GLOBE CAP: Using Real World Science for Next Generation STEM Learning

Svetlana Darche, WestEd

Next Generation STEM Learning for All: A Forum Supported by the NSF
November 9, 2015
Key Idea

• GLOBE CAP offers motivating group “work-based learning” and career exposure that prepares students for STEM careers.
At the Nexus of Key Policy Concerns

The Environment and Environmental Literacy
- Sustainability and Climate Change
- Citizen Science

High School Reform ("Next Generation High Schools")
- Application of Learning
- Hands-on Strategies
- College and Career Prep

GLOBE CAP

STEM Education
- NGSS
- Practices
- Core Ideas
- Cross-cutting concepts
- Earth Science
- Prep for the STEM Workforce

This material is based upon work supported by the Nation Science Foundation under Grant No. 1139664.
Work-Based Learning: Real Work as the Context for Learning
A Continuum of Experiences

Work-based Learning Continuum

Pre-K

Career Awareness
Learning ABOUT work.
Build awareness of the variety of careers available and the role of post-secondary education; Broaden student options.

Career Exploration
Learning ABOUT work.
Explore career options and post-secondary requirements for purpose of motivation and to inform decision-making in high school and post-secondary.

Career Preparation: Practicum & Internships
Learning THROUGH work.
Apply learning through practical experience that develops knowledge and skills necessary for success in careers and post-secondary education.

Career Training
Learning FOR work.
Train for employment and/or post-secondary education in a specific range of occupations.

This material is based upon work supported by the Nation Science Foundation under Grant No. 1139664.
Refining the Definition of Work-Based Learning

Defined as an educational strategy that:

• Links school-based instruction with activity that has consequences beyond the class or value beyond success in school

• Uses the workplace, or in-depth experience with employer or community input, to engage students and intentionally promote learning and access to future educational and career opportunities
Key Elements of Work-Based Learning

1. Purposeful connection to learning — and to standards and curriculum, as well as employer expectations (*not disconnected work experience*)

2. Depth of experience with opportunity to engage in a professional community of practice (*not job shadowing*)

3. Direct, systematic employer and/or community input (*not project-based learning*)
Key Elements of Work-Based Learning

4. Producing goods/services of value beyond the classroom (not just for the class)

5. Authentic value/benefit to students beyond the classroom (not just for the grade)
GLOBE CAP:

GLOBE: Global Learning and Observation to Benefit the Environment

CAP: California Academy Program

Supported by the National Science Foundation under Grant No. 1139664.

This material is based upon work supported by the National Science Foundation under Grant No. 1139664.
GLOBE CAP Facts

• Funded by the NSF, 2011-2015
• Operating in six (6) high school environmental career academies in Northern California
• To embed GLOBE into the curriculum and programming of career academies to deepen learning and promote sustainability
Key Strategies

• Students collect real data that contribute to our understanding of climate change and other environmental issues

• GLOBE data collection is linked to curriculum and students’ interests; students delve deeply over a prolonged period of time and carry out projects to apply what they are learning

• Scientists and other professionals support data collection, provide feedback, and provide exposure to careers
GLOBE Around the World

• 111 Countries
The Career Academy as Context

• Multi-year cohort
• Interdisciplinary teaching and collaboration
• Academics plus CTE
• Hands-on learning, including work-based learning
GLOBE CAP Three-Year Trajectory

• **Grade 10:** *What is it about?* – data collection

• **Grade 11:** *What does it mean?* – data visualization and analysis

• **Grade 12:** *What can I do?* – application of knowledge and skills in the community
Students Collect Data and Upload to an International Database
Students Collecting CO$_2$ Data on their Campus
This material is based upon work supported by the National Science Foundation under Grant No. 1139664.
UC Berkeley Grad Students Work with GLOBE CAP Students

This material is based upon work supported by the National Science Foundation under Grant No. 1139664.
Accolades from the Mayor of Oakland

The mayor of Oakland talks to the lead teacher and students of the Oakland Environmental Science Academy about the students’ project.
Grad Students Share their Career Experiences
GLOBE CAP
as Work-Based Learning

✓ Purposeful connection to learning — and to standards and curriculum, as well as employer expectations

✓ Depth of experience with opportunity to engage in a professional community of practice

✓ Direct, systematic employer and/or community input

This material is based upon work supported by the Nation Science Foundation under Grant No. 1139664.
GLOBE CAP
as Work-Based Learning

✓ Producing goods/services of value beyond the classroom

✓ Authentic value/benefit to students beyond the classroom
GLOBE CAP as Work-Based Learning

This material is based upon work supported by the National Science Foundation under Grant No. 1139664.
Thank you!

Svetlana Darche
sdarche@wested.org
www.wested.org

www.globalstudentsolutions.org

This material is based upon work supported by the Nation Science Foundation under Grant No. 1139664.