

CALIFORNIA COUNCIL ON SCIENCE AND TECHNOLOGY

In-School and Out-of-School STEM

California Science Center

October 16, 2014



THREE POINTS

- **The great equalizer in education isn't technology or standards. It's a high quality teacher that knows how to purposefully and meaningfully apply technology and standards in a manner that engages the student's interest and curiosity.**
- **The responsibility of providing a holistic STEM education to students cannot solely be the responsibility of schools.**
- **Out-of-school institutions can play an expanded role in providing support for schools and teachers to strengthen the quality and quantity of STEM education.**



NEW STANDARDS

Common Core State Standards (CCSS)

- **Currently being implemented throughout the State**
- **The main focus of schools and teachers**
- **CCSS have connections to Next Generation Science Standards to promote an interdisciplinary approach**

Next Generation Science Standards (NGSS)

- **8 Science and Engineering Practices**
- **7 Cross-cutting concepts**
- **Content core**
- **Project-based learning**



ELEMENTARY SCHOOL STEM

- **Average less than an hour of science instruction per week**
- **85% of elementary teachers report not receiving any professional development in science over the prior 3 years**
- **Over 60% of school districts report having no district science support specialist**
- **More than 50% of the principals acknowledge their students won't get a high-quality science education by the time they go to middle school**
- **The most successful science instruction typically seen in elementary schools involved community partnerships, such as with science museums**



MIDDLE SCHOOL STEM

- **Only 14% of middle school teachers regularly engage their classrooms in the practices of science**
- **25% of middle school science teachers have neither a background nor a single-subject credential in science**
- **Almost 60% of the teachers identified insufficient professional development as a barrier to high-quality science instruction**
- **55% of the principals reported receiving services from external organizations, such as science museums, in order to bolster science instruction**

OUT-OF-SCHOOL STEM RESEARCH

- **Growing body of evidence shows that individuals develop their interest in STEM through participation in activities outside of school**
- **Youth participating in science-related activities outside of school leads to positive attitudes towards science & positive social relationships around science**
- **The disparity in academic performance that has been documented between high- and low-income students disappears when low-income students have participation in afterschool programs.**
- **Results from the 2009 National Assessment of Educational Progress in science showed that 4th, 8th and 12th graders who participated in hands-on and science-related activities outside of school showed a significant increase in test scores compared to those who did not.**

OUT-OF-SCHOOL FOR TEACHERS AND STUDENTS

- California Science Center
 - Science Center School – model for informal/formal education
 - CHISPA – After-school professional development program
 - Hands-on Science Preschool program
 - Summer Camp & Community Youth Programs
- Exploratorium, the Fleet Science Center & Chabot Space & Science Center
 - Inquiry focused teacher institutes & Challenger Learning Center
- Monterey Bay Aquarium
 - Marine science curriculum & teacher professional development
- Lawrence Hall of Science
 - Full Option Science System & teacher professional development



NSTA – NATIONAL SCIENCE TEACHERS ASSOCIATION

NSTA Position Statement recommends:

- **expansion of informal learning opportunities for preK-12 students, especially students from communities underrepresented in STEM fields, to promote their interest in and readiness for school science.**
- **expansion of the role of informal science institutions in the design and delivery of professional supports for teachers in both preservice and in-service contexts.**
- **systematic promotion of strong and sustained links between districts, schools, and informal settings and appropriate research and evaluation of the ways these links strengthen the quality and quantity of science education in preK-12 classrooms.**



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Stimulating Curiosity and Inspiring Science Learning in Everyone

