Hot Town--Summer in the City

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Grade Level	7-8
Duration	5 class periods

National Standards

GEOGRAPHY
Element One: The World In Spatial Terms
1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information
3. How to analyze the spatial organization of people places, and environments on Earth's surface
Element 5: Environment and Society
14. How human actions modify the physical environment
15. How physical systems affect human systems
Element 6: The Uses of Geography
18. How to apply geography to interpret the present and plan for the future

SOCIAL STUDIES
D2.Geo.3.6-8. Use paper based and electronic mapping and graphing techniques to represent and analyze spatial patterns of different environmental and cultural characteristics.
D2.Geo.9.6-8. Evaluate the influences of long-term human-induced environmental change on spatial patterns of conflict and cooperation.
D2.Geo.12.6-8. Explain how global changes in population distribution patterns affect changes in land use in particular places.
D4.3.6-8. Present adaptations of arguments and

AZ Standards

ELA
Reading
Key Ideas and Details
7.RI.1 and 8.RI.1 Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
Writing
Text Types and Purposes
7.W.1 and 8.W.1 Write arguments to support claims with clear reasons and relevant evidence.
a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.
b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.
d. Establish and maintain a formal style.
e. Provide a concluding statement or section that follows from and supports the argument presented.

Arizona Social Science Standards

GEOGRAPHY
The use of geographic representations and tools helps individuals understand their world.
7.G1.1 Use and construct maps and other geographic representations to explain the spatial patterns of cultural and environmental characteristics. technology
7.G1.2 Analyze various geographic representations and use geographic tools to explain relationships between the location of places and their environments.
8.G1.1 Use geographic tools and representations to analyze historical and modern political and economic issues and events.
Human-environment interactions are essential aspects of human life in all societies.
8.G2.1 Examine impact of and responses to environmental issues such as air, water, and land pollution, deforestation, urban sprawl, and changes to climate.
Examining human population and movement helps individuals understand past, present, and future conditions on Earth's surface.
7.G3.3 Evaluate the influences of long-term, human-induced environmental change on spatial patterns and how it may cause conflict and promote cooperation.
Global interconnections and spatial patterns are a necessary part of geographic reasoning.
7.G4.1 Analyze cultural and environmental characteristics among various places and regions of the world.
7.G4.4 Explain an issue in terms of its scale (local, regional, state, national, or global)
8.G4.1 Take an active stance on a geographic issue reflecting its scale (local, regional, state, national, or global)
CIVICS
Civic virtues and democratic principles are key components of the American political system
8.C1.2 Demonstrate civic virtues that contribute to the common good and democratic principles within a variety of deliberative processes and settings.
8.C1.4 Engage in projects to help or inform others such as community service and service-learning projects.

explanations on topics of interest to others to reach audiences and venues outside the classroom using print and oral technologies (e.g., posters, essays, letters, debates, speeches, reports, and maps) and digital technologies (e.g., Internet, social media, and digital documentary).
D4.4.6-8. Critique arguments for credibility.

Process, rules, and laws direct how individuals are governed and how society addresses problems
7.C4.4 Explain challenges people face and opportunities they create in addressing local, regional, and global problems at various times and places. Apply a range of deliberative and democratic procedures to make decisions and act in local, regional, and global communities.
8.C4.4 Identify, research, analyze, discuss, and defend a position on a national, state, or local public policy issue including an action plan to address or inform others about the issue.
8.C4.5 Analyze how a specific problem can manifest itself at the local, regional, and global levels, identifying its characteristics and causes, and the challenges and opportunities faced by those trying to address the problem. Apply a range of deliberative and democratic procedures to take action and solve the problem.

Overview

The world is full of problems: drought, famine, climate change, wars, countries under dictators, diseases with no cures, and many more. While the Earth has problems, it doesn't mean that people are powerless to come up with solutions. Students need to learn a process to discover problems, explore the problems, analyze data and information, and then take a course of action that will help solve these issues.

Purpose

In this lesson students will explore Geographic Inquiry using the topic of urban heat-islands. Students will apply geographic tools to gather data, research information, and take informed action. This process can then be duplicated to look at and hopefully take action on other problems of their choice.

Materials

- Campus or community map (with grid) or available online software such as ArcGIS to create an electronic map
- Infrared thermometers
- Data Gathering Sheet
- Electronic Data Recording Sheet (Excel spreadsheet)

- Chain Reaction Magazine http://chainreactionkids.org/files/issues/7/chreact7_master.pdf
- Looking at Sources
- Heat Island Cooling Strategies https://www.epa.gov/heat-islands/heat-island-cooling-strategies
- Labels for Heat Island Cooling Strategies
- GeoInquiry Planning Sheet
- Scoring Guide for GeoInquiry
- Phoenix Daytime Surface Temperatures map
- Phoenix Nighttime Surface Temperatures map

Objectives

The student will be able to:

1. describe urban heat island effect.
2. gather and analyze data using geographic tools.
3. take informed action reflecting appropriate scale (community, state, national, etc.).

Procedures
Prior to the Lesson: It would be helpful to have several parent volunteers, the SRO, or school paraprofessionals help with the outdoor portion of this lesson. Otherwise select a portion of campus where students are kept in eyesight.

Prior to the Lesson: Place two materials (tile, painted boards, construction paper) (one white and one a dark color) under a strong lamp for several minutes before students begin the lesson).

ARIZONA
GEOGRAPHIC ALLIANCE

Prior to the Lesson: Teacher will need to decide if they are using low tech (paper maps with grids of their campus or community) or if they are comfortable using online software such as that provided by ESRI to create an electronic map.

SESSION ONE

1. Introduce the lesson by asking students to predict if one material (that is under the lamp) would be hotter than the other. If so, which is hotter? Are different places in our city hotter than others? Can you give any examples?

2. Ask, how would you evaluate the temperature? Discuss ways of determining temperatures in a city.

3. Then, divide students into groups with each group having an infared thermometer. Demonstrate how to use the tool with caution being given to pointing at humans or animals including those beyond windows/glass. It uses a laser beam that could be dangerous to eyes.

4. Distribute campus map (with grid) and the Data Gathering Sheet to students. Explain how to read the campus map and what is expected on the Data Gathering Sheet.

5. Go outside and gather data.

6. Return to classroom and have groups answer question 1 as a group. Then have groups work together to complete the worksheet.

SESSION TWO

Prior to the Session: Teacher needs to compile the data from the various groups using the Electronic Data Recording Sheet. Then plot the information on a map (electronic or paper).

1. Display the campus or community map and have students look for hotter and cooler zones.

2. Return the groups' Data Gathering Sheets and have groups discuss the Data Gathering Sheet data and comparisons. Record the list of sources that were generated by Question 3 on the whiteboard.

3. Read to the students the Introduction to the Magazine Chain Reaction #7 page 2 explaining how scientist are looking into the Phoenix heat island using the Phoenix Daytime Surface Temperatures map and the Phoenix Nighttime Surface Temperatures map.

4. Assign students into groups based on reading ability.
   a.   Human Nature (2 pages)
   b.   Hot in the City (2 pages) plus Phoenix Daytime Surface Temperatures map and

Phoenix Nighttime Surface Temperatures map
   c.   How Heat Hurts (4 pages)
   d.   Paving the Way to a Cooler Future (4 pages)
   e.   The Coolest Hangouts (4 pages)
   f.   How to Catch a Wave (3 pages)
   g.   Tale of a City (4 pages)
   h.   Justice for All (2 pages)
   i.   Picturing Heat (3 pages)
   j.   Water Power (2 pages)
   k.   Save these articles for extensions if you wish.
      •   Your Opinion Counts (4 pages)
      •   Arizona's Next Top Model (4 pages)

5. Project on devices the electronic version http://chainreactionkids.org/files/issues/7/chreact7_master.pdf or print for each group. Distribute the Looking at Sources worksheet and explain the directions. Have each group identify the main ideas, details, and solutions on the worksheet.

6. If time, have groups begin to share out what they learned keeping the articles in order as they may build on each other. As groups identify solutions, record these on the whiteboard for later use.

SESSION THREE

1. If needed, have groups continue to share out what they learned and record the solutions.

2. Review solutions from the whiteboard and display the EPA website on Heat Island Cooling Strategies. https://www.epa.gov/heat-islands/heat-island-cooling-strategies

3. Place the Labels for Heat Island Cooling Strategies around the room. Allow students to pick the topic they wish to explore.

4. Have students studying the same topic research the EPA website and other sources to gain information. Students should complete the GeoInquiry Planning worksheet before research begins.

5. Share Scoring Guide for GeoInquiry with students and clarify what is expected, If samples are available, model what is expected.

SESSION FOUR and FIVE

1. Research and finish GeoInquiries.

Assessment

Geography and Civics

Use the Scoring Guide for GeoInquiries to assess student's projects. Mastery will be considered 80 points or higher on the scoring guide.

Extensions

Read these articles in the Chain Reaction magazine and discuss how information is gathered and used by scientists.
- o   Your Opinion Counts (4 pages)
- o   Arizona's Next Top Model (4 pages)

Sources

https://www.nationalgeographic.org/education/professional-development/network/

https://www.epa.gov/heat-islands/heat-island-cooling-strategies

http://chainreactionkids.org/files/issues/7/chreact7_master.pdf

https://www.washingtonpost.com/graphics/2020/climate-solutions/phoenix-climate-change-heat/

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