REACHING NEVADA’S TEACHERS THROUGH NSF EPSCOR CLIMATE CHANGE SCIENCE INSTITUTES

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• NSF EPSCoR awarded NSHE a $15 mill/5 year grant for climate change science

http://epscorspo.nevada.edu/nsf/climate1/

PROJECT BACKGROUND

• Main components

  Education

  Resources

  Undergraduate Education

  Secondary Education

  Climate Modeling

  CCSD

  Policy/WCSD

  Cyber-Infrastructure
EDUCATION COMPONENT GOALS

• Increase the number and quality of STEM educators and STEM professionals in the region and country

• Develop institutional partnerships that support exemplary practices and policies in STEM education

• Implement inquiry activities focusing on facets of climate change science and promote interest in STEM career pathways and higher education
SUMMER INSTITUTES

- Two week summer sessions, 7 positions, 3 grad credits (GEOG 691), ended in December

- Rotating curriculum:

- 19 secondary teacher participants from CCSD over the course of the program
HIGH SCHOOLS

- West Career & Technical Academy
- Northwest Career & Technical Academy
- Canyon Springs H.S.
- Chaparrel H.S.
- Coronado H.S.
- Silverado H.S.
- Foothills H.S.
- Clark H.S.

MIDDLE SCHOOLS

- Coral Academy of Science
- Jim Bridger M.S.
- Bob Miller M.S.
- Cashman M.S.
- Courtney M.S.
- Harney M.S.
- Fremont M.S.
- Garrett M.S.
S.I. PROGRAMMING

**In-Class**
- Content lectures
- Reading topics
- Discussions
- Researcher presentations
- Inquiry activities

**Out of Class**
- Laboratory visits
- Researcher presentations
- Field trips
• Frenchman Mountain – geologic evidence for climate change
• Lake Mead/Forever Earth – water resources to the Southwest
• Water treatment plant
• DRI
• Desert National Wildlife Refuge – environmental monitoring
• Renewable and sustainable resources – solar plant, Vegas PBS, and Springs Preserve

OUT OF CLASS ACTIVITIES
S.I. OUTPUT

- Inquiry activities focusing on different facets of cc science

- Standards based

- Each teacher develops their lesson throughout the institute and the last day is devoted to working through each lesson.
Moving day: How does climate affect plant and animal distribution

- Measuring the Urban Heat Island Effect
- Modeling carbon consumption and GHG Emissions
- Temperature effects on CO₂ solubility in oceans
- Density of liquids to understand the Thermohaline circulation
- Climographs of Nevada
- Climate in your community
LESSONS & NEVADA SCIENCE STANDS.

PALEOCLIMATE

- Leaf margins as climate indicators: Past and Present
- Packrat Middens: Evidence for climate change in the fossil record
- Stable isotopes as proxies for paleoclimate
- Tracking and graphing CO2 through time
- Fossil Hunters: Adventures in paleoecology
- Secrets of the sediments
LESSONS & NEVADA SCIENCE STANDS.

EARTH DYNAMICS

- Plate tectonics and its relation to climate change
- Natural disasters: Volcanoes effecting climate
- Volcanoes changing global climate
LESSONS & NEVADA SCIENCE STANDS.

SUSTAINABILITY
N.8.A  E.8.C.7
N.12.A  E.12.C.4

- Calculating your carbon footprint: embracing “going-green”
- Creative writing and climate change: Be proactive
- Using google earth to understand cc mitigation
- Understanding causes of GHGs
INSTITUTE ASSESSMENTS

- Institution (informal)
  - Pre-post tests
    - Content
    - Skills and Knowledge
- Week 1 survey
- Informal feedback
  - Course subjects covered
  - Participants and activities
TEACHER ASSESSMENTS

- Several components to constitute grades
- Two post-institute meetings
- Final grade issued in the fall after the summer institute

Final Grade
PROGRAM ACCOMPLISHMENTS

- Developed inquiry lessons, available on the data portal and [https://sites.google.com/site/geog691/](https://sites.google.com/site/geog691/)

- Significant increase in the cc comprehension level of participants, and their confidence level for leading field trips and investigating local climate change impacts.

- Inquiry-based lessons produce higher level of interest in climate change topics. Student assessments ➔ students performed well on climate change activities and remembered content longer.

- Teacher evaluation of the summer institute class has been extremely favorable
  - 4.5/5 three-year average rating of summer institute quality.
PROGRAM ACCOMPLISHMENTS

- Total dissemination of climate change content to 19 teachers and over 7,000 CCSD students

19 CCSD teachers participated between 2009 to 2012

Over 7,000+ students instructed on climate change science over the course of the 4 years
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