CMaP Project

**Project Title: Noxious Weed Invasion of Local Ecosystems**
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**Class: UEN CMaP 2010**

Project Description

In order for students to understand how the spread of noxious weeds relate to local forest ecosystems, students will map areas where noxious weeds are becoming a problem along commonly used trails in their local canyon.

Using GPS and working in groups of 4-5 students, they will mark the perimeter of these areas, identify and estimate the numbers of the various invasive weeds at each location, note other organisms and characteristics of each area (including altitude, slope, terrain, natural-occurring vegetation, distance to the nearest stream or water source, geological formations, who the trail is most commonly used by, its traffic, etc.).

From their collected data, each group will construct maps of each noxious weed species recorded using ArcMap GIS. These maps will then be analyzed as a class in order to generate questions, make predictions, draw conclusions, and understand relationships as to why these noxious weeds are thriving in these areas.

The students will then collaborate with each other, the county extension office (weed-control division), and the forest service in developing methods for reducing the spread of noxious weeds from agricultural areas to forest ecosystems and organizing the removal of with volunteer groups in their community.

Community Issue or Problem Selected
-How project evolved?

"Noxious Weed Invasion of Local Ecosystems." This project evolved primarily from my own love of Payson Canyon. I enjoy hiking, mountain biking, and horseback riding and spend much of my free-time during the summer breaking in its trails and enjoying the scenery.

Recently while riding my horse along a trail up this canyon, I noticed many noxious weeds had invaded the forest ecosystem. I was really bothered to observe the consequences of allowing cattle and horses in these once pristine areas.

Whereas I feel all people should be able to use and enjoy this canyon in a respectful manner whether it be hiking, biking, motorcycling, horse-riding, etc., it is important that we take into consideration the impact we have in doing so and do what we can to prevent and reduce it.

As it seems, the weed problem is not currently being addressed and I thought it would be

a great project for students to get involved in. Once a problem has been brought to one's attention, only then can it be resolved.

Community Partner(s)
County Extension Office- Weed Control Personel
Uinta-Wasatch-Cache National Forest Service Personnel
Boy Scouts of America
Cattlemen's Association
Local Newspapers

Project Objectives

At the end of this project, the students will be able to:

A. Identify common plants of Utah (both native and non-native invasive species) from memory and with the use of a field guide

B. Describe physical features and organisms of a forest, how they relate to each other, and adaptations organisms make to live in a forest environment.

C. Use a GPS to: create waypoints and tracks, measure distances and calculate areas, navigate to specified coordinates, and download recorded information into ArcMap.

D. Work collaboratively with a group to collect data, analyze and discuss, generate questions, hypothesize, identify relationships, and formulate solutions.

E. Use ArcMap GIS to create a map from the information they collect from a GPS and specify locations on it.

F. Present their project to an audience.

G. Use technological tools to communicate information to an audience.

H. Hike a moderately difficult trail safely and at an average pace.

I. Describe how noxious weeds are spread in our local canyon and possible ways to alleviate this problem.

J. Understand some of the ways human actions modify the environment.

Utah Core Standards/Objectives

4th Grade Science
Standard 5: Students will understand the physical characteristics of Utah's wetlands, forests, and deserts and identify common organisms for each environment.

Objective 1: Describe the physical characteristics of Utah's wetlands, forests, and deserts.
Objective 2: Describe the common plants and animals found in Utah environments and how these organisms have adapted to the environment in which they live.

3-5th Grade Technology
Standard 5: Use technology tools (e.g., multimedia authoring, presentation, web tools, digital cameras, scanners) for individual and collaborative writing, communication, and publishing activities to create knowledge products for audiences inside and outside the classroom. (3, 4)
Standard 8: Use technology resources (e.g., calculators, data collection probes, videos, educational software) for problem-solving, self-directed learning, and extended learning activities. (5, 6)

4th Grade Physical Education Standard 3: Objective 4; Participate in a variety of moderate to vigorous physical activities.

4th Grade Social Studies Standard 2: Objective 3; Analyze how human actions modify the physical environment.

4th Grade Math Standard 3: Objective 2; Specify locations using grids and maps.

Essential Question(s)
-Spatial Issue

How does the spread of noxious weeds relate to:

The traffic of a trail?
The physical characteristics of the environment (elevation, soil, slope, sunlight, distance to water, other plant and tree species, etc.)?
How can we show these relationships in a concrete and easy-to-understand way?
What can be done to reduce or resolve this problem?
What role do humans play in modifying the forest environment in relation to our findings?
Who needs to be aware of this problem in order to solve it, and in what can you educate them?

Assessments (rubrics, scoring guides)

Project Products

Each group will produce a GIS map consisting of various layers containing the information students collected in addition layers such as terrain, water

bodies/rivers/streams, trails, geological features, and any other necessary information to show specific relationships. Each group will be responsible for recording 1 or more different species of noxious weed.

Photographs of each studied species and field notebooks will be provided with each group's map presentation.

Publication of the students' projects on the school and class website, and also in local newspapers.

Each group will provide a short written summary of their project and what they discovered. Students will also collaborate in creating public service announcements, and letters to local newspapers and horse association/club.

Project Timeline
(include a step by step Procedures)

This project will take the entire school year to complete. It will be repeated yearly until all of the popular riding trails and the noxious weeds along them are mapped. The field work part of this project must be completed by the end of October because the season changes will greatly restrict our access to the canyon and what plants can be observed.

Timeline/Procedures:
August-October: Lessons on learning GPS, digital camera, plant identification, using a field guide and recording data in a field notebook, cooperative learning group activities for students to learn each role, learning perimeter and basic mapping, etc. We will have a minimum of one full-day each month to collect our data in the field (at least 2 days spent on the trail(s) collecting data as groups).

November-January: Lessons on ArcMap, human actions modifying environments, map-reading and making, etc. The students will use classroom computers during centers to begin creating their maps. If the computer lab is necessary, this may take until March to complete.

February-March: Analyzing maps in order to generate questions, make predictions, draw conclusions, and understand relationships as to why these noxious weeds are thriving in these areas. Students will work together to provide solutions/ways to reduce this problem.

April-May: Students will create presentations of their work including their maps, summaries/descriptions, photographs, reflections, and proposed solutions. They will present to their peers, to the county weed personnel, and to the Unita National Forest Service. Final projects will be published via school and class website, and local newspapers.

Resources Needed

Minimum of 6 GPS units, digital cameras, transportation (bussing or carpooling),

ArcMap, plant and tree field guides, internet access and possible computer lab time, field notebooks and pencils, parent-helpers to lead groups during field-work, photo paper, and more that haven't yet come to mind…..

Skills Required

Basic computer skills, basic knowledge of a digital camera, note-taking skills, cooperative skills, and basic letter writing skills.
The lessons taught concurrently with the activities will also provide students with the skills necessary to complete their tasks/project.

Project Team Member Roles

**Teacher(s):** Teach the basic skills and provide the tools the students will need in order to conduct their own project-based learning.

**Students:** Work together as a group to complete their project and assist in each others' learning.

**Partner(s):** Parents/Volunteers- On field work days will be responsible for each student in their group and will help guide their group in collecting their information and provide any additional assistance they may need.
County Weed Personnel and Unita National Forest Service Personnel- Provide us with information they may need or want collected in order to address the noxious weed problem, taking the information gained and using it to eliminate or reduce the problem.
Boy Scouts- Possible work with the County or Forest Service as volunteers to help remove or spray the weeds.

Celebration/Presentation

When students have fully completed their projects as a group, they will prepare and execute a presentation to their class peers. This will be a teaching moment for them, whereas each group collected information on a different species of noxious weed.

I will be sure to upload each groups presentation video onto our classroom website, and hopefully to the school site as well. I hope to have an article about their projects published in our local newspapers.

Once the students have had a chance to share their presentations with each other, they will then be prepared to present to the Utah County Weed Personnel and the Unitah National Forest Personnel.

Project Evaluation

Students' projects will be evaluated according to the included rubric. Individual assessment of many of the learning goals will be based upon their summary of their

project and what they learned.

Project Bibliography

http://www.uen.org/core/
http://www.fs.usda.gov
http://www.scouting.org/
http://www.co.utah.ut.us/

Plans for Future CMaP Activities

Trying to set up recycling in our community, getting sidewalks put in students' neighborhoods, assist city in maintaining sprinkling systems (help them to save water by NOT watering sidewalks), and many more ideas to come :)