

A LEARNING RESOURCES TEACHER'S GUIDE
TO THE PRODUCTION OF INTERNET
MULTIMEDIA CURRICULUM UNITS

CENTRE FOR NEWFOUNDLAND STUDIES

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**A LEARNING RESOURCES TEACHER'S GUIDE
TO THE PRODUCTION OF
INTERNET MULTIMEDIA CURRICULUM UNITS**

By

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ABSTRACT

The purpose of this report is to present the results of an internship study and associated development project. The objective of my internship was personal professional development through observation and assumption of the dual roles of secondary school learning resources teacher and curriculum software designer. Based upon my experiences in these roles, a guide for teacher design of Internet multimedia curriculum lessons was produced. Peer critique of this guide during my internship facilitated its development.

Chapter One explains the rationale for the choice of internship setting, outlines the internship experiences, describes the evaluation and supervision procedures, and provides background information for the research component. Chapter Two is a review of the literature on Internet homepage and multimedia design with respect to important aspects of educational pedagogy, and in particular the relationships between computer-based multimedia and the theory of multiple intelligences. Chapter Three describes the Internet Multimedia Curriculum Design Guide (see enclosed compact disc) - the product of literature reviews, teacher interviews, peer collaboration and classroom observations. It is this guide that sets forth the design principles for teaching via Internet and multimedia incorporation in classroom environments. This chapter includes two examples designed based on the philosophy set forth in the IMCD guide - a plate tectonics lesson relating to faulting and folding, and an Earth Day lesson / scavenger hunt. Teacher reaction to the IMCD guide and student reaction to the two example lessons is provided. Chapter Four discusses the internship experience and the role of the learning resources computer specialist in an information technology environment.

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TABLE OF CONTENTS

	Page
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iii
CHAPTER 1: OVERVIEW OF THE INTERNSHIP	
Introduction.....	1
Defining the Internship Role.....	1
Researcher History and Possible Biases.....	3
Rationale for the Choice of Internship Setting.....	4
On-Site Supervision.....	6
The Research / Production Component.....	7
Limitations of the Internship and Report.....	9
Method of Self-Evaluation.....	10
Criteria for Internship Evaluation.....	12
CHAPTER 2: A LITERATURE REVIEW OF CHANGING ROLES AND MEDIA	
The Learning Resources / Information Teacher.....	14
Teaching and "Life-Long" Learning.....	15
Constructing Information Literacy Skills.....	17
Multiple Intelligences.....	19
Traditional Media and Computer-Based Multimedia.....	20
Multimedia Hardware and Software.....	21

TABLE OF CONTENTS (Cont'd.)

Disadvantages of Computer-Based Multimedia.....	22
Advantages of Computer-Based Multimedia.....	23
Computer-Based Multimedia and Multiple Intelligences.....	24
The Internet as a Road to Inquiry.....	25
Multimedia Teaching Strategies.....	26
CHAPTER 3: THE INTERNET MULTIMEDIA CURRICULUM DESIGN GUIDE	
Introduction.....	29
The Internet Multimedia Curriculum Design (IMCD) Guide.....	30
The IMCD Guide Menus - Directed vs Free Browsing.....	32
Design Principles and Curriculum Concerns.....	33
Design Tips and Tricks.....	38
Reactions to the IMCD Guide.....	39
Applied Design Using Earth Science Lessons.....	42
A Plate Tectonics Lesson - Faulting and Folding.....	43
An Earth Day Lesson / Scavenger Hunt.....	46
Reactions to the Earth Science Examples.....	47
CHAPTER 4: INTERSHIP EXPERIENCES AND INSIGHTS	
Introduction.....	50
Experiences and Insights.....	51

TABLE OF CONTENTS (Cont'd.)

The Learning Resources Computer Specialist.....	52
The Information Technology Curriculum.....	54
Conclusion.....	55
REFERENCES.....	56
APPENDIX A: THE INTERNET MULTIMEDIA CURRICULUM GUIDE	63
Internet Section.....	67
Multimedia Section.....	79
Curriculum Section.....	118
APPENDIX B: PLATE TECTONICS CURRICULUM UNIT.....	126
Faulting & Folding Lesson.....	136
APPENDIX C: EARTH DAY SCAVENGER HUNT.....	155
APPENDIX D: MULTIMEDIA TEACHING STRATEGIES WORKSHOP.....	172
APPENDIX E: INTERNSHIP E-MAIL COMMUNICATIONS.....	181
APPENDIX F: COMPACT DISC VERSION.....	187

CHAPTER ONE

OVERVIEW OF THE INTERNSHIP

Introduction

This opening chapter define terms related to my internship thereby characterizing the role I sought. As a researcher assuming a participant / observer role my personal biases and educational philosophy are presented. My preference in research methodology and self-imposed limitations helped to define the scope and magnitude of the work, and defined the type of internship setting required. A description of the internship sites and personnel defines my possibilities for personal professional development. This chapter also includes a description of my self-evaluation procedure and suggestions on how I believe others could critique my experience.

Defining the Internship Role

My professional development was based upon assuming specific roles during a five month period. The role of learning resources specialist is known by many names across Canada and the United States, and in the literature - school librarian, teacher-librarian, library media specialist and information technology specialist. The term "learning resources specialist" in our province means that person who manages school-based text and media collections, and who more recently manages communications to external information collections such as the Internet. The terms "Internet" and "World Wide Web" are considered to be synonymous.

For the purpose of this report, the term "technology" means the use of computers, CD-ROM, laser disc, digital video, satellite communications, telecommunications and other electronic media, as well as access to the Internet. "Information technology" has a different meaning - the use of traditional and electronic means to collect, analyse and present information.

"Multimedia" encompasses those "traditional media" or resources which have existed in learning resource centres since the 1970s - texts, periodicals, video tapes, cassettes, realia, etc. - and "computer-based multimedia" such as hypertext, digital photographs, animations, JAVA applets, etc. "Hypermedia" and "computer-based multimedia" have the same meaning. The product of my internship is a teacher's reference or guide called The Internet Multimedia Curriculum Design Guide, or the IMCD guide. This guide discusses the use of computer-based multimedia, and it is hoped that teachers using the guide will understand my internship by working through my process of designing Internet multimedia lessons.

A "curriculum software designer" is someone who incorporates the use of technology into existing curricula for computer-assisted instruction (CAI). My role was to specifically consider the use of computer-based multimedia and the Internet in curricula lesson design.

Hence, the internship was an opportunity to adopt the role of a learning resources specialist knowledgeable in curriculum design using computer-based and Internet multimedia. Throughout the internship I gained experience in using the Internet as a forum for instruction, selection of resources for computer-based multimedia lesson plans, use of technology tools such as image scanners, CD-ROM, video cameras, etc.

Researcher History and Possible Biases

It is important for a teacher to have a concept of "self", "profession", "learning" and "teaching". According to my personal experience, these definitions have changed constantly when exposed to learning environments filled with fellow students and teachers of differing beliefs and philosophies. I believe that learning is based upon subject interest and individual motivation. Teaching requires someone who not only understands subject content but is able to communicate / motivate interest.

As classroom teacher, I have advocated the need for students to integrate new content into existing knowledge webs and the acquisition of skills required to conduct research in computer-based multimedia environments, such as the Internet or as seen in CD-ROM technology. Their success now depends upon blending newer technology skills and existing information skills already taught across school curricula. This "integration philosophy" directed my rationale for the choice of internship setting and experiences I wanted to acquire.

Learning resources design based upon student interaction with Internet homepages was chosen because I have some experience with this media. I am enthusiastic about the possibilities and biased towards its use; an insider with an understanding of the context and self-interest in acting on the results; a person who fits Calhoun's definition of "collaborative action research" (1994, p 9). The researcher is also a proponent of Personalized System of Instruction (PSI) and Computer Assisted Instruction (CAI) lessons, which are designed to be teacherless and rely on student self-education. These orientations and values may influence my research; however, like Carr & Kennsis (1986, p.159), I believe that "the source of

programs for education and action designed for enlightenment must surely be in the participants [teachers] themselves, not critical investigators."

I have been a participant in listservs (LM_NET, BIGSIX) and newsgroups discussing the value of the Internet as a teaching tool. This is where the battles are being fought over what is important to students and who should have a say. There are no authorities or experts in newsgroups and they are not socially structured. Anyone is able to offer an opinion. However, it should be noted that newsgroup participants are only a percentage of the teaching population; and, the percentage of the population that is Internet literate and active.

Rationale for the Choice of Internship Setting

This internship was an opportunity to obtain practical experiences through observing a learning resources teacher, a software design specialist, their environments and exercise some professional responsibilities associated with the roles. Bishops College was an ideal setting because the school's development plan was designed to emphasize the use of information technology across the high school curriculum and in student research activities.

Bishops College has as its major focus the concept of information, assisting students in the acquisition of skills, knowledge and behaviours related to assessing, managing, processing and communicating information. Within this context technology [has] ... become a tool to help students manage the large amounts of information available. (Dibbon, 1995, p.17).

This plan - the Vision 2000 Model School Project (V2000) - was designed to be implemented in three phases. Phase 1, completed during 1994-1995 school year, gave all students and teachers direct access to the Internet through a local area network (LAN) file

server located adjacent to the learning Resources centre; Phase 2 involved an extension of the computer network and possible access from home; and, Phase 3: to develop Bishops College as a resource school for other schools in the province, using technology to pilot province-wide classes through video-conferencing and distance education.

Although Bishops College was a site where its staff provided me an understanding of the reality of the role of learning resources specialist, the aspects which were of most personal interest were the development of computer-based multimedia lessons as requested by the teaching staff. To concentrate on this aspect, one-half of the normal internship time was spent in the Memorial University Department of Computer Sciences with Dr. Ed Brown who is developing a computer-based multimedia "how to" kit for teachers. The Multimedia Teaching Strategies Project (MTSP) is a joint Memorial University Computer Science / Bishops College project to promote resource-based learning through the investigation of teacher preparation and curricular use of multimedia lesson plans. The facilities and technical expertise existent there made it an ideal site for program design and quality control.

The internship link with the Faculty of Education was the philosophical basis for using computer-based multimedia in education. CD-ROM technology and the Internet are entertaining; however their true value lie in the educational possibilities associated with the multiplicity of ways in which students learn. To guide me through the changing roles of the learning resources teacher, I asked Dr. Jean Brown to supervise my internship.

This was not a typical internship in which a student teacher shadowed a cooperating teacher. My professional development was designed to include a variety of experiences in

two different environments and involving at least eight different people.

On-Site Supervision

Bishops College is a site which uses current technology and has resource-based staff experienced in its application. "One thing that is very obvious at Bishops College is that teachers are enthusiastic about acquiring new skills and integrating them into their teaching" (Dibbon, 1995, p.18). This site provides the opportunity to work with Mr. Allister Dyke, who has been a leader in the upgrading of school information services, Ms. Daphne Butler, who has years of experience and knowledge in organizing and operating a school resource center, and Mr. Monty Smith, who has more than ten years of teaching experience in the field of earth science / geology.

Supervision was simply a matter of keeping in touch with Jean, Ed and Allister on a regular basis to inform them of the progress of my work. Initial email communication (for examples see Appendix E) kept all informed of new ideas and my progress. As the internship progressed and became more "technology-design" and "learning resources" specific, communication became more personal through frequent scheduled and impromptu meetings.

Daily contact with Jean during the initial planning and proposal stages helped guide my thinking about the scope of the project. Weekly meetings with Ed, Allister and the "multimedia group" (students and assistants actively producing material for the Memorial / Bishops Multimedia Teaching Strategies Project) kept the IMCD guide design on track and

provided a forum for constructive criticism. Daily learning resources experiences with Daphne insured exposure to teacher and student technology issues and frequent meetings with Monty were held to plan the design examples.

The Research / Production Component

The internship was spent in both a learning resources and a computer-based multimedia production environment. At the most fundamental level, professional development experiences were the research component. Through observing day-to-day routines and being involved in novel and problem-solving situations as they arose, I have qualitatively evaluated the roles of learning resources specialist and curriculum software designer.

Experiences ranged from hardware adjustments inside the computer, to peripherals, basic computer skills, file management, installing software, internet multimedia, HTML page building, capturing graphics, manipulating display, image mapping, JAVA and animation production, video and audio streaming, web servers, software authoring skills, hardware skills using the video camera, VCR, scanner, sound and video cards.

Accumulated experiences and skills were reproduced as an instrument designed to introduce teachers to the creation of internet multimedia lessons, the IMCD guide. Two examples were produced to illustrate the principles outlined in the guide and aid teachers understanding. There were many opportunities for discussions with teachers and students and feedback about the effectiveness of these designs.

Hence, fulfilling the research component of the internship involved:

- (1) a comprehensive review of the literature relating computer-based multimedia and pedagogy;
- (2) accumulation of resource- and design-based experiences;
- (3) participation in V2000 phase 3 through the joint Memorial / Bishops College Multimedia Teaching Strategies Project
- (4) production of an instrument (the IMCD guide; Appendix A) to communicate internship experiences, ideas and pitfalls;
- (5) participation in a Bishops College teacher training session (Appendix D); and,
- (6) peer evaluation of the instruments effectiveness.

This "participant-observation" internship was seen to have many of the experiences associated with qualitative research - combining observation, participation and ongoing modification of the internship design. As Glesne & Peshkin (1992) suggest, "plans will probably change as the field work progresses and the opportunities in the field emerge" (p.14). In truth, the above list grew and was modified as the internship progressed.

I accepted that my views, biases and "insider" knowledge continually influenced the experience as I sought to understand the roles from the viewpoints of my supervisors - a self-analysis and reflective pathway to professional development. "The researcher becomes the main research instrument as he or she observes, asks questions, and interacts with research participants....To do justice to the complexity, qualitative researchers immerse themselves in the setting" (Glesne & Peshkin, 1992, p.6). This is the type of "understanding" I sought.

Efforts were made to insure research credibility through literature searches and triangulation and peer debriefing. The relationship between Memorial and Bishops College

(the MTSP) permitted testing of transferability of computer-based multimedia ideas from origin to application. Ideas generated in "the multimedia pit" were based on logical interpretations of literature and judged appropriate and dependable by my peers. However, this research did not seek to confirm results beyond the judgements of fellow learning resources specialists and technology coordinators.

Limitations of the Internship and Report

The fields of learning resources and software design are broad with many practitioners and researchers. No attempt was made to gain experience in all the facets of, or uncover all the issues of concern to individuals working in these fields. In addition, many learning resources teachers are experimenting with technology from differing backgrounds and with different philosophies. This internship is limited to my concepts and their evolution through conversations with others who readily shared their vision and understandings.

The rapid changes witnessed in technology, computer-based multimedia, learning resources centers and our schools will date this internship to "cutting edge" concepts as of 1996/1997. Personal growth reflected in the IMCD Guide and this report are part of a "life-long learning" process. I have seen developments since the internship which may be included in a IMCD guide version 2. To complete this report I needed to limit the internship to a specific time frame.

Because my goal was to obtain professional development experience, I participated only in activities already ongoing at the school sites. Approval from the Ethics Committee

was neither requested or granted since it was not my intent to collect data for either qualitative or quantitative analysis, and no such study was undertaken. However, care was taken to protect the confidentiality of all members of the school community.

This report is not seen as a graduate thesis but as a reflection of the experiences accumulated during a five month period during the winter and spring semesters of 1996. No attempt was made to quantify or qualify research beyond exposing peers to my collected ideas and constantly pressing for feedback to aid the guide design and my development. Many research possibilities were imagined, especially linking computer-based multimedia and multiple intelligence, however these investigations were recognized as beyond the time frame and scope of an internship. This report should be judged in that context.

Method of Self-Evaluation

To evaluate progress and completion, I kept an E-mail correspondence journal. Example communications between myself, peers and supervisors have been collected as Appendix E. This journal was means of reflecting on experiences and eliciting feedback.

A major component of self-evaluation was a checklist of stages in the development of the IMCD guide. This dynamic checklist was constantly changing as my concept of the internship changed and as new resources were successfully uncovered and other possibilities turned into pitfalls. The checklist was a tool to evaluate progress, work completed and project planning. One aspect of the IMCD guide was to produce examples of work based upon its principles. The checklist for the Plate Tectonic Lesson Design Plan included:

- (1) conversations with Mr. Harvey Weir and Mr. Wilbur Boone to place the geology unit in the context of the new Atlantic Canada Science Curriculum;
- (2) browse through other provincial geology curricula;
- (3) initial meetings with Mr. Monty Smith to define the geology problem as a necessary focus on current, local content; for example, Newfoundland examples defining the plate tectonic unit through slides and field trips;
- (4) print literature, newsgroup and Internet search to uncover the parallels between cognitive theories of learning, multiple intelligences and multimedia; and Newfoundland geology;
- (5) set an agenda with Mr. Monty Smith, and make contacts for Avalon field trips; rebuild old public exams as an interactive, multi-intelligence teaching aid;
- (6) design and storyboard the lesson; write the lesson including the multimedia aspects;
- (7) helping set up access to 32-bit environment through Windows 95 and Netscape 2.0 to make possible inclusion of Java animation;
- (8) become familiar with multimedia software and hardware used in the production; and,
- (9) the production stage

Upon completion of the internship, I had planned to submit (1) the Internet Multimedia Curriculum Design (IMCD) Guide, with examples, and advice on successes to look for and pitfalls to avoid; and (2) this report, including a review of the literature, my methodology, findings, recommendations and references. However, this report like the guide are secondary to the professional development itself. This report is being written one year after the internship in the light of additional learning resources and design experiences.

My evaluation of the internship is simple - it was a special time set aside to examine my philosophy regarding information technology and I have continued to benefit from those experiences. As such, it was a success. Production of the guide gave me a forum to express my ideas and experiences.

Criteria for Internship Evaluation

This report should be evaluated in the proper light - not that of a thesis, but of a written account of experience. It was not possible to record all the learning experiences. For example, it is difficult to describe the joy of capturing a segment of video after three days of technical problem solving; the disappointment of students interested only in greater entertainment value after designing pages with multiple presentation formats; and the pride of presenting ideas for critique at peer conferences after weeks of constructive work without feedback. However, these experiences were fundamental to the internship.

Internships are individual learning experiences. Evaluation of individual learning experiences should compare individuals before and after the experiences to judge if learning has taken place. Alternatively, evaluation can be based on expressions of those learning experiences by the individual, such as the IMCD guide and examples. Although the guide is secondary to the actual professional development, it does reflect my experiences and allow an opportunity to display personal evaluation. Other teachers have already been asked to evaluate the guide and have, in effect, commented indirectly upon my internship experiences.

Evaluation of computer-based multimedia requires a multimedia approach. Examination of the printed pages of the IMCD guide (Appendix A), the plate tectonics (Appendix B) or Earth Day (Appendix C) example lessons does not do justice to the "multimedia" nature of this work. JAVA applets will not print; animations and video images have been frozen; audio clips are strangely silent when merely turning these pages. A compact disc version of the guide has been included for evaluation and it is only there that the "multimedia" nature of the production and research will be understood.

In summary, this report will be successful if it demonstrates that the internship was a time of learning. To demonstrate that learning occurred, I have presented the IMCD Guide which is a compilation of ideas and experiences developed during that time.

CHAPTER TWO

A LITERATURE REVIEW OF CHANGING ROLES AND MEDIA

The Learning Resources / Information Specialist

Learning Resource Centres were multimedia or "multiple media" environments before the advent of computer-based technology - collections of non-fiction books, biographies and fiction books; reference materials such as dictionaries, thesauruses encyclopaedias, world book; periodicals such as newspapers and magazines; special collections relating to French materials, local interest, oversized texts, reserved materials or specific authors, teachers and departments; and audiovisual materials such as 35mm slide collections, videotape, filmstrips, movies, cassette tapes, audio CDs, LP records, etc. In some respects the addition of computers to learning resources centre has merely added another category of computer-based media: computer CDs, diskettes, audio and video files, animations, 3D and VRML (virtual reality) graphics, Internet access and prints, interactive feedback, on-line challenges, etc.

From another point of view, the secondary school libraries of the 1970s and school resource centres of the 1980s are becoming the information centres of the 1990s. "The 1990s have brought important new concepts to school librarianship. The concept of a self-contained collection is giving way to the concept of connection to an extensive information network and the concept of the virtual library" (Kuhlthau, 1995, p.2). Electronic access to local and remote on-line networks, in-house use of CD-ROM databases, and interactive media are necessary for all library media centres (Craver, 1995).

According to Jacobson (1995) successful transition from a learning resource centre to an information centre depends upon, beyond funding and staffing, Internet research

use by students, teachers and learning resources staff; acceptance of the fluid roles between students, teachers and learning resources staff, and a "do-what-you-have-to-do-to-make-it-happen" (p.23) attitude. Because of the increasing complexity of information systems, the role of the learning resources teacher has grown to include responsibilities for teaching research methods courses, incorporating the Internet into school activities, developing curriculum units and leading staff development projects.

An information centre affects an entire school. As teachers shift from content-specific to information skills, learning resources teachers must "broaden their focus from teaching students to helping teachers integrate information skills training into classroom curriculum" (Piche, Bernard, Daigle, Dotten, Gauthier, Hughes et al., 1995, p.11) because they are in a "prime instructional position to assist students and faculty with new approaches to searching these electronic resources" (Craver, 1995, p.17). Hence, learning resources teachers need knowledge and expertise in the areas of communications networks, diverse media, copyright and ethical use of information and information technology management.

To fulfil [their] role, teacher-librarians need advanced knowledge and expertise in all aspects of teaching, including curriculum, learning strategies, cognitive development and learning styles ... to take responsibility for planning, developing and managing information resources and technology within schools. (Piche et al., 1995, p.12)

Teachers and "Life-Long" Learning

I recall a secondary school teacher who proudly told me that he had struggled at first with new course material but after the first three years of teaching felt he had the subject

conquered. Learning environments are changing so rapidly today that it is important to re-evaluate the role of the teacher.

Teaching in an age of unlimited information will be much different than teaching in the past. ... Teachers will not be professional information givers; instead, they will serve as creative climate makers helping learners understand that access to unlimited amounts of data and information is worthless unless it can be used to create knowledge and wisdom. (See, 1994, p.31)

The integration of information skills across the curriculum is requiring teachers to assume responsibility for information skills instruction. "Integrating information skills training into the curriculum requires that teachers, rather than teacher-librarians, be accountable for helping students become information literate" (Piche et al., 1995, p.11). However, the task of modelling skills to encourage active learning using different kinds of information sources requires learning and preparation time. Most teachers are caught up in so many changes that even though they would like to learn more about technology they don't have the time.

Laszlo & Castro (1995) suggest that for hundreds of years the role of education has been to produce knowers instead of learners; however, the days of separation when teachers teach and students study appear to be over. It would not be difficult to find secondary school students who attribute their understanding of course material and academic success to their involvement in peer tutorials. As teachers we have always encouraged our students learn by the challenge of passing on their knowledge in a clear manner. Likewise, as I write this report, I am surrounded by teachers working on term papers and studying for approaching final exams. My teacher peers are constantly talking about homework assignments, "all the work and effort" they are putting into graduate courses, and their plans for subsequent

doctoral work. Those who are not finishing university degrees this summer are partaking in certificate programs, seminar courses and workshops. It appears that, for these people, learning has become a "life-long" process.

The philosophy of "learning as a life-long process" is changing the ways teachers teach in schools. "Learning skills" have become the most important tools with which a student can graduate. These skills develop because teachers plan and organize learning experiences, acting as facilitators and work together with students using a wide variety of resources. Content or subject-matter is important in itself, but also as a relevant context in which learning strategies and skills are taught.

The educational process places emphasis on the development of our capacities to learn as the means through which we acquire knowledge and skills. In order to produce learners, the paradigm must be inverted: we must see knowledge and skills as the means through which we exercise and extend the range of our capacities for learning. (Laszlo & Castro, 1995, p.7)

This type of learning involves selecting topics, uncovering sources of information, compiling, interpreting and evaluating the information, and preparation of appropriate presentations. In today's society, these learning skills are "life skills."

Constructing Information Literacy Skills

Recent educational literature appears to focus on developing "information literacy" in students giving students the tools they need in educational development throughout life (Dyrli & Kinnaman, 1994). Piche et al. (1995) regard information literacy as the ability to acquire, critically evaluate, select, use, create and communicate information in ways that lead

to knowledge and wisdom.

It encompasses all other forms of literacy - traditional literacy (the ability to read and write) and media literacy (the ability to critically evaluate and create media, such as television, advertising, news stories and movies) and numerical literacy (the ability to understand and solve problems with data and numbers). (Piche et al., 1995, p.4)

Kuhlthau (1995) suggests that the concept of information literacy and information skills is an expansion of library skills.

Library skills prepare students to locate materials in a library. Information skills prepare students to learn in an information-rich environment....The process of learning from information is the key concept for the school library media centre in the information school age. (p.2)

The traditional research skills of critical thinking, defining questions, validating and selecting the best sources of information, and evaluating to detect facts, biases, opinions and value work in both learning resources and information network environments. It is this kind of thinking which changes learning resources centres into school information centres.

The philosophy of "life-long learning" blends well with the constructivist perspective as held in education pedagogy - that meaningful learning or understanding is constructed in the mind of the learner as a result of integrating new sensory data into previously known concepts (Parker, 1995). The success of students on incorporating new experiences into existing knowledge webs or structures may depend upon those "learning skills". The learning environment a student encounters when faced by a new piece of software is a golden opportunity to learn, to gain experience in accepting personal responsibility for learning, and to practice the general ideas of constructivism (Moursund, 1995).

The Internet and computer-based multimedia form associations or links by using differing presentation formats, constructing or coding meaning between ideas. Moore, Myers & Burton (1994) are interested in dual coding, the storage of information in long-term memory as both verbal strings and images. It appears that students can link words to images, music, spoken words, movies, etc. to illustrate and communicate rich and complicated ideas (D'Ignazio, 1993b), and teachers can use computers effectively to engage students of two different learning styles to work collaboratively on problem-solving (Reisman, 1993).

Multiple Intelligences

How knowledge is constructed and how we learn may depend upon which "intelligence" we use. At least this is the theory set forth by Dr. Howard Gardner in *Frames of Mind: The Theory of Multiple Intelligences* (1983). Intelligence is seen as the way of being able to solve problems and to create a product. "A person may be quite talented in one intelligence area and have little talent in another. Each person has their own profile of intelligences" (Moursund, 1994, p.5). Gardner & Hatch (1989) suggest that seven independent forms of intelligence or information processing can be described: verbal or linguistic, logical or mathematical, visual or spatial, kinesthetic or manipulative, musical, interpersonal, and intrapersonal or student-centred. In addition, I recall watching a CBC television broadcast in the Fall of 1995 in which Gardner described an eighth intelligence described as "of or relating to nature" or instinct.

If Gardner is correct and there are different ways in which students learn, then effective teaching depends upon the communication method between teacher and student. "Getting the message across" to a variety or multitude of students may require a knowledge of multiple presentation techniques or media. Success in the role of classroom teacher may depend upon matching communication strengths with students' intelligences. That some students learn better by listening to explanations, or working out problems, or copying sketches drawn on chalkboards, or performing experiments, or through group work, or quiet introspective reflection is no secret to any teacher. Using preparation time to incorporate as many ways of learning as possible into each lesson has been the challenge.

Traditional Media and Computer-Based Multimedia

I have already suggested that the term "multimedia" refers to traditional non-computer-based media such as texts, periodicals, audio cassettes, realia, etc. which have existed in learning resource centres since the 1970s. These resources have been used by students to develop the traditional, numerical and media literacies described by Piche et al. (1995, p.4); these resources have been used by students of differing "intelligences" as described by Gardner & Hatch (1989).

"Computer-based multimedia", such as hypertext, digital photographs, animations, JAVA applets, audio files, CD-ROM encyclopaedias, on-line libraries, etc. present the same information as traditional or non-computer-based media. The Encyclopaedia Britannica on-line and the print copy both have the same definitions for "student", "teacher" and "media";

a 35mm photograph and a jpg file of the Eiffel Tower would both display the same information; an audio cassette rendition and an audio wav file of "O Canada" would still consider the true north to be strong and free; and, a student working on a research paper would obtain the same information regardless if he/she obtained it from a traditional or computer-based source.

Multimedia Hardware and Software

An effective multimedia personal computer must have a monitor, processor, hard disk drive, CD-ROM drive, microphone, speakers, sound card and lots of memory. This internship and most of my experience has been on a PC-type multimedia system, although an Apple was available and well used in "the multimedia pit". Today's PC systems use the Windows operating system software, which comes with five multimedia programs: Sound Recorder, to record and playback sounds; Media Player, to play animation, video and sound files; Object Packager, to embed sound or video files in a document; MIDI Mapper, to control keyboard or musical instrument input; and Sound, to assign sounds to different system events.

Purchased "authoring software" is used to assemble all the individual elements of multimedia into a cohesive presentation. Linear presentations are a sort of a slide show on a computer screen in which user involvement is limited to advancing to the next information screen or going back to view the previous one. Interactive multimedia puts you in control and lets you steer freely through the labyrinth of images, sound and video clips in a program. Clicking on a predefined areas known as links will display another file in a program, such as

a sound file, a video clip or a window filled with new information (Collin, 1994).

Disadvantages of Computer-Based Multimedia

The educational literature recognizes two dominant disadvantages of computer-based multimedia - relative expense and relative effectiveness. Relative expense is a real concern. Madian (1995) believes that when we evaluate the educational value of computer-based multimedia, we should compare it with other possible educational media, such as gardens, telescopes, hands-on science labs, and artists' studios. In my position as a technology coordinator I have had teachers complain that my budget items of \$1500 do not even compare to their expenses, usually two orders of magnitude less. Recently, a Spanish teacher suggested she could purchase classroom sets of dictionaries, an encyclopaedia, a collection of audio tapes, a collection of travel guides, subscribe to a Mexican newspaper and present a Spanish Day concert and meal for less than cost of purchasing a new computer to use the Spanish language multimedia CDs.

Chiou (1995) believes that screen-based multimedia learning is not an example of true experience-based learning, which challenges a student's imagination. Personally, I am an advocate of experience-based learning and have used the example of examining a piece of granite or diamond on the computer screen verses the experience of a student holding it in their hand. In my opinion, there is no comparison. I believe that a student's experience when attending a Shakespearian play is of much higher quality than watching the same play on a computer monitor or television screen.

Experience has taught me that some teachers will allow their students to visit the computer lab "just for fun" and not because of curriculum objectives. Dyrli & Kinnaman (1994) suggest that before a piece of software is used in the classroom, teachers must ask if it fits the curriculum objectives and whether the classroom activity is best accomplished through technology.

Advantages of Computer-Based Multimedia

Computer-based multimedia also have advantages over traditional media. Computer-based media are "catalogued" and can be searched together, most times by typing a single word into a search engine. For example, a search in Groliers Encyclopaedia on the word "president" will locate text, audio clips, photos and video clips. Using the Internet search engine Alta Vista, a search on the word "president" will do the same thing, except offer an almost unlimited number of references.

Impractical or unsafe topics in laboratory experiments and field trips are accessible. A field trip to Manuals River to examine Cambrian-aged trilobite fossils may be a possibility for a local teacher; a field trip to the surface of Mars to explore ancient river beds is not. As I write this report, computer-based multimedia transmissions from Mars are this month's "hot topic" for science teachers.

All the media are delivered through one tool and there is no need to set up a VCR or projection screen, search through filing cabinets for periodicals or track down a missing textbook. Have you ever had to find that overhead projector, despite booking it two weeks

in advance? "One of the reasons [computer-based] multimedia is both a powerful and complex instructional tool is that it combines methods, media, and materials simultaneously" (Carlson, 1994, p.55).

Computer work stations provide a non-threatening environment where students of all abilities and backgrounds can learn at their own paces and make mistakes without embarrassment. In the same regard, information technologies can accommodate students with advanced skills who wish to explore information far beyond the limitations of the classroom. (Piche et al., 1995, p.6)

Dede (1992) suggests that multimedia presentations that are well designed and implemented have the following characteristics: (1) new methods of structured discovery; (2) address a range of learning styles; (3) motivate students; (4) are non-linear, presenting interconnected knowledge rather than disparate facts; (5) empower students to create their own materials; and, (6) enable evaluation of learning.

Computer-Based Multimedia and Multiple Intelligences

Computer-based multimedia offers the possibility of presenting the curriculum to the best advantage of students who learn based on different combinations of these intelligences. Personal learning plans may be designed to stimulate students who learn visually, by touch (typing), through reading text, through creating their own productions, by listening, through group interaction, etc. D'Ignazio (1994b) envisions future classrooms as multimedia knowledge theme parks in which students create portfolios and exhibits to demonstrate their understanding of different curricular topics. "It's an opportunity for all of us to be artists,

musicians, sculptors, composers - and readers and writers!" (D'Ignazio, 1993b, p.53). It is easy to visualize student multimedia projects, such as CD-ROM yearbooks, multicultural learning, expressing real-life situations, interactive science, highlighting history, inspired musicians, etc.

There is the luxury of offering individual students terminals having a dedicated tape recorder, videoplayer, text editor, globe, etc. "Computers are unique in that they can transform one symbol system into another. For example, text may be changed to voice, and numbers changed to visual graphs" (Moore, Myers & Burton, 1994, p.33). Chiou (1995) suggests that human activities are multimedia activities, and we need multimedia-orientated computer technologies to match with our multimedia-orientated human environment. "Combined with off-computer techniques, computer software can enrich a holistic approach to working with students" (Eichleay & Kilroy, 1993, p.39).

The Internet as a Road to Inquiry

Recent developments in communications technology have networked computers around the world as a global library or database. The depth and scope of topics available to users is unknown and unimaginable. The ability for anyone using E-mail to communicate with experts in subject areas is incredible. Newsgroups and discussions involve the global community in expanding and critiquing knowledge at a pace limited only by the speed of thought or transmission. Library print material in research fields is outdated daily.

Introducing the Internet into schools provides an opportunity for students to inquire

sun. As well, students get to participate in discussions. Because everyone is interested in something, the possibility of learning should appeal to all students. Using the Internet stimulates curiosity and eagerness to learn, a prerequisite for learning to take place. "The fun of telecommunicating on the Internet is quite a motivator" (Muller, 1994, p.5)

Society and the Internet? Television and newspapers seem to indicate that the Internet is an advance for society; even that it is "cool to be wired." Bookstores are crowded with texts explaining how the Internet works and why it is important to everyone. "Any K-12 student who does not learn how to access useful information via the Internet will be at a great disadvantage for future high-wage employment and successful life-long learning" (Muller, 1994, p.1). Using Internet resources in the schools provides a "global awareness that is necessary for understanding one's place in the global community" (Muller, 1994, p.9).

Multimedia Teaching Strategies

Can teachers effect learning through the use multimedia software? "Good teachers have always used multimedia. Their classrooms have been filled with many objects - from high tech to low tech, from robots to books" (Carlson, 1994, p.53). Computer-based multimedia technology has forever changed the way students access, process, and communicate information (See, 1994). Teachers everywhere are creating their own instructional multimedia lessons combining audio, video, animation, text and graphics (Sponder & Hilgenfeld, 1994). Imagine teachers with the ability to design individual lessons for individual students based on the student's needs (Laszlo & Castro, 1995). The use of

for individual students based on the student's needs (Laszlo & Castro, 1995). The use of computers can help teachers adapt teaching strategies to individual student intelligences, whether they learn best visually, kinetically or through interpersonal groups.

D'Ignazio (1993a) talks of "fast-food" multimedia. He likens the creation of multimedia presentations to cooking and suggests that if we keep our lesson plan objectives simple and precise then multimedia could be produced almost as rapidly as ideas. He warns that multimedia does not mean the simultaneous constant use of all media, but appropriate use of two or three media used to support each other.

Any time we "blitz" students with too much sensory input and don't allow time for reflection, discussion, analysis, and digestion of information, we are using media inappropriately and turning the classroom into a training ground for brain-numb couch potatoes. (D'Ignazio, 1993c, p.54)

The key is to use media in short spurts, then switch immediately to periods of classroom discussion, writing and critique. We want to use media to stimulate thinking, not overwhelm it. ... reserving plenty of time for students to think about what they have seen and heard. (D'Ignazio, 1993c, p.55)

Teachers' beliefs about technology's place in the curriculum is a major factor in its effective use. "Linking those beliefs to multimedia tools is perhaps the most critical aspect of the entire process of learning how to use multimedia" (Carlson, 1994, p.57). King (1996) suggests that there is a crisis of information and skill reintegration involved with change. "Change in teaching must happen on a personal level. Change may involve new materials, new approaches and new beliefs, or some combination of all of these" (p.2). She suggests that successful change is teacher-specific, in which regular on-going training and personal development of materials supplements classroom assistance from project personnel.

Teachers' answers to "How can I use this" will be based on their degree of confidence in using the technology comfortably, their knowledge of the capabilities of equipment and software, and the possibilities they see for the technology's use in their own classrooms. (Carlson, 1994, p.58).

The internship Internet Multimedia Curriculum Design (IMCD) guide has been designed to be used in teacher's own schools with the equipment they will be using with students. However, in truth, if teachers are not enthusiastic about using computer-based multimedia in their classrooms, Piche et al. (1995) suggest we encourage the students and then stand back.

CHAPTER THREE

THE INTERNET MULTIMEDIA CURRICULUM DESIGN GUIDE

Introduction

The hypothesis behind this internship is that multimedia is an effective tool to aid a variety of students who learn through different means. A simultaneous interactive lesson with a variety of media components will give the student a better chance to construct knowledge based upon his/her preferred method of learning.

The specific design included such elements as reading comprehension quizzes and word / crossword games to challenge students who learn through verbal / linguistic means. Students with strong logical / mathematical abilities should be able to enjoy problem-solving situations, simulations and animation. Maps, charts, diagrams, pictures and video were used to aid those students who learn best spatially while interviews and rhyme schemes will aid those with strong musical intelligence. Keyboarding, animated graphics and the ability to move objects around the screen appealed to learners with high kinaesthetic ability, and students were asked to complete off-screen activities to progress through on-screen problems. Some activities required interpersonal skills, such as E-mail discussions, group decision-making, and two-player games. "Studies show that groups of students working together on computers make much greater progress than when individual students work alone at the machines" (Dickinson, 1994, p.46). Self-paced tutorial sections and computer challenges were designed for the intrapersonal learner.

The Internet Multimedia Curriculum Design (IMCD) Guide

Factors such as the increasing role of computers in our society, the need for our students to acquire basic information technology skills and the availability of computers in schools are changing the role of classroom "computer" teachers. Those few brief years when "computer teachers" taught "computer courses" with packaged software are coming to a close. Today's kindergarten teacher downloads the lyrics of *The Lion King* from the Disney Site while sitting between a language teacher browsing Shakespeare and an elementary science teacher capturing dinosaur animations and images of Jupiter.

The increased speed at which knowledge is becoming available is forcing teachers to modify classes and tutorials to keep current. Regardless of whether a teacher ever designs an Internet lesson, their technology and research skills must be kept up-to-date to be able to access recent information in their fields. It appears that today's history teacher needs to learn as much about how to conduct Internet research as he/she needs to learn about the American Civil War or Aristotle's theories.

Designing Internet multimedia tutorials requires an additional set of skills. Teachers are athletes, artists and scientists who have an interest in communication. As such, teachers must be concerned with both content and presentation. The purpose of this guide is to comment on the skills required and give examples of the curriculum possibilities to teachers who wish to integrate Internet multimedia technology into daily classes. To aid these teachers, the guide has been divided into three sections: (1) the Internet; (2) multimedia considerations; and (3) pedagogy or curriculum design issues.

The Internet Section presents: (1) general information on how to search for, download and install the recommended software; and (2) design considerations necessary when deciding which multimedia elements to include on your homepages. Basic net search skills are necessary to find programs and materials to supplement personal curriculum resources. Collecting involves downloading or "FTPing" from a remote computer to your system. Most stored programs are compressed or zipped to save space and must be unzipped and installed on your hard disk or server to be useable. A knowledge of UNIX is not essential, but a little know-how may make some set-up tasks easier. An example of a 32-bit environment is Windows 95. Some of multimedia elements, such as JAVA, will not operate under a 16-bit system such as Windows 3.1. Netscape 3 and some plugins are necessary to permit the automatic use or streaming of video and audio.

The Multimedia Section presents brief tutorials on how to produce your own homepage resources, such as video; and editing tips relating to page layouts, file reduction and increasing the speed of your presentations. Available multimedia for Internet presentations include text, backgrounds, "painted" or drawn images, animated images, photos / slides, movies, audio clips, sound files and JAVA applets. JAVA applets are small individual programs which may be included on your pages to animated objects, scroll pictures, require user interaction, etc. A common design mistake is to include every "catchy gimmick" or type of media on a single page and cause a communications overload for the reader. Overloading pages also dramatically slows down page transmission over telephone lines. Consideration of layouts and formats is essential to a successful presentation.

The purpose of the Curriculum Section is to consider teaching skills which may be included in your page design. Although beautiful layouts and abundant media may increase student interest in your lessons, there are pedagogical aspects which can be considered to structure pages as "learning experiences" or lessons. How teachers structure pageflow and permit students to advance in a lesson can be designed to both increase desire to interact with the material and provide essential entertainment. It is in the Curriculum Section that the basic design principles are put forward in the light of curriculum development concerns.

The IMCD Guide Menus - Directed vs Free Browsing

Browsing has been facilitated through menu design. The "instant access" "multi-layer" system allows the user to easily move within and between levels of the guide. For example, the tri-level structure allows the user to quickly jump between the Multimedia Animation Still GIF Library page to the Curriculum page with one mouse click. Menus have also been designed for the user to instantly recognize his/her location. A larger font print is used to indicate the pathway taken to the current page. In addition, sections have been colour-coded: Internet blue, multimedia pink and curriculum green.

The numbering system located on the menus is an aid to teachers wishing to use the guide as a self-instruction tutorial. The major sections and pages within each section have been sequenced in a recommended browsing order which may represent a progression of easier to more difficult skills, or basic to more advanced topics for the beginning teacher. A user might typically first locate (The Internet-1), produce (Multimedia-2) and then integrate

(Curriculum-3) resources when designing pages. For example, within the Multimedia Section, a teacher new to page design might want to start by producing text (1), links (2) and photos (3) and leaving animation (4), video (5), audio (6) and JAVA applets (7) till later. Where numbering is absent, users are advised to browse all the pages and decide for themselves where to start.

Two buttons are universally located throughout the guide - the Help and Exit buttons. The Help button gives explanations to the guide user similar to this section of the report. The Exit button will take you to my personal homepage. In the normal design of a tutorial or unit this button may lead the user to a school or organization homepage. Because of the menu structure of this guide there is no need to save a particular page URL to restart. However, for students working inside a designed lesson, this is where information about restarting the tutorial would be necessary.

Design Principles and Curriculum Concerns

The design of the multimedia unit drew heavily upon research discovered by the literature review. For example, Moore, Myers & Burton (1994) have outlined instructional principles that could be critical to the design, development, and effectiveness of computer based programs. They suggest that reviews of relevant information, precise, audience-tailored language, high rates of student success, clear and concise directions, monitoring of assignments and activities and specific feedback of both correct and incorrect responses are all essential to an effective program. They found that "learners who had little or no control

over the instructional sequence of an instructional program performed better than students using interactive programs who had control over the instructional path" (Moore, Myers & Burton, 1994, p.37).

In addition, Dickinson (1994) suggests that "interactivity is a key element of a positive, nurturing, and stimulating learning environment....Hypermedia, which allows learners to jump from one concept, image, or sound to another while investigating a topic adds interactivity" (p.42). Students anticipatory thinking will be challenged by stopping a video midway for discussion about what might happen next. Large (1995) suggests that semantic overlap between non-text media and text, and the links constructed between the two media is the most important factor.

The Curriculum Section of the IMCD guide has been divided into discussions on (1) teaching and learning, (2) motivation, (3) tutorials, (4) lesson structure and (5) practice and testing. In addition there are two pages which present general design tips.

The basis of teaching and learning in the Internet multimedia environment is the same as it is in the classroom. Teachers want to help students integrate new ideas into existing knowledge so that they will retain more. A variety of classroom methods are used to relate to a variety of students. Research seems to indicate that some students learn better visually while others prefer text-based or vocal instruction. Some students need to see a fault or starfish while others only need to read a description to "know" what one looks like. Hence, teachers consistently bring pictures, slides, audio tapes, overheads, sound tracs, models, realia, etc. into their classrooms.

Teachers use multimedia. The advantages of computer multimedia also relate to student learning, dual coding and multiple intelligence theory. Use of video, JAVA, audio, animation, text, etc. is simply an attempt to duplicate common teaching activities. Hence, when designing HTML pages it is important to keep your audience in mind. Do your students learn better by watching video or being challenged by questions, by listening to audio clips or browsing through materials? Well-designed tutorials can be used by a variety of students, adapting to the learner, drawing on his/her strengths and giving extra help where needed.

Student motivation appears to be a function of their ability to relate to the material and control lesson flow, and the entertainment or "fun" factor. Designing pages to be relevant to students is no different than writing good lesson plans. If your students prefer to work quietly on their own, they may not be enthusiastic about having a rigidly-structured tutorial. On the other hand, if they prefer a clear step-by-step development of the subject, the computer tutorial might be the best invention since the microchip!

Student control improves motivation because progress and review is independent of fellow classmates and the teacher. Personal attention to material allows time to explore its relevance and for the student to develop confidence. Techniques developed for video games can also "involve" the student in the material. Well-designed "fantasies" challenge the student's ability to learn and their curiosity concerning what will happen next. Students encouraged to imagine that they are geologists searching for The Lost Mine of Doom develop a stronger desire to complete the tutorial than students reviewing evidence of plate tectonics. The imagination can place students in situations where they need to use information.

Tutorial lessons present information and challenge students to learn. They integrate four styles of teaching - information presentation, simulation / demonstration, practice / drill, and questioning / problem-solving. They differ based upon emphasis on amount of control, page sequencing, presentation, learning style targeted, ability to maintain motivation, challenge, etc.

Tutorials can begin with a title page that invokes curiosity by stimulating prior knowledge and linking it to the "unknown fantastic". Interested students will want to know what the lesson is about, the objectives and how it is relevant to them. Students will also want directions on how to use the tutorial. Computers can automatically display directions whenever a lesson begins and universally on every page during the tutorial. Closing pages are recognizable ends of lessons. A summary of the lesson purpose or lists of major points may be printed or copied into a notebook. Other pages in this Curriculum Section contain hints of how to develop the lesson between the title and closing pages.

Lesson structure or "page flow" is concerned with student progress through a lesson. Should students wander through the lesson choosing interesting pages or be required to read certain pages to complete the tutorial? It is easy to design a simple linear sequence that progresses from one topic to the next through pages of increasingly more difficult information. Better designs allow for branching forward to more challenging material, backward to repeat instruction and sideways for simpler explanations or paraphrasing. Navigation should include controls for forward progression, backward paging for review, access to directions / help and tutorial termination.

Controls should be consistently placed on the top and/or bottom of each page. In this way the user can become familiar with lesson structure and concentrate on content. Simple menus are the ideal if page sequence is not critical and a tri-level menu is able to display lower, present and higher levels in your hierarchy. Duplicating the menu at the top and bottom of pages simplifies linking when scrolling. Sometimes it's necessary for a student to exit without completing the tutorial and the designer must decide if he/she may restart at the page where they left off, or whether restarting requires beginning again. One possible way to restart in the middle of an Internet tutorial is for the student to write down the URL of the page where he/she exited.

Practice and testing are the means by which the student and teacher ascertain that content is being learned. Because students don't always master information on first exposure, application, activity and repeated practice are required to construct the knowledge links from "old to new". Questions scattered through tutorials force students to read pages for content and evaluate how well they recall and understand information. Questions also provide breaks between content / presentation pages and help the student deal avoid information overload. Multiple-choice questions appear to be logistically easiest to use on HTML pages as responding merely requires a mouse click. Use of multimedia in the questioning creates many possibilities for teachers - (a) text, (b) sound clip, (c) animation and (d) picture.

Correct student responses can link to continue the lesson, while incorrect answers may lead to rephrased questions or review. Corrective positive feedback should attempt to explain to students why specific responses can not be correct and locate the information the student

needs to make the right judgement. Alternatively, the tutorial may supply the student with hints or emphasize key phrases in the question for a second opportunity to solve the problem. Question pages should always have help and exit options.

Designs Tips and Tricks

A page design is a lesson plan with illustrations, demonstrations and interactions. The following hints should help the teacher design effective pages and lessons.

There should be an option to repeat animations. If animations cannot be designed to loop automatically, the student should be made aware of the Reload Button on the browser main menu.

Content help or paraphrased pages should be available when difficult concepts are introduced. How many times must a classroom teacher rephrase an explanation to ensure the message is understood?

Directions or procedural help should be constantly available.

Examples should follow rules. Students quickly pass by information unless they are challenged. One way to slow them down is to require them to think about and apply the presented information.

An Exit Button or option should always be available, along with instructions of how the student may restart the tutorial at a later time.

Important features can be marked on pictures using a paint program, to make sure that students do not mis-identify definitions and content.

Major sections can be distinguished by some sort of visible change, such as a persistent icon or a specific coloured backgrounds. Note the colours used for the sections of this guide.

Menus or buttons should be located at the top and bottom of a page. Menus located along the top are excellent for navigating through a tutorial or lesson hierarchy and can be utilized quickly without waiting for the remainder of the page to download. Buttons located at the bottom of the page force the user to scroll down to locate them. However, some users ignore content while scrolling if focused on finding the buttons.

A student's perception of concepts on a HTML page may be influenced by detail, sound, colour, font size, animation, position of screen elements, etc. and may be confused by competing stimuli. Some pages suffer from "overkill" where there is such variety that the "message" is lost.

Scrolling should be avoided. Experience has shown that people prefer to click forward as opposed to scrolling downward. Pages may be evaluated based upon initial visible content alone.

Step-by-step skills are best listed or tabled. Activities can be photographed in stages of completion.

Student interaction should be encouraged on each page by requiring him/her to answer a question, point to a specific feature, take note of vocabulary for later use, etc.

Reaction to the IMCD Guide

The guide was presented to teachers in two different ways: (1) on a one-to-one basis with detailed explanations and descriptions of my objectives and philosophy; and (2) to groups, such as a graduate education class, a teacher in-service held at Bishops College, and the monthly meeting of the Atlanta Technology Coordinators Association.

During the writing of the guide feedback from fellow graduate students occurred on an almost-daily basis. They suggested that the guide should be placed on-line while it was being written as an aid to their production of pages for coursework. These requests led to the following statement on the third page of the guide: "This preliminary draft of the skills manual is being written online and pages will be re-designed, re-edited and re-thought almost on a daily basis. One of the reasons for such an open approach to the creation of this guide is that a number of my fellow graduate students and teachers have expressed an interest in upgrading their skills during the summer break."

Impressions of the Curriculum Section suggested that none had thought of the elements of design before when designing web pages. Most students were impressed by structures such as menu sequencing to create tutorials and section consistency by background colour. Alternatively, it was suggested on a number of occasions that some of my pages were "overloaded" with text, breaking one of my own design suggestions. Also, it was through one-to-one feedback that someone suggested links to software sources should be included. The general impression was that explanations for how to use multimedia should be kept as simple as possible, with lots of examples.

Perhaps the most detailed one-on-one inspections of the IMCD Guide involved conversations about technical aspects of the multimedia section with fellow members from "the multimedia pit" - Rob Cass and Jason Aue. Jason reviewed the entire guide and suggested changes to make aspects of video production and JAVA applets more easily understood. Both recommended the VIVO program for streaming video and avoiding excessive download wait times. The final result was that more than twenty of the guide pages, including all of the curriculum design pages, were chosen to be incorporated into the Memorial / Bishops College Multimedia Teaching Strategies Project.

The IMCD guide was presented to a group of approximately fifteen teachers during a July multimedia workshop offered at Bishops College in 1996. The half-hour presentation stressed the philosophy that pages should be "designed" and not merely written. That to be effective teaching tools, as much time had to be devoted to page design as creating lesson plans or setting up laboratory demonstrations. Feedback suggested that the guide was

detailed and comprehensive; maybe too much so for teachers just learning how to conduct Internet searches and use a video camera. However, many teachers liked it as a supplement to further augment skills learned through "hands-on" experience.

The topics for the October 1996 Atlanta Technology Coordinators Association monthly meeting were the IMCD Guide, and a Website Validation Project authored by Dr. Jean Brown's graduate class in teacher librarianship. This three hour meeting of thirty-five coordinators was organized as two sessions, each with a half-hour presentation, "hands-on" experience and discussion. The general reaction in this group was extremely positive. Many had already encouraged teachers to teach information technology skills based upon Internet experience and were eager for any discussion about validity. However, few had thought about design elements to be incorporated in pages to be used in teaching. Groups of teachers chose specific topics such as animation, audio and picture editing and worked with the IMCD Guide to produce and enhance their own pages.

Coordinators at this meeting liked the menu choice of choosing specific topics or using it as a numbered tutorial. It was suggested that the IMCD Guide not be kept to teachers but be accessible to secondary school students. It was generally felt that the curriculum section was only a beginning and that many other aspects of effective teaching could be examined with respect to design. The result of the meeting was that many coordinators decided to promote the IMCD Guide and refer their teachers and students to my website.

Applied Design Using Earth Science Lessons

Geology is traditionally taught through a mixture of text-based, 35mm slide, videotape, laboratory and "hands-on" field experience; and typical lessons have been multimedia even before the arrival of computer technology. For years geology teachers have expressed the need for local and recent content in the program. Newfoundland is internationally known as a geological wonder with a history of mining and exploration activity, incredible Palaeozoic carbonate shelf and plutonic sequences, and two United Nations World Geological Sites - the Mistaken Point Precambrian fossil locality and the Gros Morne ophiolite sequences. Recent activity has focused around the Hibernia oil and gas fields and the Voiseys Bay base metal discoveries.

The time was appropriate to consider the geology curriculum because of an upcoming redesign in accordance with the new Atlantic Canada Science Curriculum. The objectives are general, such as an expectation for students to acquire a basic knowledge and appreciation of geology and the nature of scientific inquiry. The philosophy of instruction is concerned with a competence in the language of geology, its concepts and theories. Discovery learning is preferred with students actively engaged in the scientific process constructing their own information. Teachers are encouraged to expose students through classroom and field studies to the natural features of our province. (Newfoundland and Labrador Department of Education [NLDE], 1985).

The new curriculum encourages the use of technology in facilitating the learning of science in the school and suggests that any tool which draws the student in the subject as a

more active participant in research and learning, or offers the teacher more flexibility in presentation, or facilitates the communication of ideas and concepts, should be actively incorporated into lesson design.

Tutorial software should engage students in meaningful interactive dialogue and creatively employ graphs, sound and simulations to promote acquisition of facts and skills, promote concept learning, and enhance understanding....Computer software and CD-ROM discs offer simulations and models of real-life situations that permit the investigation of phenomena which are not available because of cost, safety or accessibility. (NLDE, 1995, p.23)

The lessons are interactive at many skill levels, emphasizing the semantic overlap between the media and involvement of the learner by challenge and motivation. The Atlantic Canada Science Curriculum presents seven "essential learnings" describing the knowledge, skills and attitudes of all students who graduate from high school. These lessons were designed to touch all seven: (1) aesthetic awareness - multimedia design; (2) citizenship - student participation in Earth Day awareness and environmental concerns; (3) communication - student and Internet interaction; (4) personal development - lessons supplemented with field experience; (5) problem solving - the plate tectonics game and Earth Day scavenger hunt; and (7) technological competence - use of multimedia hardware.

A Plate Tectonics Lesson - Faulting and Folding

The Plate Tectonics Curriculum Unit (PTCU) was designed to help students develop an appreciation for the way in which Plate Tectonics Theory brings together many of the geological ideas already studied. The technical design of the PTCU included many features:

JAVA animations, VIVO movies, audio files, questionnaire forms and frames. To take advantage of all of these features you need a multimedia computer running Netscape version 3.0 with the VIVO plugin in a Windows 95 environment. Without a multimedia computer you will miss audio discussions and sound effects. Without Windows 95 you will miss the JAVA applets and some of the animation.

The PTCU was designed as a game, and to complete the game students have to collect clues as they progress through the pages. Some of these clues are at other Internet sites, in backgrounds, pictures, video, text, sound clips; and some are found by answering questions correctly. For example, inside the lessons some pages have a rock, geologic feature or a scenery shot in the background. The background instruction page has a rock thin section slide for a background. This slide shows three minerals - quartz, chalcopyrite and ... The first letter in the answer is needed for students to find your way to the game site!

Alternatively, different parts of pictures have different properties that start when your mouse touches an area. These pictures work inside a special type of JAVA applet called a zine. The canyon zine used as an example contains the hidden name of the canyon, sounds you might hear there at night, and a highlighted area where sedimentary structures can be seen. Field trip videos play automatically as soon as a student opens that page. They can replay the videos by using the reload button located beneath the Netscape main menu. The clue could be in the audio track or what is seen on the screen. Sound clips, noises, instructions, questions and audio clues also start automatically when a new page is opened.

The Plate Tectonics Curriculum Unit (PTCU) has been linked to many interesting sites on the Internet. Students are required to explore the virtual world, to discover many far out places and some of the weird people who crack rocks there. Adding a bookmark to a list was the method used to allow student to browse the web and return to the lessons. For example, they were encouraged to add a bookmark before visiting the Memorial University Geology Department homepage, and given the warning: YOU WON'T HAVE ANY HELP ONCE YOU CLICK ON THE MUN ICON. Hope you get back!

Despite all the pictures, videos, audio clips, animations, games, etc., students are instructed that they will learn more and get to the games section quicker if you read all the text. Not only does the text contain interesting information but also hints on how to study and directions on how to find clues that are hidden there. There are also multiple choice questions during the lessons that students have to answer correctly to advance. For example,

THIS GEOLOGY UNIT IS ALL ABOUT THE STUDY OF THE WAY THE EARTH'S CONTINENTS AND OCEANS WERE FORMED: (a) kitchen plates - (b) igneous rocks - (c) plate tectonics - (d) lasagna. (WARNING: One of these answers will dump you right back to the start of the unit!).

Initially, the PTCU storyboard was designed to contain seven lesson tutorials, practice sessions, quizzes and a game. However, soon after starting to detail the first lesson (Faulting & Folding) it was decided to limit construction to retain the "design" focus. The initial concept was of the 7 LESSONS OF DOOM! - each lesson taking about 40 minutes - 20 minutes for the tutorial, 10 minutes practice, 5 minutes for the quiz and 5 minutes for the game. The letters you uncover during the tutorial and practice sessions spell a geologic term

and the name of the quiz file. Students who passed the quiz would be given a letter in the name of the "ultimate final quiz" file!

The Faulting & Folding (F&F) Lesson demonstrates all the design principles which would have been included in the unit - (1) information on necessary software; (2) instructions on how to progress; (3) variety of media; (4) "in tune" or complimentary text and media content; (4) interaction through zines; (5) testing as multiple choice questioning. The easiest way to discover these features is to work through the PTCU and choose the F&F lesson.

An Earth Day Lesson / Scavenger Hunt

The Earth Day Scavenger Hunt (EDSH) consists of 10 multiple choice questions about Earth Day and the environment. Students are asked to find the information they needed to answer each question at various sites on the Internet. For example, question #1:

One of the Earth's greatest treasures is the variety of plant and animal life which exists on the planet. There is evidence that some species which existed in the Earth's past are extinct today. One of the animals now on the endangered list is the whooping crane. Visit this site to find out how many remain in the world.

The answer to this multiple choice question is contained in the text of a site entitled The Majestic & Endangered Whooping Crane: An Alberta, Canada Perspective (www.afternet.com/~teal/crane.html). Students were required to record their answers on a provided questionnaire.

Questions were designed to be pathways leading to the appropriate answer. For example, consider question #2:

Bacchanali produces cartoons describing some of these (environmental) problems. If you check out the sorting by range of topics and surf the Environmental Science cartoons, you'll find one about Heavy Metal. No! Not the music. What elemental poison does the cartoon describe?

Linear thinking led students to choose the "sort by range of topics" link to the Environmental Science cartoons. The specific cartoon desired was entitled *Heavy metal in the marine environment*.

The design used consistent background colours and text formatting to give students the feel of working in a structured environment. A key element of each Internet site, usually a picture, was included on each of the question pages. This key was used as a signal to the students that they were close to the necessary information. The whooping cranes in the EDSH originated from the answer page on the Internet.

Students were able to progress to the next question without finding an answer, decreasing the frustration of being trapped in a program. No on-line help was provided; however, students unfamiliar with Internet navigation were initially instructed by a teacher. After completing the lesson, students wishing a further challenge were directed towards an Earth Day On-line Contest and a collection of Earth Day links compiled by their classmates.

Reaction To The Earth Science Examples

Teacher reaction to the Plate Tectonics Curriculum Unit (PTCU) lesson entitled Faulting & Folding has been consistent - the production of Internet and multimedia lessons based on design principles may reach those students whose "way of learning" or "intelligence"

can be focused by a computer system, but that actual teacher work involved in producing a lesson may be prohibitive. It was suggested that actually producing four or more such lessons per evening to use the next day would be impossible. However, other teachers critiquing the examples suggested that students may like to design a lesson themselves as a semester project. A class which designed ten lessons per year for three or four years could accumulate a library of Internet and multimedia examples, and learn design techniques.

The use of multiple choice questions for students to self-test their knowledge was seen as the logical testing device. Correct answers allowed the students to progress through the Faulting & Folding lesson while incorrect answers reinforced earlier material by alternative explanations of the questions and answers, and returned students to earlier pages containing the appropriate information.

Student review of the PTCU Faulting & Folding lesson has been limited to about a dozen students of the Atlanta International School (AIS) computer club. The biggest attraction amongst students was the use of zines - active pictures which revealed information when a mouse was used to point to visual answers to textural questions. Students especially liked the "game" atmosphere of the lesson and the page which explained how clues could be found in the different media (backgrounds, video, audio, etc.).

The Earth Day Scavenger Hunt (EDSH) was designed specifically for AIS students and was optionally tested by 46 students. These students ranged in grade from six to ten, with ideas for the questions being contributed by my sixth grade class. Student feedback suggest that they really liked the ability to skip questions and return later. This enabled them

not to "get stuck" on any one question but answer the easier questions first. Although many found the imposed forty-minute time limit challenging, they enjoyed the competition against their fellow students. Submitted answer forms with ten correct responses were included in a draw for an Earth Day t-shirt. Only eight of forty-two participating students qualified for the draw which was won by a grade six student.

CHAPTER FOUR

INTERNSHIP EXPERIENCES AND INSIGHTS

Introduction

The traditional role of the teacher-librarian involved the collection and caretaking of fiction and non-fiction secondary school resources. These resources ranged from hardcover texts to novels, periodicals, magazines, dictionaries, atlases, encyclopaedias, audio tape recordings, LP records, audio CDs, filmstrips, videotape, 35mm slide collections, globes, maps and a multitude of realia - a multitude of media. I personally experienced this "traditional role" through years of service as a library monitor at St. Patrick's Hall School (Merrymeeting Rd.) and Beaconsfield High School during the early and mid 1970's. I remember times spent fixing AV equipment, printing the cards for the card catalogues and shelving books.

The change in title from that of teacher-librarian to learning resources teacher reflects the increased emphasis placed on exporting the materials from the library to the classroom and across the curriculum. The change appears to be one of philosophy - passive caretaker to active contributor. During my teaching experiences at some schools in the 1990's, some learning resources specialists I've known have prided themselves on the heavy use of the school's collection in classroom settings. These individuals actively sought opportunities to engage teachers and students.

The recent addition of compact disc encyclopaedias and Internet libraries have added new resources for student learning and computer-based means to disseminate information. The advantages of the use of computers for information research are quite clear - speed,

access, up-to-date information, cross-referencing, browsing, etc. Computer skills are necessary to be successful in today's information- and technology-based world.

Experiences and Insights

My internship was an experience in a learning resources environment in which computer-based student research was advocated. It was unique. Through Bishops College I was able to work with Ms. Daphne Butler observing aspects of the traditional role of a learning resources specialist while simultaneously observing how she coped with the introduction of information technology into the library curriculum. Simultaneously, I was part of a multimedia group which worked out "the multimedia pit" at MUN Computer Sciences and was actively experimenting with new technology.

The Bishops College experience did not reflect the traditional role of a learning resources teacher but focused on that stage during just after the introduction of computers into the library environment. Ms. Daphne Butler spent most of her time introducing teachers to the production possibilities associated with Internet and computer multimedia use, and in assisting students with computer-based research. Traditional media use was rare; however I clearly understood that the purpose of the internship was to observe the technological changes taking place in a secondary school library. My role quickly became one of technology assistant. Since that time I have come to experience a better "balanced" blend of traditional and computer media in a school environment.

The Memorial Computer Science department experience was fantastic - access to four people who were constantly discovering the latest software off the web and testing new hardware for virtual reality (VRML), video compression, etc. Mr. Rob Cass patiently taught me the basics of converting super-8 video to VCR tape format and then to AVI format for Adobe Illustrator. I recall lessons on how to integrate still frames between video clips and overlay audio tracs for continuity. Mr. Jason Aue, Ms. Beth Power and I spent weeks researching JAVA programming, applets, downloading problems associated with UNIX and 16-bit environments, etc. It took weeks to discover how to properly incorporate applets into webpages; however, I believe we were the first on the MUN campus to do so.

The dual internship role allowed me to uncover technological difficulties at Bishops College in the morning and work them out with software experts in the afternoon. Alternatively, new ways to incorporate multimedia in teaching could be tested in "the multimedia pit" one day and tried at Bishops College the next. Having had experiences in secondary school libraries and as a computer / technology teacher it was nice to have the opportunity and freedom to philosophically merge the two fields together. I would recommend such an internship to anyone interested in interdisciplinary work.

The Learning Resources Computer Specialists

There is a need for learning resources specialists who are not only computer literate but able to work comfortably in Internet and computer multimedia environments. Will schools transform learning resources specialists and technology specialists into "cybrarians"

in the future? Cybrarians would combine the talents of research and computer technology to help students retrieve and also create on the web.

However, computer use must be kept appropriate to student needs and situations; and not deny students "real world" experiences. I would be disappointed in a teacher who suggests students should "look up" definitions on the Internet before thinking of a dictionary or encyclopaedia. How much computer time have students wasted on assignments and projects by using specific resources at the wrong time in their research? Similarly, as a technology coordinator, I would be disappointed by a teacher who displays a multimedia slide collection of geologic faults and folds but never takes students on field trips to experience the real situation. There are no real rocks on a computer monitor (at least I hope not!); and textural characteristics cannot be felt by touching the screen.

There is a strong movement, as evidenced on the LM-NET and BIGSIX listservs, amongst teacher-librarians to and students to explore all the pathways to information access and learning, not just the computer-driven, technological means. Many write of the need to explain to students that the computer is one of many presentation tools. It is special in that it can show video clips, present magazine article summaries, and present information via an impressive multitude of media. However, it cannot replace an hour-long VCR movie presentation, rarely contains the entire text of a magazine issue, and cannot presently present the "best" of all media simultaneously.

The Information Technology Curriculum

The MUN Computer Sciences "multimedia pit" produced tutorials for teachers on the use of multimedia software and hardware, as collected in their teaching strategies guide. "Information technology" was understood to mean the "electronic presentation" of lessons by teachers. At the Bishops College learning resources centre, the dominant resource used by students was computer access to the Internet. "Information technology" was understood to mean the "electronic search" for facts to be used in student assignments and report writing.

"Information technology" is that set of skills used by researchers or students to acquire, analyse, critique and present knowledge. The term does not refer to the use of computers in secondary schools, nor is it the incorporation of electronics into the classroom environment. "Information technology" is independent of the media used - be it the ancient technology of the printing press, the 1800's telephone technology, the 1900's radio and television technology, the 1980's computer technology or the 1990's Internet/web technology. All these technology media have weaknesses and strengths when compared with each other.

"Information technology" includes that set of library and research skills which have been taught to primary and middle school students for generations. Classroom teachers teach students how to browse through bookshelves and books to locate relevant text using indices and the table of contents, how to research a topic using encyclopaedias, and the use of cross-referencing. Search "engines" may be Internet-based programs but keyword searches existed long before the 1990s.

My internship and later experiences have taught me that "information technology" has less to do with technology and much more to do with information. To this end, I have undertaken a project to integrate traditional primary and secondary school "information" skills into the computer department curriculum.

Conclusion

The success of my internship was exposure to an active learning resources environment and a computer-based multimedia production group. Conversations and observations have contributed to my understanding of how computer technology is being used in the secondary school system and the possibilities for future development and application. The production of the Internet Multimedia Curriculum Design Guide was the vehicle through which I could express those experiences and pass them on to others. The success of the guide is indicated through my thought processes in creating examples, and its use by other teachers to design Internet multimedia lessons.

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APPENDIX A

THE INTERNET MULTIMEDIA CURRICULUM DESIGN (IMCD) GUIDE

Selected pages of the Internet Multimedia Curriculum Design (IMCD) Guide have been reproduced as Appendix A as a reference for the internship report reader.

Unfortunately, these pages contain none of the colour, animation, applets or other computer-based multimedia features which give the guide its value. These features are best experienced through using the guide located in the enclosed CD-ROM disc. One way to start the IMCD guide is to open Windows Explorer, obtain a directory listing of the D drive, open the IMCD folder and double-click on the file entitled "index.htm".

NEXTHELP|EXIT



TIME



TIME

Internet Multimedia Curriculum Design Guide

This guide was developed in co-operation with the Bishops / MUN CS Multimedia Project and as partial fulfillment of the requirements for my M.Ed. Internship Project. An example Earth Science Plate Tectonics Curriculum Unit has been designed in accordance with the principles and skills outlined in this guide.

Multimedia
Teaching Strategies

Internet Multimedia Curriculum Design Guide



Factors such as the increasing role of computers in our society, the need for our students to acquire basic information technology skills and the availability of computers in schools are changing the role of classroom "computer" teachers.

Those few brief years when "computer teachers" taught "computer courses" with packaged software are coming to a close. Today's kindergarten teacher downloads the lyrics of *The Lion King*® from the Disney Site while sitting between a language teacher browsing Shakespeare and an elementary science teacher capturing dinosaur animations and images of Jupiter.



The increased speed at which knowledge is becoming available is forcing teachers to modify classes and tutorials to keep current. Regardless of whether a teacher ever designs an Internet Lesson, their technology and research skills must be kept up-to-date to be able to access recent information in their fields. In truth, today's history teacher needs to learn as much about how to conduct Internet research as he/she needs to learn about the American Civil War or Aristotle's theories.

The Internet Multimedia Curriculum Design Guide | 23 | EXIT



Internet Multimedia Curriculum Design Guide

BROWSING: Menus have been designed to allow the user to easily move within and between levels of the guide. For example, the tri-level structure allows the user to quickly jump between the Multimedia Animation Still GIF Library page to the Curriculum page with one mouse click.

EXIT: This button will take you to my personal homepage. In the normal design of a tutorial or unit this button may lead the user to a school or organization homepage. Because of the menu structure of this Design Guide there is no need to save a particular page URL to restart. However, for students working inside a designed lesson, this is where information about restarting the tutorial would be necessary.

LOCATION: Menus have been designed for the user to instantly recognize his/her location. Larger font print is used to indicate the pathway taken to the current page.

MENUS: See Browsing, Location, Numbering.

NUMBERING: A user might typically first locate (The Internet-1), produce (Multimedia-2) and then integrate (Curriculum-3) resources when designing pages. The guide menus include a recommended browsing order for pages within each section. Order is based upon a continuum from initial considerations through an increasing complexity of skills. Where numbering is absent, users are advised to browse all the pages and decide for themselves where to start.

NOTE: To return to the previous page click the Back Button on the browser (Netscape) button bar.

The Internet Multimedia Curriculum Design Guide | 23 | EXIT

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100				
Browsers	CR	Downloading	Environments	Net Search	Plugins	Programs	Problems	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100



The Internet Section

presents: (1) general information on how to search for, download and install the recommended software; and (2) design considerations necessary when deciding which multimedia elements to include on your homepages.

Basic net search skills are necessary to find programs and materials to supplement personal curriculum resources. Collecting involves downloading or FTPing from a remote computer to your system. Most stored programs are compressed or zipped to save space and must be unzipped and installed on your hard disk or server to be useable. A knowledge of UNIX is not essential, but a little know-how may make some set-up tasks easier.

An example of a 32-bit environment is Windows 95. Some of multimedia elements, such as JAVA, will not operate under a 16-bit system such as Windows 3.1. Netscape 3 and some Plugins are necessary to permit the automatic use or streaming of video and audio.

				The Internet	Multimedia	Curriculum	Design Guide	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1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The Internet									
Multimedia		Curriculum		Design Guide		1	2	3	HELP/EXIT
Browsers	Curriculum Resources		Downloading	Environments	Net Search	Plugins	Programs	Problems	12345678

You can save yourself many **Development Problems**, if you can work in a 32-bit environment such as the Windows '95 / NT combination and discard your present versions of Netscape, WS_FTP, HTMLed, Paint Shop Pro, etc. The new 32-bit versions can be located by using the Programs Page of this guide. Some of the features described in this guide will only be "usable" and indeed visible if you are working in this environment. For example, individuals working in Windows 3.1 will not be able to see the JAVA applet on the bottom of this pages. And they have no indication they are not viewing all the available information!

Most commonly encountered problem during homepage development:
 Students using 16-bit software which ignores UNIX case-sensitive file names (capitals)
 and truncates them to the DOS eight.three naming convention.

The Internet		Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT						
Browsers	Curriculum Resources	Downloading	Environments	Net Search	Plugins	Programs	Problems	1	2	3	4	5	6	7	8

A teacher needs to be able to **Collect the Necessary Software** for constructing pages. Programs can be considered to be of two types: (1) Internet programs such as Netscape, VIVO or WS_FTP32 necessary for viewing and manipulating pages; and, (2) Multimedia programs such as Paint Shop Pro and GIF Construction Set necessary for creating pages. Programs are easily found at sites such as Shareware.com. Links to the software sites recommended throughout this guide have been compiled on this page.



Adobe Premiere	GIF Construction Set	Hot Dog / Sausage	HTMLed	JAVA Developers Kit	Lview		
Microsoft	Netscape	Paint Shop Pro	Sound Gadget	Stem-Net	VIVO Movies	WinZip	WS FTP

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1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The Internet		Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT					
Browsers	Curriculum Resources	Downloading	Environments	Net Search	Plugins	Programs	Problems	1	2	3	4	5	6	7
Critical Evaluation		Evaluating Quality		Thinking Critically		Validation Project								

A teacher needs to be able to **Validate Web Resources**. There are two primary questions which should be asked by teachers wishing to use materials discovered on the World Wide Web:



(1) Are the resources reliable? We trust books and periodicals because of review boards and editors. Net Information must be viewed differently. Not all authors are primary sources and many "rework" information. Also, the "authority" of authors is not guaranteed. Government and agency sites such as NASA may be acceptable but it is easy to produce a page on Scottish Terriers without ever owning a dog!



(2) Are the resources freely available? Copying images and pages from the Internet is stealing and users browsing sites does not have permission to copy files for personal use. A Canadian teacher should suspect a student who assembles an illustrated page about Australian marsupials. Was the source of the photos a personal trip "down south"? Do teachers want students compiling such pages?

Internet Source Validation Project

Context Validity - Ratings Guide - Example1 - Example2 - HOME

Concrete Validity

Definition:

We defined "concrete validity" as validity based upon items which should be visible on a home page. The reader should be able to answer the first two questions, and answer YES to most of the remaining questions. NOTE: We suggest that pages should pass the majority of these criteria. It may be unrealistic to expect a home page to pass all.

- 1. Where is this information coming from? What is the source?
- 2. Is this site sponsored by an individual, group, or organization?
- 3. Is the author / publisher a recognizable authority?
- 4. Does the author / publisher provide his/her e-Mail address?
- 5. Is there a common link to the page from recognized authority?
- 6. Does the page provide other sources which could be contacted for confirmation or further information?
- 7. Does the page cite a bibliography or provide references to confirm the accuracy of the information?
- 8. Has the site been reviewed by a "content" reviewing agency?
- 9. Has the site been updated recently?

Context Validity - Ratings Guide - Example1 - Example2 - HOME

Internet Source Validation Project

Concrete Validity - Ratings Guide - Example1 - Example2 - HOME

Context Validity

Definition:

We defined "context validity" to deal with pages which do not meet the majority of the concrete criteria but contain information which appears valid in comparison to other pages. In order to accept a page as "valid in context," the reader should be able to answer all of the following questions.

- 1. Does the information contradict or confirm the information from other sources?
- 2. Does the information link you to other sources on the same topic? Is there a common link?
- 3. What is the intent of this information? Why was it put there - entertainment, educational?
- 4. Can you detect any evidence of bias from reading the page?

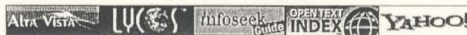
Concrete Validity - Ratings Guide - Example1 - Example2 - HOME

The Internet		Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT										
Browsers	Curriculum Resources	Downloading	Environments	Net Search	Plugins	Programs	Problems	1	2	3	4	5	6	7	8				

A teacher needs to be able to **Search the Web for Resources.**

Curriculum resources are those existing HTML, GIF, JPG, MPG, VIV, AU, WAV, CLASS, etc. files already developed by scientists, artists, other teachers and various webpeople which may be relevant to the lesson being planned. After all, one the primary reasons for integrating the Internet into curriculum development is to take advantage of its freely-available, virtual-unlimited library of current resources.

Net Search is an excellent tool for gathering information for research and presentation as long as the original authors are recognized.



The Internet		Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT						
Browsers	Curriculum Resources	Downloading	Environments	Net Search	Plugins	Programs	Problems	1	2	3	4	5	6	7	8
Create New Sites	Handbook	Internet Explorer	Navigator	TIPS#1	TIPS#2	What's Cool	What's New								



The two common **Internet Browsers** are Netscape Navigator and Microsoft Internet Explorer. Both support the new HTML 3.0 features, JAVA applets, streamed video, real-time applications such as Shockwave, and have Plug-in support and fully integrated mail and news services. Their differences are minor and choice of which to use is really a matter of preference. Of greater significance is the browser version used - Is it capable of supporting a 32-bit environment and take advantage of the newer features offered over the Internet.



My TIPS may help you configure your browser to streamline homepage development.





The Multimedia Section presents:

- (1) brief tutorials on how to produce your own homepage resources, such as video; and
- (2) editing tips relating to page layouts, file reduction and increasing the speed of your presentations.

Available multimedia for internet presentations include text, backgrounds, "painted" or drawn images, animated images, photos / slides, movies, audio clips, sound files and JAVA applets. JAVA applets are small individual programs which may be included on your pages to animated objects, scroll pictures, require user interaction, etc.

A common design mistake is to include every "catchy gimmick" or type of media on a single page and cause a communications overload for the reader. Overloading pages also dramatically slows down page transmission over telephone lines. Consideration of layouts and formats is essential to a successful presentation.



Text is basic to multimedia as the primary and sometimes only media on many pages. The advantage of having animation, applets, audio, links, pictures and video on HTML pages is that it can supplement text content. These media are generally used with text and it is rare to find any page without a description or explanation.

Text suffers in its ability to hold a "viewer's" attention when placed on pages with other media. Personal studies of students have shown that some totally ignore content and only read the link text because it is necessary to jump to other sites. This should not be a problem! One of the promises of Multimedia is that lessons may be designed for students who prefer to learn through pictures as opposed to words, or audio as opposed to interaction.

This guide uses different Font Sizes and Colors to highlight titles, menu choices and lists of examples. The changes in font draw attention to items to which the user should have immediate knowledge, helping him/her quickly decide if there is any content on interest on a particular page.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1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The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT					
Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
Escape and Return				Useless Links									



Hypermedia Links are used on the Internet to allow the designer to associate related topics to a particular HTML page and to allow the user to explore content in ways he/she thinks are significant. The phrase "hypermedia link" is used instead of "hypertext link" because it has become common practice to have pictures as well as text act as links to other sites. Multimedia - the use of more than one medium on a page - becomes hypermedia when it acts as links across the Internet.

An important design consideration for any Internet-based lesson or guide is that the user should be able to leave it, explore the possibilities out there on the net, and return without getting lost. To this end, a lesson should have instructions on how to explore and return similar to those given for the Plate Tectonic Unit.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT					
Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
Escape and Return				Useless Links									

Before You Browse the Net, read this:

This lesson has been linked to many interesting sites on the Internet. We want you to explore the virtual world to discover many far out places and some of the weird people who crack rocks out there. However, before you leave you should Add A Bookmark so that you can return to this page. This is because:



YOU WON'T HAVE ANY HELP ONCE YOU CLICK ON THE LINK.



For example, before you visit the Memorial University Geology Department you should choose Bookmarks, then Add a Bookmark from the Netscape Menu. You can get back to this page by choosing Bookmarks and Go To Bookmarks. You may have to scroll down to find the one entitle The Plate Tectonics Unit.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT					
Animation	Audio	Java	Links	Photos	Text	Videos	1	2	3	4	5	6	7
Escape and Return			Useless Links										

Using vs Useless Links:

Using a links to help students find specific sites is one of the benefits of the Internet. However, pages of links are a different problem. Collecting your favourite sites and listing them beneath your name appears to have become an intellectually "cheap" way to make a homepage. It is much more useful for someone interested in your hobbies to be able to obtain first-hand information from your page than links to sites in which you are interested.

A simple Net Search will always list more and newer links than those found on any link page!

Link#1	Link#2	Link#3
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Still Photographs add content and visual details to HTML pages making it easy to "picture" an object when textual descriptions are insufficient.



Iron Skull Mountain Above the Fog

Belleoram, Newfoundland, Canada

Searching through Internet Photo Libraries is a quick way to find a picture of that "something" you want to illustrate - for example, there are no African elephants in my neighbourhood. However, in the interest of primary sources, it may be better to link to "elephant" sites than to use photos which you did not take. After all, the person who took the photos is

more of an "elephant expert" than you.

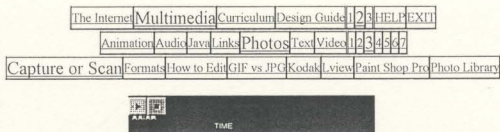
Capturing or Scanning your own photos can be expensive - cameras, scanners, video capture boards and software. However, shareware Editing software such as Lview Pro and Paint Shop Pro can be used to adjust resolution, color depth, image size and save photos as JPG, GIF, etc. formats.

A basic knowledge of Photography design and mechanics may do more to help your images than any editing magic. Kodak offers A Guide To Better Pictures and an Education Solutions pages to help teachers improve their photography skills. By the way, a small collection of some of my photos have been included as a Photo Library.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT
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Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
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Capture or Scan	Formats	How to Edit	Kodak	Lview	Paint Shop Pro	Photo Library
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There are four ways to **Capture or Scan** your still photographs: (1) Scanning personal photos using a flatbed or 35mm scanner; (2) Downloading video and capturing single frames; (3) Downloading from a digital camera such as the Apple QuickTake; and, (4) Direct camera feed from a personal camera such as CUSeeMe.



Scanning requires hardware - either a hand-held, flatbed / photocopier-style, or a 35mm slide scanner. Hand-held scanners adequately reproduce cartoons, drawings and text, but do not do justice to photographs. A flatbed scanner is necessary to scan print photos; however, image and color quality can vary greatly. Personally, conventional 35mm slide photography and a 35mm slide scanner produces the best quality. Scanners are software-specific and users must become familiar with settings and options.

Although quality is not as good as a 35mm camera, capturing stills from video shot using a camcorder does reduce the amount of equipment necessary to carry on trips, assuming that a video camera was to be used anyway. Downloading video requires the expense of a video capture board - a necessity if you intend to use video. See the Video Page of this guide.



Digital cameras have two draw backs - (1) they cannot yet reproduce the same quality as high-resolution scans of 35mm slides, and (2) the limited number of shots (8 for the QuikTake) make carrying a laptop computer a necessity. Digital cameras can produce good 320x160 photos but image quality disappears when it is necessary to zoom in on details. CUSeeMe or personal digital video cameras have the ability to capture video and stills; however, poor quality may preclude their use for serious photography.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT
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Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
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Capture or Scan	Formats	How to Edit	GIF vs JPG	Kodak	Lview	Paint Shop Pro	Photo Library
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Image Formats, such as GIF, JPG and TIFF, govern the detail of photos and their

download time on HTML pages. It is best to capture or scan at the highest "reasonable" resolution possible - images can always be reduced in resolution and size later during the editing process.

"Reasonable" relates to your purpose in using your images. If you want users to be able to Zoom In to look at specific details then the capture / scan resolution must be sufficient to maintain image clarity and color.

"Reasonable" also means to store your images at a comfortable file size. My options during scanning can produce files which range from 50K to 27000K (27 Megs). 1.5 to 2 Meg TIFF files appeared to be the optimum resolution for my purpose. The TIFF file is an industry-recognized format for uncompressed images - all of the resolution and color information obtained during the capture / scan process is kept.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT				
Animation	Audio	Image Links	Photos	Text	Video	1	2	3	4	5	6	7
Capture or Scan	Formats	How to Edit	GIF vs. JPG	Kodak	Lyview	Paint Shop Pro	Photo Library					

TIFF Files can be compressed to GIF or JPG files for Internet use - smaller images load quicker from remote sites. Compression means that images are "remapped" to reduce the number of pixels by averaging area details and colors to a single pixel value. Hence, compression loses information. This loss can be seen by comparing resolution and color when zooming in on compressed GIF or JPG and uncompressed TIFF images. You can download the JPG and GIF versions of this photograph for comparison.



The question "JPG or GIF?" is one of balancing information loss with file size reduction. JPGs retain more of the original detail and color information than GIFs and this is why TIFFs compress to larger JPG than GIF files. A common technique is to produce both JPG and GIF images of the same photo and use the GIF as a thumbnail for JPG. In this way users do not have to wait for "photo-heavy" HTML pages to download.

It is also a way of providing the user with choice - he/she may not want or need to view all your images in detail.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1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paint or image browser program such as Lview. You can see the HTML code for the above image by Netscape View Document Source: ``. The true width and height of the *sunset1.jpg* are 664 and 400 respectively. Such a HTML code image size reduction does not decrease the size of the file or the time it takes to download.

Alternatively, you could open Lview Pro, File Open *sunset1.jpg*, change the Edit Resize New Size values to 332 and 200. It is important to remember to Preserve the Aspect Ratio so that your file does not become distorted. If you File Save As *sunset2.jpg*, this similar-sized image will only be 9K compared to 21K for *sunset1.jpg*.

- *Redimensioning*: Redimensioning means to crop your image so that only part of the original is saved. For example, using Lview and *sunset2.jpg*, if you choose Edit Redimension from the menu and enter 250 x 180 as the new Image Size, right-side and bottom portions of the photo will be eliminated and your image should look like *sunset3.jpg*



- *Cropping*: If you want to cut out and save a particular part of an image then you need to crop it. This is accomplished by holding down the left mouse button and dragging the red-and-white box to include the piece you want. When you choose Edit Crop from the menu the image will be changed to include only what you specified inside the crop box. *sunset4.jpg*
- *Adding Text*: Choosing Lview Edit Add Text you should be able to place your name, school, organization or some remark on the image. You will need to choose Edit Apply before saving the file. *sunset5.jpg*

- *Rotating and Flipping:* Reorientating the image should not be a problem. Edit Rotntge Right was used to change view in sunset6.jpg below.



- *Contrast Enhancing:* Changing the contrast of an image is an interesting way to produce low-contrast wallpaper or backgrounds for your HTML pages. Alternatively, increasing the contrast can change ordinary images into bizarre landscapes. To change the contrast of images choose Lview Retouch Contrast Enhance and experiment with the positive and negative settings.



The Internet	Multimedia	Curriculum	Design Guide	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	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The Internet	Multimedia	Curriculum	Design Guide	12	III	IX	XXI
Animation	Audio	Event Links	Photos	Text	Video	123	4567
Capture or Scan	Formula	How to Edit	HP's vs. PC's	Scalable	view	Paint Shop	Doc
							Photo Library

This Photo Library has been provided for users of the Design Guide. Click on a thumbnail image to view a larger version of the photograph. Photos may be downloaded by clicking the right mouse button when the arrow is located atop the image and using the Save As option. Replication or alteration of these photos for purposes than an as practice items for this Design Guide are not permitted.



The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT
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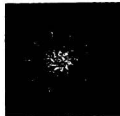
Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
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AniLib#1	AniLib#2	GIF Construction Set	How to Animate	Introduction	Still GIF Library
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Animation on HTML Pages is either a JAVA applet or a special GIF file. Animated GIFs may be mistaken for applets in 32-bit environments; however, applets are given away by <applet> tags when viewing the document source. Animated GIFs can be downloaded and saving them is like saving a any still image - hold down the right mouse button while on top of the image. Using animated GIFs simply requires the Link Image command or the Image Button in your HTML editor. You can check this Document Source now to see what the link looks like. To help you construct your own I have included links to my animated library, freeware still GIFs, the GIF Construction Set and a brief tutorial.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT				
Animation												
Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
Audio Lib#1	Audio Lib#2	GIF Construction Set	How to Animate	Introduction	Still GIF Library							



Constructing **Animated GIFs** is easy. All you need is the GIF Construction Set and a freeware collection of GIF's or icons. One way to start using "the Set" is to File-Open existing animations and discover their structure. Alternatively, the Set has a Wizard or guide which streamlines the development of your own animations. There is also an Edit-Transition feature which allows you to control how images are replaced, faded, etc. The Edit-Banner feature is recommended for creating scrolling text.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT					
Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
Amilab#1	Amilab#2	GIF Construction Set	How to Animate	Introduction	Still GIF Library								



TUTOR

The following is a **Step-by-Step Guide** to constructing the "Closing Door" GIF. 

This Tutorial assumes that you have already downloaded and installed the GIF Construction Set and viewed the Animated and Still GIF Library pages.

- *Step One:* You must have the Still GIFs that you wish to use downloaded onto your hard disk. You can download or Save As the following two GIFs by clicking the right mouse button while on top of each icon.



- *Step Two:* Start the GIF Construction Set. Note that in Windows you can have these instructions and the Set on your desktop simultaneously. Choose File Wizard from the GIF Construction Set main menu. The Wizard will give you a number of choices in designing your animation. My standard choices are:

- Yes, for use with a Web Page
- Loop indefinitely
- Drawn in sixteen colours, and
- 10 hundredths Delay
- You will then have to select your files from the appropriate directory.
- Done!

- *Step Three:* Each line in the sequence can be modified separately by double-clicking on the line. For example, you need to make sure that the dimensions specified in the Header do not exceed the dimensions of your Still GIF files.

To change the settings simply double-click on the Header line. You can discover other features, such as how to fade, interlace or replace stills, by experimenting with the "double-click" options and the main menu.

- *Step Four:* Link the image to your HTML page. If you View Document Source for this page the code for the Animated GIF looks like ``. The file *exitdoor.gif* is located in a directory called *anilib*. This code is no different from that of a Still GIF.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT						
Animation		Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
AniLib#1	AniLib#2	GIF Construction Set	How to Animate	Introduction	Still GIF Library									

The Internet	Multimedia	Curriculum	Design Guide	123	HELP	EXIT
Animation	Audio	Java	Links	Photos	Test	Video
AniLib#	AmiLib#	GIF	Construction Set	How to Animals	Introduction	Still GIF Library

This **Animated GIF Library** consists of examples of available freeware / shareware Internet images. They can be downloaded and saved by using the right mouse button while in your browser.



The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT
Animation			Audio	Java	Links	Photos	Text	Video
			1	2	3	4	5	6
AniLib#1	AniLib#2	GIF Construction Set	How to Animate	Introduction	Still GIF Library			

This **Animated GIF Library** consists of examples constructed with the GIF Construction Set. They can be downloaded and saved by using the right mouse button while in your browser.



The Internet	Multimedia	Curriculum	Design Gunks	1	2	3	HELP	EXIT						
	Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
Adobe Premiere	Cold Fusion	How to Move	Photos VS Video	Production Problems	VIVO									

Video Clips can add add meaning beyond that possible in still photographs. Consider a lesson on the causes of coastline erosion. The above video demonstrates that it is the wave "action" itself that is important.

Just a Day at the Beach
Outer Cove, Newfoundland, Canada

Adobe Premiere is an example of a video production program with enough "bells and whistles" to satisfy even the diehard media jockey. Coolfusion (AVI) and VIVO (VIV) are examples of streamed movie players / plugins. VIVO has an incredible compression routine reducing, for example, 48 Meg AVI to 0.22 Meg VIV files.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT						
	Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
Adobe Premiere	Cold Fusion	How to Move	Photos VS Video	Production Problems	VIVO									

Photos vs Videos. Videos imply action. Photos should be used when the "activity" of video is not required. For example, in producing an Internet lesson on fossil types, it would not make sense to invest the time and effort to shoot, capture, edit and compress video when photos of "still" fossils could be used to explain the same features. However, if the purpose is to show students discovering and exploring fossil beds, then that "action" of discovery may be important.

The advantage of being able to acquire both still and action shots with a camcorder may outweigh its poorer quality shots. Video production requires a capture board such as Adobe Premiere while photo / slide production requires a scanner, assuming that the school or organization already owns a 35mm camera and a camcorder.

Out The Narrows - St. John's, Newfoundland, Canada

The Internet	Multimedia	Curriculum	Design Guide	12	III	IX	XII
Animation	Audio	Java	Links	Photos	Text	Video	Web
Adobe	Premiere	Cold Fusion	How to Move	Photos VS Video	Production Problems	VIVO	



Most commonly encountered Problems During Video Production:

1. Start simply before you work in multiple video clips, pre-recorded sound tracks, etc.
2. The yellow bar in the construction window dictates what is actually saved as a MOVIE file. My most common error was to forget to stretch the bar to include all the frames in my video.
3. VivoActive will not produce a VIV file unless it detects an audio track. Attempting to reduce file size by not saving the audio track for the AVI file will cause VIVO to fail.
4. Vivo requires the system operator to include a VIV specification in the server's MIME file.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT						
	Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
Adobe Premiere	Cold Fusion	How to Move	Photos VS Video	Production Problems	VIVO									

The following is a **Step-by-Step Guide** to constructing the *fallfwd.viv* file. This Tutorial assumes that you have already downloaded and installed the Adobe Premiere Demo, which has the *fallfwd.avi* file in its sample directory, and the VivoActive Producer with its Netscape plug-in player.

Lower River Falls - Manuels, Newfoundland, Canada

- *Step One:* Go shoot some video! Stop. For the purposes of this demonstration we can assume that you have shot footage and are ready to capture it with Adobe Premiere. However, the demo version does not permit video capture or saving. If you could capture, your first steps might be to:
 1. Choose a 320 x 200 format for your project. This size will be reduced by VIVO later.
 2. File Capture Movie Capture to open the record window.
 3. Turn on your VCR / camcorder in play mode and preview the footage.
 4. Rewind to the approximate start position and press play on the VCR.
 5. Click the Record Button in the record window.
 6. Click again to stop the video record / capture. A clip window should pop-up.
- *Step Two:* We will start by using File Open to load *fallfwd.avi* from the *samples* directory and pop-up the clip window. The clip window is used for setting the IN and OUT frames of your video - a rough edit before transferring to the construction window for detailed work. The green numbers indicate the time and frame currently displayed in the window. The controls to the left deal with the original *fallfwd.avi* file while those on the right are used to play the version after the IN and OUT points have been set. Experiment with the controls to discover how to do this.

- *Step Three:* Choose Edit Copy To Construction Insert At Edit Line to transfer the clip file to the construction window. Make sure that there is an audio track displayed. VIVO requires an audio track. Adjust the yellow bar atop the construction window. This bar determines what part of the clip file is eventually saved. You may want to choose Windows Construction Windows Options to adjust the Track Format and Icon Size for easier viewing. Experiment with the tools located at the base of the construction window.
- *Step Four:* If this was the full version of Premiere, the next step would be to choose Make Make Movie and type in *fallfwd.movie*. There are usually no changes necessary in the Video or Compression Options.
- *Step Five:* The next step is to change the Adobe MOVIE file into an AVI file format with a conversion program such as QT2AVI. Note that you have created *fallfwd.avi*, the same file you opened to start this tutorial, and have run around chasing your tail. The only reason for this is the limitations of the Adobe Premiere Demo. We actually opened and looked at a final product.
- *Step Six:* Start the VivoActive Producer and File Browse to find the *fallfwd.avi* file. As you can see there are only two VIVO options. Choosing both Better Quality and Smoother Motion will preserve the quality of your video and compress it to less than 1% of its original size, making streamed video a reality for those with slow telephone connections.
- *Step Seven:* The code to embed VIV videos in HTML pages is simple: `<embed SRC="vidlib/falls.viv", width=176, height=144, autostart=true>`. The width and height are standards set by Vivo - the price you pay for the compression. The waterfall is located in my *vidlib* directory. Autostart can be turned "off" or "on".

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT						
	Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
Adobe Premiere	Cold Fusion	How to Move	Photos VS Video	Production Problems	VIVO									

The Internet	Multimedia	Curriculum	Design Guide	#1	#2	HELP	EXIT						
Animation	Audio	Java	Links	Photos	Text	Video	#1	#2	#3	#4	#5	#6	#7
Audio Clip Library	How to Record	Sound Gadget Pro	Sound Library #1	Sound Library #2									



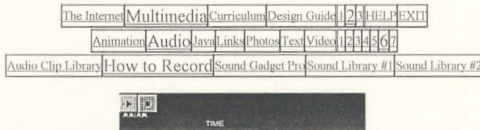
Topic

Including Audio Clips and Sounds

on your homepage are excellent ways to ensure that your message is received.

Adding sound to homepages is inexpensive - it's the cost of purchasing a simple microphone to plug into your system's sound card. The CD Player, Sound Recorder and Volume Control programs packaged with Windows 95, together with a shareware editor such as Sound Gadget Pro, is all that is needed to record messages and noises.

This Guide provides a Library of the messages and sounds used in this guide and the Plate Tectonic Curriculum Unit, a discussion of Audio JAVA Applets and a short step-by-step Recording Tutorial.

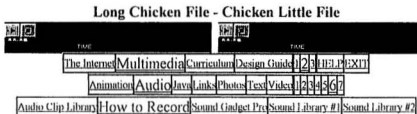


The following is a **Step-by-Step Guide** to constructing the Chicken AU Audio File. This Tutorial assumes that you have already installed Sound Gadget Pro, and have a source for the "chicken" sound.

- *Step One:* Your "chicken" sound will be recorded with the Windows Multimedia Sound Recorder. The important option to set in this program is Edit Audio Properties. The Recording Preferred Quality option can be set to either CD, Radio or Telephone. CD quality - 172K/sec, 16-bit, 44100 Hz stereo recording - is the best but also creates the largest files. The Curriculum sound clip is an example of a 6 second / 1 megabyte recording. Higher quality means slower download and play times.
- *Step Two:* If your "chicken" sound will be recorded from a CD, you need to open the Microsoft Multimedia CD Player and use the buttons to skip to the correct track. If you are the source! then the CD Player isn't necessary.
- *Step Three:* Click the Record Button on the Sound Recorder and then either the Play Button on the CD Player or start acting like a chicken and "clucking" into the microphone! Press the Stop Button on the Sound Recorder (and then CD Player) when finished.
- *Step Four:* Choose File Save As on the Sound Recorder to save your noise as a WAV file.
- *Step Five:* Start Sound Gadget Pro and File Open your WAV file. Use the mouse to drag the dark beginning markers from time 0 to the visible start of your wave pattern. Edit Cut this dark section - dead air which increases your file size. Use the mouse to perform a similar operation starting at the other end of your wave pattern.

- *Step Six:* Choose File Save As in Sound Gadget Pro, but this time save your edited "chicken" sound as an AU file. Although both WAV and AU file types are recognized by Netscape 3.0 and Microsoft Explorer, some software such as Netscape 2.0 and the AudioItem JAVA Applet can only use AU files.
- *Step Seven:* To place or "embed" the sound file on a HTML page, you simply include the line `<EMBED SRC="aolib/chicken.au" WIDTH=146 HEIGHT=35>` where you want the player to appear. The full player HEIGHT is actually 60 pixels.

You're done. The following is my example of the "chicken" sound before (208K) and after (66K) editing. It may interest you to download and compare both files in the Sound Gadget Pro editor.



The Internet	Multimedia	Curriculum	Design Guides	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	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The Internet	Multimedia	Curriculum	Design Guide	23	113	117
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	Animation	Audio	Java	Links	Photos	Text
						Videos
21 levels	Classroom	Java#1	Java#2	JDK	Library	Plug-ins
						Problems
						Programming
						Sausages
						Sum

There are **Two Levels** from which to approach the use of JAVA applets on homepages - as a programmer in a object-orientated language similar to C++, or as someone who learns how to use applets by adjusting the HTML code parameters. If you are considering investing the time to learn a new language, JAVA would be recommended because of its the ability to create platform-independent code that will run on any type computer system. In addition, it is a subset of C++ with many of the common pitfalls (and some of the power) removed. There are many good programming tutorials freely available online. Once created, a JAVA file must be compiled as an executable CLASS file. The compiler is available in the JAVA Developer's Kit or JDK.

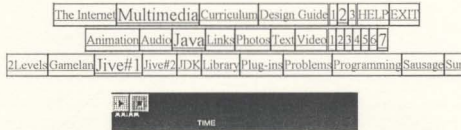
You do not need to know how to write JAVA code to use the applets. However, as you need to learn about HTML tags such as `<BODY background= " ..blue_roc.gif">` to design backgrounds, you'll need to learn about the HTML tags to run applets. The catch is that except for the opening `<applet>` and closing `</applet>` tags, each applet has its own rules, parameters and tags. Applets are not related to one another but different independent programs.

The Internet		Multimedia		Curriculum		Design Guides		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220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The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT					
Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
2 Levels	Games	Java #1	Java #2	JDK	Library	Plug-ins	Problems	Programming	Sausage	Sum			

Most common problems associated with using Applets in homepages:

1. The name of the applet CLASS file should be the same as the subdirectory in which it is stored. For example, *blinking.class* should be stored in a subdirectory called *blinking*. Remember UNIX is a case-sensitive 32-bit environment without the DOS eight.three rule.
2. The HTML file which calls an applet must be outside the applet subdirectory.
3. Down/Uploading applets from or to a server requires a 32-bit version of WS_FTP, or a working knowledge of UNIX file renaming and subdirectory structures. Also, ensure that the transfer protocol is set to binary.
4. Applets cannot be copied like HTML files, GIFs, JPGs, etc. Netscape File Save As will not work.



This is a **Step-by-Step Guide** for changing the HTML parameter tags of the NervousText.CLASS applet. This guide assumes that you have browsed and downloaded these particular files.

NOTE: The italics are only used to distinguish the discussed HTML code from the explanatory text. No italics are necessary in your HTML code.

-
- *Step One:* Let's consider the HTML code of the NervousText Applet. File New in your HTML editor and then Edit Copy - Edit Paste this code into your file.
 - `<applet code="NervousText.class" width=500 height=50>`
 - `<param name=text value="You can make it say anything!">`
 - `</applet>`
 - *Step Two:* The second line has `text value="You can make it say anything!"` Please change the phrase to something you'll recognize when YOU have the applet working. File Save As your HTML file as *junk.html*
 - *Step Three:* The `code="NervousText.class"` is the HTML parameter which assigns the applet filename. This type of

assignment implies that all the applet files will be located in a subdirectory called `NervousText`. Note that the subdirectory name is case-sensitive and must match the `code` parameter exactly. Use WS_FTP to create the `NervousText` subdirectory on your server account and copy the `NervousText.CLASS` file into that subdirectory. FTP the *junk.html* file one level outside the `NervousText` directory. For example, my *junk.html* file is located in my `.www/design` directory while the class file is located in the `.www/design/NervousText` subdirectory.

- *Step Four:* Start your browser (Netscape) and type in the URL of the *junk.html* page. That's it! You should be able to see the message you substituted for "You can make it say anything!"

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT					
Animation	Audio	Java	Links	Photos	Text	Video	1	2	3	4	5	6	7
2 Levels	Games	Jive#1	Jive#2	JDK	Library	Plug-ins	Problems	Programming	Sausage	Sun			

The Internet	Multimedia	Curriculum	Design Guides	123	HELP/EXIT
	Animation	Audio	Java	Links	Images
2 Levels	Games	Java#1	Jive#2	JD8	Libraries
				Plug-ins	Problems
				Programming	Sausage Soup



This is a **Step-by-Step Guide** for changing the HTML parameter tags of the Zine.CLASS applet. This guide assumes that you have browsed and downloaded these particular files.

NOTE: The italics are only used to distinguish the discussed HTML code from the explanatory text. No italics are necessary in your HTML code.

- *Step One:* Consider the HTML code of the Zine Applet. File New in your HTML editor and then Edit Copy - Edit Paste this code into your file.

- `<applet code="Zine.class" width=320 height=200>`
 - `<param name=dataurl value="canyon.zine">`
 - `<param name=imgurl value="canyon.gif">`
 - `<param name=showhot value="no">`
 - `</applet>`
- *Step Two:* *canyon.gif* was the name of the GIF file used in the example. Choose a different GIF file of your own to use in the applet and copy it into the same directory as the *Zine.CLASS* file. Also, copy the *canyon.zine* file to have the same first name as that of your GIF file.
 - *Step Three:* Use Windows Notepad to File Open your ZINE file. The Notepad is a simple way to edit the contents of a ZINE file. DO NOT try to remove any spaces or symbols because they are necessary to the format of a ZINE file.
 - *Step Four:* Note the text `#point: 10 120 #rect: 10 10 120 120 #text: "The fault is not in this location."` The `#point: 10 120` indicates how far from the left side and top of your page the upper left corner of the text block with *"The fault is not in this location."* should be located. The `#rect: 10 10 120 120` indicates the active mouse area which pops up the block. *10 10* is the coordinate upper left corner and *120 120* the coordinate of the lower right corner. Note that there are two blocks defined in the ZINE file. Start experimenting by keeping all coordinates the same and changing the text for the blocks.
 - *Step Five:* The `code="Zine.class"` is the HTML parameter which assigns the applet filename. This type of assignment implies that all the applet files will be located in a subdirectory called Zine. Note that the subdirectory name is case-sensitive and must match the `code` parameter exactly. Use WS_FTP to create the Zine subdirectory on your server account and copy the *Zine.CLASS* file into that subdirectory. FTP your GIF and ZINE files into the same directory. FTP your HTML file one level outside the Zine directory. For example, my HTML file is located in my *.www/design* directory while the CLASS, GIF and ZINE files are located in the *.www/design/Zine* subdirectory.
 - *Step Six:* Start your browser (Netscape) and type in the URL of your HTML file. You should be able to see your GIF and force text boxes to pop up by moving your mouse over defined areas. You might want to try to adjust the coordinates of your boxes, WS_FTP and Netscape again.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	4	5	6	7	8	9	10	11	12	EX1	EX2	EX3	EX4	EX5	EX6	EX7	EX8	EX9	EX10	EX11	EX12	EX13	EX14	EX15	EX16	EX17	EX18	EX19	EX20	EX21	EX22	EX23	EX24	EX25	EX26	EX27	EX28	EX29	EX30	EX31	EX32	EX33	EX34	EX35	EX36	EX37	EX38	EX39	EX40	EX41	EX42	EX43	EX44	EX45	EX46	EX47	EX48	EX49	EX50	EX51	EX52	EX53	EX54	EX55	EX56	EX57	EX58	EX59	EX60	EX61	EX62	EX63	EX64	EX65	EX66	EX67	EX68	EX69	EX70	EX71	EX72	EX73	EX74	EX75	EX76	EX77	EX78	EX79	EX80	EX81	EX82	EX83	EX84	EX85	EX86	EX87	EX88	EX89	EX90	EX91	EX92	EX93	EX94	EX95	EX96	EX97	EX98	EX99	EX100	EX101	EX102	EX103	EX104	EX105	EX106	EX107	EX108	EX109	EX110	EX111	EX112	EX113	EX114	EX115	EX116	EX117	EX118	EX119	EX120	EX121	EX122	EX123	EX124	EX125	EX126	EX127	EX128	EX129	EX130	EX131	EX132	EX133	EX134	EX135	EX136	EX137	EX138	EX139	EX140	EX141	EX142	EX143	EX144	EX145	EX146	EX147	EX148	EX149	EX150	EX151	EX152	EX153	EX154	EX155	EX156	EX157	EX158	EX159	EX160	EX161	EX162	EX163	EX164	EX165	EX166	EX167	EX168	EX169	EX170	EX171	EX172	EX173	EX174	EX175	EX176	EX177	EX178	EX179	EX180	EX181	EX182	EX183	EX184	EX185	EX186	EX187	EX188	EX189	EX190	EX191	EX192	EX193	EX194	EX195	EX196	EX197	EX198	EX199	EX200	EX201	EX202	EX203	EX204	EX205	EX206	EX207	EX208	EX209	EX210	EX211	EX212	EX213	EX214	EX215	EX216	EX217	EX218	EX219	EX220	EX221	EX222	EX223	EX224	EX225	EX226	EX227	EX228	EX229	EX230	EX231	EX232	EX233	EX234	EX235	EX236	EX237	EX238	EX239	EX240	EX241	EX242	EX243	EX244	EX245	EX246	EX247	EX248	EX249	EX250	EX251	EX252	EX253	EX254	EX255	EX256	EX257	EX258	EX259	EX260	EX261	EX262	EX263	EX264	EX265	EX266	EX267	EX268	EX269	EX270	EX271	EX272	EX273	EX274	EX275	EX276	EX277	EX278	EX279	EX280	EX281	EX282	EX283	EX284	EX285	EX286	EX287	EX288	EX289	EX290	EX291	EX292	EX293	EX294	EX295	EX296	EX297	EX298	EX299	EX300	EX301	EX302	EX303	EX304	EX305	EX306	EX307	EX308	EX309	EX310	EX311	EX312	EX313	EX314	EX315	EX316	EX317	EX318	EX319	EX320	EX321	EX322	EX323	EX324	EX325	EX326	EX327	EX328	EX329	EX330	EX331	EX332	EX333	EX334	EX335	EX336	EX337	EX338	EX339	EX340	EX341	EX342	EX343	EX344	EX345	EX346	EX347	EX348	EX349	EX350	EX351	EX352	EX353	EX354	EX355	EX356	EX357	EX358	EX359	EX360	EX361	EX362	EX363	EX364	EX365	EX366	EX367	EX368	EX369	EX370	EX371	EX372	EX373	EX374	EX375	EX376	EX377	EX378	EX379	EX380	EX381	EX382	EX383	EX384	EX385	EX386	EX387	EX388	EX389	EX390	EX391	EX392	EX393	EX394	EX395	EX396	EX397	EX398	EX399	EX400	EX401	EX402	EX403	EX404	EX405	EX406	EX407	EX408	EX409	EX410	EX411	EX412	EX413	EX414	EX415	EX416	EX417	EX418	EX419	EX420	EX421	EX422	EX423	EX424	EX425	EX426	EX427	EX428	EX429	EX430	EX431	EX432	EX433	EX434	EX435	EX436	EX437	EX438	EX439	EX440	EX441	EX442	EX443	EX444	EX445	EX446	EX447	EX448	EX449	EX450	EX451	EX452	EX453	EX454	EX455	EX456	EX457	EX458	EX459	EX460	EX461	EX462	EX463	EX464	EX465	EX466	EX467	EX468	EX469	EX470	EX471	EX472	EX473	EX474	EX475	EX476	EX477	EX478	EX479	EX480	EX481	EX482	EX483	EX484	EX485	EX486	EX487	EX488	EX489	EX490	EX491	EX492	EX493	EX494	EX495	EX496	EX497	EX498	EX499	EX500	EX501	EX502	EX503	EX504	EX505	EX506	EX507	EX508	EX509	EX510	EX511	EX512	EX513	EX514	EX515	EX516	EX517	EX518	EX519	EX520	EX521	EX522	EX523	EX524	EX525	EX526	EX527	EX528	EX529	EX530	EX531	EX532	EX533	EX534	EX535	EX536	EX537	EX538	EX539	EX540	EX541	EX542	EX543	EX544	EX545	EX546	EX547	EX548	EX549	EX550	EX551	EX552	EX553	EX554	EX555	EX556	EX557	EX558	EX559	EX560	EX561	EX562	EX563	EX564	EX565	EX566	EX567	EX568	EX569	EX570	EX571	EX572	EX573	EX574	EX575	EX576	EX577	EX578	EX579	EX580	EX581	EX582	EX583	EX584	EX585	EX586	EX587	EX588	EX589	EX590	EX591	EX592	EX593	EX594	EX595	EX596	EX597	EX598	EX599	EX600	EX601	EX602	EX603	EX604	EX605	EX606	EX607	EX608	EX609	EX610	EX611	EX612	EX613	EX614	EX615	EX616	EX617	EX618	EX619	EX620	EX621	EX622	EX623	EX624	EX625	EX626	EX627	EX628	EX629	EX630	EX631	EX632	EX633	EX634	EX635	EX636	EX637	EX638	EX639	EX640	EX641	EX642	EX643	EX644	EX645	EX646	EX647	EX648	EX649	EX650	EX651	EX652	EX653	EX654	EX655	EX656	EX657	EX658	EX659	EX660	EX661	EX662	EX663	EX664	EX665	EX666	EX667	EX668	EX669	EX670	EX671	EX672	EX673	EX674	EX675	EX676	EX677	EX678	EX679	EX680	EX681	EX682	EX683	EX684	EX685	EX686	EX687	EX688	EX689	EX690	EX691	EX692	EX693	EX694	EX695	EX696	EX697	EX698	EX699	EX700	EX701	EX702	EX703	EX704	EX705	EX706	EX707	EX708	EX709	EX710	EX711	EX712	EX713	EX714	EX715	EX716	EX717	EX718	EX719	EX720	EX721	EX722	EX723	EX724	EX725	EX726	EX727	EX728	EX729	EX730	EX731	EX732	EX733	EX734	EX735	EX736	EX737	EX738	EX739	EX740	EX741	EX742	EX743	EX744	EX745	EX746	EX747	EX748	EX749	EX750	EX751	EX752	EX753	EX754	EX755	EX756	EX757	EX758	EX759	EX760	EX761	EX762	EX763	EX764	EX765	EX766	EX767	EX768	EX769	EX770	EX771	EX772	EX773	EX774	EX775	EX776	EX777	EX778	EX779	EX780	EX781	EX782	EX783	EX784	EX785	EX786	EX787	EX788	EX789	EX790	EX791	EX792	EX793	EX794	EX795	EX796	EX797	EX798	EX799	EX800	EX801	EX802	EX803	EX804	EX805	EX806	EX807	EX808	EX809	EX810	EX811	EX812	EX813	EX814	EX815	EX816	EX817	EX818	EX819	EX820	EX821	EX822	EX823	EX824	EX825	EX826	EX827	EX828	EX829	EX830	EX831	EX832	EX833	EX834	EX835	EX836	EX837	EX838	EX839	EX840	EX841	EX842	EX843	EX844	EX845	EX846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The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT					
Lesson Structure	Motivation	PD#1	PD#2	Practice/Test	Teach/Learn	Tutorials	1	2	3	4	5	6	7



The purpose of the **Curriculum Section** is to consider "Educational" or Teaching Skills which may be included in your page design. Although beautiful layouts and abundant media may increase student interest in your lessons, there are pedagogical aspects which can be considered to structure pages as "learning experiences" or lessons. How teachers structure pageflow and permit students to advance in a lesson can be designed to both increase desire to interact with the material and provide essential entertainment.

For example, my Plate Tectonics Curriculum Unit has been designed along an integrated tutorial - practice - challenge scheme. The tutorial session is where students encounter new information and are given opportunities to explore on their own. Practice problems are a method for students to challenge their attention to this new material and a "warm-up" for subsequent testing. The "game" is topical, such as a virtual geology field trip with the challenge of applying newly learned information to discover *The Lost Mine of Doom!*.

The Internet		Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT			
Lesson Structure	Motivation	Page Design#1	Page Design#2	Practice/Test	Teach/Learn	Tutorials	1	2	3	4	5	6

The basis of **Teaching and Learning** in the Internet Multimedia Environment is the same as it is in the classroom. Teachers want to help students integrate new ideas into existing knowledge so that they will retain more. A variety of classroom methods are used to relate to a variety of students. Research seems to indicate that some students learn better visually while others prefer text-based or vocal instruction. Some students need to see a fault or starfish while others only need to read a description to "know" what one looks like. Hence, teachers consistently bring pictures, slides, audio tapes, overheads, sound tracs, models, realia, etc. into their classrooms.

Teachers use multimedia.★★★

The advantages of computer multimedia also relate to student learning, dual coding and multiple intelligence theory. Use of video, JAVA, audio, animation, text, etc. is simply an attempt to duplicate common teaching activities. Hence, when designing HTML pages it is important to keep your audience in mind. Do your students learn better by watching video or being challenged by questions, by listening to audio clips or browsing through materials? Ideally, well-designed tutorials can be used by a variety of students, adapting to the learner, drawing on his/her strengths and giving extra help where needed.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1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The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT				
Lesson Structure	Motivation	Page Design#1	Page Design#2	Practice/Test	Teach/Learn	Tutorials	1	2	3	4	5	6

Lesson Structure or Page Flow is concerned with student progress through a lesson. Should students wander through the lesson choosing "interesting" pages or be required to read certain pages to complete the tutorial? It is easy to design a simple linear sequence that progresses from one topic to the next through pages of increasingly more difficult information. Better designs allow for branching forward to more challenging material, backward to repeat instruction and sideways for simpler explanations or paraphrasing. Navigation should include controls for forward progression, backward paging for review, access to directions / help and tutorial termination.



Controls should be consistently placed on the top and/or bottom of each page. In this way the user can become familiar with lesson structure and concentrate on content. Simple menus are the ideal if page sequence is not critical and a tri-level menu is able to display lower, present and higher levels in your hierarchy. Duplicating the menu at the top and bottom of pages simplifies linking when scrolling. Sometimes it's necessary for a student to exit without completing the tutorial and the designer must decide if the he/she may restart at the page where they left off, or whether restarting requires beginning again. One possible way to restart in the middle of an Internet tutorial is for the student to write down the URL of the page where he/she exited.

The Internet	Multimedia	Curriculum	Design Guide	1	2	3	HELP	EXIT					
Lesson Structure	Motivation	Page Design#1	Page Design#2	Practice/Test	Teach/Learn	Tutorials	1	2	3	4	5	6	7

A **Page Design** can be thought of as the lesson plan with illustrations, demonstrations and interactions.



- There should be an option to repeat *Animations*. If animations cannot be designed to loop automatically, the student should be made aware of the Reload Button on the browser main menu.
- *Content Help* or paraphrased pages should be available when difficult concepts are introduced. How many times must a classroom teacher rephrase an explanation to ensure the message is understood?
- *Directions* or procedural help should be constantly available.
- *Examples* should follow rules. Students quickly pass by information unless they are challenged. One way to slow them down is to require them to think about and apply the presented information.
- An *Exit Button* or option should always be available, along with instructions of how the student may restart the tutorial at a later time.
- *Important Features* can be marked on pictures using a paint program, to make sure that students do not mis-identify definitions and content.

APPENDIX B

PLATE TECTONICS CURRICULUM UNIT (PTCU)

Selected pages of the Plate Tectonic Example Lesson (PTCU) have been reproduced as Appendix B as a reference for the internship report reader. Unfortunately, these pages contain none of the colour, animation, applets or other computer-based multimedia features which give the guide its value. These features are best experienced through using the guide located in the enclosed CD-ROM disc. One way to start the PTCU guide is to open Windows Explorer, obtain a directory listing of the D drive, open the PTCU folder and double-click on the file entitled "index.htm".

Plate Tectonics Curriculum Unit



This unit was designed to help students develop an appreciation for the way in which Plate Tectonics Theory brings together many of the geological ideas already studied.

Comments and suggestions are welcome. You can contact me at

dfurey@calvin.stemnet.nf.ca



System Requirements



The technical design of the Plate Tectonic Unit includes many features: JAVA animations, VIVO movies, audio files, questionnaire forms and frames. These features start on the following pages.

To take advantage of all of these features you need a multimedia computer running Netscape version 3.0 with the VIVO plugin in a Windows 95 environment. Without a multimedia computer you will miss audio discussions and sound effects. Without Windows 95 you will miss the JAVA applets and some of the animation. If you are setting up your system, some of the following links may help.

If you are sure about YOUR COMPUTER'S CAPABILITIES, click on the forward arrow.



Finding Your Way Around the Unit

If you are reading this page you must know how the arrows work! The  RIGHT ARROW takes you forward while the  LEFT ARROW takes you back to the previous page.



The INFORMATION MARK will always take you back to this page.



The OPEN DOOR is your way to exit.

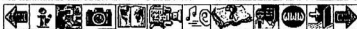
Sometimes you will find other options located on the bottom line as well. These options will be explained to you on the appropriate pages.

The Plate Tectonics Game!

There are many hidden CLUES you will need to access the GAMES section of the Plate Tectonics Unit. Some of these clues are at other Internet Sites, in Backgrounds, Pictures, Video, Text (like this!), Sound Clips; and some are found by answering Questions correctly.

THE GAME STARTS HERE & NOW. No one will tell you what the extra icons located below will do. However you need to find out if you want to learn about "CLUE HIDING PLACES" and how to *dig out* the information.

If you've already read these GAME HINTS, click on the forward arrow.



Background Images

Up till now you've only seen black print on a grey background.

However, some pages of the Plate Tectonics Unit have a rock, geologic feature or a scenery shot in the background.

For example, the background for this page is showing three minerals - quartz, chalcopyrite and ... The first letter in the answer is needed to find your way to the game site!



Hidden Messages in the Text

Despite all the pictures, videos, animations, games, and everything else, You will learn more and get to the *games* section quicker if you read the all text. Not only does it contain alot of interesting information about geology and Plate Tectonics but it hints on how to study and directions on how to find clues *are hidden* there. It would be very hard for you to read if ALL the important information was *in capital letters* or italics. Some will be but you will have to read each word on each screen.

YOU WILL LEARN MORE AND GET TO THE GAMES SECTIONS QUICKER IF you read the all text. By the way, did you find the clue on this page?



There are Quizzes!

There is a quiz after each lesson that you have to get 100% on to advance to the games section, *DoN'T wOrRY!* Each lesson has a tutorial and practice session before you get a chance at the quiz. By the time you get there you'll know everything you need to! To see what quiz question answers can do to you, try the following question:

HINT: You need to get this question right to get back to the main game hints page. **WARNING:** One of thses answers will dump you right back to the start of the unit!

THIS GEOLOGY UNIT IS ALL ABOUT THE STUDY OF THE WAY THE EARTH'S CONTINENTS AND OCEANS WERE FORMED:

(a) kitchen plates - (b) igneous rocks - (c) plate tectonics - (d) lasagna

Traversing into the Web

The Plate Tectonics Unit has been linked to many interesting sites on the Internet. We want you to explore the virtual world to discover many far out places and some of the weird people who crack rocks there. However, before you leave this unit to go to the Internet or World Wide Web (WWW), you will be asked to ADD A BOOKMARK so that you can get back here again.

For example, before you visit the Memorial University Geology Department you should choose BOOKMARKS, then ADD A BOOKMARK from the Netscape Menu. The word bookmark is right beneath the word tectonics!

Before you click on the MUN icon, be sure you know how to get back. You do this by choosing BOOKMARKS and GO TO BOOKMARKS. You may have to scroll down to find the one entitle The Plate Tectonics Unit.

YOU WON'T HAVE ANY HELP ONCE YOU CLICK ON THE MUN ICON. Hope you get back!



The Lessons of Doom!

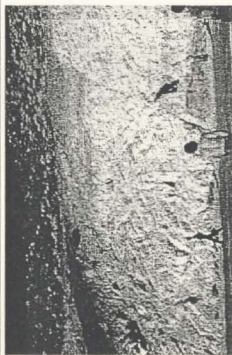
Welcome to the 7 LESSONS OF DOOM! (What was I going to say?) Each lesson should take you about 40 minutes - 20 minutes for the tutorial, 10 minutes practice, 5 minutes for the quiz and 5 minutes for the game. The letters you uncover during the tutorial and practice spell a geologic term and the name of the Quiz File. If you pass the quiz you will be given a letter in the name of the ULTIMATE FINAL. QUIZ File.

THE LESSONS:

History and Hypotheses, Sea-Floor Spreading, Plates and Plate Boundaries, Structural Evidence, Igneous Evidence, Sedimentary Evidence, Fossil Evidence, Other Stuff, The Ultimate Final Quiz.



Structural Evidence of Plate Tectonics



Local Faulting and Folding

As with the other types of evidence, we like to start with geologic features you can see around you school or community and show how they fit into the grander scheme of Plate Tectonics.

LOCAL FAULTING AND FOLDING IS THE RESULT OF FORCES WHICH PUSH ONE BODY OF ROCK RELATIVE TO ANOTHER.

Why one area moves while the other remains fixed is either the result of:

- (1) the "pushing" forces are stronger on one area than another; or
- (2) one area is composed of a more moveable rock type.



Local Faulting and Folding

LOCAL FAULTING AND FOLDING IS THE RESULT OF
FORCES WHICH PUSH ONE BODY OF ROCK RELATIVE TO ANOTHER.

Having examined the fault, why do you think it occurred?

- (A) the forces were stronger on the left side than the right,
 - (B) the forces were stronger on the right side than the left,
 - (C) one side was composed of a more moveable rock type, or
 - (D) a heavy rock concert which took place two weeks earlier!
-

Local Faulting and Folding

LOCAL FAULTING AND FOLDING IS THE RESULT OF
FORCES WHICH PUSH ONE BODY OF ROCK RELATIVE TO ANOTHER.



YES! The forces were stronger on the left side than the right.

It's possible to tell this because if you look at the coloured sedimentary layers that the person with the red shirt is standing on, they are lower than corresponding beds on the other side of the fault. So either those layers have dropped (which wasn't an option) or forces were stronger on the left pushing the left side up! GOOD!



Local Faulting and Folding

LOCAL FAULTING AND FOLDING IS THE RESULT OF
FORCES WHICH PUSH ONE BODY OF ROCK RELATIVE TO ANOTHER.



SORRY! Check out the slide again.

HINT: The sedimentary layers on both sides of the fault are composed of the same material.

Look at the coloured sedimentary layers that the person with the red shirt is standing on.

This person was in the area two weeks ago and can confirm that there wasn't a rock concert!



Local Faulting and Folding

As you have seen, displaced sedimentary layers can indicate which side of a fault moved upwards relative to another. Igneous dykes and veins cut by faults can also be used to describe movement.



Local Faulting and Folding

Faults rarely follow a straight line. They are usually irregular "zones" in which peices of the surrounding or country rock have been crushed and broken into sharp fragments. The fragments are usually cemented with minerals crystallized from fluids which flowed through the fault zone. The resulting rock is a **FAULT BRECCIA**.



Local Faulting and Folding

FAULT BRECCIAS ARE CEMENTED FRAGMENTS OF COUNTRY ROCK LOCATED IN A FAULT ZONE.

Where do you think the minerals which cement the rock fragments together may come from?

- (A) A geologist puts them there so that the fault doesn't move while being studied,**
- (B) From the surrounding rocks. Minerals may be released when country rocks are crushed,**
- (C) From fluids flowing along the fault zone, or**
- (D) From the atmosphere. Rain contains minerals which can cement the fragments!**

Local Faulting and Folding

FAULT BRECCIAS ARE CEMENTED FRAGMENTS OF COUNTRY ROCK LOCATED IN A FAULT ZONE.



YES! The fluids are believed to flow upwards along a fault zone from fluid-rich magmas located deeper in the geologic sequence.

These fluids are usually composed of water and/or quartz and/or calcite. The rock fragments in the previous picture have been cemented together with crystallized calcite. Sometimes small amounts of other minerals such as barite, fluorite, chalcopryrite, gold or other minerals may also move in the fluid.

Do you remember how to tell the difference between calcite and quartz?

GOOD! Calcite is much softer and can be scratched with a knife.



Local Faulting and Folding

FAULT BRECCIAS ARE CEMENTED FRAGMENTS OF COUNTRY ROCK LOCATED IN A FAULT ZONE.



SORRY! Check out the slide again.

HINT: Geologist are famous for carrying heavy rocks in their packsacks, not bags of cement!

Although some minerals may be released when rocks are crushed, there is only a small amount of fluid created.

And, if you think rain is the answer, you'd better be careful of all the "cement-causing" minerals the next time you go for a drive outdoors. Concrete car!



Local Faulting and Folding

A geologist is lucky if he/she can put a finger on a spot and call it a fault, or if he/she can see a cliff in which some marker such as an igneous dyke or sedimentary layer has been displaced on one side relative to another.

Usually, a geologist will find that the rocks on one side of a tree-filled or grass-covered valley are different than those on the other side. Sometimes it is possible to see these valleys stretch on for kilometers.

Sometimes rocks are different on adjacent islands,
or an island's rocks are different from rocks found on the mainland.

If neither side is an igneous intrusion, then there may be a buried or underwater fault zone.

FAULT ZONES TEND TO WEATHER RECESSIVELY AND FORM VALLEYS OR STRAITS.



Local Faulting and Folding

Rocks do not always break or fault when put under pressure. Sometimes they are folded instead.



Local Faulting and Folding

LOCAL FAULTING AND FOLDING IS THE RESULT OF
FORCES WHICH PUSH ONE BODY OF ROCK RELATIVE TO ANOTHER.

What is necessary for folding to occur instead of faulting?

- (1) Either there is more than one force, and the forces are acting in different directions; or,
- (2) The single force is "pushing" a group of rocks against something that will not move.

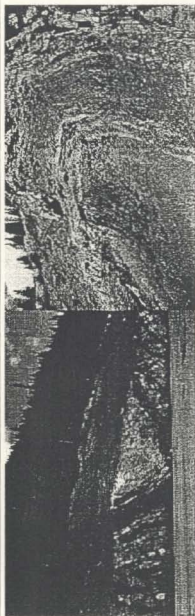
AND

The rocks must be wet or plastic enough to be bent or folded.



Local Faulting and Folding

FOLDS WHICH OPEN UPWARDS ARE CALLED SYNCLINES,
WHILE THOSE WHICH OPEN DOWNWARDS ARE CALLED ANTICLINES.



Local Faulting and Folding

LOCAL FAULTING AND FOLDING IS THE RESULT OF
FORCES WHICH PUSH ONE BODY OF ROCK RELATIVE TO ANOTHER.

Which of the following BEST describes the conditions necessary for folding to occur?

- (A) Dry brittle rocks are forced against others that will not move,
 - (B) Dry brittle rocks are acted on by two forces from opposite sides,
 - (C) Wet plastic rocks are acted on by one force and two geologists, or
 - (D) Wet plastic rocks are acted on by two forces from opposite sides.!
-

Local Faulting and Folding

WET PLASTIC ROCKS CAN BE FOLDED TO OPEN UPWARDS IN SYNCLINES
OR DOWNWARDS IN ANTICLINES.



YES! For folding to occur the rocks must be "foldable" or plastic enough to bend. This is usually the case when they are filled with fluids.

Also, either a single force must "push" the wet rocks against something fixed, like a granite intrusion, or two forces must act on the wet rocks at the same time in different directions.

Do you remember some of the minerals which can be found in these fluids?

GOOD! Calcite and quartz are the two most common minerals.



Local Faulting and Folding

WET PLASTIC ROCKS CAN BE FOLDED TO OPEN UPWARDS IN SYNCLINES
OR DOWNWARDS IN ANTICLINES.



SORRY! Check out the slide again.

HINT: If rocks are dry and brittle they crack into fragments instead of bending. A rock composed of cemented cracked fragments is called a **FAULT BRECCIA**.

Although two geologists can usually put up a good fight, they are not a significant force when it comes to folding.



Regional Structures

The faults and folds that you can find around your backyard can be noted on a geological map.



Regional Structures

WARNING! -- This page scrolls down!

This geological map of part of the North West Territories was compiled (the geologist's term for coloured!) during the summer of 1979.

Notice all the faults - the dark wavy or squiggly lines which separate different rock types. Those lines take the place of the **FAULT ZONES and **FAULT BRECCIA** you've seen in the slides and can see in the field.**

In the middle of the map you can see how the gold-coloured area (representing a certain type of rock) has been displaced or moved to the left a little as you follow it downwards. Check out how the thin brown areas in the lower right part of the mapsheet have been faulted.

Folding is represented on a map by a thin line through the middle of an area with two small arrows on either side. Can you find any?

There are two hidden boxes on the map which can help you identify an example fault and fold.

APPENDIX C

EARTH DAY SCAVENGER HUNT (EDSH)

Selected pages of the Earth Day Example Lesson (EDSH) have been reproduced as Appendix C as a reference for the internship report reader. Unfortunately, these pages contain none of the colour, animation, applets or other computer-based multimedia features which give the guide its value. These features are best experienced through using the guide located in the enclosed CD-ROM disc. One way to start the EDSH guide is to open Windows Explorer, obtain a directory listing of the D drive, open the EDSH folder and double-click on the file entitled "index.htm".

Earth Day Scavenger Hunt



The challenge of this Earth Day Scavenger Hunt is to make it to the end. The hunt consists of 10 multiple choice questions about the Earth and our environment. You can find the information you need to answer each question at various sites on the Internet.

Read each question carefully and good luck.

[On to Question #1](#)

Question #1

Donated by Sara Viberg



One of the Earth's greatest treasures is the variety of plant and animal life which exists on the planet. There is evidence that some species which existed in the Earth's past are extinct today. One of the animals now on the endangered list is the whooping crane.

[Visit here to find out how many remain in the world.](#)

Is it A - 149, B - 1500, C - 25 or D - 320?

[On to Question #2](#)

The Majestic & Endangered Whooping Crane: An Alberta, Canada Perspective

On my quest to learn about Whooping Cranes, I found that they attract passionate interest throughout their migratory route linking the Canadian North to the Texas Gulf. This page and the links below are about the Crane's journey.

The links were done by people living in many states and provinces. They reflect a web of human concern connected through the inspiration of the great, graceful white bird who knows no human boundaries.



Status: U.S. Wildlife officials counted 149 whooping cranes in November 1995, the most since the American government began taking censuses in the 1930s.

In the late 1800s, there were about 1,500 birds in the aspen parkland and prairie regions of Western Canada and the U.S. As human settlement spread westward, the world population dropped to a low of 14-16 in the 1940s.

Conservation efforts since 1938 have resulted in a slow increase. Including those in captivity, and 25 cranes in two other wild populations, there are now 320 whooping cranes in the world.

Habitat: In late April, cranes arrive at their breeding area in Wood Buffalo National Park, which extends into northeast Alberta from the N.W.T. By the end of September, the whoopers leave for the 4,000 km flight south to the Aransas National Wildlife Range in Texas. By gliding on wind currents, they

can stay aloft for 10 hours and cover up to 750 km.

Question #2

Donated by Katie McGaskill



In this century science has produced an large number of chemicals to help man live more comfortably, produce more food and wage more war. The effects of these chemicals on the Earth, its plants and animals, sometimes is not what we expect. Bacchanali produces cartoons describing some of these problems. If you check out the sorting by range of topics and surf the Environmental Science cartoons, you'll find one about Heavy Metal.

No! Not the music. What elemental poison does the cartoon describe?

[Visit here to find out the answer.](#)

Is it A - Lithium, B - Mercury, C - Magnesium or D - Lead?

[On to Question #3](#)

Question #3

Donated by



Michael Jackson is one of the best-selling recording artists of all time. On one of his latest releases - the HIStory album - a song entitled "Earth Song" asks questions about the condition of our planet in a unique and poetic way. Check out the lyrics of "Earth Song" to find the first question he asks of us.

[You can visit here to find out the answer.](#)

Is it A - What about sunrise, B - What have we done to the world, C - I used to dream or D - What about yesterday?

[On to Question #4](#)

Question #4

Donated by Chris

- 18 Earth Day is a day for everyone, adults and kids alike, and its the everyday things and chores we do that can help us save energy. Check out the 5 question Earthquiz and find the answers for the CNN challenge of 1996. "T" stands for True; "F" stands for False. What is the correct answer to the quiz?

[You can visit here to find out the answer.](#)

Is it A - TTCBC, B - FFABC, C - TFCCC, or D - TFCAB?

[On to Question #5](#)



Earth Day for Kids



Make your bed! . . . and do the dishes: Everyday chores can help save energy. Leaving a heated waterbed unmade in the fall or winter can double its energy use by letting the heat dissipate into the air. When doing the dishes, washing them by hand requires 37% less water than the dishwasher.

(source: "30 Simple Things You Can Do to Save Energy," The EarthWorks Group)

EarthQuiz

Relax! This is an open-Web quiz. We'll even point you to the answers.

1. True or False: You can use your mom's food processor and old panty hose to make recycled paper at home.

[Find the answer here](#) or check [all the answers](#)

2. True or False: Taking a bath instead of a shower gets you cleaner.

[Find the answer here](#) or check [all the answers](#)

Question #5

Donated by Dorothea Carter



With the increase in human population there is an increasing need for land for agriculture, manufacturing and other human uses. Natural forests, habitats and parks have become even more important than before. Check out the Encarta On-line environment section on Earth Day to find out how Costa Rica is working Preserving Natural Habitats. That country has designated almost what percentage of its land as national park area?

You can visit here to find out the answer.

Is it A - 5, B - 10, C - 15, or D - 25?

On to Question #6

Question #6

Donated by George Carstens



On Earth Day it is important to consider some of the serious damage we, as a people, have done to our planet. One of the most serious problems we may have in the near future is the absence of an Ozone Layer to protect us from lethal solar radiation. In what year do scientists believe that the hole in the Ozone Layer over Antarctica first appeared?

[You can visit here to find out the answer.](#)

Is it A - 1976, B - 1980, C - 1984, or D - 1988?

[On to Question #7](#)

Parent document is top of "*Ozone Depletion FAQ Part III: The Antarctic Ozone Hole*"

Previous document is "3.) How big is the hole, and is it getting bigger?"

Next document is "5.) How far back do antarctic ozone measurements go?"

4.) When did the hole first appear?

It was first observed by ground-based measurements from Halley Bay on the Antarctic coast, during the years 1980-84. [Farman, Gardiner and Shanklin.] (At about the same time, an ozone decline was seen at the Japanese antarctic station of Syowa; this was less dramatic than those seen at Halley since Syowa is about 1000 Km further north, and did not receive as much attention.) It has since been confirmed by satellite measurements as well as ground-based measurements elsewhere on the continent, on islands in the Antarctic ocean, and at Ushuaia, at the tip of Patagonia. With hindsight, one can see the hole beginning to appear in the data around 1976, but it grew much more rapidly in the 1980's. [Stolarski et al. 1992]

Parent document is top of "*Ozone Depletion FAQ Part III: The Antarctic Ozone Hole*"

Previous document is "3.) How big is the hole, and is it getting bigger?"

Next document is "5.) How far back do antarctic ozone measurements go?"

Question #7

Donated by Kirstin



Sometimes people forget that we share this planet with millions of plant species as well as animal species. Earth Day is a good day to remember that here in Georgia there are many endangered species. Check out the information to find out how many species are at risk of extinction right here in our own backyards.

[You can visit here to find out the answer.](#)

Is it A - 26, B - 10, C - 49, or D - 88?

[On to Question #8](#)

Question #8

Donated by Neena



Here are some Strange Facts and Tips to help you understand Earth Day.

FACT#1: American swimming pools contain enough water to cover the city of San Francisco with a layer of water about seven feet deep.

FACT#2: Keeping your car tuned up is an easy way to help the environment. A well-tuned car uses up to 9% less gasoline than a poorly tuned car.

FACT #3 / QUESTION: In one year, the USA generates enough hazardous waste to fill the New Orleans Superdome how many times?. HINT: Look for Clean Air on Earth Day 1996.

You can visit here to find the answer.

Is it A - 10, B - 50, C - 100, or D - 1500?

On to Question #9

Question #9

Donated by Stuart



One of the biggest problems we have today is the build up of Greenhouse Gases in our atmosphere. These gases are dangerous because they (1) trap the sunlight which falls on the Earth heating up the planet, and (2) change the living conditions for all the plant and animal life here. On alien worlds, these gases may create different problems. Although it's Earth Day check out the Toxic Waste archive to find the gas the aliens are worried about.

[You can visit here to find the answer.](#)

Is it A - carbon dioxide, B - oxygen, C - ammonia, or D - oxygen?

[On to Question #10](#)

Question #10

Donated by Michelle Obrien



The Earth is believed to be billions of years old. Dinosaurs became extinct tens of millions of years ago. The pyramids of Egypt were built mere centuries ago. While it was only 500 years ago that Columbus reached the New World. How about 25 years ago? Do you know what happen on Earth Day 25 years ago? If not you might want to check it out.

[You can visit here to find the answer.](#)

Is it A - the largest organized demonstration in America's history,
B - present George Bush talked about the environment,
C - Earth Day was moved to December 25th,
or D - the Ozone Layer was filled in with Jello?

[On to the New Beginning](#)

Earth Day On-line Contest



Thank you for participating in our Earth Day Scavanger Hunt. However, don't stop there. Why not check out another [On-line Earth Day Hunt](#).

There are also [many links](#) we've collected about the Earth and our environment which have great information, pictures and activities for your enjoyment.

Or you can [return to the beginning](#) and enjoy our Earth Day Scavanger Hunt again.

Earth Day Bookmarks

These bookmarks have been gathered by Mr. Furey's the Sixth Grade Computer Class at the Atlanta International School. Please enjoy them!

["Wild Earth Animal Essentials" - How to Smell like a Wolf!](#)

[60 Ideas for Earth Day](#)

[77 Theses on the Care of the Earth](#)

[Animal Bytes & Facts](#)

[Animal Information Database](#)

[Animal Mania - Capturing and Selling Wild Animals](#)

[Animal Rights Essays](#)

[Animal Rights Picture Gallery](#)

[Animal Rights Resource Site](#)

[Animals' Sounds Quiz](#)

[ASTRONOMY Magazine](#)

[Biodiversity in the USA](#)

[Boy Scouts' CITIZENSHIP IN THE ENVIRONMENT Badge](#)

[Classroom Ideas](#)

[Clinton Earth Day 1996 Remarks](#)

[Create an Adventure](#)

[Declaration of Planetary Rights](#)

[DISCOVERY Online](#)

[Drinking Water Quality and Companies](#)

[Earth Care Recycled Plastic Products](#)

APPENDIX D

MULTIMEDIA TEACHING STRATEGIES WORKSHOP OUTLINE

Appendix D is a copy of the outline of a multimedia teaching strategies workshop presented at Bishops College during the first week of July, 1996. Different aspects of this workshop were presented by Mr. Allister Dyke, Dr. Ed Brown, members of "the multimedia pit" and myself.

Multimedia Teaching Strategies
Research Training Session
July 2-5, 1996 Bishops College

173

Personal Information

Name: _____

School: _____

Job Description: _____

Technology Familiarization Summary:

The following questions relate to your personal workplace computer technology usage.

1. Please describe your role as related to technology usage in your school.
2. List the computer applications that you use on a regular basis (ie: WWW, Word Processor, Drill and Practice)
3. Does your school create applications using existing IT products (ie Powerpoint show, WWW pages).
4. What role do you play in your school technology integration efforts. (ie. Network Admin, Webmaster, Trainer, user etc.) Write a short description.
5. Indicate with which of the following you are familiar(experience in using).

Microsoft Office
Wordperfect
World Wide Web page making
Windows NT server
Windows 95
WWW browsers
Paint Shop Pro
Corel
WS FTP
Other _____
Other _____

Agenda
Multimedia Training Session
July 2 - 5, 1996 - Bishops College

174

Day one

- 9:00 Introductions
- 9:15 Presentation on the Project
 - Description
 - Sample Project (Walking Tour)
 - Guidebook
 - What do we need from this session ?
- 10:15 Nutrition Break
- 10:45 Skills Session number one
- 12:30 Lunch Break
- 1:30 Skills Session Number one (cont)
- 2:30 Skills Session Number two
- 3:45 Concluding discussion and feedback

Day two

- 9:00 Introduction and discussion of agenda
- 9:15 Skills session Number two (cont)
- 10:45 Field Trip Preparation
 - Equipment Familiarization
 - Preparation of Story board
 - Grouping
- 12:00 Lunch Break
- 1:00 Meet at Bowring Park Bungalow
- 3:45 Concluding discussion and Feedback

Day three

175

- 9:00 Introduction and discussion of agenda
- 9:15 Skills session number three
- 12:30 Lunch
- 1:30 Skills session number three (cont)
- 3:45 Concluding discussion and feedback

Day four

- 9:00 Introduction and discussion of agenda
- 9:15 Presentation of the Bowring Park Tour
- 10:45 Skills Session number four
- 12:30 Lunch
- 1:30 Skills session number four (cont)
- 3:00 Concluding Discussion

Have a Nice Day and Thank You

Skills Session Number One:

- **Inside the computer**
 - physical layout
 - interface cards
 - adding features
 - etc
- **Peripherals (scanner, camera etc.)**
- **Basic computer skills**
- **File management**
 - storing, moving, deleting
 - FTP
 - Zipping and Unzipping
- **Installing software with Windows 95**

Additions:

This section will include any items that you would like to see included in this session. Please record any items which you feel have been covered but are not listed in the agenda.

Skills Session Number Two:

- Introduction to WWW Multimedia curriculum units
 - Field trip
 - Walking Tour
 - Geology Unit
 - Discussion of components
- Basic HTML
 - Discussion of standards etc.
 - sample page
- WWW page building
 - Personal Homepage using HTML ed
 - Look ahead with new WWW editors

Additions:

This section will include any items that you would like to see included in this session. Please record any items which you feel have been covered but are not listed in the agenda.

Skills session Number Three:

- Introduction to graphics for the WWW
 - file types
 - discussion of file size
- Capturing graphics - various techniques
 - scanning
 - video capture
 - use of digital camera
- Manipulating and display
 - Paint Shop Pro
 - conversion
 - advanced graphic features (optional)
- Use of image mapping

Additions:

This section will include any items that you would like to see included in this session. Please record any items which you feel have been covered but are not listed in the agenda.

Skills session Number Four:

This session has a little different focus, instead of focusing on specific skills we will be looking at some new feature of Multimedia/ Internet. The topics will be presented and you will be asked to comment on them as you feel they will impact on your work in Multimedia development. Participants may want to revisit some previous work with a thought to possible use of the new features.

- Multimedia Authoring - non WWW
 - Authorware demo
 - Toolbook
- Advanced WWW authoring
 - JAVA - Intro
 - JAVA applets, imagemaps, textboxes etc.
 - Animated GIF
- Video and audio streaming
 - VIVO
 - Streamworks
 - Real Audio
- WEB Servers

Additions:

This section will include any items that you would like to see included in this session. Please record any items which you feel have been covered but are not listed in the agenda.

**Multimedia Research Project
Session Evaluation Sheet**

180

The purpose of this evaluation form is to provide feedback to the researchers on the specific training sessions. Space has been provided to comment on the appropriateness of each item, method and effectiveness of presentation as well as any suggestions you feel will be helpful. When commenting be sure to include session number and item name. *Be sure to keep all forms together....*

Item : _____

Appropriateness: _____

**Method of
Presentation:** _____

Suggestions: _____

Item: _____

Appropriateness: _____

**Method of
Presentation:** _____

Suggestions: _____

APPENDIX E

SAMPLE E-MAIL COMMUNICATION DURING INTERNSHIP

Appendix E is a copy of sample E-mail correspondence between Dr. Jean Brown, Mr. Allister Dyke, Dr. Ed Brown, members of "the multimedia pit" and myself. E-mail conversations such as these were kept as an electronic journal record of progress during the internship.

APPENDIX E: SAMPLE EMAIL COMMUNICATIONS DURING INTERNSHIP
(Email have been edited to exclude whitespace.)

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:45:07 1997
Date: Mon, 26 Feb 1996 12:58:15 -0330 (NST)
From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>
To: Multimedia <adyke@calvin.stemnet.nf.ca>, brown@cs.mun.ca, dbutler@calvin.stemnet.nf.ca,
fredb@cs.mun.ca, jeanbrown@kean.ucs.mun.ca
Subject: PROPOSAL ATTACHED

Hi Everyone! A lot has happened un the past two weeks, since the last journal entry, and I'm planning on summarizing the events later on today. There are two reasons for the lack of mail recently. First, I joined 8 listserves so as to make sure I could teach a class specific to those newsgroups. As a result I'm swamped with mail and have been afraid to turn on the computer. But I'll fix that later today.

Second, the proposal. Well, here it is. Jean has gone through it, and it passed :-). However, she recommends that I should be able to clearly define the research question so as someone not familiar with the work could quickly understand the problem. In the works. Anyway, looking for feedback.

FRED / ED: Need Brian's eMail address. I've heard that he has a laptop computer but I haven't seen him in the past few days.

ALLISTER: Passing on a message from Jean. She says that anytime between 9 and 11 tomorrow is OK, but wonders if 10 wouldn't be more convenient for you. Doug

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:46:31 1997
Date: Thu, 29 Feb 1996 15:06:59 -0330 (NST)
From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>
To: Multimedia <adyke@calvin.stemnet.nf.ca>, bkerr@morgan.mun.ucs.ca, brown@cs.mun.ca,
dbutler@calvin.stemnet.nf.ca, fredb@cs.mun.ca, jeanbrown@kean.ucs.mun.ca
Subject: Thesis

Ed / Allister: Mailed my thesis proposal to you. Have you had a chance to look at it yet?
ALL: Planning a field trip to Mistaken Point to shoot video and collect photos of preCambrian fossils for my project. Will be gone this weekend. Will be dropping by MUN CS to pick up the video camera. Already borrowed a 35mm from MUN Ed. Couldn't find a laptop computer so I will not be needing the digital camera.

Brian: Welcome to the Mail! Doug

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:53:25 1997
Date: Thu, 2 May 1996 14:15:59 -0230 (NDT)
From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>
To: Multimedia <adyke@calvin.stemnet.nf.ca>, bkerr@morgan.mun.ucs.ca, brown@cs.mun.ca,
dbutler@calvin.stemnet.nf.ca, fredb@cs.mun.ca, jeanbrown@kean.ucs.mun.ca
Subject: Today's meeting!

Hi Everyone! Sorry, but I have to miss today's meeting. I've just been talking to Nancy (StemNET) and realized that tomorrow is the deadline for Hook-Line-and-Net '96. Have to write proposals for two Workshops - multimedia / java and the validation project.

PS. Spent one day taking slides for the geology curriculum unit, which is developing nicely. Talked to Monty briefly about going through it within the next two weeks and using it as a review for his class.

PS. Trying to get in touch with Bruce Lane concerning the animation clips he has.

PS. Talked to Beth Power (StemNET) with respect to starting up the School Rings part of my proposal. Will be submitting a project proposal to her this afternoon. Ed. She mentioned a meeting with you but was uncertain of the time or place. Doug

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:53:57 1997

Date: Mon, 6 May 1996 12:00:12 -0230 (NDT)

From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>

To: Multimedia <adyke@calvin.stemnet.nf.ca>, bkerr@morgan.mun.ucs.ca, brown@cs.mun.ca,

dbutler@calvin.stemnet.nf.ca, fredb@cs.mun.ca, jeanbrown@kean.ucs.mun.ca

Subject: Geology Section

Hi Everyone! I'm working through the geology portion of the project and expect to have presented and cleared it through Monty by next Friday, May 17. He and I hope to shoot some video this weekend. Writing the text for the homepages and the Internet connections should be complete by Thursday. Meeting with Bruce at 5:00 re: animation. Doug

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:54:50 1997

Date: Tue, 28 May 1996 12:58:22 -0230 (NDT)

From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>

To: Allister Dyke <adyke@calvin.stemnet.nf.ca>

Subject: Tentative Outline for Skills Section.

Hi Allister! Between the Java classes, working on the project, Int. to Ed. Admin., etc. I haven't had much time since Friday. Here's a tentative list of some of the skills I think we should be considering as essential. This is a rough outline for the skills section I'm writing. Please feel free to add suggestions. Doug

the web:	web browsers for content and links
	grab-a-site software
	how to download, unzip and install software
	uploading and synchronizing files in UNIX
	design for streaming vs downloading
	new Netscape 3 features and plugins
	16 / 32-bit system requirements / limitations
multimedia:	HTML page design
	background design considerations
	paint techniques preceding animation
	how to animate gifs
	shooting photos and video
	scanning prints / slides, editing
	video capture and editing
	CD audio and voice capture and editing

JAVA programming and editing
 file format conversions: mpg/mov, tiff/jpg/gif, wav/au
 reduction techniques for file size
 the entertainment factor
 educational: multiple / multimedia approach to learning
 static (watcher) vs active (participant) design
 sequenced vs random-access page flow
 conditional response advance
 monitoring student choice / response
 final testing of content

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:55:15 1997
 Date: Thu, 30 May 1996 14:54:19 -0230 (NDT)
 From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>
 To: Allister Dyke <adyke@calvin.stemnet.nf.ca>
 Subject: Java and Friday

Hi Allister! Did you receive the outline for the skills section I sent? Interested in your comments and suggestions. Also, this has been a M-F 9-4 Java week. Tomorrow is the last day. And have arranged with Ed for someone to get the videocapture board working. If he hasn't done this by next week, we'll have to arrange to do my video there. Havin' fun and drinkin' java, Doug

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:55:53 1997
 Date: Fri, 31 May 1996 11:09:03 -0230 (NDT)
 From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>
 To: Allister Dyke <adyke@calvin.stemnet.nf.ca>
 Subject: My Methods Section

Hi Allister! There appears to be some confusion about the project. My list, which you forwarded to Jason, was the outline for the "how to" and commentary component that was the second part of my project. My understanding is that this component is 50% of my project. Trying to understand the distinction between what I'm planning on doing and what you want Jason to do with my outline. For example, I'm planning on describing the steps I went through in capturing and editing audio - my process. All the items listed are either skills I've had to learn or design elements I've had to consider. Please advise on the distinction as you see it. Thanks, Doug.

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:56:24 1997
 Date: Mon, 3 Jun 1996 12:31:49 -0230 (NDT)
 From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>
 To: Allister Dyke <adyke@calvin.stemnet.nf.ca>
 Subject: Re: Tentative Outline for Skills Section.

On Sat, 1 Jun 1996, Allister Dyke wrote: > Hi Doug. I have spent a little more time looking through the list of skills.... I really like the approach you have taken...can we get together this week...sometime after Tuesday would be good with me...

Wednesday sounds good. How about Wednesday afternoon around 1:00. However, your schedule is more structured than mine. I'm flexible. Let me know. Doug

PS. Had a talk with Ed on Friday concerning skills. Concluded that my list was a personal list and that there are many skills necessary that I haven't touched and which Jason could write-up. Maybe the four of us could get together sometime after our meeting.

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:58:36 1997
 Date: Fri, 14 Jun 1996 05:51:58 -0230 (NDT)
 From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>
 To: Allister Dyke <adyke@calvin.stemnet.nf.ca>
 Subject: !!! Friday Morning Fog !!!

Hi Allister! It's 5:30 am Friday and you're (probably) laid off comfortably in bed. I'm tucked away on the 5th floor of the Education Building, where I've been since 7:00 pm Thursday. Think it's time to return to the life of a teacher so I can relax in those 10-hour days.

I've been weaving together a story about the design elements of the Plate Tectonic Unit, explaining the control of flow, motivation, questioning procedures, etc. a la Alessi and Trollip (1991). The text is out of date with respect to the available technology, but the best source I've found lending CAI design and educational thinking. However, in 1991, multimedia was young, the Internet was text-based, and ... I'm writing a 1997 edition. Also, it was written from a Toolbook-type authoring perspective and I'm focusing on HTML pages.

Anyway, I don't feel that I have tied everything together enough to present to you today. I realize that you're busy next week, but that's when everything should fall in place. Cancelling the meeting for this morning (going to sleep); however, I'll drop by in the afternoon. Broadcasting through the early morning fog, Doug

PS. I received an eMail from Nancy stating that Hook, Line and Net has been cancelled. Just thought I'd let you know.

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:59:12 1997
 Date: Tue, 25 Jun 1996 12:53:16 -0230 (NDT)
 From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>
 To: Allister Dyke <adyke@calvin.stemnet.nf.ca>
 Subject: Friday!

Hi Allister! ED just informed me of the meeting at 10:00 Friday. I'll be there. If you want to get together sooner than that, let me know. I've just finished term-paper time and am now working on the project full time. Should have a geology project and some skills to show you for Friday. Realize that things are happening quick, but I'm there. Jason tells me that you've decided on a tentative outline. I seem to be in there anywhere! Am planning on at least two sessions - one presenting my project and one describing educational pedagogy skills. Doug

From dfurey@calvin.stemnet.nf.ca Sat Jul 5 10:59:44 1997
 Date: Wed, 26 Jun 1996 22:42:50 -0230 (NDT)
 From: "Douglas J. Furey" <dfurey@calvin.stemnet.nf.ca>
 To: Allister Dyke <adyke@calvin.stemnet.nf.ca>
 Subject: Tentative OUTLINE for next week.

Hi Allister! I'm gone tomorrow to Gander for a job interview. When I arrived home this evening there was a message on my answering machine asking me to an interview on Friday morning in Clarendville. I'm going to call the board and try to schedule the interview for as early as

possible so that I can be back at 11:30. Will keep you advised. I've been having thoughts about next week. Am throwing out a suggested outline to start the ball rolling.

Tuesday (AM) - Intro / Basics

Downloading, unzipping, installing software
 32-bit environment and some new Netscape features
 to be considered when designing pages (eg. Streamworks)
 basics of HTML new versions
 file formats used on the WWW for audio, video, etc.
 Intro to Basic UNIX (navigating, not programming)
 - may be necessary for some JAVA
 Show everyone how to operate the Video Cam and Digital Cam
 to be ready for the afternoon

Tuesday (PM) - Video Tour of Bowring Park

We could actually get enough cameras to split up into
 four or five groups and surprise each other with the
 theme / location - hit the CAVE for the cameras

Wednesday (AM) - Capturing

Capturing and editing the shot video and stills
 Concerns about file size - Jason and Vivo
 Capturing Audio tracks from CDs
 Dubbing in audio tracks on top
 Slide and Print scanning

Wednesday (PM) - Java & Animation

Animated GIFS
 Getting applets to run on the Internet
 JAVA imagemaps, textboxes, text, audio, etc.
 Writing a simple program ?

Thursday

HTML Page Design Considerations (AM - 1 hr)
 Individual Work on Projects (AM)
 Pedagogical Considerations (PM - 1hr): The flow / structure of a unit; Activating
 the student; Monitoring and Testing

Friday

Presentation of the Geology Curriculum Unit (AM - 1 hr)
 Individual Work on Projects (AM)
 Individual Presentation of Projects (PM)
 Barbeque!

Hey! I know I've left things out! I understand that one of the purposes for Friday is a division of labour. I'm willing to volunteer for any of these topics. Suggest I take a lead in Wednesday's JAVA, Thursday's pedagogy and Friday's Geology. I understand from Jason that you are working on an outline as well. Hope this helps. Doug

APPENDIX F

COMPACT DISC VERSION

Appendix F is the compact disc version of this internship report. This version includes a Word Perfect 6.1 version of the introduction, each chapter, and the reference list. It also includes the multimedia versions of the Internet Multimedia Curriculum Design Guide, the Plate Tectonics Curriculum Unit and the Earth Day Scavenger Hunt. The guide, unit and hunt have been designed as HTML pages and are best viewed in a browser such as Netscape or Internet Explorer. To start any of these, open Windows Explorer, obtain a directory listing of the D drive, open the appropriate folder and double-click on the file entitled "index.htm". The browser should start automatically if your system has been setup correctly.



