**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.
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| **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
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| **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 displaysDay 5: Students finish data displays; gallery walk to display findingsDay 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
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| **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>
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