

## **NATURE LAB SUMMER CAMP:** *Tackle Climate Change*

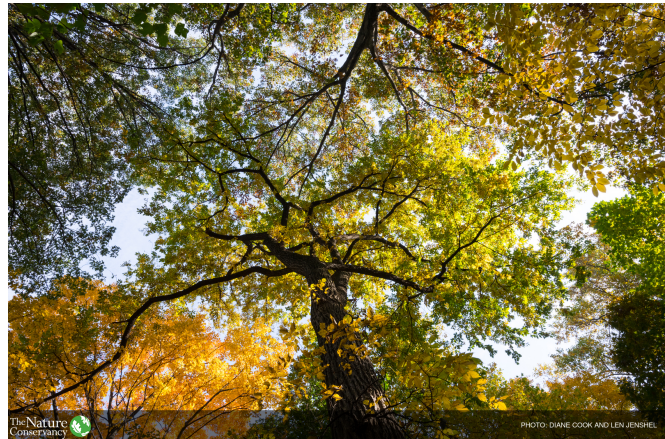
### **Experiential Project Concept:**

Extreme Heat

**Grade Levels:** 3-8

### **Essential Question:**

- How do trees, grass, asphalt, and other materials affect temperature?



### **Introduction:**

A microclimate is the climate of a very small area. It can be influenced by the type of land surface, the presence or absence of plants, the type of plants, and the amount of shade. In this activity, you will have your students complete an experimental design challenge in which they will discover the differences between the microclimates of various locations in their neighborhood while they search for the most extreme microclimates. Based on their results, students hypothesize how concentrations of surfaces that absorb heat might affect the temperature in cities - the urban heat island effect.

### **Materials:**

- Thermometer (digital pocket thermometers and 1 m. pieces of string, compass, camera, several flags or site markers (these can be made at home)

### **Objectives:**

The student will...

- Design a microclimate survey to determine the most extreme microclimates in their neighborhood
- Analyze their data and use this information to support claims about the most extreme microclimates.
- Hypothesize how concentrations of surfaces that absorb heat might affect the temperature in cities - the urban heat island effect.

### **Suggested Flow:**

Suggested concepts to discuss with your students before they begin this activity:

- What is the difference between climate and weather?  
[http://oceanservice.noaa.gov/facts/weather\\_climate.html](http://oceanservice.noaa.gov/facts/weather_climate.html)
- What is the difference between climate and microclimate?  
[http://www.metlink.org/secondary/key-stage-4/microclimates/#urb\\_micro](http://www.metlink.org/secondary/key-stage-4/microclimates/#urb_micro)

## Participate in a Survey Design Challenge:

*Find the two most extreme (coldest and hottest) microclimates in your neighborhood, create an inventory of what lives there, and characterize what factors make the microclimates so different.*

- 1) Have students complete the Design Challenge worksheet and construct a data table. When they have completed these items you can suggest that they get approval from you before moving forward.
- 2) The suggestion on the worksheet is that students conduct measurements in a minimum of five locations, but this can be varied according to the time allotted. If time is limited, you could also have one student group responsible for only one location and then compile the data from the class.
- 3) Make sure that students take a minimum of three measurements at each location. Depending on the time available, students could add a component to sample their microclimates on different days/times. Even if there is not enough time to do this, it's worth having a discussion about how these changes might affect the microclimate of an area.
- 4) Student designed data tables may look different to reflect their design ideas, but here's an example if needed

### Sample Data Collection Chart for One Location Sampled

Location 1 Measurements      Date: \_\_\_\_\_ Time: \_\_\_\_\_

	Trial 1	Trial 2	Trial 3	Average
Air Temperature				
Soil Temperature				
Relative Humidity				
Soil Moisture				
Wind Speed				
Wind Direction				

Description of Area	
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- 5) Make sure to have a discussion with students about the size requirements for the sites they are sampling. For example, is there a minimum or maximum area that should be used? Also help them to decide how to photograph their sites, if you're choosing to take photos.
- 6) Have the students go outside and conduct their investigations.
- 7) Once all of the data is collected, students should discuss and reflect on the following:
  - a. Where in your neighborhood was the temperature the warmest? Where was it the coolest? Why?
  - b. What aspects of the environment affect temperature in these areas?
  - c. Based on these results, which they think would be warmer: urban areas or rural areas. (In urban areas where surfaces like asphalt and concrete are abundant, temperature will be higher.)
  - d. Introduce the concept of urban heat islands for further discussion.

**Source:** *A Windows to the Universe* activity by [Lisa Gardiner](#)