1999

Integrating technology into the science curriculum : environmental studies grade 5

Lois Diane Enger
University of Northern Iowa

Integrating technology into the science curriculum : environmental studies grade 5

Abstract

The project was developed to illustrate a process for including hands-on use of technology in an environmental education activity. The requirements for an integrated curriculum identified by McRel are incorporated: science, technology, language arts, math, and life skills. Activities included are discussion of the topic, writing and editing a script, digital photography, computer usage including scanning, on-site visiting, and teacher and student evaluation. The on-site visit was conducted at a nature center.

Classroom activities involved planning, research, storyboarding, organizing visual materials, script writing, and creating a computer-generated presentation using mPOWER, a presentation software program. The completed computer presentation was converted to video. The resulting videotape was used in the classroom and shared with students and parents. The videotape, vocabulary list, worksheets, and project evaluation forms are included.

Integrating Technology into the Science Curriculum:

Environmental Studies Grade 5

A Graduate Project

Submitted to the

Division of Educational Technology

Department of Curriculum and Instruction

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts

UNIVERSITY OF NORTHERN IOWA

By

Lois Diane Enger

May 10, 1999

This Graduate Project by: Lois Enger

May, 1999

Titled: Integrating Technology into the Science Curriculum:

Environmental Studies Grade 5

has been approved as meeting the research requirement for the

Degree of Master of Arts.

Sharon E. Smaldino

May 10, 1999
Date Approved

Graduate Faculty Reader

Robert H. Hardman

May 17, 1999
Date Approved

Graduate Faculty Reader

William P. Callahan

May 19, 1999
Date Approved

Department of Curriculum
and Instruction

ABSTRACT

The project "Integrating Technology into the Science Curriculum: Environmental Studies Grade 5" was developed to illustrate a process for including hands-on use of technology in an environmental education activity. It was targeted at grade five and meets the curriculum objectives of the standard course of study from Mid-Continent Regional Educational Laboratory (McRel) Content Knowledge, a compendium of Standards and Benchmarks for K-12 Education, 2nd Edition. The requirements for an integrated curriculum identified by McRel are incorporated: science, technology, language arts, math, and life skills. Activities included are discussion of the topic, writing and editing a script, digital photography, computer usage including scanning, on-site visiting, and teacher and student evaluation. The on-site visit was conducted at a nature center. Classroom activities involved planning, research, storyboarding, organizing visual materials, script writing, and creating a computer-generated presentation using mPOWER, a presentation software program. The completed computer presentation was converted to video. The resulting videotape was used in the classroom and shared with students and parents. The videotape, vocabulary list, worksheets, and project evaluation forms are included.

TABLE OF CONTENTS

Abstract ii

Table of Contents iii

Acknowledgements iv

Chapter I - Introduction 1

Chapter II - Methodology 7

Chapter III - Project 12

Chapter V - Conclusions and Recommendations 18

References 20

Appendix A - Terminology 22

Appendix B - Project Development Cycle 25

Appendix C – Standards and Benchmarks 26

Appendix D - Rubrics 31

Appendix E – Project Description 32

Appendix F – Photo Log Sheet 35

Appendix G – Slide Planning Form 36

Appendix H – Student Assessment Form 37

Appendix I - Video Tape – Nature in Palo Alto County, 1998 38

ACKNOWLEDGEMENTS

The author wishes to express her appreciation to the Emmetsburg Catholic School 5th grade and their teacher Judy Murphy for their participation in this project. In addition, special thanks to Dorothy Brandt who supplied much needed encouragement, and proofreading skills.

CHAPTER 1

INTRODUCTION

The integration of technology into the curriculum should serve to enhance and support the learning process. Just as textbooks and pencils are tools used to promote learning, so are the resources available through computers and the World Wide Web. The tools that are used need to be carefully selected for their value in promoting and reinforcing learning. The selection of these tools is an important part of the curriculum planning process. The focus of the planning process should be on learning outcomes and what tools will support this process. Else (1966) says, "A learning culture needs to be encouraged and nurtured to create meaningful and relevant connections, produce group and individual learning through cooperation, and help students produce a variety of outcomes as information is made available with continuous feedback" (p. 3). Smaldino (1966) writes "...technology can only serve the role as "tool" for the teacher. It is, in fact, the teacher who must utilize the tools within the process" (p. 223).

President Bush and the 50 state governors attended an Education Summit in Charlottesville, Virginia in 1989 (Kendall & Marzano, 1997, p. 1). The summit resulted in the establishment of six goals for education to be reached by the year 2000.

A process for achieving the six goals established at the Education Summit was developed by the Mid-continent Regional Educational Laboratory (McRel).

In response to the six goals, the document, Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education, was published in 1995 with a second edition published in 1997. The standards and benchmarks outlined in the document can serve as a guide for developing curriculum and assessing the learning outcomes of the educational process. Lohman (1999), Superintendent of Schools in Spencer, Iowa, states that:

> Standards serve as goals to improve teaching and learning. They will allow parents, teachers, and community members to be aware of what students are expected to know and be able to do by given times in their education. Standards will allow everyone to measure student progress and to clearly determine if they have been achieved. All of our students are capable of higher levels of learning when the target is clearly defined and they know what is expected of them. The absence of standards has consequences similar to a lack of goals in any pursuit (p. 1).

Of the six goals established at the Education Summit, two goals, 3 and 4 "are specifically related to academic achievement" (Kendall & Marzano, 1997, p. 1). Goal 3 states that:

> ...by the year 2000, American students will leave grades 4, 8, and 12 having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they

may be prepared for responsible citizenship, further learning, and productive employment in our modern economy (p 1).

Goal 4 states that "by the year 2000, U.S. students will be first in the world in science and Mathematics achievement" (p. 1).

According to Kendall & Marzano (1997), "Content standards describe the knowledge and skills that students should attain. Curriculum standards, on the other hand, can describe overarching goals, or ways in which the curriculum should be orchestrated to achieve a desired result" (p. 25). They also established a benchmark as the "smallest unit of analysis", defined as a " statement of the expected knowledge" (p. 25). A benchmark can be declarative, procedural, or contextual. Procedural knowledge is what a student can do. Declarative knowledge is what a student understands. Contextual knowledge is "knowledge acquired in a unique context" (p. 23). Technology can help students achieve these goals through increased understanding and retention of the information that is presented.

Technology is becoming increasingly important in our society and needs to be addressed in the classroom. A classroom project that has technology as an integral component should meet the standards and benchmarks appropriate for the grade level and subject area. One project can be designed to incorporate a number of these standards and benchmarks in several subject areas, including the standards and benchmarks for technology as identified by the National

Educational Technology Standards for Students project Educational Standards (NETS). The project is an International Society for Technology in Education (ISTE) initiative funded by the National Aeronautics and Space Administration (NASA) in consultation with the U.S. Department of Education, the Milken Exchange on Education Technology, and Apple Computer, Inc. Integration of technology into the curriculum depends on the availability and promotion of these tools. Classroom arrangement can be used to promote use of computers. As McKenzie (1998) said:

> If we expect student-centered, engaged classrooms with the technologies fully blended into the daily routines, the computers belong where they will do the most good, not sequestered in a back corner or shoved against a back wall. Many teachers with project-based, problem-based classrooms elect to spread their computers about so that they serve as interest centers. In some classrooms it is difficult to find a "front" to the classroom because the focus is on learning instead of teaching (p. 9).

The project, "Integrating Technology into Science Curriculum, Environmental Studies, Grade 5", was designed to illustrate how the integration of technology into the curriculum can reinforce the learning process, and help students reach the goals by meeting the standards. It also illustrates how one project can encompass many different subject areas such as math, language arts, and science when technology is included as a part of the process. With the

addition of a technology component the students can learn how to research information, organize that information, and present that information in a variety of ways.

In her presentation at the Iowa Technology Education Connection (ITEC) convention, Baehr (1998), a Special Education Consultant with Lakeland Area Education Agency 3, stated that, "The tools provided by computer technology can provide a means for all students to participate and learn in an equity-conscious atmosphere."

Every school technology plan should contain an assistive technology component that addresses equal access for all students. There are options available on computers and in many software packages that allow adapting the screen and the input and output devices of a personal computer for students with specific needs. These options can benefit students with many types of functional limitations, impaired vision, finger and hand movement, and learning disabilities. There are programs called screen readers that verbalize the text that appears on the screen, and Braille keyboards for visually impaired students. Keyboards are available with larger keys and/or combined function keys for students with functional limitations.

Computer programs have been designed that promote problem-solving skills and critical and creative thinking. Multimedia programs incorporate computer software, video, and print to promote learning. Software that is

educationally relevant can be incorporated with other resources to facilitate learning.

The rapidly advancing uses of technology in the home and work place require that students be able to use the existing technologies and have the ability to adapt to the changes that are occurring. This ability will be promoted by the inclusion of technology as an integral part of the curriculum design.

With inclusion of technology into the curriculum, students will need to learn the terminology that is integral to the understanding of how to use the computer equipment and software. These terms are common to all computer processes and will form a basis for future understanding and use of the technology in the classroom and workplace. Terms that are associated with this project include those from science and technology. Discussion and definition of these terms are an important part of the research and planning process in a class project. A vocabulary list can be developed as the project progresses with the students identifying and defining new terminology from all of the different subject areas (Appendix A).

CHAPTER II

METHODOLOGY

An Environmental Science unit for grade five was the basis used for demonstrating how technology could become an integral part of the educational process. The project was developed to illustrate how a project could meet the standards for more than one subject area as outlined in Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education by Kendall & Marzano, 1997.

Marzano (1998), Deputy Director, McRel Institute, spoke at the Iowa Technology Education Connection (ITEC) convention in Des Moines, Iowa. ITEC is an organization for Iowa Educators interested in classroom applications of computers. He stated that schools suffer from a lack of well-articulated curriculum. He also stated that memorization of information by students is not permanent. Combining information with practical application will help students to retain the information presented by providing an opportunity to apply it. Research into how students learn suggests that:

> To make information meaningful we must first find the experience that students have had and hook the new information to it or create the experience with them. There are no other ways for it to work. The brain has been described as a "pattern-seeking" device. It constantly takes information and tries to synthesize it into patterns

that make sense. If it can't make patterns, it can't retain the information" (Our Children First, 1999, p. 2).

In order for children to learn, instruction must focus on how they can understand and make use of the information presented. Allowing the students to be active participants in the creation and execution of a project is an important part in achieving the objectives. Each part of this project was designed to provide students with an opportunity to apply the information and skills learned to reinforce the learning process. Students were encouraged to use decision making and problem solving skills. Hargreaves and Fullan (1998) quoted Ruddock as suggesting: "...young people are observant, are often capable of analytic and constructive comment, and usually respond well to the serious responsibility of helping identify aspects of schooling that strengthen or get in the way of their learning" (p. G3).

A seven-step process was developed for this project to serve as a guide for the instructors in developing their project and to provide them with an example of parameters for the selection of a topic and implementation of the project (Appendix B). Students need to be included in the development process. They need to be encouraged to work cooperatively in selecting the topic, deciding what components they will include, and how to develop the topic. The instructor should act as a facilitator, keeping students on track and instructing students on the methods and procedures needed to accomplish the project. The subject goals, standards, and benchmarks that are

included in the project need to be identified and the students given this information so they can keep track of their own progress. These should include standards and benchmarks from across the curriculum such as: science, technology, language arts, math, art, and life studies (Appendix C).

A project of this type can be large and complex and cover several curriculum areas, or it can be tailored for a smaller unit. It was designed to meet specific standards and benchmarks for each curriculum area. Technology is included as an integral part of the project to reinforce learning by providing a method for applying and demonstrating the knowledge and skills learned.

It is important to have technical support available throughout a project that involves the use of technology. This will be especially helpful when using equipment for the first time or to deal with problems that may arise and to provide assistance with difficult processes. This type of project can be used in many different subject areas. The skills that students can learn from this project will serve as a foundation for future projects.

Step 1 Identification of Standards and Benchmarks

Achieving the six goals established at the Education Summit will challenge educators to develop curriculum that enables students to achieve academic success. Technology is an important tool that can be used in meeting the goals, standards, and benchmarks of specific projects in the classrooms. A project should involve the integration of curriculum standards from many subject

areas. The standards identified for this project were from the areas of science, math, technology, language arts, art, and life skills.

Step 2 Selection of Topic and Restriction Development

Restrictions for the project need to be developed by the instructor prior to implementation. These restrictions need to conform to local school regulations and limitations dictated by class size, technology available, and travel requirements.

Step 3 Technology Instruction

Instruction on the use of various technologies needs to be provided to the students and their instructor. Use of computer technology could be conducted as part of the student's computer classes. This would create a unity between courses and provide an opportunity for practical application of skills learned.

Step 4 Research and Development

Using resources available to the class, such as library, textbook, and Internet, the students need to research the topic they have chosen and develop an outline. Working cooperatively students need to conduct the research and develop the project including establishing a time frame in completing the steps in the project.

Step 5 Proofing, Correcting and Finalizing

Students need to make any changes/corrections and finalize their project.

Step 6 Presentation

The project can be presented to other students, teachers, and parents.

Step 7 Evaluation

The students and their instructor need to evaluate the process and results of the project. Using the performance tasks that indicate student achievement of a benchmark, student progress can be evaluated according to the 4-point rubric developed by McRel (Appendix D).

CHAPTER IV

PROJECT DEVELOPMENT

An outline was developed for this project by the Media Production Specialist from the Lakeland Area Education Agency, which provided the students and instructor with guidelines for the selection of a topic and development of parameters (Appendix E). The instructor, using school rules, procedures, and time frame considerations that were appropriate for the particular area established these parameters. The students were encouraged to work cooperatively in selecting the topic, deciding what components would need to be included, and how to develop the topic. The instructor acted as a facilitator, keeping students on track and instructing students or arranging for instruction on the methods and procedures needed to accomplish the project. The Media Production Specialist provided technical support when needed and demonstrated technology processes.

Step 1 Identification of Standards, and Benchmarks

Standards were identified for each of the curriculum areas covered by this project. Benchmarks were developed from Content Knowledge A Compendium of Standards and Benchmarks for K-12 Education 2nd Edition that would provide a method for measuring student achievement. Benchmarks covered declarative knowledge, procedural knowledge, performance assessment task, and developmental level. Standards and Benchmarks for technology were adapted

from the National Educational Technology Standards for Students. The 4-point rubric from McRel was used to grade the students in achieving each of the benchmarks.

Step 2 Topic Selection and Restriction Development

The students reached a consensus on a topic. The students chose the habitats of animals in the local area. This was part of an environmental unit in science. Restrictions for the activities were provided in the outline. These restrictions were: outside activities needed to be within fifteen miles of their school building, out-of-school activities had to be accomplished in one school day. The students determined the nature and scope of the project using decision-making skills. They chose the Lost Island Nature Center at Ruthven, Iowa, as the site that would provide them with the most resources for their project.

Step 3 Technology Instruction

The students and the instructor received instruction from the Lakeland Area Education Agency 3 Computer Consultants on the use of the digital camera, presentation software, and how to convert a presentation to videotape. Digital cameras are similar to regular cameras except for the LCD (Liquid Cathode Display) panels used as a viewfinder and the use of 3.5 floppy disks instead of film. These cameras convert images to a JPEG format for use on the computer. Students also learned that each floppy disk could hold from 30 to 50 photos depending on the color and effects used. Students were made aware of the two-

hour battery life of the camera. They learned that turning the cameras off between shots would extend the life of the battery.

Students and instructors attended a workshop on the use of mPOWER presentation software. mPOWER is an easy-to-use program for creating multimedia presentations. They learned how to create slides, choosing appropriate backgrounds, text, and transitions. They learned how they could import photos that were taken with the digital camera into the presentation and how to add sound. They also learned how to organize the slides following a storyboard. The Area Education Agency Media Production Specialist provided technical support throughout the process. A "how to" video on mPOWER was provided to the class as additional support in how to use the program.

Step 4 Research and Development

The students developed an outline for their presentation. This included deciding what animals and habitats they could expect to find in the area. They used library resources and their textbook to develop the outline and identify animals and habitats. This class did not have Internet access. The students conducted all of their research using library resources to learn what animals they could expect to find in the immediate area and what type of habitat these animals required. Miriam Patton, the Naturalist from Palo Alto County, Iowa, provided additional information on animals and their habitats. The availability of Internet resources would have provided another area for research.

A one-day field trip to the Nature Center located north of Ruthven, Iowa, was arranged to collect photos and information. This location provided access to wetlands, prairies, and forest areas that fit with the project restrictions. Students, using log sheets provided by their teacher, were required to keep a record of the pictures they took, recording the number of the picture, a description, and information about the subject (Appendix F). The students worked in pairs with one student logging the information while the other took pictures, trading off periodically.

Step 5 Proofing, Correcting, and Finalizing

Adobe Photo Deluxe, a photo-editing program, was loaded on the classroom computer and the students received instruction on how to preview, edit, and save their photos. A chart was designed on the blackboard, using the three categories the students had decided on for their presentation. These categories were wetlands, prairies, and forests. Each photo was evaluated for content and listed in the appropriate category. If a photo did not fit or the students did not like the quality, it was eliminated. The photos that they selected were imported into mPOWER, presentation software, and arranged in a presentation according to the script that the students had written. Background and transitions were decided on and added to the presentation. The slide timings were set and final adjustments made to the presentation (Appendix G).

With the completion of the slide show on the mPower storyboard, sound in the form of narration and music was added. Using the script and their notes, the students wrote narration to go with their presentation. Using the computer sound recorder, students had to determine the time limits on the sound clips, which were saved in "wav" format. Each sound clip was numbered to correspond to the slide to which it would be attached. These sound clips were then attached to the presentation and set to play automatically.

Background music was selected from the sound library available at the Lakeland Area Education Agency 3 and added to the presentation. The students previewed the presentation and final adjustments were made to sound levels and transitions.

Using "ScanDo", a digital converter that connects the computer to a video recorder, the students recorded the completed presentation on videotape. A copy of the presentation was dubbed for students to include in their portfolio.

Step 6 Presentation

The class showed the presentation to other students, teachers, and parents. The students described the steps they used in creating the video and talked about the animals and their habitats that were depicted in the video.

Step 7 Evaluation

The subject areas included in the project were: technology, language arts, math, art, and life studies. In Technology, students demonstrated proficiency in

the use of digital cameras, photo-editing software, presentation software, and computer sound input devices. In language arts, students demonstrated proficiency in researching, writing, script development, and recording sound. The Math skills included timing of slides to fit a specific time frame. Art included photography and photo editing and the overall design of the presentation. The organizing of information, working as a team and making group decisions, and presenting the completed project to an audience represented life skills.

Student progress was evaluated according to the 4-point rubric developed by McRel. Students were assigned grades based upon how well they had achieved the standards and benchmarks identified for this project (Appendix H).

CHAPTER V

CONCLUSIONS AND RECOMENDATIONS

This project was large and complex and covered several curriculum areas and met specific standards and benchmarks for each area identified. Technology was used to reinforce learning by providing a method for applying and demonstrating the knowledge and skills learned.

It was important to have technical support available throughout the project. This was especially helpful when equipment did not work right and to provide assistance with difficult processes. This was the first time that the teacher or the students had attempted a project of this type. The teacher learned the process and the how to use the technology along with the students. An environment developed where students and teacher worked cooperatively and encouraged each other creating a very supportive learning atmosphere. Judy Murphy, the 5th grade instructor at the Emmetsburg Catholic School said, "Organization was the key to the project. The students learned how important it was to follow the procedures and keep things organized"(Personal communication, November 1998). This was reinforced when a mistake was made in a photo log, throwing off the numbers of the photos. Extra time had to be spent in identifying and renumbering the photos.

This was a very small class with only one computer so all of the students were involved in one project. With larger classes, students would need to be split

into teams and more equipment would be necessary. With a larger class and access to more computers, students could be split into groups with each group doing a different project. The skills that the students learned in creating this project will serve as a foundation for future projects and this type of project could be used in other subject areas. Each student was able to keep a copy of the finished video for inclusion in a portfolio (Appendix I).

The cost of this project was limited to the videotapes needed for the finished project. Computer software, hardware, and technical support was available in the school or from the Area Education Agency serving this school district.

REFERENCES

Baehr, P., (1998). How to include all students in your tech plan. Iowa Technology Education Connection (ITEC) convention, Des Moines, Iowa

Eisenberg, M. B, and Johnson, D. (1996). Computer skills for information problem solving: learning and teaching technology in context. Eric Digest, ED392463.

Else, D. (1996). An Iowa dialogue on issues surrounding utilization of technology in schools. Monograph Series Volume VI, Number 1. Institute for Educational Leadership, College of Education and the University of Northern Iowa, Cedar Falls, Iowa.

Hargreaves, A. and Fullan M., (1998). What's worth fighting for out there? New York: Teachers College Press.

Kendall, J.S., and Marzano, R.J. (1997). Content knowledge, a compendium of standards and benchmarks for k-12 education, (2nd edition). McRel Mid-continent Regional Educational Laboratory, Aurora, Colorado.

Lohman, G., (1999, February). The source, Spencer Community School, Spencer, Iowa

Marzano, (1998). Iowa technology education connection (ITEC) convention, Des Moines, Iowa

McKenzie, J. (1998). The wired classroom, creating technology enhanced student-centered learning environments, [on-line]. Available: http://fromnowwon.org/mar98/flotilla.html

National educational technology standards for students. (1998) International Society for Technology in Education. Eugene, Oregon.

Our Children First (1999). Implications of brain research to learning – a basic understanding, Volume I, Issue I Lakeland Area Education Agency 3, Cylinder, Iowa

Smaldino, S. (1996). An Iowa dialogue on issues surrounding utilization of technology in schools. Monograph Series Volume VI, Number 1. Institute for Educational Leadership, College of Education and the University of Northern Iowa, Cedar Falls, Iowa.

APPENDIX A

TERMINOLOGY

- APPLICATION – is a sequence of instructions that can be executed by a computer. In common usage, program, software and application all pretty much mean the same thing. A program is a complete executable file, whereas "software" and "application" more accurately describe collections of program and data files devoted to a single purpose, such as word processing. Programs such as Microsoft Word, MacWrite, MacPaint, etc. are applications. Applications give the computers instructions that provide the user with tools to accomplish a task. For instance, a word processing application provides space to type in, means to format the text, and a spelling checker.
- ASCII (American Standard Code for Information Interchange) – is the American Standard Code for Information Interchange is a 7-bit character set. The ASCII character set is the most universal character-coding set.
- BIT – is a binary digit. This is the smallest unit of digital information. It is either ON or OFF, 1 or 0.
- CURSOR – is an icon on the screen that moves when the computer's mouse is moved, allowing the user to "point" to a command or position on the screen.
- DATA – is a description for information that is stored or transmitted as a sequence of symbols that represent graphics and text. Data can be anything from a word-processing document or an electronic (digitized) version of your

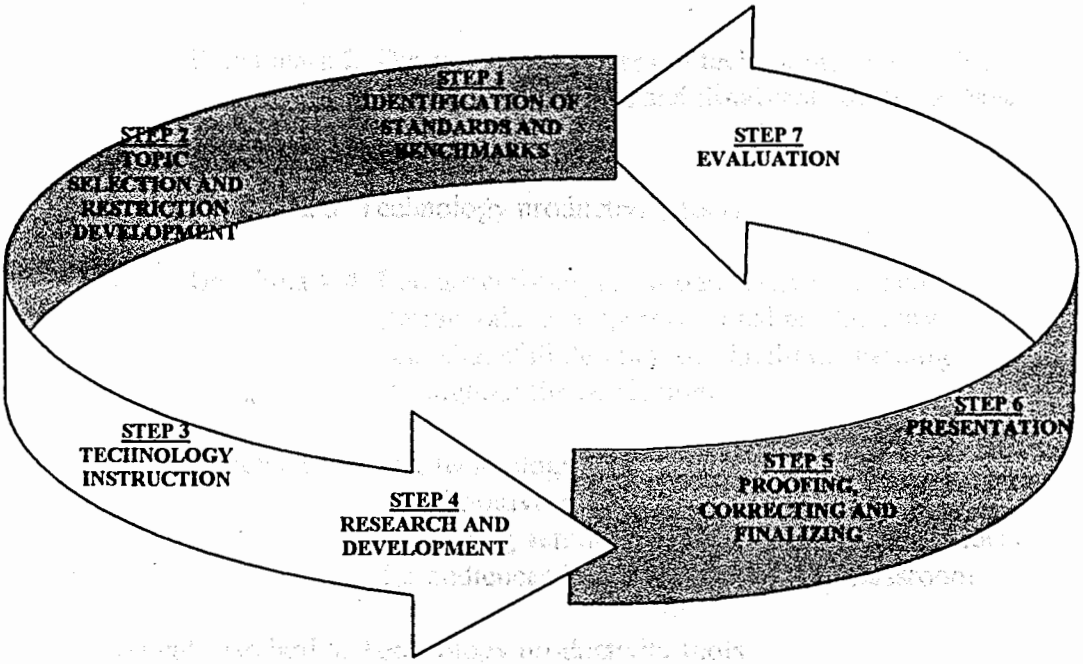
family's photo album. Data is actual information such as text, numbers, sounds, and images, in a form that can be processed by a computer.

- DIGITAL – is information expressed in bits (zeros and ones), the form understood by computers. Digital devices are hardware products like printers or scanners that receive and/or send out information in a digital format.
- DIGITIZE – is the conversion of any continuously varying source of input, such as an audio signal, into a form understood by a computer (i.e., bits). It means taking something like a document or photo and converting it into something you can use in your computer. If you have a piece of paper with handwriting on it and you key all the words into your computer, you've just digitized that document.
- JPEG – is a format for compressed graphic images. Various settings are available, to allow more compression at the cost of a greater loss of image quality.
- LCD (Liquid Crystal Display) – is technology used for portable computer displays, as well as many other electronics display applications.
- PRESENTATION – is a slide or series of slides utilizing audio and/or video clips in addition to text, charts, and graphics.
- RUBRIC – The criteria established for assessing the learning outcomes of a learning project. The set of rules that govern the process.

- SCANNER – is a device for converting text or graphics displayed on a sheet of paper into a digital image you can display on your computer screen and use with certain applications.
- SOFTWARE – is a set of instructions that make computer hardware perform tasks. Operating systems, programs, device drivers, and applications are all software.
- TEXT FILE – is a file composed entirely of text characters. Text files are usually in ASCII format, a format practically all computers can use.
- WAV – is a multimedia, file format. A sound format developed by Microsoft and used extensively in Microsoft Windows. Wav files are used as a sound source.

APPENDIX B

PROJECT DEVELOPMENT CYCLE



APPENDIX C

STANDARDS AND BENCHMARKS

Curriculum: Technology

Content Standard 1: Basic operations and concepts

Benchmark 1: Use keyboards and other common input and output devices efficiently and effectively.

Benchmark 2: Discuss common uses of technology in daily life and the advantages and disadvantages those uses provides.

Content Standard 3: Technology productivity tools.

Benchmark 4: Use general-purpose productivity tools and peripherals to support personal productivity, remedial skill deficits, and facilitate learning throughout the curriculum.

Benchmark 5: Use technology tools for individual and collaborative writing, communication and publishing activities to create knowledge products for audiences inside and outside the classroom.

Content Standard 5: Technology productivity tools.

Benchmark 8: Use technology resources for problem-solving, self-directed learning and extended learning activities.

Benchmark 9: Determine when technology is useful and select the appropriate tool(s) and technology resources to address a variety of tasks and problems.

Curriculum: Mathematics

Content Standard 4: Understands and applies basic and advanced properties of the concepts of measurement.

Benchmark 2: Selects and uses appropriate tools for given measurement situations.

Benchmark 5: Uses specific strategies to estimate quantities and measurements.

Content Standard 9: Understands the general nature and use of mathematics.

Benchmark 1: Understands that numbers and the operations performed on them can be used to describe things in the real world and predict what might occur.

Curriculum: Science

Content Standard 4: Knows about the diversity and unity that characterize life.

Benchmark 1: Knows different ways in which living things can be grouped and purposes of different groupings.

Benchmark 2: Knows that plants and animals progress through life cycles of birth, growth and development, reproduction, and death; the details of these life cycles are different for different organisms.

Content Standard 7: Understands how species depend on one another and on the environment for survival.

Benchmark 2: Knows that an organism's patterns of behavior are related to the nature of that organism's environment.

Benchmark 3: Knows that changes in the environment can have different effects on different organisms.

Curriculum: Language Arts, Level II (Grades 3-5)

Content Standard 1: Demonstrates competence in the general skills and strategies of the writing process.

Benchmark 1: Uses prewriting strategies to plan written work.

Benchmark 2: Uses strategies to draft and review written work.

Benchmark 3: Uses strategies to edit and publish written work, selects presentation format.

Content Standard 5: Demonstrates competence in the general skills and strategies of the reading process.

Benchmark 1: Previews text.

Benchmark 2: Establishes a purpose for reading.

Benchmark 5: Decodes words not recognized immediately by using phonetic and structural analysis techniques, the syntactic structure in which the word appears, and the semantic context surrounding the word.

Benchmark 8: Monitors own reading, strategies and makes modifications as needed.

Content Standard 7: Demonstrates competence in the general skills and strategies for reading a variety of informational texts.

Benchmark 1: Applies reading skills and strategies to a variety of informational texts.

Benchmark 4: Identifies and uses the various parts of a book.

Content Standard 8: Demonstrates competence in speaking and listening as tools for learning.

Benchmark 1: Contributes to group discussions.

Benchmark 2: Asks questions in class.

Benchmark 3: Responds to questions and comments.

Benchmark 4: Listens to classmates and adults.

Benchmark 6: Reads compositions to the class.

Curriculum: The Arts, Theater, Level III (Grades 5-8)

Content Standard 9: Demonstrates competence in writing scripts.

Benchmark 1: Refines and records dialogue and actions.

Benchmark 2: Creates improvisations and scripted scenes based on personal experience and heritage, imagination, literature, and history.

Content Standard 3: Designs and produces informal and formal productions.

Benchmark 1: Develops focused ideas for the environment using visual elements.

Curriculum: Life Skills, Thinking and Reasoning, (Grades 3-5)

Content Standard 1: Understands and applies the basic principles of presenting an argument.

Benchmark 1: Uses facts from books, articles, and databases to support an argument.

Content Standards 5: Applies basic trouble-shooting and problem-solving techniques.

Benchmark 1: Identifies issues and problems in the community.

Curriculum: Life Skills, Working With Others (Grades K-12)

Content Standard 1: Contributes to the overall effort of a group.

Benchmark 1: Challenges practices in a group that are not working.

Benchmark 2: Demonstrates respect for others in the group.

Benchmark 3: Identifies and uses the strengths of others.

Benchmark 4: Takes initiative when needed.

Benchmark 5: Helps the group establish goals.

Benchmark 6: Engages in active listening.

Benchmark 7: Takes the initiative in interacting with others.

Benchmark 8: Evaluates the overall progress of a group toward a goal.

Benchmark 9: Keeps request simple.

Benchmark 10: Contributes to the development of supportive climate.

APPENDIX D

RUBRICS

The four point rubric

- 4 – Exceeds standard

  Demonstrates exemplary performance that shows creativity. The students' understanding of concepts is profound. An expert's performance.

- 3 – Meets standard

  Demonstrates competent performance. The student's understanding is through. A journeyman's performance.

- 2 – Approaches standard

  Demonstrates competence in some phases of the performance but the performance as a whole is emerging. The student's understanding of concepts is not thorough. An apprentice's performance.

- 1 – Not yet approaching standard.

  Demonstrates competence in few, if any, phases of the performance. The student's understanding of concepts is confused or invisible. A novice's performance.

APPENDIX E

PROJECT DESCRIPTION

GRADE LEVEL: 5

SUBJECT AREA(s): Science

GENERAL TOPIC: Environmental Studies

SPECIFIC TOPIC: Local Wild Life Habitat

PROJECT LIMITATIONS:

- Out-of-school activities will be contained within a fifteen-mile radius of the elementary building.
- Out-of-school activities will be limited to a one-day session approach.

OBJECTIVES:

- Students will demonstrate an ability to develop and research a project
- Students will be able to identify various animal habitats in the immediate area.
- Students will create a video presentation illustrating what they have learned.
- Students will record their observations on the project.
- Students will evaluate and the project.

MATERIALS/EQUIPMENT:

- Digital Camera/Floppy Disk
- Computer (PC or MAC)
- Digital Converter
- VCR

TV Monitor

Video Tape(s)

Microphone

mPOWER Presentation Software or other program

Science Text book, Merrill (1994)

Slide Presentation Sheets

Photo Log Sheet

DISCUSSION:

1. Decide what environmental components will be used in the presentation.
2. Decide what will be needed such as photos.
3. Organize an outline for a script.
4. Develop a storyboard for the presentation.

DISCUSSION:

What wildlife areas are within 15 miles of the school?

What research session can be completed within the school-day restriction?

TEACHER ACTIVITIES

Demonstrate and explain how to use the Digital Camera.

Explain how to create a photo log.

Explain how to use the slide-planning sheets to write a script

STUDENT ACTIVITIES:

Decide what visual materials will be needed.

Take a field trip to the nature center, local lake, or other area.

Divide into teams of two. (A photographer and a recorder)

Write A Script

Using Adobe Photo Shop, photo editing software or other software. , view the photos, trim and size the ones to be used in the presentation. Save and name the photos.

Using mPOWER create a visual presentation.

Record the script.

Copy the presentation to videotape using the ScanDo.

CONCLUSION:

Students can demonstrate what they have learned by discussing the topic, writing a summary of the project or showing the presentation to another class or group.

VOCABULARY TERMS:

1. Develop project vocabulary.

EVALUATION:

Student Evaluation

Teacher Evaluation

APPENDIX F

PHOTO LOG SHEET

PHOTO NUMBER	SUBJECT/DESCRIPTION	COMMENTS

APPENDIX G

SLIDE PLANNING SHEET

SLIDE NUMBER:
BACKGROUND:
GRAPHIC(S) FILE NAME:
PHOTOGRAPH(S) FILE NAME/NUMBER:
SOUND(S) WAV FILE: VOCAL RECORDING: BACKGROUND:
TEXT
SPEECH
SLIDE TRANSITION
ANIMATION(S)

STUDENT ASSESSMENT

Curriculum:				
Content Standard ( ):	**Declarative Knowledge**	**Procedural Knowledge**	**Performance Assessment Task**	**Developmental Level**
Benchmark ( ):				
Benchmark ( ):				
	Comments			
4 = Exceeds standard • Demonstrates exemplary performance that shows creativity. The students' understanding of concepts is profound. An expert's performance.				
3 = Meets standard • Demonstrates competent performance. The student's understanding is through. A journeyman's performance.				
2 = Approaches standard • Demonstrates competence in some phases of the performance but the performance as a whole is emerging. The student's understanding of concepts is not thorough. An apprentice's performance.				
1 = Not yet approaching standard • Demonstrates competence in few, if any, phases of the performance. The student's understanding of concepts is confused or invisible. A novice's performance.				

APPENDIX H

STUDENT ASSESSMENT FORM

APPENDIX I

Finished Project

The completed project is in the form of a videotape, Nature in Palo Alto County, 1998.