2000

Geography Education Virtual Trunk

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THE GEOGRAPHY EDUCATION VIRTUAL TRUNK

by

Meagan K Bayless

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presented in partial fulfillment of the requirements

for the degree of
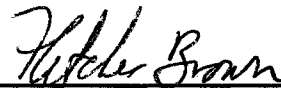
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Introduction

This is the story of the Geography Education Virtual Trunk (GEVT). The GEVT is a new paradigm in providing free, adaptable education resources for teachers. The GEVT is not a substitute for experiential learning or active teaching. It is a 'resource book' of seven adaptable lessons whose goals, objectives, and content are based on the National Geography Standards, the Excellence in Environmental Education Guidelines, and the National Education Technology Standards. The flow of the lessons follows the Five E's learning cycle. To engage students and teachers, the GEVT is designed with a variety of resources including activity instructions, movies, relevant book references, hands-on work, and satellite imagery. It was created with five stakeholders in mind: Montana educators, Montana students, the EOS Education Project (EOSEP), the Montana Geographic Alliance (MGA), and myself, a graduate student in Environmental Studies at the University of Montana. This paper describes the GEVT including background information, research leading to the idea, construction of the product, implementation and evaluation, a projection of where this curriculum will go in the future, and a final reflection of the experience for me, the author and creator.

Background

In the spring of 1999, a subcontract was drafted to hire a graduate research assistant to help build a curriculum for NASA through the Earth Observing System Education Project (EOSEP) and for the Montana Geographic Alliance (MGA). The EOSEP and MGA united to build an educational resource that integrates satellite imagery into geography curriculum. I was hired as the graduate research assistant because of my

interest in and experience with satellite imagery, geographic information systems (GIS), kindergarten through twelfth grade (K-12) curriculum, and educational technology. The geography and environmental education curriculum created through this subcontract plus this paper also complete my requirements for a Master's degree through the Environmental Studies (EVST) program at the University of Montana. Flexibility in the subcontract project allowed me to create a curriculum of my own design, but the original concept was a joint effort between the MGA and the EOSEP, two organizations that merit further description.

The Montana Geographic Alliance (MGA) is a group of teachers that collaborate and share methods and ideas about how to incorporate geography in K-12 classrooms. The MGA is part of a community of Geographic Alliances supported by the National Geographic Society's Geography Education Program. The community includes Alliances in every state, as well as Washington D.C., Puerto Rico, and Canada. Alliances work to provide teacher support, materials, public awareness, and consultation in national geography education decisions. Teacher-Consultants, teachers trained by their state Alliances, are the main source of state Alliance support and activity. Teacher-Consultants work with each other and the Alliance staff to promote geography in classrooms. Dr. Jeffrey Gritzner is the director of the MGA and a professor in University of Montana's Geography Department. He became my primary contact with the MGA and he worked with the Special Projects Director of the EOSEP to write the subcontract for the curriculum project.

The Special Projects Director for the EOSEP, Alex Philp, is the main supervisor for the geography curriculum project. He was the person who had the first vision to

integrate satellite imagery into geography curriculum using EOSEP and MGA resources. He is an original staff member on the Education Project and is one of the main people creating the vision for the EOSEP.

The EOSEP is a National Aeronautics and Space Administration (NASA) funded organization. One of the main goals of the EOSEP is to create and evaluate K-16 curricula that disseminate information gathered from NASA's Earth Science Enterprise (ESE). The ESE program continues to gather more detailed, higher quality public information about Earth using a variety of methods including a series of new satellites. The Earth Observing System (EOS) is this series of satellites. The EOS program did not begin collecting Earth science information until December when the Terra satellite was launched. The EOSEP follows the overarching missions of both the ESE and EOS programs, but focuses on sharing EOS information with the K-16 education community. The EOSEP's mission:

> "supports educator and student understanding of complex global ecosystems and the role humans play in affecting these systems. We use a variety of digital solutions to foster Earth understanding and inculcate integrated perspectives to successfully meet the global change challenges of the next millennium."

To fulfill their mission, EOSEP goals and objectives include offering on-line classes in GIS, a web page that provides maps and images for free (called a server), in-service and pre-service teacher workshops, keynote addresses, brochures, newsletters, and other events. In August 1999, the EOSEP started on-line GIS and education technology courses. During the fall of 1999 and spring 2000 the EOSEP was also helping several Montana schools, called Action Centers, with outdoor experiential science projects. The EOSEP continues to provide short workshops and events at the University of Montana for teachers and students. The curriculum created for the EOSEP

subcontract with the MGA was created with these other projects in mind; the curriculum was created to compliment and effectively utilize all the current and future projects of the EOSEP.

The overriding goal of the MGA/EOSEP geography curriculum subcontract was to "hire a graduate research assistant to integrate satellite imagery into geography curriculum and get it in the classroom." Reaching this goal required integrating and balancing interests from five main interest groups: educators, students, the EOSEP, the MGA, and the Environmental Studies (EVST) program at the University of Montana. The following paper includes a description of the process used to create the curriculum including the literature review, design, construction, implementation, and evaluation. The Appendix provides a complete printout of the curriculum resource as well as a CD that can be viewed on a computer using a web-browsing program such as Explorer or Netscape. The paper also discusses the future direction of the GEVT including training, support, and maintenance.

Literature Review

Building a curriculum for the MGA and EOSEP required me to first build my knowledge base. I had to learn standards, content, and education methodology for geography, environmental education, remote sensing (satellite imagery), GIS, and technology. In addition, I had to understand different methods for disseminating content for each of these subjects. I talked to educators across the country, sharing and getting feedback on several formats and ideas before settling on the final design. The following

is a description of the literature review used to support the content, standards, and methods used in designing and building the curriculum.

My literature review for content and standards began with geography, the emphasis of the commissioned curriculum and the subject with which I had the least familiarity. Assisted by both Alex Philp and Jeff Gritzner, I received geography literature and other informative resources including books and web sites. I found the best resource for understanding the organization of geography curriculum to be the book *Geography for Life: National Geography Standards* (GESP 1994).

According to the book, geography curriculum was organized into Five Themes prior to 1994. The **Five Themes** include location, place, human/environment interaction, movement, and regions. More detailed descriptions of the Five Themes can be found at the end of this paper in Appendix B; this Appendix contains the section of the curriculum that describes its background and is titled 'Foundations.' When the new National Geography Standards were published in 1994, geography was reformatted to fit into the following **three components**:

1. six categories of subject matter called Essential Elements,
2. Five Skills,
3. and Two Perspectives.

The **six Essential Elements** are

- The World in Spatial Terms
- Places and Regions
- Physical Systems
- Human Systems
- Environment and Society
- and Uses of Geography.

The Essential Elements are the primary basis for the 18 National Geography Standards (Appendix D), but they have not totally replaced the Five Themes in classrooms I have

visited and in the minds of teachers I have talked to. The Five Themes are still a common basis and resource for geography curriculum. The **Five Skills** are similar to the scientific method, but focus on geographic rather than scientific information. The Skills include asking questions, acquiring information, organizing information, analyzing information, and answering questions. The **Two Perspectives** are ecological and spatial. The spatial perspective is the component most easily associated with satellite imagery.

The second area I reviewed was environmental education. Environmental education is a relatively young discipline best summarized by two documents, the Belgrade Charter (UNESCO-UNEP 1976) and the Tbilisi Declaration (UNESCO 1978). Two of the main organizations helping formalize environmental education are the National American Association of Environmental Educators (NAAEE) and its state chapters, the Montana Environmental Education Association (MEEA). NAAEE provides the most comprehensive collection of concepts and definitions for environmental education in their publication titled *Excellence in Environmental Education – Guidelines for Learning* (NAAEE 1999). According to this book, the basis of environmental education can be distilled into a set of **six principles**:

- Systems
- Interdependence
- The importance of where one lives as a base to build upon
- Integration and infusion into other disciplines
- Roots in the real world using direct experiences with real issues
- Lifelong learning including
  - o Creative thinking
  - o Decision making
  - o Communication
  - o Collaborative learning

These six principles have been organized into a series of **Four Strands** that provide a backbone to the discipline. The Four Strands are what were used to incorporate

environmental education into the primarily geography curriculum created for EOSEP and

MGA. The Four Strands include:

Strand 1: Questioning and Analysis Skills
- Ask questions, inquiry
- Speculate
- Hypothesize
- Seek information, skills for gathering and organizing information
- Develop answers, interpret and synthesize to develop and communicate explanations

Strand 2: Knowledge of Environmental Processes and Systems (based on synthesis across disciplines and including human systems and influences)
- 2.1 – The Earth as a physical system
- 2.2 – The living environment
- 2.3 – Humans and their societies
- 2.4 – Environment and society

Strand 3: Skills for Understanding and Addressing Environmental Issues
- (3.0 – Skills to identify the real-life dramas involving differing viewpoints about environmental problems and potential solutions.)
- 3.1 – Skills for analyzing and investigating environmental issues
- 3.2 – Decision-making and citizenship skills

Strand 4: Personal and Civic Responsibility
- Willing and able to act on their own conclusions to ensure environmental quality

Environmental education and geography share very similar skill sets and components.

The similarities and differences were put into a table for comparison and can be viewed

in Figure 1. This figure can also be found in the section that describes the curriculum's

background called 'Foundations' in Appendix B.   The synthesis of geography and

environmental education components became the basis of the goals and objectives for the

curriculum lessons and activities.

Figure 1

National Geography Standards Components	Excellence in Environmental Education Guidelines
The Five Skills Asking geographic questions Acquiring geographic information Organizing geographic information Analyzing geographic information Answering geographic questions **Comment:** The geography standards do not explicitly emphasize the ideas of Strand 3 (environmental issues and citizenship skills). The GEVT lessons include environmental issues and questions that fit into the elements of geography and aim to add citizenship skills through authentic, real-life projects in the lessons.	**Strand 1** **Questioning and Analysis Skills** · Ask questions, inquiry · Speculate Hypothesize · Seek information, skills for gathering and organizing information · Develop answers, interpret and synthesize to develop and communicate explanations **Strand 3** **Skills for Understanding and Addressing Environmental Issues** · (3.0 - Skills to identify the real-life dramas involving differing viewpoints about environmental problems and potential solutions.) · 3.1 - Skills for analyzing and investigating environmental issues · 3.2 - Decision-making and citizenship skills
The Six Essential Elements The World in Spatial Terms Places and Regions Physical Systems Human Systems Environment and Society Uses of Geography The eighteen <u>Geography Standards</u> are built into these six elements. **Five Themes** Location Place Human/Environment Interactions Movement Regions	**Strand 2** **Knowledge of Environmental Processes and Systems** (based on synthesis across disciplines and including human systems and influences) · 2.1 - The Earth as a physical system · 2.2 - The living environment · 2.3 - Humans and their societies · 2.4 - Environment and society **Comment:** The concepts and ideas in both of these areas are very similar and constitute the content of the GEVT lessons.
The Two Perspectives Spatial Ecological	Not explicitly defined. **Comment:** Environmental Education is an ecological perspective. Using geography and images in the GEVT adds a spatial perspective that increases the accessibility of information of the other EE Strands.
Not explicitly defined. **Comment:** The GEVT lessons include authentic, real-life action plans to complement the content of geography by empowering students to take geographic ideas into their everyday lives and decision-making.	**Strand 4** **Personal and Civic Responsibility** · Willing and able to act on their own conclusions to ensure environmental quality · Empowered

In anticipation of using satellite imagery and geographic information systems (GIS) for the curriculum, the National Educational Technology Standards (NETS) were also used to build the curriculum (ISTE 1998). Technology education, like environmental education, is a relatively new subject for educators. Similar to environmental education and geography, technology is a subject whose inclusion is being promoted through infusion or integration into standard subjects rather than one that stands on its own. Technology education is organized into six standards. The standards include important issues such as responsible and appropriate use of technology and are summarized in the following list.

National Educational Technology Standards (NETS)

1. Basic operations and concepts
2. Social, ethical, and human issues
3. Technology productivity tools
4. Technology communications tools
5. Technology research tools
6. Technology problem-solving and decision-making tools in the real world

One of the main reasons for considering and utilizing technology in the curriculum was the interest of the EOS Education Project to integrate satellite images into the curriculum. Satellite images are not photographs; they are produced on computers using a series of numbers generated by sensing equipment in satellites. Computers are the most common and most versatile method for obtaining, viewing, and interacting with satellite images. Hard copies of images are most often seen as posters or other publications, but can be produced by printing or plotting images from a computer. Quality and, therefore, the functional use of printed and plotted images can vary depending on the quality of the equipment used for printing or plotting. Whether hard

copy or on the computer, images are engaging and can provide a wealth of information regarding a wide range of environmental and geographic topics.

The curriculum foundation is based on the synthesis of geography, environmental education, and technology primarily through satellite images. Geography's Five Themes and Six Essential Elements plus the Four Strands from environmental education provide the foundation for the primary content of the curriculum. Both geography and environmental education embrace the idea of asking questions, using hands-on research to collect information regarding the questions, organizing that information, and using that information to develop answers to questions. This process is central to the flow of the lessons. Geography adds to the curriculum the unique emphasis of two perspectives within this process: spatial and ecological. Environmental education adds a unique emphasis on skills and practice with civic responsibility to the curriculum. It not only emphasizes answering the questions, but also requires using the answers to promote and empower responsible behavior. Technology is utilized as an option and as a method of distribution for the curriculum. The goals and objectives of the curriculum summarize the conceptual foundation: to focus on geography content using spatial perspective using technology to answer environmental questions and build civic responsibility through practiced behavior.

Initial Curriculum Design

My first vision for the curriculum was a guidebook, a do-it-yourself type manual, providing support for teachers to use images and geographic information systems (GIS) while modeling inquiry teaching practices. Inquiry is a method that relies on student-

driven questions guiding class topics. This method can be more engaging to students because they have vested interest in the subject they choose to inquire about. Teachers can incorporate skills and information from more traditional subjects such as science, math, and social studies within this structure that is engaging their students. Inquiry method can be used to complete action projects based on student interest. An 'action project' is a project where students actively participate in real life issues and situations. Inquiry and action projects were chosen as methods for the curriculum because they have been shown to promote greater student understanding.

My vision was to use inquiry based action projects as the way to include geography skills and concepts, environmental education strands, and satellite imagery in one curriculum. One of the most exciting parts about planning this curriculum was considering the plethora of ways students could use GIS to analyze, answer questions from, and display their data. It was exciting to think about the ways a GIS could be used to teach and help students create their own projects around geographic questions. The original guidebook idea was designed to support teachers as their class progressed through the five geographic skills: ask, acquire, organize, analyze, and answer. In its design, special emphasis was placed on using GIS and satellite imagery within the process. The curriculum resource was also filled with example project ideas and experiences of classes who had completed this type of project. GIS was a natural fit into this curriculum plan and a GIS curriculum seemed to be what most of the EOSEP team was anticipating for the geography curriculum project.

The next step taken was to understand how often and how successfully GIS was used in classrooms. I began to research the use of GIS in classrooms around the country

and found the most concentrated use and contacts in Colorado. During October, I met with Steve Wanner at Boulder High School in Boulder, Joseph Kerski with USGS in Denver, Melinda Laituri at Colorado State University in Fort Collins and Pam Uhls, an administrator for Poudre School District also in Fort Collins. I shared my ideas with them about an inquiry method guidebook for geography projects using GIS and they reciprocated by sharing their experiences using GIS in a variety of classroom atmospheres.

The anecdotes, comments, and feedback I heard in Colorado were generally not supportive of using GIS. The experience left me feeling tired and deflated. The more I talked to teachers about my ideas the more I realized how unfeasible my original guidebook really was. GIS was not something teachers and schools were ready to use at the level that would be required in the curriculum I envisioned. I would be asking too much for teachers to facilitate an inquiry-based class action project using GIS and satellite imagery because both GIS and inquiry are very new methods. The guidebook curriculum, I concluded, would most likely not be used because it would be too difficult, frustrating, and time consuming for most teachers to implement. My meetings with educators also brought the following issues concerning GIS and satellite imagery to the foreground.

Satellite images can be very time consuming to find and expensive to order, but these are its only major limiting factors. The challenges of using GIS are much more daunting. First, GIS has a high learning curve and it requires significant time and effort for teachers to learn how to use. Teachers also have to learn and practice how to use GIS in their curricula and with their students, which is a whole different set of skills. Many

teachers feel computers in general are challenging and it can be very overwhelming for them to try to learn a more complex application such as GIS. Second, technology supplies and support in most schools are not ready for GIS. GIS requires more advanced computer hardware and software than most teachers have access to currently. Even more difficult to attain, and arguably the most important component to successful GIS in schools, is a competent and motivated technology support person interested in helping teachers facilitate GIS for their classes.

The awesome capabilities and possibilities for classroom projects using GIS, however, are drawing increasing interest from educators. The process of getting GIS functioning in most educational settings should happen, but it is a slow process. There are other projects within the EOSEP aligned with this task and, as a result, I chose not to focus on using GIS within the new curriculum. Instead, I refocused on the original mandate of the subcontract, to integrate satellite imagery.

I kept the idea of creating a guidebook, but dropped the emphasis of GIS used for inquiry based action projects. Instead, I decided to make the new guidebook a series of lessons that incorporated geography, environmental education, and satellite images. Rather than come up with all new lessons, I decided it would be most effective to adapt an existing curriculum to include satellite imagery. The new resource would be an adaptable one built for educators that contained a set of lessons with all the text, videos, worksheets, and other necessary components to implement them. The new concept was modeled after traditional 'educational trunks.'

Education trunks are real trunks, similar to steamer trunks except usually made of tough plastic that can be more inexpensively shipped and not as easily damaged. There

are hundreds of education trunks available regionally and nationally. They are a complete resource within themselves, which makes them available to many educational settings including classrooms, Scout troop meetings, Boys' and Girls' Clubs, and others. They are filled with lesson plans and all the resources to implement the plans. Each trunk is based on a topic or theme such as wolves, wilderness, pioneers, or amphibians. The key resource in each trunk is the curriculum guide. The curriculum guide provides background information, directions for how to implement activities, and any other pertinent information on the trunk theme. Each trunk contains hands-on aids and supplies for the activities in the guide. For example, the Wolves and Humans trunk has pelts, skulls, videos, games, scat, books, and other aids that complement the lessons and activities in the main guide (MNHC 1997). Based on the structure of education trunks, distributing several educational trunks whose focus was using satellite imagery in environmental and geographic education context was a good solution. An education trunk would be a cheap way to provide expensive satellite images to classrooms. It would also provide the structure educators would need to facilitate lessons even if they had little to no experience with images, geography, or environmental education.

I shared the idea of using a traditional education trunk with teachers in Montana and Colorado. Teachers listened to my education trunk idea and liked what they heard, but they all hesitated to endorse or say they would use such a product. Those teachers who had used trunks found them very useful and very engaging for students, but under this positive tone was an intensifying dislike for trunks. Teachers like trunks when they can get them, but they are having a harder and harder time getting trunks reserved and getting trunks when they need them because they are very popular and are often already

being used. Teachers were also frustrated when the activity they wanted to use was missing from the guidebook or when a resource to complete an activity was broken or missing. As a result of this feedback, I realized that creating a series of traditional trunks was not how I wanted to approach the project. I feared the long-term organization and maintenance required to keep traditional trunks in good condition and to ship trunks to classes and back would not find the necessary level of support from the EOSEP in the long run.

Not giving up on the positive feedback teachers gave about the educational trunk concept, I rekindled my search for geography curriculum that would be fitting for a new kind of trunk. It was at this time that Dr. Gritzner introduced to me the book *Experiencing Geography*, a publication of adaptable geography lessons prepared by Montana Geographic Alliance Teacher-Consultants in 1988. After looking through the lessons, I was given permission to adapt and integrate satellite imagery into seven of them. Using the lessons from this book, I had a vision of a new kind of education trunk, a *virtual* education trunk.

Design – Why a Virtual Trunk?

A virtual trunk is a new paradigm in educational trunk curricula. This type of educational trunk is on the Internet and is similar to traditional education trunks in that it offers lesson and activity ideas based on a theme. A resource for many different lessons, the virtual trunk does not limit educators and students solely to computer activities. The virtual trunk concept was developed in response to educators concerns about traditional

'hard copy' education trunks. A list of teachers' concerns and their proposed solutions are listed in Figure 2.

In addition to addressing the concerns in Figure 2, virtual trunks offer opportunities and benefits that traditional trunks do not. Educators and students can access complete trunk lessons at any time from a virtual trunk on the Internet without needing reservations or paying shipping fees. Students can review the lessons and content information in a virtual trunk outside of class where they have Internet access. Teachers can save the trunk on their computers to be viewed off-line and can print out their own copies of lessons and lesson resources. Teachers do not need to worry about missing pages or broken items as they might when they use a traditional trunk. Education virtual trunks add new interactive capabilities to curriculum; virtual trunk lessons provide direct links to internal and external resources so educators and students can retrieve current information and can facilitate communication through email. The Internet appears to be a more cost effective means of providing curriculum to more educational environments than a traditional trunk or hard copy book of lessons. Maintaining and updating a trunk on Internet is also less labor intensive and therefore virtual trunks are more current and are more easily maintained. Virtual trunks have potential for becoming a popular new form of curricula, and the GEVT is the prototype for this new paradigm.

Figure 2: Virtues of the Virtual Trunk

Concern	Solution
Teachers are skeptical and not as accepting of curriculum made by someone 'not in the classroom.'	Use curriculum (*Exploring Geography*) and curriculum method (educational trunk concept) already accepted and used by teachers.
Access to educational trunks is not reliable, the information in them is not always up to date, and sometimes pieces are missing from the trunk or destroyed so we can't use them anyway.	Create an educational trunk anyone can get to at any time, which can be easily updated, and cannot be lost or stolen.
Teachers and classrooms do not have the hardware, software, or knowledge to easily implement GIS, yet.	Don't use GIS, yet. Use the GEVT as a stepping-stone for teachers to start with simpler technology and gradually build up to using GIS, especially with satellite images.
Satellite images are expensive.	Many satellite images and maps are already available for free for education purposes on image and map servers on the web. These images can be used in the classroom by printing them out or incorporating them into multimedia presentations. The GEVT links teachers to the best-known servers and to a specially designed EOSEP server with pages created for each lesson as appropriate.
Teachers don't have time.	Make the curriculum easy to navigate, adapt, and use. Provide training on how to adapt and use the curriculum easily and quickly.
Create and provide an educational product that matches and can adapt to the future direction(s) of the EOSEP in order to provide a useful product and educational tool for the EOSEP.	The EOSEP is moving toward being more on-line and catering to a wider audience, so curriculum needs to follow the trends that will get supported in the project over the long run.
Support for teachers using the curriculum and support for revision and upkeep of the curriculum.	A web site can be easily updated more often, does not need constant maintenance and organized lending like non-virtual trunks, and can be easily supported by the hired curriculum specialist working for the project. The trunk also provides conceptual support in the form of information pages about technology, curriculum, and basic geography questions.

Construction - The Vision

The first step in constructing a curriculum is defining the audience and getting input from them regarding their needs. The two primary audiences for the GEVT are the organizations funding the project (the EOSEP and MGA) and the end users (educators and students). Input from the funding organizations was maintained through weekly meetings and constant collaboration. Input from the end users was more difficult to attain. My work plan dictated I get the GEVT on-line by the end of January or beginning of February, which left little time to contact teachers and no time to gather student input prior to trunk construction. One of the primary attempts to gather teacher input was through my attendance at the National Council for Geography Education (NCGE) annual meeting in Boston, MA during the first week of November 1999. For this conference, I prepared a poster outlining the concept of the Geography Education Virtual Trunk (GEVT).

Approximately twenty teachers attended my poster session and I was able to meet and speak in depth with fifty teachers about the new virtual trunk concept. Talking to teachers from across the United States provided me with a wealth of information and perspectives. I learned about what type of technology, hardware, and software is available and got a feeling for how comfortable most teachers are using it in their classrooms. I found that many geography teachers already use satellite imagery to supplement their classes and they were interested in using the Internet as an interactive resource for lessons. Most teachers were very excited about the GEVT and wanted to know the web address so they could review it on-line. Although the concept of a virtual

education trunk was well received, it took substantial explanation. The benefit of explaining the concept so many times was that I could focus on what worked and what caused confusion or uncomfortable feelings with the teachers. It strengthened the concept in my mind and ultimately made the GEVT more concrete.

Some of the best feedback and conversations I had about virtual trunks and geography were with my roommates at the NCGE conference, two Teacher-Consultants from Montana. Both women were authors of lessons in the *Exploring Geography* book I was planning to use as the basis for the GEVT. They talked to me about their methods and perspectives of teaching geography in Montana. They were very willing to tell me how they could and would use satellite imagery for the lessons in their classrooms and in a virtual trunk curriculum. It was very important to get feedback from the teachers who created the original lessons, to understand what they felt was acceptable change and what they felt was the most important to keep the same while adapting the original lessons. They also introduced me to other geography teachers they knew from around the country and facilitated my success at talking to many teachers over the three days I was there.

Besides my personal interaction with teachers at the conference, the interest of geography educators in using technology was reflected in the schedule of talks and workshops. Most of the meeting was dedicated to GIS, space images, and multimedia technology applications. The GEVT hits all of these hot topics. Possibly less noticeable, but important, was the fact that nothing in the program showed anyone else working on a resource providing what the GEVT would soon offer. I was able to return to Montana with a positive feeling that I had a well-defined vision of what the GEVT would be and that my vision of the GEVT had a niche.

The GEVT is based on the traditional educational trunk format. Traditional trunks have a guidebook that contains background information, lesson plans, and listings of other resources on the subject. The GEVT has taken this format and created an interactive 'guidebook' that is the home page of the web site. The help pages, lessons, evaluation, quick references, and acknowledgements all run from the home page 'guidebook.' The lessons have additional links and pages that provide the resource materials to do the lesson activities. The virtual trunk includes the guidebook plus the resources used for each lesson.

Links from the lesson plans supply users with the information and resources they need, while not overwhelming them with the entire content of the trunk. The links are specific to the needs of the user, depending on which lesson or activity is of interest. For example, one of the GEVT activities called Air Care (Appendix G) asks students to graph air pollution statistics from Missoula, MT. The lesson plan text says 'graph pollution from Missoula' and this text is highlighted and underlined to indicate it is linked to another web page. When the words are clicked, a new web page opens and the user finds a table of pollution data to graph.

Construction – The Physical Construction of the Vision

Constructing the concept framework and basic layout of the GEVT began in mid-November. The content was broken into the following sections: background, help, lessons, evaluation, and acknowledgements. I drew up basic flowcharts and concept designs for the main pages in each of these sections during November and December. Physical construction of the site had to wait until I had been trained in a new computer

software program. It took three days at the Bridgerland Applied Technology Center in Logan, UT at the end of December to learn how to use what many consider to be the best, most capable web design software currently on the market. I was trained to use Macromedia Flash, a software program that would allow me to create interactive multimedia movies. Flash movies can be used to create dynamic pieces within web pages and can function as web pages themselves.

During the training, I was introduced to the other two Macromedia software programs that work well with Flash movies called Fireworks and Dreamweaver. Fireworks is a program that helps process and manipulate images. This program became essential when I processed satellite images for GEVT web pages and for the EOSEP image server. Dreamweaver is a program specifically designed to build web sites. Dreamweaver allowed me to create templates for many of the GEVT pages. Templates ensure continuity throughout the site pages and make maintenance and updates of the pages very simple.

Using Flash, Dreamweaver, and Fireworks I started creating a central set of goals and objectives for the seven lessons (Appendices D-K contain all seven complete lessons with flowcharts). Using the same basic goals and objectives for all the lessons tied the lessons together and strengthened them as a unified curriculum. The seven Goals/Objectives pages were written and the physical pages built from a template. After these pages were complete, I began building the seven Lesson Home pages.

Lesson Home pages list general information about the lesson itself, such as the approximate length of time the lesson takes, general topics covered, age group, and standards covered. Each Lesson Home page also links the reader to the following lesson

information pages: Overview, Goals/Objectives, Background, Lesson Plan, Extension,

Materials, and References (when applicable to the lesson). Once the Home pages were

built, I began construction of the Lesson Plans. I worked on one Lesson Plan page at a

time, creating the resource pages specific for the lesson as I went. For example, when I

was building the Image Travel Agent lesson and got to the part of the lesson that requires

teachers and students to look at a page of mystery images I constructed the Mystery

Image page. Some resource pages were created for more than one lesson, such as the

Map Reference Page (Appendix U) and the page describing the Five Themes (Appendix

T).

I chose to build the lesson plans around the Five E's Inquiry Method developed

by Rodger Bybee and Leslie Trowbridge after having used it successfully in other

education curriculum development and implementation projects (Bybee and Trowbridge

1995). The Five Es is an instructional model based on constructivism, a philosophy of

learning that believes students must build their understanding to learn. The Five Es

constructivist model organizes teaching strategies and activities to facilitate the learning

cycle in a series of steps or stages. Educators and students start with a quick Engagement

activity that aims to establish a student's 'need' for constructing the information in the

lesson. The engagement activity leads to an Exploration activity. During the exploration

stage students are required to become activity involved in the subject matter and

materials, often in groups facilitated by the instructor. This stage is designed to give

students the experience of the phenomena about which they are learning before they are

given the terminology and definitions. The next step clarifies the exploration activity

with Explanation by the educator. This is the stage that utilizes labels and common

language to place the concepts experienced during the Exploration stage into context and into a common frame of reference for the students. An Elaboration activity follows which further involves students in the topic to reinforce the lesson content. The fifth 'E' is Evaluation, a continuous process providing feedback about student understanding, skills, and interests (Miami Museum of Science 2000).

The Five E's model provided a unified method for structuring the seven lesson plans. One of the benefits of this model was that it is adaptable. Teachers can rearrange the lesson plans and use the resources within the lesson plan at any stage within the Five E's. The lesson plans are designed to be complete and ready to use, but can also be adapted to fit the needs of educators and students.

The lessons in the GEVT are organized so the content and data skills (question, research, analyze, and answer) are emphasized in the engagement, exploration, and explanation stages of the Five E's model. The elaboration piece for each lesson emphasizes 'action projects.' Action projects are class projects that actively engage students in real life issues within their community. They should demonstrate student knowledge of the lesson subject material as well as responsible civic behavior. Action projects in the elaboration stage were designed to be the capstone of each of the seven GEVT lessons.

Once the lessons and their accompanying resource pages were built, I focused on creating a meaningful help section. The goal of the help section was to provide descriptions of the 'essential skills' needed to use the GEVT the most effectively and efficiently. The Essential Skills section was divided into Technical, Assessment, Class Facilitation, and Citation sections (Appendix C).

The Technical Essential Skills section includes such topics as how to name files, make folders, save images off the web, and use images in slide shows to create dynamic presentations for students. The Assessment Essential Skills section includes ideas for alternate assessments, with emphasis on using rubrics to evaluate presentations, portfolios, and other non-traditional assessment methods. The Class Facilitation Essential Skills section includes creative ways for teachers to use GEVT resources in their classes, whether or not they have access to computers in their rooms. The Citation Essential Skills section includes copyright law, how to cite web sites, and important information concerning infringement and fraud. After the Essential Skills sections were complete, I built the last three sections: Foundations, Evaluation, and Acknowledgements.

The Foundations section tells an abbreviated version of the GEVT story and lists the main goals and objectives for the GEVT. This section also explains how the National Geography Standards (GESP 1994), the Excellence in Environmental Education – Guidelines for Learning (NAAEE 1999), and the National Technology Standards (ISTE 1998) were used to create the unifying goals and objectives for all the lessons in the GEVT. The Five E's (engage, explore, explain, elaborate, evaluate) method that provides the structure of each lesson are also described in the Foundations section (Bybee and Trowbridge 1995). This section can be read in Appendix B.

The basic component of the Evaluation section contains a form that can be filled out and returned to EOSEP staff (Appendix L). In the future, the Evaluation section will also include comments and experiences from teachers and students who have used the GEVT lessons and activities. The Acknowledgements section was the final section to be

created and can be viewed in Appendix M. After all the main sections were built, I focused on finalizing the opening pages.

The opening page of the GEVT welcomes visitors and assists them with downloading the Macromedia Flash player if they don't already have it. The Flash player enables visitors to view Flash movies in the GEVT. The first page also links the reader to the main GEVT Index Home page. The Index Home page has links to the core sections of the GEVT (Foundations, Essential Skills, Lessons, Evaluation, and Acknowledgements) and provides descriptions of the content of each core section so users know what they can find when they visit the sections. Printouts of the first two opening pages and the Index Home page are located in Appendix A.

After the opening pages were complete, the entire GEVT was printed out and revised. A final check of links was performed and bad links were fixed. The GEVT was now ready to go on-line. The GEVT came to life in the afternoon of February 16, 2000 at the web address http://eos1.cec.umt.edu/gevt/index.htm. The GEVT can be interactively viewed on a computer from the CD included with this report on a web browser such as Explorer or Netscape. To open the GEVT from the CD, double click on the 'indexd.htm' file and use it as you would a web site.

Implementation and Evaluation

Once the GEVT came on-line, it was time to focus on getting the resource out to educators and students. Informing and training teachers to use new curriculum resources like the GEVT takes time, energy, and connections. Articles describing and announcing the GEVT coming on-line were published in the Winter versions of both the 1999/2000

EOS Oracle (a publication by the EOSEP) and the 1999 BugNet Alliance (a joint publication by the Montana Environmental Education Association and the Montana Geographic Alliance). Numerous teachers across Montana and other states receive both of these publications. The GEVT will be one of the headlines on the EOSEP web page for several months during the spring of 2000. John Kuglin, Director of the EOSEP, has and will continue to endorse the GEVT in his keynote addresses at large conferences, such as Classroom Connect, throughout the United States. The GEVT will continue to receive support and promotion from the EOSEP through Mr. Kuglin's keynote addresses and by the hiring of a curriculum specialist who will maintain the web site and provide in-service and pre-service training for teachers to learn how to use the GEVT curriculum. Two trainings have already been funded by the EOSEP that have reached over 30 Montana teachers as of the middle of April 2000.

Implementation and Evaluation - Workshop

February 17, 2000 was the first full day GEVT informational workshop for teachers. Twenty-four Montana teachers came to Missoula and participated. The workshop schedule is listed in Appendix N. The morning focused on using the Image Travel Agent lesson as a method to explore the EOSEP Image Server. Of the 17 teachers who responded to an evaluation of the activity, 82% felt the activity was good and 17.6% thought it could be a little more organized, but still liked it.

In the afternoon, the teachers were introduced to the Foundations section of the GEVT and were then asked to get into groups and create a lesson plan for their classrooms using one of the activities. Each group was given a different lesson, so when

groups presented their work at the end of the workshop all the participants could become familiar with all the lessons provided in the GEVT. The activity also provided the time for teachers to create a lesson plan to use in their classes by the end of the workshop, which made them feel as though their time in the workshop as well spent. Teacher response to the voluntary evaluation form for this activity was meager with only 9 of 24 teachers responding. The lack of response was due to poor scheduling of the evaluation during the 15 minute break. Those that responded were very positive. All nine responses registered between 13-15 on a scale of 1-15 with 15 being the highest praise.

An evaluation provided in the afternoon of this full day workshop asked the teachers to share their perceived high and low points. This evaluation produced the most comments. Comments on the high points of the day included:

- New ideas and resources easy to use.

- Excellent, great activity.

- Very good practice. Neat ideas.

- Good overview, well designed lessons.

- Enjoyed the PowerPoint. Good job, Meg.

- Superb! Can't wait to implement new ideas!

The one low point comment suggested to "develop full curricula for targeted grades, K-2, 3-5, 6-8, 9-12."

Implementation and Evaluation – Sheridan, MT

Three of the first full day workshop attendees agreed to and scheduled days for me to observe their classrooms when they planned to use the GEVT. My first visit

happened March 9, 2000 in Sheridan, MT. I visited Jim Lane's 4th grade class and Roger Klette's 5th grade class for one hour each. Mr. Lane's class was working on the Changing Face of Place lesson. The class began with a digital slide show Mr. Lane created using images from the EOSEP Image Server. He was very excited to have learned how to create digital slide shows during the GEVT workshop and planned on using this new skill more often for his classes. The slide show facilitated an animated discussion and all the students in the room were engaged in the topic.

After the slide show, Mr. Lane divided the students into groups of four and gave each group a handout (see Appendix O) that had the following phrases typed out: natural events, human caused events, cosmic events, and time span events. The groups were asked to discuss what sort of changes in places occur based on the different types of events listed on the handout. The class discussed and shared these ideas before they moved on to the next activity, which was to draw Quake Lake in Montana and think about what kind of event caused the lake to form. The students were also asked to define 'place' and write their definitions on the picture before they presented their drawings and definitions to the class. The class began to fidget and not listen very well as the period came to an end, but was overall very actively involved in the subject material throughout the period. Photos from this visit are in Appendix O.

Mr. Klette's 5th grade class started working on the Digital Quilted Geoportrait lesson the day of my visit. Mr. Klette told me the Five Themes explanation in the GEVT was the best he has come across and printed them out for each of his students. He started the class by reviewing the Five Themes. His students were engaged and involved, waving hands and practically standing in their seats to be called on to provide definitions

and examples. Then, Mr. Klette handed out copies of the 'My Geoportrait Exploration' sheet he had printed from the GEVT (Appendix F). He had students look at this sheet as he constructed a geoportrait using his own photos from home with his own photo in the center. Then he asked the class to use magazines, photo albums, and the Internet to find images to create their own geoportraits in class the next day. He assigned students to find remotely sensed images of Sheridan or their houses to add to their geoportraits. Once the students created their individual pieces the following day, Mr. Klette planned to put them all together to create a class geoportrait and get it displayed in a prominent location in town. He felt the activity was an excellent way to discuss differences, interdependence on many scales, the Five Themes, and using spatial resources to understand these concepts. Photos from this visit are included in Appendix P.

Implementation and Evaluation – Eureka, MT

Thea Borgen, a teacher in Eureka, MT was another participant from the first full day GEVT workshop who offered to have me visit her classes when she used the GEVT lessons. She not only wanted me to visit her classes, but also organized a three-hour in-service for other Eureka area teachers that I conducted while I was there (Appendix Q). The in-service was held on March 22 with 11 teachers in attendance. Many offered positive comments about the GEVT lesson ideas and were glad to have lesson plans they created for their classes to take with them at the end. Several felt as though the GEVT gave them a real reason to learn how to use more technology in their classrooms, such as PowerPoint slide shows, and requested that I return to give an in-service on how to use these kinds of technology. The teachers requesting the course had missed an in-service

previously offered in Eureka on the same subject. It is important to note that teachers are offered opportunities to learn how to use technology in their classrooms. Depending on how useful teachers feel the technology can be greatly impacts if they choose to attend in-services or use technology in their classes, or not. The GEVT subject material has instigated interest in teachers in Eureka and Sheridan to start using more technology in their classes and in class projects.

The day after the in-service I visited three of Thea Borgen's high school classes. All of her classes were working on finishing their geoportraits for the Digital Quilted Geoportrait lesson that day. The students were engaged in cutting out magazine photos and looking for their houses in images on the Internet. On the walls in Ms. Borgen's room were remnants of other GEVT lesson activities. Her classes had previously worked on the World in Your Closet lesson and had colored world maps and graphs depicting the location of where their clothes came from. Her classes discussed the method of transport of their clothes, child labor laws, and other social issues relating to their clothing. The students also learned how to gather, analyze, organize, and interpret data using the clothing in their closets. As a result, her students were able to discuss how their choices have a global impact. Photos from these classes can be found in Appendix R.

Implementation and Evaluation – General Interest and Summary

Teachers outside of Montana are interested in the GEVT too. During a March ski trip in Canada, I met schoolteachers from Wyoming and Canada who were interested in supporting and testing the GEVT. They have been sent the web address and I anticipate their reactions to the GEVT by May 2000. The School for Field Studies in Bamfield,

British Columbia, Canada also invited me to talk to their students regarding the EOSEP and the use of GIS and imaging in regards to environmental education. I used the GEVT as an example of how imaging and GIS are being used in classrooms, and we discussed the future trends of these sorts of technology in field studies and traditional education settings (Appendix S). Rattlesnake Middle School in Missoula, MT is also interested in incorporating and further testing the GEVT in their classes. These contacts will continue to be nurtured and new contacts made to increase the use and the value of the GEVT.

The GEVT is succeeding. Teachers are glad to have a free resource they can access any time that helps make sense of using technology in their classrooms. Teachers tell me they are excited to implement at least part of the lessons and feel the GEVT resource is valuable. They are also talking about using satellite images for other projects and are starting to really feel images are a feasible and accessible option.

Future Direction and Support

The GEVT continues to get visits every day and will continue to be evaluated, revised, maintained, and promoted as one of the core pieces of the EOS Education Project. One of the main interests of the EOSEP for 2000-2002 is to gather quantitative as well as qualitative data about the success of their curricula, especially the GEVT. Wes Snyder, a member of the EOSEP team and an associate of the Harvard Institute for International Development, will supervise the data collection and my continued work with the GEVT. Bonnie Prince, an associate of Mr. Snyder's also from the Harvard Institute for International Development, will assist with creating the evaluation methods for measuring the effectiveness of the GEVT.

Other organizations interested in promoting and maintaining the GEVT include Goddard Space Flight Center, NASA's Earth Observatory web site, and The National Geographic Society. The resource will continue to be supported by these organizations and is jointly owned by the EOSEP and myself. In the event that the EOSEP cannot support the GEVT, I have exclusive rights and interest in maintaining the curriculum resource to continue making it available. The outlook that the GEVT will remain supported by the EOSEP for at least several years is positive.

Reflection

Working on the subcontract between the EOSEP and the MGA has been an intense eight months. When I think about the experience many of my thoughts seem very cliché; the final product is not what I had originally envisioned, it is hard to believe I have accomplished as much as I have, I can't believe it is actually working, and it has been a challenge. No matter how cliché, all of these thoughts are mine and are true.

When I started in August, I planned on using GIS to create a curriculum and had no idea I would be coming up with an educational trunk that would essentially 'live' on the Internet. Only when I actually wrote this story to describe the process I went through to create the GEVT did I realize how much work I have actually done to get where I am and get the GEVT where it is going. Despite all the time and effort I have put into creating the GEVT, I still feel weird when I check the web page 'hit' counter to see if anyone has used the GEVT within the last 24 hours. It is a strange feeling to realize I can count the number of people using something I created, and even more strange to imagine with how many countless others they are sharing the GEVT.

The project has been a series of different kinds of challenges. In the beginning, my challenge was to define what I should do that fit into the future direction of teachers and the EOS Education Project. The EOSEP is a soft-money organization, so it survives by adapting to changing environments. At the time I was hired, the project was changing and adapting to fit new needs and one of my biggest challenges was to try and keep a step ahead to produce something for them that would still fit their interests ten months from the start. It was also challenging to plan trips and meetings with people, share my ideas and receive negative feedback, learn many new software programs, and trust my work and myself.

The greatest rewards from the project have been since the GEVT has been on-line. Providing workshops for teachers has been my favorite part. I like showing them the resources available and empowering them to use new tools they think are fun and exciting. I also like visiting classes to see students discussing how images relate to them personally. I enjoy sharing the GEVT and my ideas.

I hope the biggest challenges and greatest rewards from this project are yet to come. As a result of my work on this project, I have been asked to continue working for the EOSEP as the Education Technology Specialist. In this capacity, I will be able to continue expanding the use and content of the GEVT. Longevity of the curriculum will be its true test and it will be challenging for me to continue to support the GEVT while I begin to work on other projects.

Working for the EOSEP and MGA to create the GEVT has touched my life in many ways, some of which I probably don't understand yet. The GEVT will always be a positive part of my past and my future. My hope is that the GEVT will touch others lives

in an insightful, positive way as well and will make a difference for future generations as they learn how they relate to the Earth, our Terra.

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Appendix A: Flowchart: Introduction Pages

The page file names follow X:/GEVT/

```
┌─────────────────────┐
│    Welcome Page      │
│     index.htm        │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│   Home Index Page    │
│    index_h.htm       │
└─────────────────────┘
           ▲
           │
           │    ┌──────────────────────────┐
           ├───▶│       Foundations         │
           │    │     index/fndtns.htm      │
           │    └──────────────────────────┘
           │
           │    ┌──────────────────────────┐
           ├───▶│      Essential Skills     │
           │    │     index/essklls.htm     │
           │    └──────────────────────────┘
           │
           │    ┌──────────────────────────┐
           ├───▶│     Lesson Index Page     │
           │    │    index/index_l.htm      │
           │    └──────────────────────────┘
           │
           │    ┌──────────────────────────┐
           ├───▶│     Project Evaluation    │
           │    │      index/evaltn.htm     │
           │    └──────────────────────────┘
           │
           │    ┌──────────────────────────┐
           └───▶│    Acknowledgements       │
                │     index/acknw.htm       │
                └──────────────────────────┘
```
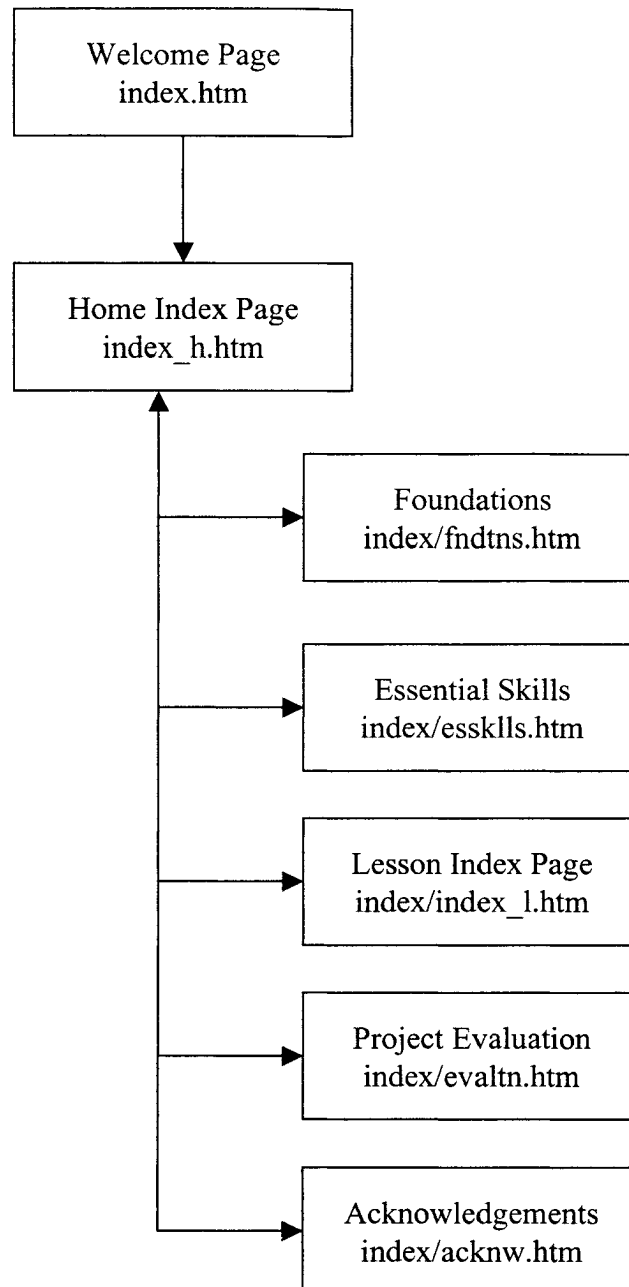
WELCOME

To use the **Geography Education Virtual Trunk** you need to take a few

minutes to **download the Shockwave Player**.

The Shockwave Player is a program that runs certain types of movies in web sites.

It is something that is becoming common-place and something you should have.

What do I need to do?

1. Follow the directions CAREFULLY from this link that lets you Download the
Shockwave Player.

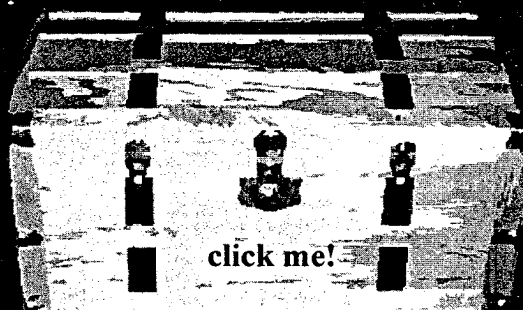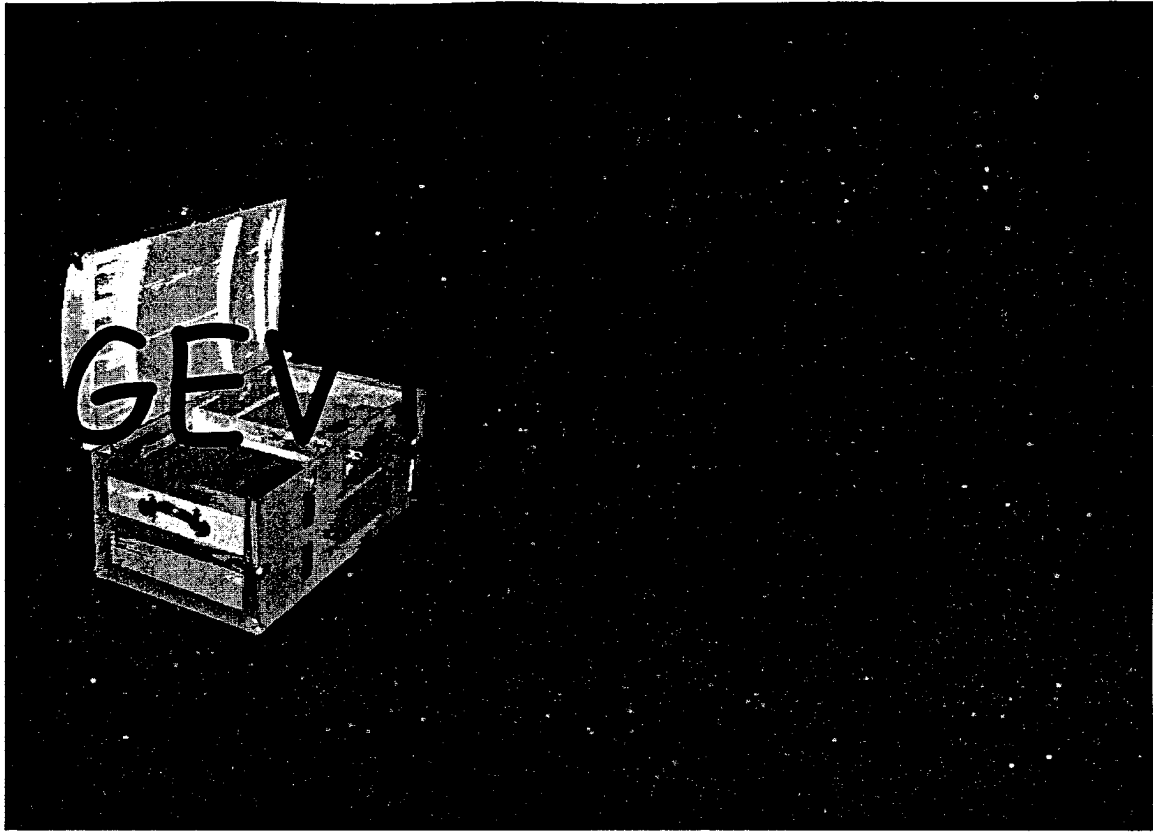2. Return to this page and click below to

...ENJOY THE TRUNK !
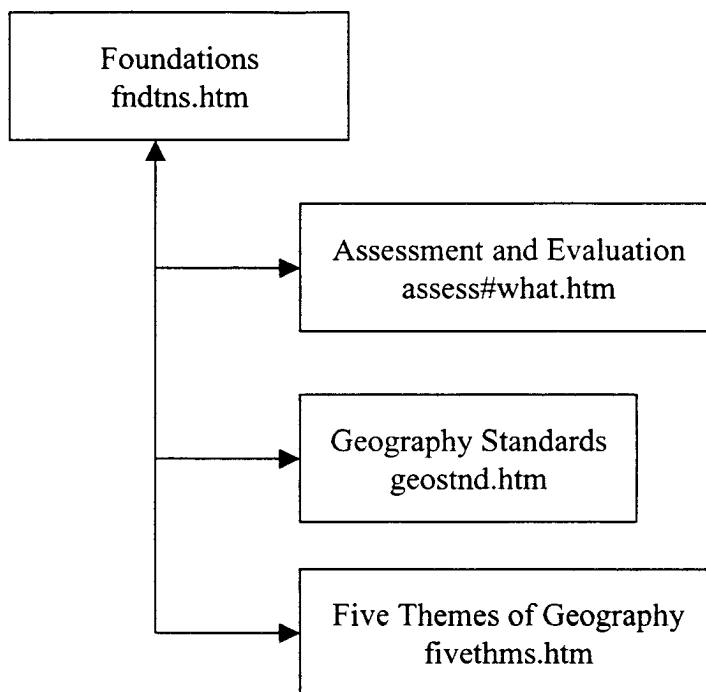
Appendix B: Flowchart: Foundations Section

The page file names follow X:/GEVT/index/

Foundations of the GEVT -

Geography Education Virtual Trunk

The GEVT Story

Main GEVT Goals

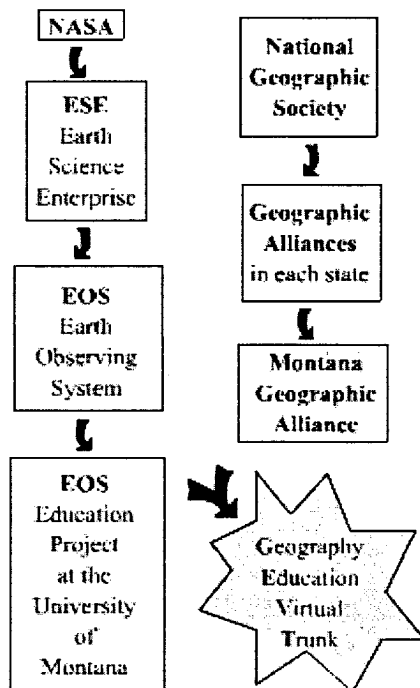| **Foundations of the Lessons:** |
| --- |
| Construction of the Goals Using Standards and Guidelines |
| Template of Lesson Goals |
| How Technology Standards Fit |
| Construction of the Lesson Plans |

References

GEVT Home Page

Page by Meagan Bayless meaganb@eoscenter.com. Copyright 2000 EOS Education Project and Montana Geographic Alliance. Last update: April 2000.

Witness the birth of a new era in Educational Trunks.... ...thanks to the collaboration of the following organizations:	**The GEVT Story**
	Let me take you back to the spring of 1999...when Alex Philp capitalized on a vision. **Alex** is a team member of the EOS Education Project, whose mission is to get information from the newest series of NASA satellites out to the public in educational settings. As an inspiring part of the EOS Education Project Team, Alex saw that satellite images could be used with GIS (Geographic Information Systems) in more ways than just scientific; he saw a natural fit with geography. Alex secured a subcontract between the **Montana Geographic Alliance** and the **EOS Education Project** in the spring of 1999. This contract allowed Alex to hire me, Meagan Bayless, in the fall of 1999 as a Research Assistant to tackle his vision to "integrate satellite imagery into geography curriculum."
	After months of research, interviews with teachers across the country, travel to the Boston meeting of the NCGE (National Council for Geography Educators), and many weekly meetings with the EOS Education Project Team I found my own vision. My vision is encompased in the GEVT.

	The GEVT is a compromise and a solution to a complex of ideas, resources, and problems surrounding getting and using images in educational settings. It is a 'trunk' of lesson ideas equiped with the resources required to implement the activities. The GEVT is a series of lessons adapted from curriculum created by Montana Geographic Alliance Teacher Consultants published in ***Exploring Geography: Adaptable Lessons in Geography***. It has **Goals and Objectives, Lesson Plans, and methods of Assessment and Evaluation that are similar and standard across all of the GEVT's adapted lessons**. Read on to learn more about the philosophy behind and the creation of these GEVT resources.

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The main goals for the GEVT:

Primary Goals:

1. Provide a unique, quality, useful, free set of geography curriculum lesson plans for most education settings (including, but not limited to, schools, homes, and learning centers) that are easy to access and integrate into current curriculum and activities.

2. Integrate images into a set of geography curriculum lesson plans already used by educators, with emphasis on the EOS mission satellites as they are launched and as their images become available.

3. Provide a table of reference detailing which standards are covered by each complete lesson, most explicity for the the Geography Standards and the Excellence in Environmental Education Guidelines. The National Educational Technology Standards for Students will also be covered, but will not be explicitly determined in a reference table.

Secondary Goals:

4. Introduce teachers and students to image and map servers on the web, especially the EOS Education Project Map and Image Server.

5. Introduce and demonstrate imagery, maps, technology, and how these tools can be used in projects with the objective to ncrease student involvement and information retention.

6. Introduce teachers and students to inquiry-based action projects using a variety of resources and tools.

7. Interest teachers and students in expanding their use of technology, especially GIS, in classroom activities.

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Foundations of the Lessons

Constructing the Goals and Objectives

All the goals and objectives in the lessons use a similar format; they are based on a template to ensure that all lessons used in the GEVT now and in the future are aligned on the same general principles. The template was created by synthesizing the main components of *Geography for Life: National Geography Standards* and the *Excellence in Environmental Education - Guidelines for Learning (K-12)*. In the future, the goals and objectives should also aim to synthesize more objectively the National Educational Tehcnology Standards for Students.

The following table provides a comparison as a basis for understanding how the Four Strands of knowledge in the Excellence in EE Guidelines fit into the National Geography Standards components.

National Geography Standards Components	Excellence in Environmental Education Guidelines
The Five Skills Asking geographic questions Acquiring geographic information Organizing geographic information Analyzing geographic information Answering geographic questions	**Strand 1** **Questioning and Analysis Skills** · Ask questions, inquiry · Speculate · Hypothesize · Seek information, skills for gathering and organizing information · Develop answers, interpret and synthesize to develop and communicate explanations
Comment: The geography standards do not explicitly emphasize the ideas of Strand 3 (environmental issues and citizenship skills). The GEVT lessons include environmental issues and questions that fit into the elements of geography and aim to add citizenship skills through authentic, real-life projects in the lessons.	**Strand 3** **Skills for Understanding and Addressing Environmental Issues** · (3.0 - Skills to identify the real-life dramas involving differing viewpoints about environmental problems and potential solutions.) · 3.1 - Skills for analyzing and investigating environmental issues · 3.2 - Decision-making and citizenship skills

The Six Essential Elements The World in Spatial Terms Places and Regions Physical Systems Human Systems Environment and Society Uses of Geography The eighteen <u>Geography Standards</u> are built into these six elements. **Five Themes** Location Place Human/Environment Interactions Movement Regions	**Strand 2** **Knowledge of Environmental Processes and Systems** (based on synthesis across disciplines and including human systems and influences) · 2.1 - The Earth as a physical system · 2.2 - The living environment · 2.3 - Humans and their societies · 2.4 - Environment and society **Comment:** The concepts and ideas in both of these areas are very similar and constitute the content of the GEVT lessons.
The Two Perspectives Spatial Ecological	Not explicitly defined. **Comment:** Environmental Education is an ecological perspective. Using geography and images in the GEVT adds a spatial perspective that increases the accessibility of information of the other EE Strands.
Not explicitly defined. **Comment:** The GEVT lessons include authentic, real-life action plans to complement the content of geography by empowering students to take geographic ideas into their everyday lives and decision-making.	**Strand 4** **Personal and Civic Responsibility** · Willing and able to act on their own conclusions to ensure environmental quality · Empowered

The Underlying Goals and Objectives for all GEVT Lessons

GEVT Lessons are **built on three goals**. Assessing and Evaluating students should be done in regards to these underlying GEVT goals, in the context of each lesson and in relation to various educational standards (such as geography, technology, environmental education, and others).

> **Goal 1** aims to clarify individual understanding of the lessons concepts, attitudes, values, and subsequent behaviors regarding the lesson subject.

> **Goal 2** aims to have students work collaboratively to accomplish the five skills in geography (asking geographic questions, acquiring geographic information, organizing geographic information, analyzing geographic information, and answering geographic questions) and the four strands of the Excellence in Environmental Education (questioning and analysis, knowledge of processes and systems, skills for addressing and understanding environmental issues, and personal and civic responsibility).

> **Goal 3** aims to have students revisit the information and skills acquired in Goals 1 and 2 in a real-life (authentic) project where they have opportunities to work individually and collaboratively.

Click here to learn more about the Assessment and Evaluation of the specific lesson goals and objectives.

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How Technology Standards Fit in the GEVT

Technology Standards	How they fit in the GEVT
1. Basic operations and concepts • Demonstrate a sound understanding of the nature and operation of technology systems • Proficient use of technology	Using basic Internet capabilities, saving files, and manipulating images.
2. Social, ethical, and human issues • Understand ethical, cultural, and	GEVT acitivities do not aim to focus on the ethics of technology use, but lend themselves to such discussion

societal issues related to technology • Practice responsible use of technology systems, information, and software • Develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity	especially at the outset of using the Internet as a research tool. The activities provide a very authentic application for discussion of such topics. The projects lend themselves to supporting collaboration using technology.
3. Technology productivity tools • Use technology tools to enhance learning, increase productivity, and promote creativity • Use productivity tools to collaborate in constructing technology-enhanced models, preparing publications, and producing other creative works.	The GEVT activities lend themselves perfectly to increasing students' use of a variety of technology applications such as word processing, image manipulation, GIS, and Internet applications.
4. Technology communications tools • Use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences • Use a variety of media and formats to communicate information and ideas effectively to multiple audiences	Students learn to use the Web to gleen information, but can also use project times to reach out to other schools, write letters to Congress, or create their activity as a web page.
5. Technology research tools • Use technology to locate, evaluate, and collect information from a variety of sources • Use technology tools to process data and report results • Evaluate and select new information resources and technological innovations based on the appropriateness to specific	GEVT activities rely heavily on the idea that students can use the Internet and other software applications to ask questions, acquire information, organize information, analyze data, and answer questions.

tasks	
6. Technology problem-solving and decision-making tools • Use technology resources for solving problems and making informed decisions • Employ technology in the development of strategies for solving problems in the real world	Students doing GEVT activities utilize technology to find the spatial relations they need for their projects and activities in the Lessons.

Constructing the Lesson Plans

All the lesson plans use a similar format; they are based on a template to ensure that all lessons used in the GEVT now and in the future are constructed using the same general principles. The template for the lesson plans follows the Five E's Inquiry Method, whose adaptation was developed originally by Rodger Bybee and Leslie Trowbridge from the Biological Sciences Curriculum Study (BSCS).

The Five E's in Education

Engagement
A very brief activity to spark interest and gain attention.
Example: A quick demonstration, anecdote, or film on the subject.

Exploration
An activity that lets students wonder and think. Facilitators should ask divergent questions and not give them explanation or answers - that comes later. See what the students come up with so they have vested interest in the next phase, the explanation. Example: Give students some pollution statistics, have them create a question from the statistics, and finally demonstrate how they would answer their question using the information.

Explanation
The facilitator can use this time to explain the concepts and give the concepts names. It is a good time now to define terms and clear up the misconceptions identified through the exploration activity. Example: Define producers, consumers, and the food web for a beginning ecology lesson.

Elaboration
This is the time to let students use their experiences of exploration and explanation to apply what they have learned in another situation. This is a third chance to present and have the students experience the information. Example: Students have studied air quality definitions and measures. For elaboration they could ask questions, measure, analyze their measurements, and answer their questions about the air quality in their hometown.

Evaluation
A time for students to express the meaning of the activities and content of the activities. This piece includes formative (during the process) and summative (at the end of the process and activities) assessments and evaluations. Feedback is key for sutdents and facilitators throughout the lessons.

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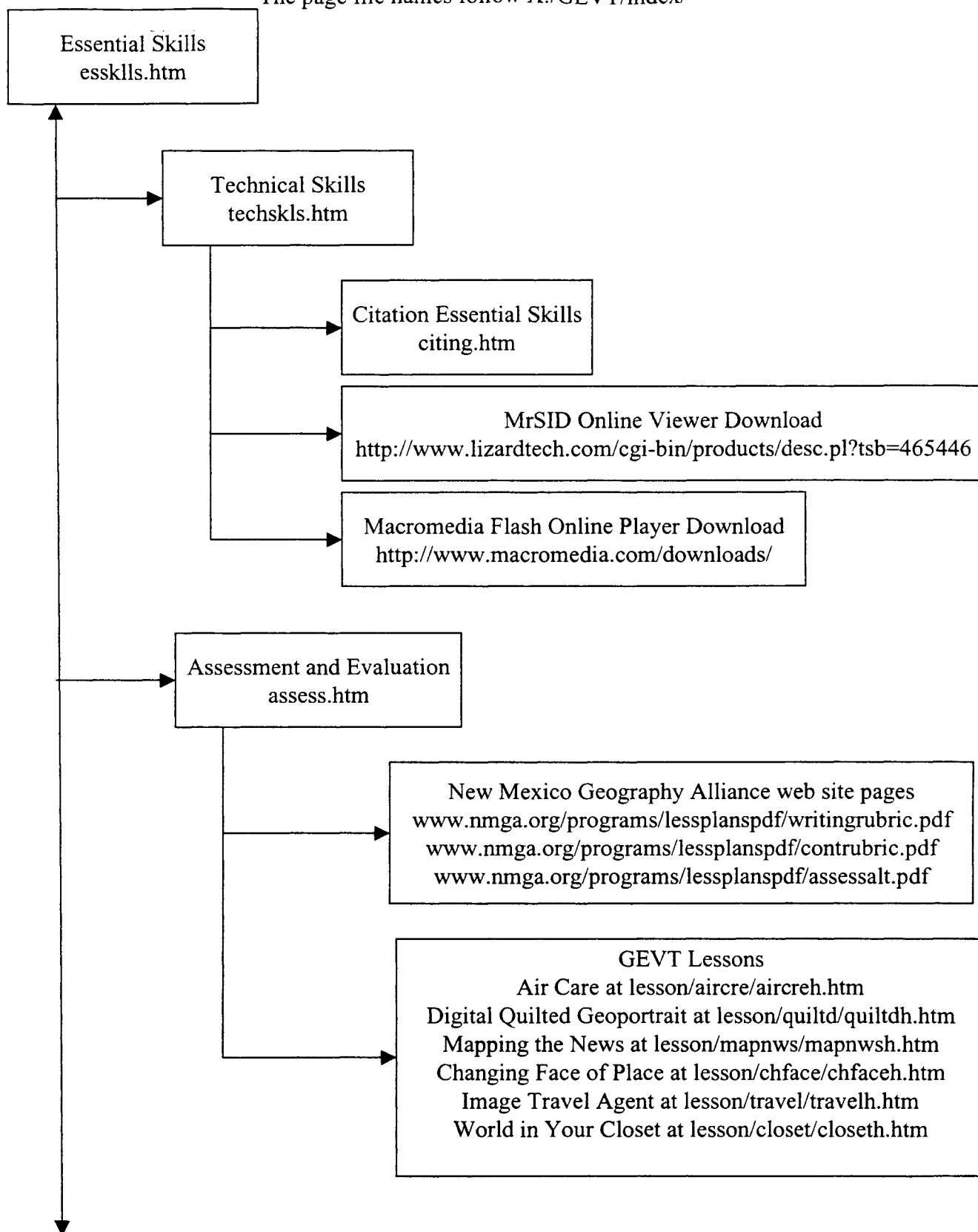
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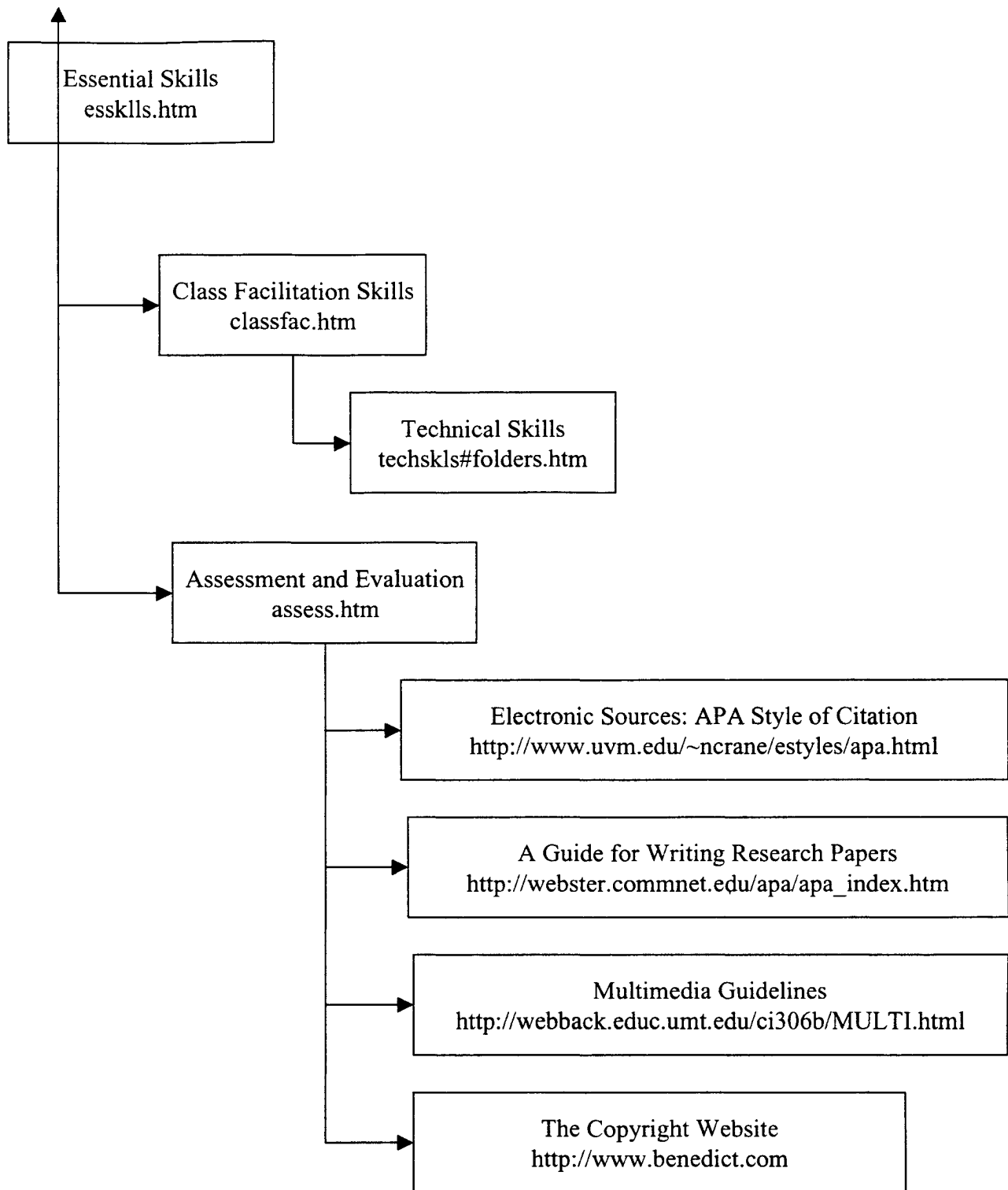
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Appendix C: Flowchart: Essential Skills Section

The page file names follow X:/GEVT/index/

```
Essential Skills
essklls.htm
```

```
Technical Skills
techskls.htm
```

```
Citation Essential Skills
citing.htm
```

```
MrSID Online Viewer Download
http://www.lizardtech.com/cgi-bin/products/desc.pl?tsb=465446
```

```
Macromedia Flash Online Player Download
http://www.macromedia.com/downloads/
```

```
Assessment and Evaluation
assess.htm
```

```
New Mexico Geography Alliance web site pages
www.nmga.org/programs/lessplanspdf/writingrubric.pdf
www.nmga.org/programs/lessplanspdf/contrubric.pdf
www.nmga.org/programs/lessplanspdf/assessalt.pdf
```

```
GEVT Lessons
Air Care at lesson/aircre/aircreh.htm
Digital Quilted Geoportrait at lesson/quiltd/quiltdh.htm
Mapping the News at lesson/mapnws/mapnwsh.htm
Changing Face of Place at lesson/chface/chfaceh.htm
Image Travel Agent at lesson/travel/travelh.htm
World in Your Closet at lesson/closet/closeth.htm
```

```
┌──────────────────────┐
│ Essential Skills     │
│ essklls.htm          │
└──────────────────────┘

        ┌──────────────────────┐
        │ Class Facilitation Skills │
        │ classfac.htm         │
        └──────────────────────┘

                ┌──────────────────────┐
                │ Technical Skills     │
                │ techskls#folders.htm │
                └──────────────────────┘

        ┌──────────────────────┐
        │ Assessment and Evaluation │
        │ assess.htm           │
        └──────────────────────┘
```

Electronic Sources: APA Style of Citation
http://www.uvm.edu/~ncrane/estyles/apa.html

A Guide for Writing Research Papers
http://webster.commnet.edu/apa/apa_index.htm

Multimedia Guidelines
http://webback.educ.umt.edu/ci306b/MULTI.html

The Copyright Website
http://www.benedict.com

Essential Skills

Technical Essential Skills:	
	Finding and Saving Images, How to make Geoportraits, and much more!
Assessment Essential Skills:	
	Methods, rubric examples, and much more!
Class Facilitation Essential Skills:	
	How to use computers you don't have, using the DDD-E saves the day, and more!
Citation Essential Skills:	
	Copyright laws, how to reference web sites, and the GEVT use agreement.

GEVT Home Page

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Technical Essential Skills Assistance Page

How do you.....?

Name Files	Make and Use File Folders	Print Trunk Lessons	Use Save As...
Get Images Off The Web	Use Saved Images for Projects	View Web Pages Off Line	References

Essential Skills Home Page * GEVT Home Page

Naming Files

The first rule is to **keep file names six to eight characters long** and **limit characters to lower case letters, numbers, and the occasional underscore**. Using this rule will help you avoid a lot of problems and will speed up your work if you have to write or type out the file names.

Example: alpha_1

Rule number two is to keep files **well organized in folders**. This is the most important skill when working on all kinds of technology projects!

Making Folders! Folders! Folders!

- Organizing files into folders is **the most important skill** when using computers.
- You should keep track of your folder system like you keep track of what your file names mean.
- Organize your files by subject.
- For the purposes of the Trunk, I recommend the following organization scheme:

Black = directory Blue = Folders Red = Files

- Your Directory:/
  - o GEVT Folder/
    - General Info Folder/
      - References Folder/with files that have references
      - Instructions to keep Folder/files of instruction pages
    - Lessons Folder/
      - Title of the lesson Folder/
        - Images and Maps Folder/with the files of images and maps
        - Text Folder/keep lesson plan, hand-outs, and rubrics
        - Web Research Folder/
          - Web Images Folder/
          - Web Text and Web Site names Folder /
      - Title of the lesson Folder/
        - Etc.etc.

How to make Folders:

1. Open your file management window such as Windows Explorer.
2. Highlight the directory (A:/, B:/, E:/, etc.) or folder within a directory in which you need to create a folder by clicking on it once with your mouse.
3. With your mouse, click on File>New>Folder.
4. A new folder should appear within the directory or folder you highlighted.
5. Type the folder name, press enter, and you have a new folder.
6. Highlight the next directory or folder and keep on a clicking.

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Printing the Lessons and Lesson Supplements

Option 1: (easiest)

Print the web page directly by clicking File>Print.

Benefits: It is easy to do and will print text, tables, and graphics. It will also print the name of the web page automatically in most cases, which is nice for references.

Downfalls: It may not give you the format you want and usually **uses a lot more paper**, which is not cost effective or very invronmentally conscious.

Option 2: ("best")

1. Select by highlighting the area you want to print using the mouse or clicking Edit>Select All to choose the whole page.
2. Copy saves your highlighted selection to the 'clipboard' - a special part of the computer's memory.
3. Open a text editor such as NotePad if you are only interested in printing text or a word processing program such as Word, WordPerfect, or WordPro if you are interested in getting the graphics and tables on a page.
4. Click the Edit>Paste button on the top of the window in a new file. Hint: Try the different types of Paste options (Paste Special or Paste as Text) to see which one works best. To do this you can usually Edit>Undo to reverse the Paste you don't like and try another one.
5. If you want to know what web page you are copying and pasting remember to also copy and paste the web page address (the URL in the bar toward the top of the screen. It usually looks something like http://www.webpageyouwant.com/page1like/index.htm). Hint: Make sure you get the citation information you need. Refer to Citation Essential Skills.

Benefits: You can print just what you want, know exactly what you are getting and can edit before you print. You can print graphics on the page this way if you use a word processor rather than the text editor. The Copy and Paste method is really the best way to print, especially to minimize paper use.

Downfalls: It takes a little bit more effort and time. It also doesn't automatically print the web page address.

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How to Collect Images Off the Web

## From General Sources on the Web

1. Find an image or graphic you want to save. (Create a folder you want to keep your images and graphics in for the project.)
2. Move your mouse on top of it and right click on your mouse if you are using a PC and hold down the mouse button if you are using a Mac.
3. A window should appear.
4. Look at the window and select Save As....
5. This option should bring up a window that will let you select which folder you want to save the file in.
6. Select the folder.
7. Select the type of file you want to Save As.... The file types are listed in a little box below the bar where you can type in the name of the file. See Save As...Options to learn more about which file type to select.
8. Type in the name you want your file to have.
Major Hint: Make sure you type the full name with the extension of the file type you have selected (.gif, .jpg, etc.) if you intend to use the image across platforms (PC to Mac or vice versa)!

From the EOSEP Map and Image Server

Option 1:

1. Find an image and press download.
2. This will let you save the image as a .sid file. (See Save As...Options)
3. If you use this option you need to have the SID-Viewer program on your computer.

Click here to Download the SID Viewer.
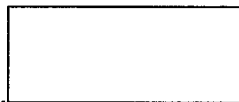
Benefits: You can view the image off-line just like you do on-line.

Downfalls: You will have trouble getting SID images in presentation or graphics programs to use for other things besides looking at the images in a really nifty way on the screen using the MrSID viewer.

Option 2:

1. Find an image you want.
2. Click on the picture to view it.
3. Move around, zoom in, zoom out, and get it how you would like to save it.
4. Go to <u>Save As...</u> and follow further directions.

Benefits: You can import a tailored image saved as a .jpg into just about any other program you might want to use to display it. See <u>Making a Quilted Geoportrait</u> for ideas.

Downfalls: Once it is saved you cannot view it in the SID Viewer anymore and cannot look around, zoom in, zoom out on the whole image.

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What do the Save As.... Options Mean

Your computer remembers all images and graphics as a series of small squares, called raster. The following types of files are different ways the computer remembers information for each square in the image or graphic. The book by Ivers and Barron is a good resource for learning more about file types and how to use them in the classroom.

.bmp = Bitmap
Benefits: They tend to be good quality and can be opened in most types of programs.
Downfalls: They tend to use more memory for each file than other types of files. They are also only for Windows.
Hints: You don't want this unless it is small (< 10KB) or unless you feel comfortable taking the image into an image editing program to manipulate it and export it as a different, smaller type of file.

.pict = Picture Format
Like Bitmaps, but for the Mac only.

.jpg = JPEG (Joint Photographic Experts Group)
Benefits: Smaller files (they are compressed) that are good for web publishing and presentations. They can also be used on Windows, Mac, and UNIX.
Downfalls: Less clarity and quality than Picts or BMPs, especially if you zoom in on them.

.gif = Graphics Interchange Format
Benefits: They can be still or animated and are small enough to use well on web pages or in presentations. They can be used on Windows, Mac, and UNIX.
Downfalls: Best if used for simple line drawings with few colors rather than photos and images that have a lot of colors and are complex (such as satellite images).

.tif = Tagged Image File Format
Benefits: Usually good quality and smaller file size. Good for exchanging files between Mac and Windows platforms.
Downfalls: Not available in all programs and usually less quality is the payoff for smaller size (than Picts and BMPs).

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How Can I Make a SlideShow of Images?

1. Collect images in a well-named <u>folder</u> in a <u>small file format</u> by saving them:

       a. from a map server/image server or other web sites,
       b. from a scanner,
       c. after drawing them in a paint or graphics program,
       d. or from a digital camera.

2. Open a presentation program such as PowerPoint or Freelance Graphics.

3. Insert the images on separate pages and add text if you choose. Save it and....

4. Play the SlideShow. Additional ideas: You can play the slide show over a projector for a whole group at one time or play it on one screen for a display table or for each student in a computer lab during class.

How to Make a Geoportrait

Option 1: Each student creates their own mini-geoquilt
Option 2: Each student makes one square for a larger geoquilt.

1. Collect images in a well-named <u>folder</u> in a <u>small file format</u> by saving them:

       a. from a map server/image server or other web sites,
       b. from a scanner,

       c. after drawing them in a paint or graphics program,
       d. or from a digital camera.

2. To create the quilt

       As a slide show. Refer to How to Create a Slide Show.

       As a web page, open a graphics editing program such as Adobe
       Photoshop, Microsoft Publisher, Microsoft PhotoEditor or Macromedia
       Fireworks and use the following directions.

       Note: You can print the pieces of your geoquilt from any of these
       programs, using either of these project ideas.

3. Insert or Copy>Paste images onto the pages.

4. Resize and move the images to fit them on one page to create a geoquilt for each
student.

5. Students can add text if they want to.

6. Save the files in a specific folder. You need to make sure the images are in the same
folder as the new file you create in case the program you use needs to refer to the original
image.

7. Create your quilt by:

       a. Printing out each page and pasting them together to create one large
       geoquilt for display,

       b. Putting all the pieces (pages or files) of the quilt in one file and viewing
       them as a Slide Show for presentations to the community and parents.
       Hint: This may take too much memory and might not work all in one file,
       but you could break it into several files, or

       c. Creating the quilt on the class web page, displaying student comments
       with the image inserted.

How to view the GEVT off-line:

1. Go to the GEVT home page.
2. Click File>Save As....an .htm or .html in a specific directory where you can easily find

it again. The computer will automatically create folders to hold the web page.

3. Open the index.html page to open the trunk. This page will help guide you through making sure you have the correct player and viewer software to view everything in the trunk.

4. If you cannot get the GEVT to play, the software you will need to have to use the trunk can be downloaded from here:

Macromedia Shockwave Flash Player.

This player displayes certain types of animated movies included in the main part of the trunk.

How to view the EOS Map and Image Server off-line:

1. Go to the EOS Map and Image Server home page.
2. Click on the GEVT page to go to the page you would like to save.
3. Click on File>Save As....and select the folder or directory in which to save the .htm or .html file(s). The computer will automatically create folders to hold the web page(s).
4. Using your desktop explorer, you can find the folder where the page was saved and open the .htm or .html file.
5. If the images do not appear, it means you do not have the software to 'view' the type of file the images are saved as. You need to download the SID-Viewer, which you can do from the EOS Image Server web site or from here.

Click here to Download the SID Viewer.

Why have the GEVT and the EOS GEVT Images and Maps off-Line?

It is good to be able to have access to the trunk off line so you can save it at home and show it in class or whatever you need to do when you might not be able to be connected to the internet the whole time.

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References

Ivers, Karen S. and Ann E. Barron. (1998). Multimedia Projects in Education: Designing, Producing, and Assessing. Englewood, CO: Libraries Unlimited, Inc. and Its Division Teacher Ideas Press.

Assessments and Evaluation

What to Assess and Evaluate	References
Types and Methods of Assessment	
How to use Rubrics to Evaluate Alternative Assessments	

Example GEVT Rubric Ideas		
Content	Collaboration and Self-Assessment	Clarify Values, Beliefs, Behaviors

Essential Skills Home Page * GEVT Home Page

What to Assess and Evaluate

GEVT Lessons are **built on three goals**. Assessing and Evaluating students should be done in regards to these underlying GEVT goals, in the context of each lesson and in relation to various educational standards (such as geography, technology, environmental education, and others).

> **Goal 1** aims to clarify individual understanding of the lessons concepts, attitudes, values, and subsequent behaviors regarding the lesson subject.
>
> **Goal 2** aims to have students work collaboratively to accomplish the five skills in geography (asking geographic questions, acquiring geographic information, organizing geographic information, analyzing geographic information, and answering geographic questions) and the four strands of the Excellence in Environmental Education (questioning and analysis, knowledge of processes and systems, skills for addressing and understanding environmental issues, and personal and civic responsibility).
>
> **Goal 3** aims to have students revisit the information and skills acquired in Goals 1 and 2 in a real-life project where they have opportunities to work individually and collaboratively.

Reading through these goals we find three general areas of assessment and evaluation for each lesson. These three components can be broken into different rubrics or combined into the same rubric for different stages of the lessons.

The Three C's to Assess for Each GEVT Lesson:

> **Clarification** of attitudes, values, and behaviors (Goals 1 and 3)
> **Content** such as definitions, concepts, subjects, proof of skills (Goals 1-3)
> **Collaborative Group Work** such as team skills, doing different jobs as part of a team - individual work within group work, presentations (Goals 2 and 3)

Type of Assessments

GEVT Lessons encourage using alternative assessments rather than traditional methods (true/false, multiple choice, fill-in-the-blank) to measure student outcomes related to each lesson's goals.

Types of Alternative Assessments

Ivers and Barron (1998) describe two types of alternative assessments that can be used for GEVT Lessons. They are performance-based and authentic.

1. **Performance-based** assessments ask students to create answers or products to demonstrate knowledge or skills. Performance-based assessments are used primarily for Goals 1 and 2.
2. **Authentic** assessments ask students to be involved in real-life situations. Goal 3 aims at creating an authentic assessment piece for every Lesson.

Methods for Alternative Assessments

Method	GEVT Lesson Example
manipulative tasks	graphing pollution in the Air Care Lesson
writing assessments	a written explanation of the student's piece of the class' Digital Quilted Geoportrait

oral discourse and examination	discussing with students what they found and how their news article relates to the Five Themes of geography in Mapping the News
exhibitions	students planting willows in a stream bed as part of their Changing Face of Place project
portfolios	the vacation guide students create in Image Travel Agent

(First five methods from: Feuer and Fulton; Lange)

concept mapping	creating a map of concepts of how the Five Themes are involved in the World in Your Closet

(Learn more about concept mapping by refering to Briscoe and LaMaster)

There is a great list titled *Assessment Alternatives* on the New Mexico Geographic Alliance web site www.nmga.org/programs/lessplanspdf/assessalt.pdf. They got the list from *The Status of State student Assessment Programs in the United States.*

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Using Rubrics to Evaluate Alternative Assessments

ACE the Rules on Rubrics:

Assignment - include the assignment, grading, and due date(s) at the top of the rubric

Components - terms used to describe what is required in the lesson and how the students are being graded should be very specific and clear

Explained - time needs to be spent to explain the assignment and the rubric with time for students to ask questions

Example GEVT Rubric Ideas

Clarification
Content (Performance-based Project or Presentation)
Collaborative Group Work and Self-Assessment

Other Awesome Rubric Resources

Books:

Ivers, Karen S. and Ann E. Barron. *Multimedia Projects in Education: Designing, Producing, and Assessing.* 1998. Libraries Unlimited, Inc: Englewood, CO.

McCullen, Caroline. March 1999. *Taking Aim: Tips for Evaluating Students in a Digital Age.* Technology and Learning: pp 48-50.

Partnow, Patricia H., Roger W. Pearson and Marjorie Hermans, ed. 1998. *Teachers Guide for Alaska in Maps: A Thematic Atlas.* University of Alaska Fairbanks: pp31-32.

Web Sites:

New Mexico Geographic Alliance web pages:	
Rubric of student contract.	www.nmga.org/programs/lessplanspdf/contrubric.pdf
Rubric of a writing project	www.nmga.org/programs/lessplanspdf/writingrubric.pdf

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Rubric Example : Content

Content - The Five Themes of Geography
Lesson - Mapping the News
Geographic Skills - questioning, acquiring, organizing, analyzing, answering
Assessment Type - manipulative
Assessment Method - writing, oral presentation to class each week

Assignment:

1. Work in pairs.
2. Find a piece of current news.
3. Read your piece and analyze which of the Five Themes are relevant.

4. Answer at least five geographic questions from the Geography's Five Themes in the News hand-out, including those questions listed in the content section of the rubric below to create a complete summary of your news piece.

5. Prepare a written report to be turned in to the instructor and a brief oral report to share with the class.

6. Reports are due next Friday, one week from today.

Good luck and have fun.

		Possible Points					Points Earned
		1	2	3	4	5	
Content:							
Student Names		Yes = 1 No = 0					
Title		Yes = 2 No = 0					
Author/Creator		Yes = 2 No = 0					
Summary		a few words or no correct information, answered one question		a few sentences or partially correct information, answered 3 questions		a complete paragraph with correct information, answered at least five questions	
Questions From the Five Themes in the News Hand-out							
Type		not challenging		somewhat challenging		most challenging	
Answers		not complete		somewhat complete		very complete	
Reports:							
Written		poor grammar, misspelled words		some grammar mistakes, some misspelled words		no grammar mistakes, no misspelled words	
Oral		didn't speak or too quiet to hear, very nervous		sometimes too quiet or a little nervous		loud enough, relaxed	
Total Points out of 25 Possible:							

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Rubric Example: Group Work and Self-Assessment

Collaboration - through a class project to create a presentation to the city council regarding a real air quality issue being discussed.
Lesson - Air Care
Skills - teamwork, individual contribution, communication
Assessment Type - authentic
Assessment Method - exhibition

Assignment:

Work in collaborative groups.
Utilize knowledge gained from the Air Care lesson to prepare and present one statement per group at the city council meeting regarding the current debate over whether or not to limit winter driving hours per household to improve air quality.

Note: There would probably be a content rubric for this project too, but for this example we will focus on only evaluating group work and self-assessment.

Air Care Collaborative Group Assessment Directions: Rate each team member on a scale of 0 (no effort) to 5 (excellent effort)	Write in Names of Group Including Yourself				
Participation: participated, came prepared, stayed focused, reliable, dependable					
Involvement: asked thoughtful questions, showed enthusiasm and initiative					
Contribution: did fair share of work, high quality work and effort					

Group Dynamics: respectful of others and their ideas, did not try to dominate					
Total Points Earned out of 20 Possible:					

What Grade Would You Give Yourself?

What were your successes in the project?

What would you change about the project?

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Rubric Example: Clarification

Clarify values, beliefs, and behaviors related to the lesson topic
Lesson - Border Disputes
Skills - ask questions, seek information, develop awareness and answers
Assessment - manipulative (authentic because it is their own views)
Assessment Method - written (or interview and class discussion)

Assignment:

1. View the slide show of images depicting areas that have changed over time.
2. For each site, write down if the change is human or non-human.
3. Then, for each site, write down how the change makes you feel and what you could do to affect change in the area.

Assessment of Attitudes, Values, and Behaviors Expression of Border Disputes Slide Show				
1 = poor	2 = weak	3 = average	4 = good	5 = excellent

	Totals for Each Section
Quality and organization of ideas	1 23 4 5	
Organization, relevance	1 2 3 4 5	
Subtotal times the weight	X 4	
Grammar	1 2 3 4 5	
Legibility	1 2 3 4 5	
Subtotal times the weight	X 1	
Total Points Earned out of 50 Possible:		

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Class Facilitation Essential Skills

How to use computers from none to tons	Decide, Design, Develop - Evaluate The (DDD-E) Model	References

Essential Skills Home Page * GEVT Home Page

How to use computers - from none to tons

Rule #1: It is most important to make the most of the computer time you have.

Refer to the DDD-E model to understand where in the process computers really fit in and to help your students use their time wisely when they are at the computers, especially if you are 'computer limited.'

There are many ways to facilitate computer use in your classroom depending on all of the following scenarios:

Your Scenario: I have	Suggestions
A Computer lab available with a technology specialist	Lucky you! This is, of course, ideal. Get together with your technology person for help and planning a use schedule to maximize your time and the lab time. A lot of GEVT activities do not require computer time.
A couple computers in the classroom	See if you can get a projection system for one of the computers to run the slide shows for the whole class. Otherwise, give the students designated time slots where they can view the slide shows, movies, do research for projects, or view images.
One computer in the classroom	Hopefully you can find a projector to project the slide shows. Otherwise, you can print out the information ahead of time including the images.

HELP! I don't have web access in my classroom!

1. Look through the GEVT on a computer that does have web access and only save what you absolutely need the kids to be able to view on the computer that doesn't have Internet access.

2. Zip the files if they are too large to fit on a disk.

3. Save them to a disk and take them to the computer(s) without Internet access.

4. Make a <u>folder</u> on the desktop of the non-Internet computer with a clear title in an easy to find place.

5. Copy the file from the disk to the desktop and unzip it if necessary.

6. Use the files as you would from the computer hooked to the Internet. You will need to have a browser such as Explorer or Netscape on the non-Internet computer to be able to look at the web page files. This means you will need to save a browser and put it on the desktop of the non-Internet computer too, if it doesn't already have one.

See <u>Technical Essential Skills</u> for more details about file types and exactly what you need to use different file types.

Note: You will not be able to use, for example, .sid images from the EOS Image Server on a computer that doesn't have the Viewer program. So, if a computer is not online you need to bring both the .sid image and the Viewer to the off-line computer. The solution is to save the image(s) as .jpg or .gif so you can easily look at them on the off-line computer.

<u>Back to the Top</u>

DDD-E Model for Technology Projects

This model is GREAT to use in the classroom. To get the BEST explanation you should buy and use the following book religiously! It has templates for everything you can imagine, explains in detail about technology, and gives you great advice for how to organize your classroom around whatever you can get.

Ivers, Karen S. and Ann E. Barron. 1998. *Multimedia Projects in Education: Designing, Producing, and Assessing.* Libraries Unlimited, Inc; Englewood, CO.

The DDD-E Overview

The DDD-E model is a step-by-step process that helps you organize projects to help your students stay on task and have a quality experience. It is an acronym that stands for the process Decide, Design, Develop - Evaluate. To use the process, move from one stage to the next, evaluating all the way through and at the end.

Decide	What you are going to do? Who it is for? Why you are doing it? What your objectives and goals are. What you need and have to do the project.
Design	Use your decisions to plan it out in as much detail as possible Create flowcharts. Create storyboards
Develop	Create the product by... • Searching the web. • Drawing the graphics. • Taking the digital photos. • Gathering the data if you don't have it.
Evaluate	All three stages and the final project. Use rubrics and other alternative forms of assessment.

Back to the Top

References

Ivers, Karen S. and Ann E. Barron. (1998). Multimedia Projects in Education: Designing, Producing, and Assessing. Englewood, CO: Libraries Unlimited, Inc. and Its Division Teacher Ideas Press.

Citation Essential Skills

Cite Internet Sources	Multimedia Use Guidelines	Copyright Laws	GEVT Use Agreement and Disclaimer

Essential Skills Home Page * GEVT Home Page

How to cite Internet Resources (APA)

http://www.uvm.edu/~ncrane/estyles/apa.html This web site provides an excellent composite of how to site electronic Sources in APA Style. We have it thanks to Nancy Crane (ncrane@zoo.uvm.edu) from the University of Vermont, who maintains the site.

http://webster.commnet.edu/apa/apa_index.htm The Humanities Department and library staff from Capital Community College in Hartford, CT made this compilation of APA Style Citations available in a question and answer format.

Multimedia Guidelines

http://webback.educ.umt.edu/ci306b/MULTI.html

If you want to know how much of what you can use from web sites, check this quick list of statistics out! It is a very nice compilation of things you need to know about finding and using things off the web for educational purposes. Thank Sally Brewer, Professor in the Department of Education at the University of Montana for this list. It is part of a multimedia course for students becoming teachers.

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Copyright Laws

http://www.benedict.com/
"...real world, practical and relevant copyright information..." Copyright 1995-1999 Benedict O'Mahoney

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Appendix D: Flowchart: Lesson Index Page

The page file names follow X:/GEVT/

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Lesson Index Page
index/index_1.htm
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Changing Face of Place
lessons/chface.chfaceh.htm

Digital Quilted Geoportrait
lessons/quiltd/quiltdh.htm

Air Care
lessons/aircre/aircreh.htm

The World in Your Closet
lessons/closet/closeth.htm

Border Disputes
lessons/bordis/bordish.htm

Image Travel Agent
lessons/travel/travelh.htm

Mapping the News
lessons/mapnws/mapnwsh.htm

EE Guidelines
index/fndtns.htm

Geography Standards
index/geostd.htm

GEVT Lesson Index Page

Title	Grade/Age	Main Subject	Duration*	Geography Standards	Excellence in EE Guidelines Strands
The Changing Face of Place	K-5	place, ecology, literature	2 classes	12, 14, 15, 17	1, 2.1, 2.3, 2.4, 3, 4
Digital Quilted Geoportrait	K-12	Five Themes of geography, community, technology	3-4 classes	4, 12, 16	1, 2.3
Air Care	3-6	air quality, inversions	4 classes	4, 18	1, 2, 3,4
The World in Your Closet	5-8	trade, interdependence, Five Themes of geography	3 classes	1, 2, 11, 17, 18	1, 2.3, 3.2, 4
Border Disputes	6-12	types of disputes, stakeholders, borders and boundaries	2-4 classes	6, 10, 13, 18	1, 2.1, 2.4, 3, 4
Image Travel Agent	7-12	image and map interpretation, culture	2 classes	1, 4, 7, 8, 11, 15, 16	1, 2.3, 2.4
Mapping the News	7-12	current events, map reading, relationships, Five Themes of geography	1-3 hours/week	1, 3, 18	1, 2.3, 2.4, 3, 4

Tell me how the Technology Standards fit into the GEVT.

* Duration: Each 'class' equals one hour of instruction and in-class work. The lessons also include active, original projects for students which will take additional time that will vary project to project.

GEVT Home Page

Appendix E: Flowchart: Changing Face of Place Lesson

Changing Face of Place Home Page
lessons/chface/chfaceh.htm

The page file names follow X:/GEVT/ unless they begin with http:// and link to a different web site.

Overview: Changing Face of Place
lessons/chface/chfaceo.htm

Goals/Objectives: Changing Face of Place
lessons/chface/chfaceg.htm

Background: Changing Face of Place
lessons/chface/chfaceb.htm

Lesson Plan: Changing Face of Place
lessons/chface/chfacel.htm

Essential Skills
index/essklls.htm

Assessment and Evaluation
index/assess.htm

Map Reference Page
index/mapref.htm

Background: Changing Face of Place
lessons/chface/chfaceb.htm

Materials: Changing Face of Place
lessons/chface/chfacem.htm

Slide Show: Changing Face of Place
lessons/chface/chfacess.htm

Image Pages on EOSEP Server
http://eos1.cec.umt.edu/sid/chface1
http://eos1.cec.umt.edu/sid/chface2
http://eos1.cec.umt.edu/sid/chface3

Reading List
lessons/chface/cfpread.htm

Extensions: Changing Face of Place
lessons/chface/chfacee.htm

Materials: Changing Face of Place
lessons/chface/chfacem.htm

References: Changing Face of Place
lessons/chface/chfacer.htm

Project Evaluation
index/evaltn.htm

Lesson Index Home Page
index/index_l.htm

Home Index Page
index/index_h.htm

Changing Face of Place Home Page

GEVT Project Evaluation Form

Grade:	K-5
Subject:	human/environment interaction, choices and change
Skills:	critical thinking, analyzing, reading, writing, action
Duration:	2 classes plus project time
Standards:	Geography 12, 14, 15, 17 Environmental Education 1, 2.1, 2.3, 2.4, 3, 4
Key Vocabulary:	environment, place
Contributing Teacher:	Sharon McDermott
Lesson Adapted By:	Meagan Bayless

Overview:

Changing Face of Place

The lesson focuses on identifying, defining, and understanding change of a place. Students are engaged through literature, explore a real life place, and explain what they know by investigating a place of their choice that they can visit first hand.

Changing Face of Place Home Page

Goals:

Changing Face of Place

Goal 1:

Through a piece of literature, clarify the definition and concepts of individual, personal attitudes, values, and behaviors regarding place and change.

Objectives:

1. Define 'place' in terms of physical and social characteristics.
2. Communicate how maps and images depict place.
3. Explain why and how places change.

Goal 2:

Collaboratively acquire, organize, analyze, and answer questions regarding a place that has changed significantly over time.

Objectives:

1. Acquire, organize, and analyze information regarding how their schoolyard has changed over one year.
2. Students will present the changes of a place spatially (using images and maps) as well as through written or spoken word, demonstration, or other creative outlets.
3. Students will work together as a class and more mature students will practice working in small groups.

Goal 3:

Collaboratively or individually revisit and clarify attitudes, values, and behaviors regarding change of place by creating, completing, and evaluating an action plan involving change at their school.

Objectives:

1. Discuss what changes they like and dislike regarding their schoolyard.
2. Write an action plan that can be completed within two months that relates to the changes they would like to see in their schoolyard.
3. Complete the action plan.

Changing Face of Place Home Page

Background:

Changing Face of Place

Place, as one of the Five Themes of Geography, refers to physical and human characteristics of a location. When we are sensitive to our surroundings we recognize the context of our location as unique in space and time. When describing place, we might talk about sunshine, a rocky shore, moss on a tree, or the language being spoken during a cultural ceremony.

Places do not remain the same. They change due to the interactions between the four components of our ecosystem: air, water, soil, and biodiversity (which includes humans). Changes can only occur over time. So, when we try to look at and understand changes we need to look at places over time.

Maps and images depict place by giving us a spatial perspective on which to lay our ecological perspective of physical and human characteristics. On a map we can see the political boundaries of cities or the physical boundaries of mountain chains that add to the definition of a place.

Maps and images help us see changes on landscapes over time. Looking at a map or photo from the early 1900's anywhere in the Western United States, for example, you can see how there are more trees where fires have been kept from burning and you can see where cities have come and in some cases gone.

Changing Face of Place Home Page

Lesson Plan:

Changing Face of Place

Pre-Lesson

Read and be familiar with the GEVT Essential Skills and Lesson Background pages before reading through the lesson plan. Read all the way through the lesson plan to tailor the ideas to your class and to be comfortable with the sequence and information.

Day 1 materials Go to Other days - Day 2-4

Engagement (10 minutes)

1. Show the Images Show the Changing Face of Place Slide Show. Ask students to share some ideas of places they have seen change in a major way.

Collect these ideas and find images of as many of their places as possible for use in Day 2. See Instructions page on How to Collect Maps and Images from the Web.

Exploration (50 minutes)

2. Either read aloud to the class or have more mature students in groups of three read a piece of literature that reflects the way a place has changed over time. Sample titles for different grades and focuses are listed on the Changing Face of Place Reading List.

3. After reading the story, divide students into cooperative groups and give them a large piece of paper with drawing tools. Have them draw a map of the place where the story takes place. On the map each student should write a definition of 'place' including both physical and social characteristics.

4. When the maps are complete have each group present their map. During presentations the group should describe the physical and social characteristics of the place in the story, read their individual definitions of place, and share how they feel about the changes in the story.

Assessment: Collect, grade, and post maps. Give points for participation and for having their own definition of place and a list of physical and social characteristics of place on their maps. See Assessments and Evaluation for more information and ideas.

Days 2-4 materials

Explanation (25 minutes)

5. Share your own definition of 'place' to the class and read them a dictionary definition. Take the time to explain how humans affect place changes. Use the maps and images you were able to find from the students' ideas from the Engagement activity on Day 1 as good examples for explaining physical and social changes in the world.

Elaboration (30 minutes)

6. Take at least 10 minutes for each student to think about and write down (or draw for younger grades) in a journal or a list how their school has changed over time: in a week, a month, since the beginning of school, since last year. Limit their concentration to within the year. Have them include their feelings about the changes, i.e. what they like and don't like.

7. Spend 15 minutes collecting their ideas in a brainstorm/discussion session. This will give you a good perspective on what the class is seeing and is most interested in. While you do the brainstorming session, reinforce and tie their ideas back to the book(s) you read for the first part of the lesson.

8. Assist the class in picking one thing on their list of changes at the

school that they could do a project around and have them come up with a project.

The project could be around a change they don't like in which they could draw pictures and write letters to the appropriate people explaining what they have been studying, what the issue is, and why they feel it is important to stop the change.

Or, they could do the same sort of actions in support of a change they like.

Or, they could promote a change and do the change they would like to see happen.

An example: The students decide they do not like how the front of the school is plain or how the playground has no vegetation any more so they decide to plant flowers. Their project to plant flowers would encompass a whole host of other disciplines and lessons in the process, while empowering the students to be actors in positive change.

Be sure to utilize the Image and Map Resource Links to find a new perspective on your school. You might be able to find images that show your local area over time, which could be a dramatic way for your students to create a history and explanation of what has happened to their schoolyard over time in terms of the human/environment interface.
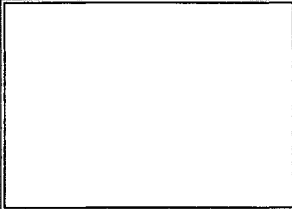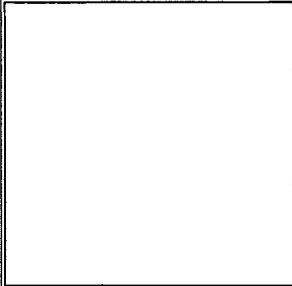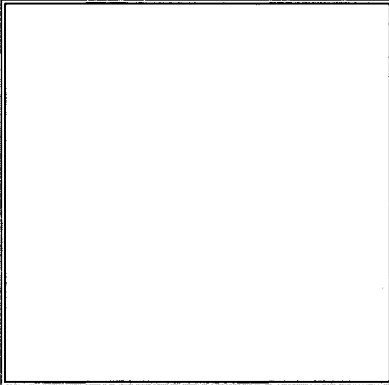
If you are a GLOBE site, you may wish to use information from your protocols when you look at changes and make and action plan.

Assessment: Grading the project should assess their use of images and maps, cooperative group work, and the planning and completion of a project. Refer to Assessments and Evaluation for more information and ideas.

Changing Face of Place Home Page

Changing Face of Place Image Slide Show
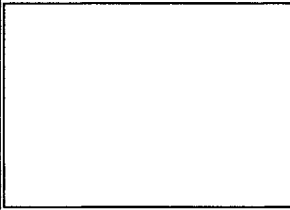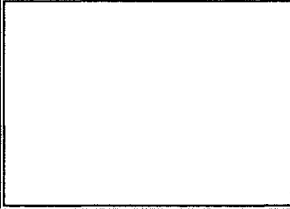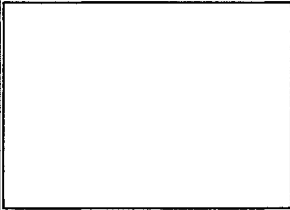
Directions: Use the questions and descriptions on this page to enhance the 'slide show' as students take time to view the images and learn more about them on the Server.

Click on an image to see it larger and up close from the EOSEP Server.

Las Vegas, Nevada, USA		
	1972	
	1986	What do you notice right away? What do you think the different colors mean? Use relative and absolute location to interpret what is happening to the city. Colors: bright red = young vegetation (think golf courses), dark red = older vegetation probably in mature neighborhoods, almost black = water, white = bare soil probably where the land has been cleared for building, light and medium green = young neighborhoods, dark green = soil
	1992	
EROS Data Center. (1972, Sept. 13)(1986, Sept. 10)(1992, Sept. 10). *Las Vegas, NV.* Earthshots. 5th ed. Retrieved on January 26, 2000 from the USGS EROS Data Center on the World Wide Web at: http://edcwww.cr.usgs.gov/earthshots/slow/LasVegas/LasVegas		

Yellowstone National Park, Wyoming and Montana, USA

	July 22, 1988 before the fires	What do you notice different between the two images?
	August 4, 1988 during the fires	What does the change in colors tell you? Are there any other patterns that change between the two images?

The Observatorium. (no date given). *Yellowstone National Park*. NASA's Observatorium: Eyes in the Sky. Retreived on January 26, 2000 from the World Wide Web at: http://observe.ivv.nasa.gov/nasa/exhibits/eyes_sky/jellystone1.html

Nile Delta, Egypt

Cairo		
	1973	Where do you see changes? What do you think the red patterns are? What does this mean about how the land is changing?
	1987	What is causing the change in the landscape?
Tanta		
	1973	Where do you see changes? What do you think the red patterns are? What does this mean about how the land is changing? What (who) is causing the changes?

	1987	

EROS Data Center. (1997, December 26). *Nile Delta, Egypt*. Earthshots. Retrieved on January 26, 2000 from the USGS EROS Data Center on the World Wide Web at: http://edcwww.cr.usgs.gov/earthshots/slow/Nile

North Carolina Coast, USA

	April 25, 1999	These two images show the effects that Hurricanes Dennis and Floyd had on North Carolina's estuaries. The picture on top shows the North Carolina coast before either of the two hurricanes came through (April 1999). The image on the bottom shows the estuaries after the hurricanes. Look at the muddiness around the shore and in the estuaries. How would this affect the ecosystem (soil, air, water, biodiversity) on the coast? Are hurricanes bad? (No, they are a natural phenomenon. They are part of how the ecosystem evolved and have significance in how the system works).
	Sept. 23, 1999	

Ahalt, Darlene A. (2000, January 11). *After They've Gone...*. Retreived on February 01, 2000 from Goddard Space Flight Center Cool Pics on the World Wide Web at: http://pao.gsvc.nasa.gov/gsfc/weekly/weekly/htm

Brazilian Rainforest

	The land in these images has obviously changed. How can you tell?
	Red is vegetation and white is bare land, where the land has been cleared. What has been happening to this land?
	Why do you think this change is occuring? How do you feel about it? What are the pros and cons, do you think?
1975, 1986, 1992	How is it different to look at the forest if you are a child that lives in Brazil where the images were taken rather than where you live now? How might that change how you feel about the land changing?

USGS. (1997, December 17). Brazil. *Natural Features*. Retrieved January 27, 2000 from the World Wide Web:
http://edc.usgs.gov/bin/html_web_store.cgi?page=paofeature1.html&cart_id=39

Changing Face of Place
Reading List

Book	Author
Anno's Counting Book	Mitsumasa Anno
Antarctica	Helen Cowcher
Farewell to Manzanar	Jeannie Huston
From Path to Highway	Gail Gibbons

Heron Street	Ann Warren
The House on Baxter Street	Sabin Gray (HBJ)
The House on Maple Street	Bonnie Pryor
The Little House	Virginia Lee Burton
The Lorax	Dr. Seuss
New Providence	Van Tscharner and Fleming
Shaker Lane	Alice and Martin Provensen
The Way It Was	Annie R. Mitchel
Window	Jeannie Baker

Changing Face of Place Home Page

Extensions:

Changing Face of Place

1. Discuss anthropologist's study of man's environmental, cultural, and social relations. Use a sand tray, paintbrush, and broken dishes (from a thrift shop) to simulate an archeological dig.

2. Participants create their own fictional or real historical literature/picture book to show the development of the area of their home or town, or for an area being studied. They can

use the Map Reference List to find images to support their study.

3. Discuss the implications of human/environment interaction and create posters to advertise solutions for display around the classroom or school.

4. Past dates/seasons for use to match pictures from the book (Xerox copies or cut apart a paperback copy of the book).

Materials:

Changing Face of Place

Day 1

- Computer: one computer that can be projected for the whole class to watch or access to the computer lab for the first 15 minutes of class
- Copy or copies of a story from the Changing Face of Place Reading List or other piece of literature to read to the class
- Large pieces of paper, one for each group of 3-5 students
- Markers, crayons, colored pencils for drawing on the big paper

Day 2

- Computer: one computer that can be projected for the whole class to watch or access to the computer lab for the first 15 minutes of class
- The collection of images you retrieve off the web based on Day 1 activity to show on the computer
- Your definition and the dictionary definition of 'place'
- A copy of the story you read on Day 1
- Brainstorming supplies (thinking caps, big paper, pen)

Appendix F: Flowchart: Digital Quilted Geoportrait Lesson

Digital Quilted Geoportrait Home Page
lessons/quiltd/quiltdh.htm

The page file names follow X:/GEVT/ unless they begin with http:// and link to a different web site.

Overview:Digital Quilted Geoportrait
lessons/quiltd/quiltdo.htm

Goals/Objectives:Digital Quilted Geoportrait
lessons/quiltd/quiltdg.htm

Background: Digital Quilted Geoportrait
lessons/quiltd/quiltdb.htm

Five Themes of Geography
index/fivethms.htm

Lesson Plan: Digital Quilted Geoportrait
lessons/quiltd/quiltdp.htm

Essential Skills
index/essklls.htm

Assessment and Evaluation
index/assess.htm

Map Reference Page
index/mapref.htm

Background: Digital Quilted Geoportrait
lessons/quiltd/quiltdb.htm

Materials: Digital Quilted Geoportrait
lessons/quiltd/quiltdm.htm

My Geoportrait Exploration
lessons/quiltd/mygeo.htm

Extensions: Digital Quilted Geoportrait
lessons/quiltd/quiltde.htm

Materials: Digital Quilted Geoportrait
lessons/quiltd/quiltdm.htm

References: Digital Quilted Geoportrait
lessons/quiltd/quiltdr.htm

Project Evaluation
index/evaltn.htm

Lesson Index Home Page
index/index_l.htm

Home Index Page
index/index_h.htm

Digital Quilted Geoportrait

GEVT Project Evaluation Form

Grade:	K-12
Subject:	Five Themes of Geography, community
Skills:	technology, research, visual presentation
Duration:	4 classes with research time
Standards:	Geography 4, 12, 16 Environmental Education 1, 2.3
Key Vocabulary:	Five Themes of Geography (location, place, human/environment interactions, movement, regions), images, maps
Contributing Teacher:	Linda Ransford
Lesson Adapted By:	Meagan Bayless

Overview:

Digital Quilted Geoportrait

Students explore the Five Themes of Geography as the Themes relate to them individually and how they relate to the students' community in which they live. The class works in cooperative groups to create a quilt using digital images and graphics programs that will be displayed publicly, as a web site or printed out as a poster.

Digital Quilted Geoportrait Home Page

Goals:

Digital Quilted Geoportrait

Goal 1:

Clarify the definition and concepts of individual, personal attitudes, values, and subsequent behaviors regarding the Five Themes of Geography.

Objectives:

1. Define the Five Themes of Geography.
2. Communicate how these Five Themes relate to each student personally.

Goal 2:

Collaboratively acquire, organize, analyze, and answer questions regarding the Five Themes in their community.

Objectives:

1. Each group will acquire, organize, and analyze information regarding one of the Five Themes as it relates to the community.

2. Each group will present their issue spatially (using images and maps) and will use their artistic skills and talents to design a section of the quilt.
3. Students will practice working in a group, having the opportunity to assess each member's contribution anonymously as part of the project evaluation when applicable.

Goal 3:

Collaboratively or individually revisit and clarify attitudes, values, and behaviors regarding the Five Themes of Geography in their community.

Objectives:

1. As a class, make an action plan to have their quilt publicly displayed.
2. Each student will prepare a summary reflection on their work throughout making the quilt and their impression of the five themes throughout their community and the world.
3. Complete the action plan.

Digital Quilted Geoportrait Home Page

Background:

Digital Quilted Geoportrait

A **geoportrait** combines art and research to 'paint' a description of a community including the Five Themes of Geography: location, place, human/environment interactions, movement, and regions.

Using images (pictures of places) and maps (depiction of places) provides an important spatial perspective to these descriptions.

Digital Quilted Geoportrait Home Page

Lesson Plan:

Digital Quilted Geoportrait

Pre-Lesson

Read and be familiar with the GEVT Essential Skills and Lesson Background pages before reading through the lesson plan. Read all the way through the lesson plan to tailor the ideas to your class and to be comfortable with the sequence and information.

Have students bring small pictures of themselves they can use for the project.

Day 1 materials Go to Other days - Day 2-4

Engagement (5 minutes)

Bring a photo of yourself (funny is always good) and do an example geoportrait of yourself, preferably with entertaining anecdotes.

Exploration (15 minutes)

1. Give each student a copy of the My Geoportrait Exploration page.

2. Give them 10 to 15 minutes to draw a picture of themselves (or they can bring a picture from home to put in the center) and write a short sentence to describe how they think each of the Themes relates to them.

Explain (30 minutes)

3. Describe the Five Themes of Geography. As you describe each one have students share the examples they wrote about on their My Geoportrait Exploration sheets.

4. Give the students time to change or add to what they have written on their Geoportrait Exploration to turn in as an assessment and to display in the classroom. This can be done as homework or to finish up the class time.

Assessment: Class participation and completion of the personal geoportrait. See Assessments and Evaluation for more information and ideas.

Day 2-4+ materials

Elaboration (whole class(es) as needed)

The class will work together to create a geoportrait of their community for public display.

5. Have the class plan the production of their geoportrait with the intention that it will displayed and shared with a public audience. Have the class think about whom they are creating the geoportrait for and that might dictate what kind of project they choose to do. They may choose to do a fabric quilt, tile mosaic, but you might want to expand on this and use technology to create a unique series of graphic geoportraits.

The **advantages of doing digital** geoportraits are that they are versatile end product, they facilitate looking at geoportrait information in new alternative ways (from above in photos), and provide students experience using technology as a tool while working in groups.

The graphic geoportraits can be **produced in a simple graphics program** where you can use images, photos, original drawings and words. Once they are created in a graphics program they can be put on a web page or printed out and recreated as a poster display for the classroom, school, the mall, or even the city hall (think big, your students will be more engaged with challenge and real-life applications).

If you choose to **put it on a web page**, I suggest making one page that shows the whole quilt and link each piece of the quilt to a different page with a close-up shot of the piece crediting the student creators with their text describing the piece.

Click here for Technical Instructions on how to make a geoportrait.

6. Divide students into small working groups and have them pick one of the Five Themes. They will need to be given time to research their Theme in the community and write up what they learn.

They should find images and maps of the community if they can on the web using sources listed on the Map Resource List page that they could add to their geoportrait. They could try to find images that show change over time to give a sense of how human/environmental impacts and movement has changed the place.

7. Complete the project and get it displayed publicly, either on the web or hanging in the school, mall, or some other prominent location. Contact the

media and get your hard work and innovation recognized!

Assessment: Create a rubric to evaluate the content, creativity, and completeness for each student's contribution. Use a rubric to evaluate team work and group cooperation. See Assessments and Evaluation page for ideas.

Digital Quilted Geoportrait Home Page

My Geoportrait Exploration

Location   Place

Movement   Regions

Me

Human/Environment Interactions
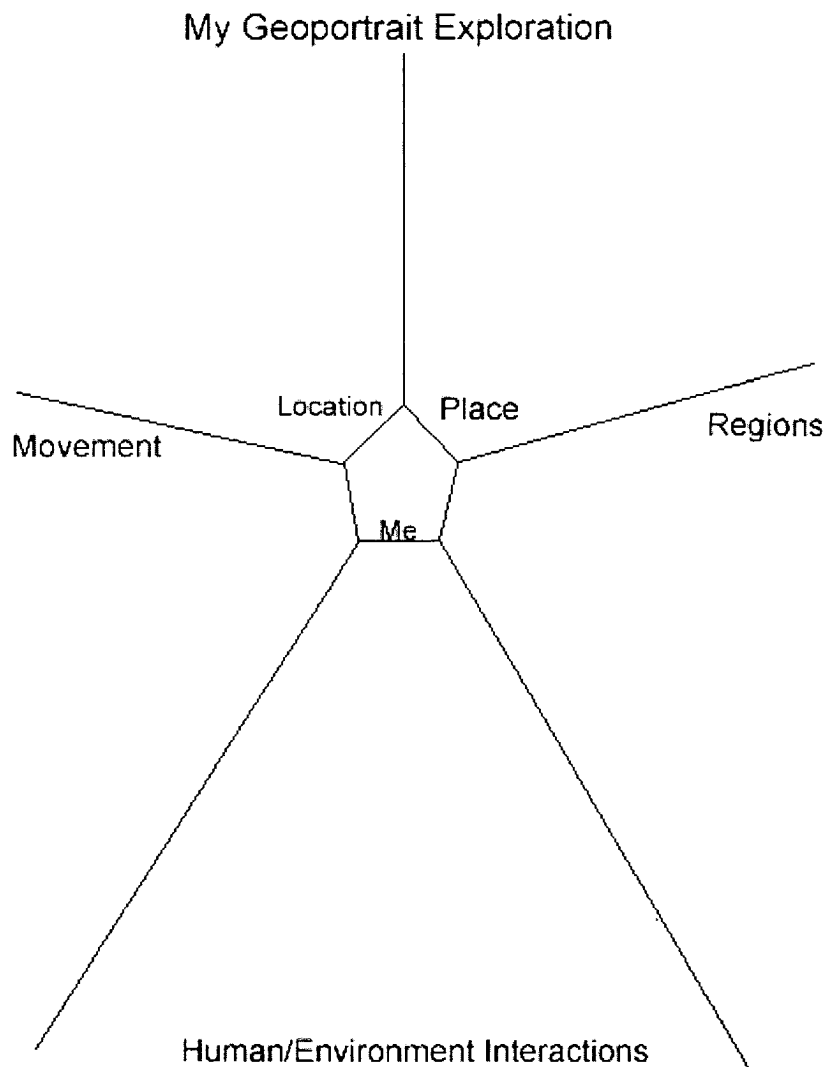
Extensions:

Digital Quilted Geoportrait

Your class could wrangle other schools to make geoportraits around a theme (your state, your town, etc.) and then have a competition and/or an auction to benefit a good cause (like the local Geographic Alliance!).

Digital Quilted Geoportrait Home Page

Materials:

Digital Quilted Geoportrait

Day 1

- Copy of My Geoportrait Exploration for each student
- Copy of Five Themes in Geography definitions for reference if needed

Day 2-4

- Computer: for each student or give students a set amount of time to use the computers you have to research and to find maps and images, also for construction of the quilt pieces
- Digital cameras if possible

Digital Quilted Geoportrait Home Page

Appendix G: Flowchart: Air Care Lesson

Air Care Home Page
lessons/aircreh.htm

The page file names follow X:/GEVT/ unless they begin with http:// and link to a different web site.

Overview: Air Care
lessons/quiltd/quiltdo.htm

Goals/Objectives: Air Care
lessons/aircre/aircreg.htm

Background: Air Care
lessons/aircre/aircreb.htm

Inversion Movie
lessons/aircre/inversion.htm

Lesson Plan: Air Care
lessons/aircre/aircrep.htm

Essential Skills
index/essklls.htm

Assessment and Evaluation
index/assess.htm

Map Reference Page
index/mapref.htm

Background: Air Care
lessons/aircre/aircreb.htm

Materials: Air Care
lessons/aircre/aircrem.htm

Hands-On Inversion Demonstration
lessons/aircre/invgme.htm

Inversion Game
lessons/aircre/invgme.htm

Extensions: Air Care
lessons/aircre/aircree.htm

STAPPA and ALAPCA
http://www.4cleanair.org

Missoula Pollution Measurements
lessons/aircre/pltnsts.htm

Missoula Particulates Graph
lessons/aircre/pltngrph.htm

Missoula CO Graph
lessons/aircre/cograph.htm

AIRS Data
http://www.epa.gov/airsdata/moncols.htm

Extensions: Air Care
lessons/aircre/aircree.htm

Materials: Air Care
lessons/aircre/aircrem.htm

References: Air Care
lessons/aircre/aircrer.htm

Project Evaluation
index/evaltn.htm

Lesson Index Home Page
index/index_l.htm

Slide Show: Air Care
lessons/aircre/aircress.htm

Home Index Page
index/index_h.htm

Image Pages on EOSEP Server
http://eos1.cec.umt.edu/sid/aircre1

Air Care Home Page

<u>Overview</u> * <u>Goals/Objectives</u> * <u>Background</u> * <u>Lesson Plan</u> * <u>Extensions</u> * <u>Materials</u> * <u>References</u>

<u>GEVT Project Evaluation Form</u>

Grade:	3 – 6
Subject:	air quality, inversion
Skills:	graphing, writing, group work, discussion
Duration:	4 classes at least one hour long plus project follow-up time
Standards:	Geography 4 and 18 Environmental Education 1, 2, 3, 4
Key Vocabulary:	air quality, pollution, inversion, particulates, CO (carbon monoxide), air alert
Contributing Teacher:	Jann Clouse
Lesson Adapted By:	Meagan Bayless

<u>Lesson Index Page</u> * <u>GEVT Home</u>

Overview:

Air Care

This lesson takes us through the science and social issues of air quality. We use images and information from Missoula, MT as a case study to explore how physical factors and human systems can affect air quality.

Looking at air quality both qualitatively and quantitatively, students graph pollution and act out physical processes as well as tap artistic and creative outlets to express their feelings about air quality.

Then, students have the opportunity to be active in their own community by creating and completing a project regarding air quality, pollution, or inversions using images and other creative means.

Air Care Home Page

Goals:

Air Care

Goal 1:

Clarify the definition of and individual, personal attitudes, values, and subsequent behaviors regarding air quality.

Objectives:

        1. Define air quality
        2. State two reasons to protect air quality.

Goal 2:

Collaboratively acquire, organize, analyze, and answer questions regarding air quality issues in Missoula, MT including where it comes from, why it happens, the consequences, and what can be done to clean it up.

Objectives:

1. Graph and explain the major sources of pollution in Missoula, MT
2. Explain how an air inversion happens in Missoula, MT
3. Express two different points of view regarding cleaning up the air in Missoula, MT
4. Practice working in a group, having the opportunity to assess each member's contribution anonymously as part of the project evaluation

Goal 3:

Collaboratively or individually revisit and clarify attitudes, values, and behaviors regarding air quality and specific air quality issues in Missoula, MT to the place they go to school.

Objectives:

1. Explain and graph (if data is available) the major sources of pollution where they live or go to school
2. Express at least two different points of view regarding air quality where they live or go to school
3. Write an action plan regarding air quality where they live or go to school that can be completed within two months.
4. Complete the action plan.

Air Care Home Page

Background:

Air Care

Air Quality and Pollution Facts

Air quality describes the composition of what is in the air. The quality of air is considered good when it has little to no air pollution. Good quality air is about 78% nitrogen, 21% oxygen, and 1% other gas. **Air pollution** can be chemicals and small particles (called **particulates**) that cause sickness, both in humans and in other parts of the ecosystem humans rely on to live.

Most polluting chemicals and particles are a result of burning. Burning is a natural phenomenon, but humans have increased the amount of burning and type of things that get burned in ways that are changing how the Earth functions; global warming is one example. Factory smoke stacks and combustion engines used in motorized machines (snowmobiles, lawn mowers automobiles are some examples) are two of the most important sources of air pollution from burning. Cars and things that produce wind also pick particulates up off the ground and add the amount of particles in the air.

The following table breaks down some of the common sources, chemicals, particulates, and the significance of each as pollutants.

Source	Mobile Combustion Sources (cars)	Stationary Combustion Sources (power plants and factories)
Chemicals	carbon monoxide (CO), nitrogen oxides (NOx), hydrocarbons (CH)	sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), and carbon dioxide (CO2)
	In sunlight these chemicals react and make smog, which can cause long-term health problems for humans and other living things. Carbon monoxide keeps warm sun energy trapped closer to Earth and contributes to global warming.	These chemicals can be absorbed by plants and animals and can cause serious health problems and death. Carbon monoxide keeps warm sun energy trapped closer to Earth and contributes to global warming.
Particulates	dust, anything on the 'road'	ash

	surface	
	Particles increase stress on our respiratory system and can cause asthma, lung cancer, and other long-term health problems. Chemicals and even metals on small particles can easily enter the body through our lungs, which can cause many different types of problems depending on the chemicals and metals.	Ash particles can contain a wide variety of very dangerous chemical toxins that can easily enter our bodies through our lungs, causing a host of long-term health concerns. The particles can affect ecosystems, especially when combined with water and can cause far reaching effects on our overall environmental health (food and water sources).

Inversions and Air Quality

Inversions happen when a warm layer of air is over the top of a colder layer. When this happens the air is stagnant, it doesn't move on it's own because cold air won't rise through warmer air. The result of an inversion is that any pollution created in that cold layer will stay there and become more concentrated and therefore potentially more dangerous to the living things breathing and absorbing the chemicals and particulates. (Click here to see the Inversion Movie that is part of the lesson).

Pollution can be removed from the cold air layer if there is precipitation (such as rain, snow, sleet, etc) to grab the pollution from the air and carry it to the Earth. However, this is also a very good way for the chemical pollutants to enter the ecosystem through the soil, water, and living things that they contact.

Inversions end when the warm air layer above becomes cooler than the underlying layer, the underlying layer warms more than the upper layer, or when wind comes and blows the layers out of the are where they are 'trapped.'

Case Study: Missoula, MT

Missoula, Montana is in a valley that does not receive much sun in the winter and therefore frequently has inversions. The valley has a pulp mill that emits toxic chemicals and particulates into the air from smoke stacks. The city has a road system that creates traffic jams during certain times of the day, which creates smog from chemical photo (sun) reactions and adds particulates to the air.

The air quality in Missoula used to be very poor. People monitor the pollution at different sites around town and at the pulp mill. When they find dangerous levels of pollution are

stuck in the valley they issue an **air alert** that tells the people living in the valley that the air could be hazardous to their health.

Solutions

There are solutions and options. Missoula is an example of a city has taken control of their air quality. Alternative transportation options such as walking, bicycling, or riding buses is gaining popularity. In the winter, gas stations are required to sell a cleaning agent in the gas that makes car emissions cleaner. There are plans to change how the streets are arranged to make traffic move more quickly so people do not drive their cars as long when they drive. The city passed a law that makes burning in fireplaces illegal. Local groups monitor the pulp mill and have gotten the pulp mill to stop emitting some of the most poisonous chemicals from their paper bleaching process. As a result, Missoula is cleaner and a much nicer place to live than it was before people learned about and took action to change their air quality.

Air Care Home Page

Lesson Plan:

Air Care

Pre-Lesson

Read and be familiar with the GEVT Essential Skills and Lesson Background pages before reading through the lesson plan. Read all the way through the lesson plan to tailor the ideas to your class and to be comfortable with the sequence and information.

Day 1 materials Go to Other days - Day 2 * Day 3 * Day 4

Engagement (10 minutes)

> 1. Show the Air Care Image Slide Show from the EOS image server that introduces students to air quality problems in Missoula, MT, USA.
>
> 2. Have students define through discussion their feelings regarding the slide show. What did they notice? How might they feel growing up in Missoula? How would it be different than growing up where they do if

they don't live in Missoula? Better, worse, or just different?

Exploration (50 minutes)

1. Break students into groups of 3 to 5, providing each group with a large sheet of paper and writing implements.

2. Each group will be asked to prepare a presentation lasting 2-3 minutes to 'teach' the rest of the class why and how what they saw in the slide show happens. As the instructor, DO NOT say the word inversion and do not tell them the answer. Let them think about it and be creative. They do not need to have the exact correct answer, just to express what they decide as groups. DO let them know their presentations should include:

    a. Physical reasons the air looks like it does
    b. Human reasons the air looks like it does
    c. Why they care or don't care about what is in the air. For this part have them think about how what is in the air affects the ecosystem (air, water, soil, and biodiversity).
    d. Name of the process(es) they are 'teaching' to the class.

3. Give the students no more than 20 minutes to prepare their explanation and create a poster from the large sheet of paper to help explain their ideas.

4. When the posters are done, each group will take turns explaining what they decided is happening in Missoula and why or why it isn't important (5 minutes for each group until they are all done presenting).

Assessment: Create an Air Care Poster Rubric for grading poster and presentation content as well as student contribution and teamwork. Refer to Assessments and Evaluation for more information and ideas.

Day 2 - Inversions materials

Explanation (Inversions) (30 minutes)

1. Introduce the term **inversion**. Explain this is what they were describing during their day one presentations. Demonstrate an inversion using the movie in this trunk or using a hands-on demonstration with dry ice.

2. Explain that inversions are important because they trap pollution until wind or precipitation removes the pollution from the air.

Assessment: Participation by observation.

Elaboration (Inversions) (30 minutes)

3. Play the Inversion Game. The game should be a chance to physically act out an inversion and use critical thinking skills and creativity to figure out how air quality, inversions, and ecosystem health are interrelated. Click here to find out about an Optional Extension to this activity.

4. As homework have students find maps of their hometown and explain through writing why or why not their hometown would have an inversion in the winter like they have seen in Missoula. Have students use the Map Reference Page to find maps either at the library, store, or online. They can also bring them from home. Topographic maps that show elevation changes are the best kind to find.

Assessment: Points assigned for getting a map and for writing a paragraph of explanation. Create a rubric to evaluate their research and writing for the assignment.

Day 3 materials

Explanation (Pollution) (20 minutes)

1. Like Missoula, there are two primary types of pollution in most cities. They are particulates and CO. Have the class list what they think are the types of pollution and their sources. Point out what types of pollution the students create that contribute to poor air quality where they live.

2. So, there is pollution, but why is it bad? Explain and support a discussion about the hazards of pollution on health including not only human health, but also the total health of an ecosystem (soil, water, air, biodiversity).

The www.4cleanair.org web site also has more detailed information on how pollution can affect different populations of people and shows ratings for large cities. Why are the ratings only for larger cities? This is an excellent time to talk about air alerts (what they mean, who issues them, and what to do).

3. Since pollution can cause many health problems in many ways, how do we control it? Discuss with students how air pollution is studied and controlled scientifically. Get to the point that you can describe that we (scientists, geographers, teachers, students, everyone) need to be able to measure if pollution is getting worse or better depending on what we try to

do to remove the air pollution. See if the students can think of a good way to look at the measurements - the answer might be graphs, which leads us to our next activity....

Elaboration (Pollution) (40 minutes)

4. Have students graph the particulate and CO levels in Missoula over the years how it makes sense to them. This could be done in groups or individually, depending on the students. Show them a graph of particulate levels in Missoula, a graph of CO levels at Malfunction Junction in Missoula, and explain why they use the graphs they use and discuss the trends the students see.

5. Ask students what they think the graphs and trends would look like for their home town. Find these statistics ahead of time. It is really easy if you use the http://www.epa.gov/airsdata/moncols.htm website to search by state, county, and pollutant type.

Assign homework that has the students graph the statistics from their home town. You might want to make part of the assignment finding the information from the web site and go over how to do it in class.

Assessment: Participation in class activities and correctly graphed pollution statistics with an explanation why they graphed what they graphed (curiosity, relevance, need, etc) and briefly what it tells them. You may choose to make a rubric for grading.

Day 4 materials

Elaboration Project (whole class time)

Have class design a project that can be completed within two months of doing the activities in class. The project should reflect two reasons for protecting air quality that the students identify and should help them realize they can make a difference in their community.

1. Suggested project: Find out about a city council proposal regarding air pollution issues. Have the class take a stand and prepare testimony to take to the city council meeting when the proposal calls for public input. The students could write simple statements and/or draw pictures after discussing in class how they feel and why. Tape the city council proceedings when the students' views are presented and show this to the class (and open house for parents) and post the views on the school web site if possible.

2. Students can make poster to distribute around town regarding a local air quality issue such as supporting alternative transportation or a safe cycling event that might be happening around town.

3. Students could design a research project that tests the pollution levels around town, comparing them and submitting their results to the city ensuring a local factory is emitting an allowable and safe amount of particulates and chemicals. This could double as a science research project (and use GLOBE data if you are a GLOBE site) that gets into many chemical and physical aspects. Kits for such research are available from the Montana Natural History Center in Missoula and might be available from a similar education support center in your area.
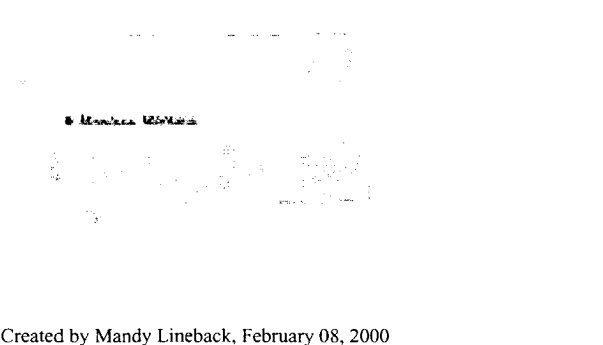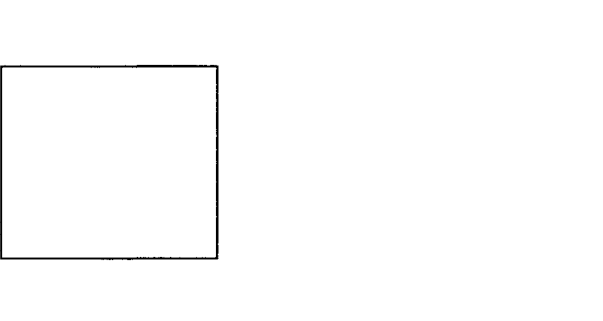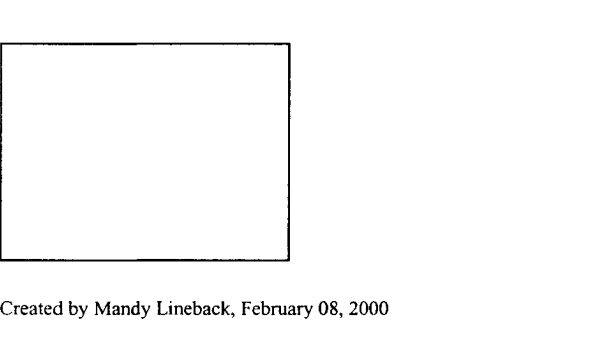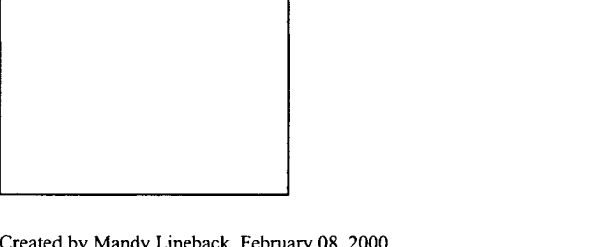
If you are wondering if there is a similar kit available locally and you are not in the Missoula vicinity it might be best to make one contact when you find local pollution statistics for the graphing section that would be willing to come into the class and do the project with you (as well as supply the necessary science equipment and knowledge of how to use it).
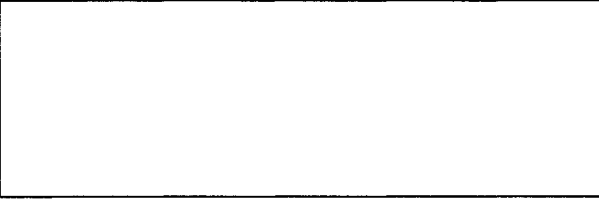
Assessments: Vary based on the project. Rubrics including content, group work, and self-assessment are appropriate.

Aire Care Home Page

Air Care Slide Show - Missoula, MT

Directions: The images shown here can be viewed very close up and interactively from the EOS Education Project Server in the Inversion Slide Show. Use the questions and descriptions on this page to enhance the 'slide show' as students take time to view the images and learn more about them on the Server.

Click on any of the images to interactively view them up close from the EOSEP Server.

Created by Mandy Lineback, February 08, 2000	Missoula is in the western part of Montana, in the Rocky Mountains.
	This is a photo of Missoula, MT taken from the Landsat 7 satellite in August 1999. The red is vegetation on the surrounding hills, the purple-pink tones show city areas, and the turqoise blue reflects the more bare soil and low shrub areas of the valley.
Created by Mandy Lineback, February 08, 2000	This image of Missoula is called a 'hillshade' and was made using Geographic Information Systems (GIS). The colors show the elevation (red is highest and green is lowest elevation in meters). Roads in and around Missoula are light red. Where is Missoula's relative location to the mountains? Is it in a valley or on a flat plain?
Created by Mandy Lineback, February 08, 2000	This is a cross-section view of Missoula that shows how the city sits in a valley between mountains.

 Photo by Meagan Bayless, January 2000	The mountains we see in this picture are those on the left (west) side of the cross-section image. In this photo we can see a layer of smog trapped close to the ground. Describe to yourself what you think it looks like when you are walking down the street. How about if you hiked up one of the hills near town? What do you think it smells like in Missoula today?
 Photo by Meagan Bayless, January 2000	Here is another photo of Missoula during a calm winter day. Where is the smog from? Can Missoula get rid of the smog? If so, how?

Invert means to turn upside down.

You are inverted when you do a hand stand.

Air is inverted when warm air is above cold air.

How does this happen?

Look at the path of the Summer Sun

Now look at the path of Winter Sun

Can you explain why air can be inverted in the winter?

Let's see if you are correct and ...

Let's Watch an Inversion

Dry Ice Inversion

Material	Representing
Bowl	Valley
Dry ice	Cold air
Lamp or light that produces heat	Solar energy, the sun

Procedure

Directions: Read the bolded sentences and do the actions in parenthesis to create an inversion story.

We are on a field trip to Bowl Valley State Park.

(Just have the bowl to look at)

The empty bowl we have now is how Bowl Valley looks during the summer - warm and clear.

The Park looks very different in the winter, which is when we are visiting now.

(Place dry ice in bowl to simulate colder air in the valley)

Because the Bowl Valley State Park is more toward the North Pole than the equator (it is at a high latitude), the Park doesn't get many hours of sunlight during the day. The sun doesn't go directly overhead and instead is further south in the sky. This means things are colder, including the air that settles in the bottom of Bowl Valley.

Cold air is heavier than warm air, so the cold air likes to hang out in the bottom of the valley. When the cold air hangs out in the valley that is called an 'inversion.'

If there is nothing to move the air out of the valley what do you think can happen?

Yup, if the air doesn't move then all the things in that air stay in the valley too. This means that the dust that rose up when we threw that clod of dirt at our friend or the smoke that comes out of our chimney or the chemicals that come out of car tailpipes all stay there and it can get quite dirty and thick. This is what we saw when we looked at the images of Missoula.

Hint: When asking the following questions give the class time to think about their answers. Don't give it away right off the bat; let them sit in silence for a while if that is what it takes to get them to respond.

There are ways to reverse the inversion. Can you think of any?

Remember the sun and solar heat energy?

Inversion Game

Cast Members

The Facilitator (the teacher or person in charge who has already read through the whole game/play) needs to choose several students to represent each of the cast members and have one Narrator.

Narrator
Mountains
Cold Air Mass
Warm Air Mass
Wind
Sun
Pollution - Particulates and compounds (such as CO from cars)
Storm with Snow (Precipitation)

Act One

Narrator: The mountains are formed as the Earth folds and pushes towards the sky.

(Mountain people put their hands on the ground forming the mountains with a valley in the center of a ring of mountains. Designate cardinal directions: north, south, east, and west)

Narrator: The heat from the summer sun is directly above the mountains.

(The sun people walk directly through the middle of the mountain chains)

Narrator: When fall approaches and turns to winter the Earth tilts toward the North and the sun appears to move south. Now its heat is not directly over the mountains and there are not as many hours of sun during the day.

(The sun goes across the mountains, moving a little bit more toward the south each time and going faster each time to represent the changes)

Narrator: Cold air is heavier than warm air and it slides down the mountain sides to rest in the valley.

(Cold air people move into the valley and lie there.)

Narrator: Warm air moves over the top of cold air and keeps it trapped and still in the valley.

(Warm air people extend their arms over the valley as far as they can - they can try to reach hands of other students across the valley.)

Narrator: We have an INVERSION, where warm air is above cold air! People in the city in the bottom of the valley continue to put pollution into the air and it is also trapped in the valley.

(Pollution people get trapped in the valley).

Narrator: Soon a strong wind comes. It blows out the warm and cold air with the pollution.

(Wind people come and gently remove all the other cast members from the valley, except for the mountains of course)

Facilitator: STOP HERE and ask the students what happens to the pollution now. It is not really gone, it is just moving somewhere else and probably other pollution is moving in from somewhere else.

Act Two

Narrator: It is still winter and the Earth is still tilted to the north so there is still little heating from the sun. Let us watch and see how an inversion happens....

(The sun person continues to cross the valley every day. Have the kids decide what happens this time and have them act out the build-up of another inversion.)

Narrator: This inversion will not be blown away like the last one. This time there is only high wind that blows off the warm layer.

(Wind people blow off only the warm layer).

Narrator: It is followed by a cold storm that moves in and snows

(Storm people come in and snow, working with the cold air to squish the pollution down onto the valley floor).

Facilitator: STOP HERE Ask the students where the pollution is now and what they think that means.

Act Three

Facilitator: Do the students see any other things happening with the INVERSION, the STORM or the WIND?

Maybe they would like to try making it a full year and having the sun last longer each day to see what would happen. Most likely the inversion would not happen any more because the air would get heated up and rise out of the valley.

When this happens in the summer where does the pollution go?

Wrap up the game

Wrap up the game by leading into a discussion of where pollution goes, what pollution does to ecosystems, and what type of pollution does different things to different parts of the ecosystem.

The discussion could start with Missoula and should lead to interest in where the students are actually doing the activity (the place where they go to school or live).

Carbon Monoxide Measurements

All measurements were done in the same location at a five way intersection locally known as "Malfunction Junction."

Maximum Measured in 1 hour (ppm)*	Year
8.5	1994
8.9	1995
6.7	1996
8.1	1997
5.7	1998
6	1999

* ppm = parts per million

Particulate Measurements

Maximum Measured in 24 hours**	Annual Mean ***	Year	Address of Location Where Measured
81	32.2	1994	Stone Container #1a, Moccasin Lane
49	26.7	1995	Stone Container #1a, Moccasin Lane
84	36.2	1996	Stone Container #1a, Moccasin Lane
83	32.9	1997	Stone Container #1a, Moccasin Lane
86	25.8	1998	Stone Container #1a, Moccasin Lane
30	15.9	1999	Stone Container #1a, Moccasin Lane
80	20.7	1994	Stone Container #2-Well Field,Frenchtown
52	14.3	1995	Stone Container #2-Well Field,Frenchtown
86	20.3	1996	Stone Container #2-Well Field,Frenchtown
89	16.8	1997	Stone Container #2-Well Field,Frenchtown
90	16.8	1998	Stone Container #2-Well

			Field,Frenchtown
28	8.3	1999	Stone Container #2-Well Field,Frenchtown
181	26.6	1994	Boyd Park, 3100 Washburn 1
130	26.6	1995	Boyd Park, 3100 Washburn 1
61	27.7	1996	Boyd Park, 3100 Washburn 1
58	23.3	1997	Boyd Park, 3100 Washburn 1
36	22	1998	Boyd Park, 3100 Washburn 1
4	21.3	1999	Boyd Park, 3100 Washburn 1
170	32.9	1994	Boyd Park, 3100 Washburn 2
331	24.1	1995	Boyd Park, 3100 Washburn 2
261	23.9	1996	Boyd Park, 3100 Washburn 2
313	21.6	1997	Boyd Park, 3100 Washburn 2
295	20.2	1998	Boyd Park, 3100 Washburn 2
248	17.9	1999	Boyd Park, 3100 Washburn 2
36	20.6	1998	Boyd Park, 3100 Washburn 3
4	19.8	1999	Boyd Park, 3100 Washburn 3
54	24.9	1994	Health Dept, 301 West Alder 1
58	25.8	1995	Health Dept, 301 West Alder 1
61	28.2	1996	Health Dept, 301 West Alder 1
59	26	1997	Health Dept, 301 West Alder 1
59	22.2	1998	Health Dept, 301 West Alder 1
48	20.4	1999	Health Dept, 301 West Alder 1
59	21	1998	Health Dept, 301 West Alder 2
48	19.2	1999	Health Dept, 301 West Alder 2
14	15.5	1997	Lolo Lube Center;11555 S Hwy 93
39	16.6	1998	Lolo Lube Center;11555 S Hwy 93
32	13.2	1999	Lolo Lube Center;11555 S Hwy 93

** measured in micrograms per cubic meter (μg/m3)

***Annual Mean: Computed by AIRS software from 24-hour values. Weighted arithmetic mean of 24-hours values. The method of calculation compensates for scheduled sampling that did not occur.

Particulates in Missoula
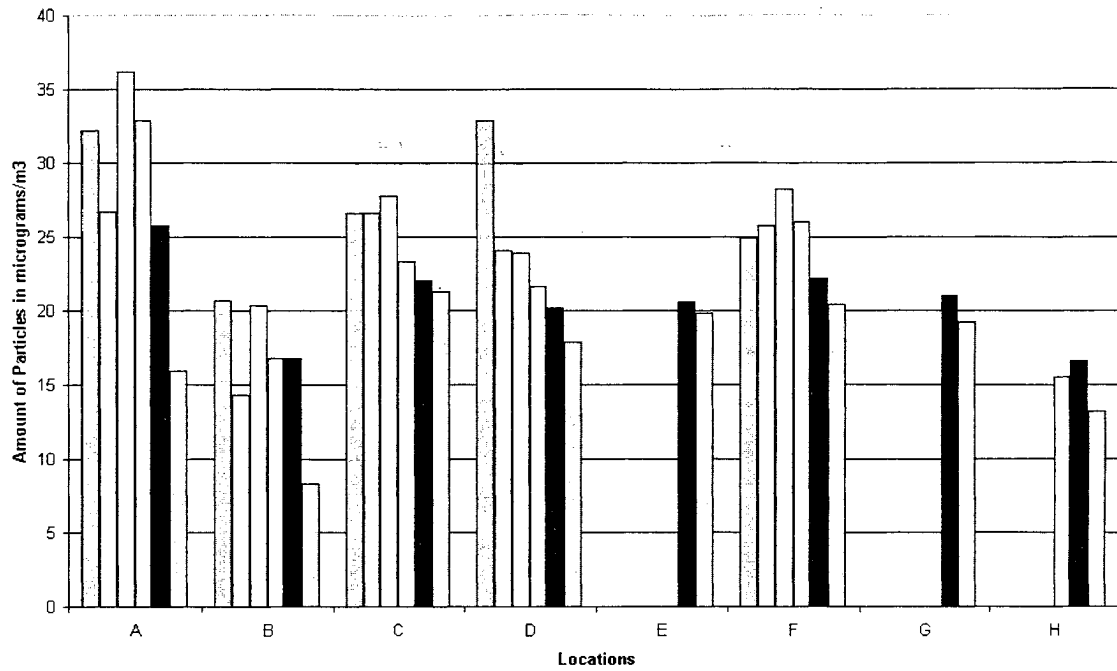
Location Key

	Location Title and Address
A	Stone Container #1a, Moccasin Lane
B	Stone Container #2-Well Field,Frenchtown
C	Boyd Park, 3100 Washburn 1
D	Boyd Park, 3100 Washburn 2
E	Boyd Park, 3100 Washburn 3
F	Health Dept, 301 West Alder 1
G	Health Dept, 301 West Alder 2
H	Lolo Lube Center;11555 S Hwy 93

Missoula Carbon Monoxide at Malfunction Junction
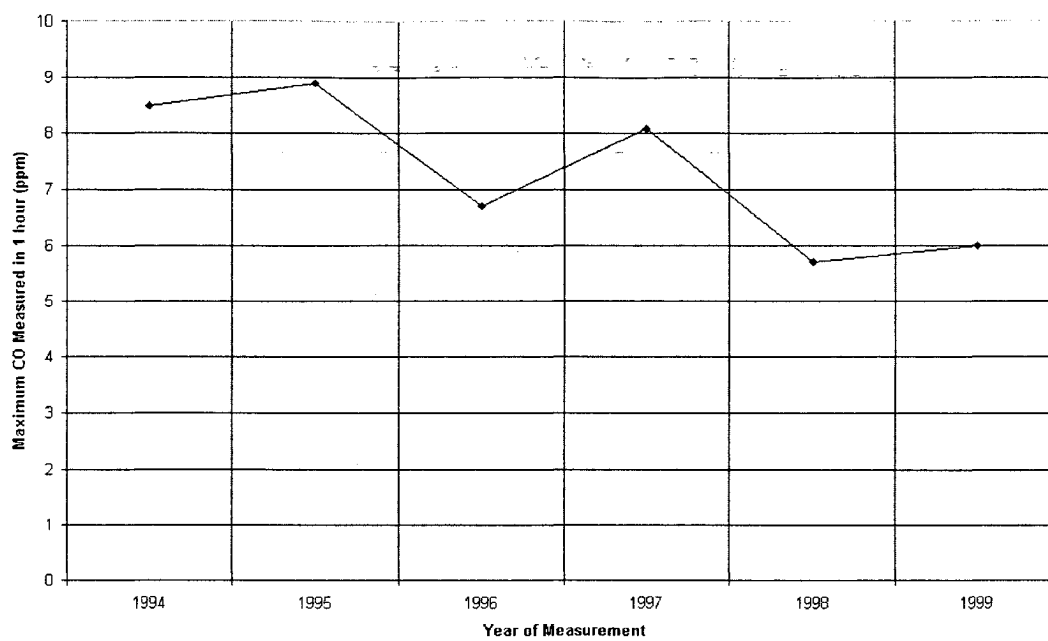
Extensions:

Air Care

Extension for the Inversion Game

You can make this into a presentation for the whole school and/or parents. The students can make costumes, make it part of a larger presentation of their special Air Care project, and invite the media. You can take photos on a digital camera or scan photos in to be put on the school web site and even better yet you can send them to us and we can put it on this web site for other students to see!

General Project Extension

Make the project lasting by creating some media attention around your class project. The students will be more engaged if they know the project is real and will really be used by real people and seen by the public. Encourage and facilitate presenting the project to the people involved, whether at a meeting around the issue or as a photo in newspaper it makes a difference in student attention and learning.

Air Care Home Page

Materials:

Air Care

Day 1

- Computer: one computer that can be projected for the whole class to watch or access to the computer lab for the first 15 minutes of class
- Large pieces of paper, one for each group of 3-5 students

- Markers, crayons, colored pencils for drawing on the big paper

Day 2

- Computer: one computer that can be projected for the whole class to watch or access to the computer lab for the first 15 minutes of class
- Two copies of the Hands-On Inversion simulation with a bowl, dry ice, and a lamp or light as a heat source
- Two copies of Inversion Game for reference
- (Optional, but recommended) Copy of Map Reference List for each student for their homework assignment

Day 3

- Copy of Missoula Pollution Statistics sheet and copies of the graphs, one per student (or as needed)
- Graph paper for each student
- (Optional) In class computer time for students to find hometown information on the web

Day 4

- Thinking and Creativity Caps, at least one for each student
- Brainstorming tools (chalkboard and chalk or the equivalent)

Air CareHome Page

References:

Air Care

Department of Environmental Quality. (October 1999). *Missoula Air Quality Data.* Retrieved January 11, 2000 from EPA Aerometric Information Retrieval System (AIRS) database on the World Wide Web: http://www.deq.state.mt.us/ppa/mdm/air

Environmental Protection Agency. *Missoula Air Quality Data.* Retrieved January 11, 2000 from AIRS Data database on the World Wide Web: http://www.epa.gov/airsdata/moncols.htm

Foundation for the Conservation of Nature, International. (no date). *12. Air Pollution.* Retrieved January 11, 2000 from the World Wide Web: http://fcn.fcn.org/fcn/ecosystem/air_po.html

McKnight, Tom L. (1999). *Physical Geography· A Landscape Appreciation.* 6th ed. University of California, Los Angeles: Prentice Hall.

Air Care Home Page

Appendix H: Flowchart: World in Your Closet Lesson

World in Your Closet Home Page
lessons/closet/closeth.htm

The page file names follow X:/GEVT/ unless they begin with http:// and link to a different web site.

Overview World in Your Closet
lessons/closet/closeto.htm

Goals/Objectives:World in Your Closet
lessons/closet/closetg.htm

Background: World in Your Closet
lessons/closet/closetb.htm

Five Themes of Geography
index/fivethms.htm

Lesson Plan: World in Your Closet
lessons/closet/closetp.htm

Essential Skills
index/essklls.htm

Assessment and Evaluation
index/assess.htm

Map Reference Page
index/mapref.htm

Background: World in Your Closet
lessons/closet/closetb.htm

Materials: World in Your Closet
lessons/closet/closetm.htm

General Maps and Images
index/genmaps.htm

Extensions: World in Your Closet
lessons/closet/closete.htm

Materials: World in Your Closet
lessons/closet/closetm.htm

References: World in Your Closet
lessons/closet/closetr.htm

Project Evaluation
index/evaltn.htm

Lesson Index Home Page
index/index_l.htm

Home Index Page
index/index_h.htm

The World in Your Closet

GEVT Project Evaluation Form

Grade:	5-8
Subject:	production, consumption, export, import, interdependence
Skills:	critical thinking, analysis
Duration:	3 classes
Standards:	Geography 1, 2, 11, 17, 18 Environmental Education 1, 2.3, 3.2, 4
Key Vocabulary:	consumers, producers, imports, exports, interdependence
Contributing Teacher:	Mary Jo Segaar-VandenBos
Lesson Adapted By:	Meagan Bayless

Overview:

The World in Your Closet

Students will become more aware of how world trade is a big part of their own lives as consumers. The themes of location and movement can be clearly experienced in this lesson. Students will also gain experience collecting and analyzing geographic information and viewing it spatially.

The World in Your Closet Home Page

Goals:

The World in Your Closet

Goal 1:

Clarify the definition and concepts of and individual, personal attitudes, values, and subsequent behaviors regarding consumption, production, and trade.

Objectives:

1. Define consumers, producers, imports, exports, and interdependence.
2. Consider initial perceptions by speculating where clothes come from before collecting information.

Goal 2:

Collaboratively acquire, organize, analyze, and answer questions regarding where clothes come from.

Objectives:

1. Each group will acquire, organize, and analyze the source of clothing.

2. Each group will present clothing locations spatially (using images and maps) as well as through written or spoken word, demonstration, or other creative outlets.
3. Students will practice working in a group, having the opportunity to assess each member's contribution anonymously as part of the project evaluation.

Goal 3:

Collaboratively or individually revisit and clarify attitudes, values, and behaviors by creating, completing, and evaluating an action plan involving clothing production, consumption, and trade.

Objectives:

1. Make a statement of position concerning clothing production, consumption, and trade issues.
2. Write an action plan that can be completed within two months.
3. Complete the action plan.

The World in Your Closet Home Page

Background:

The World in Your Closet

Our closets contain a wonderful example of our **interdependence** with resources and people from around the world. We are the **consumers** of **products** from various countries and cultures. Our **imports** are their **exports**, making us interdependent on each other and the Earth's resources. We can ask many geographical questions around these themes.

Surveys help us collect the information we need to gather to answer our questions. Graphing, charting, and placing the data spatially on a map helps us interpret our data. Analyzing the information about where our clothes come from empowers us to make informed decisions and choices; we can answer our questions about how we are interdependent in all aspects of the Five Themes of Geography (location, place, human/environment interactions, movement, and regions).

Lesson Plan:

The World in Your Closet

Pre-Lesson

Read and be familiar with the GEVT Essential Skills and Lesson Background pages before reading through the lesson plan. Read all the way through the lesson plan to tailor the ideas to your class and to be comfortable with the sequence and information.

Day 1 materials Go to Other days - Day 2 * Day 3 * Day 4

Engagement (20 minutes)

>   1. Have the class define and give examples of exports, imports, consumers, and producers.

>   2. Ask if they are all of these and lead that into discussing their interdependence, including where they think they get their clothes.

>   3. Have each student write down where they think their clothes come from in their daily journal entry or in a list to refer to later.

Exploration (30 minutes)

>   1. Ask the class to create survey that will describe the 'world in their closets' by having them decide:

>   >   a. what they should look at in their closets (and drawers)
>   >   b. how many of each item
>   >   c. what format the information should be gathered in
>   >   d. whatever else the class is interested in or feels is important to their understanding the profile of their wardrobes.

2. Assign each student to do the survey as homework.

Assessment: Observe participation in creating the survey during class and give points for completing the survey as homework.

Day 2 <u>materials</u>

Exploration (continued):

1. Compile the personal lists into one list for the whole class.

2. Geographically visualize the class' results by placing colored dots on a large world map. Divide students into groups, one group per type of clothing in the survey, and have each group be responsible for correctly placing dots on the map for their type of clothing.

3. While each group is taking turns putting dots up on the large class map, have each student make a personal profile by placing dots on their <u>own</u> <u>world map</u> that represents their closet. Make sure each student includes all the components of a map (including a key showing which color represents which type of clothing - ask the class if they should all do the same colors or not).

4. While they are placing dots, ask them to look for patterns. Ask (you could maybe write these questions on the board): Is there a region of the world where we import more? Do certain articles of clothing seem to be imported from specific regions of the world?

5. Make comparisons between clothing types on the class map. Maybe the students would also find differences and similarities between their personal maps and the class map. Use their observations and questions to discuss anything they find exciting, surprising, or why it isn't exciting or surprising.

Assessment: Observe class participation.

Day 3 <u>materials</u>

Explain (40 minutes)

1. Have the students make a chart with columns for the seven continents. Each nation should be listed under the correct continent heading. Discuss by asking: What continent has the most import nations listed? Which one has the least? How can this be explained? What conclusions can be drawn

from this information? Possibly draw graphs to visualize the differences. Within groups students could come up with their own ways to graph what they found interesting or important.

During this time reinforce an explanation of the vocabulary: export, import, consumer, producer, and interdependence.

2. Have students make a chart with columns for each type of clothing, placing the names of the countries under each one respectively. Discuss observations by asking: Do some countries seem to be more specialized in what they produce while others are more diversified? Why?

3. Divide students into groups of four, assigning roles of recorder, reporter, materials manager, and time keeper to each group member.

4. Have each group choose an imported item and brainstorm how the item was produced and transported to their closets.

5. Each group will be given time to present their step-by-step production and travel including places such as foreign and U.S. ports, big cities, roads, et cetera to the rest of the class. Students should be encouraged to use their creative energies for this presentation.

Assessment: Use a rubric that includes content, presentation skills, group work, and self-assessment. For more information and ideas see Assessments and Evaluation.

Elaborate (10 minutes)

1. Have the class choose one piece of clothing they are interested in learning more about and have the groups find out more about it; where exactly it came from, who exactly made it, how many different people helped make it, etc. This is a homework assignment, but you may choose to provide library, class time, or time on the Internet for groups to do their research.

Day 4 materials

Elaborate (continued)

2. Have each group share what they found and discuss how they feel and how it affects them.

3. Have the class take a stand in support or against one piece of clothing in

a report.

4. Assist the class to develop an action plan they can accomplish within two months to voice their position on the one piece of clothing they have chosen.

This could be a class letter to the company stating how good or bad the item is and why they think so. It could be a direct action or a phone call.
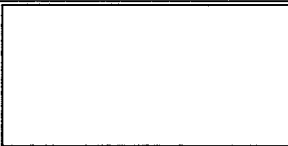
Let the students get creative and let it rise from what they are interested in doing. The point is empowering them to act on information they have found and understood. It can be small, but needs to be active.

Assessment: Create a rubric based on the project the class choses to do. See Assessments and Evaluation for more information and ideas.

The World in Your Closet Home Page

General Images and Maps

Click on the images to go to the EOSEP Image Server to view them up-close and interactively with the MrSID viewer.

World Texture Map
Pape, Dave. (1995, December 9). *AVHRR Texture Map*. Goddard Space Center. Retrieved February 1, 2000 from the World Wide Web: http://www.evl.uic.edu/pape/vrml/etopo/avhrr.html

World Data Bank Texture Map
Pape, Dave. (1995, June 21). *CIA World Data Bank Texture Map*. Goddard Space Center. Retrieved February 1, 2000 from the World Wide Web:

http://www.evl.uic.edu/pape/vrml/etopo/wdb.html

World Map
USGS. (1998, December 7). *Global Land 1-KM AVHRR Project*. Retrieved February 1, 2000 from the World Wide Web: http://edcwww.cr.usgs.gov/landdaac/1KM/1kmhomepage.html

Political Boundaries World Map
Graphic Maps. (no update date). World: Political - Drop Shadow. Clip Art. Retrieved February 10, 2000 from the World Wide Web: http://www.graphicmaps.com/webimage/world/polit/politfd.gif

United States Political Boundary Map
Graphic Maps. (no update date). USA - Aliased Edges. Clip Art. Retrieved February 10, 2000 from the World Wide Web: http://www.graphicmaps.com/webimage/usimages/48shapes/border/89a/aliased/blue5.gif

Extensions:

The World in Your Closet

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1. Students could focus their homework research on other products they possess - such as the World on Your Plate and in Your Bowl.

2. Students could write an essay under the heading "One nation's imports are another nation's exports" to explore the nature of interdependence.

3. Students could research the controversy over working conditions of factories in various countries and present their findings to the class and/or community.

4. Students could interview parents and grandparents regarding their perceptions of imported products when they were young. For example, what was the quality or perceived quality of products 'made in Taiwan?' How have these perceptions changed? What has caused these changes in perceptions?

The World in Your Closet Home Page

Materials:

The World in Your Closet

Day 1

Nothing

Day 2

- Large world map on a bulletin board
- Copy of the world map for each student
- Colored dots or colored tacks (one color for each inventory item)

Day 3

- Large paper to make charts for the whole class to view
- Large paper for each group to draw a transportation map
- Pens and coloring utensils to with on the large paper

Day 4

Thinking caps to brainstorm and make and action plan

The World in Your Closet Home Page

Appendix I: Flowchart: Border Disputes Lesson

Border Disputes Home Page
lessons/bordis/bordish.htm

The page file names follow X:/GEVT/ unless they begin with http:// and link to a different web site.

Overview:Border Disputes
lessons/bordis/bordiso.htm

Goals/Objectives:Border Disputes
lessons/bordis/bordisg.htm

Background: Border Disputes
lessons/bordis/bordisb.htm

Lesson Plan: Border Disputes
lessons/bordis/bordisp.htm

Essential Skills
index/essklls.htm

Assessment and Evaluation
index/assess.htm

Map Reference Page
index/mapref.htm

Background: Border Disputes
lesson/bordis/bordisb.htm

Materials: Border Disputes
lessons/bordis/bordism.htm

Case Studies List
lessons/bordis/cases.htm

Border Disputes Images
lessons/bordis/bordisss.htm

Images on EOSEP Server
http://eos1.cec.umt.edu/sid/bordis1
http://eos1.cec.umt.edu/sid/bordis2

Extensions: Border Disputes
lessons/bordis/bordise.htm

Materials: Border Disputes
lessons/bordis/bordism.htm

References: Border Disputes
lessons/bordis/bordisr.htm

Project Evaluation
index/evaltn.htm

Lesson Index Home Page
index/index_l.htm

Home Index Page
index/index_h.htm

Border Disputes Home Page

GEVT Project Evaluation Form

Grade:	6-12
Subject:	disputes (causes and resolutions), boundaries, borders
Skills:	problem solving, analysis, critical thinking, group work
Duration:	2-3 classes
Standards:	Geography 6, 10, 13, 18 Environmental Education 1, 2.1, 2.4, 3, 4
Key Vocabulary:	borders, boundaries, disputes (territorial, positional, functional, resource), stakeholders
Contributing Teacher:	Sari Bennett
Lesson Adapted By:	Meagan Bayless

Overview:

Border Disputes

Students explore the cultural influences and people's perceptions of the Five Themes in Geography using borders and border issues. Elaborating on the general concepts of border disputes, students will have the opportunity to investigate and complete an action project concerning one of the border disputes discussed in the lesson.

Border Disputes Home Page

Goals:

Border Disputes

Goal 1:

Clarify the definition and concepts of and individual, personal attitudes, values, and subsequent behaviors regarding borders and border disputes.

Objectives:

1. Define 'border' in terms of physical and social characteristics.
2. Communicate how maps and borders are related.
3. Explain why and how borders change based on the four types of border disputes: territorial, positional, functional, and resource.
4. State real-life examples for each of the four types of border disputes.
5. List five benefits and five detriments (problems) that result from creating borders.
6. Define stakeholders and be able to describe their position.

Goal 2:

Collaboratively acquire, organize, analyze, and answer questions regarding border

issues around the world.

Objectives:

1. Each group will acquire, organize, and analyze information regarding at least one border issue.
2. Each group will present their issue spatially (using images and maps) as well as through written or spoken word, demonstration, or other creative outlets.
3. Students will practice working in a group, having the opportunity to assess each member's contribution anonymously as part of the project evaluation.

Goal 3:

Collaboratively or individually revisit and clarify attitudes, values, and behaviors regarding borders and border disputes by creating, completing, and evaluating an action plan involving a disputed border issue.

Objectives:

1. Make a statement of position concerning a border dispute presented.
2. Write an action plan that can be completed within two months.
3. Complete the action plan.

Border Disputes Home Page

Background:

Border Disputes

Two-fifths of the globe's surface is land and this land is divided into over 150 sovereign political units. It is not surprising that the boundary lines separating them should occasionally be the focus of some kind of dispute between neighbors (Bennett, 90). **Boundary lines** are three-dimensional. They extend to the top of the atmosphere and to the center of the Earth. Worldwide, there are at least 100 officially recognized boundary disputes at any given time and nasty new ones arise regularly. A map of political boundaries can reveal ancient and ongoing disputes in all parts of the world (Demko, 63).

Boundaries are usually drawn by physical landscape characteristics such as rivers and mountain chains or by coordinate system points and lines such as latitude and longitude. Boundaries do not usually represent the ecosystem. Instead, they represent the political

atmosphere of the time and are human concepts and ideas superimposed on the landscape. The fact that ecosystems are not confined to the politically divided borders can cause interesting disputes such as toxins put in the water on one side leaking across the border or air pollution being blown over the border from the United States into Canada.

The basic function of boundaries are as a barrier to primarily human movements - the circulation of people, goods, and ideas. One can consider barriers more as filters or screens having different effects on the quantity of movement allowed through. Disputes at shared boundaries, or borders, continue to complicate international life and to add to further threat to peace among nations (Bennett, 92-93).

There are generally four types of disputes (Bennett 1998):

Territorial disputes include conflicts between states or countries over the ownership of a given area. There may be different reasons why one state or country would make a claim against a neighbor. For example, a nation may want to increase its power or shift attention from other problems within the country. Its leaders may feel that they have a 'right' to the land claimed based on history, ethnic groups, or geography.

Positional disputes include conflicts over the interpretation of documents defining a boundary or the way it is shown on the ground. This situation frequently arises when two states or nations share a boundary that was drawn up when accuracy was less important than reducing tension. As population increases and resources are discovered, the placement of the boundary becomes more important.

Functional disputes include conflicts over national policies applied at a border. These could be immigration and customs regulations or land use and location policies between neighbors. Serious disputes at the local or regional level can also develop.

Resource Conflicts over the use of resources created or complicated by a political boundary. The most common examples occur where rivers are used as boundaries or where a border separates a river basin between upstream and downstream control.

The people who's lives are affected by the dispute and the people involved in the dispute are the **stakeholders**. They can represent government organizations, non-government organizations or can be individuals. It is important to recognize stakeholders, the position they take on the issue, and the power they have in deciding the issue to understand the dispute and to determine the possible outcome or your own stand on the issue.

Border Disputes Home Page

Lesson Plan:

Border Disputes

Pre-Lesson

Read and be familiar with the GEVT Essential Skills and Lesson Background pages before reading through the lesson plan. Read all the way through the lesson plan to tailor the ideas to your class and to be comfortable with the sequence and information.

Day 1 materials Go to Other days - Day 2 * Day 3 * Day 4

Engagement (15 minutes)

1. Use string, chalk, or ribbon to divide the classroom into 6 or 8 unequal areas or regions. Inform students that these lines, or barriers, extend from the floor to the ceiling and may not be crossed for any reason. Ask students in each area to brainstorm a list of problems and benefits that would result from these barriers. Give the groups a few minutes to come up with their ideas and then 5 minutes to discuss what they found with their neighbors. Discuss the items on each list as a class, writing them up on the board for reference later, accepting any reasonable response (e.g. problems - not being able to get out of the room or speak to their friends; benefits - not having to deal with other people in the class or being able to work with the same people all the time).

Exploration (25 minutes)

2. Ask students what would happen if they were allowed to negotiate with the group(s) that bordered their area regarding movement of the line itself or movement of people, goods, and ideas over that line. What would be their major concerns in negotiating such an agreement? Accept all reasonable responses (e.g. concerns might include the size of their space, the ability to leave the room, talking to their friends, etc.)

3. Ask students what might happen if agreement between areas touching the same border could not be reached? Accept all reasonable answers (e.g. permission of other groups, etc.)

Explanation (20 minutes)

4. Describe the four types of border disputes and define the term
'stakeholders;' include the different types of stakeholders such as
individuals or organizations and their position whether for or against in the
discussion.

5. Have each group pick one dispute discussed in class from the list on the
board and state what kind of dispute it is, who the stakeholders are, which
type of organizations would be involved, and how they would be involved.
Each group should have time to share these brief answers with the class.

6. As further reinforcement of the ideas see the Border Disputes Images
for examples of how borders can be viewed spatially.

Assessment: Class participation and the brainstorm lists from each group.

Day 2 materials - (depending on how much time you chose to spend in class on the project)

Elaboration (50-60 minutes)

1. Divide students into small work groups.

2. Give each group a case study from the Border Disputes Case Studies
List and let them determine what type of dispute it is.

3. Give students time to research their dispute, write a report about it, and
present it to the class.

Their reports and presentations should include:

- Background of the dispute
- The type of dispute their case study is and why they drew that
  conclusion
- Maps and/or images of the location or region of the dispute to
  provide a spatial reference
- The stakeholders and their positions,
- And any other relevant information or conclusion you feel is
  important to include

Use the Map Reference List to start your map and image searches.

Day 3-4 materials (these days are not continguous, giving the students a chance

to work on projects)

Presentations of projects to the class.

Day 4

1. Have the class pick one of the presented disputes and come up with a class action project involving the dispute. It could be to write letters to the editor, make connections with kids on either side of the disputed border to solicit their opinion about the dispute, or setting up an information booth at the mall with flyers and other media.
2. Complete the action project within two months.

Assessment: Grading the final project might be best accomplished with a rubric that is handed out as the assignment so students know what is expected and how it will be graded. Include points for presenting the information and extra points for creative solutions to the dispute. For more information and ideas see Assessments and Evaluation.
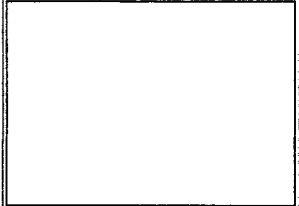
Border Disputes Home Page

Border Disputes Images
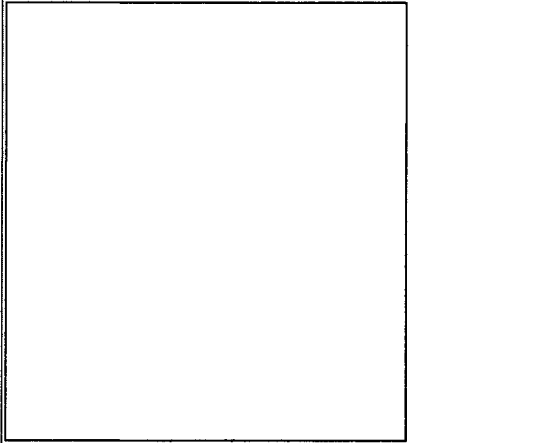
Directions: Use the questions and descriptions on this page to enhance the 'slide show' as students take time to view the images and learn more about them on the Server.

Click on the images to go to them on the EOSEP Image Server.

Imperial Valley, CA		
	1973	Can you find the border in this picture? What makes it noticable? The border is between Imperial Valley, CA and Mexico. Can you tell what the red squares are? They are agricultural fields.

144

| | | They are agricultural fields.

How do the fields in the US look different than those in Mexico? What are other ways you might see the border and the differences in agricultural practices?

How have they changed/ not changed between 1973 and 1992?

This image is a multispectral image taken from Landsat 1 in 1973. |
| 1992 | | |

Schweitzer, Peter and Randy Schumann. (1997, July 10). Imperial Valley, CA. [image]. USGS. Retreived January 26, 2000 from the World Wide Web: http://geochange.er.usgs.gov/sw/changes/anthropogenic/imperial/

Southern Florida, USA

| | How many borders can you find in this image? What kinds of borders are they?

There is West Palm Beach, a city, to the east that borders the Everglades (dark area in the center). The lines (borders?) through the Everglades are irrigation ditches that are draining the swamp areas for the agriculture to the north, seen in red.

What type disputes occur? What type of borders are drawn?

Do you see more that we haven't mentioned?

This image is from Landsat 5 taken in 1993. |

USGS. (1997, December 17). Everglades, Florida. *Natural Features*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi?page=paofeature1.html&cart_id=39

Southern New Mexico, USA
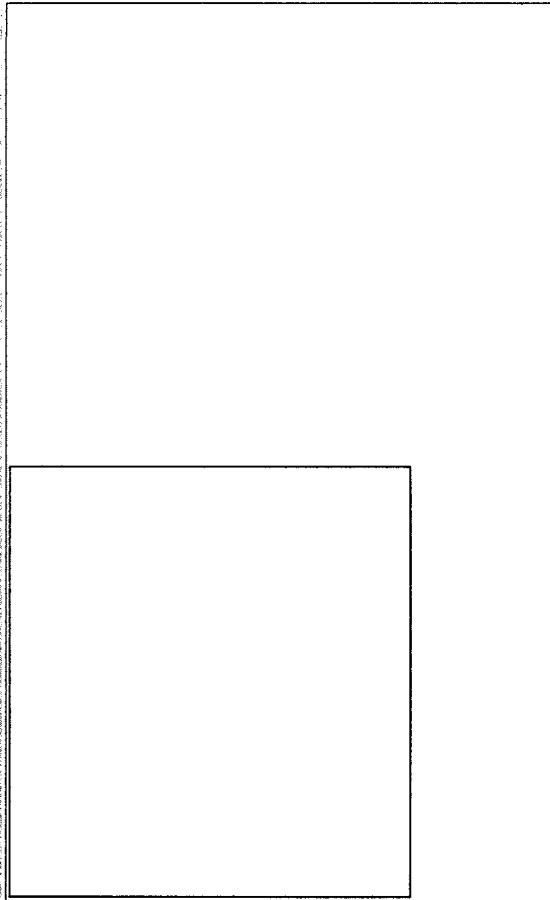
What type of borders can you see in this image? What is the blue area and is it a border?
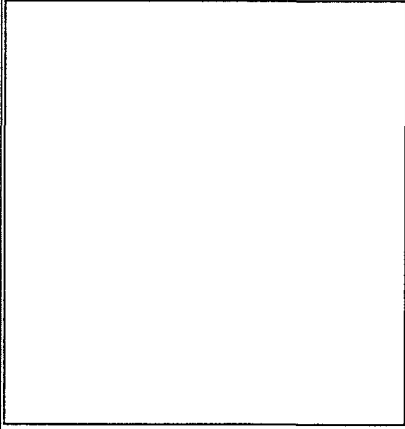
The blue is actually the White Sands National Monument. It is an area of sand dunes that is now fenced and run within the National Park system. How do you think the ecology of the system is affected by the different type of borders around the white sand dunes (political, physical, ecological, natural)?

The Rio Grande River and the man-made Elephant Butte Reservoir are to the west of the White Sands. Are there any types of border issues that might occur with the river (along which many types of exotic birds migrate and live at different times of the year) and the reservoir (where many people drive motorized water craft and camp along the beach with their cars and mobile homes)?

Can you see the two perfectly round light-colored patches north of White Sands and between White Sands and the Rio Grande river? Those patches are called the 'Trinity Site,' where the first atomic bombs were set off and tested. What sort of borders and disputes do you think are involved with this area?

Are there any other borders you can

| | see in the image? Natural, man-made, or otherwise?

This image is from Landsat taken in 1990. |

USGS. (1997, December 17). Southern New Mexico. *Natural Features*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi?page=paofeature1.html&cart_id=39

Southern California, USA

| | Can you see any obvious borders in this image? What about the color in the image - does this border represent human-caused differences or other natural causes?

The light colored area is Antelope Valley and the Mojave Desert. The diagonal line running northeast to southwest is the San Andreas Rift Zone along the San Gabriel Mountains. What kind of borders do the mountains represent? What sort of disputes might arise from these sort of borders?

The San Gabriel Mountains seperate Los Angeles from the Mojave. Are there any kinds of issues that might arise from this natural border? Why or why not?

This image was taken from Landsat in 1990. |

USGS. (1997, December 17). Southern California. *Natural Features*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi?page=paofeature1.html&cart_id=39

Border Disputes Case Studies List

The Spratleys, island reefs in the South China Sea, have underwater petroleum and natural gas reserves. Five countries - the Philippines, Malaysia, Vietanam, the People's Republic of China, and Taiwan - claim them. Free navigation through straits in the area is important to global shipment of cargo. Disputes could place the straits of Malacca and Singapore, shortcuts between the Indian Ocean and the South China Sea, in the middle of the dispute.

The border between North and South Korea has separated 10 million families since their civil war ended in 1953. They were not allowed to make telephone calls or send letters to relatives in the 'other' Korea. Beginning in 1990, travel between the two was permitted, but only for a few days.

Pakistan has a long-standing border dispute with India over the land known as Kashmir. Whereas people of Hindu faith govern India, Pakistan is a Muslim country. Kashmir is also a Muslim land.

The Somali Republic is involved in active disputes over the borders with all three of its neighbors - Kenya, Ethiopia, and Djibouti. Ethnic Somali tribes live in the border of three nations Somali wants to extend its border to include all areas occupied by its tribes.

Ireland is divided into two parts, the larger Republic of Ireland in the south and the smaller Northern Ireland. Protestants and Catholics in Northern Ireland have been fighting for more than two decades. Catholics are determined to cut the Protestant's ties to Great Britain and reunite Northern Ireland with the rest of the Republic.

In the 1980's, South Africa erected an electrified fence along sections of its border with Zimbabwe. They topped it with coils of razor-sharp wire to keep men from crossing over in search of work or trouble.

For years, the friendly relationship between Canada and the United States has been strained by a disagreement over the Northwest Passage. Canada claims that the waters of the Northwest Passage are internal Canadian waters and subject to its exclusive control. The United States does not argue Canada's claim to the islands bordering the Passage, but insists that the passage itself is international water open to all countries.

There was a dispute for years between the former Soviet Union and Norway over the Svalbard Islands in the Arctic Ocean. A treaty allows the islands to remain under Norwegian control, but 41 nations that signed the treaty now share equal rights to mine coal there.

The states of Ohio and Kentucky have argued for decades over a stretch of the Ohio River, much of it involving fishermen, the licensing of boats, and taxes from the sale of boats.

The former Soviet Union and Japan never signed a treaty at the end of World War II. They are still engaged in a bitter dispute over several islands north of Japan that were taken by the USSR at the end of the war. Giving up the islands, known in Japan as the "Northern Territories," could limit the former Soviet Union's pass to the open seas.

Extensions:

Border Disputes

1. Have students review their textbooks to examine and analyze other border disputes that have arisen during the history of the nation or the world (German/French dispute over Alsace Lorriane, building of the Great Wall of China to keep out enemy forces, the Berlin Wall, etc.) Have them decide the type of dispute and explain the reason(s) for their decision.

2. Discuss possible future border disputes over 'uncommon space' in Antarctica, under the seas and oceans, and in outer space - the universe beyond Earth's atmosphere.

Border Disputes Home Page

Materials:

Border Disputes

Day 1

- Enough string to divide the classroom up into 6-8 sections
- Enough tacks to hold up the string
- Definitions of terms from the Background section

Day 2

- Copies of Border Disputes Case Studies List
- Access to the internet for case studies research and images from the EOS Image Server

Border Disputes Home Page

Appendix J: Flowchart: Image Travel Agent Lesson

Image Travel Agent Home Page
lessons/travel/travelh.htm

The page file names follow X:/GEVT/ unless they begin with http:// and link to a different web site.

Overview: Image Travel Agent
lessons/travel/travelo.htm

Goals/Objectives: Image Travel Agent
lessons/travel/travelg.htm

Background: Image Travel Agent
lessons/travel/travelb.htm

Five Themes of Geography
index/fivethms.htm

Lesson Plan: Image Travel Agent
lessons/travel/travelp.htm

Essential Skills
index/essklls.htm

Assessment and Evaluation
index/assess.htm

Background: Image Travel Agent
lessons/travel/travelb.htm

Materials: Image Travel Agent
lessons/travel/travelm.htm

Image Travel Agent Slide Show
lessons/travel/travelss.htm

Mystery Image Bank
travel/mystery.htm

Location of Mystery Images
travel/mysterya.htm

Extensions: Image Travel Agent
lessons/travel/travele.htm

Materials: Image Travel Agent
lessons/travel/travelm.htm

References: Image Travel Agent
lessons/travel/travelr.htm

Project Evaluation
index/evaltn.htm

Lesson Index Home Page
index/index_l.htm

Home Index Page
index/index_h.htm

Mystery Images on ESOEP Server
http://eos1.cec.umt.edu/sid/mystery1
http://eos1.cec.umt.edu/sid/mystery2
http://eos1.cec.umt.edu/sid/mystery3
http://eos1.cec.umt.edu/sid/mystery4

Image Travel Agent Home Page

<u>Overview</u> * <u>Goals/Objectives</u> * <u>Background</u> * <u>Lesson Plan</u> * <u>Extensions</u> * <u>Materials</u> * References

<u>GEVT Project Evaluation Form</u>

Grade:	7-12
Subject:	remote sensing, map reading, investigating cultural resources
Skills:	deduction, critical thinking, writing, analyzing, creative thinking, problem solving
Duration:	2 class periods and 2 additional weeks for independent (home)work
Standards:	Geography 1, 4, 7, 8, 11, 15, 16 Environmental Education 1, 2.3, 2.4
Key Vocabulary:	remote sensing, image, digital elevation model, scale, atlas, feature, ground truthing
Contributing Teacher:	Kathy J. Doolittle
Lesson Adapted By:	Meagan Bayless

<u>Lesson Index Page</u> * <u>GEVT Home</u>

Overview:

Image Travel Agent

Students will use previously learned skills to show that they can correctly locate an unknown mystery remotely sensed image, research the immediate area surrounding the image, write a detailed report about the area using the Five Themes of Geography, and plan a vacation to the area.

Image Travel Agent Home Page

Goals:

Image Travel Agent

Goal 1:

Clarify the definition and concepts of and personal attitudes, values, and subsequent behaviors regarding remote sensing images primarily and a variety of other geographic resources secondarily.

Objectives:

1. Define map, remote sensing, image, digital elevation model, atlas, feature, and ground truthing.
2. Communicate through discussion or reflective writing how images, photos, and maps are used in everyday living.
3. Communicate through discussion or reflective writing the interaction between features, images, and ground truthing.

Goal 2:

Collaboratively acquire, organize, analyze, and answer questions to determine the

exact location of a remotely sensed image using features and critical thinking skills.

Objectives:

1. In pairs, students will problem solve to determine the location of a 'mystery' image.
2. Students will practice working in a group, having the opportunity to assess each member's contribution anonymously as part of the project evaluation.

Goal 3:

Collaboratively or individually revisit and clarify attitudes, values, and behaviors regarding their topographic map location by creating an action plan.

Objectives:

1. Research and create a 1-2 week vacation plan to the image location.
2. Present the vacation trip to the class and possibly outside the class.

Image Travel Agent Home Page

Background:

Image Travel Agent

Geography aims to help us understand our world in spatial terms. We are constantly creating new ways to look at the world that will give us more information, more ways to answer our endless geographic questions. **Maps** are representations that we use to help us see areas from a different perspective. Maps can give us information such as political boundaries, elevation, city names, and latitude and longitude coordinates to locate exactly where a feature is. (This lesson uses latitude and longitude lines imposed on images so students can use atlases and globes to help them locate their images.) Humans have been trying to gain new perspectives on their world by creating maps for hundreds of years.

More recently we have learned to create one of the best methods of looking at our world spatially; we have created images. **Images** are photos that can be taken with many kinds of cameras. Some cameras take pictures in black and white and some use the light as we see it, which we call true color. True color and black and white photos come from

airplanes, hot air balloons, satellites, or from just about anywhere.

There are other lenses and films that bend light in new ways to help us see how we normally cannot. Bending the light can help us see how healthy vegetation is, where pollution is in water, or how dry the soil is in an area. Most of these different types of images come from satellites. You may see them called **Landsat, SPOT, AVHRR**, and the newest additions are coming soon from the **Terra** satellite.

Satellites also send images back that create pictures using sound waves instead of light. These are called **radar images**. Have you ever wondered what radar really is? It is an acronym that stands for **Ra**dio **D**etection **A**nd **R**anging. Radar functions like a bat's navigation system. The satellite sends out sound waves and records how long it takes for the waves to return. The measurements are made into images that show us how far away things are. People use radar to do things like find fish under water, map the contour of the landscape on Earth, or to measure the height of waves in the ocean.

Creating and using images to help us get a spatial perspective is called **remote sensing**. We use **photographic interpretation** methods to figure out what we are looking at when we look at images. To interpret photos for this lesson, students will need to be aware of spectral patterns, spatial patterns, and features in their images to find the location exactly.

When we look at **spectral patterns** we are concentrating on how colors change across the image. In images from the Landsat TM satellite, bright purple is very healthy vegetation. Therefore, we interpret less bright purple in a similar area as less healthy vegetation.

When we look at **spatial patterns** we are looking at the shapes and relative location (see the Five Themes) of things we see in the photo. Coast lines, city streets, buildings, lakes, streams, and agricultural fields are some examples.

Features are distinct or outstanding parts in an image (or a map) that also help us interpret what we are looking at. Some examples of features are the Eiffel Tower in an image of Paris, France, the Great Salt Lake in northern Utah, a distinct curve in the image of a coast line, or the crater of Mount Saint Helens in an image of Oregon.

Using photos to understand the Five Themes is very real. Scientists use images to find pollution, monitor change in landscapes over time, and gather information about the bottom of the ocean, to name a very few applications. Anyone might be interested in using images to look at how their city is growing, to appreciate as artwork, or to see what is happening in their local recreation area to ensure that people are managing it well.

You can surely think of many more ways to use images!

Image Travel Agent Home Page

Lesson Plan:

Image Travel Agent

Pre-Lesson

Read and be familiar with the GEVT Essential Skills and Lesson Background pages before reading through the lesson plan. Read all the way through the lesson plan to tailor the ideas to your class and to be comfortable with the sequence and information.

Day 1 materials Go to Other days - Day 2 * Day 3

Engagement/Exploration (20 minutes)

1. While you show them the Image Travel Agent Slide Show have them write down what they think each image is and how they could tell.

Explanation (20 minutes)

2. As a class discuss the results. Go through the slide show again and touch on each image using the notes from the Travel Image Slide Show. Ask them what the images were and how they could tell. Have them discuss what made it obvious or not. Discuss where the images came from and possibly how and why they were produced.

Assessment: Class participation.

Day 1/Day 2

Explanation (20 minutes)

3. Define remote sensing, image, digital elevation model, scale, atlas, feature, ground truthing.

Day 2/Day 3 materials

Elaborate (whole class times)

4. Students are to be placed in pairs and issued a mystery image from the Mystery Image and Map Bank. Click here to find the correct locations of the mystery images.

5. Their assignment is to find the EXACT location of the image.
6. Once the location is found they must research the area to provide specific information you determine. (Some ideas are general weather patterns, climate, activities, population, holidays; choose geographical type information for them to find that is relevant.) Using the information they are to create a 1-2 week vacation itinerary. Let them be creative, but be specific with what you want as a result for the assignment. Maybe hand out a rubric that defines what you are looking for.
7. You can provide extra credit for promotional items from the area such as food items, T-shirts, license plates, vacation brochures, key chains, pins, bumper stickers, etc.
8. Have students present their vacations as advertisements or travel agents to clients in front of the class.

Assessment: Provide a rubric with all the expectations and due date on it as the assignment. The rubric should include correct exact location of image (and map if applicable), good write-up of how the image was identified (using what sort of skills and resources), creative resources for travel package, and the presentation of the travel package to the class. There should also be opportunity for students to comment on their group partners as far as cooperation and contribution. See Assessments and Evaluation page for more details and ideas.

Image Travel Agent Home Page

Photo Interpretation Slide Show and Tutorial

Image One:

	When you look at this image, you are a **photo interpretor**.
	Can you tell where we are? How can you tell?
	Did you use colors?
	How? What do you see? Some **spectral patterns** you might notice are the blue water green land areas, and yellowish land areas. What do you think the turquoise color is in some places between the water and land? What are the white lines and swirls?
	Did you use shapes?
	How? What do you see? Some **spatial patterns** you might notice are the curve of the land where it meets the water or dark areas within the land that are lakes and swamps.
	Did you use obvious parts of the image?
	How? What do you see? One **feature** you might notice is Lake Okeechobee toward the southern portion of the land area. When you zoom in on this image can you see some other interesting features even further south than the Lake. What do you think is happening?
	Where are we? Yes, good work photo interpretors, we are looking at Florida! This image was taken while forest fires were burning in the southern tip of the state.

(1999, April 19). Florida. Retrieved February 3, 2000 from the World Wide Web: http://www.orbimage.com/news/logos/lowflfires1.jpg

Image Two:

	Where are we?
	How could you tell?
	By colors (spectral patterns)?
	By shapes (spatial patterns)?
	By certain features?
	You are looking at the Great Lakes in the north central United States.

(1999, May 2). Great Lakes America. Retrieved February 3, 2000 from the World Wide Web: http://www.orbimage.com/news/logos/lowgreat_lakes.jpg

Mystery Image Bank

for the Image Travel Agent

Mystery Page Number	Image Identification Letter	Absolute Location of Travel Destination	
		Latitude	Longitude
mystery1	A	38° 00' N	23° 38' E
	B	30° 00' N	31° 17' E
	C	42° 02' N	70° 02' W
	D	63° 00' N	151° 02' W
mystery2	E	36° 15' N	112° 20' W
	F	52° 16' N	104° 00' E
	G.1	38° 08' N	13° 24' E
	G.2	39° 16' N	9° 08' E

	G.3	36° 59' N	10° 06' E
	H.1	33° 53' N	35° 30' E
	H.2	23° 58' N	32° 53' E
	H.3	32° 07' N	20° 04' E
mystery3	I	37° 35' N	127° 03' E
	J	35° 42' N	139° 46' E
	K	34° 22' N	132° 25' E
	L	23° 14' N	106° 27' W
mystery4	M.1	27° 49' N	85° 21' E
	M.2	22° 32' N	88° 22' E
	N.1	46° 13' N	122° 10' W
	N.2	42° 58' N	122° 40' W
	O.1	29° 00' N	48° 45' E
	O.2	26° 01' N	50° 33' E
	P	43° 05' N	79° 05' W
	Q	40° 45' N	111° 52' W

Mystery 1 Page
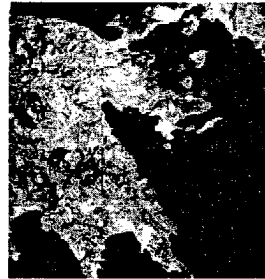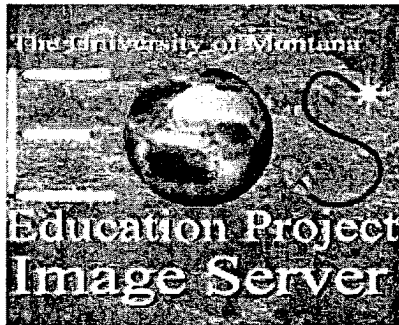
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with plug-in   without plug-in   java   get plug-in
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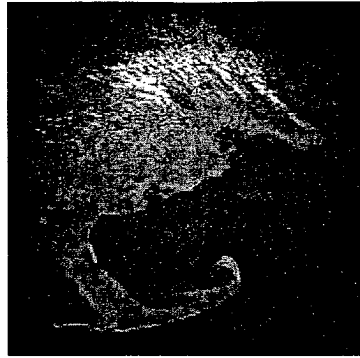
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Mystery 2

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download file

H.sid

with plug-in | without plug-in | java | get plug-in
download file

Mystery 3
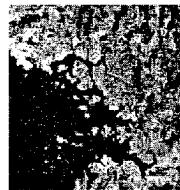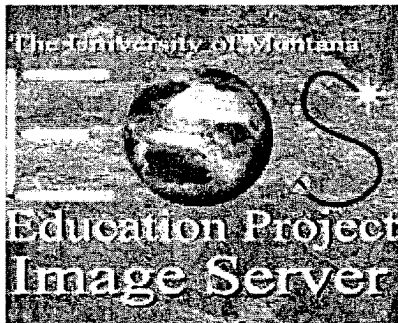
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download file
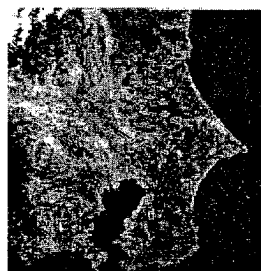
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162
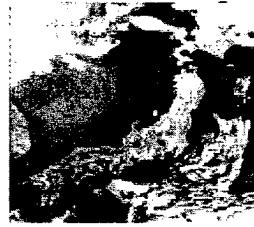
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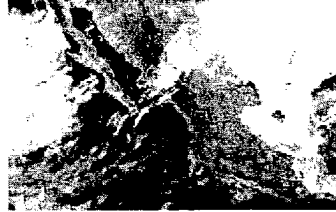
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Mystery 4
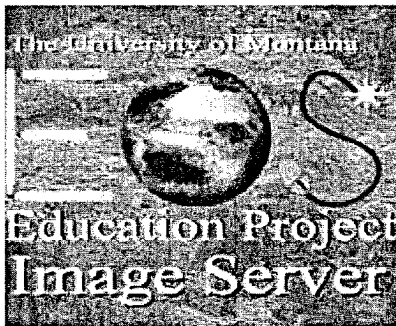
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Image Travel Agent:

Locations of the Mystery Images

Go To Answers for Mystery Page One, Two, Three, Four

Mystery Page Number	Image Identificati on Letter	The Travel Destination	Image Reference

mystery1			
	A	Athens, Greece	USGS. (1997, July 10). Athens, Greece. *Cities of the World*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi ?page=paocity1.html&cart_id=39437 This is a multispectral image from Landsat 1 taken in 1972.
	B	Cairo, Egypt	USGS. (1997, July 10). Cairo, Egypt. *Cities of the World*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi ?page=paocity1.html&cart_id=39437 The image is from Landsat 5 thematic mapper image taken in 1986.
	C	Cape Cod, Massachusetts, USA	USGS. (1997, December 17). Cape Cod, Massachusetts. *Natural Features*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi ?page=paofeature1.html&cart_id=39 This color photo was taken from the Shuttle Columbia in 1981.

	D	Denali (Mount McKinley), Denali National Park, Alaska, USA	USGS. (1997, December 17). Mt. McKinley, Alaska. *Natural Features.* Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi ?page=paofeature1.html&cart_id=39 This image was created on a computer using a (thematic mapper) image from Landsat 5 draped like a sheet over a file that shows the elevation of the area, called a digital elevation model (dem).
mystery2	E	Grand Canyon National Park, Arizona, USA	USGS. (1997, December 17). Grand Canyon, Arizona. *Natural Features.* Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi ?page=paofeature1.html&cart_id=39 This image is a multispectral color image taken from Landsat 1 in 1973.

	F	Irkutsk near Lake Baikal, Siberia, Russia	Feldman, Gene Carl. (no update date). *Coastal Zone Color Scanner Interactive Region Selection - Lake Baikal.* SeaWiFS Project. Retrieved Feb 3, 2000 from the World Wide Web: http://seawifs.gsfc.nasa.gov/seawifs_scripts /baykal_subreg.pl This image was made using theCoastal Zone Color Scanner (CZCS), which has not been used since 1986. The Sea-viewing Wide Field-of-view Sensor (SeaWiFS) has replaced the CZCS. Lake Baikal holds 20% of the Earth's lquid fresh water and is the largest lake by volume. For more information refer to Earth Island's Baikal Watch.
	G.1	Palermo, Sicily, Italy	http://www.orbimage.com/
	G.2	Cagliari, Sardinia, Italy	
	G.3	Tunis, Tunisia	http://www.orbimage.com/(1999, June 1). Northern Coast of Africa. *Images and Logos.* Retrieved February 3, 2000 from the World Wide Web: http://www.orbimage.com/news/logos/low duststorm.jpg
	H.1	Beirut, Lebanon	http://www.orbimage.com/
	H.2	Aswan Dam, Egypt	
	H.3	Banghazi, Libya	http://www.orbimage.com/(1998, August 15). Egypt Showing the Nile River. *Images and Logos.* Retrieved February 3, 2000 from the World Wide Web: http://www.orbimage.com/news/logos/lowe gypt8_15_98.jpg

mystery3			
	I	Seoul, South Korea	USGS. (1997, July 10). South Korea. *Cities of the World*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi ?page=paocity1.html&cart_id=39437 This image is from April 4, 1988. It shows Seoul, South Korea on the Han River. To the north the Imjin River and Demilitarized Zone can also been seen North Korea.
	J	Tokyo, Japan	USGS. (1997, July 10). Tokyo, Japan. *Cities of the World*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi ?page=paocity1.html&cart_id=39437 This is a multispectral image from Landsat 1 taken in 1972.
	K	Hiroshima, Japan	http://www.orbimage.com/ http://www.orbimage.com/(1999, April 30). Japan. *Images and Logos*. Retrieved February 3, 2000 from the World Wide Web: http://www.orbimage.com/news/logos/lowj apan4-30-99.jpg

	L	Mazatlan, Mexico	http://www.orbimage.com/ http://www.orbimage.com/(1998, December 22). Mexico. *Images and Logos*. Retrieved February 3, 2000 from the World Wide Web: http://www.orbimage.com/news/logos/low mexico12_22.jpg
mystery4	M.1	Mount Everest, Nepal	http://www.orbimage.com/
	M.2	Calcutta, West Bengal, India	 http://www.orbimage.com/(1999, January 20). Mt. Everest. *Images and Logos*. Retrieved February 3, 2000 from the World Wide Web: http://www.orbimage.com/news/logos/low mtevrst.jpg
	N.1	Mount Saint Helens, Washington, USA	http://www.orbimage.com/
	N.2	Crater Lake National Park, Oregon, USA	http://www.orbimage.com/(1998, October 19). Oregon. *Images and Logos*. Retrieved February 3, 2000 from the World Wide Web: http://www.orbimage.com/news/logos/low oregon.jpg
	O.1	Kuwait City, Kuwait	http://www.orbimage.com/
	O.2	Al Manamah, Bahrain	 http://www.orbimage.com/(1999, February 1). Persian Gulf. *Images and Logos*. Retrieved February 3, 2000 from the World Wide Web: http://www.orbimage.com/news/logos/low persian_gulf.jpg
	P	Niagara Falls, Ontario, Canada	USGS. (1997, December 17). Niagara Falls, Ontario. *Natural Features*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi ?page=paofeature1.html&cart_id=39 This image was not taken from space. It is a color photo taken from a plane that shows the Horseshoe Falls part of the Niagara Falls in the center.

Q		Salt Lake City, Utah, USA	USGS. (1997, December 17). Great Salt Lake, Utah. *Natural Features*. Retrieved January 27, 2000 from the World Wide Web: http://edc.usgs.gov/bin/html_web_store.cgi ?page=paofeature1.html&cart_id=39 This image is actually four images put together from the Landsat satellite in 1984. The Great Salt Lake is blue and the dark red is vegetation in the Wasatch Mountains. The cities of Brigham City, Ogden, and Salt Lake City are on the eastern shore of the Great Salt Lake, made obvious by patterns and squares. To the west of the Lake you can see barren flats and mountains of the Great Salt Lake Desert.

Extensions:

Image Travel Agent

1. Contact the schools within the image area to arrange for student pen pals.

2. Invite travel agents to come to class for the presentations to provide feedback.

3. Plan to take the class on one of the trips.

4. Have one of the trips be the main prize for a raffle put on by the class to support a cause the class feels strongly about.

Image Travel Agent Home Page

Materials:

Image Travel Agent

Day 1

- Computer: one computer that can be projected for the whole class to watch or access to the computer lab
- Definitions of the key vocabulary from the Background section

Days 2-4

- Computer: access to a computer for each pair of students
- Atlas, globe, world map

Image Travel Agent Home Page

Appendix K: Flowchart: Mapping the News Lesson

Mapping the News Home Page
lessons/mapnws/mapnwsh.htm

The page file names follow X:/GEVT/
unless they begin with http:// and link
to a different web site.

Overview: Mapping the News
lessons/mapnws/mapnwso.htm

Goals/Objectives: Mapping the News
lessons/mapnws/mapnwsg.htm

Background: Mapping the News
lessons/mapnws/mapnwsb.htm

Five Themes in Geography
index/fivethms.htm

Lesson Plan: Mapping the News
lessons/mapnws/mapnwsp.htm

Essential Skills
index/essklls.htm

Assessment and Evaluation
index/assess.htm

Map Reference Page
index/mapref.htm

Background: Mapping the News
lessons/mapnws/mapnwsb.htm

Materials: Mapping the News
lessons/mapnws/mapnwsm.htm

General Maps Page
index/genmaps.htm

Extensions: Mapping the News
lessons/mapnws/mapnwse.htm

Five Themes in the News Page
lessons/mapnws/nwsqs.htm

Materials: Mapping the News
lessons/mapnws/mapnwsm.htm

Hot Spots
lessons/mapnws/hotspot.htm

References: Mapping the News
lessons/mapnws/mapnwsr.htm

EOSEP Map and Image Server
http://eos1.cec.umt.edu/sid

Project Evaluation
index/evaltn.htm

Lesson Index Home Page
index/index_l.htm

Home Index Page
index/index_h.htm

Mapping the News

Overview * Goals/Objectives * Background * Lesson Plan * Extensions * Materials * References

GEVT Project Evaluation Form

Grade:	7-12
Subject:	current events, map reading, relationships, Five Themes of geography
Skills:	analysis, critical thinking, map reading
Duration:	1-3 hours/week
Standards:	Geography 1, 3, 18 Environmental Education 1, 2.3, 2.4, 3, 4
Key Vocabulary:	current events, journalism, objectivity, and the Five Themes of geography
Contributing Teacher:	not available
Lesson Adapted By:	Meagan Bayless

Lesson Index Page * GEVT Home

Overview:

Mapping the News

In this lesson, students will maintain a bulletin board map of the United States or the World to provide a visual display of each week's current events. Headlines, pictures, magazine covers, and political cartoons are analyzed for content of the Five Themes of Geography and then displayed by location. Students identify and label significant 'hot spots' in the country or world and discuss the interrelationships of these areas to themselves.

Mapping the News Home Page

Goals:

Mapping the News

Goal 1:

Clarify the definition and concepts of individual, personal attitudes, values, and behaviors regarding geography in current events.

Objectives:

1. Define current events, journalism, objectivity, and the Five Themes of Geography.
2. Apply the Five Themes to printed current event articles on a weekly basis.

Goal 2:

Collaboratively acquire, organize, analyze, and answer questions regarding geography in current events.

Objectives:

1. Sharpen critical thinking skills by choosing appropriate current events articles as they acquire, organize, and analyze weekly current event articles.
2. Students will present current events spatially by creating a permanent visual display on a map in the classroom.
3. Students will gain social skills by working in teams.

Goal 3:

Collaboratively or individually revisit and clarify attitudes, values, and behaviors by creating, completing, and evaluating an action plan involving a current event previously discussed in class.

Objectives:

1. Choose a current event of focus and use critical thinking skills to make a statement of position concerning the chosen event.
2. Write an action plan that can be completed within two months.
3. Complete the action plan

Mapping the News Home Page

Background:

Mapping the News

The Five Themes, students' interests, and spatial relations visualized on the map in the classroom run this lesson. It is important to facilitate the activity with solid understanding of the Five Themes to cultivate class motivation and discussion around what you discover together each week.

Mapping the News Home Page

Lesson Plan:

Mapping the News

Pre-Lesson

Read and be familiar with the GEVT <u>Essential Skills</u> and <u>Lesson Background</u> pages before reading through the lesson plan. Read all the way through the lesson plan to tailor the ideas to your class and to be comfortable with the sequence and information.

Day 1 <u>materials</u> After day 1 see what to do <u>Each Week</u> .

Engagement (10 minutes)

    1. Unroll and put up a large world map in the classroom and read a stimulating article you find off the web or from the newspaper that is timely and significant to the students in some way. Get images of the whole world to project and use from <u>GEVT General Maps</u> on the EOSEP Server.

    2. Lead a brief class discussion by asking questions relating the article to how the students feel about the issue and how it relates to them. What is their sense of the place, the human/environment interactions, or the region? Do they perceive themselves as involved in the issue, why or why not? As a class, locate the place(s) in the article on the map.

Exploration (20 minutes)

    3. Write the broad headings of the Five Themes of geography up on the board, show them on an overhead, or project them from the computer. Do not explain them.

    4. Break students up into groups of 2-3 and give each group an article, picture, magazine cover, political cartoon, etc. Give the groups a few minutes to relate the piece to the Five Themes of geography and prepare a short presentation to share what they found.

    5. When the groups are done have them take turns explaining their piece and how it relates to the Five Themes as they have interpreted them.

    Assessment: Observe class participation.

Explanation (15 minutes)

6. Using the piece of news from the Engagement activity, provide an example of how you want them to relate the Five Themes to their news pieces. Support what they did well in the exploration activity and give them a good sense of what you will be looking for. Hand out Geography's Five Themes In the News page to each student as a reference guide for each week's activity.

7. During this time do through each of the Five Themes and explain them more thoroughly. Add designated colors to each of the Five Themes as you go (BLUE for Place; RED for Location; YELLOW for Human/Environment Interactions; GREEN for Movement; and PURPLE for Region).

8. Explain that each piece of news will have one or all of the Themes involved in it, attaching the appropriate colors string of the corresponding color to the piece of news you have used as and example.

9. Place your example piece on the border of the map on the wall, braid the strings, and attach them to the location of the place in which the news piece refers.

10. Have the students place their news pieces on the board.

11. When all the pieces are on the board have the students see if there are any places on the map that have more news than others. Explain that the class will identify news Hot Spots by tracking the news throughout the year.

Assessment: Observe class participation.

One Day Each Week
Elaboration

12. Once per week have several collaborative groups of students collect an article from the Internet or other printed media and have them relate it to the Five Themes and place it on the board.

13. When the class discusses the news pieces each week have them consider which areas are the Hot Spots and mark the hot spots with laminated Hot Spots. Consider a minimum of six and a maximum of ten Hot Spots.

Assessment: Create a rubric you can use each week to evaluate context

and skills. See <u>Assessments and Evaluation</u> for more information and ideas.

After A Couple Months
Elaboration

14. Have the class pick one Hot Spot they have identified and find out more about it. Create an action plan around that Hot Spot using images and maps from the <u>EOS Education Project Map and Image Server</u> or from our Image and <u>Map Resource List</u>.

Projects may be to create a media campaign around the issue, facilitate a local debate around the current event, or an educational program for the community. Utilize technology to create the presentations and facilitate research.

<u>Mapping the News Home Page</u>

General Images and Maps

Click on the images to go to the EOSEP Image Server to view them up-close and interactively with the MrSID viewer.

World Texture Map
Pape, Dave. (1995, December 9). *AVHRR Texture Map*. Goddard Space Center. Retrieved February 1, 2000 from the World Wide Web: http://www.evl.uic.edu/pape/vrml/etopo/avhrr.html

World Data Bank Texture Map
Pape, Dave. (1995, June 21). *CIA World Data Bank Texture Map*. Goddard Space Center. Retrieved February 1, 2000 from the World Wide Web: http://www.evl.uic.edu/pape/vrml/etopo/wdb.html

World Map
USGS. (1998, December 7). *Global Land 1-KM AVHRR Project.* Retrieved February 1, 2000 from the World Wide Web: http://edcwww.cr.usgs.gov/landdaac/1KM/1kmhomepage.html

Political Boundaries World Map
Graphic Maps. (no update date). World: Political - Drop Shadow. Clip Art. Retrieved February 10, 2000 from the World Wide Web: http://www.graphicmaps.com/webimage/world/polit/politfd.gif

United States Political Boundary Map
Graphic Maps. (no update date). USA - Aliased Edges. Clip Art. Retrieved February 10, 2000 from the World Wide Web: http://www.graphicmaps.com/webimage/usimages/48shapes/border/89a/aliased/blue5.gif
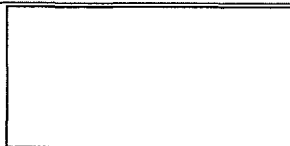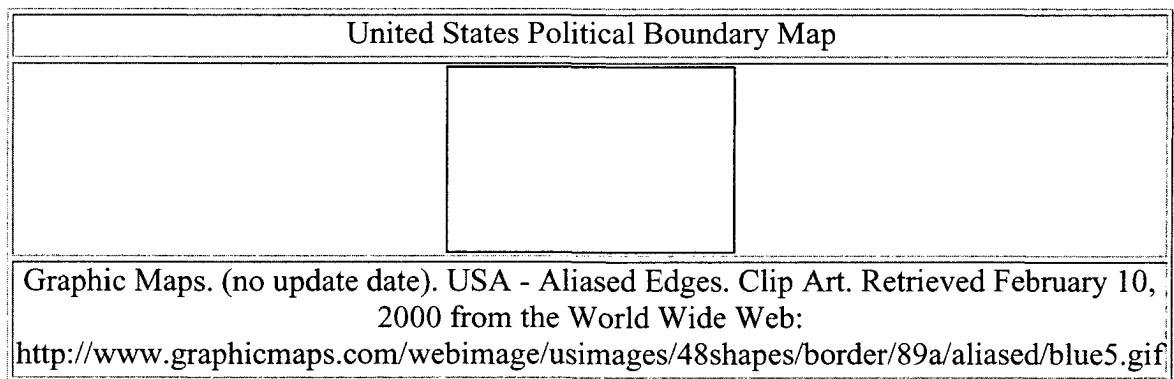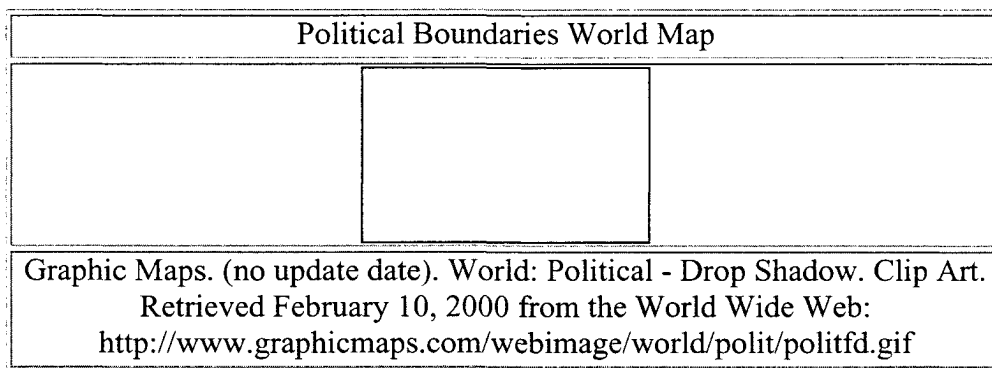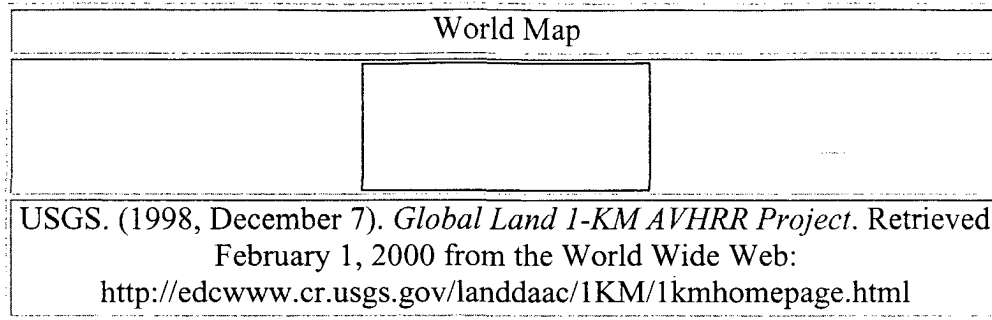
Geography's Five Themes In the News

1. Location

a. Where does the story take place (city, state, territory, country, continent, longitude, latitude, hemisphere)? Find a map and image.
b. What is the capital of the country?
c. What is the most populous city there?
d. What is the time difference between the location of the news event and our community?

2. Place

a. Describe the climate.
b. Describe the physical features of the country (mountains, rivers, deserts, coastlines). Use maps and images.
c. Identify and describe the people who live there.
d. What are the distinctive cultural traditions of the country (food, dress, customs)?
e. How is the place similar or different from your community?

3. Human/Environment Interactions

a. What is the primary use of the land in the region where the story takes place (agriculture, mining, industry, tourism)?
b. Give examples of how the people living there have altered their environment and examples of how the environment has influenced their lives.
c. Where do most people live (near a coastline, near a river, in the mountains)?
d. Compare this area of the world to your area. List the similarities and the differences.

4. Movement

a. What are the major exports?
b. What are the major imports?
c. Where are the major airports?
d. Describe the country's railway system.
e. List major ports (if any) and describe their locations.
f. How many TV sets, radios, and motor vehicles are there per capita in the country?

5. Regions

a. What are the country's major languages/
b. What are the country's political divisions (states, providences, republics)?
c. What are the vegetation regions (grasslands, rain forests, other)?
d. How is the country similar to its neighbors in language, culture, religion, and traditions?

Now that you know more about the geography of the country in the news, think about why the event happened there. What are the connections between the news event and the geography of the country? Do you think the news event occurred because of the physical or cultural characteristics of this particular place?

Hot Spot Template Page
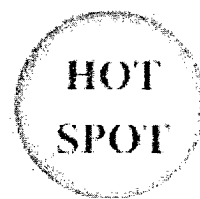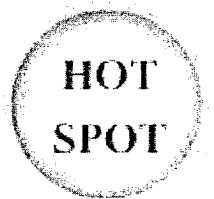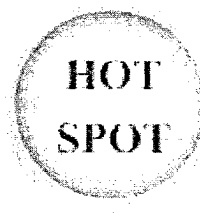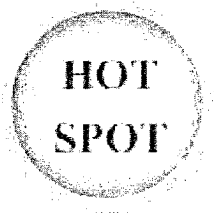
Extensions:

Mapping the News

Expand the class discussions to include journalism. You could focus on the rights, ethics, and methods of reporting. This could include a study of different types of writing such as persuasive versus informative and can bring up many issues surrounding communication.

Mapping the News Home Page

Materials:

Mapping the News

Day 1

- Copy of Geography's Five Themes In the News for each student (for ideas of ways to analyze their news pieces)
- Interesting news pieces, one for every three students on one for example
- Large world map mounted on a bulletin board for several months
- Colored floss or thin yarn (red, purple, blue, yellow, and green)
- Glue to put strings on new pieces
- Cards to put news pieces on if necessary
- Tacks to hold cards and strings on the board

Each week

- Computer access occasionally for research to find news pieces and images
- Colored floss or thin yarn
- Glue to put strings on new pieces
- Cards to put news pieces on if necessary
- Tacks to hold cards and strings on the board

Mapping the News Home Page

Appendix L: Project Evaluation

GEVT Project Evaluation Form

Directions: Please be patient with us while we continue to work on getting this form to submit over the Web. In the meantime, fill out the form and copy and paste it into another file and attach it to an email mesasge. If you prefer, please feel free to snail mail the form to us - we want to get feedback and make the GEVT better and better and thank you in advance for your help and contribution to this resource.

GEVT Contact: Meagan Bayless meaganb@eoscenter.com 406-243-2644 1-800-411-0341	Send snail mail to: EOS Education Project - GEVT Attn: Meagan Bayless James E Todd Building University of Montana Missoula, MT 59801

Basic Information:

Name:	
Email:	
Street Address:	
City/State/Zip/Country:	
Phone:	

I am a Student ⌐ an educator ⌐

Where do you teach or learn?	
What grade?	

For Teachers Only	
Number of Students in Your Class:	Total □ Female □ Male

Technology Available	**Internet**
	`in your classroom ▼`
	
	Computers
	`one in classroom ▼`

1. The GEVT is a unique resource (it is more accessible than regular Education Trunks and offers more actual resources than books with similar lesson plans).	`true ▼`
2. The activities and resources in the GEVT are of good quality.	`true ▼`
3. The GEVT is useful to me as an educator/student.	`true ▼`
4. The GEVT lessons and activities can be intergrated and adapted to fit into my current educational setting.	`true ▼`
Comments: ▲ ▼ ◄ ►	

5. The GEVT introduced me to at least one Map and Image Server.	`true ▼`

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6. Using images is a good way to explore the spatial perspective of geography questions.	true ▼
7. It is important for me to have free access to images for education purposes to use for a variety of subjects.	true ▼
8. Viewing images from the Internet increased the interest of students and the information gained by students during the activities.	true ▼
Comments:	

9. Using the Internet as one tool for project research increased the interest of students and the information gained by students during the activities.	true ▼
10. The Internet is an effective and efficient method for teachers to find lessons and supporting materials, especially for those resources such as images that can be expensive to get elsewhere.	true ▼
11. I am comfortable with the Internet, using computers for educational projects, and using computer technology.	true ▼
Comments:	

12. As a result of using the GEVT, I am interested in doing more with images and maps including their use in Geographic Information Systems (GIS).	true ▼

Comments: ▲ ▼
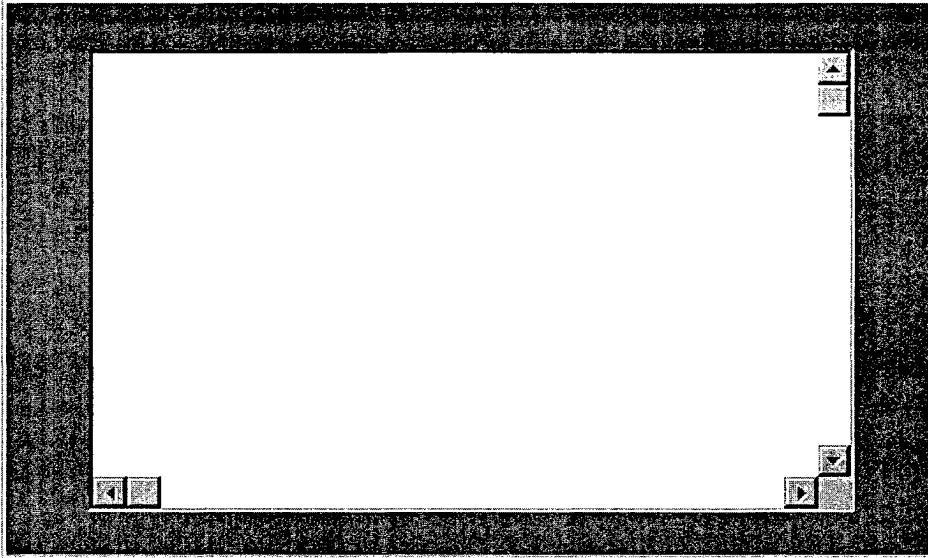
	Content	Layout and Navigation
Home Page and Index Pages	awesome ▼	useful ▼
Help Pages (Essential Skills)	awesome ▼	useful ▼
Lessons	awesome ▼	useful ▼
The Changing Face of Place	awesome ▼	
Digital Quilted Geoportrait	awesome ▼	
Air Care	awesome ▼	
The World in Your Closet	awesome ▼	
Border Disputes	awesome ▼	
Image Travel Agent	awesome ▼	
Mapping the News	awesome ▼	
EOS Image Server	awesome ▼	useful ▼

187
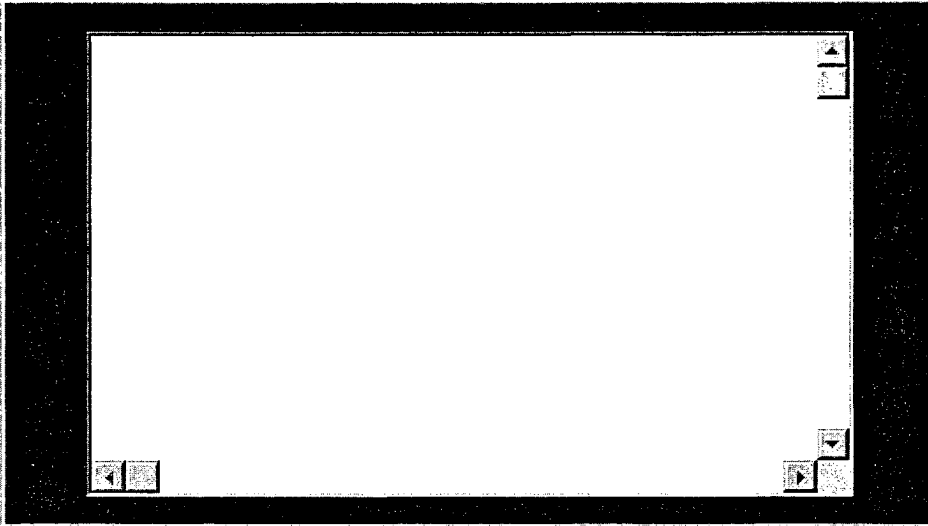
| Foundations Page | awesome ▼ | useful ▼ |
| Project Evaluation | awesome ▼ | useful ▼ |

Please provide constructive criticism and suggestions regarding the Content and Layout/Navigation of any part of the GEVT:

Any other comments/suggestions/ideas:

Appendix M: Acknowledgements Page

Acknowledgements

Thanking people is wonderful and there are several key people to thank in making the GEVT possible. First and foremost we must acknowledge Alex Philp who was the mastermind behind the action to try to integrate EOS imagery into geography curriculum to begin with. He coordinated with Jeff Gritzner, who gave me the book of lesson plans and who has been my contact to the Montana Geographic Alliance. The whole EOS Education Project Team has been vital in getting me where I needed to go with equipment, trips, and moral support throughout the Trunk founding process. The Team includes (in alphabetical order by first name for lack of a better way to do this) Alex Philp, Bernadette Heckle, Bill Peterson, Chris Kuglin, Chris Munson, John Kuglin, Lauren Mackay, Mandy Lineback, Torian Donohoe, and Wes Snyder.

Thanks also to my family and friends for taking me out skiing to get away and for reminding me that I could get it done. I want to thank them for getting me out on telemark ski demos so I could sprain my ankle and feel okay about sitting down and getting this done.

Finally, I would like to thank in advance any of those educators and students that want to help become a part of the GEVT by filling out an evaluation and giving me your two cents. Your name will be added to this acknowledgements page.

Special Thanks to the Evaluators of the GEVT:

The EOSEP Team

Fletcher Brown, Professor, Department of Education, University of Montana

Jeff Gritzner, Professor, Geography Department, University of Montana

Page by Meagan Bayless meaganb@eoscenter.com. Copyright 2000 EOS Education Project and Montana Geographic Alliance. Last update: April 2000.

Appendix N: First GEVT Workshop Schedule

GEVT Workshop – Thursday, February 17, 2000

By Meagan Bayless
406-243-2644
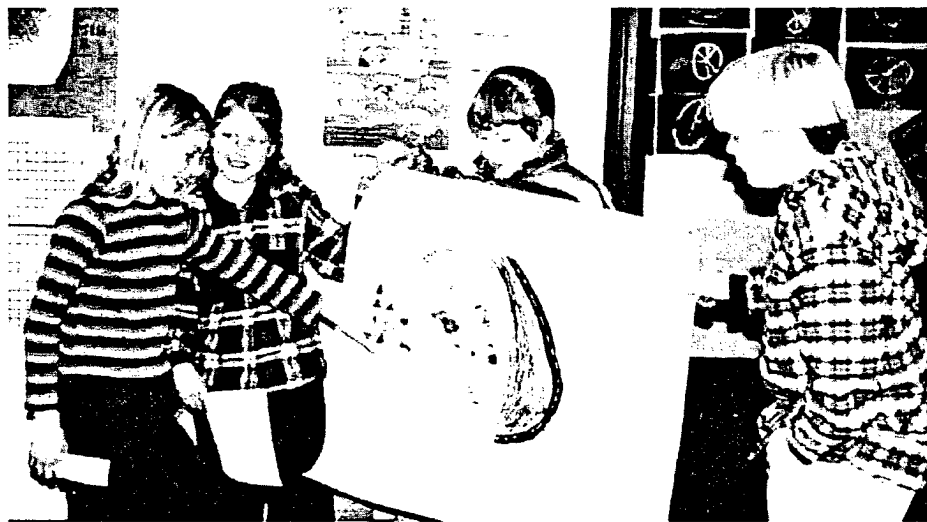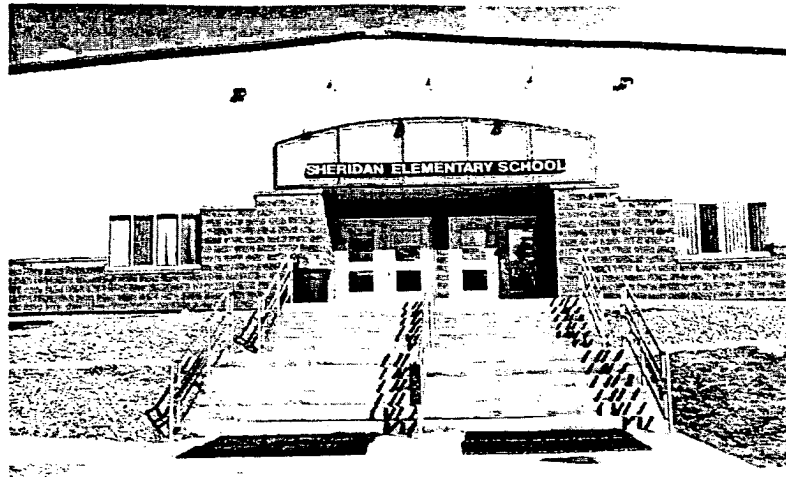meaganb@selway.umt.edu

9:30 – 10:30 a.m.	Image Travel Agent
10:30 – 10:45 a.m.	Evaluation/Break
10:45 – noon	Image Travel Agent
noon – 1:00 p.m.	Evaluation/Lunch
1:00 – 2:30 p.m.	Foundations of the GEVT
2:45 – 3:15 p.m.	Evaluation/Break
3:15 – 4:15 p.m.	Using the GEVT in your Classroom
4:15 – 5:00 p.m.	Presentations/Final Evaluation

The GEVT is available via:

http://www.eoscenter.com - look for the link
or
http://eos1.cec.umt.edu/gevt/index

Appendix O: Visit to Jim Lane's Class

When I visited on March 9, 2000 I found these students from Jim Lane's fourth grade class describing their drawing of Quake Lake in Wyoming and sharing their definitions of place as part of the Changing Face of Place Lesson from the GEVT.
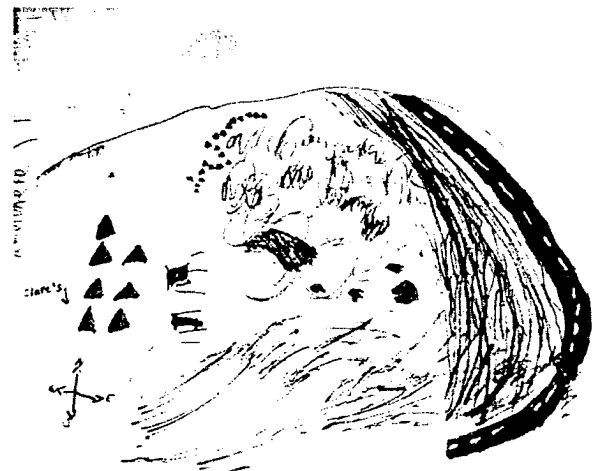
CHANGING FACE of PLACE

NATURAL EVENTS:

MAN CAUSED EVENTS;

COSMIC EVENTS:

TIME SPAN EVENTS:

OTHER:

Appendix P: Visit to Roger Klette's Class

Roger Klette's fifth grade class in Sheridan, MT just started
working on the Digital Quilted Geoportrait when I visited
them March 9, 2000. They plan to complete a geoportrait
for the whole class, discuss the interrelationships of each
classmate to each other and their community, and display
their work in a prominent location in Sheridan.

Appendix Q: Inservice in Eureka, MT

Eleven teachers attended the inservice workshop I presented
in Eureka on March 29, 2000. The teachers were introduced
to all the seven GEVT lessons, several image and map servers
on the Internet, and a new way to use technology in their
classrooms. All of them thanked me for coming and felt their
time had been well spent. They also said they hoped to use the
GEVT in their classrooms at some point.

Appendix R: Visit to Thea Borgen's Classes
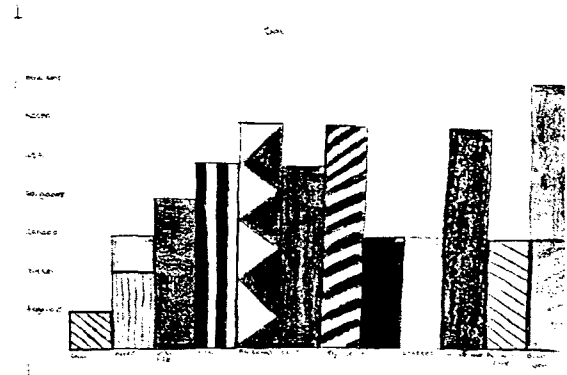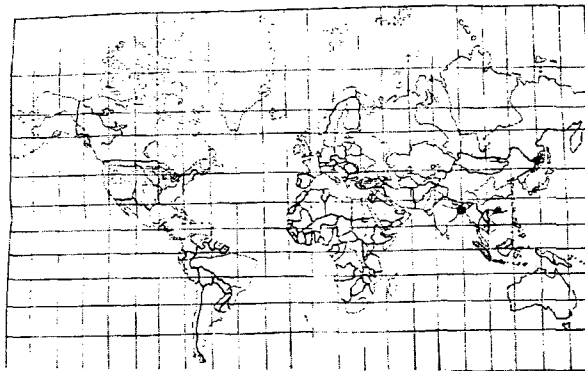
The map and graph were one of many projects hanging on Ms. Borgen's classroom walls when I visited on March 30, 2000. Several of her classes had already finished working on the World in Your Closet lesson from the GEVT and had their work on display.

This geoportrait is one of many Ms. Borgen's students were creating when I visited. Notice the images from the Internet used to help depict place and the map from the Internet helping to depict human/environment interaction.
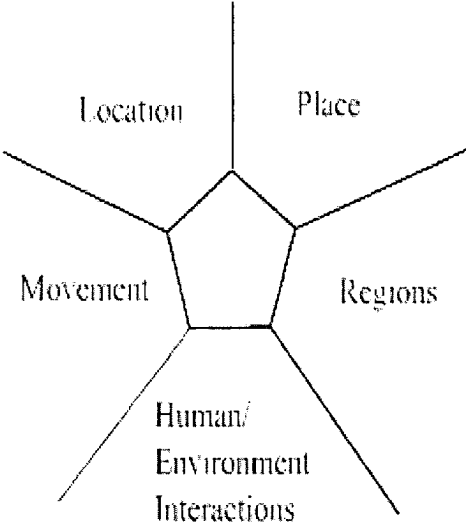
Appendix S: School for Field Studies
Bamfield, British Columbia, Canada
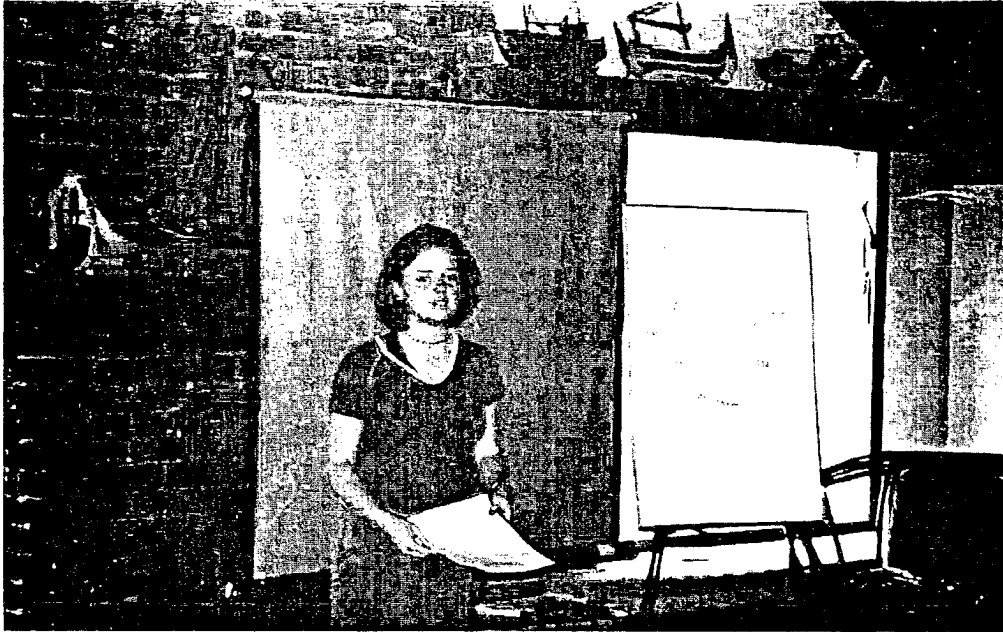
My visit to the School for Field Studies (SFS) house on the west
coast of Vancouver Island near Bamfield gave me the
opportunity to share my knowledge and experience with GIS,
remote sensing, environmental education, and natural resources
management. Notice the Five Themes of geography and the
EOSEP web site address on the board to my left. I used the
GEVT and the EOS Education Project as examples of how
imaging and GIS are being used in classrooms. The SFS students
and I discussed the future trends of these sorts of technology in
field studies and traditional education settings.

Appendix T: Five Themes in Geography

Five Themes in Geography

Location

Absolute and Relative

Location describes where something is. *Absolute location* is the exact point described by a fixed system that groups of people agree on using the same way. Using latitude and longitude lines or cross streets to describe the location of your house are examples of absolute location. *Relative location* is where something is compared to where something else is. Saying your house is next to the old oak tree by the sharp bend in the river is an example of using relative location.

Location   Place

Movement   Regions

Human/
Environment
Interactions

Place

Physical and Human Characteristics

Place is the cultural and the physical context of our location. When we are sensitive to our surroundings we recognize the context of our location as unique in space and time. When describing place, we might talk about sunshine, a rocky shore, moss on the tree, or the language being spoken during a cultural ceremony.

Human/Environment Interactions

Relationships Within Places

Humans interact with their immediate environment. Their immediate environment interacts and is linked with other environments and in this way people affect and interact with many environments; our local actions have global affects. It is important for geographers to look at how these interactions form and what consequences they produce. An example of significant human/environment interaction is oil extraction in the Middle East that is burned in the United States of America and whose polluting products disperse through the atmosphere globally to act as a significant source of global warming.

Movement

Mobility of People, Goods, and Ideas

Geographers look at the nature and the effects of human mobilization. Some examples include how commuter flights, shipping goods, and business via the Internet occurs and what interacting effects they will have on places and locations.

Regions

How They Form and Change

Physical characteristics such as the Rocky Mountains can define areas that are unique. Human characteristics are also used to define areas. Defining unique areas into regions facilitates organization to help us learn about the Earth. Some examples of regions are Los Angeles and the corn belt in the central United States.
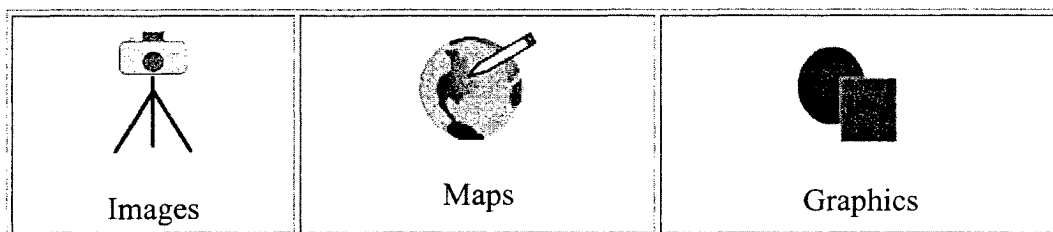
Appendix U: Image and Map Reference List

Image and Map Reference List

All of these resources are good and worth checking out.

The following icons represent the primary focus of the Map and Image Server Site

Images	Maps	Graphics

NASA

earth observatory **http://earthobservatory.nasa.gov**

Goddard Space Flight Center (GSFC) http://pao.gsfc.nasa.gov

- **Cool Pics http://pao.gsfc.nasa.gov/gsfc/weekly/weekly/htm**

- **Distributed Active Archive Center (DAAC) http://daac.gsfc.nasa.gov**

- **SeaWiFS http://seawifs.gsfc.nasa.gov/SEAWIFS.html**

The Observatorium http://observe.ivv.nasa.gov
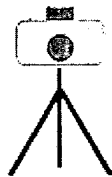
United States Geologic Survey (USGS)

Earth Resources Observation Systems (EROS) Data Center (EDC) http://edc.usgs.gov or http://edcwww.cr.usgs.gov

Earthshots http://edcwww.cr.usgs.gov/earthshots

Mapping http://mapping.usgs.gov

Global Change Research Program http://geochange.er.usgs.gov

Terra for Kids http://terraweb.wr.usgs.gov/TRS/kids/

TerraServer http://terraserver.microsoft.com

Orbimage http://www.orbimage.com

The Woolwine Moen Group
http://www.graphicmaps.com

Graphicmaps.com
http://www.graphicmaps.com/graphic_maps.htm
Worldatlas.com
http://www.graphicmaps.com/graphic_maps.htm

Natural Resources Information Systems (NRIS)
http://nris.mt.gov

GIS maps http://nris.mt.gov/gis/mtmaps.html

Geography in the News by Neal Lineback
http://www.geographyinthenews.com/

maps.com http://www.maps.com