United Nations Sustainable Development Goals Open Pedagogy Fellowship

Community Site Assessment for Sustainable and Resilient Cities (LEED).

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Introduction:

Welcome to your role in an international mission. This mission is dedicated to expanding educational access and championing student empowerment through "open pedagogy." In this approach, you, as a student, are at the heart of an engaging, collaborative learning environment, with the freedom to access your educational journey. What is this mission's ultimate goal? To heighten social justice in our community, promoting the free exchange of knowledge and work. Under the United Nations Sustainable Development Goals (SDGs) framework, this renewable assignment paves your path to becoming an agent of change within your community. Prepare to embark on this transformative journey.

For this work, we will integrate the disciplines of Geography, Language, Culture, Rhetoric, Composition, and the Teaching of English to achieve the primary goal of responding to SDG #4: Quality Education. Within this SDG we will focus on the specific target 4.7: “By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development.” This assignment also focuses on SDG #11: Sustainable Cities and Communities.

Purpose:

This active learning practice is designed to explore data regarding community demographics, economics, families, housing, and social factors. Data are recorded in an Open Attribute Table to be used for mapping and assessment of spatial patterns. Students use these patterns to compare sites and make recommendations to the city council for site development to reduce community risk from dangerous heat.

Learning Objectives:

- Use web maps to locate vulnerable communities (City to National Scales)
- Explore demographic analytics to curate data in an "open access" attribute table
- Describe spatial patterns and rank using industry LEED Certification criteria for locating at-risk communities to advise community development.

Instructions:

Project Scenario: Increased summer temperatures caused by climate change make cities hotter because of the Urban Heat Island (UHI) effect. The UHI has caused a dangerous situation for people and infrastructure, and green solutions are needed to mitigate the impact and decrease social vulnerability. To create a resilient and sustainable community, your city council has tasked your urban planning team with a site assessment to identify vulnerable populations to build infrastructure solutions (ex., cooling centers, renewable energy infrastructure, and tree placement for urban forests) to provide relief for the community.

Your team is using the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) Tools Scorecard (LEED) guidelines to guide the urban planning site assessment to develop solutions for vulnerable populations to help mitigate heat stress. The site assessment focuses on solutions that overcome income constraints and promote community health and safety.

The site assessment requires creating data for a Geographic Information System (GIS). This requires you to "ask geographic questions" using a web map to locate five of the most vulnerable areas in your community. All projects seeking LEED certification must follow the requirements, and projects can be selective of the credits they wish to pursue. Your planning team has decided to use the LEED credits for the "*High Priority Site and Equitable Development*" part of the scorecard.

The intent of *High Priority Site and Equitable Development* is as follows:

"To build the economic and social vitality of communities, encourage project location in areas with development constraints and promote the ecological, cultural, and community health of the surrounding area while understanding the needs and goals of existing residents and businesses." (USGBC, n.d.)

Based on the LEED criteria, the geographic questions for this project are:

- What census tract has household income at or below 80% Area Median Income (AMI)? (USGBC, n.d.)
- What census tract has 20% of population at or below poverty rate (depending on location choose state, provincial, or system that makes laws for the area)? (USGBC, n.d.)

Why does LEED use the AMI? The AMI is the median household income. We can think of median as the "middle" income in a group of families ordered from the highest earning to the lowest earning families in an area. The median is NOT to be confused with "average." The median is a better indicator of a typical income in an area as it is not skewed by the higher income households. The AMI LEED criteria reflect households that may not have the economic resources to cope with more severe consequences of a changing climate.

Part 1: Explore the Census Reporter to search communities to find the Area Median Income (AMI). Find places in your community in the Census Reporter

- In the Profile search window type in the "city", "state", and "zip code."
- Select the correct "Map this address" in the drop-down menu.
- The map layers window will appear on the left of the screen. In the layers window select "place."
- Statistics for the area will appear below the map arranged in the order of: Demographics, Economics, Families, Housing, and Social factors. Scroll down to "Economics."
- Find "Income", "Median Household Income." Record that value to use in Part 2 census tract exploration.

Part 2: Explore the interactive, online Justice Map to locate five census tracts that match the most vulnerable areas you identified in your community. The Justice Map is a visualization of race and income within communities of the contiguous United States informed by the United States Census.

Use the recorded Median Household Income from Part 1 as the value to determine if the census tracts meet the LEED criteria.

Find a city near you on the Justice Map.

- Use the + on the interactive map to zoom in on the region. Use the – on the interactive map to zoom out of the region.
- The map default is to show different census tracts that will appear on the map in a variety of colors. These colors are "classifications" based on the data for income.
- Click on a census tract within the region you selected. (A legend featured on the right side of the map will identify the census tract number, the % of population by race, and the total number of populations in that tract.)
- If income with a + or – estimate does not appear in the legend, then please click "income" on the homepage "Ribbon".

Based on your knowledge, the geographic questions are:

- What additional information in this map do you think is important to tell the spatial story of this community? Is there something missing from this spatial story? (Make notes, save for the discussion question write-up)
- Sense of Place component: Based on your experiences in the community, what additional information do you think is important to add dimension of place? (Make notes, save for the discussion question write-up)

Record the 5 location census tracts and their data into the "open access" attribute table. An attribute table is a table that contains the non-spatial elements of a something that might be found at a location. These data describe characteristics or "attributes." An attribute table has this data arranged in columns and rows. The rows are the spatial objects (for our lesson the spatial objects are the five "sites"). The columns contain the attributes, or for our lesson, the characteristics of the five sites.

Part 3: Record the information from five chosen sites to fill in the Google sheet Open Attribute Table for Site Comparison. Please find the bottom-most row that is empty and add your site data to the table. Do this for each of your sites. Use this link to access the table:

https://docs.google.com/spreadsheets/d/1RbrFOVT4X9yi-125I8LX6d48Km0dIa9lBVK3qyRI1js/edit?usp=sharing

Open Attribute Table for Site Comparison

Site	City	State	Census Tract Number	Latitude	Longitude	Total Population	Population Density	Income with + or - variation	Notes
Site 1									
Site 2									
Site 3									
Site 4									
Site 5									

Part 4: Research these sites further by revisiting the Census Reporter. Place a "City, State, and Zipcode" in the "Profile field" and click "enter." Place additional information of useful data from Demographics, Economics, Families, Housing, and Social factors into the "Notes" column of the Open Attribute Table. Use the notes to explore for Site Comparison.

Part 5: Download the table as a .csv file to add into the Quantum Geographic Information System (QGIS) project. Once your project parameters are set (Make sure to select the

“Project”>”Properties”> “CRS” (Coordinate Reference System), add the .csv data to the QGIS project.

- Select “Layer”
- Select “Add Layer”
- Select “Add Delimited Text Layer”

Part 6: Create a map that tells the spatial story of these communities. Make sure the maps explore the following geographic questions:

- Which site has the lowest area median income?
- Which area has 20% of the population below poverty?

Write a 1 page story explaining what your map shows. Discuss the techniques you used to display descriptive elements of your map. Does your map tell a strong spatial story of which communities may need assistance to mitigate risk from climate change? Explain your logic.

Submit your map and discussion of the spatial story.

Add the map to the ESRI Storymap gallery with one quote from your reflection.

References:

Census Reporter. (n.d.). https://censusreporter.org/

ArcGIS Storymap. (n.d.) https://storymaps.arcgis.com/

Justice Map. (2020). http://www.justicemap.org/

Quantum Geographic Information System. (n.d.). https://www.qgis.org/en/docs/index.html

U.S. Green Building Council. (n.d.). High Priority Site and Equitable Development. https://www.usgbc.org/credits/new-construction-schools-new-construction-retail-new-construction-healthcare-data-centers--9

Format Requirements:

Open attribute table as a URL, Document submission is .docx, ESRI Story Map as a web URL

Assessment Criteria:

Map Assignments

Criteria Exceeds Expectations	Approaches Expectations	Emergent
Student uses geographic questions and LEED criteria to explore spatial thinking and spatial patterns of human/environment relationship, communities and change The visual comparisons are deeply reflective. Recommendations based on student ranking and comparison of sites is clear and concise. Associated map is uploaded. ESRI Storymap is developed using text, spatial pattern and statistics explored. Text for artifacts is 300-500 words.	Student uses geographic questions and LEED criteria to explore spatial thinking and spatial patterns of human/environment relationship, communities and change. The visual comparisons are limited. Some development is found for human/environment relationship, but less attention is placed on communities and change. The visual comparisons are more shallow in emotional depth. Text for artifacts is 150-250 words.	Little use of geographic questions and LEED criterias are employed. The visual comparisons are few. No Assignment Submitted