE IN DEMAND

In California, STEM skills have stayed in demand even through the economic downturn.

STEM:
1.4 jobs for every
1 unemployed person



Non-STEM:
4.9 unemployed
people for every **1 job**

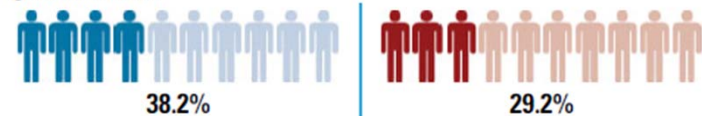


California must plug gaps in the STEM ¹ pipeline

What percentage of high school students graduate? (2009)



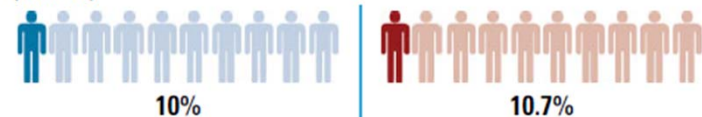
Of students who enter a two-year degree program, what percentage graduate? (2009)



Of students who enter a four-year degree program, what percentage graduate? (2009)



What percentage of college degrees and certificates are in STEM fields? (2008-09)

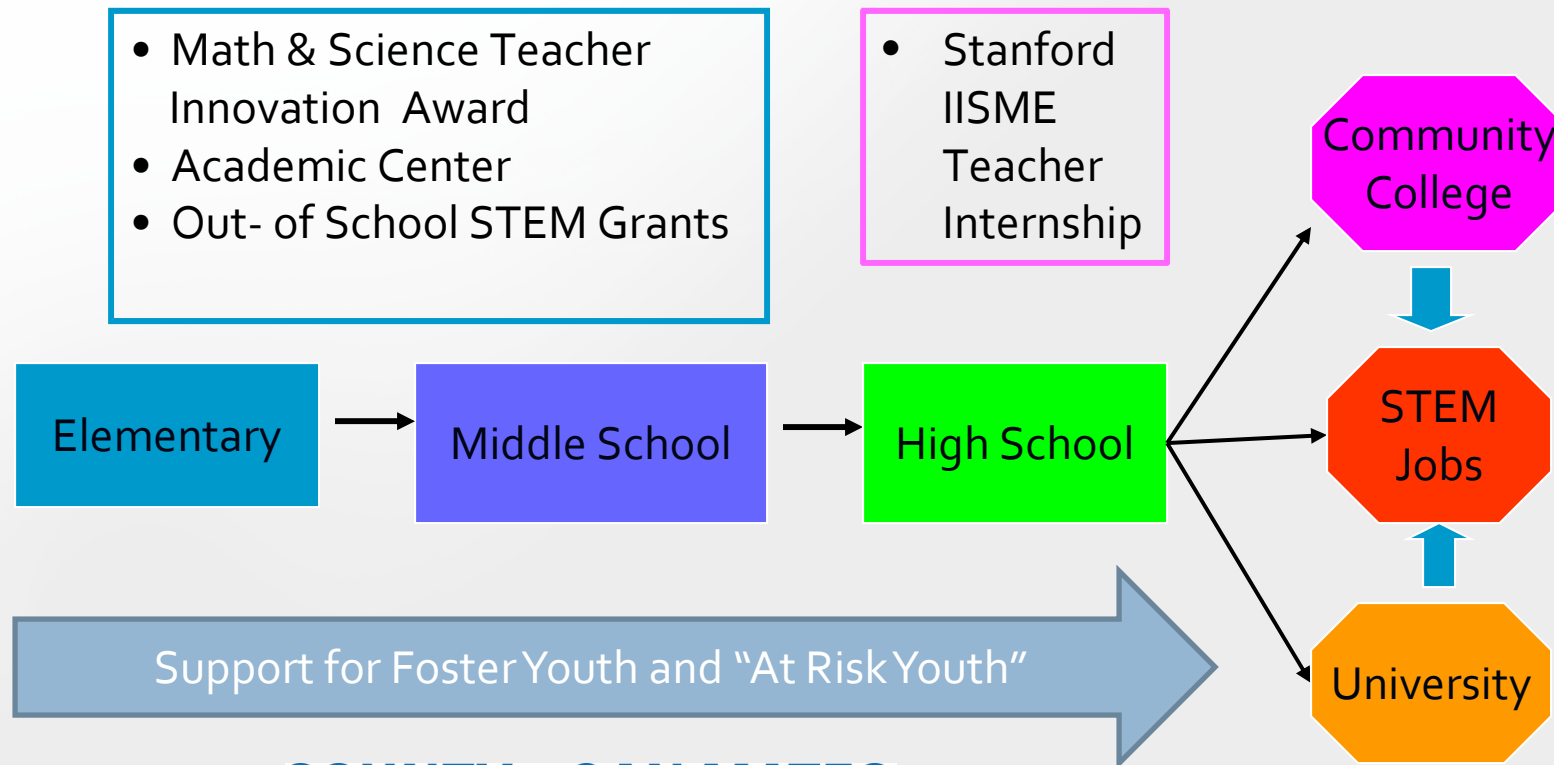


¹ Vital Signs California, Changetheequation.org, 2012

² CA Federal R & D and STEM Jobs Report 2013



STEM Career Pathways



COUNTY OF SAN MATEO
HUMAN SERVICES AGENCY

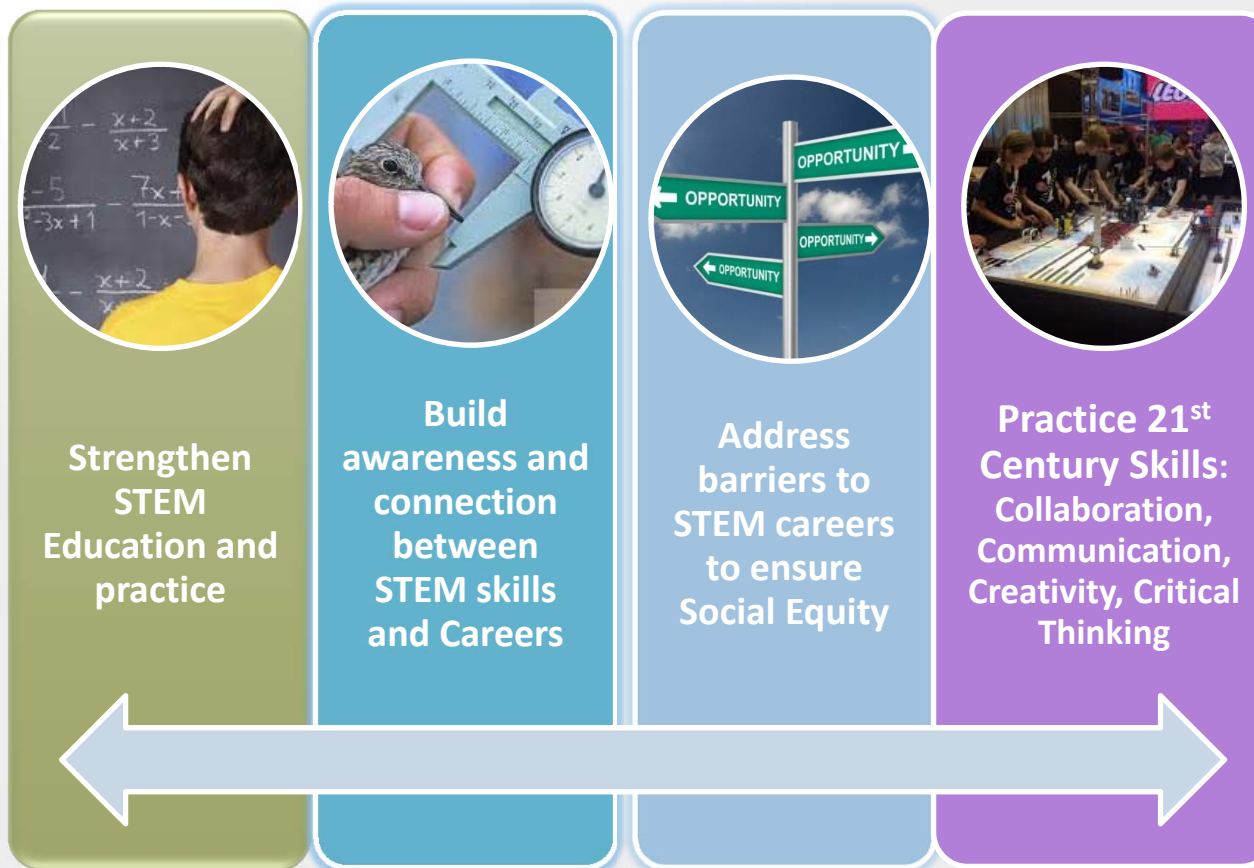
Science, Technology, Engineering, Math (STEM)



STEM Pathways



- For Youth grades 3-14





County of San Mateo STEM Programs



- **Two In-School Programs:**
 - Math & Science Teacher Innovation Grant
 - Matt Pavao and students from Roosevelt Elementary School
 - Stanford University Summer Research Program for Teachers



Math & Science Teacher Innovation Grant



- Since 2005 this award has:
 - Funded 107 teacher's hands-on project based learning
 - Engaged 4,110 4-6th grade students in science
 - Prepared students for the Next Generation Science (NGSS)

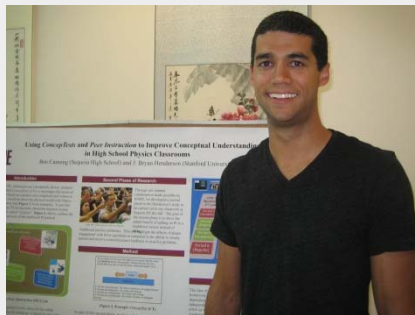
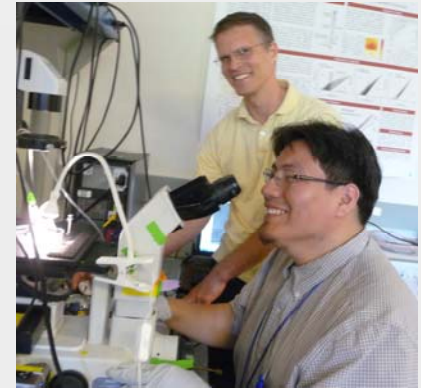




Stanford Summer Research Program for Teachers 2005-2014



- Since 2005....
 1. County of San Mateo BOS sponsored 38 Summer Fellowships for San Mateo County science teachers.
 2. Teachers from 16 schools (public, charter, private) in 6 school districts participated.
 3. Teachers educated over 93,000 County students, 50% are economically disadvantaged students historically underrepresented in STEM.





ChemEx² Workshop for Teachers



- Team members: Aragon & Summit Prep chemistry teachers, Stanford chemistry faculty & graduate students collaborated to create hands-on chemistry labs for high school students
- Curriculum formed the basis for **ChemEx²** a laboratory-based course offered during the summer for HS chemistry teachers.
- ChemEx² has trained 69 teachers to date; **20 teach in San Mateo County**. Workshop will be offered again in summer 2015.





County of San Mateo STEM Programs



- Two Out-of-School Programs
 - Academic Center (Homework Centers)- *Close knowledge gaps in core academic subjects and tutoring to gain new knowledge. Supports “The Big Lift” efforts.*
 - Out-of –School STEM Grant- *Practice applying academic knowledge in hands-on projects. Gain 21st Century workforce skills.*
 - ❖ City of Pacifica- Learningtech.org



Out-of-School STEM Grant



- Collective Impact: building a community of cities, agencies, non-profits community based organizations and lead education agencies to support STEM education
- Building 21st Century workforce skills and exposure to STEM careers
- Giving elementary and middle school youth the opportunity and time to create, test and re-design their student-driven projects

Who and Where

- Number of 4th -8th grade youth participating in summer and afterschool STEM programs in Academic Year 2011-2014 is 3, 720
- Location: Entire Coast, North County (Daly City – South San Francisco), Central (San Carlos), South County (Redwood City- East Palo Alto); multiple sites in unincorporated San Mateo County



Out-of-School STEM Grant 2014-15 Award



- Providing training and tools that allow for STEM providers to continuously improve their programs
- Power of Discovery STEM² California Initiatives





Academic Centers

- An afterschool program where students can get academic tutoring in a small group setting:

Hands-on manipulatives, ELL curriculum

English language learners

Identify gaps in knowledge , focused practice

Students who are below or far below academic proficiency in core subjects

Create tutor and mentoring relationships

Students who have other barriers that challenge their academic success
Middle School Students who need specific help on an academic topic



Academic Centers



- Serves approximately 3000, K-8 students annually
- Countywide program in 16 School Districts with 37 school sites participating

Results 2013

1055 student surveyed:

- 87% of students reported that the Academic Center helped them academically

80 Teachers surveyed:

- 76% reported students with improved academic

595 Parents surveyed:

- 94% of parents reported his or her student benefited academically from the Academic Center

Kent Award 2014- John F. Kennedy Middle School Academic Center: video posted on website: <http://hsa.smcgov.org/stem>



STEM Pilot Programs in STEM



- **Redwood Academy of Environmental Leadership (REAL)**
High school project based learning with creek restoration garden project. [2008-09](#); ongoing
- **First Lego League Robotics Redwood City:** Launched 12 new FLL teams in three schools in the Redwood City Elem. School District, [2009-10](#). Multiple awards were won. Ongoing-Boys & Girls Club Peninsula (FLL) and Citizen Schools incorporate robotics in their program
- **Personalized Math:** Trained middle school math teachers and afterschool staff in South San Francisco to use individualized math student diagnostic profiles to identify and close gaps in knowledge using RAFT games. [2010-11, SVCF interested in funding](#)
- **Schmahl Science Train the Trainer Model:** Deepen science knowledge through expanded learning. Sustain programs through a train the trainer model. Redwood Shores and South San Francisco. [2011-12](#)
- **Digital Literacy:** Train afterschool staff to teach digital literacy and digital citizenship. Provide hardware and software for youth 3rd-4th grade. STEM career awareness and exploration. Layer other STEM programming onto this foundation. Award of Excellence California Parks & Recreation Society, [2014-15, ongoing](#)

More information contact Josie Yu, jvyu@smcgov.org



Next Steps



Give Youth Access to High Quality STEM Programs to gain skills needed to be the Future STEM Workforce

- Recruit members for the Math & Science Workgroup
- Continue to improve quality of STEM Out-of-School programs through training and use of diagnostic tools
- Create a community of best practice in out of school program providers
- Create tools and programming that allows our most mobile student populations access to STEM education (foster, homeless, migrant youth)