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HABITATS ONLINE:

A COLLABORATIVE TELECOMMUNICATIONS PROJECT

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

Education: Instructional Technology

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by

Tracee Dee Sudyka

June 1997

HABITATS ONLINE:

A COLLABORATIVE TELECOMMUNICATIONS PROJECT

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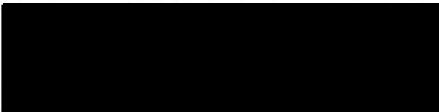A Project

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Approved by:

_____   6/23/97
Rowena Santiago, First Reader   Date

_____
Sylvester Robertson, Second Reader

ABSTRACT

Computer-based telecommunications provides students and teachers learning experiences that they cannot get through any other medium. Collaborative telecommunications projects are an effective tool to teach students how to both communicate and collaborate by connecting teams of students with other classrooms around the world. The students communicate with schools from different geographical locations, are given opportunities to understand different environments, and begin to consider issues that are of global concern.

Collaborative telecommunications projects also motivate teachers to use classroom telecomputing technologies as a tool for involving students in interactive projects that will improve their skills and teach students about the world around them.

This project develops a collaborative telecommunications project called Habitats Online. Review of the literature indicates that collaborative telecommunications projects, like Habitats Online, engage students in rich learning experiences and establish a network of future citizens who have a greater understanding of our environment and global communications. This master's project specifically addresses these issues.

ACKNOWLEDGMENTS

I would like to thank my family for their support and patience during this project. I would also like to thank Rowena Santiago and Sylvester Robertson for their expertise and assistance.

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CHAPTER ONE. INTRODUCTION

Background on Environmental Education

Due to the multidisciplinary and interdisciplinary nature of environmental education, this area of science education is often difficult to define. Environmental education can mean concepts in ecology, outdoor education, environmental science or instruction about issues. A primary goal of environmental education, though, is the development of responsible environmental behavior in citizens, both as individuals and societal groups (Ramsey & Hungerford, 1992).

Over the last several years, environmental education has become increasingly important. The National Environmental Education Act of 1990 charged the Environmental Protection Agency (EPA) with the responsibility for coordinating federal environmental education initiatives and for providing leadership at a national level to the public and private sectors. The act also mandated the creation of an office of environmental education within EPA and the operation of a number of environmental education programs and projects. As directed by Congress, EPA created an office at its Washington headquarters, which developed the following mission with support from the 10 EPA regions: To advance and support national education efforts to develop an environmentally

conscious and responsible public, and to inspire in all individuals a sense of personal responsibility for the care of the environment (Browner, 1995).

Increasing emphasis on environmental education is closely related to concerns about our environment, which in recent years also have become issues of international interest and global concern. Two decades ago, topics such as hazardous waste, environmental equity, climate change, deposition, and deforestation once were just curiosities or thought about only by reactionary groups. Now these same issues are the core of international and national debates and policy initiatives around the world. In the past 25 years, environmental education has helped people to reach a new understanding. There is a greater awareness of environmental problems. However, environmental education is only in its beginning stages.

The use of technology is a growing field within environmental education. Technology allows both teachers and students to reach out to the global world to research information, to collaborate with peers, and to analyze and present their information. Computer-aided environmental education offers unique opportunities. Computers can help redefine the interaction between students and teachers, give students alternative modes of expression, and give users greater access to the world. In the technologically integrated classroom, environmental educators can tap into

an enormous pool of information. Environmental resources

can stimulate sustained exploration of environmental

content, problem-solving skills, and citizen action

(Rohwedder,1994).

Students' Environmental Attitudes

If the United States is to meet the environmental

challenges of the next 25 years, there must be must deepened

environmental awareness among all Americans. In a

longitudinal study of fifth and ninth graders in Ohio,

school classes were found to be increasingly influential in

the acquisition of knowledge about the environment.

Although students ranked movies and television as the most

influential sources of knowledge about specific

environmental issues in 1979, by 1983 and 1987 those sources

had been replaced by classes in school as being most

influential (Fortner & Mayer, 1991).

In recent years, the quality of the natural environment

has become an issue of concern not only among American

adults, but among young people as well. Roper-Starch (1994)

surveyed environmental attitudes of students, and the role

school plays in forming them. According to this 1994 study,

concern about harming of the natural environment was found

to be high among "all students." However, their perception

of environmental problems vary and these problems are of

lesser concern to students from disadvantaged areas.

Few young people from disadvantaged areas considered the environment as one of the leading issues facing Americans today that they would like to help address. Those who said they knew "a lot" about the environment are far more likely to be worried about the state of the natural environment than those who said they knew "only a little" or "practically nothing" about the environment in general (67% to 31% margin).

Similarly, by a margin of 55% to 40%, students from disadvantaged areas who say they learn a lot about the environment at school are more likely than those who learn only a little or practically nothing to be worried about the environment. Large numbers of students from both disadvantaged and non-disadvantaged areas report learning "only a little or practically nothing" (47% and 58% respectively) about environmental issues in class. In other words, approximately half of all students do not feel that school contributes significantly to their environmental education.

Urbanicity also figures into the disadvantaged students' environmental attitudes. Disadvantaged students in urban areas generally report higher levels of concern than those in rural areas. For example, polluted ocean water (63% urban versus 57% rural), destruction of the rainforest (60% versus 54%), lead poisoning (54% versus 47%), global warming (54% versus 48%), damage to the

environment caused by mining or cutting down trees (53%
versus 46%) and pollution of water from fertilizers (48%
versus 40%) are all issues of greater concern to
disadvantaged students from urban areas than those from
rural areas (Roper-Starch, 1994).

The importance of a sound technical background to the
scientific and social principles of environmental studies is
needed most in our classrooms to address students' varying
attitudes, as well as ambivalent attitudes, about the
environment. From elementary through graduate studies, the
training of future generations of environmental users, as
well as environmental researchers, policy makers, managers,
and information specialists is the all-essential ingredient
for preserving and restoring the integrity of the
environment (Stoss, 1994). Goals and objectives of many
state and local environmental education programs have
included developing among students the knowledge, skills,
positive attitudes and motivation to take action, to prevent
and to resolve environmental problems.

With this background in mind, teachers of Margaret
White Elementary School established a wildlife habitat
called the Margaret White School Desert Riparian Habitat
(MWSDRH) to promote environmental education. The MWSDRH was
established on campus in January of 1993 in order to give
students hands-on learning experiences with native desert
wildlife.

Margaret White Elementary School is located in the lower desert of California. The school is in Blythe, California which is a small, rural town in an isolated area of the Southern California desert. Blythe is 100 miles from the Mexican border. It serves approximately 700 students in grades kindergarten through five. Fifty-four percent of the school population is Hispanic. Agriculture has been the primary industry in the area since its inception. Many of the students' parents are farm workers or unemployed. The majority of students are on free or reduced lunch, and come from a low socieconomic background. Most students are unable to travel over 100 miles to the nearest cities. Visiting museums or zoos is not an option for the majority of Margaret White Elementary School students. Many of the students have never been outside of Blythe.

Due to the extreme isolation the students face, there was a need to bring hands-on nature experiences to the students. Thus, the MWSDRH was created on the campus of the school. Since the town is located along the Colorado River, the MWDRH was designed for natural river plants and wildlife. Students planted trees and shrubs in the campus wildlife area. A variety of wildlife such as birds, reptiles and insects lived in the habitat. The MWDRH became a living ecosystem which gave the students a greater appreciation for the desert environment.

The MWDRH had given students the opportunity to see
that the desert is full of natural resources and life. It
brought nature to the campus, and was a great step toward
developing environmentally conscious students. However, on
August 27, 1996 administrators had the MWDRH bulldozed to
make room for portable classrooms. Teachers, students, and
parents were unaware of the plans to destroy the MWDRH.
Just weeks before, two ponds had been built in the habitat.
Aquatic plants and animals had been ordered, and projects
were planned for the students return from summer vacation
the following week. The teachers' vision for environmental
education had been wiped out with a few passes of a
bulldozer.

The destruction of the MWDRH was devastating. The
fourth grade students were probably most affected. These
students had followed the progress of the MWDRH since their
first year at the school. They had been most involved in
the development and success of the MWDRH. They had planted
the initial trees and shrubs, cared for them, and planned
for future development. These students had done
experiments, shot videos and created multimedia projects
relating to the MWDRH. Their sense of ownership to the
MWDRH was very strong. Now the campus wildlife area that
was developed to promote concern for the natural environment
was gone. This created a new set of problems. The students

are still extremely isolated, disadvantaged, and living in a
rural area.

What could be done to help these isolated students
continue their environmental awareness? A collaborative
telecommunications project called Habitats Online was
developed for the fourth grade students to continue their
environmental efforts.

Significance of the Project

The Habitats Online project is designed to give
students of Margaret White Elementary School a much needed
connection with the outside world, and to continue to
promote the importance of environmental education. Through
telecommunications and the Internet, the project will enable
the students to share their knowledge of their own desert
habitat with others, thus, giving them interactive
experiences with other people and places. Through the use
of technology, the students can electronically communicate
with others who are interested in the desert. They can
gather information about different types of habitats in the
process. The project will allow students to share
multimedia projects, such as HyperStudio stacks, about the
desert habitat.

Habitats Online is primarily designed to create an
awareness of the variety of natural habitats and ecosystems
throughout the world. The "Habitat" theme was used as a
tool to create an awareness of the students' immediate

environment; as well as show the connection with the world as a whole.

Project Overview

Habitats Online is a collaborative telecommunications project which will result in the creation of a home page and a HyperStudio stack. This project will begin as a global exchange project for students to share information about ecosystems in their part of the world. It is hoped that by making personal connections, the students will gain more understanding and appreciation for the outside world. The students will share ideas, information and insights with their peers. They will network with others who are interested in the desert, as well as with those who have information about different environments. The students are expected to become "experts", yet they also gain knowledge from others. They become hands-on practitioners with enormous amounts of knowledge to share. However; through collaborating with others, the students will also learn a great deal in the process.

The project focuses on a variety of curricular areas for upper elementary to middle school students. Curricular areas include: Science, Ecology, Geography, Language Arts, and Visual Arts. The project is designed for environmental education to be integrated across the curriculum.

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Definition Of Terms

Cyberspace: The virtual realm where online communication occurs.

Electronic Mail (e-mail): The transfer of messages between users of online network systems.

Home Page: Also referred to as "Main Page" or "Front Page". A home page for a Web site is like the foyer of a house or the cover of a magazine. It is the first thing seen and the place from which to enter. It can link to many other documents or pages.

Hypermedia: A computer environment in which multiple linkages enable users to move directly from one segment of audio, video, graphic, or textual data to another.

HyperText Markup Language (HTML): A coding used to write and format documents for use on the Web.

Interactive Multimedia: Various types of multimedia information are presented interactively by a computer in response to user input. The user's responses and choices direct the computer's presentation.

Internet: The interconnected global network of computers that uses the same set of software protocols.

Internet Relay Chat(IRC): Exchanging text messages with others while simultaneously connected to the Internet.

Modem: A device used to connect a computer through a telephone system to another computer.

Multimedia: The delivery of information using two or more formats, including text, graphics, audio, still images, music, animation, and motion video.

Online: Connected to network or via a network.

Scanner: A device that optically reads text, graphics, and photos and tranfers them in digital form to a computer.

Stack: A group of cards (screens of information) in a hypermedia program.

Telecommunication: Communicating with other people through the computer using communication software and modems.

Uniform Resource Locator (URL): A logical address that identifies a resource on the Internet.

World Wide web (WWW): A hypertext-based system for finding and accessing Internet resources.

CHAPTER TWO. REVIEW OF THE LITERATURE

Using technology in environmental education involves
addressing many issues. The review of the professional
literature provides insight into these issues and
establishes a knowledge base from which to make informed
decisions. This chapter will present a review of the
literature and will present its findings under the following
sections:

*Environmental Education
*Learning Theories in Instructional Technology
*Multimedia in Education
*Multimedia in Environmental Education
*Telecommunications and the Internet
*Environmental Multimedia on the Internet
*Collaborative Telecommunications Projects
*Environmental Telecommunications Projects
*HyperStudio
*Hypermedia on the Internet
*Environmental Hypermedia Sites on the Internet

Environmental Education

The 1990 National Environmental Education Act (Public
Law 101-619) has brought environmental education back to the
attention of many educators and most environmentalists.
Over the years, significantly greater interest has been
demonstrated by conservationists and environmentalists.
Environmental quality was seen as a priority, and education
as a mechanism for promoting it. For this reason, the 1990
Act is receiving significant attention from its host unit,
the U. S. Environmental Protection Agency, and from

conservationists and environmentalists, in general
(Marcinkowski, 1991).

Goals and objectives of many state and local
environmental education programs have included developing
students with knowledge, skills, positive attitudes and
motivation to take action, to prevent and to resolve
environmental problems. The creation of an environmentally
literate citizenry is the bottom-line goal of environmental
education. This goal does not mean, however, the same thing
to everyone. Although the term environmental literacy has
been used for more than two decades, it continues to lack
precise definition. Renewed interest in environmental
education affords an opportunity to reconsider and highlight
the interrelationships between environmental education and
environmental literacy, and to define the latter so it can
be a useful term and concept. Environmental education is a
process of moving individuals toward stewardship and
ultimately a union view of the relationship of people with
nature. Environmental education is process more than it is
content: environmental education is usually infused into
various curricula, particularly in the sciences (Disinger &
Roth, 1992).

Environmental literacy should be defined in terms of
observable behaviors. That is, people should be able to
demonstrate in some observable form what they have learned
or their knowledge of key concepts, skills acquired,

disposition toward issues, and the like (Roth, 1992).

Measurement of literacy then focuses on environmental

knowledge including understanding the basics in areas such

as ecological concepts and biodiversity.

Leading environmental educators have, however, defined

environmental literacy as a multi-dimensional guideline. As

outlined by the Environmental Literacy Framework, developed

by the Environmental Literacy Assessment Consortium (ELAC),

environmental literacy has: cognitive dimensions; affective

dimensions; additional determinants of environmentally

responsible behavior and personal and/or group involvement

in environmentally responsible behaviors. Roth (1992)

similarly defines environmental literacy as essentially the

capacity to perceive and interpret the relative health of

environmental systems and take appropriate action to

maintain, restore, or improve the health of those systems.

Since the term was coined, a distinguishing characteristic

of environmental literacy has been its action perspective.

Others describe environmentally literate citizens as an

individuals competent and willing to take action.

Roth's definition exemplifies a trend in the

environmental education community to define environmental

literacy as going several steps beyond acquisition of

knowledge. He stresses the students' ability to interpret

and act to maintain or improve the environment. This goal

for environmental literacy emphasizes the need for complex

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strategies and action based on higher level procedural

thinking. It more accurately approximates the advanced

abilities of experts in the field.

The various definitions of environmental literacy call

for well-developed skills in perception, interpretation and

environmentally-based actions. Most of the assessments for

levels of environmental literacy, however, appear to be

content-driven rather than measuring action, as promoted by

proponents of environmental literacy.

Environmental literacy derives its focus from four

basic issues: the interrelationships between natural and

social systems; the unity of humankind with nature;

technology and the making of choices; and developmental

learning throughout the human life cycle (Roth, 1992).

Environmental education is a process of moving individuals

toward stewardship and ultimately a union view of the

relationship of people with nature. Environmental education

is process more than it is content: environmental education

is usually infused into various curricula, particularly in

the sciences (Disinger, 1990). Ultimately, environmental

education should focus on the development of lifelong

learning skills: communication, problem-solving, decision-

making, critical-thinking, evaluation, participatory

citizenship, valuing, aesthetic appreciation and a sense of

ethics (Hug, 1995).

Education reformers recognize the need for greater strides to be made in educational systems that provide students with the skills and knowledge they need to formulate responsible choices concerning their relationship to the world around them. Those involved in the reform process see the potential value of environmental education methodologies that incorporate problem-solving, hands-on learning approaches, scientific method, complex thinking strategies, cooperative learning, relevant subject matter and topics that engage students in the educational process (Lieberman, 1995).

Environmental issues of global concern are known to students and to educators. If asked to identify issues, most would be able to identify several: global climate change, ozone depletion, acid rain, deforestation, ocean dumping, and so on. The challenge of environmental education is to make these global issues meaningful to learners by focusing on individual contributions to the problems, and then, using problem-solving, decision-making strategies to develop, refine and redirect the thinking and the learning. Efforts to increase the public's understanding of the environment, especially among students from preschool through university programs is a result of more than twenty years of environmental activity in the United States. Increased awareness about the environment was stimulated by the myriad of activities of Earth Day 1990, celebrating the twentieth

anniversary of Earth Day. Classrooms at all levels have seen unprecedented efforts bringing environmental themes, projects, and activities to students and teachers (Stoss, 1994).

Tapping the zeal of young people interested in working for the environment is key for the future of the environmental movement. Finding new avenues of involving young people, perhaps through the sources they use and prefer to use to learn about the environment, may be one route to take. One approach for teachers is to use supplementary curricular guides that, at least for a few learning segments, transform the learning process into an environmental focus rather than a discipline-based and separated structure. Examples of such projects include Project WILD, Project Learning Tree, and non-formal educational materials and programs provided by 4-H, scouting, and others. These short-term programs usually evoke very positive responses from both teachers and learners. Longer-term programs, however, may suffer from problems that range from economics to personnel qualifications to lack of administrative support (Scharmann, 1990). What is yet unclear is whether the problems stem from real problems in creating settings for learning of this nature or from the reluctance of individuals to affect the significant changes that framing for environmental learning requires.

Learning Theories in Instructional Technology

There is a movement for reform in schools currently, which centers around changing the nature of the educational activity from teacher-led lessons on subject matter content to project-based work in which students are active problem-solvers and theorists, while the teacher plays more of a coaching role. Very often, the complexity of the projects invites collaborative work as a way to bring multiple perspectives to the problem and for students to learn from each other. Collaborative problem-solving is being used all the way from elementary school classrooms to professional education.

While it has been observed that placing computers in classrooms often results in changes in the amount and kind of group work, researchers are just beginning to develop and study technology specifically designed to support collaborative project-based school work, and explore ways of molding both the technology and the pedagogy to best support student collaboration. Collaborative problem-solving in schools is making use of computer tools for analysis, simulation, display, and communication (Koschmann, 1992).

One learning theory used in the design of instructional technology projects is constructivism. Constructivism is fairly hard to nail down because the label covers a wide spectrum of beliefs about cognition (Jonassen,

1991). Merrill (1991), while not sharing constructivist

beliefs, defined constructivism as it relates to

instruction:

> * Knowledge is constructed from experience.
> * Learning is a personal interpretation of the world.
>
> * Learning is an active process of meaning-making
>   based on experience.
> * Learning is collaborative with meaning negotiated
>   from multiple perspectives.
> * Learning should occur (or be situated) in realistic
>   settings.
> * Testing should be integrated with the task, not a
>   separate activity.

The Internet can be viewed as a powerful constructivist

environment for learning. Successful projects encompass

learning outcomes, as well as design. Many successful

projects are also based on developmental research that

follow contructivist learning theories. Developmental

research is defined as "the systematic study of designing,

developing and evaluating instructional programs, processes

and products that must meet the criteria of internal

consistency and effectiveness" (Seels & Richey, 1994).

Brown and Campione (1996) describe a deductive

knowledge-building process in their Fostering Communities of

Learners (FCL) project, designed to promote the critical

thinking and reflection skills that are the foundation of

higher literacy. Students engage in research in order to

share knowledge and expertise with their group. Their

efforts culminate in an authentic task which demands that

all participants have learned about all aspects of a joint

topic. Successful projects are designed to allow for multiple goals for different learners. Instructional design (ID) often includes the assumption that instructional goals will be identical for all learners. This is sometimes necessary, but not always. Hypermedia learning environments almost by definition are designed to accommodate multiple learning goals. Even within traditional classrooms, technologies exist today for managing multiple learning goals (Collins, 1991).

Multimedia in Education

The concept of multimedia has been present for a long time. A commonly accepted definition supports the concept of computer-driven interactivity and a learner's ability to determine and control selection of sequence and content. Matchett and Elliot (1991) argue that this interactive multimedia should include motion, voice, data, text, graphics, and still images. Interactive multimedia allows the user to see, hear and do. Unlike some of the earlier linear technologies where users remained passive, interactive multimedia demands user involvement.

Charp (1996) says the interactive component means that the system does not present information literally, but responds to signals from the user. Multimedia refers to the presentation of information that can include text, images, graphics, sound, animation, and motion video. Charp noted general observations on the use of interactive multimedia in

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education. There is a growing number of multimedia resources available to teachers and students. Interactive multimedia software is capturing students' attention, arousing curiosity, stimulating creativity, encouraging critical thinking, and fostering interaction.

Noblitt (1996) says educators are interested in multimedia because the methodology is interactive. Students become engaged in active learning and instructors can easily introduce students to primary data in sound, symbol, or image form. Instructors function as guides or navigators of knowledge, while the learner takes greater responsibility for driving the educational process. Information technologies have the power to completely transform instructional methodologies and enhance instruction. Teaching methods will continue to be altered to improve learning as new technologies emerge.

T.S. King Middle School in Los Angeles has set an example of how multimedia can be used in the classroom. The teachers at that school have integrated technology into nearly every aspect of the curriculum. The school's environment is more like a place of business. Students work on self-initiated learning projects. Instead of having teachers dispense information to the students, the students gather their own information from books, the Internet, or CD-Roms. The students then work on projects that are presented to the class in either newspaper or multimedia

format. Educators at T.S. Middle School maintain that this approach will do a better job of preparing students for the twenty-first century. The teachers say this form of education promotes interaction, communication, and collaboration which are important skills that are needed in the workplace (Posnick-Goodwin, 1996).

Dickinson (1994) tells about another important aspect of multimedia systems: their ability to address a variety of different learning styles. Educators can use multimedia as a tool to treat students as individuals, with individual backgrounds, aptitudes, and needs. Dickinson discussed Howard Gardner's theory of multiple intelligences (verbal/linguistic intelligence, logical/mathematical intelligence, visual/spatial intelligence, bodily/kinesthetic intelligence, musical intelligence, interpersonal intelligence, and intrapersonal intelligence), and gave examples of multimedia applications educators can use to help students develop those intelligences. Dickinson points out that with multimedia, educators are acquiring new tools to address the individuality of students.

Peck & Dorricott's summary (1994) of the top ten reasons for use of multimedia and other types of technology in education represent a good overview of the current status of what technology can accomplish. These reasons include technology's potential to assist with educational goals such as:

1. individualization
2. increasing proficiency at accessing, evaluating, and communicating information.
3. increasing quantity and quality of students' thinking and writing
4. improving students ability to solve complex problems
5. nurturing artistic expression
6. increasing global awareness
7. creating opportunities for students to do meaningful work
8. providing access to high-level and high-interest courses
9. making students feel comfortable with the tools of the Information Age
10. increasing the productivity and efficiency of schools

Research has been done on the effect of technology on student achievement(Kromhout and Butzin, 1993). The Computers Helping Instruction and Learning Development (CHILD) study was a five year investigation in nine Florida elementary schools, which began in 1987. Over 1400 students participated and their teachers received training which included not only the technological components of the program. Each classroom was given three to six computers, but an important factor was emphasis on establishing a team environment with other teachers in the project. Much of the students' daily routine involved self-paced interactions in a learning station environment. Student empowerment was a key concept of the project.

Standardized test scores indicated a positive and statistically significant result across all grades, schools and subjects, with the largest effects appearing for

students who had been in the program for more than one year. When surveyed, none of the nine schools expressed dissatisfaction with the project, five were planning to expand their level of participation and nine new schools were about to become involved. In addition to showing improvement in achievement as measured by standardized tests, the program also showed success in problem solving and higher order thinking skills (Kromhout and Butzin, 1993).

More recently, the Software Publishers Association (SPA) commissioned an independent consulting firm (Interactive Educational Systems Design, Inc.) to prepare a meta-analytic report on the effectiveness of technology in schools. Research from 1990 to 1995 was included, and 176 studies were analyzed (SPA,1996).

The report concluded that the use of technology as a learning tool can make a measurable difference in student achievement, attitudes, and interaction with teachers and other students. With respect to achievement, positive effects were found for all major subject areas, in preschool through higher education, and for both regular education and special needs. Student attitude toward learning and student self-concept were both found to be increased consistently in a technologically-rich environment across the studies included, and in general, student control and self-pacing was found to be one of the more positive factors relating to

achievement when technology was used.

Cooperative/collaborative environments were seen to be enhanced by the introduction of technology, which also increased teacher-student interaction. The evidence suggested that teachers who use technology in their classrooms are more effective if they have received training, if they have district-level support, and if they have a network of other computer-using teachers to share experiences with.

Innovative educators are continuously finding new ways to use multimedia and other emerging technologies in the classroom. New technologies hold great promise for future educational opportunities. The wise use of this technology demands a deep commitment to education, recognition of learning needs, imagination, and establishment of goals.

Multimedia in Environmental Education

Computer-aided environmental education presents a whole new set of extremely powerful ways of promoting, as perhaps never before, the goals and objectives of environmental education. The new technology allows teachers, students, and in-service professionals to reach out to the wider world to research information, to collaborate with their peers, and to analyze and present their information, both for their own education and to create positive change.

W.J. Rohwedder (1994) created a resource manual for environmental educators. Rohwedder says there are five principal ways multimedia technology is used in environmental education today. First, at the front of the classroom as an update of traditional audio visual media used in lecture and presentations. Second, in student groups for collaborative learning. Third, in individual student use for independent learning. Fourth, in the creation of reports or presentations. Finally, technology is used for assessment in environmental education. Environmental multimedia is a flexible, dynamic tool, which can model and mimic interactive, complex behavior of natural and human systems. Environmental multimedia can mirror the way students learn and the way the world works.

Rohwedder gave twelve examples of how computer-aided environmental education can benefit the classroom. Technologically integrated classrooms that stress environmental education:

1. encourage fundamentally different forms of interaction among students and between students and teachers
2. engage students systematically in higher-order cognitive tasks
3. facilitate student-centered learning by allowing choice in the pathways and rate of information
4. motivate student interaction, experimentation, and cooperative learning
5. address a variety of learning styles and modalities
6. provide a rich variety of instructional approaches
7. involve both learners and experts

8. facilitate "storylines" or thematic learning
9. prompt teachers to question old assumptions about teaching and learning
10. allow teachers to be a guide at students side
11. provide easy access to current local and global environmental data
12. incorporate educational technologies

Providing basic resources to teachers and students alike is critical to the success of any classroom adventure. The Electronic Green Journal, like its predecessor the Green Library Journal, serves as a forum bringing to the attention of its readers resources on general environmental education. These resources are intended to serve as starting points for initial inquiries about issues and events related to the environment. Hopefully, enhanced access to information will allow teachers at all levels to stimulate and sustain their student's interests in the environment, and provide a strong technical background and understanding for their students (Stoss, 1994).

Rohwedder (1994) argues some important reasons to utilize technology in environmental education. He says that technology: facilitates student-centered learning; addresses several learning styles and modalities; motivates student interaction, experimentation, and cooperative learning; facilitates thematic learning where pathways of learning can be woven around a particular environmental concept; and promotes the constructivist view of learning.

A fifth grade class at L.A. Gilliland Elementary in Blue Mound, Texas used technology to create a project when they learned that ninety-nine percent of the Blackland Prairie had been depleted, and only 5,000 acres remained. The students created a multimedia field guide to educate others about this endangered ecosystem. The students took still digital and video cameras to prairie land within walking distance of their school. The students also made notes in journals which included writings with drawings, math and poetry. The information that the students gathered were transformed into a student-produced multimedia slide shows. The filed guide shows students harvesting native grass seeds and sowing them, videos of students planting trees, detailed illustrations of prairie wildflowers, and narrations of interesting facts relating to prairie plants and animals. The students were dedicated to bringing pieces of the prairie back to life, and their multimedia field guide helped them get others interested in their efforts (Quesada, 1997).

Telecommunications and the Internet

Telecommunications is another way to motivate students, and give them knowledge about the outside world. Educators are finding a variety of ways to use telecommunications to benefit their classrooms. Whether it is being used to teach curriculum, promote professional growth for teachers, or

helping to teach students to become citizens in the future world, telecommunications has a great deal of value in education.

Berenfeld (1996) cites several common rationales for using telecommunications to meet the needs of pedagogical educational goals. They are: bringing real world relevance into the classroom; helping students perceive knowledge as constructed; providing students with an effective model of lifelong learning; bolstering social, communication and critical thinking skills; meeting emerging standards for inquiry-based learning; increasing the authenticity of the learning environment; putting a human face on learning; finding role models for students; and providing equity to students.

Many schools are climbing on line and the Internet is becoming an integral part of the teaching process. Schools are getting assistance to set up and use the Internet, and to create their own home pages. Teacher training is becoming available allowing teachers to train their students. The students, in return, are training their peers. The Internet is a world of information for both students and teachers (Sanchez, 1995).

Edwards (1995) writes about a school that has 20-25 work stations hooked up to the Internet. This allows students, seeking enrichment or alternative methods of education, a chance to receive their high school diploma by

hooking up to the Internet at home, or on the Internet High

School Campus.

Wilson (1995) discusses Eagan High School in Minnesota,

which uses the Internet to improve education throughout the

school. Eagan is currently pioneering some new areas of

technology in education. For example, Eagan is a server

site and has established a web page. Educators there are

hoping to make technology accessible and easy to use for

beginners. Eagan's teachers strive for interactive

learning. They want students to be able to walk out of the

school with the skills and technology that is available in

the world today. The teachers at Eagan feel the Internet

makes learning real to the students.

During the last few decades, schools have not been

buying books or supplies in any great amount. Gordon (1996)

points out that the Internet will allow a consortium of

libraries to become depositories of knowledge which students

can access in ways never before imagined. Most importantly,

students will learn to access comparative information and

viewpoints, thus, broadening their range of thinking skills.

Teachers should not feel intimidated with

implementation of the Internet. Within a few hours, any

teacher can learn the basic technology to communicate with

students in new, powerful, and efficient ways. By the use of

e-mail, students can talk to their teachers about concerns

in a way that would perhaps not be possible in a normal

classroom situation. Also, rather than using merely the lecture format to teach, having the students go to a particular web site to gather and learn about new information is a wonderful extension of both students and instructor's knowledge. With all the wonderful possibilities, the use of the Internet is evolving beyond even the wildest imaginations (Partee, 1996).

Telecommunications is developing at great speeds. The entire society is in the midst of a profound change. Dyrli and Kinnamann (1996) say that education stands to benefit from the change more than any other institution. The roles and responsibilities of educators are also expanding and taking on new meanings empowered by technology. Telecommunications can enrich and extend school curriculums significantly. It has the capabilities to redefine the entire school community, and shape education policy and school organization.

The World Wide Web lends itself to student-centered learning. The hypertextual organization of materials on the web promotes personalized learning environments that allow students to master individual goals and move at their own speed. Information is available to students without the imposition of pre-determined paths for them to follow. In this way, students have more control of their own learning. The web is providing an increasingly rich variety of media

through which to present learning materials and encourage collaborations that take students beyond the classroom (Polyson, Saltzberg & Goodwin-Jones, 1996).

Story (1996) believes that many teachers fail to see the value of the Web, and technology in general, as a tool for teaching. The Web creates a virtual community in which the many challenges of teaching can be dealt with collaboratively. On the Web, teachers can learn from the successes and failures of others. There are hundreds of forums available to teachers for sharing. One moderated discussion forum for educators, edweb.cnidr.org/wwwedu.html, has over 1,700 members from 40 countries and all of the 50 states.

Story further believes the Web is the single richest resource of information available to educators worldwide. No other library or organization can compare with its diversity, size, growth rates, or ease of accessibility. Story described examples of five exemplary Web sites that can be can utilize to promote enthusiasm about the educational potential of the Web. NASA (www.nasa.gov) fuels enthusiasm for science, mathematics, and technology. Students can participate in award winning interactive projects and use resources provided by NASA. WebMuseum (watt.emf.net) is an online art museum. The site has over 200,000 visitors a week that view over 10 million documents. Students can visit art museums such as the Lourve and the

Guggenheim. The Smithsonian (www.si.edu) includes links to all the Smithsonian museums, offices, and research centers. Students can explore exhibits on art, history, science, or human culture. The United States Department of Education (www.ed.gov) contains a variety of educational links including grants, research reports, guides and publications. Time Warner's Pathfinder (www.pathfinder.com) plans to be the future home of the largest collection of news and entertainment producers. Students can explore this site to find news and entertainment stories.

Educators must provide relevant learning experiences for students that will prepare them for the rapidly changing world. The Internet offers solutions to many of the challenges that educators face. By teaching students to use information-based inquiry processes on the Internet, educators can create many new learning opportunities for students.

Environmental Multimedia on the Internet

Many students and teachers are using the latest telecommunications technology to assist with environmental research and restoration. A variety of Web Pages have been created to bring the topic of Environmental education to the classroom in a timely and effective fashion. The State Education and Environment Roundtable has been created to provide access to a myriad of resources related to the field of environmental education. The Roundtable is sponsored by

the Pew Charitable Trusts and administered by the Council of Chief State School Officers. The function of the Roundtable is to incorporate environmental curricula into K-12 education. The Roundtable is organized into a seminar-format to facilitate cooperation and sharing among state departments of education; to conduct case study research about effective environmental curriculum programs, and to provide technical support to education agencies (Stoss, 1996).

This new open media is especially important for issues related to the environment. Polish Professor, Jankowska (1996) believes that the Internet is the most democratic communication forum of the twentieth century. The Internet as a tool of democracy will play a more important role than all of the assistance for environmental protection and "democratic education" coming from the Western countries to Eastern Europe and Poland. It will teach students not to wait for any help to restore their damaged environments.

Educational reform efforts promoting interactive learning environments, point to the critical role of technology (Pearlman, 1992). When used in combination, computer-aided tools including environmental monitoring devices, video cameras, audio conferencing, databases and spreadsheets, electronic mail, and fax machines can create a powerful and exciting learning environment. Teachers and students chose the appropriate technology tools to match

their environmental educational objectives and learning environments.

There are many advantages to using telecommunications in the classroom. Students enjoy writing more when they are able to write for a distant audience of their peers, students are more careful about their spelling, punctuation, grammar and vocabulary, when they are writing for a distant audience, students enjoy communicating with schools from different geographical locations, students are given opportunities to understand different cultures, students begin to consider issues that are of global concern, teachers are provided an opportunity to exchange ideas and resources with many other teachers very quickly and efficiently, and many futurists believe that electronic communications will become a necessity for business and education, by the year 2000, due to increasing transportation and building costs (Andres, 1991).

Collaborative Telecommunications Projects

Collaboration is a major advantage for using telecommunications. Today many issues affect populations of all countries. Global problems such as the environment, terrorism, and inflation are just a few examples of global problems. The Internet offers an effective way to teach students to both communicate and collaborate by connecting teams of students with classrooms around the world. Through telecommunications, students can easily unite and work

cooperatively to accomplish common goals. Curriculum

Director of Global School Net, Andres (1996), says that

electronic interactive communication between students,

educators, and the world community offer potential for gains

in literacy, cultural, geographical, and socio-political

understanding, preparation for the workforce, and

democratization of society. Andres says that collaboration

in the classroom is the first step in collaboration over the

Internet. And, collaboration over the Internet can be the

first step toward global cooperation.

Willett (1996) also says collaboration is the key to

success in education. He says collaboration is the model by

which the new learning paradigm offered by technology can

be embraced and taken to its fullest potential. Willet, who

is a teacher at Garfield Elementary School in Spokane,

Washington, reported about the success of his international

collaborative project. His students began exchanging e-mail

with students from Kyoto, Japan. The students were

motivated and excited to share information with each other.

Willett says projects like this highlight the power

technology has to bring the global community together.

Teachers are no longer confined to teaming up with

colleagues who work next door. Teachers can get involved in

projects across grade levels, across the state or across the

world.

Tele-collaboration is one of the most sophisticated deployments of classroom telecommunications (Berenfeld, 1996). Berenfeld believes it advances online cooperation to distributed problem-solving, collaborative design and cross-classroom collaborative inquiry. Tele-collaboration increases the authenticity and relevancy of environments to the student. It allows learning to be student-driven, interactive and experiential. Students no longer have to passively receive information. Instead, they have become managers and creators of information.

Telecommunications using the Internet provides students and teachers with the benefits of immediate access to global communications and information resources. However, teaching and learning power can be multiplied significantly through online projects that study topics in depth. Those projects that require collaboration among students in various locations strongly motivate students, enhance communication skills, and increase geographic competence and cultural understanding (Dyrli & Kinnaman, 1996).

Global classroom projects involve two or more classrooms studying a common topic together, and sharing information learned about the topic. Global classroom projects are topically focused and involve groups of students communicating with each other. The Web allows for collaboration on a global basis. Geography is no longer an obstacle, but a benefit. The Web has made it easier to

collaborate with a classroom across the world than with a neighboring classroom (Harris, 1995).

Online projects can be designed to custom fit both curricula and students' needs. Story (1996) offered guidelines for designing an instructional project using telecommunications. Story says that projects must have clear learning objectives and some kind of activity structure that will help reach those learning objectives. He also points out the importance of examining other online projects and taking the time to plan the details of the project before getting started. Projects must provide relevant learning experiences for students. Collaboration is a key for making learning experiences relevant to the real world. Collaboration gives students and teachers the context necessary to instill information with meaning. The Web is a good environment for this type of activity. Because students take possession of the learning process, knowledge becomes more meaningful and results in greater understanding.

TIES (Technology and Information Educational Services) has ten recommendations for creating successful collaborative classroom projects (Mather, 1996):

1. Pick a topic that develops skills directly linked to standards and curriculum outcomes

2. The project should be or simulate a real world experience

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3. List skills the students will learn

4. Define assessment information about student learning

5. Plan activities for students to pursue on their own

6. Create assessment tools like checklists and rubrics with the students

7. Set start and end dates

8. Include research by the students

9. Create a research library

10. Be the project facilitator, not the sole source of information for the students

Harris(1995) also developed the following guidelines for collaborative telecommunications projects:

Step One: Choose the Curricular Goal(s) that are tied directly to the curriculum and could not be accomplished at all, or as well, using more traditional teaching/learning tools.

Step Two: Choose the Activity's Structure

Step Three: Explore Examples of Other Online Projects

Step Four: Determine the Details of Your Project

Step Five: Invite Telecollaborators

Step Six: Form the Telecollaborative Group

Step Seven: Communicate

Step Eight: Create Closure

Numerous projects already exist. Teachers nationwide have invented projects to bring global resources to the

classroom. Dyrli (1995) reported about several successful teacher-initiated projects. Fourth grade teacher, Jim Meckel, developed a collaborative telecommunications project in which elementary school classes joined an online wagon trail to share historic information along the route. Students in each participating class conducted research in order to send e-mail listings of supplies packed for the journey, and profiles of the travelers in their wagons. The students then simulated travel west according to a set schedule, and took part in a variety of activities specially designed for the project. Students at Lincoln Elementary School in San Bernardino, California exchanged electronic postcards, Hypercard stacks about themselves, with other students. The students used word processors, paint programs, scanners, digitized cameras, sound recorders, and video cameras to create the postcard designs. The postcards were compressed and sent electronically through the Internet to participating schools. Students were able to share information about themselves, their school, and their community with peers from around the world. Ron Adams, a seventh grade teacher in Massachusetts posted a message to veterans of World War II asking for volunteers to be interviewed by e-mail. Many veterans not only agreed to the interview, but also sent the students copies of photos, letters, artifacts, and newspaper clippings. This project

allowed the passing of history from generation to generation.

According to an announcement in the OnlineClass Newsletter: December (1996), a recent national study confirmed that online communications can raise student achievement in the classroom. "The Role of Online Communications in Schools: A National Study," conducted by the Center for Applied Special Technology (CAST), a nationally recognized, independent research organization, demonstrated that students with online access perform better on key comprehension, communication and presentation skills.

The study, sponsored by the Council of the Great City Schools and Scholastic Network, was the first controlled study to isolate the impact of online use and measure its effect on student learning in the classroom. The study showed that students with access to the Internet excelled in finding, comprehending and evaluating information, and presenting information and ideas effectively. In the study, students with online access achieved significantly higher scores on measures of information management, communication and presentation skills than those who had no online access.

Environmental Telecommunications Projects

Because online learning simply provides access to information and opportunities for interaction, it can enhance the educational experience and provide a venue for collaborative action to solve environmental problems.

Teachers have found that one of the most powerful ways to get students involved in applying information-access tools is through collaboration. Many types of collaborative projects are possible through the use of the Internet. One good example that utilizes technology and environmental education involved the use of pond water. The project was funded by the National Science Foundation as part of the New Jersey Infrastructure in Education program. The project was designed to promote improved science education in New Jersey through the use of the Internet. Elementary students gathered samples of water from a local pond and examined organisms they found with a microscope. Students shared their observations with peers around the world through the Internet. The students shared similarities and differences found in the pond waters. Students were surprised to find the same microorganisms in ponds separated by almost 10,000 miles. This project was developed to add to the body of knowledge of the students, to involve them in active independent study, and to broaden their horizons. The project posted information and results on a Web page (www.njnie.dl.stevenstech.edu/curriculum/water.html). It was felt that this project motivated greater interest in and involvement with the experience of learning. Telecommunications is transforming science study by removing the need for students to be at the same place as their

laboratories, their mentors, or their collaborators (Friedman, et al, 1996).

A collaborative environmental project called The International Education and Resource Network (I*EARN) Global Art Exchange focused on the theme, Habitats: A Sense of Places. This project encouraged students from the ages of 5 to 13 to create two-dimensional artwork that represented habitats of their region. The artwork could include urban or rural habitats and could represent animal, plant, or human habitations. Each student also added a narrative in their primary language to the art pieces. The schools involved kept some of their own artwork and evenly distributed the rest by mail to other participating schools. Students could extend the project by sending electronic messages to each school or artist through the iearn.glob.art conference. The project culminated with a school-wide Global Art Show at each site featuring the artwork from this project. The schools were encouraged to extend their participation by choosing a meaningful habitat project for their school that could make a difference in the world (http://www.igc.apc.org/iearn/projects/globart.html).

Technology is being used by educators to take students on virtual excursions or electronic field trips to a variety of fascinating places. Telecommunications makes it possible for students to visit other locations from within the walls of the classroom. Many of these existing projects focus on

environmental issues. Journey North located at
http://www.ties.k12.mn.us/~jnorth focuses on wildlife
migration and seasonal change. Blue Ice located at
http://www.usinternet.com/onlineclass takes students in
grades kindergarten through twelve on a virtual expedition
to Antarctica. Some schools will be collecting Antarctic
weather from the Internet on a daily basis and comparing it
with their own. Others will be mapping the continent and
noting, among other things, the progress of three live
expeditions which are trying to make exploration history.
Still other schools will be charting the continent's
geological history. The roster of e-mail guests included:
Mike Powers, former commander of the ice cutter Polar Sea;
glaciologist Paul Mayewski, University of New Hampshire,
plus Stephanie Shipp, glacier expert, Rice University; Dr.
Bill Green, Ohio State University; explorer Ann Bancroft;
Rebecca Johnson, author of numerous children's books on
Antarctica and ozone; and Beth Marks Clark, director of the
Antarctica Project in Washington, D.C.

Another collaborative project called Maya Quest '97
(http://www.mecc.com/internet/maya/maya.html) has students
follow the Maya Quest team of anthropologists and explorers
as they cycle through Guatemala, Mexico, Belize, and
Honduras. Students give feedback to team scientists and
communicate via e-mail with peers around the world. Classes
exchange information so they can learn vicariously through

their partners. Students become researchers and reporters,
gathering information and making observations for distant
peers (Holzberg, 1996).

Quesada (1997) reported about four environmental
projects in which students used local field studies,
telecommunications-based data comparisons, and multimedia
tools to help preserve natural resources in local
communities. The projects were designed to make students
earth-conscious, and also to provide scientists with
important data for assessing the health of the planet.

One of the projects was originated by Vice-President Al
Gore. The project, called Global Learning and Observations
to Benefit the Environment (GLOBE), is an international
environmental, science and education program. It is a
public-private partnership among the National Oceanic
Association, National Science Foundation, Environmental
Protection Agency, NASA, and the Department of Education.
The program involves more than 3,000 schools from 40
countries, and covers the atmospheres, hydrology, land
biology, and soil. Students collect data about the
environment and enter the information into GLOBE's online
Student Data Archive. Teachers and students can see the
information posted at http://hpcc2.hpcc.noaa.gov/globe.html.
The Web site serves as a forum where students can ask
questions to scientists. It also gives online reports about
other environmental investigations.

Eagle Eye, Inc. was a project based in Avalon Park, Florida. Ninth and tenth grade students at Walker Memorial Junior Academy conducted environmental monitoring at Lake Lillian, an ancient freshwater lake that is home to many unique species. Students collected and analyzed water samples, conducted chemical tests, and collected bottom samples to determine invertebrate life in the lake. This information helped students to identify environmental problems and design solutions. For example, the students discovered that runoff from storm drains were polluting the lake. The students then designed a stencil for painting the drains with warning messages that dumping in these areas pollutes the lake. The students also developed a web page and a multimedia report to share what they learned with schoolmates and their community. Adults involved in the project felt the students gave a real contribution to their community.

Fourth graders at Old Mill School in Mill Valley, California designed a project to help them learn about plants, animals, and waterways in their local, regional, and state biomes. The students were interested in learning about California's 11 different bioregions. The students were especially interested in learning about animals and the habitats that they live in. The Students used books, CD-ROMs, and the Internet for their research. They also conducted telephone interviews and exchanged e-mail with

scientists to gather more information. Then the students learned HTML so they could design Web pages. The Web site (http://marin.k12.ca.us/~oldmweb/tilley) was designed so people can click on the different-colored regions of the state map to call up pictures and information about the animals that the students studied. The biome project is part of a larger project, Autodesk Foundations TinkerTech program, a elementary-level, project-based learning curriculum.

Road Kill is an ongoing multi-age, interdisciplinary telecommunications project involving students in grades kindergarten through twelve from 45 schools around the United States. Each March students are assigned a local road to watch and do a weekly account of the animals they see run over by cars. The students compare their local findings with the mammals, birds, reptiles, and amphibians found on other roads across the country. The weekly reports are added to a database and then reported to the project Web site (http://earth.simmons.edu/roadkill.html). The project encourages investigations of the data to teach ecological principles, such as the effects of seasonal changes, moon phases, and the influences of different ecosystems.

The Desert and Desertification Project was a year-long, four stage interdisciplinary project for students around the world who were interested in studying about deserts. The project was lead by students of the tenth grade from the

High School for Environmental Studies in Midreshet Ben
Gurion, Israel. It involved multiple activities including
discussion, data collection and organization, sound and
image collection and transmission, simulations, role plays,
and environmental forecasting. The project was not a
curriculum, but more of a framework for participants to
select from. The participating students and teachers were
allowed to choose the subjects to study, the method, and
resources given within the framework and timetable.
Participants wrote a report describing the subjects that
they studied or things that may have been of interest to
other participants. The Israeli group then wrote a final
report based on contributions that were made during the
study process. The Israeli group designed this project to
be very open-ended because they felt that the process of
teaching and studying needs to be relevant. Guidelines were
provided that could be adapted to each learning environment,
according to available learning materials
(http://www.ietn.snunit.k12.il/desert/des1996.htm).

The JASON Project is another ongoing telecommunications
project. It focuses on a variety of ocean themes. Students
investigate conditions for ocean life including habitats and
food for aquatic populations. Students can visit ocean
expeditions throughout Florida online. Investigations
include sites in the Everglades, Florida Bay, Florida Keys,
and relic reefs. Students in the project are also

encouraged to communicate electronically about the project with classrooms around the world (Giagnocavo, 1996).

On April 26, 1996 students interested in environmental issues used telecommunications to participate in the fourth annual international Youth CAN (Youth Communication and Networking) Conference at the American Museum of Natural History in New York City. The conference theme was restoring and protecting the earth. The conference promoted worldwide idea sharing about problems facing the earth's environment. Students were encouraged to share projects that focused on the restoration of damaged ecosystems, the creation of habitats, or the protection of existing wildlife (Classroom Connect, April, 1996). Environmental collaborative telecommunications projects and activities like these are making a positive impact on environmental issues. Through collaboration and telecommunications students are able to become active participants in solving environmental problems.

HyperStudio

In this age of CD-ROM and the explosion of the Internet, the way we read and gather information has changed significantly. Multimedia software author, Wagner (1996), believes if students' references are in a multimedia format, it is time students delivered presentations and research in the same manner. Paper and pencil reports, even word-processing, no longer prepare students for their future. In

1978, classroom teacher, Wagner, founded Roger Wagner
Publishing to provide software that emphasizes technology as
a personal creative tool. The company is committed to
supporting teachers with a vision of how the meaningful and
appropriate use of technology can foster a more individual
and humanistic learning environment. Wagner says his
company's mission is to be a responsible participant in the
movement to fundamentally change the educational process in
this country, to provide the multimedia writing tool that
not only supports a student-centered constructivist approach
to learning, but also to provide the ideal platform for
assembling and presenting the wealth of information now
available through the Internet, CD-ROM and other information
sources.

Milton & Spradley (1996) present a no-nonsense approach
to teaching HyperStudio to high school students. Initial
strategies are discussed for creating interest groups,
gathering text, graphics, clip art, animation, and video.
Hardware requirements are listed along with production
suggestions. Flow charts, storyboards, conferences,
revisions, deadlines, and due dates are also discussed. The
rationale is that when students, in a collaborative
environment, are able to develop and express their own
individual creativity, higher level thinking skills are
fostered.

Hypermedia on the Internet

Through Hyper Text Markup Language (HTML) and the Internet, hypertext has taken on a role as a facilitator of navigation and as a tool for enhancing communication. The features of HTML provide a forum for sharing ideas. As students exchange materials about their projects with other students, expectations are that learning will be enhanced. The web-based hypertext system enables student projects to become a training opportunity for other students (Scigliano, Levin and Hane, 1996).

Since much of the new material found on the Internet today is contained on World Wide Web (WWW) sites, it makes sense that students and staff would like to utilize WWW resources as part of their multimedia writing. One solution might be to use a Web browser such as Netscape or MacWeb as the presentation tool and jump from site to site using the Web's hypertext interface. Unfortunately, that doesn't allow for the degree of interactivity people have become accustomed to since not all Web sites referenced in a report on a topic would necessarily have links to the other Web sites used for the report, nor would most people like to present from a hotlist or bookmark list that contains dozens of entries. Ideally, the presentation tool used by staff and students should allow for local, static types of information such as text, graphics, sound, animation, videodisc and CD-

ROM, but also allow transparent access to Web sites as part

of the local presentation. A number of companies purport to

allow this. HyperStudio's solution is New Button Actions

(NBAs).

NBAs allow the designer to enter a URL directly or copy

and paste from an Internet address list. After creating

this button action, any time this button is activated in the

stack, the connection will pass this URL to the application,

which will in turn display the requested Web page. At this

point, the viewer can continue to browse the World Wide Web

and be returned to the HyperStudio stack and local

presentation mode. In this manner, staff and students can

share local resources and Internet resources in the same

presentation software. The only requirements to using these

NBAs are that the user has Netscape or MacWeb browser on the

hard drive and an active TCP Internet connection.

A second method to access Web pages through

HyperStudio is to make a button action in the presentation

which connects to a MacWeb Hotlist file, a Netscape Bookmark

file, the Netscape application or the MacWeb application.

This method effectively allows HyperStudio to access

virtually every resource available on the Internet as part

of a multimedia writing project. Effective use of either of

these methods of accessing the Internet through HyperStudio

would involve staff and students in researching their sites

beforehand and saving the URLs in a word processor document for copy and paste in the NetPage or MacWebPage dialog box.

Yet another method of delivering HyperStudio stacks over the Internet is to configure the Web browser to support the launching of HyperStudio when it encounters stacks as part of a URL. However, an even easier and more effective method of including HyperStudio stacks in Web pages is to use the HyperStudio plug-in. With this plug-in and the ability to use frames on Web pages, all of the features of HyperStudio stacks along with standard HTML coding can be combined, all on the same page without launching HyperStudio separately. This is the tool that enables K-12 staff and students to create special effects without any programming training.

Advanced multimedia options for the Web have been created in the past year that use formats other than those traditionally supported by Web browsers. A technology called plug-in has been developed to allow these multimedia special effects to be viewed from a standard browser. Examples of programs with plug-ins are Macromedia's Shockwave and Progressive Network's Real Audio. On the high end is Java, a plug-in technology designed to do advanced animation (Weinstein, 1997).

HyperStudio has its own innovative approach for accessing data on the Internet. HyperStudio buttons can direct Netscape to open to a specific home page or other URL

location. This can be used to easily integrate particular Internet displays right into a presentation or student project. With HyperStudio MediaLinks, HyperStudio will automatically connect through the Internet to a predetermined site, download the file, and the image will appear in the clip-art selection window, without the user even having to know anything about the Internet. Students can transparently access Internet files (Wagner, 1996 www.hyperstudio.com).

Roger Wagner Publishing chose to use the plug-in route because of the flexibility it offers users. Multimedia authors can create new HyperStudio stacks for their Web pages or utilize previously created stacks to include in Web sites. Web authors download the HyperStudio-to Internet publishing system to include HyperStudio stacks in HTML environments. Authors can specify whether they want the HyperStudio animation, lesson, or other multimedia presentation to display in a window of the page or take the place of the entire Web page. Visitors to the page download the plug-in needed for playback. Then they are able to interact with the online HyperStudio stack as much as they would a stack running on the computer. Those visiting the site can see special effects such as screen wipes and unusual button actions (Salpeter, 1997).

Web sites using this new technology are beginning to emerge. A project using hypermedia, Global Exchange

(http://cirrus.sprl.umich.edu/KGS/KGS.html), was developed
as a learning model in the Kids as Global Scientists
Project. This project was developed to value the
contribution of each participating site; capitalize on
distributed expertise; take advantage of real- or near-time
knowledge; give increased responsibility to students;
provide opportunities to make connections and relevance
while learning content; and seek appropriate use of mentors
and others for scaffolding knowledge development and
integration (Black, Klingenstein & Songer, 1995).

Another Web site that utilizes this hypermedia is State
Fairs on the Web(www.aristotle.com/MapServe/usa.map?24,113).
The site was developed for publishing student-team
generated, multimedia presentations on the World Wide Web.
Students used traditional research tools in addition to an
Internet State Report Resources page. All fifth grade
students at Sonoran Sky Elementary School, following the
completion of a unit of study on the United States,
participated in a State Fair. Students represented different
states from around the country, displaying items of culture
related to their individual states. In addition, each
student displayed a State Report in hard copy format.

HyperStudio multimedia publishing software was
purchased to enable students to create multimedia
presentations of their State Reports. Students used the Web
and on-site resources including campus videos, photographs

from a digital camera, scanner, laser discs and electronic

encyclopedias, atlases and reference guides to develop their

presentations. During the State Fair, parent volunteers

helped relocate the computers from the Computer Lab to the

gymnasium where the fair was held. Those attending the fair

were interactively involved with the digital State Reports.

The multimedia reports were put together as part of an

elaborate Web site. Visitors just click on areas on map of

the United States to download multimedia presentations of

each state.

Another site called HyperStudio in Cyberspace

(http://picard.dartmouth.edu/~cam/RBA.01.html) consists of

several cards from a HyperStudio stack. The site was

created by fifth and sixth graders at Marion Cross School in

Vermont. The Web page was hosted by Interactive Media Lab

at Dartmouth Medical School. When visitors can click on

images of the students within the card, it dissolves to a

new card containing information about the students. The

site also contains links to school and community news sites.

Environmental Hypermedia on the Internet

A group of students at the Model Secondary School for

the Deaf (MSSD) located at Gallaudet University in

Washington, D.C. used the Internet to enhance their

awareness and knowledge about the Earth's ecosystems. The

students hoped this would help them to make informed

decisions about environmental issues in the future. The

MSSD group was one of 14 members of the Earth Systems

Science Community Curriculum Project. The science students

conducted research, tested hypotheses, and exchanged

information electronically with other students, teachers,

and scientists from around the world. The MSSD students

studied topics such as atmospheric cycling, climate

modeling, global warming, and ozone distribution. Students

were grouped cooperatively in teams and asked to work on

problems that were of real concern to scientists. One team

used their data to chart graphs and conduct in-depth

research in order to test their hypothesis. The group's

conclusions were published in a hypermedia report available

on the World Wide Web. Both the teacher involved in the

project and the students said that the ESSC Web page Web

page was a source of pride. The group's Web page can be

found at http://www.gallaudet.edu/~msellwso/start.html.

The Web page was a focus for student work throughout the

year (Ellsworth, 1996).

Technology has played an important role in facilitating

access to environmental information. Technology will

continue to be an important resource of value to

environmental education for years to come. Over the last

several years technology has been a valuable tool for

environmental education, especially in broadening

communication among educators and students, and expanding

environmental education to include scientists, citizen

groups, businesses, and government agencies (Rohwedder, 1994). Computer-aided environmental education, when used properly, has served as a catalyst or extension for field-based exploration or instruction. The Communication Age has provided an opportunity to create an inspired, informed, and active environmental citizenry. As even more advanced technologies come forth, educators will be challenged to find new ways to use new technologies to promote environmental education.

CHAPTER THREE. STATEMENT OF OBJECTIVES

The goal of this master's project is to develop a collaborative telecommunications project that will use telecommunications, multimedia, and online learning as an approach to teaching environmental literacy. The project focuses on using instructional technology as a way of promoting the goals and objectives of environmental education. Technology will assist in creating a deepened environmental awareness among the students. Technology will stimulate sustained exploration of environmental content, problem-solving skills, and citizen action.

It is the objective of this master's project that after participating in the collaborative telecommunications project, the students will be able to identify a variety of natural habitats and ecosystems throughout the world; and demonstrate the development of responsible environmental behavior. It is hoped that this collaborative project will inspire within the students a sense of personal responsibility for the care of the environment. Ultimately the goal is for the students to develop lifelong learning skills: communication, problem-solving, decision-making, critical-thinking, and evaluation. Students will be able to use these skills throughout their lifetime in order to take

appropriate action to maintain, restore, or improve the

health of the environment.

CHAPTER FOUR. DESIGN AND DEVELOPMENT OF THE PROJECT

Habitats Online has three components: a collaborative telecommunications project, a HyperStudio stack, and a Web page. Although there are three separate components, they are all linked together. The collaborative telecommunications project is a component developed to engage students in rich, meaning-centered learning. This component requires collaboration among students in various locations around the world to plan, collect, organize, pool together, and share information about a common topic. In this project the students exchange information about habitats from their part of the world. The HyperStudio stack component is a student project used to both showcase the learning outcomes from the telecommunications project, as well as to motivate participation in the telecommunications project. The Web page component is a delivery tool to share information about the telecommunications project, and to display the student products of the project. This chapter will explain details for the design and development of the three components.

Telecommunications Project Design and Development

The first component, a collaborative telecommunications project, is posted on the Global School Network. Since 1985 Global SchoolNet Foundation (GSN) has been a leader in the instructional applications of

telecommunications. Today the Global SchoolNet Foundation (http://www.gsn.org/), non-profit corporation, is a major contributor to the philosophy, design, culture, and content of educational networking on the Internet and in the classroom. GSN has had a big impact on networking in the kindergarten through grade 12 community.

GSN, formerly called FrEdMail (Free Educational Mail), originated with a group of teachers in San Diego over a decade ago. With no budget and minimal support, GSN set about creating a powerful and now internationally recognized educational information infrastructure starting at the grass roots level.

With the help of a grant from the National Science Foundation in 1992, GSN envisioned and then constructed the concept of the Global SchoolHouse (http://www.gsh.org/gsn/) where teachers, students, business, government, and the community can learn side-by-side. Today GSN's New Global SchoolHouse is sponsored by Microsoft. GSN's Internet Project Registry (http://www.gsh.org/gsn/proj/index.html) is designed for busy teachers searching for appropriate on-line projects to integrate into their required coursework. This registry is the one central place on the Internet where teachers can find projects from the GSN and other organizations such as I*EARN, IECC, NASA, GLOBE, Academy One, TIES, Tenet, and TERC. Projects are listed by the month in which they begin. Habitats Online was listed in

the September, 1996 project registry. The project can be found online at http://archives.gsn.org/sep96.

As part of GSN, Habitats Online was also distributed through HILITES, the oldest listserv on the Internet devoted exclusively to project-based classroom learning projects. All messages sent to the HILITES list must meet a certain criteria before they are posted. This is to ensure that subscribers to HILITES mailboxes won't be flooded with inappropriate or off-subject messages. HILITES is reserved for K-12 teachers to announce learning projects which will engage students in other classes in one or more collaborative learning activities. This listserv does not post questions, announcements, requests for pen pals or sister classes or any other messages which do not support a concrete, multi-lateral learning project that engages students in more than one classroom. Project proposals must contain goals & objectives, suggested or tentative timelines, proposed or example activities, and explain how participating classes can also benefit from their contribution to the project. Appendix A shows the template provided by HILITES called "Keys to Successful Projects". Figure 1 is an image of the project posting.

Because Habitats Online was a qualifying project announcement sent to HILITES@gsn.org, it was also cross-posted to other popular Internet listservs as well as to many state, regional, and national networks around the

world. This enabled the project to receive a wide distribution around the world. Appendix B shows the Habitats Online project plan and call for collaboration which was posted on the Global School Network.

Habitats Online was primarily designed to create an awareness of the variety of natural habitats and ecosystems throughout the world. The "Habitat" theme was used as a tool to create an awareness of the students' immediate environment; as well as show the connection with the world as a whole. Students from across the globe shared their knowledge about their own habitats.

The project focused on a variety of curricular areas including science, ecology, geography, language arts, and visual arts. The project allowed technology to be integrated into these curriclum areas.

This master's project initiated the participation in a global collaborative telecommunications project. The project began with a 4th grade class at Margaret White School, located in the isolated desert of Southern California. The school was home to the Margaret White School Desert Riparian Habitat where the students had been given the opportunity to learn a great deal about the desert area. Through Habitats Online the students are to share multimedia projects created about the habitat with others interested in learning about the desert environment. In

addition, the students are to learn about other types of habitats and ecosystems.
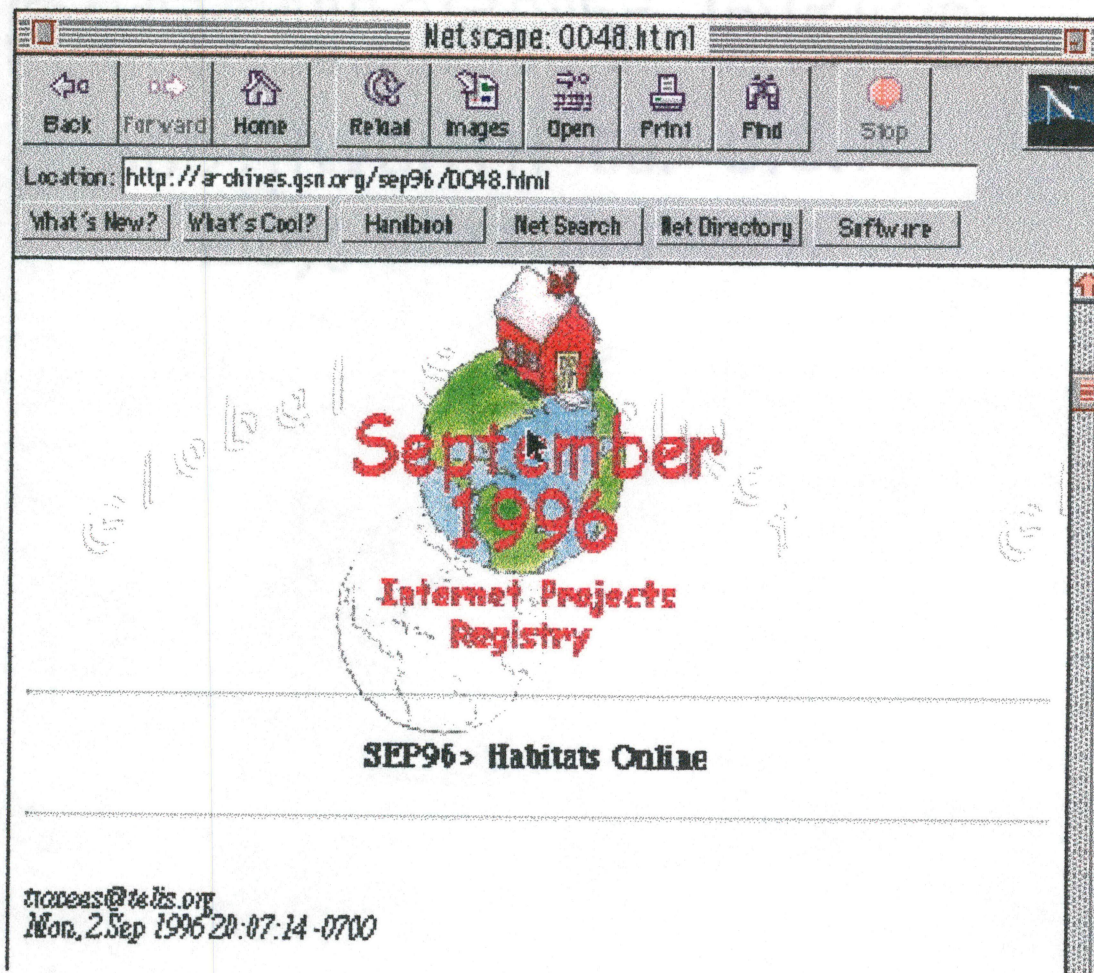

Figure 1. Habitats online posting on Global SchoolHouse.

Each participating teacher has students write descriptive essays about the habitat of their own region. The teacher chooses the most descriptive essay and e-mails or faxes a copy to the initiating classroom in the California desert. The desert classroom then creates a piece of artwork reflecting that description. Descriptions

are received for a variety of different ecosystems in habitats ranging from California to Ireland. Appendix C lists the e-mail participants of the project.

The Habitats Online project is designed for students in upper elementary grades to middle school. Students in grades three through seven participate in the project. Initially, over thirty schools responded to the project posted on the listserv. Twenty different schools completed the project. They included the following habitats: Desert Habitat, Plains Habitat, Wetlands Habitat, Deciduous Forest and Grasslands, Lake Eerie Habitat, Woodland Habitat, Smoky Mountains, Valley Habitat, Pacific Coast Habitat, Redwoods Habitat, Atlantic Coastal Plain, Grassland & Deciduous Forest, Connecticut Wildlife Habitat, Oak Woodland, Temperate Hardwood Forest, Pacific Coastal Plain, Pacific Northwest Habitat, Fresh Water Pond Habitat, Prairie Habitat, and Ireland Habitat.

Two of the participating schools were studying the desert at the start of the project. These schools transmitted questions about the desert electronically for the desert students to answer. Students from the American School for the Deaf in Hartford, Connecticut faxed questions to the desert students. Students in Potter Valley, California used e-mail to ask questions. Both schools also shared information about their habitats in the same way.

Students near the Lake Eerie habitat in Perrysburg, Ohio sent a newspaper article via the United States postal service that told about their habitat. Other schools sent e-mail attachments such as graphic image files (GIFs) and word processing documents that would assist with the project. Figure 2 is a GIF sent from Cocoa Beach, Florida to help students understand the wetlands habitat.

For project development of the telecommunications component, e-mail access, a computer, a modem, a telephone line, and a scanner were required. For project delivery and usage, the collaborating classrooms needed a computer with e-mail capabilities and access to the Internet.

Figure 2. Manatee GIF from Florida participants.

HyperStudio Stacks Design and Development

The second component of this master's project was to create a HyperStudio stack showcasing the essays and artwork. The Habitats Online HyperStudio component includes two stacks that are linked together. The two stacks are

linked with a button that transitions them together. Both
stacks include cards that display the habitat artwork and
essays.

This component is a student project. After gathering
information electronically from descriptive essays and
creating artwork based on that information, the students
scan the artwork to make GIFs of the images. Students then
use HyperStudio software to create interactive showcase
cards for the artwork and the essays. Figure 3 shows
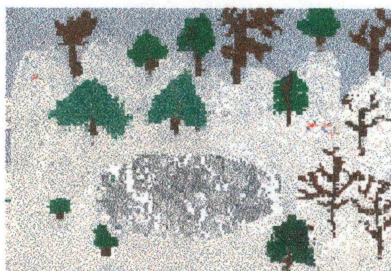artwork samples created by the students.

Figure 3. Student artwork samples created from e-mail.

The first stack includes a title card that give an overview of the telecommunications project and explains the use of the stacks (Figure 4). Examples of the buttons used in the stack are also explained.
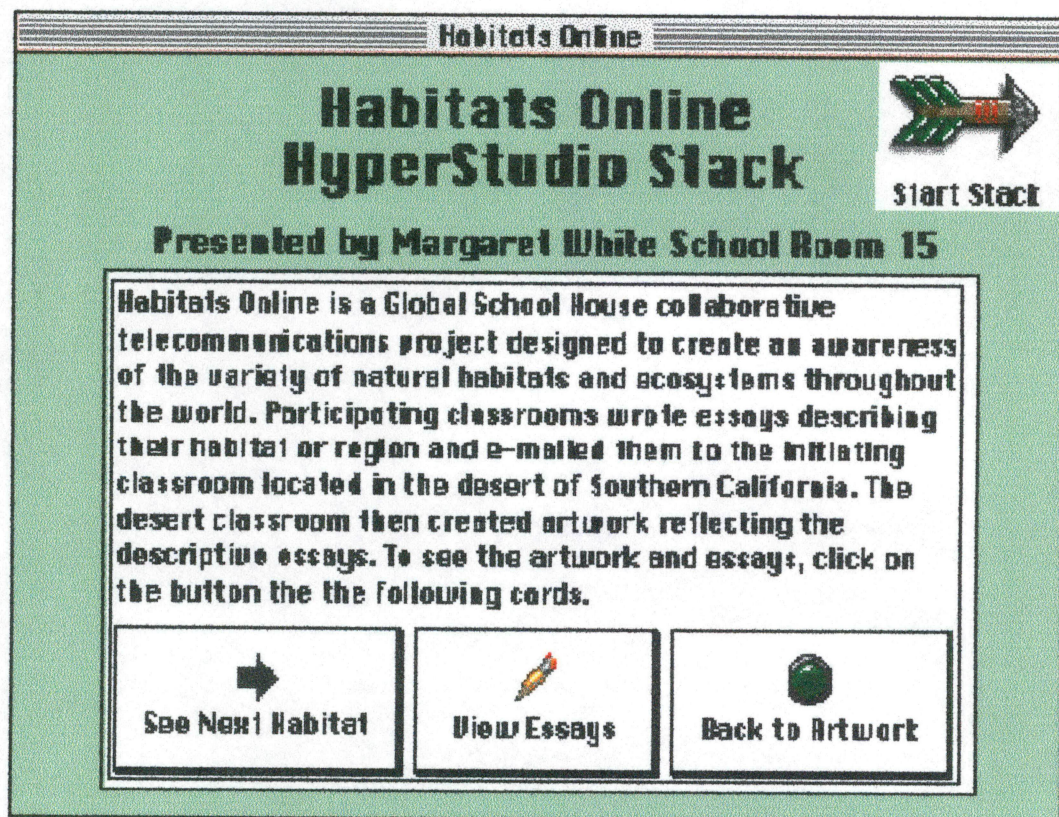
Figure 4. HyperStudio stack title card.

Each artwork card has the same format. Every artwork card includes the name and location of the habitat, a button that links to the essay describing the habitat, and a button linking to the next card. Figure 5 shows an artwork card from the stack. The essay cards also follow a basic format

including the name of the habitat, the description about the
habitat, and a button that links back to the artwork.
Figure 6 shows an essay card.

Figure 5. Sample artwork card.

Figure 6. Sample essay card.

Figure 7 shows a partial storyboard of the two HyperStudio stacks. A few samples of the artwork and essays are shown.

Figure 7. Partial storyboard.
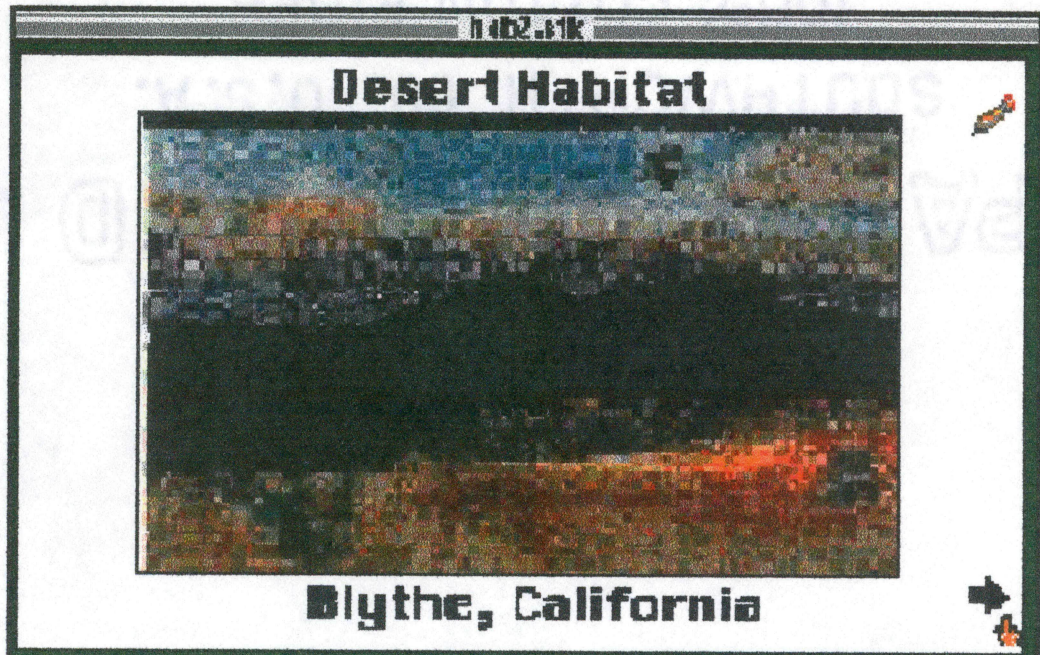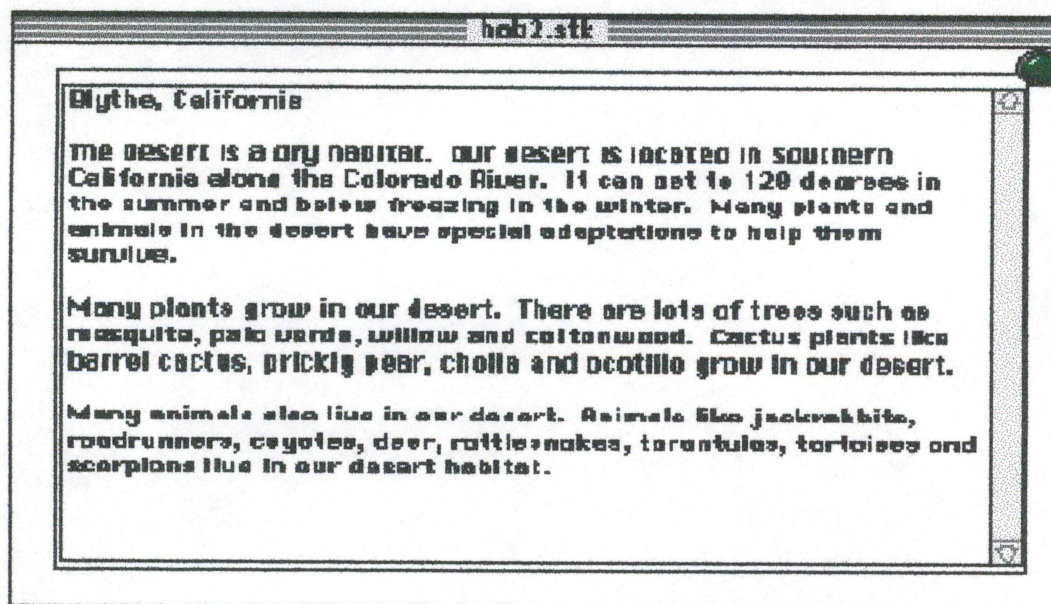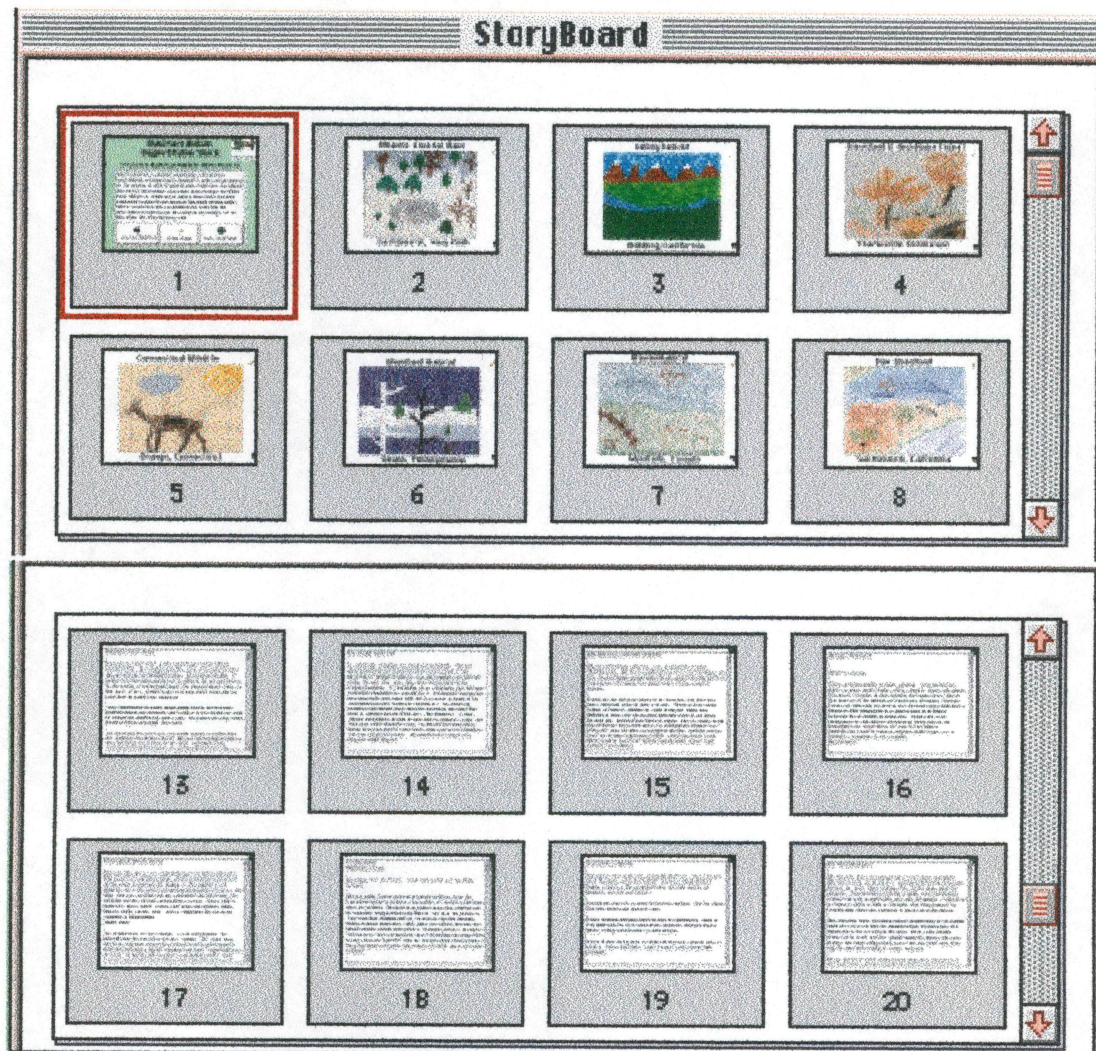
Participants received a copy of the HyperStudio stack in the spring of 1997. The HyperStudio stack was uploaded to

a file transfer protocol (ftp) directory on America Online
on March 2, 1997. Participants could download the stack by
locating the ftp file at
http:members.aol.com/agman38/habitatstacks. Participants
were also sent a hard copy of the stack on disk via the
postal service.

For project development of the HyperStudio stacks, a
Power Macintosh 8500/120 and HyperStudio 3.0 software were
used. For project usage, the collaborating classrooms
needed a computer and HyperStudio or HyperStudio player
software to view the stacks.

The primary purpose of the HyperStudio stack was to be
used as incentive for participation in the project, and as a
learning product. Collaborators were eager to receive a
copy to the stack and indicated that the HyperStudio
component was what sparked their interest in the project.
Many participants e-mailed questions about HyperStudio and
sent messages indicating their excitement about receiving
the stack.

Web Page Design and Development

The final component of this master's project was to
design a Web page about the project. The purpose of the Web
page was for collaborators and others interested parties to
have a site on the Internet where they could learn about the
different habitats. Students and teachers were eager to

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have their artwork and essays posted on the Internet for others to see.

Initially the project was posted on Microsoft's Schools on the Web (http://207.22.231.50:80/schools/usa/ca/mwe2806/). Microsoft and MCI Corporation developed Schools on the Web in order to provide every K-12 school in the United States the opportunity to have a presence on the Internet at no cost. The only requirement was for the school to already have an Internet connection and an email account. The program also allows K-12 schools to register their school in the Schools on the Web database.

At first Habitats Online became part of Schools on the Web by using the basic templates available online through the GSH Web Site. Simple questions were answered which included giving the name of the school, address, and project information. A variety of background colors were available to individualize the Web page. Within minutes, the page could be viewed online and changes could be made. The page was very simple, but provided instant information about the school and the Habitats Online project.

Later a custom home page was created using Claris Home Page software for a 30 day trial period. The custom page was uploaded to the pre-existing page created for the school using the templates. The Habitats Online home page enabled students interested in learning about a variety of

ecosystems to visit the school's web site at the touch of a
button. The names of participants and their essays were
posted on the page. However, the graphics were not able to
be seen.   By this time the 30 day trial period for use of
the Claris Home Page had expired. Therefore, a new home
page was designed using Netscape Gold Editor. This final
version was posted at:

http://www.redrivernet.com/tracee/habitat.html.
Appendix D shows samples of the Web page. Appendix E shows
the html source code for the entire project.

Since the page was designed to disseminate the
information gathered about the habitats during the
collaborative telecommunications portion of the project, the
design was kept simple. Visitors to the page click on the
name of a particular habitat to view the artwork and the
essay describing that habitat. Visitors who have
HyperStudio Pug-In and are using Internet Explorer or
Netscape 2.0.1 or higher can also view the HyperStudio
stacks created about the project through two links on the
page. The plug-in displays the HyperStudio stacks right
inside of the viewer's browser window.

Visitors to the page can navigate through the stacks
just as they would if it had been opened through
HyperStudio. Those who do not already have the HyperStudio
Plug-In can download it through another link on the page.

The page is also linked to another Web page which gives tips for successful telecommunications projects. This link gives access to the Global SchoolHouse Web page.

Telecommunications Project Instructional Design

All three components of Habitats Online (the collaborative telecommunications project, the HyperStudio stacks, and Web page) applied the constructivist theory. Habitats Online was meant to demonstrate how technology-based design activities give students opportunities to build on their own experiences, draw on real-world educational experiments, and empower children from a wide range of backgrounds to become more confident and competent learners.

One foundational premise of this theory is that children actively construct their knowledge, rather than simply absorbing ideas spoken at them by teachers. In this project, the teachers served as a guides, rather than as the sole source of knowledge.

Constructivism theory research has found powerful gains are made when children work together. A growing body of research on collaborative or cooperative learning has demonstrated the benefits of children working with other children in collective learning efforts (Rysavy & Sales, 1991). When children collaborate, they share the process of constructing their ideas, instead of simply laboring individually. The advantages of this collective effort are that children are able to reflect on and elaborate not just

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their own ideas, but those of their peers as well. Children

come to view their peers not as competitors but as

resources. Mutual tutoring, a sense of shared progress and

shared goals, and a feeling of teamwork are the natural

outcomes of cooperative problem-solving, and these processes

have been shown to produce substantial advances in learning.

This research was considered when planning the instructional

design of Habitats Online.

HyperStudio Stacks Instructional Design

Although students designed the HyperStudio stacks, a

basic framework was provided. Consistency and clarity were

the key design features. With the exception of the title

card, each card followed the same format in order to keep

the contents organized. The title card explained the

collaborative project and the various buttons on the

remaining cards.

Eleven cards had a basic template to showcase the

artwork created from the collaborative project. Each of

those cards included the name and location of the habitat, a

graphic of the habitat, a button that linked to the essay,

and a button that linked to the next card. The eleven essay

cards included a scrolling text field, and a button that

linked back to the artwork card for that habitat.

Since the stacks were being used as a presentation

tool, the cards were designed to minimize confusion. The

presentation material was organized and displayed into

easily recognized patterns. The cards were also designed to be visually pleasing to the viewer.

Web Page Instructional Design

The Web page was also designed to be visually pleasing but easily interpreted. It was developed to create a balance between visual sensation and graphic and text information. Consistency and predictability were essential attributes of the design.

The design also included essential items that should appear on every WWW page according to a style guide located at:

http://info.med.yale.edu/caim/stylemanual/M_II_5.HTML

The items included:

> *author or contact person
> *link to local home page
> *institution
> *date of creation or revision
> *the URL of the document
> *links to other related pages in the local Web
> site
> *button bars or other navigation aides

Telecommunications Project Formative Evaluation

Since it is the objective of this master's project that after participating in the collaborative telecommunications project, the students will be able to identify a variety of natural habitats and ecosystems throughout the world, the initiating classroom was surveyed to evaluate their acquired knowledge. One hundred percent of the students surveyed

were able to identify eighty percent of the habitats in the project (See Appendix F for I.R.B. approval letter).

Student attitudes were also surveryed. First, students were asked to say whether they felt they learned a lot, a fair amount, only a little, or practically nothing about the environment problems after participating in the project.

All of the students in the initiating classroom indicated that they learned a lot about environmental problems after participating in the project. The students were also asked if they would like to participate in more collaborative telecommunications projects. All of the students indicated that they would like to participate in more collaborative telecommunications projects.

Collaborating participants were also involved in the evaluation process. Participants were asked to make comments and suggestions about the project through e-mail. The habitat theme proved to be a topic of great interest. Many participants indicated that their students were eager to study a variety of habitats, and get first hand information from peers as opposed to just reading about the habitats from books. All feedback from participants was positive. Appendix G shows a sample of e-mail from a collaborating classroom.

Many participants indicated that this was their first collaborative telecommunications project, and they were eager to try out this technology with their students. Two

collaborators created their own projects after participating in Habitats Online.

HyperStudio Stack Formative Evaluation

The fourth grade class located in the desert was surveyed to evaluate the Habitats Online HyperStudio stacks. The students were asked to view the stacks, and answer the following questions: Are the stacks easy to use? What do you like best about the stacks? What would you like to see changed within the stack? The students were encouraged to express their opinions about changes in writing. Surprisingly all of the surveys had basically the same responses. All of the students felt the stacks were easy to use, and they could figure out the buttons by reading the title page instructions. Nearly all of the students stated that the scanned graphics were their favorite part of the stacks. Some said that their favorite part of the stacks was seeing the picture that they created. A couple of students stated that they liked everything about the stacks. None of the students wanted to make changes to the stacks.

During the evaluation process, some students found typographical errors. These were instantly corrected as they were found during the viewing of the stacks.

Web Page Formative Evaluation

Since the Web page was meant to be used as a tool for delivery to disseminate information about the collaborative

telecommunications project, the evaluation process was very informal. Participants were asked for advice on what they would like to see on the Web page. Most just wanted to see the artwork and essays posted so the students could see their accomplishments on the Internet. The teacher from the American School for the in Deaf Hartford, Connecticut asked if the page could include a section on tips for creating this kind of a project. She thought many teachers would be interested in this kind of information. As a result, a link to the Global SchoolHouse "Tips for Successful Projects" was added to the page.

Strengths and Limitations

Habitats Online has several strengths. The project was an effective tool to teach students how to both communicate and collaborate by connecting teams of students with other classrooms around the world. The students enjoyed communicating with schools from different geographical locations, students were given opportunities to understand different environments, and students began to consider issues that are of global concern. The teachers were also motivated to use classroom telecomputing technologies as a tool for involving students in interactive projects that will motivate them to improve their skills and learn about the world around them.

Habitats Online also had some limitations. Time was one limitation for the project. Because the project lasted approximately six months, many changes took place over that period of time. At first, participants kept close contact with each other through e-mail and other forms of communication. When participants were e-mailed later in the project to inform them about obtaining the HyperStudio stacks, several messages were returned. Many were no longer members of the e-mail service that they previously belonged to. This project required enough time to get all of the artwork and essays put together. However, six months may have been too long for the communication aspect of the project. Teachers tend to get busy and lose contact with each other. Perhaps a shorter timeline would have been more successful.

Equipment was another limitation. Because not all participants used the same platform and software, there were some problems with sending some files electronically. At first, some word processing files were unable to be opened because not all participants used the same software. Some files had to be resent using a different program. Some participants could not receive any attached files through e-mail.

Another limitation was trying to get Web page space that could handle all the graphics needed for this type of project. The Habitats Online Web page, with the HyperStudio

stacks included, was 3.0 megabytes. This was much too large for most services that provide Web space for free. The Web page also is very slow to dowlnload because of all of the graphics on the page.

Recommendations for Future Projects

Habitats Online could be expanded in the future. Noteworthy individuals such as scientists, explorers, or experts in some aspect of environmental study, could be invited to participate on-line via electronic mail or in computer conferences as an extension of the personal on-line exchange.

Habitats Online could also become an environmental action project. Unlike simulations and electronic field trips, these are the real thing. Collaborative projects can be used to mobilize action in many different ways, from working to change public policy to cleaning up pollution. The students could work together to solve some type of environmental problem. Other collaborative telecommunications projects have tackled such issues as rural water quality, air quality, and other causes of pollution. Perhaps, Habitats Online could focus on issues that involve the destruction of natural habitats. The project would probably be more meaningful if it were more action-oriented.

Habitats Online will be featured as an Internet project success story in the Successful Internet Projects book published by Classroom Connect. Appendix H shows the e-mail correspondence from the publishing company.

Collaborative telecommunications projects like Habitats Online offer an abundance of learning opportunities. Telecommunications has the potential to revolutionaize the educational future. Educators will be faced with many challenges for implementing and evaluating the use of emerging technologies. With advancements in technologies, the Web can be an even more compelling educational medium. Educators and students participating need to be actively involved in shaping the continuing development of the future of educational telecommunications. Collaborative telecommunications projects enable teachers to try emerging technologies while bringing the global community together.

<u>Appendix A: Keys to Successful Projects Template</u>

Project:
Name of your project

Date:
1 line: Give the starting and ending dates of the
complete project. Leave at least 4 weeks before the
start of the project to permit enough people to
respond to your call for collaboration.

Purpose:
2-3 sentences: give a brief summary of the purpose
of the project: What will students who participate
in this project learn?

Subjects:
1-2 lines: State the curriculum areas which will be
addressed by this project. Most projects are
multidisciplinary... list as many as apply.

Grade level:
1 line: Indicate the appropriate grade levels for
the project.

Summary:
1-2 short paragraphs: BRIEFLY describe the project.
This paragraph should catch the interest of your
readers. Number of participants: 1 line: Indicate
the number of classrooms that you wish to work with.

Project Coordinator:
Give your name and email address. You may wish to
include your school mailing address and phone
number.

How to register:
Provide complete instructions for registering with
you to complete this project. Don't forget to
include your email address. You may want to request
all or some of the following information:

Your full name:
Your email address:
Your school:
District:
School address:

School voice phone:
Home voice phone:

Grade(s) taught:
Subject(s):

HILITES also recommended the following
information:

Timeline:
Break down the project into very specific steps with
dates, including starting and ending dates where
relevant. This should in effect summarize all of the
important steps of the project described below.

Complete project outline and procedures:
Describe the project in greater detail. Make an
effort to be specific regarding who does what: what
the other teachers and students do, what you do.
This description should give participants a clear
idea of what you will expect of them, and they of
you.

Appendix B: Habitats Online Using Template

Project: Habitats Online

Date: September 1996-December 1996

Purpose: This project is primarily designed to
create an awareness of the variety of natural
habitats and ecosystems throughout the world. The
"Habitat" theme will be used as a tool to create an
awareness of the students' immediate environment; as
well as show the connection with the world as a
whole.

Subjects: Science, Ecology, Geography, Language
Arts, Art

Grade Level: Upper Elementary to Middle School

Summary: My 4th grade class is located in the
isolated desert of Southern California. Our school
is home to a "Hands-On Desert Habitat" where my
students have been given the opportunity to learn a
great deal about our desert area. Through Habitats
Online my students would like to share multimedia
projects created about our habitat with others
interested in learning about the desert environment.
In addition, my students would like to learn about
other types of habitats and ecosystems.

Each participating teacher would have students
write descriptive essays about the habitat of their
own region. The teacher would then choose the most
descriptive essay and e-mail or FAX a copy to us.
My class would then create a piece of artwork
reflecting that description. We are hoping to get
descriptions for a variety of different ecosystems.
The final stage of the project would be for my class
to create a HyperStudio stack showcasing the essays
and artwork. Participants would receive a copy of
the HyperStudio stack in the spring.

Stage I: (Late September 1996-November 1996)
Collaborating classrooms send descriptive essays of
habitats via
e-mail(tracees@telis.org) or FAX (619) 922-1367
Interested classrooms could also inquire about our
desert habitat and multimedia projects during this
time.

Stage II: (December 1996-February 1997)
The desert group will create artwork reflecting the
descriptive essays,
then create a HyperStudio stack showcasing the
essays and artwork.

Stage III: (March 1997-April 1997)

Habitat HyperStudio stacks will be sent to
participants.

Number of Participants: Approximately 30

Project Coordinator: Tracee Sudyka
                       4th Grade Teacher
                       tracees@telis.org
                       Margaret White Elementary
                       Palo Verde Unified School
District

                       610 N. Broadway
                       Blythe, CA 92225
                       (619) 922-5159
                       FAX (619) 922-1367

Appendix C: E-mail Participants

E-mail participants included:

clingsen@usit.net

KSchaw@aol.com

sysop@kghs.ncape

bobt@scceo.k12.ca.us

TREADWAY@TEN.K12.TN.US

mbodner@minet.gov.mb.ca

yoda@mail.twd.net

orange2@minerva.cis.yale.edu

attracta@iol.ie

jcoffman@cabrillo.campus.mci.net

srace@t-e.k12.pa.us

lminsart@shastlink.k12.ca.us

LVVF95D@prodigy.com

clumsden@orca.esd114.wednet.edu

jUpton@gnn.com

kdavid@ops.esu19.k12.ne.us

TEMPEST_L@POPMAIL.FIRN.EDU

LAUBRY@UOFT02.UTOLEDO.EDU

pamela13@ix.netcom.com

cjones@springfield.k12.il.us

Habitats Online

Presented By Margaret White Elementary School Room 15

610 North Broadway Blythe, California 92225

Habitats Online is a Global SchoolHouse collaborative telecommunications project designed to create an awareness of the variety of natural habitats and ecosystems throughout the world. Participating classrooms wrote essays describing their habitat or region and e-mailed them to the initiating classroom located in the desert of Southern California. The desert classroom then created artwork reflecting the descriptive essays. The following habitats participated in the project:

Atlantic Coastal Plain, New York

Pacific Northwest, Washington

Wetlands Habitat, Florida

The Plains, Nebraska

Pond Habitat, Connecticut

Ireland Habitat

California Desert

The Great Smoky Mountains

Potter Valley, California

Clarksville, Tennessee

Sacramento, California

Springfield, Illinois

Manitoba, Canada

Santa Barbara, California

Pennsylvania Woods

Central Pacific Coast, California

Orange, Connecticut

Lake Erie, Ohio

Oak Woodland, California

New Florence, Pennsylvania

Send comments or questions to tracees@telis.org

Tips for Successful Collaborative Projects
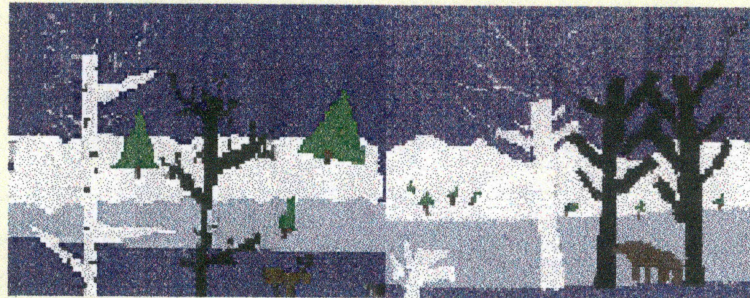
Download HyperStudio Plug-In to View Our HyperStudio Stack

See Part of Our HyperStudio Stacks
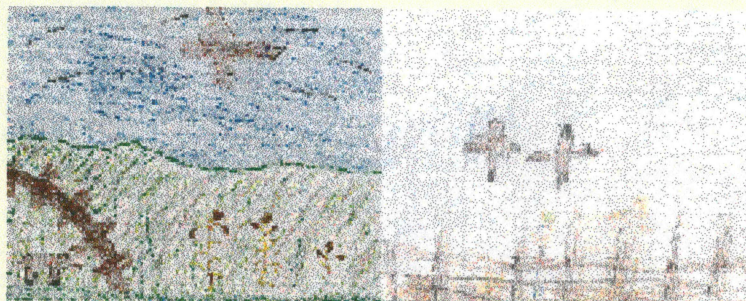
See the Rest of the Stacks

Last updated May 10, 1997

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Pennsylvania Woods Habitat

Picture By Sarah Jensen and Tori Poole

We have lush, green trees and deciduous trees. When fall comes the leaves turn yellow, orange, red and brown. The temperature in the winter is normally 30 degrees. In the summer it is 90 degrees out. In the winter we get heavy snow and a lot of ice. The deer became a problem and we sometimes have deer hunts. The animals we have here are groundhogs, raccoons, foxes, rabbits, squirrels, geese, robins, crows, owls, blue jays, skunks, hawks, ducks, snakes, toads, frogs, turtles, chipmunks. We live in the suburbs of Philadelphia.

Prairie Habitat Manitoba, Canada

Pictures By Ashley Dockery and Lucas Lawson

Greetings from the Prairie - Grade five students of Sun Valley School!

We live on the Prairies, natural grassland with few trees. The Canadian Prairie lie between the Foothills of the Rocky Mountains and the Red River. This natural grassland covers the southern part of Manitoba, Saskatchewan and Alberta. Not all of the prairies is flat, level land. Although half of the area is very flat, there are many different landscapes. Hills, wide river valleys and even low mountains are found on the prairies. However, much of the land is flat with rich, fine soil. Because there is little rainfall and the land is dry, there are few trees. The flat, treeless prairie has become a huge agricultural region of wheatfields, livestock farms and cattle ranches.

Appendix E: Web Page HTML

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<CENTER><P><B><FONT COLOR="#041000"><FONT SIZE=+1>Presented
By Margaret
White Elementary School Room 15</FONT></FONT></B>
</P></CENTER>

<CENTER><P><B><FONT SIZE=+1>610 North Broadway Blythe,
California 92225</FONT></B></P></CENTER>

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<P><B><FONT COLOR="#1F4D13"><FONT SIZE=+2>Habitats Online is
a Global School
```

House collaborative telecommunications project designed to
create an awareness of the variety of natural habitats and
ecosystems throughout the world. Participating classrooms
wrote essays describing their habitat or region and e-mailed
them to the initiating classroom located in the desert of
Southern California. The desert classroom then created
artwork reflecting the descriptive essays. The following
habitats participated in the project:</FONT></FONT></B></P>

<P><B><A HREF="essays.html#Blythe, California">California
Desert</A></B></P>

<P><B><A HREF="essays.html#Smoky Mountains">The Great Smoky
Mountains</A></B></P>

<P><B><A HREF="essays.html#potter">Potter Valley,
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<P><B><A HREF="essays.html#Clarksville,
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<P><B><A HREF="essays.html#Pennsylvania Woods
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<P><B><A HREF="essays.html#Orange, Connecticut">Orange,
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California">Oak Woodland, California</A></B></P>

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<P><B><A HREF="tsudyka@aol.com">Send comments or questions
to tsudyka@aol.com</A></B></P>

<P><B>Last updated March 20, 1997</B></P>

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Desert</FONT></B></P></CENTER>

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California</FONT></B></P></CENTER>

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<CENTER><P><B>Pictures by Garrett Reaume and Daniel Sanchez
</B></P></CENTER>

<P>The desert is a dry habitat. Our desert is located in
Southern California along the Colorado River. It can get to
128 degrees in the summer and below freezing in the winter.
Many plants and animals in the desert have special
adaptations to help them survive.</P>

<P>Many plants grow in our desert. There are lots of trees
such as mesquite, palo verde, willow and cottonwood. Cactus
plants like barrel cactus, prickly pear, cholla and ocotillo
grow in our desert.</P>

<P>Many animals also live in our desert. Animals like
jackrabbits, roadrunners, coyotes, deer, rattlesnakes,
tarantulas, tortoises and scorpions live in our desert
habitat.</P>

<P>Margaret White School 4th Grade Room 15</P>

<P>tracees@telis.org</P>

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<CENTER><P><B>Pictures By Kristen Bates and Shanica
Robinson</B></P></CENTER>
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<P>This is about the Great Smoky Mountains. Part of the Smoky Mountains are in our county, Blount County.</P>

<P>Great Smoky Mountains National Park is one of the largest protected
land areas east of the Rocky Mountains. With over 500,000 acres of forest, the Smokies has an enormous variety of plants and animals. This area is diverse in its many forms of life. </P>

<P>The vegetation in the Park is the most biologically diverse in the National Park System, so many comprehensive research programs are done here. This helps people have a better understanding that will affect people locally, regionally, and globally. It is designated as an International Biosphere Reserve by the United Nations. </P>

<P>The Smokies also have a rich cultural history. Cherokee Indians moved into the area about 1,000 years ago, and permanent white settlers arrived around 1800. Commercial logging came in around 1900 and stripped trees
from nearly 2/3 of what is now the national park. The Great Smoky Mountains National Park was established in 1934. The park took 6,000 tracts of private and commercial land that was bought with money raised by public and private donations. It is centrally located within a two days drive for half of the nation's population. The Great Smoky Mountains has the highest visitation of all the national parks in the country. </P>

<P>There are more animals and plants than can be mentioned. A few of our favorites are the black bear, red wolf (re-introduced by park officials), wild boar, and white-tailed deer.</P>

<P>clinsen@usit.net</P>

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<CENTER><P><B>Pictures By Jesse Catron and Diana Lopez</B></P></CENTER>

<P>Potter Valley is a small beautiful community that is different in some ways from the desert. The average rainfall is about 40 inches a year. Our town has a lot of water. Our two main water sources are the East Fork of the Russian River, which runs through the Valley, and the Eel River which flows north from the mountains surrounding Potter Valley. In 1910 they drilled a hole in a mountain to bring Eel River water to the valley for irrigation. Our two closest lakes are Lake Mendocino and Lake Pillsbury, which is way up in the mountains. Our valley is about 8 miles long and about 3 miles wide. We have creeks and irrigation ditches running through our valley that kids swim in when it is hot.</P>

<P>We have many beautiful green trees with skinny arms of wood towering up to the sky with leaves clinging by little stems onto the branches. Most of the trees are in the hills and mountains above Potter Valley. We have many different types of trees. Here are a few: redwood, oak, madrone, pine, and willow. Some people in Potter Valley do logging to make a living. A lot of people farm in Potter Valley. They grow grapes, pears and hay. Farmers raise cattle, sheep and horses.</P>

<P>Some of our wild animals include insects, reptiles, mammals, birds,
water animals and amphibians. Some of our insects are June bugs, hairy
caterpillars, ants, fleas, ladybugs, bees, ticks, crickets, wasps, mosquitoes and dragonflies. Some reptiles are rattlesnakes, alligator lizards, turtles, blue belly lizards, garter snakes, gopher snakes and rubber boas. Some mammals are skunks, black tailed deer, foxes, mountain lions, bats, black bears, raccoons, grey squirrels, and opossums. We have many different types of birds like red tailed hawks, mourning doves, ducks, cranes, red-winged black birds, geese, vultures, wild turkeys, woodpeckers, bluejays, quail, barn owls, hummingbirds, crows, scrub jays robins, mockingbirds, crows, finches and swallows. Some of our water animals are crawdads, horsehair, bass, catfish, salmon, striper, steelhead, trout and many others. Some amphibians are salamanders, newts, frogs and pollywogs.</P>

<P>Some of our plants are blackberries, golden poppies, cattails, poison
oak, moss, algae, manzanita, wild roses, buckeye, shooting star, star thistle, bluebells, grass, weeds, daisies, wild grapes and buttercups.</P>

<P>Room 4 Fourth Graders </P>

```
<P>mwolff@mail.telis.org</P>

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<CENTER><P><B>Picture By Estela Ramirez</B></P></CENTER>

<P>In Clarksville, Tennessee we have several habitats. We
have grassland, fresh water, and deciduous forest. Most of
our grassland is farmland. Tobacco, corn, and soybeans are
our main crops. We have two rivers. One of the nearest river
is the Cumberland River. It is normally a nice, clean river,
but right now Nashville is dumping raw sewage into it. Some
people have gotten messages with their water bills that it
is unsafe to drink it. The newspaper said not to even ski or
swim in it. The University students from Austin Peay State
have protested, but that didn't stop it. We have another
little river, &quot;The Red River&quot;. It's too narrow and
shallow to swim or boat unless you have a canoe. We have
lots of old, deciduous trees. The fall here is really
pretty. Some of our seasons are cold (winter) and some are
hot (summer). Fall and spring can be either. Our
temperatures range from 5 degrees to 100 degrees.</P>

<P>Mrs. Treadway's Internet Fourth Graders Elementary 740
Greenwood Avenue Clarksville, TN 37040 TreadwayB@ten-
nash.ten.k12.tn.us </P>

<CENTER><P><A NAME="Sacramento, California"></A><B><FONT
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<CENTER><P><B>Pictures By Chris Cunha and Chad
Prochaska</B></P></CENTER>

<P>Sacramento has many trees, especially Oak trees. Most
trees are near
the rivers and in the foothills. There are many different
types of plants in the Sacramento area including poison oak,
poppies and other wild flowers.</P>
```

<P>Sacramento has lots of squirrels, raccoon and deer, that live along
the Sacramento and American rivers.</P>

<P>There are many different kinds of birds in Sacramento.
Some of the birds that live in Sacramento are sparrows,
bluejays, geese, ducks, turkey vultures and red tailed
hawks.</P>

<P>There are also many kinds of reptiles living in
Sacramento such as lizards, snakes and turtles. Rattlesnakes
can be found in the foothills.</P>

<P>Sacramento has hot and dry summers with temperatures
above 100 degrees. The winters are pretty cold with some
days below freezing. Sometimes it hails.</P>

<P>Ryan English Grade 4 Capital Christian School Sacramento,
California
</P>

<P>Pamela13@ix.netcom.com</P>

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<CENTER><P><B>Pictures By Cheri Nepusz and Amanda
Johnson</B></P></CENTER>

<P>We are 5th graders in the Deciduous Forest. We have
changing seasons. We have summer, fall, winter and spring.
The temperature in summer ranges from lows of 60 - highs of
90+. Fall ranges from 50s to 70s. Winter is cold. We have
lows sometimes below zero and the highs usually are around
20. Spring usually has highs of 60-70 and lows in the 40s
-50s. There is little precipitation in the fall. We have
snow and ice in the winter. We usually have 2-3 inches, but
it melts quickly. The spring has lots rain and trees and
flowers bloom. Summer is usually very dry.</P>

<P>Since we have four seasons, the colors of the environment
in our area
change a lot. The fall brings reds, yellow, oranges and
browns. Leaves
fall from the trees. Winter is bleak and dreary. Spring
brings everything to life with green plants and colorful

tulips and daffodils. Summer is green and colorful with beautiful flowers and blooming shrubbery.</P>

<P>Our environemnt is full of interesting animals. We are home to deer,
wolves, squirrels, woodchucks, raccoons, snakes, beavers, turtles, frogs, fish, and birds.</P>

<P>Emily Whitlock, Aimee O'Malley, Andre Curtis and Shawn Gibbs.</P>

<P>Lincoln School 300 S. 11th Springfield, IL 62703 </P>

<P>cjones@springfield.k12.il.us</P>

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<CENTER><P><B>Pictures By Ashley Dockery and Lucas
Lawson</B></P></CENTER>

<P>Greetings from the Prairies - Grade five students of Sun Valley School!</P>

<P>We live on the Prairies, natural grassland with few trees. The Canadian Prairies lie between the Foothills of the Rocky Mountains and the Red River. This natural grassland covers the southern part of Manitoba, Saskatchewan and Alberta. Not all of the prairies is flat, level land. Although half of the area is very flat,there are many different landscapes. Hills, wide river valleys and even low mountains are found on the prairies. However, much of the land is flat with rich, fine soil. Because there is little rainfall and the land is dry, there are few trees. The flat, treeless prairie has become a huge agricultural region of wheatfields, livestock farms and cattle ranches. </P>

<P>Millions of years ago, during separate times, shallow seas covered this area. Clay and sand, carried by rivers, settled on the sea floor. Over a long time, this material formed into layers of soft rock called sediment. After the seas disappeared, the sediments remained. Much later, about 25,000 years ago, the area was covered by thick sheets of ice. As the ice flowed from north to south, it scraped away and broke up chunks of rock and earth and carried them south. Much of this materials was deposited on the area that

is now the Prairies. When the ice sheets began to melt, the water formed large, shallow lakes. Rivers flowing from the melting ice carried fine materials which settled to the bottom of these lakes. These sediments remained after the lake water drained away. From these materials came the rich clay silts that now cover large parts of the Prairies.</P>

<P>Most of Canada has four seasons. The seasons change because Canada receives different amounts of sunlight and heat during the year. This is because of the tilt of the earth as it travels around the sun. In winter, the Prairies receive less sunlight because the sun is lower in the sky and its rays are more slanted during this time of year. In the summer, the Prairies receive the most light and heat as the sun is higher in the sky so its rays are more direct than they are in winter. Prairie summers are warm with many hours of daylight.</P>

<P><B>Prairie Grasses</B></P>

<P>Grasses grow in places that are too dry for trees. Their blades or leaves are long and narrow. Grass is the main food for bison, antelope and other grass-eating animals of the Prairies.</P>

<P><B>Wheat</B></P>

<P>There are many large wheat farms in the flat part of the Prairies. The flat land is easy to work. Farmers can use large animals to plow the fields, plant the roots and harvest the grain. The machines also allow the farmer to cultivate large area of land. Wheat grows well in the rich prairie soil. Rain fall mostly in late spring and early winter when the growing plants need it most. The long, sunny summer nights help the wheat to die and ripen.</P>

<P><B>Animals of the Prairies</B></P>

<P>The Prairies provide an abundant and rich source of food for many animals. However, there are few places to hide on open prairies. The animals must be able to run fast to escape their enemies or to catch their food. They must be able to survive without much water. They must be able to endure winter cold and wind and summer heat and drought. The pronghorn antelope is well adapted to its prairie home. Its patterned coat provides good camouflage against the prairies landscape. </P>

<P>mbodner@minet.gov.mb.ca</P>

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<CENTER><P><B>Pictures By Rogelio Garnica and Anthony
Stewart</B></P></CENTER>

<P>Santa Barbara has four main geographical habitats. The
first is the
Santa Ynez Mountains which are the highest part of the
habitat. The mountains have lakes, rivers, and creeks.
Mostly there is brush and chaparrel growing on their
slopes.</P>

<P>The next area is the foothills called the Riviera here in
S.B. This
is a place where people build houses. It is not as high as
the mountains
nor as flat as the city. There are lots of trees and brush
in the area
and many houses.</P>

<P>The plain is where the City of Santa Barbara is built. It
is where most of the people live and where the businesses
and schools are located. It is mostly flat.</P>

<P>The last area we will describe is the beach area. The
beaches are right in the city. They are very beautiful,
especially the water. The beach has no trees, lots of sand,
a wharf called Stearns Wharf and a very nice yacht harbor.
</P>

<P>Essay written by Kayla, Freddy, Sean, and Helen from Mr.
T's Fifth Grade Class, Rm. 18, Harding School, Santa
Barbara, CA Oct. 16, 1996.</P>

<P>bobt@sbceo.k12.ca.us</P>

<P>Visit the WWW page:Mr. T's Teaching and Travel Page
http://members.aol.com/rmt1838/index.html</P>

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<CENTER><P><B>Picture By Sarah Jensen and Tori
Poole</B></P></CENTER>

<P>We have lush, green trees and deciduous trees. When fall
comes the leaves turn yellow, orange, red and brown. The
temperature in the winter is normally 30 degrees. In the
summer it is 90 degrees out. In the winter we get heavy snow
and a lot of ice. The deer here are a problem and we
sometimes have deer hunts. The animals we have here are
groundhogs, raccoons, foxes, rabbits, squirrels, geese,
robins, crows, owls, blue jays, skunks, hawks, ducks,
snakes, toads, frogs, turtles, chipmunks. We live in the
suburbs of Philadelphia.
</P>

<P>Adam Magee Tredyffrin-Easttown School District </P>

<P>Beaumont Elementary School 575 Beaumont Road Devon, PA
19333 </P>

<P>srace@t-e.k12.pa.us</P>

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<CENTER><P><B>Pictures by Vincent Phothisene and Jackie
Elsner</B></P></CENTER>

<P>I live near the Monterey Bay. It is located along the
central coastline of California, about 50 miles south of San
Francisco. If you could walk out into the Pacific Ocean for
about a mile you would then fall into the Monterey Canyon.
It is a mile deep! It is a Grand Canyon under the ocean.When
you look out at the Pacific Ocean it glimmers like a diamond
shimmering in the sunshine. We often have fog is the
morning. It changes to sunshine by noon. Our temperature is
usually in the 70's and 80's year round. At the beach there
are waves. Some are three to nine feet tall and some are
nine to twelve feet high. You can surf, body surf, boogie
board, skim board,knee board or swim in the waves. The water
here is cold, about fifty-five degrees, and tastes salty and
smells like seaweed. When you play in the ocean you might be
lucky enough to see a whale spouting, seals, dolphins, sea
otters, crabs, fish, sea lions, sea urchins, kelp floating
by, jellyfish, or, if you're unlucky, sharks. Many sharks
are small and they won't really hurt you. Maybe twice a year

<CENTER>103</CENTER>

one of the Great White Sharks attacks a surfer off our
central coast. People always bring their dogs to the beach
and play with them in the waves. On the beach you can hear
dogs barking, seagulls screeching, wild house cats in the
jetty hissing, wharf rats scratching and waves crashing. In
the sand I can build sand castles. The sand feels soft to my
feet. Some of our sand is rocky and coarse. There are lots
of broken shells and sand crabs on the beaches. It is
important to clean up our beaches. The Monterey Bay is a
most important habitat and we want to protect it for all
living things. Our United States Government agrees. It
recently passed a law creating the Monterey Bay Marine
Sanctuary. This law now protects our Bay's great abundance
and variety of sea animals and plants. Oil drilling is not
allowed in our waters and our coastline is protected for
public use. A good place to learn more about our habitat is
at the Monterey Bay Aquarium. It is the largest aquarium in
the world and only an hour's drive south of Santa Cruz,
where I live next to the beautiful Monterey Bay.</P>

<P>jcoffman@cabrillo.campus.mci.net</P>

<CENTER><P><A NAME="Orange, Connecticut"></A><B><FONT
SIZE=+2>Orange, Connecticut
</FONT></B></P></CENTER>

<CENTER><P><IMG SRC="ORANGE.GIF" LOWSRC="ORANGE.GIF"
HEIGHT=140 WIDTH=200></P></CENTER>

<CENTER><P><B>Picture By Royce Anna Harris</B></P></CENTER>

<P><B>Wildlife in Orange</B></P>

<P>There are many wildlife animals in Orange. These animals
are: deer,
raccoons, wild turkeys, rabbits, squirrles, foxes, and
skunks. The pests
of Orange are deer and wild turkeys because they eat the
food out of the gardens of the citizens in Orange. Raccoons,
foxes, and squirrels, can
also be pests because they could carry a disease called
rabies, which is
an infectious, fatal illness transmitted to humans through a
bite. Skunks can be an annoyance for the obvious reason,
they spray a nasty odor throughout the town. There are some
of the wildlife animals that roam our streets and yards
which could cause a number of problems for our
neighbors.</P>

<P>By Jeff Russo, fifth grade Turkey Hill School, Orange,
CT</P>

<P><B>Plants in Orange </B></P>

<P>Some plants that live here in Orange are the oak and pine tree. There
are many different kinds of pine trees. Some of them are;
the white pine,the Canadian hemlock, and spruce. There many
places for these trees to grow. We have large lawns and lots
of wooded areas,smaller than a forest, but not very big
either. There are also places in Orange where trees do not
grow at all,such as clear fields and meadows. In fall,
Orange is very lovely with red, orange, and brown mixed with
some still green leaves. Orange has many different kinds of
trees in many different places. </P>

<P>By, Alison Pond, fifth grade Turkey Hill School, Orange,
CT</P>

<CENTER><P><A NAME="Lake Erie"></A><B><FONT SIZE=+2>Lake
Erie</FONT></B></P></CENTER>

<CENTER><P><IMG SRC="ERIE.GIF" LOWSRC="ERIE.GIF" HEIGHT=140
WIDTH=200><IMG SRC="ERIE2.GIF" LOWSRC="ERIE2.GIF" HEIGHT=140
WIDTH=200></P></CENTER>

<CENTER><P><B>Pictures by Justin Conway and Venessa
Carrasco</B></P></CENTER>

<P>Lake Erie is the fourth largest lake of the Great Lakes.
It is 241 miles wide and 210 feet deep. It was formed by a
glacier millions of years ago.</P>

<P>By 1960 Lake Erie was the most polluted of the lakes.
Industrial waste sewage and other wastes have contributed to
this problem. The animal life of Blue Heron, the American
Great Egret, ducks and fish have suffered greatly. For
several years the fish in Lake Erie were unsafe to eat. Much
of the pollution problem was solved when Canada and the
United States set up the International Joint Commission.
Both countries worked together. Now much of the fish is safe
to eat. The beaches and water are safe for recreation once
again. However Lake Erie now has another pollution problem.
it is the invasion of zebra mussels. These mollusks were
accidentally brought into the US. by ship from Russia where
they thrive. Now they live throughout the five Great Lakes
as far south as Louisiana. They have caused problems along
the lake shore area because they live in large colonies and
can block water pipes. The fish of Lake Erie include perch,
bass, and white fish. Animal life on the shores include
muskrats, opossums, rabbits, porcupines, raccoons,
squirrels, mice, moles, and skunks. </P>

<P>Fourth graders and Mrs. Reing and Ms. Keller</P>

<P>Linda Aubry Tech Coordinator St. Rose School Perrysburg, Ohio 43551</P>

<P>laubry@uoft02.utoledo.edu</P>

<CENTER><P><A NAME="Oak Woodland of Northern California"></A><B><FONT SIZE=+2>Oak Woodland of Northern California </FONT></B></P></CENTER>

<CENTER><P><IMG SRC="SHAST.GIF" LOWSRC="SHAST.GIF" HEIGHT=140 WIDTH=200><IMG SRC="Oak2.GIF" LOWSRC="Oak2.gif" HEIGHT=140 WIDTH=200></P></CENTER>

<CENTER><P><B>Pictures by Jamie Camden and Jared Sessions</B></P></CENTER>

<P>We live in Redding, California. It has a population of about 90,000
people. We live in a valley between the Coastal Range, and the Cascade
Range of mountains. We are about 320 miles north of Sacramento. We have
a nice view of both Mt. Shasta and Mt. Lassen. There are four different
types of oak trees near our area...live oak, valley oak, blue oak and scrub oak. There are also several types of conifers...douglas fir, cedar, gray pine, sugar pine, ponderosa pine, and jeffrey pine. Animals native to our valley include deer, mountain lion (more recently), squirrel, rabbit, skunk, opossum. The Sacramento River cuts through the middle of our city and is
also the home of many riparian birds, animals and fish such as the Bald
Eagle, turkey vulture, Great Blue Heron, wood duck, mallard, river otter, beaver, Canada Geese, egret, crane, salmon, and steelhead. It is very hot here in the summer, up to 115 degrees sometimes. It is mild to cold in the winter with freezing temperatures only occasionally. It snows here about every three years. We have two large lakes nearby. Shasta Lake and Whiskeytown Lake. Both are reservoirs with dams and the water is used for recreation, making electricity, and for our drinking water, too. Farmers in our area raise cattle, sheep, grains, mint, strawberries, sod, and Christmas trees. </P>

<P>Lillie Minsart & third grade class Redding, CA </P>

<P>lminsart@shastalink.k12.ca.us</P>

```html
<CENTER><P><A NAME="New Florence, Pennsylvania"></A><B><FONT
SIZE=+2>New
Florence, Pennsylvania</FONT></B></P></CENTER>

<CENTER><P><B><FONT SIZE=+2>Temperate Hardwood
Forest</FONT></B></P></CENTER>

<CENTER><P><IMG SRC="PEN.GIF" LOWSRC="PEN.GIF" HEIGHT=140
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<CENTER><P><B>Picture by Brittaney Hammock and Anthony
Hernandez</B></P></CENTER>

<P>Our habitat is Temperate Hardwood Forest. We are located
fifty miles
east of Pittsburgh in Westmoreland County, which is in
southwestern Pennsylvania. This is in the foothills of the
Allegheny mountains, part of the Appalachian Mountain chain.
There are many streams and hills. We have cold, snowy
winters and warm, rainy summers. We have four seasons :
spring, summer, fall, and winter.</P>

<P>In the fall as we look out our windows, to the south we
see colorful
yellow, red, orange, and a little bit of green leaves on the
trees on the rolling hills. If we look to the east, we see
the mountains that are just as colorful as the hills. We
also see high, uncut grass and low, cut grass. We see many
wildflowers. Among them are goldenrod, Queen Ann's lace,
daisies, and New York iron weed. The most annoying plant we
have here is poison ivy. We can also see yellow-brown
cornfields here and there. We have very rocky soil, so we
can see large, small, and in-between sized gray rocks. There
are many streams and ponds. We have lots of insects
including mosquitoes, horseflies, honeybees, ants, hornets,
houseflies, yellow jackets, and ladybugs. In the evenings we
catch fireflies. We can see houses scattered here and there.
Most houses are made of bricks or wood and some are two
stories high. Almost all houses have porches and/or decks.
Most are pastel colored and have shingled roofs.</P>

<P>When we can't sleep at night and stand at the window, we
hear owls,
crickets, and other bugs. </P>

<P>Laurel Valley Elementary New Florence, PA</P>

<CENTER><P><A NAME="Atlantic Coastal Plains"></A><B><FONT
SIZE=+2>Atlantic
```

Coastal Plains</FONT></B></P></CENTER>

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<CENTER><P><B>Pictures by Virginia Fowler and Crystal
Jones</B></P></CENTER>

<P>Eastchester, New York is in the northern part of the
Atlantic Coastal
Plains. We consider ourselves to be at sea level because we
are so close
to the Atlantic Ocean. We are located about 15 miles from
the sandy beaches of the Atlantic. We are even closer to the
waters of Long Island Sound. The Sound is about 3 miles to
our east. In fact, seagulls visit our school almost every
day for food that we might have dropped.</P>

<P>Long Island Sound provides many sandy beaches which
permit swimming,
boating and other water sports in the summer, as well as
fishing and shellfishing year-round. The harbors on Long
Island Sound are used mainly for recreation.</P>

<P>The waves on the waters of Long Island Sound are smaller
than the waves of the Atlantic Ocean. They are more kindly
to children than the dangerous waves of the ocean. Horseshoe
crabs, clamshells, and mussel shells are found on the
beaches. There is lots of seaweed.</P>

<P>Our habitat is very colorful. We live in an area filled
with many colorful tall trees. Maples, oaks, willows and
other deciduous trees cover our landscape. We also have many
evergreens and big bushes. We love the evergreens because
they make us think of Christmas. Active animals, especially
grey squirrels, are found all over.</P>

<P>We have small hills that are good for sleigh riding and
snowboarding
in winter. Several nearby lakes are used for swimming,
boating, and ice-skating in winter.</P>

<P>We celebrate all four seasons.</P>

<P>Ms. Mary Jean O'Neill's Fifth Grade Anne Hutchinson
School Eastchester,
NY </P>

<CENTER><P><A NAME="The Pacific Northwest"></A><B><FONT
SIZE=+2>The Pacific

Northwest</FONT></B></P></CENTER>

<CENTER><P><IMG SRC="Chrism.GIF" LOWSRC="Chrism.gif"
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<CENTER><P><B>Picture by Chris Mallett and Brandyn
Monds</B></P></CENTER>

<P>I walked from the warmth of my wood house into the
frosted land of Washington. It rains a lot, but with rubber
boots, a raincoat, and an umbrella, you manage. As you walk
you hear broken twigs, brightly colored leaves and pine
cones breaking and snapping under the pressure of your
boots. You can watch as squirrels scramble from here to
there on a nut-hunt. Then when they find their nuts, they
sit on their back legs and eat away or store it in their
home, a big oak tree.</P>

<P>If you're lucky, you might see a black bear stomping
through the forest searching for the last berries before
hibernation. A deer may scramble out in front of you and
then bound off like those grasshoppers you can catch in the
summer. A bald eagle may plummet into a nearby pond and
catch a trout, or into a stream and catch a salmon.
Huckleberries are just begging to fall off, but salmon
berries aren't going to produce berries until the spring.
Fir, pine, and maple trees stand tall and proud. The maple
stands with his leaves all peach, tomato, flame, ruby, and
topaz, and the pines and firs are dressed in gorgeous greens
such as celery, mint apple, and lime.</P>

<P>If you happen to stray into a marsh, you might be
surprised to see what's there. Salamanders squirm out from
under the mud. Lizards slither from sun bathing into deep
dark holes. If you stayed there for more than two seconds,
you could smell the stench of skunk cabbage. The horrible
stuff looks like canary yellow cabbage with a white corn-
looking thing coming out of it. That's what makes it smell
so bad. If I were you, I wouldn't get caught in a marsh in
one thousand years! Come down near the pond and you will see
water bugs, salamanders, or a giant toad as big as your
hand. Now that you went through the woods with me, we have
to go home and look at the lavender, lilac, violet, indigo,
aqua, ruby, raspberry, crimson, tangerine, and lemon sunset
looking over proud pink Mt. Rainier, the jagged peaks of the
Cascade Range, and the radiant Seattle. They're not only
silhouetted against the sky, but the waters of the Puget
Sound reflect the gorgeous scenery wonderfully.</P>

<P>by Julie Parrot for Vinland Elementary 6th grade
Lumsden/Fuhrer classes
clumsden@orca.esd114.wednet.edu </P>

<P>November 25, 1996</P>

<CENTER><P><A NAME="Wetlands Habitat, Florida"></A><B><FONT
SIZE=+2>Wetlands
Habitat, Florida</FONT></B></P></CENTER>

<CENTER><P><IMG SRC="FL1.GIF" LOWSRC="FL1.GIF" HEIGHT=140
WIDTH=200><IMG SRC="FLOR2.GIF" LOWSRC="FLOR2.GIF" HEIGHT=140
WIDTH=200></P></CENTER>

<CENTER><P><B>Pictures by Anna Harris and Estela
Ramirez</B></P></CENTER>

<P>We live in Central Florida near the Kennedy Space Center.
In Florida,
we have lots of rain. As the rain falls, flowers bloom and
plants grow.
Also a lot of fruit grows on bushes and trees. Florida is a
very green
place. </P>

<P>Florida is also very flat and has a lot of swamps. Our
weather also
changes. Sometimes it is cool in the morning and hot in the
afternoon.
In the summer it is in the high 90 degrees Fahrenheit almost
every day.
We have high humidity which means that there is a lot of
water in the air. In the winter it seems cold to us, but we
don't ever have snow or ice.
</P>

<P>Plants and animals are adapted to living in the wet
lands. We have many different life forms. We have beautiful
birds. Some are blue jays, herons, woodpeckers, seagulls,
mockingbirds, sparrows, pelicans, hawks, eagles, turkey
buzzards, osprey, owls. In our schoolyard, we have wild
sandhill cranes. We want to tell you about a few of our
favorite animals:</P>

<P>The Florida Panther - There are only 30 to 50 of them
left in the wild. They are mammals. Another name for them is
cougar or puma. Adults tendto live alone. They spend some
time in trees. The color of their coatscan vary from tawny
to grey. Their coloring helps them to hide in the wild.They
are very endangered.</P>

<P>The Florida Alligator - This used to be a very endangered
species. We
are happy to report that they are no longer endangered. In
fact, there
are too many of them now. Female alligators makes nests of
grass near fresh water. Alligators take good care of their
young. When hatched, alligators are about nine inches long.
Alligators eat fish, snakes, frogs, turtles and small
mammals. When full-grown, alligators are 12 feet long. They
have good eyesight and hearing and a good sense of
smell.</P>

<P>The Manatee - The manatee is also called a sea cow
because its face
resembles a cow. Manatees are very large sea mammals. They
are very endangered because motors from boats sometimes kill
them. Our manatee is called the Caribbean manatee. All
manatees eat water plants. They eat as much as 100 pounds of
these plants each day. Adult manatees weigh over 3500
pounds. Manatees have a flat tail like a beaver. This tail
helps to push them around in the water. </P>

<P>by Miranda R., Blake P., and Rob Y. of Atlantis
Elementary School, Cocoa,
Florida </P>

<CENTER><P><A NAME="The Plains, Nebraska"></A><B><FONT
SIZE=+2>The Plains,
Nebraska</FONT></B></P></CENTER>

<CENTER><P><IMG SRC="plain.GIF" LOWSRC="plain.gif"
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<CENTER><P><B>Pictures by Columbian and Margaret White
Elementary Fourth
Grades</B></P></CENTER>

<P>On the plains there are many kinds of farms where people
live. One kind
of farm on the plain is a family farm. Family farms have
lots of jobs to
do. One is raising cattle, chicken, pigs, and other animals.
They work
from morning to night. Some family farms raise crops such as
vegetables
and fruits, like apples. It is hard for a farmer to make a
living on the
plains. And today many of the family farms have been
replaced by farms
run by businesses.</P>

<P>One the plains there are many kinds of people. Some of the people who
live there are Mexicans and Americans. The Americans and Mexicans do lots of work on the plains. Most of the time the fathers have to do all of the work to build their homes and other things. And today family farms have to do more work than years ago to make more money for things they need.</P>

<P>Many species of turtles and birds and many more animals live in the
plains naturally. The animals eat various meats, eggs, and plants. There
are many animals in the plains that hibernate. Most of them are warm blooded. Animals in the plains are really cool! Buffalo were once very important to the Plains Indians. Plains Indians for example, used the skins for teepees. The buffalo were also their main source of food. When buffalo herds came the Indians would hunt. </P>

<P>The weather in the plains changes with the seasons. In the summer it
can get up to one hundred degrees. When itÕs winter the normal temperature often falls below zero. In the spring the farmers plant their crops. In the fall they harvest. The temperature in the plains goes along with the seasons.</P>

<P>Agriculture rules the economy of the plains. In the plains there are
many wheat and corn fields. There are also alfalfa, barley, oats, and rye fields. Cattle , goats, and sheep graze in the plains. After the Civil War, railroads were built across the Great Plains. This led to the building of many new towns and farming and ranching areas. The Great Plains is so important for farming that it is called the nation's breadbasket. </P>

<P>Plains are found in different locations all around the world. There
are prairies in North America where the soil is dark and deep. There are
very few trees on the prairie. The plains in Africa are called savannas.
Here the grass and shrubs grow short. There are some tall trees called
acacias. Asia has prairies called steppes. This is an area of flat land
with mostly tall and short grasses. Although the plains are alike in many ways, there are differences too. There are many natural resources found on plains. The three main resources are grass, water, and soil.

The grass on the plains is often used to graze cattle. The soil and water are very important for growing crops. The resources are there to help people. When you take something from the plains, replant and take care of them.</P>

<P>There are many different kinds of natural resources found in the plains. For example, the plains have rich soil because of the underground rivers and deltas caused by glaciers long ago. You might not believe it, but grass is also a resource. It gives many animals food. The plains have many kinds of natural resources. </P>

<P>There are many flowers and grasses in the plains. One of the plants
is "Queen Anne's lace". Another plant is in Iowa. This is called Saskatchewan wheat that is used for bread. Different kinds of grasses cover seventeen states. Plants are very plentiful in the plains. </P>

<P>Columbian Elementary Fourth Grade, Omaha, NE </P>

<P>kdavid@ops.esu19.k12.ne.us </P>

<UL>
<CENTER><P><A NAME="Pond Habitat"></A><B><FONT SIZE=+2>Pond Habitat, Connecticut</FONT></B></P></CENTER>

<CENTER><P><IMG SRC="pond.GIF" LOWSRC="pond.gif" HEIGHT=140 WIDTH=200></P></CENTER>

<CENTER><P><B>Picture by Kurt Sudyka</B></P></CENTER>
</UL>

<P>Two fish that live in our pond are the creek chub and the brook trout. The creek chub is about 10 inches long. It eats mostly insects. It has orange fins and grey from head to tail.</P>

<P>The brook trout loves cold water. It weighs about 5 pounds. It has a
pink belly, spots and is green from nose to tail. Many people enjoy fishing get brook trout. The Bullfrog lives in water and on land. First, it is born in an egg mass. Then it becomes a tadpole or baby frog. Later, it loses its tail, grows legs and is an adult. It hides in water and plants. Some frogs can change body color. They have long tongues for catching bugs. The frog have webbed feet. The frog grows to 8 inches long. </P>

<P>Dragonflies eat small fish and bugs. It has keen eyes and fast movement. Two dragon- flies mate and the female lays

the eggs on the water. The eggs hatch and the babies are
called larva.</P>

<P>Dragonflies have four wings and big eyes. Some fish eat
dragonflies
and dragonflies escape by flying away fast. Dragonflies can
be many different colors. Their bodies are about 1.8 inches
long and their wings are about 2.2 inches long. They are
hard to catch.</P>

<P>Water striders stay on the top of water. Sometimes this
bug goes under water. Bugs need to breathe the air. Many
water striders live together on the pond. The water
striderÕs favorite place is not the ocean, not trees,
not dry places. Its favorite place is on top of the pond
water. The water strider has four legs. </P>

<P>Its body is black. The bug jumps fast and drinks water.
The water strider eats larvae that rise to the surface and
eats terrestrial insects that fall into the water. Some
water bugs bite people.</P>

<P>by students from American School for the Deaf Hartford,
Connecticut</P>

<CENTER><P><A NAME="Ireland Habitat"></A><B><FONT
SIZE=+2>Ireland Habitat</FONT></B></P></CENTER>

<P>We are the boys and girls of St Attracta's Senior
National School in
Ballinteer, Dublin 16, Ireland. We would like to send you
some information about two habitats here in Ireland. The
first is about our man made forests and the second about
Ballinteer itself. We hope the information is helpful to
you. If there is any more information you need please let us
know. Good luck.</P>

<P>Irish Forests</P>

<P>In Ireland we have two types of forests, coniferous and
deciduous. In
the coniferous forest the most common tree is the sitka
spruce. These are planted to be cut down later for paper.
The trees look like a green carpet on the hills with
straight edges where the forest ends. The trees are planted
close together so no light reaches the ground, unless a tree
falls, so there is no vegetation on the ground which is
covered with brown rotting needles. Apart from birds and
squirrels very few animals live in the forest.
</P>

<P>Ballinteer</P>

<P>We live in the suburbs of Dublin. There are lots of
housing estates
where the houses look the same. Most of the houses are semi
detached. The houses are made of brick and concrete. Our
gardens are small with walls around them and we have many
flower beds. Our driveways can hold about two cars so they
are not very big. The back garden is bigger than the front
with some back gardens having greenhouses, swings and garden
sheds. Many houses have a room, glass covered, where people
can sit in Summer. Any trees are usually small in our
gardens due to small space. The houses are two storey with
about 3 bedrooms upstairs. The roads are usually tree-lined,
the trees being about 20 years old. In between the estates
we have green areas for playing sports and in Summer people
go to these areas to meet and relax. There are also bigger
areas - parks where people walk, run and go to get away from
the gardens. These parks have playing fields and gardens and
sometimes an old historic building. There are lots of shops
near our houses, some small single shops, some larger
shopping centres.</P>

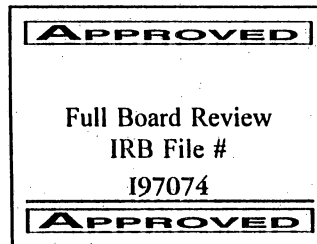<P>Regards, Mr. Feehan's Third Class (age 8-9 years).</P>

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CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO

| APPROVED |

Full Board Review
IRB File #
I97074

| APPROVED |

The California
State University

May 20, 1997

Tracee Sudyka
c/o Dr. Rowena Santiago
California State University
5500 University Parkway
San Bernardino, California 92407

Dear Ms. Sudyka:

Your application to use human subjects in research has been reviewed by the Institutional Review Board (IRB). Your application has been approved. Please notify the IRB if any substantive changes are made in your research prospectus and/or any unanticipated risks to subjects arise.
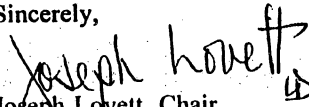
Your informed consent statement should contain a statement that reads, "This research has been reviewed and approved by the Institutional Review Board of California State University, San Bernardino."

If your project lasts longer than one year, you must reapply for approval at the end of each year. You are required to keep copies of the informed consent forms and data for at least three years.

If you have any questions regarding the IRB decision, please contact Lynn Douglass, IRB Secretary. Ms. Douglass can be reached by phone at (909) 880-5027, by fax at (909) 880-7028, or by email at ldouglas@wiley.csusb.edu. Please include your application identification number (above) in all correspondence.

Best of luck with your research.

Sincerely,

Joseph Lovett, Chair
Institutional Review Board

JL/ld
cc: Rowena Santiago, Science, Mathematics and Technology Education

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Appendix G: E-mail Sample From Collaborating Classroom

From: LAUBRY@uoft02.utoledo.edu
Date: Tue, 11 Mar 1997 07:36:03 -0500 (EST)
Subject: Habitats Online
To: tracees@telis.org
MIME-version: 1.0

Tracee, thanks so much for sending the habitat information.
My fourth graders are having lots of fun putting together
drawings from the descriptions we received...then we will
compare them with the drawings on the stack you send.
Thanks for a great project!

Linda Aubry
St. Rose School
217 East Front Street
Perrysburg, OH 43551
laubry@uoft02.utoledo.edu

X-Sender: bobt@mail.sbceo.k12.ca.us (Unverified)
Mime-Version: 1.0
Date: Sun, 18 May 1997 17:41:24 -0700
To: tracees@telis.org (Tracee Sudyka)
From: Bob Townsend <bobt@sbceo.k12.ca.us>
Subject: Re: habitat essay from Santa Barbara

Hey, Tracee, cool page! Thanks, our essay showed up very
well with your
students' art. I really like it. I am writing a new WWW page
for Harding
school, and I put a link under student projects to your
habitat page. Good work!

Thanks much, Bob T

From: lminsart@shastalink.k12.ca.us
Mime-Version: 1.0
Date: Tue, 20 May 1997 07:02:43 -0800
To: tracees@telis.org (Tracee Sudyka)
Subject: Re: Habitats Project

Tracee,
Thanks! We really enjoyed the Hyperstudio pictures with our
Habitat (The Oak Woodland)...one looks like a mosiac...how
did you do it???

<u>Appendix H: Classroom Connect E-mail</u>

X-Sender: tfrey@classroom.net
Mime-Version: 1.0
Date: Mon, 21 Apr 1997 15:13:10 -0500
To: tfrey@classroom.net
From: Todd Frey <tfrey@classroom.net>
Subject: URGENT: From Classroom Connect -- Permission to Publish

Dear educator,
I am an editor for a small publishing company specializing in
K-12 curriculum material designed to help teachers integrate the
Internet into their classrooms. Our goal is to show teachers
how easily they can access the abundance of terrific
educational material on the Internet and to help them
discover how the Internet can make learning exciting, hands-
on, and student-centered.

We write lesson plans, activity sheets and Internet
integration ideas
for the sites we especially like. Teachers are able to make
as many copies of our curriculum materials as they need to
use with
students.

We'd like your permission to include your internet project
success story as well as your personal email address in our
upcoming Successful Internet Projects book. We feel that
many teachers will love what you have to say, and benefit
from your experience.

Even if we have contacted you before, we need you to respond
via email now in order for us to include your story. Your
email is our "permission slip". In addition, we'd be very
grateful for a photo of yourself (and/or of you and your
class) to use accompanying your material. In this way,
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Appendix I: HyperStudio Disks
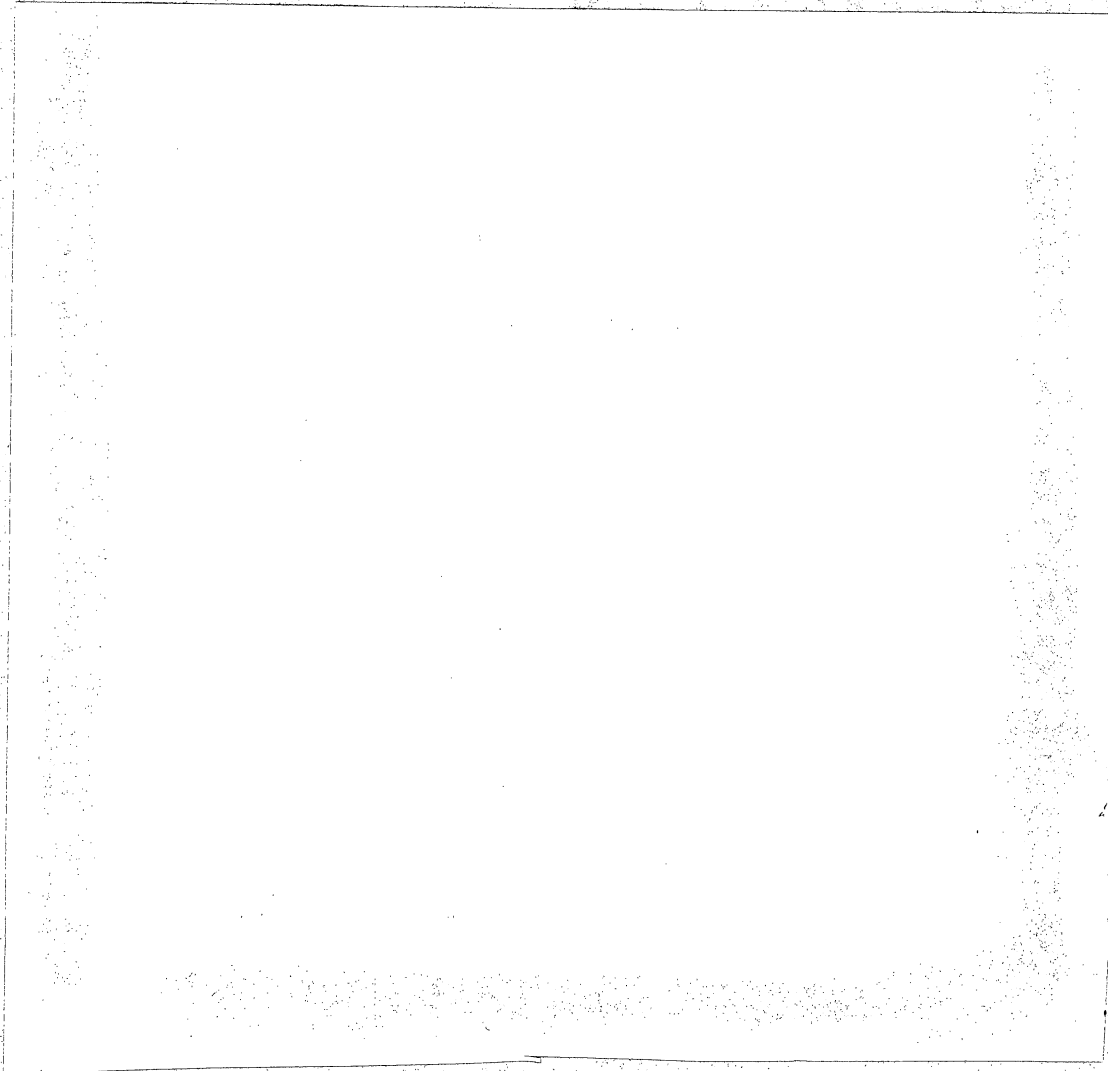
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