Heat Islands as a Tool for Teaching Sustainability
Abstract

Due to the unique placement of Western High School within a concrete and asphalt island and a result construction project to rebuild it, a group of science teachers from Western High became interested in how the new construction would affect the urban heat island footprint of their school. A student project was developed to track and document the construction process over a two-year timeframe. The participating teachers used action research to study the impact of the project on their teaching practice and student learning. Three inquiry-style laboratory activities were created to teach students about heat concepts and the effect of heat islands. A misconceptions survey, along with student journaling, were used as data sources for determining changes in student understanding. Results show significant conceptual change in the grade 9 students, with less significant change for the older student population. This presentation will describe the research context, process, and its impact on participating students and teachers.
Our goals:
1. Reach our students through real world connections.
2. Engage them with ideas they can relate to from their own experience.
Urban Heat Islands

- Cities are hotter than surrounding areas
  - Increased absorption of heat due to building materials, lack of vegetation, etc.
Why is Las Vegas Hot?

• We’re a desert.
• Also, we’re a city.

• How is heat exchanged?
Three inquiry lessons relate heat gain to student experiences.
Lesson One: Introduce Heat

- What is heat?
- How is heat exchanged?
- Lab: The Can Challenge
  - Students design a better coffee cup.
  - Relate to a possible design career.
Lesson Two: Urban Heat Islands

- Heat isn’t just exchanged by us, it’s exchanged by the entire city.
- Does color and reflectivity effect heat exchange?
- What causes UHIs?
- Lab: Color and material investigation with infrared thermometers
Lesson Three: Identify Building Features that Reduce Heat Gain
Results

- Increased attendance in our classes
- Decreased apathy
  - Scores a standard deviation higher than students taught with another inquiry lesson set!
Anecdotal Additions

• At least two families contacted the science teachers asking where they could find more information to incorporate in their current landscaping projects
Conclusion

• By linking science to real world experiences students attached an increased value to what they learned

• Learning was connected to experiences outside school and interest in sustainable building practices increased