

Objective: Students will evaluate the air temperature data collected from the schoolyard during the summer months. The data will be compared the data to a reference site and determine if it meets the EPA definition of an UHI.

Curriculum Standards:

- NGSS ESS3.C Human Impacts on Earths Systems
- MD E-Lit Standard 1 Topic A: Environmental Issue Investigation
 - Indicator 5: Use data and references to interpret findings to form conclusions

Materials Needed:

- Summer temperature data from schoolyard and reference site.
- Other schoolyard air temperature data, e.g., Air Lesson 4 (optional)
- HOOD-CCWS logger data website

BACKGROUND

The increase in temperature in developed and urban areas as compared to rural areas is known as the Urban Heat Island. The annual mean air temperature of a city with one million or more people can be 1.8 to 5.4°F (1 to 3°C) warmer than its surroundings, and on a clear, calm night, this temperature difference can be as much as 22°F (12°C). Even smaller cities and towns will produce heat islands, though the effect often decreases as city size decreases.¹

UHIs can be measured with **surface temperatures** or **atmospheric temperatures**. This lesson focuses on atmospheric temperatures.

Heat Island intensity is most pronounced on clear calm nights when night time temperatures from urban areas as compared to rural can differ from 12.6 to 21.6F (7 to 12C).

DIRECTIONS: Using the Hood-CCWS Website (www.ccwsscience.org) or data summary sheet provided by your teacher, identify the following average temperatures for each logger during the logger deployment period:

Enter the dates that your class had the logger outside & collecting temperatures:

SUMMER Logger Deployment Dates: _____

- Using the dates above, set up the ccwsscience.org data graph for this date range.
- From the list on the left, select the appropriate air logger for your school and select the reference logger.
- Use the table below the graph toggle between daytime data, nighttime data, and all temperature data. Select the “Apply” button each time to refresh the calculations.
- Fill in the table below to compare air temperatures:

¹ USPEA Urban Heat Island Compendium – Chapter 1 Urban Heat Island Basics. October 2008.
<https://www.epa.gov/heat-islands/heat-island-compendium>

