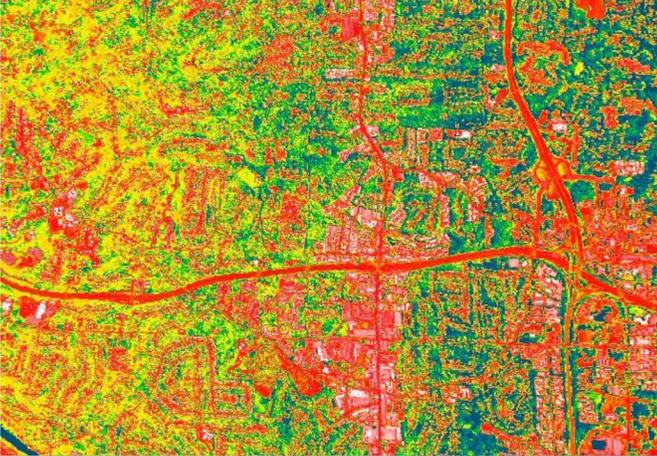
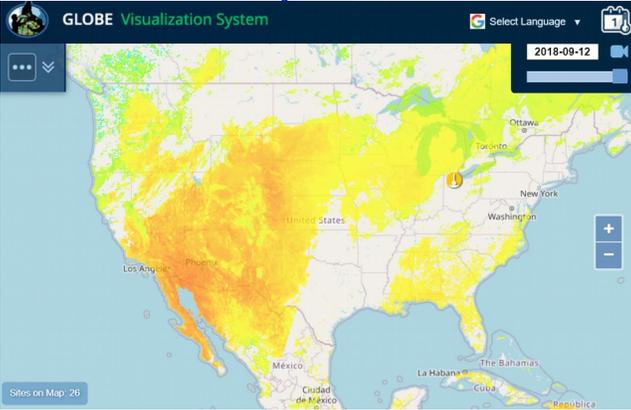
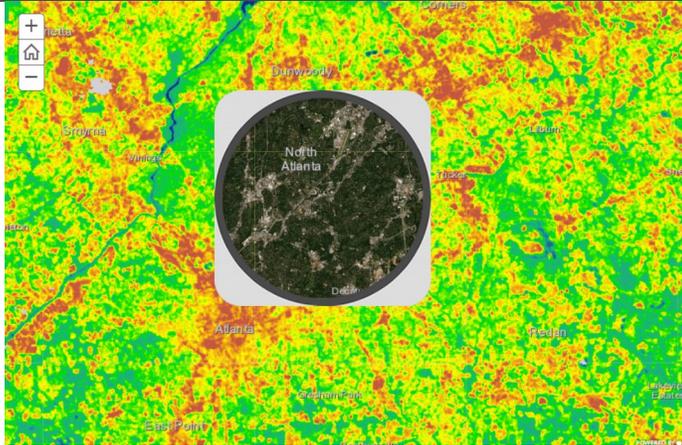
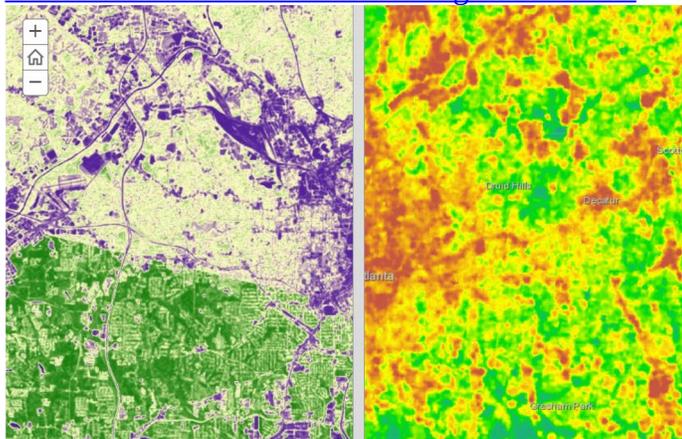


Data... and Math Are Everywhere

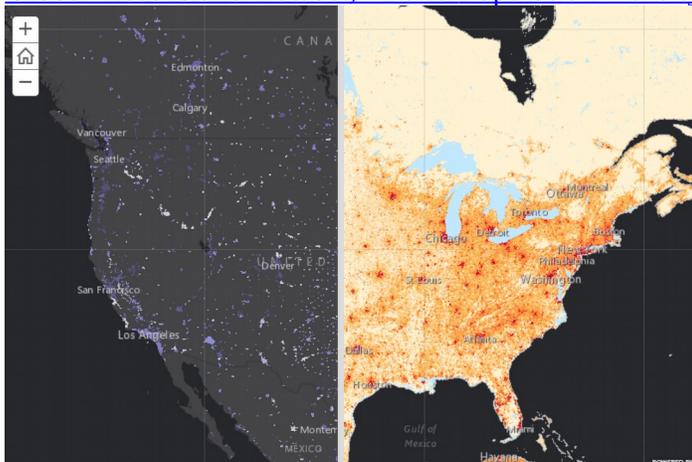
Lesson	Creation of Urban Heat Islands (my NASA Data website)
Data	<ul style="list-style-type: none"><li data-bbox="443 296 906 331">• NASA Earth Observatory image <li data-bbox="443 787 1149 1220">• <p>air temperature: 54° F (12° C) sunlit asphalt: 66° F (19° C) sunlit concrete: 59° F (15° C) sunlit grass: 56° F (13° C) shaded concrete: 46° F (8.0° C) shaded grass: 40° F (4.0° C)</p><li data-bbox="443 1220 1123 1665">• Globe Visualization System <li data-bbox="443 1665 1019 1696">• Landsat Provisional Surface Temperature



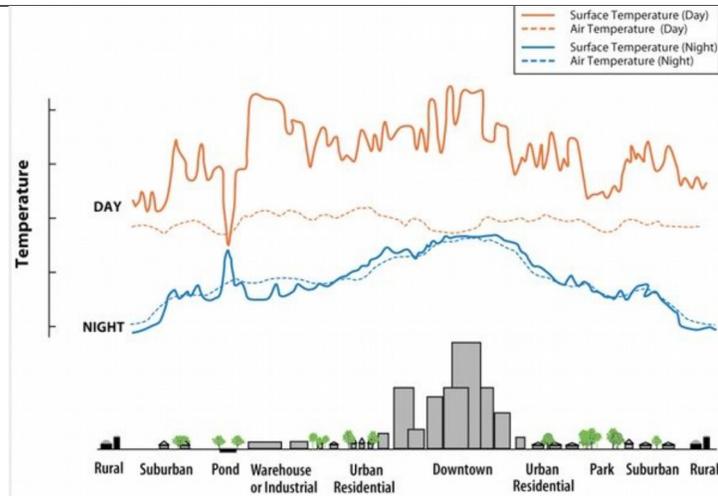
- [Landsat Normalized Difference Vegetation Index](#)



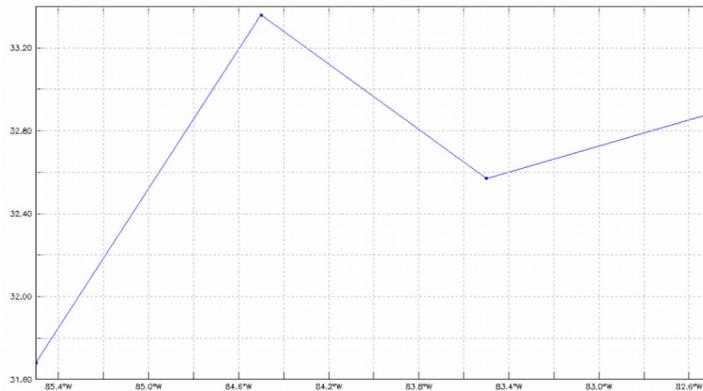
- [Global Heat Island Dataset, v1 and Population Density, v4.11](#)



- [United States Environmental Protection Agency, Learn About Heat Islands](#)



- [Earth System Data Explorer](#)



Engaging Context

The data serves as an engaging context for math concepts related to graphing, reasoning quantitatively, and understanding what level of accuracy is appropriate when reporting quantities. The data is engaging because it relates to the real world and something students have experienced personally. The ‘hook’ for the lesson involves asking students about walking barefoot on different surfaces and whether they noticed a temperature difference between the surface and the air. Students look at pictures of bare feet on several surfaces and predict if the surfaces feel cooler or warmer than the air. Students then look at a picture that includes multiple surfaces with the temperature of each surface listed. This brings in the quantitative aspect of the lesson, and students can begin to make a connection between surfaces and temperatures, which then lead into the math

	<p>concepts.</p>
Measurable Objectives	<p>Students will...</p> <ul style="list-style-type: none"> • Graph line plots and bar graphs • Make a claim about how human activities have influenced the urban heat island effect • Make predictions about the surface temperatures of different materials • Observe and analyze surface temperature differences between natural and built materials <p>(Cited from my NASA Data lesson ‘Creation of Urban Heat Islands’)</p>
Standards	<p>NGSS</p> <p>HS-ESS3-6: Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.</p> <p>HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.</p> <p>CCSS Math</p> <p>MP.2: Reason abstractly and quantitatively</p> <p>HSN.Q.A.1: Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays</p> <p>HSN.Q.A.3: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities</p>
Evidence	<p>Evidence of learning will be collected several ways:</p> <ul style="list-style-type: none"> • Students will analyze a graph, describe what they see, and look for

	<p>patterns in the data (written responses by students which are then shared in small groups)</p> <ul style="list-style-type: none">• Students will create a graph based on data• Students will make a claim about the human impact on surface temperature (written responses by students which are then shared in small groups)• Students will complete a case study in a small group• Student assignment (for written responses and graph) – from my NASA Data lesson ‘Creation of Urban Heat Islands’• As students are working on the lesson, I will be circulating through the room to monitor and ask students formative and guiding questions. Students will work both independently and in a small group.• After teaching the lesson, I will have students complete a survey (using Google Forms) to reflect on the lesson.
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Link to [Copy of Student Assignment](#)