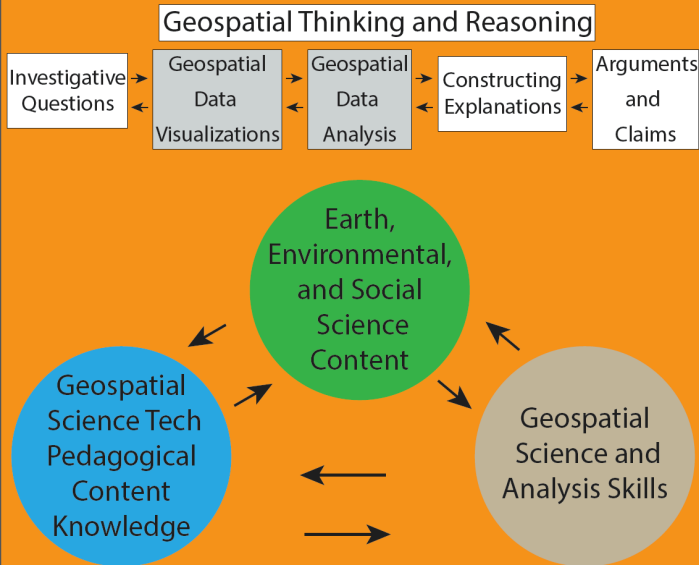


Geospatial Curriculum Framework



Curriculum Approach

- Develop geospatial learning activities in such a way that the software and hardware become transparent to the user.
- Visualizations are designed to be quick and intuitive for both students and teachers to use.
- Novel form of hybrid professional development (PD), with both face-to-face and online learning.
- Design partnership with classroom teachers.

Design principles to promote geospatial thinking and reasoning skills:

- (1) Use motivating contexts and personally relevant and meaningful examples to engage learning.
- (2) Design image representations that illustrate visual aspects of Earth and environmental scientific knowledge.
- (3) Design web GIS data to make geospatial relations readily apparent.
- (4) Scaffold students to analyze geospatial relations.
- (5) Develop curriculum materials that better accommodate the learning needs of all students, while also promoting the geospatial pedagogical content knowledge of teachers.

Classroom Data Analysis

Figure 1. Crime Data Layer

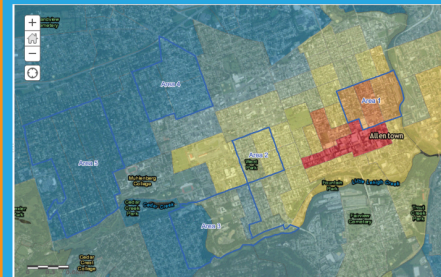
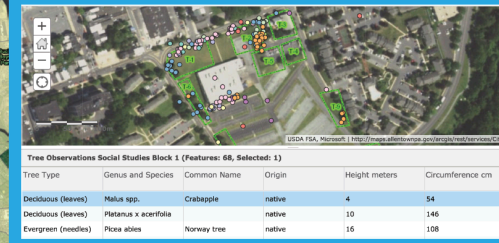


Figure 2. Tree Canopy Percentage Layer



Figure 3. Student Collected Data Layer



Examples of Web-based classroom georeferenced data layers that students use to explore and analyze socio-environmental issues in their city.

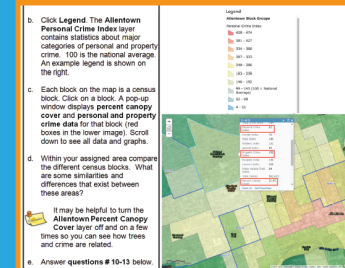
Data analysis takes place in ArcGIS Online, freely available for K-12 schools.

Example above: Regions of the city with lower amounts of personal and property crime (blue colors in Fig 1 above) also have high percentage of tree canopy cover (darker green colors in Fig 2 above).

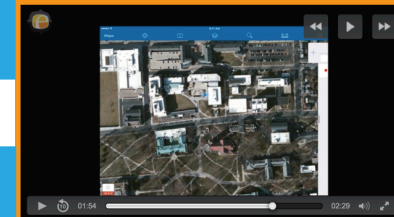
Support Materials

Student and Teacher Guides

Design features to assist English language learners and students with special needs.



Video Tutorials



Field Data Collection with Mentors

Figure 4
Collector Interface

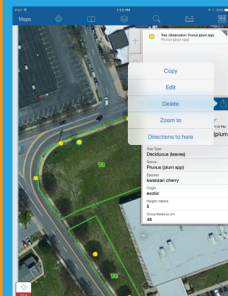


Figure 5
iBook Interface

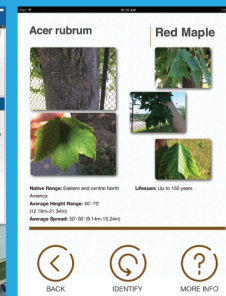


Figure 6
Data Collection



Students collect geospatial data in their local environment.

Mobile data collection with Esri Collector app (Figure 4).

Custom tree identification iBook for Trees and Ecological Services Investigation (Figure 5).

Mentors assist students with data collection in the field (Figure 6).

Findings to Date

- 1) Strong growth in teachers' geospatial pedagogical content knowledge.
- 2) Increased map use by teachers, both within and outside of SESI activities.
- 3) Teacher use of maps as media for inquiry, not didactic instruction.
- 4) Teacher modeling to guide students' analysis in GIS.

Acknowledgments

We would like to thank James Carrigan, William Farina, Ian Hanson, Shannon Salter Burghardt, Sara Kangas, Jim Novak, Robson Junior, and Tracy Davis for their assistance with this program. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF.