The 2008 GLOBE Program: Promoting Student Research at Local to Global Scales

Dr. Edward E. Geary, Director------ 23 September 2008
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Talk Overview

• GLOBE --- Mission, and Goals
• Accomplishments and Assets
• GLOBE Student Research
  – GLOBE Learning Expeditions
  – Earth System Science Projects
  – Research Campaigns
  – The GLOBE Research Collaboratory
• GEO and GLOBE
The GLOBE Program

GLOBE---Mission and Goals

**GLOBE is--- a worldwide community of students, teachers, scientists, and citizens working together to better understand, sustain, and improve Earth’s environment at local, regional, and global scales.**

**Mission:** To promote the teaching and learning of science, enhance environmental literacy and stewardship, and promote scientific discovery.

**Goals**

- *Increase* student achievement across the curriculum with a focus on student research in environmental and Earth system science;
- *Enhance* awareness and support activities of individuals and groups throughout the world to benefit the environment;
- *Contribute* to scientific understanding of Earth as a system; and
- *Inspire* the next generation of global scientists.
Accomplishments & Assets

• Longevity = 14th Year of Operation
• Scope and Scale
  – 110 countries
  – 21,182 schools
  – 43,431 teachers
  – >1.5 million students
  – >18,000,000 environmental measurements
  – >150 Publications
  – >10 Years of Evaluation data (SRI, Learning Partnership)
• Assets:
  – GLOBE Networks, Protocols, Teacher’s Guide, ESSPs, Staff, Materials translated in 6 U.N. languages
GLOBE Student Research
GLOBE Learning Expedition 2008

Cape Town, South Africa
To promote global understanding of local and regional sustainability issues
To create an authentic audience for student research presentations.

Student Research Presentations
To increase student understanding of science

**Students and scientists collaborate in the field**
Local to Global
Environmental Investigations

• Single classroom---students investigate topics of local interest and relevance (ongoing)

• Earth System Science Projects (ESSPs)---students from multiple classrooms collaborate with scientists around a common topic area (e.g. Carbon cycle, Watersheds, Biomes) (by 2010)

• Research Campaigns---students from many countries and classrooms collaborate on investigations ranging from: Climate Change, to Water, Energy, and Human Health (>2010)
Earth System Science Projects
The Carbon Cycle

Global Carbon Cycle

University of New Hampshire: Rita Freuder, Lara Gengarelly, Mary Martin, Scott Ollinger, Annette Schloss, Sarah Silverberg

Czech Republic: Jana Albrechtova, Kateřina Čiháková, Zuzana Lhotakova, Barbora Semeráková, Premek Stych, Dana Votapkova

GLOBE Program Office: Gary Randolph

Legend
Units: Petagrams (Pg) = 10^15 gC
- Pools: Pg
- Fluxes: Pg/year
Watershed Investigations

Students will engage in authentic scientific investigations of watershed dynamics

- using real-time and archival data sets
- at local, regional, and continental scales
Student Research Campaign on Climate Change: 2011-2013

- Engage > 1 million K-16 students in climate change research
- Enhance Climate literacy and understanding for millions of people around the world
- Empower students, teachers, and citizens to “take action” on climate and environmental issues affecting their communities.
- Create a compelling model for integrating environmental research and data into K-16 classrooms
GLOBE Student Research Collaboratory

• Earth system science teaching and learning resources
  – Tutorials, modules, digital library resources, professional development opportunities, assessments
• Data sets, tools and services
  – GIS, Mapping, Graphing, Modeling, Remote sensing
• Online collaboration tools and services
  – School-school and Scientist-Teacher-Student
• GLOBE Student Research Projects---online library/archive
• Student Research---campaigns and events
GEO----GLOBE: Mutual Interests and Features

- Climate, Water, Ecosystems, etc.
- Scientist-centered data collection and use (GEOSS)
- International: 70 countries
- Network of data systems, providers, and users

- Climate, Water, Biomes, etc.
- Student-centered data collection and use (in situ +)
- International: 110 countries
- Network of Partners, teachers, scientists, students
GEO and GLOBE

Questions and Discussion
For Additional GLOBE Information see the following slides or visit www.globe.gov
GLOBE Around the World

GLOBE Regions (countries)
- Africa (23)
- Asia-Pacific (17)
- Europe-Eurasia (38)
- Latin America-Caribbean (18)
- Near East (11)
- North America (2)

6 New Countries since Oct 2003
105: Maldives — 8 December 2003
106: Mauritania — 6 July 2004
107: France — 4 October 2004
108: Congo — 28 June 2005
109: Niger — 11 August 2005
110: Ethiopia — 24 August 2005
111: Malta --- 1 December 2007

Capacity Building:
- 98 Master Trainers
- 41,000 Teachers
- 21,000 Schools

140 U.S. Partners
Collaborating Organizations

- National Science Teachers Association
- NOAA
- USGS
- AMERICA View
- United States Department of Education
- World Meteorological Organization
- The Association of American Geographers
- American Council on the Teaching of Foreign Languages
- TERC
- Cooperative Institute for Research in Environmental Sciences
- University of Colorado
- PHI DELTA KAPPA International
- Royal Netherlands Meteorological Institute
- AWS / International Partners in Education
- Royal Caribbean International
- IEEE
- Institute of Electrical and Electronics Engineers
- Organisation for Economic Co-operation and Development
- PolarTREC
- America-Israel Friendship League
- Geosynchronous imaging Fourier Transform Spectrometer
- PRECIP
- International Space University
- CloudSat
- CSU & Jet Propulsion Laboratory
- CLOUDSAT
- National Geographic
- UNESCO
- United Nations Educational, Scientific and Cultural Organization
- USAID
- United States Agency for International Development
- UNEP
- United Nations Environment Program
- United States Peace Corps
- Sister Cities International
- Center for Teaching International Relations
- International Space University
- Sister Cities International
- Geosynchronous Imaging Fourier Transform Spectrometer
Evaluation… student impacts

- Improved observational skills
- Improved measurement skills
- Improved technology skills
- Ability to understand data
- Improved critical thinking
- Improved map skills
Evaluation---Teacher Needs

- More student investigation and analysis ideas
- Modularized Teacher Guidebooks
- Additional Teacher Training
- Help with Equipment
- Mentoring
- Help with classroom/curriculum integration
Evaluation---Community Input

• Put Education First
• Focus Resources
• Integrate Evaluation
• Become More International
• Emphasize Local and Regional Relevance
• Become even more of a Leader in ESE
• Diversify Funding and Leverage Partnerships
• Create More Opportunities for Collaboration
• Increase Effectiveness of Technology Spending