

Objective: Students will conduct background research on the issue of rising temperatures, extreme heat, and the impacts of urban heat.

Curriculum Standards:

- NGSS ESS3.C Human Impacts on Earths Systems
- MD E-Lit Standard 1 Topic A: Environmental Issue Investigation
Indicator 1: Identify an environmental issue.
Indicator 2: Develop and write research questions related to an environmental issue.
- MD E-Lit Standard 5 Topic A: Human Impact on Natural Processes
Indicator 1: Analyze the effects of human activities on earth’s natural processes.

Materials Needed:

- Issue Research Worksheet
- Device to access the internet \ library

TEACHER DIRECTIONS

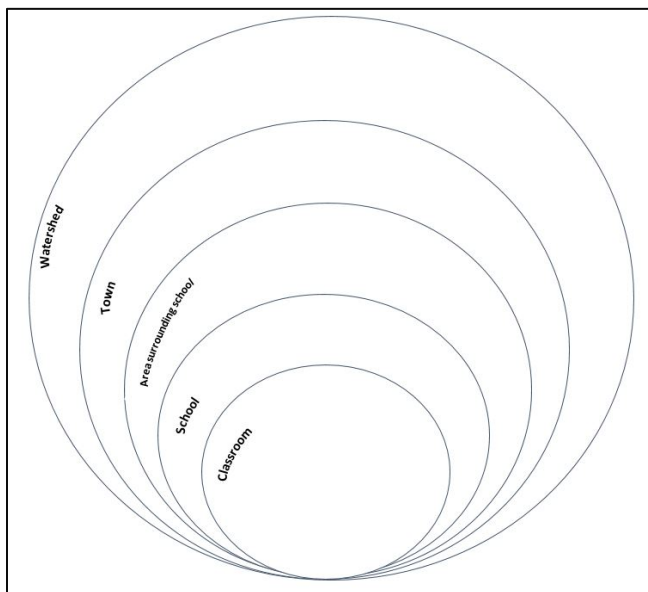
Introduce the issue of rising temperatures worldwide and, if possible, reference local events. Describe the concepts of students being a part of different communities. Issues, environmental or otherwise, can have impacts on stakeholders within one community, or be farther reaching into several communities, such as the entire town or watershed. Students should understand the core concepts and definition of a watershed.

Terms to Know

>Extreme heat is defined as summertime temperatures that are much hotter and/or humid than average. (Center for Disease Control). In most of the United States, extreme heat is defined as a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees. (Department of Homeland Security)

>Watershed: the area of land in which water drains to a central body of water and is defined by geographic ridges.

>Stakeholders = an individual or group interested in, could influence, or be impacted by an activity.



Representation of the various levels of a student’s overlapping communities

Divide the students up into small groups and have them spend time researching the questions on the attached Issue Research Sheet. Remind them to record the source of their information. Is the source credible, peer-reviewed, or simply opinion? Explain the terms and differences of each source type. Is there data that supports the information?

Students should develop their own research question to add to the research worksheet.

Encourage students can use websites such as:

- National Weather Service (Weather.gov)
- US Climate Resilience Toolkit (toolkit.climate.gov)
- NOAA Weather (www.noaa.gov/weather)
- Department of Homeland Security (www.ready.gov/heat)
- Maryland Public Health (https://preparedness.health.maryland.gov/Pages/resources_hot.aspx)
- Center for Disease Control (www.cdc.gov/disasters/extremeheat/heat_guide.html)

Compile student research as a classroom activity using the attached worksheets as an example.

Discuss the responses. What are the sources of responses? Are the responses from credible sources? Are there any impacts missing from their research?

Compile & Discuss the responses to community impacts

Upon completion, **ask** the students: *“Do you think our schoolyard acts as an Urban Heat Island?”*

Continue your classroom conversation:

- inquire how students would evaluate their schoolyard as an urban heat island.
- Compile a list of their ideas.
- Discuss what is feasible depending on criteria, such as timing, resources, and accessibility to information.
- Who would they ask for help with the investigation?

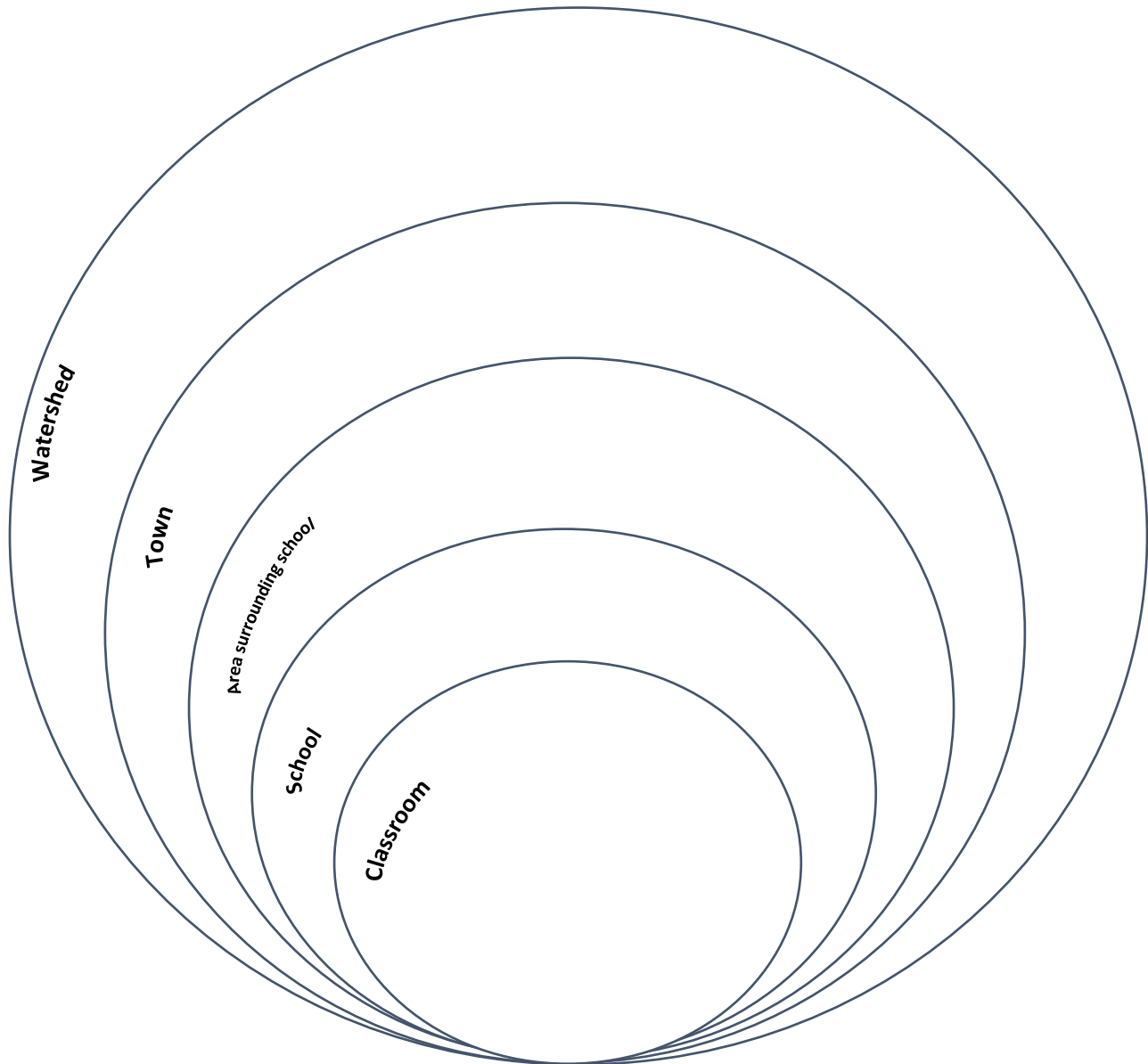


Teacher: After small group research, compile student answers as a group. (Table below represents same as the student worksheet)

Research Question		Information Source:
1. What are some factors that cause the city (urban) to be warmer than the country (rural)?		
2. When & where did urban heat effects first become a known issue?		
3. Who are the stakeholders (groups of people) impacted by extreme heat? Who could improve the issue?		
4. Why should we be concerned about the effects of extreme urban heat?		
5. How does urban heat impact me?		
6.		

After small group collaboration, compile student answers about the stakeholders in their communities:

Stakeholders = an individual or group interested in, could influence, or be impacted by an activity.





STUDENT URBAN HEAT ISSUE RESEARCH SHEET

In your group, conduct some online research to answer the following questions about urban heat and its impacts. *You will be asked to share your answers, so be sure to know your sources of information.* Create your own research question for the last entry.

Research Question		Information Source:
1. What are some factors that cause the city (urban) to be warmer than the country (rural)?		
2. When & where did urban heat effects first become a known issue?		
3. Who are the stakeholders (groups of people) impacted by extreme heat? Who could improve the issue?		
4. Why should we be concerned about the effects of extreme urban heat?		
5. How does urban heat impact me?		
6.		



Identify the stakeholders in each level of your community.

Stakeholders = an individual or group interested in, could influence, or be impacted by an activity.

Community Level	Stakeholder List	Information Source:
Your classroom		
Your school		
Area surrounding the school		
Town\city		
Watershed		