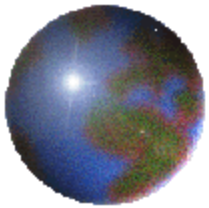
Advancing Geospatial Thinking and Technologies in Grades 9-12:



Citizen Mapping, Community Engagement, and Career Preparation in STEM

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Key Questions

- How can we improve students' spatial thinking and geospatial technology skills through citizen mapping while preparing them for the STEM workforce of the future?
- How does the use of spatial thinking, geospatial technologies, and citizen mapping enhance student engagement in and knowledge of their communities?

Students flying a drone at summer workshop.

Related Questions:

- How can we increase awareness of career paths using geospatial technology and broaden participation of students in underrepresented groups in STEM?
- How do 21st century challenges relate to both the social and physical sciences, requiring a comprehensive and interdisciplinary approach to solutions?

Authentic Learning and Careers

- Authentic learning works best when it is applied to real-world challenges that are relevant to students' lives and career opportunities.

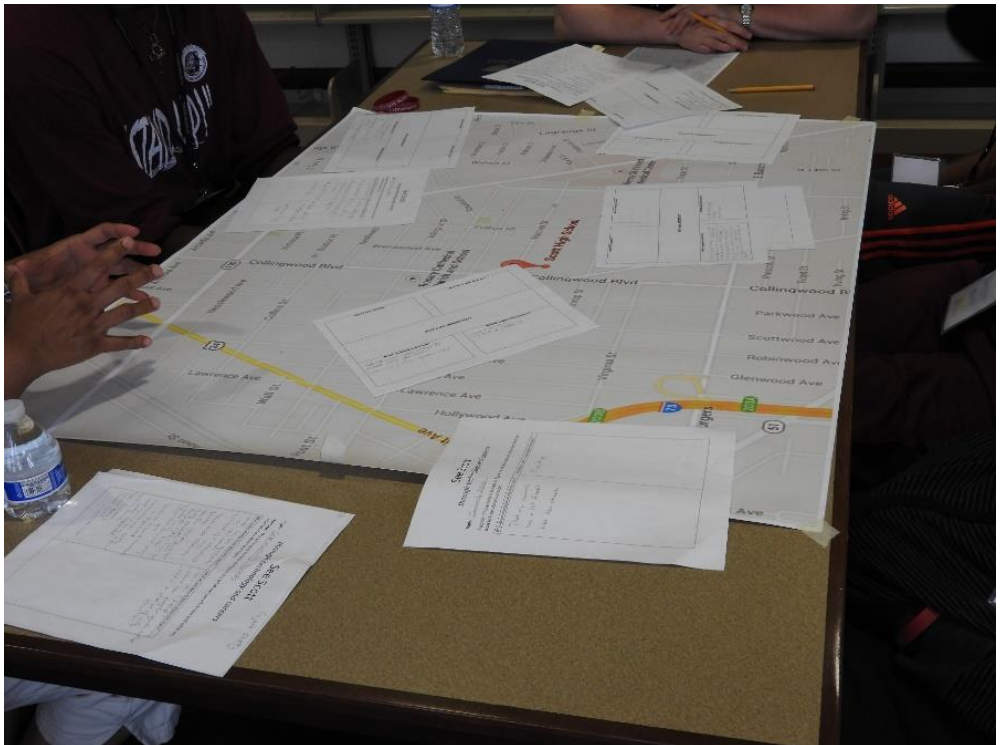
Broadening Participation

- Recent research on career aspirations suggests that having an opportunity to ***give back and make a difference in their communities*** was one goal of underrepresented students considering various career paths.

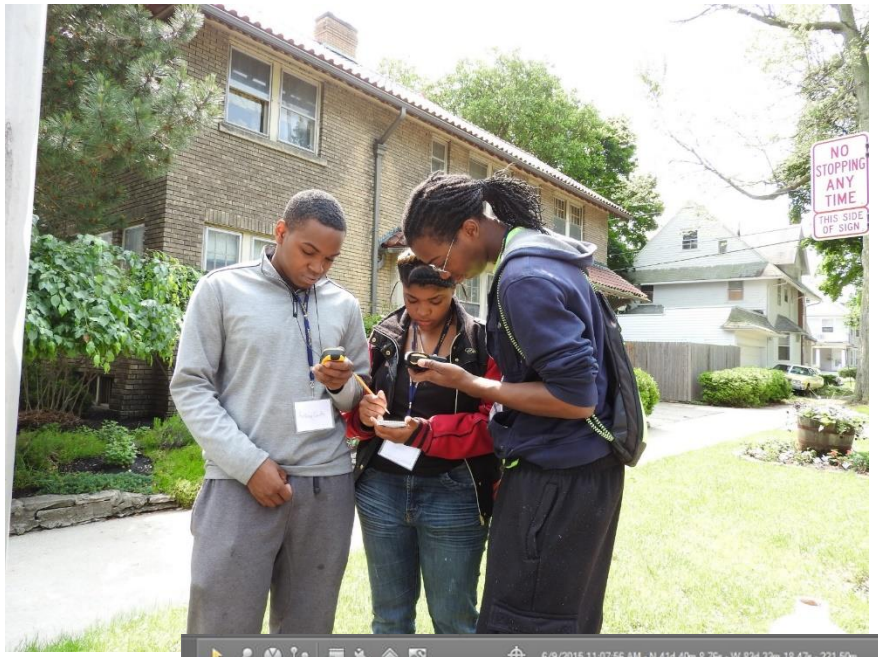
Students with the Mayor of Toledo

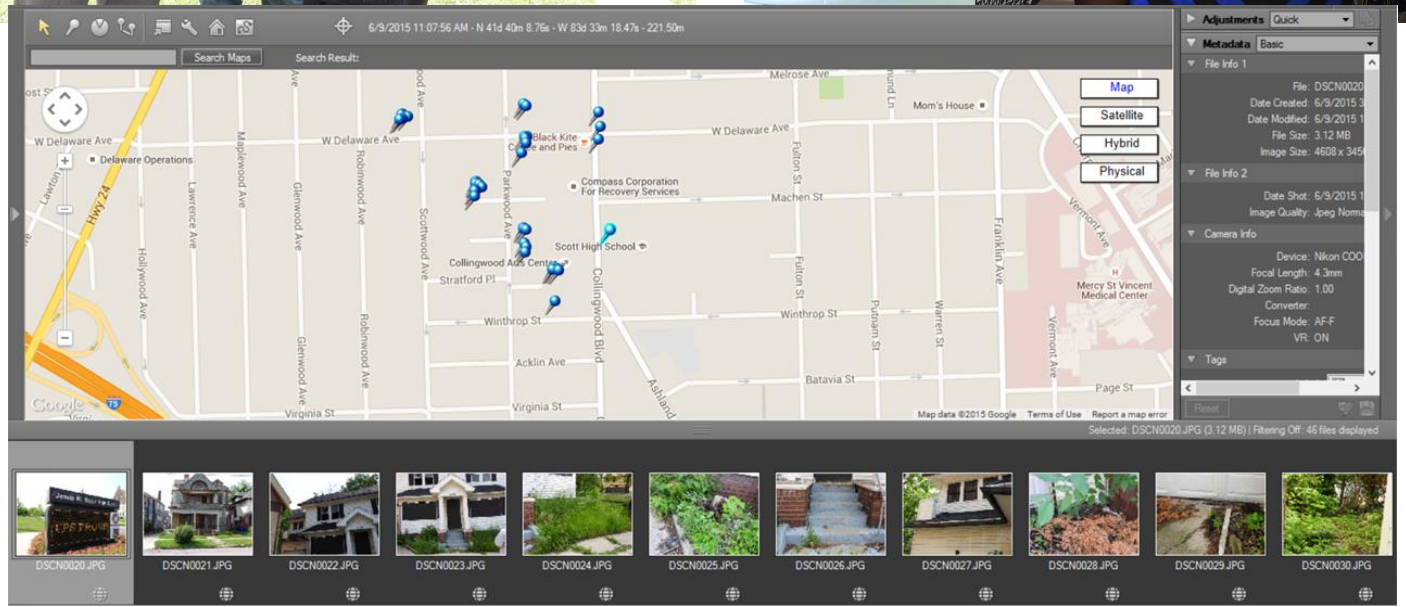
Students Brainstorming Topics

- Crime
- Housing
- Conditions of sidewalks and roads
- Need for a youth center
- Use of abandoned green space and houses



Fieldwork and Using Technology





Collecting and Analyzing Data

Presenting to the Community

Community Needs - Background

- Our topic was community needs.
  - Community needs is the well being of the people in the neighborhood. We included stray animals, abandoned spaces, and conditions of the road and sidewalks.
- As a team , we already knew that when researching this topic we would find a lot of abandoned buildings, potholes, and messed up sidewalks.
- We believe this topic was worth researching because we each had an experience that made us believe that we should change the way our community is viewed by the media, and the people that live in it.

Community Needs - Research Question

- Can the abandoned/available lots and buildings be made into youth centers?
  - Are the roads and side walks around the neighborhood safe to travel on?
- We believe this research question is important because in the community there are a lot of youth who have nothing to do or no places to have fun in.
  - We believe that if the youth have nothing to do they will find negative things to do in the street such as joining gangs. This will increase the crime rates and deaths of young teens.

COMMUNITY NEEDS
HELPING THE COMMUNITY

Community Needs – Reference Map

Community Needs - Results

- We learned that:
  - a lot of sidewalks/streets need to be fixed in the community.
  - there are many open spaces not being used or maintained in the community.
  - there are not enough safe and convenient places for youth to gather and feel that they are being protected.
  - there is a relatively high level of crime in the community,
    - but at the same time there is a lot of concern about what is going on within the neighborhood itself.
  - by walking around that there were many vacant lots that could be used for a potential youth center.
  - there could be a longer process for approval if we propose a indoor recreation facility in a residential area.

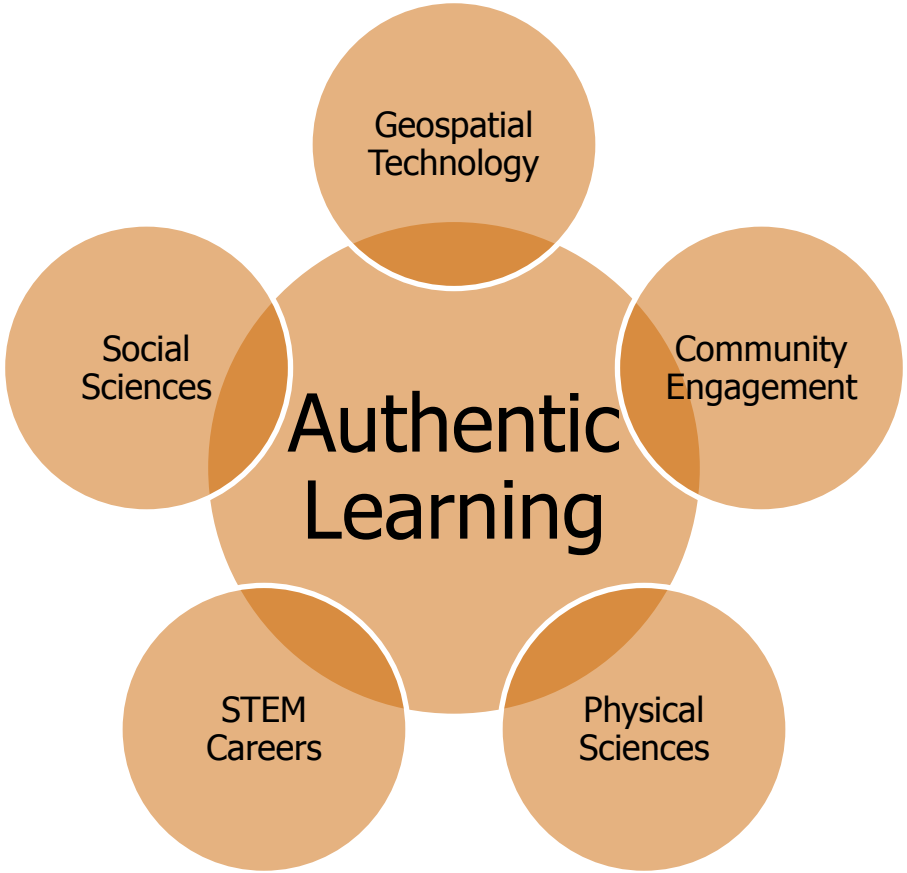
Sample Slides from a Group's Presentation

Presenting to the Community

The students felt empowered to make a difference in their neighborhoods by making recommendations to community leaders and others, such as to the Mayor of the City, urban planners, school officials, family members, and nonprofit neighborhood organizations.

Outcomes and Goals

- We plan to create curriculum that provides an effective and accessible way of introducing geospatial technologies to students through local issues and authentic learning.



Recommendations

- Integrate authentic learning experiences for students into formal and informal settings
- Provide tools to teachers to better enable them to make learning real and meaningful to students
- Build partnerships with schools, businesses, government agencies, and nonprofit organizations to advance learning and raise awareness of career opportunities.

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