

# Geospatial Environmental Project

ENGAGE  
EXPLORE  
INVESTIGATE

Collegiate High School  
At  
Northwest Florida State College  
100 College Boulevard  
In Cooperation with Florida's Great Northwest

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## Project C<sup>2</sup> Goals and Overview

### Project Goals:

- To increase the number of high school students who will major in engineering, science and/or mathematics at the high school and college/university levels
- To provide a curriculum enhancement program in engineering, science and mathematics that is replicable at other high schools
- To develop a curriculum enhancement program in engineering, science and mathematics which supports the expansion of Florida's school choice options through the Northwest Florida State College model
- To demonstrate the commitment of Great Northwest Florida higher education to promoting and supporting college majors in engineering, mathematics and science.
- To involve local business and industry leaders in the development and support of local students interested in science, math or engineering careers.

### Overview and Project Summary

The students who participated in the pilot phase of Project C2 during the three year program experienced a variety of learning experiences designed to support the objectives of the program. The following learning activities were incorporated in the curriculum in the pilot phase:

- Five field trips related to the four fields of study – environmental science, medical science, engineering, and mathematics
- Seven “Science Friday” labs/interactive demonstrations or lectures by experts in targeted fields
- Interviews with experts-in-field of research or career interest
- Development of a portfolio incorporating learning logs from labs, field trips, and lectures/demonstrations, a research paper on career interests in targeted fields, transcripts of interviews with experts in field, and a reflection of Project C<sup>2</sup> learning experiences
- Interaction with state and local community and industry leaders who are employed in the targeted career fields.

## Replicable Learning Activities for Geospatial Environmental Mapping Project

Geospatial Technology is included as a significant part of the overall project experiences focusing particularly on the use of Global Positioning System (GPS) technology in environmental issues and workplace application. The GPS activities presented are suitable for:

- General classroom strategies in comprehensive science and mathematics classes
- Small group special collaborative experiences
- Survey of careers in science, mathematics, and engineering
- Focused units in technology education application
- Co-curricular activities/clubs/special interest community groups

### **UNIT OBJECTIVES:**

- Describe the basic operating principles of GIS and GPS technology
- Explain the uses of GIS and GPS technology in personal and commercial use
- Demonstrate use of basic GPS technology in local environmental settings
- Construct meaning from a variety of data collection points to solve environmental problems
- Collect environmental data as baseline for future monitoring studies
- Manipulate data and resources to communicate and collaborate in addressing local and global environmental issues
- Identify career fields where GPS and GIS technology is used

### **EQUIPMENT NEEDED:**

- Basic GPS Receivers with Digital Maps
- ArcGIS Mapping Computer Software
- Waterproof Notebooks if doing field water sampling

### **DESCRIPTION OF GPS AND GIS MAPPING PROJECT**

We involved students enrolled in the Project C2 (Career Connections) in a variety of units involving project-based experiences using mathematics, science and engineering concepts including forensics science, robotics, environmental science, and geospatial technology. The geospatial environmental component of Project C<sup>2</sup> (Career Connections) involved three layers of experience: Engage, Explore, Investigate. Any of the learning strategies at each level could be used as an isolated activity or as an ongoing project. The project involved real time collection of data that had a pre-disposed use and authentic end results. The Engage level concentrated on basic skills using GPS equipment including reading and plotting collected data. The Explore level involved identifying mapping invasive/exotic plant species along the shoreline of Camp Creek Lake in Walton County, Florida. The students used GPS/GIS technology to create a layered map indicating the location of invasive plant species. The map will be used by the Florida Department of Environmental Protection to control and monitor the effectiveness of measures to eradicate destructive invasive plants in South Walton County dune lakes. The project is the beginning of an ongoing cooperative community project involving local and state agencies including Choctawhatchee Basin Alliance, Florida Department of Environmental Protection, Walton County Extension Service (University of Florida Institute of Food and Agricultural Sciences), Nokuse Plantation, a private environmental preserve, Eglin Air Force Base, and the Collegiate High School at Northwest Florida State College. The project offered an opportunity for students to collaborate with a variety of community resources on a project of common interest. It also exposed students to a first-hand view of a diverse number of careers connected by a common project, but diversified in primary focus and available

resources. The project brought together private, public, post-secondary, secondary, and professional resources to solve a problem of common interest, but with unique missions.

Additional projects involving identifying species, plotting location, and monitoring movement were conducted on a smaller scale at the Explore level including wetland sampling and identification, relocation and tracking of gopher tortoise habitats at Nokuse Plantation. At the Northwest Florida Campus of the Collegiate High School, students erected tubes for frogs to inhabit, plotted the locations of the tubes and monitored the census at various times of the year and under varying conditions. Such small projects may be replicated in any habitat available for the purpose of learning to apply GPS and GIS technology.

The project suitably supports project-based learning, portfolio development, community service and volunteer goals, career inquiry, development of higher level skills of spatial organization, reflection, analysis, and problem solving. Further, the project helps to develop and reinforce “soft skills” identified by the SCANS Competencies and the 21<sup>st</sup> Century Skills needed by students in order to adequately apply the core knowledge that K-12 education has traditionally provided.

#### **SUGGESTED RESOURCES FOR LOCAL PROJECT SUPPORT:**

- Colleges and Universities (Science, Mathematics, and Technology Departments)
- County and Municipal Planning Departments
- State Park Services
- State Land Grant University Local Extension Departments
- Private Environmental Groups
- State Environmental Protection Agencies
- Military Base Personnel

#### **FOR ADDITIONAL INFORMATION:**

[www.nwcollegiatehigh.org](http://www.nwcollegiatehigh.org)

[www.nokuse.org](http://www.nokuse.org)

[www.basinalliance.org](http://www.basinalliance.org)

[www.waltoncounty.gov](http://www.waltoncounty.gov)

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# APPENDIX

Project Support Materials