

Teachers and Students on Climate Change Science Education: 7th-12th grade Classroom Observations of Inquiry-based lessons in Clark County School District

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Timeline of Education Component

Summer Institute 1

- Group 1 entered program
- Focus on water resources and sustainability

UNLV Grad-course

- Group 1

Classroom Observation

- Visited each school
- Groups 1 & 2 implemented lessons
- Completed a research project

Summer Institute 3

- Group 2 cycles back to water resources



Classroom Observation

- Visited each school
- Group 1 implemented lessons
- Completed a research project

Summer Institute 2

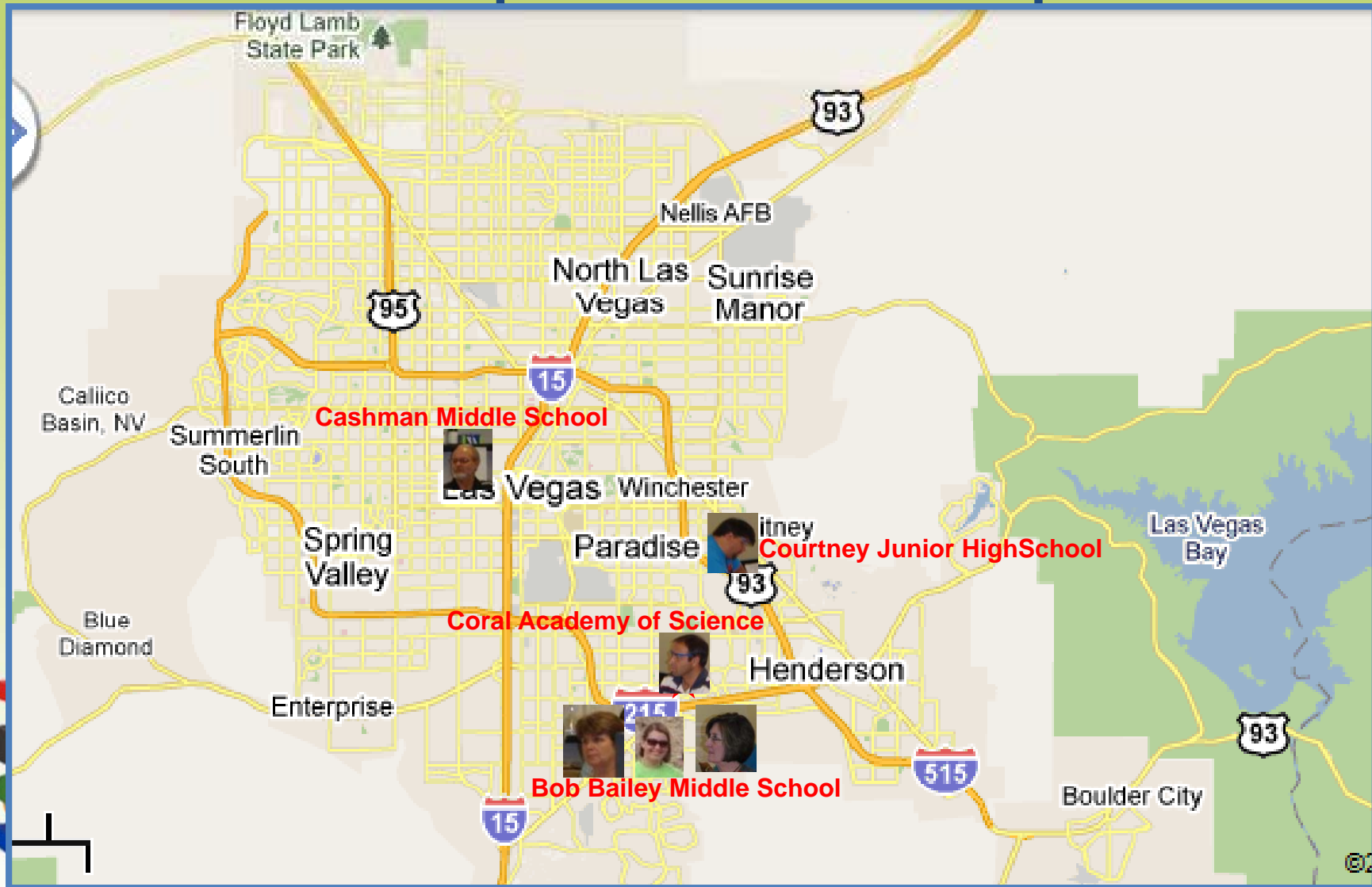
- Group 2 entered program
- Focus on disturbance and ecological change

UNLV Grad-course

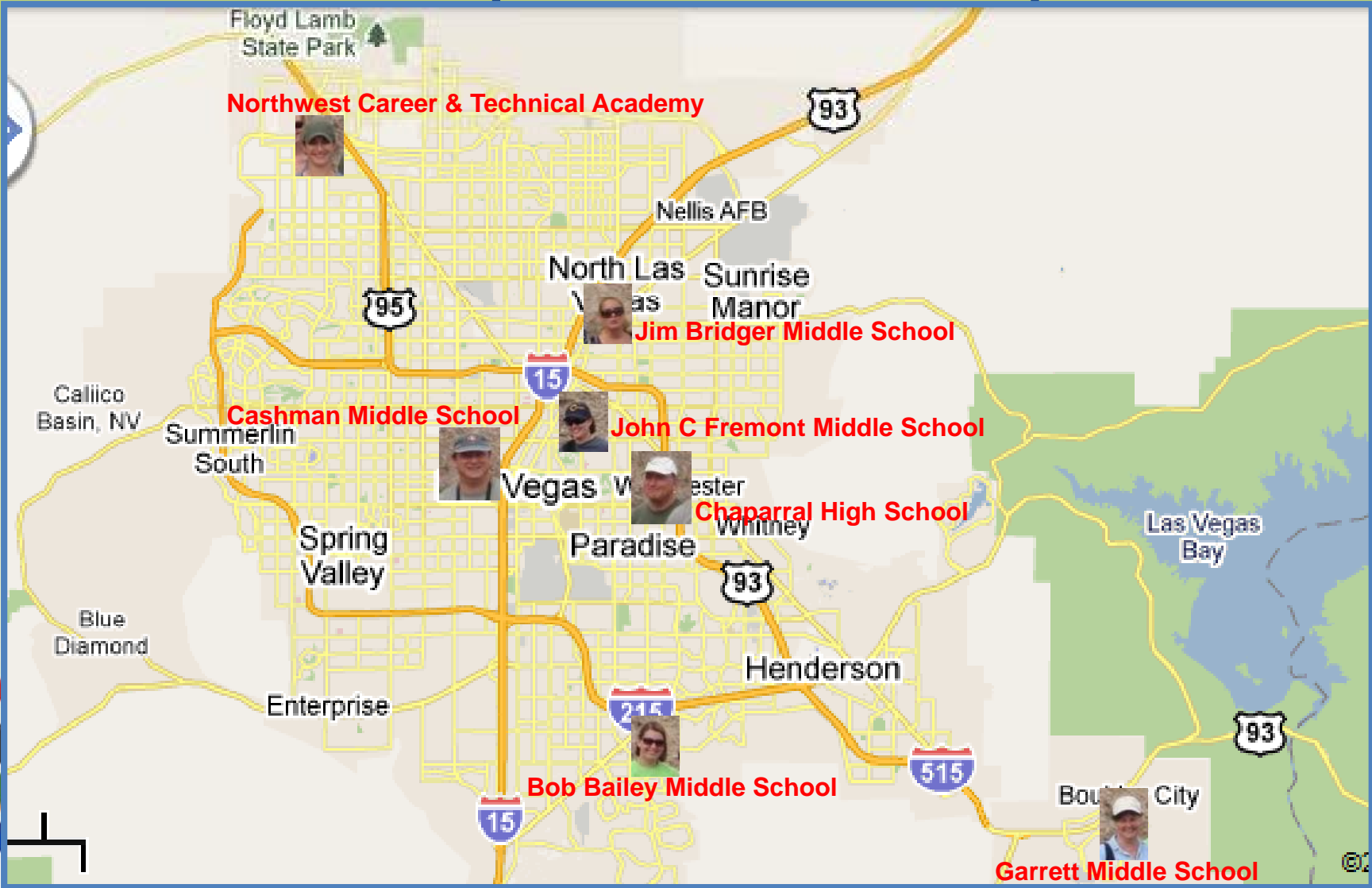
- Group 2



Participants – Group 1



Participants – Group 2



Lesson Development

- Earth & Space Science Unifying Concept A → Scientific Inquiry Standards
 - (6th-8th) Understand the relationship between Earth's atmosphere, topography, weather and climate. (Sun radiation, water cycle, climatic patterns, atmosphere composition, difference between climate and weather)
 - (9th-12th) Understand heat and energy transfer in and out of the atmosphere and influence weather and climate. (Earth's atmosphere past and present, greenhouse effect, heat transfer through convection and radiation)



Inquiry learning

- “Tell me and I forget, show me and I remember, involve me and I understand.”

Observe, collect data, & confer info

Question & connect ideas

Synthesize info & draw conclusions

Communicate results & Develop
Problem Solving Skills!



Lesson Plans

Group 1

- Volcanoes changing global climates
- Calculating your carbon footprint: embracing “going-green”
- Plate tectonics and its relation to climate change
- Measuring the Urban Heat Island Effect
- Modeling carbon consumption and GHG Emissions
- Creative writing and climate change: Be proactive

Group 2

- Packrat Middens: Evidence for climate change in the fossil record
- Tracking and graphing CO₂ through time
- Leaf margins as climate indicators: Past and Present
- Moving day: How does climate affect plant and animal distribution
- Stable isotopes as proxies for paleoclimate
- Natural disasters: Volcanoes effecting climate



Teachers creating lesson plans



Lesson Plans



Classroom Observations

- Timing based on when lesson falls into standard (mostly)
- Activity follows an introduction, field trip, or pre-test. Various teaching tools: smartboard, pictures, videos, computers
- Teachers are not assessed by observations
- Inquiry-based lessons produce higher level of interest in climate change topics. Assessments → students performed well on climate change activities and remembered content longer



Students working on lessons



Students working on lessons



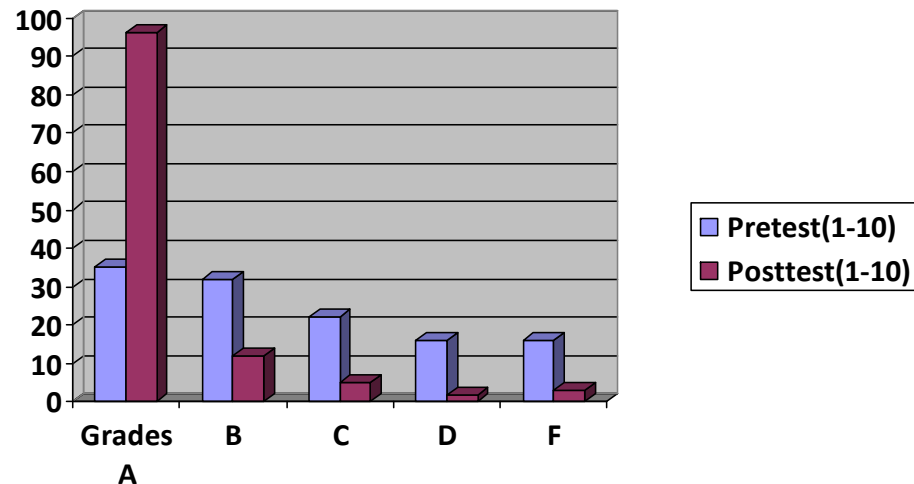
Student Understanding

- Teaching as a Research project

Graph of Results of Pre and Post Tests

Questions 1 – 10: Fossils, Geologic Time, and Climate

Pretest – 121 students; Posttest – 118 students



Future Direction of Activities

- Summer Institute 2011: Cycling back to water resources & sustainability (Group 2)
- Summer Institute 2012: Disturbance and Ecological Change (Group 3)



Thank You

- NSF EPSCoR
- Paul Buck
- Larry Rudd
- Juan McAlister
- CCSD Teachers and Students

