GIS and Service-Learning in Montana

Developing Safer, Stronger Communities through Youth Leadership and GIS

Project Overview

The Montana Office of Public Instruction (OPI), in partnership with the University of Montana, Division of Educational Research and Service (DERS), collaborates with state Disaster and Emergency Services personnel, schools, and community institutions to enhance the safety and security of schools and communities through a Citizen Preparedness Through Youth Leadership (CPTYL) project. CPTYL addresses the unique homeland security needs of a rural, sparsely-populated state with a high propensity for natural and man-made disasters through a service-learning model.

CPTYL seeks to engage students and volunteers in service-learning activities that strengthen existing disaster response infrastructures and builds linkages between schools and community-based homeland security initiatives.

-Six pilot sites addressing locally identified needs

Six diverse pilot sites with unique safety and security issues utilize a service-learning model with the aim of building safer communities where youth and community organizations work in partnership.

-**School / Community partnerships**

Students at each pilot site work in collaboration with community partners to develop an active Citizen Preparedness Council with genuine youth participation.

-**Technology training and Geographic Information Systems (GIS)**

Through a partnership with the University of Montana, Division of Educational Research (DERS), students will receive training in Geographic Information Systems which they can apply to local homeland security initiatives.

Montana students at work during a GIS training session with DERS. Students and teachers trained by DERS later apply GIS to science, geography, and math lessons and use the technology to make their schools and communities safer places through service-learning projects.

Montana elementary school students in the field, identifying safe routes to school. Even the youngest students quickly learn GIS basics.

Montana students become acquainted with GPS technology. These students will apply these skills to a service-learning project that examines community preparedness for a possible flood.

GIS and Service-Learning

Service-Learning is defined by the Corporation for National and Community Service as "a method of teaching and learning that connects classroom lessons with meaningful service to the community." Service-learning strategies have been shown to improve academic achievement, increase student engagement, improve social behavior, build civic skills, and strengthen school-community partnerships. The approach to learning moves beyond in-the-classroom learning, and beyond one-time service events to high impact learning projects with measurable benefits to communities and students.

The inclusion of Geographic Information Systems into service-learning efforts is a natural fit. GIS and Service-Learning are alike in that they both are tools that can help make communities stronger. As Volunteerism and GIS are now critical components of any disaster preparedness effort, the choice to incorporate GIS into CPTYL projects was a simple one.

Current GIS / Service-Learning Projects - Montana

SAFE ROUTES TO SCHOOL: Middle and elementary school students in Missoula, Montana are conducting valuable field work to identify the safest routes for walking and biking to school. Equipped with GPS units and ARC-GIS, students compile data and make analyses of their neighborhoods. The end result are maps that are provided to students and parents identifying safe-to-school routes.

THE URBAN BEAR AWARENESS PROJECT: Students at Missoula's Sentinel High School are partnering with Montana Fish, Wildlife, and Parks, and community organizations to raise citizen awareness of the hazards of urban-wildlife interface. Sentinel students contribute to the project by assisting in mapping urban areas that are frequented by black bears.

COUNTY GIS DATABASE DEVELOPMENT: Students at Libby's Central Alternative School are working closely with county officials, FEMA, and others to improve the county GIS database. Students are trained in GPS to assist officials in local mapping. Other students are involved in flood planning efforts.

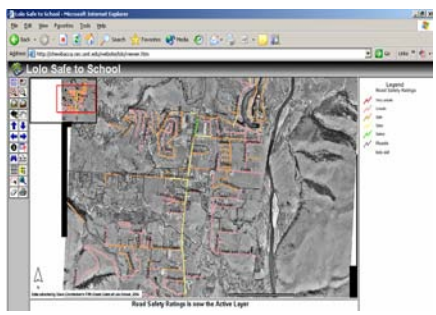
MAPPING HISTORICAL LANDMARKS: Students in Hardin, Montana are helping to preserve community treasures through GIS technology. As part of an extensive history-based service-learning project, students work to improve the county database of historical landmarks and develop maps that are available to local citizens and tourists.

A Multi-disciplinary Approach - GIS and Montana Content and Performance Standards

Combined with a service-learning approach, GIS education can make a significant contribution to student academic achievement. As GIS spans disciplines, students involved in a GIS project may be simultaneously working toward achieving content standards for library media, technology, social studies, science, and mathematics.

Montana Content And Performance Standards	GIS	Service-Learning
Social Studies		
1. Students access, synthesize, and evaluate information to communicate and apply social studies knowledge to real world situations	X	X
2. Students analyze how people create and change structures of power, authority, and governance to understand the operation of government and to demonstrate civic responsibility		X
3. Students apply geographic knowledge and skills (e.g., location, place, human/environmental interactions, movement, and regions)	X	
4. Students demonstrate an understanding of the effects of time, continuity, and change on historical and future perspectives and relationships	X	
5. Students make informed decisions based on an understanding of the economic principles of production, distribution, exchange, and consumption		X
6. Students demonstrate an understanding of the impact of human interaction and cultural diversity on societies.	X	X
Science		
1. Students design, conduct, evaluate and communicate scientific investigations	X	X
2. Students demonstrate knowledge of properties, forms, changes, and interactions of physical and chemical systems		
3. Students demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment		
4. Students demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.	X	
5. Students understand how scientific knowledge and technological developments impact society	X	
6. Students understand historical developments in science and technology	X	

Mathematics		
1. Students engage in the mathematical processes of problem solving and reasoning, estimation, communication, connections and applications, and using appropriate technology	X	X
2. Students demonstrate understanding of and an ability to use numbers and operations	X	
3. Students use algebraic concepts, processes, and language to model and solve a variety of real-world and mathematical problems	X	
4. Students demonstrate understanding of shape and an ability to use geometry	X	
5. Students demonstrate understanding of measurable attributes and an ability to use measurement processes	X	
6. The students demonstrate understanding of an ability to use data analysis, probability, and statistics	X	
7. Students demonstrate understanding of and an ability to use patterns, relations, and functions	X	
Library Media		
1. Students understand an inquiry process including how to access, evaluate and use information	X	
2. Students demonstrate an understanding of ethical, legal, and social responsibility in accessing, evaluating and using information, materials and technology	X	
3. Students seek a variety of materials for independent learning and personal enjoyment, including the appreciation of literature and other creative expressions		X
4. Students distinguish among, evaluate and appropriately use current and emerging media technologies in the inquiry process	X	
Technology		
1. Students demonstrate an understanding of the basic operations of technologies	X	
2. Students use a variety of technologies to enhance productivity	X	
3. Students use a variety of technologies for communication	X	
4. Students use technology responsibly and understand its impact on individuals and society	X	
5. Students develop the skills, knowledge and abilities to apply a variety of technologies to conduct research, manage information, and solve problems	X	X
6. Students apply technological abilities and knowledge to construct new personal understanding	X	X



Safe Routes to School – student analysis of their neighborhood enhances academic knowledge and will ultimately benefit all students and parents by providing a public service.

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