MADE CLEAR Climate Change Education Program

A Joint Delaware-Maryland Effort to Embed, Support and Study Climate Change Education in K-12, Informal Education, and Higher Education Settings

A Member of the NSF Climate Change Education Program Alliance…

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Maryland and Delaware Climate Change Education Assessment and Research

• Comprehensive and Integrated in Scope Encompassing
  
  – Communities
    • Climate Scientists
    • Learning Scientists
    • Education Practitioners
  
  – Educational Delivery Mechanisms
    • Formal
    • Informal
  
  – Region that is a Microcosm for US
    • Socioeconomic Diversity
    • Urban to Rural Demographic
    • Northern to Southern Cultures

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• **LEAD Institution**
  – The University System of Maryland (USM)
  – University of Delaware (UD)

• **Partner Academic Institutions**
  – University of Maryland, College Park (UMCP)
  – University of Maryland Center for Environmental Science (UMCES)
  – Towson University (TU)
  – Delaware State University (DSU)

• **Partner Formal as well as a Number of Informal Educational Organizations**
  – Maryland Public Television (MPT)
  – Columbus Museum of Science and Industry (COSI)
• **Alliances with State Educational Agencies**
  – Delaware Department of Education (DDE)
  – Delaware Science Coalition (DSC)
  – Maryland State Department of Education (MSDE)

• **Alliances with State Environmental Agencies**
  – Delaware Department of Natural Resources and Environmental Control (DNREC, especially the Division of Energy and Climate)
  – Maryland Department of the Environment (MDE)
  – Maryland Department of Natural Resources (MDNR)
  – Maryland Energy Administration (MEA).

• **Alliances with Climate Scientists**
  – University-based
  – Government-based (Federal and State)
  – NGO-based
Four Goals

• Embed climate change science into formal and informal education in the region.

• Build and sustain the capacity of educators to deepen student understanding of climate change.

• Utilize the sociocultural diversity of the region and key learning principles to develop models of climate change education that are effective, scalable and transferrable.

• Advance policies and practices for climate change education in the region.
• Approaches:
  – Professional development for K-12 teachers, formal educators, and informal educators guided by:
    • Next Generation Science Standards
    • Environmental Literacy Initiatives
    • Connection between global climate science and local impacts
    • Research on student learning
Higher Education Partners

Make climate change more accessible and understandable to education students (pre-service) through

- Faculty fellowship programs
- Faculty participation in professional development events
- Course development

Campus partners include:

Delaware State University, University of Delaware
University of Maryland including: Towson, UMCP, UMCES

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Climate Science Advisors

Experts in climate science and solutions

Active role in teacher training, expert review, rapid response to teacher inquiries, and out of classroom training and internships

MADE CLEAR will provide science communications training workshops

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Informal Education Partners

Build capacity for climate education at informal education institutions by:

- Providing opportunities for communities of practice
- Identifying common needs and priorities
- Providing effective, accurate informal education materials to
- Providing access to climate change education professional development for informal educators

Goals to develop: 1) Shared positive messages, 2) Access to deeper understanding of climate change 3) Strategy for working with K-12 educators

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Informal Education Partners Include:

- State and Local Natural Resource Agencies
- National Estuarine Research Reserve System
- Conservation Organizations
- Museums
- Zoos
- National Aquarium, Baltimore
- Chesapeake Bay Foundation

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Delaware Education Model

• Delaware Science Coalition provides a mechanism for state-wide adoption of approved curriculum.
  – Provides science curriculum vetting, piloting, and classroom-data-based revision.
  – Delaware Department of Education provides training (PD) for science curricular materials.

• Through DSC we:
  – Work to ensure MADE CLEAR can provide a relevant, sustainable, climate change curriculum for adoption by DSC that is NGSS-based.

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Maryland Education Model

• De-centralized, with district control of curriculum
• District science supervisors critical to curriculum testing and deployment to meet state-set standards
• Professional development handled at the district level
• However statewide PD is common for new standards (e.g. Common Core) and we have a staff member at MSDE to sit at the table for NGSS implementation
Next Generation Science Standards

Connections to Common Core:
  Math
  Social Studies
  English Language Arts

Inclusion of Engineering

Emphasis on Core Ideas of Science…including climate change

Highlights College & Career Readiness
Teacher Professional Development

Climate Science Academy: Summer institute, school year workshops and online community of practice

Goals:
Model NGSS implementation

Utilize/develop learning progressions on sea level rise and carbon cycling to address student learning

Include global to local climate impact connections through Climate Science Advisors

Partners: NOAA, POLAR project, MSU (Anderson)
Sustained engagement of students
Success depends on scaling up

Reach 67 classrooms and 11 districts in MD
Partnership to develop climate lab

Plan to develop climate science modules
Reach 60 local teachers annually

Reach K-12 students and teachers in DE
State Parks reach across the state

Develop and review content
Pilot content with preservice educators

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Policy

How can we effectively leverage NGSS implementation to embed best practices for climate education professional development and content?

How do variations in implementation between states impact effectiveness of Professional Development?

How do we leverage existing policies and relationships between higher ed, informal education, and K-12 to better support climate education?
The Big Picture

All components will be used to research approaches and effectiveness of climate change education to provide:

• Effective professional development in climate change science
• Research to support scale-up of climate change education
• Demonstrated mechanisms for sustainability
The Path Forward

- Articulate and Refine the “Big Idea”
- Development of a Climate Change Learning Progression
  - Broadly Use the USGCRP Climate Literacy Learning Principles
  - Make Relevant Connections for MD & DE
    - Sea Level Rise
    - Urban Heat Island Effects
    - Extreme Weather
- Develop Assessment Tools
  - AAAS
  - NSTA
  - MADE CLEAR
Questions/Comments?