**Urban Heat Islands Exploration Activity Lesson Plan**

Mandy Becker- 8th grade Science Mansfeld MMS– BIORETS 2024

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| **Objectives:**   * I can understand what an urban heat island is and how it affects Earth’s energy balance. * I can explain how human activity changes urban, desert, and riparian environments. * I can collect and analyze data to show others about a phenomenon in my community. |
| **Purpose:**  This lesson introduces students to the phenomenon of urban heat islands in a place-based way. It provides them experience in hands-on data collection, reading graphs, and data analysis. They can observe how energy can be stored differently in local desert, urban, and riparian environments. The lesson is culturally relevant, place-based, and intended to get students thinking about how human interactions with nature have changed energy dynamics and/or created societal inequities in their community. |
| **Standards Engaged:**  8.P4U1.3- *Construct an explanation on how energy can be transferred from one energy store to another*  E1- *...natural and human processes... shape Earth and its climate*  8.E1U3.8- *Construct and support an argument about how human consumption of limited resources impacts the biosphere.*  **Science and Engineering Practices:**   * Analyze and interpret data * Obtain, evaluate and communicate information * Plan and carry out an investigation |
| **Timeline/Pacing:**  Day 1: Students are introduced to heat island phenomenon and basics. Focus is on their own observation of this phenomenon, and outline of lesson timeline.  Day 2: Students engage with NASA graphs and visuals to learn more about urban heat islands. Discuss experiment  Day 3: Brief students on experiment design. Students collect data on temperatures in their school/community.  Day 4: Analysis of Data; students begin work on their own graphs and data displays  Day 5: Students finish data displays; gallery walk to display findings  Day 6 extension: Urban Heat Islands effects on equity (can be moved to an earlier day if finish early) |
| **Materials:**   * Individual student lab notebooks for data collection * Art materials/ poster board for presentations * School iPads (can also have students work with printouts of graphs if cannot access electronically * Kestrel * Point and Shoot Thermometers (7- 1 for each lab group) * NASA Science Data resources |
| **Supplemental Resources/Suggestions:**   * My NASA Data site: [My NASA Data](https://mynasadata.larc.nasa.gov/) * Intro activity: <https://mynasadata.larc.nasa.gov/mini-lessonactivity/analyzing-surface-temperature-differences> * Where Do Heat Islands Form article: <https://mynasadata.larc.nasa.gov/basic-page/urban-heat-islands#:~:text=Urban%20heat%20islands%20form%20because,from%20solar%20radiation%20they%20absorb> * Graph Analysis: <https://mynasadata.larc.nasa.gov/mini-lessonactivity/interpreting-graph-surface-temperature-urban-areas>  <https://mynasadata.larc.nasa.gov/mini-lessonactivity/relationship-between-surface-temperature-and-vegetation>  [Human Impact and the Creation of Urban Heat Islands (arcgis.com)](https://storymaps.arcgis.com/stories/6246c0bbe2e44ff29781da712f247604) * Extension: <https://climateaction.tucsonaz.gov/pages/milliontrees-tree-equity> |