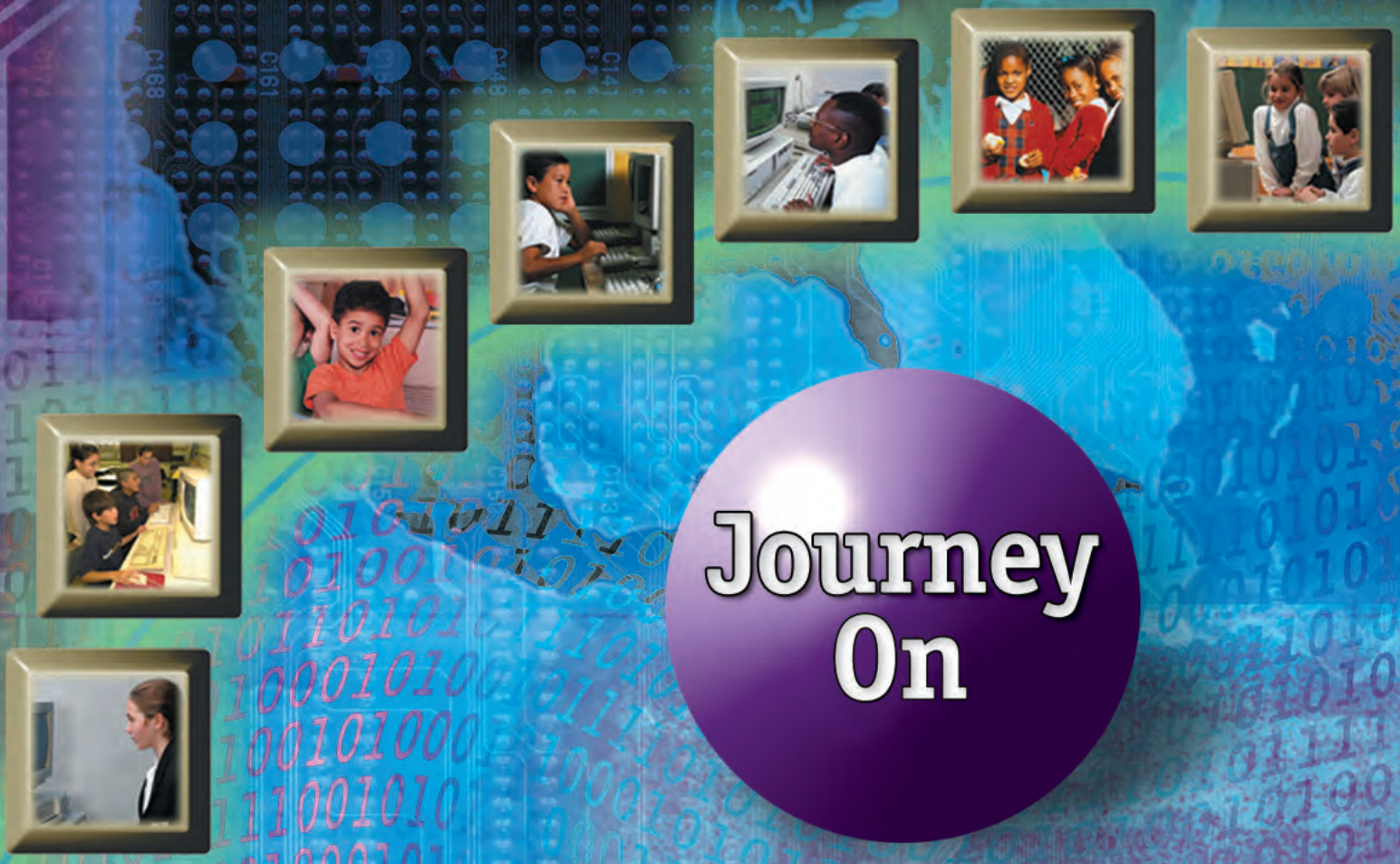
Prince Edward Island
CANADA

Department of Education



Journey On

Working Toward Communication and Information Technology Literacy

Science – Grades 10 to 12

September 2006 Draft

Preface

The document, A Journey (1997), first introduced the general concept of integrating technology into the curriculum at the elementary level in Prince Edward Island. As stated in this earlier document, using information technology in the schools was considered new and largely uncharted territory. We continue a journey into an interesting world of communication and information tools for teaching and learning. Journey On Grades 1-3 (1999) provided a framework and lesson plans for teachers at the primary level to integrate communication and information technology in their classrooms. Journey On Grades 4-6 (September 2000) and the document, Journey On Grades 7-9 (September 2000), continued with the same framework and specific grade level lesson plans intended for teachers in elementary and intermediate schools. Journey On Grade Level 10-12 guides for the senior high level integrated technology into core subject areas; Math (February 2000), English (May 2000), Social Studies (August 2001), Physics (September 2002), Biology (October 2002) and Chemistry (February 2002).

Journey On (2006), provides grade specific curriculum outcomes that have been assigned to core curriculum subjects. This Science document contains specific technology outcomes, instructional considerations, teaching suggestions - activities and assessment strategies, lesson plans, and links to other curriculum areas.

These documents will serve as a guide for teachers. Lesson plans suggest specific exercises for classroom use and will serve as a starting point from which teachers may develop and enhance their own ideas and competencies in the area of communication and information technology (CIT).

Acknowledgements

The Department of Education, Technology In Learning, gratefully acknowledges the suggestions, lesson plans, and other contributions made by Prince Edward Island students and educators. The authors would also like to extend their appreciation to those individuals who provided feedback and editorial comments during the development of this document.

The communication and information technology committees were instrumental in providing input for the curriculum outcomes grades 1-12 framework on which Journey On (2006) is based. Past and present members of the committees are listed below:

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Contents

Vision

Technology education for Atlantic Canada fosters the development of all learners as technologically literate and capable citizens who can develop, implement, and communicate practical, innovative, and responsible technological solutions to problems.

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Introduction

Purpose of Document

Journey On is a practical working guide which will provide educators and administrators at all levels, including schools, school boards/districts, and provincial departments, with a reference point for integrating communication and information technologies (CIT) into the Prince Edward Island school curriculum.

Journey On will be the basis for future decisions pertaining to human and physical CIT resources. These decisions will focus on personnel, professional development, instructional techniques, course development, student and teacher access to technology, and hardware and software purchases.

It is recognized that many disciplines have their own specialized technologies and technological processes. Students will have the opportunity to develop skills required to use these specialized technologies within the context of courses such as Computer Science, Science, Career Exploration, Visual Communication, Industrial Arts, and Home Economics. CIT differs from other technologies because of its vast and far reaching applications in all disciplines.

The purpose of *Journey On* is to focus on how CIT can be used from grade 1-12 and across all areas of the curriculum as part of a more global strategy that will contribute to the development of technologically competent and literate individuals graduating from our school system.

Journey On:

- provides strategies and concrete suggestions for effective integration of communication and information technologies into the Prince Edward Island curriculum in a way that enhances learning
- identifies the communication and information technologies that we wish our students to use
- identifies the knowledge and skills that students need to develop to be considered technologically competent in communication and information technologies

Terminology

Technology

The broad definition of technology includes the tools and processes we use to alter our surroundings, perform a task, discover more about ourselves, and communicate. For the purpose of this document *technology* refers to the tools used to access, gather, process, and share information. These communication and information technologies (CIT) pertain to computers and their peripherals such as scanners, printers, digital cameras, projection devices, and videoconferencing equipment.

Technological Competence

The Atlantic Provinces Educational Foundation (APEF) defines technological competence as "the ability to use a variety of technologies, demonstrate an understanding of technological applications and apply appropriate technologies for solving problems independently." Individuals competent in information and communication technologies have specialized knowledge and skills that enable them to use technology to access, gather, process, and share information.

Technological Literacy

Technological literacy encompasses technological competence but refers to a higher level of understanding of technology. Individuals literate in the area of CIT think critically about information gained through the use of technology, the application of specific technologies, and the impact of technology on individuals and society when formulating decisions, opinions and courses of action. These individuals apply problem solving strategies and creative thinking skills to independently learn how to use new technologies, or circumvent problems associated with older technologies. CIT literate individuals demonstrate confidence and a positive attitude as they adapt and use technologies for a beneficial purpose.

Philosophy

The use of technology in our educational system is based upon a number of underlying beliefs:

- as educators in Prince Edward Island we are committed to provide for the development of children so that each may take a meaningful place in society
- literacy extends beyond the traditional concept of the ability to read and write print materials to encompass media and information literacy
- technological competence is a requirement for literacy and lifelong learning in today's world
- students today require knowledge, skills and attitudes for dealing with the rapid pace of change and growth of our knowledge base
- technology, when used appropriately, enhances student-centred learning and the teacher's role as a facilitator

Technology Integration

Integrating communication and information technologies into the curriculum is a preferred strategy for developing technologically literate learners. Integration occurs when the technology is used as a tool to achieve existing curricular learning outcomes within the context of a theme or subject. Technology knowledge and skills are not acquired separately in an integrated approach but in the context of learning activities intended to address various outcomes across the curriculum. Integration means that the use of technology as a teaching tool should not be limited to specialist teachers but applies to teachers in all curricular areas.

Advantages of Technology Integration

Integration of technology into the curriculum

- ensures that curriculum is the principle focus, rather than technology
- promotes the development of creative thinking, critical thinking, research, communication, and problem solving skills
- provides access to rich resources and learning experiences that can extend far beyond those offered in traditional classrooms
- motivates students to complete learning tasks and become more readily engaged in their own learning
- supports current research which suggests that people learn in a holistic fashion rather than in a compartmentalized manner
- supports contemporary approaches to education such as cooperative learning, constructivism, resource-based learning and individualized learning
- provides teachers with an additional means to address multiple learning styles
- provides students with the opportunity throughout their school career to expand and reinforce their repertoire of technology skills
- enables the students to acquire a better understanding of how to use technology in meaningful ways
- ensures that all students have the opportunity to develop technological competencies
- prepares students to select appropriate technologies to complete tasks
- provides teachers with an opportunity to model lifelong learning as students witness teachers learning and using new skills for a purpose

ABCs of curriculum

An Outcome-based Curriculum

An outcome-based curriculum is a student-centred design which focuses on expectations of the student as a result of learning. It ensures that each student is provided with the time and assistance to meet his/her potential.

> A learning outcome is the result of learning for the student, something that the student *will know, be able to do,* or *be like.*

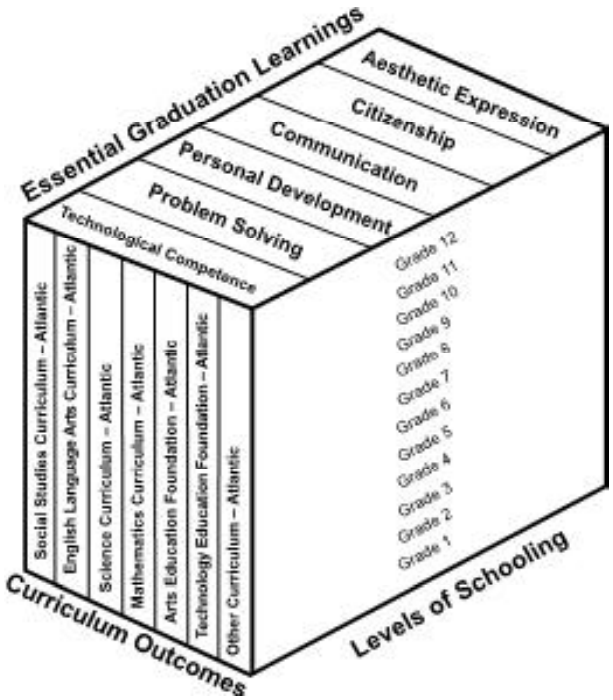
Essential Graduation Learnings (EGLs)

"The essential graduation learnings are statements that describe the knowledge, skills, and attitudes expected of all students who graduate from high school." (APEF/CAMET) These statements are the framework upon which curriculum for all subject areas is based. The six Essential Graduation Learnings include:

- Aesthetic Expression
- Citizenship
- Communication
- Personal Development
- Problem Solving
- Technological Competence

General and Specific Curriculum Outcomes

General curriculum outcomes are statements that describe what students are expected to know in a curriculum area upon graduation. Specific outcomes are statements that identify what students should know and be able to do at a particular grade level. These are used to guide the teacher in planning day to day activities. Students demonstrate the essential graduation learnings through accomplishing the outcomes.



Other Features of the Curricula

In addition to the six essential graduation learnings, there are a number of underlying concepts and strategies which are interwoven into the 1-12 curricula of Prince Edward Island, and which influence methods of delivery and instruction.

Cooperative Learning and Group Work

Small and large group work provide students with the opportunity to develop language (communication skills) and social skills.

Creative Thinking

"Creative thinking deals with combining elements of reality in novel ways to formulate new perceptions, enriched concepts and new understandings" (Nature of Thinking)

Critical Thinking

Critical thinking involves the analysis of statements or arguments and an evaluation of their worth or validity. Critical thinking skills include identifying and validating sources; determining what is being said, relevancy, and point of view or perspective; detecting bias; recognizing persuasive techniques; and drawing logical, well-supported conclusions.

Diversity/Equity Education

Diversity education encourages the understanding of diversity within our society and promotes a commitment to equity by fostering an awareness and critical analysis of individual and systemic discrimination.

Resource-based learning

Resource-based learning is an educational approach that actively engages the students in carefully structured learning activities that use a wide range of resources, and emphasizes skills and strategies needed to achieve information literacy.

Learning Styles

The Theory of Multiple Intelligences suggests that all people learn differently, with eight identfied intelligences. It is essential that educators make students aware of their learning styles and teach using a variety of methods to provide students the opportunity to learn in a number of ways.

Essential Grad

Aesthetic Expression **Citizenship**
Personal Development

Language Arts

Speaking and Listening

Students will be expected to
- speak and listen to explore, extend, clarify, and reflect on their thoughts, ideas, feelings, and experiences
- communicate information and ideas effectively and clearly, and respond personally and critically
- interact with sensitivity and respect, considering the situation, audience, and purpose

Reading and Viewing

Students will be expected to
- select, read, and view with understanding a range of literature, information, media, and visual texts
- interpret, select, and combine information using a variety of strategies, resources, and technologies
- respond personally to a range of texts
- respond critically to a range of texts, applying their understanding of language, form, and genre

Writing and Other Ways of Representing

Students will be expected to
- use writing and other forms of representation to explore, clarify, and reflect on their thoughts, feelings, experiences and learnings; and use their imaginations
- create texts collaboratively and independently, using a variety of forms for a range of audiences and purposes
- use a range of strategies to develop effective writing and media products and to enhance their clarity, precision and effectiveness

General Curri

Mathematics

Number Concepts/Number and Relationship Operations
- Students will demonstrate number sense and apply number theory concepts
- Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations

Patterns and Relationships
- Students will explore, recognize, represent and apply patterns and relationships, both informally and formally

Shape and Space
- Students will demonstrate an understanding of and apply concepts and skills associated with measurement
- Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships

Data Management and Probability
- Students will solve problems involving the collection, display and analysis of data
- Students will represent and solve problems involving uncertainty

Ot

Health, Music, Physical Education and Visual Arts curriculum curriculum outcomes and specific curriculum outcomes.

uation Learnings

Technological Competence

Communication ***Problem Solving***

culum Outcomes

Science

Science, technology, society, and the environment (STSE)

- Students will develop an understanding of the nature of science and technology, the relationships between science and technology, and the social and environmental contexts of science and technology

Skills

- Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions

Knowledge

- Students will construct knowledge and understanding of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge

Attitudes

- Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment

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guides exist on Prince Edward Island. These guides contain general

Social Studies

Citizenship, Power, and Governance

- Students will be expected to demonstrate an understanding of the rights and responsibilities of citizenship; and the origins, functions, and sources of power, authority, and governance

Culture and Diversity

- Students will be expected to demonstrate an understanding of culture, diversity, and world view, recognizing the similarities and differences reflected in various personal, cultural, racial, and ethnic perspectives

Individuals, Societies, and Economic Decisions

- Students will be expected to demonstrate the ability to make responsible economic decisions as individuals and as members of society

Interdependence

- Students will be expected to demonstrate an understanding of the interdependent relationship among individuals, societies, and the environment - locally, nationally, and globally, and the implications for a sustainable future

People, Place, and Environment

- Students will be expected to demonstrate an understanding of the interactions among people, places, and the environment

Time, Continuity, and Change

- Students will be expected to demonstrate an understanding of the past and how it affects the present and the future

Effective Use of Technology with

Language Arts

The Foundation for the Atlantic Canada English Language Arts Curriculum (1996) identifies technological advances in our society as a contributing factor to the revision of the concept of literacy. Literacy now encompasses print literacy, visual literacy, media literacy, and other literacies required to use technology in our culture. This APEF foundation guide suggests that students use a range of information retrieval, and information processing technologies to meet their own information needs. Specific examples of student experiences should include

- using a word processor to develop a piece of writing
- constructing simple databases and spreadsheets to organize information
- exploring the applications of interactive CD-ROM software
- using graphic communication software
- producing a variety of desk top publishing texts
- using multimedia
- using e-mail
- using listservs and web browsers
- using appropriate technologies to organize and create complex information with multiple textual and graphic sources
- distinguishing sources which are central, reliable and relevant among the vast number of choices offered by technologies

Adapted from APEF Foundation Guide for English Language Arts Curriculum (1996) page 40

Mathematics

The Foundation for the Atlantic Canada Mathematics Curriculum guide (1996) supports the recommendations of National Council of Teachers of Mathematics (NCTM) curriculum standards to use technology i) to enhance the teaching and learning of mathematics and ii) to relate school mathematics to the world in which students live through developing and interpreting mathematical models. APEF suggests that technology has altered the nature of what mathematics is important to learn and has made possible the development of new problems and innovative ways of investigating these problems. Specifically, it is recommended that technology should be used to

- explore situations with complicated numbers which previously would have been beyond their capabilities
- quickly and easily explore individual or groups of related computations or functions
- create and explore numeric and geometric situations for the purpose of developing conjectures
- perform simulations of situations which would otherwise be impossible to examine
- easily link different representations of the same information
- model situations mathematically
- observe the effects of simple changes in parameters or coefficients
- analyze, organize, and display data

Adapted from APEF Foundation Guide for Mathematics Curriculum (1996) page 39

in the Core Curriculum Areas

Science

The Foundation for the Atlantic Canada Science Curriculum guide (1998) states that technology can be used to facilitate the learning of science and recommends that technology should have a major role in the teaching and learning of science. APEF proposes the following guidelines for the implementation of technologies in the teaching and learning of science

- 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
- simulation software should provide opportunities to explore concepts and models that are not readily accessible in the laboratory (e.g., those that require hazardous materials, unavailable equipment, or more time than is possible in real-time classroom.)
- analog-digital interface technology should be used to permit students to collect and analyse data as scientists do, and perform observations over long periods of time, enabling experiments that otherwise would be impractical
- databases and spreadsheets should be used to facilitate the analysis of data by organizing and visually displaying information
- networking among students and teachers should be encouraged to permit students to emulate the way scientists work and to reduce teacher isolation
- using tools such as the World Wide Web should be encouraged as it provides instant access to an incredible wealth of information on any imaginable topic

Adapted from APEF Foundation Guide for Science Curriculum (1998) page 44

Social Studies

The Foundation for the Atlantic Canada Social Studies (1998) recommends that technology have a major role in the teaching and learning of social studies but, that it enhance, not replace, essential social studies learning. APEF recognizes that Communication and Information Technologies have become important tools for the acquisition, analysis, presentation, and communication of data in ways that allow students to become more active participants in research and learning

- CD-ROMs and the Internet provide teachers and students with quicker and easier access to extensive and current information. Students and teachers should critically analyse such information to determine its validity, accuracy, bias, and interpretation
- students are enabled to directly employ inquiry skills by exposure to first hand information through direct e-mail conversations, student created Web sites, and listservs. These modes of communication provide connections to students and cultures from around the world.
- students can present their learnings to peers within their classroom and beyond in a wide variety of forms (graphics, maps, text, graphic organizers, Web sites, multimedia presentations, etc.) that fit their learning styles.
- technology can provide opportunity for students to become more actively involved in their learning by allowing students control of information gathering, processing, and presentation.

Adapted from APEF Foundation Guide for Social Studies(1998) page 40

Technology Curriculum Outcomes

GENERAL TECHNOLOGY OUTCOMES (as per APEF Technology Foundation Document)

GTO A- Technology Problem Solving
Students will be expected to design, develop, evaluate, and articulate technological solutions.

GTO B- Technology Systems
Students will be expected to operate and manage technological systems.

GTO C- History and Evolution of Technology
Students will be expected to demonstrate an understanding of the history and evolution of technology and of its social and cultural implications.

GTO D- Technology and Careers
Students will be expected to demonstrate an understanding of current and evolving careers and of the influence of technology on the nature of work.

GTO E- Technological Responsibility
Students will be expected to demonstrate an understanding of the consequences of their technological choices.

Areas

1. Computer Systems - In general, a complete, working computer. The computer system includes not only the computer, but also any software, networking, and peripheral devices that are necessary to make the computer function. Every computer system, for example, requires an operating system such as Windows.

2. Social, Ethical and Health - General user guidelines for the responsible use of technology .

3. Internet - A global network connecting millions of computers. This network carries various information and services such as email, online chat, video, audio, web sites and other documents of the World Wide Web.

4. Concept Maps - Visual representations of relationships between ideas. Methods for grouping and organizing information. Visual learning allows new concepts to be more thoroughly and easily understood.

5. Graphics - Refers to display and manipulation of images (text, pictures and drawings)

6. Spreadsheets - A table of values (text, numeric, dates) or information arranged in rows and columns. Spreadsheets allow the computation of data with formulas and the creation of charts and graphs.

7. Word Processing - Using a computer to create, edit, and print documents. A word processor enables you to create a document, store it electronically, display it on a screen, modify it by entering commands and characters from the keyboard, and print it.

8. Multimedia -The use of computers to create and present several different media such as text, graphics, video, animation, and sound in an integrated way.

9. Database - A collection of data organized in such a way that a computer program can quickly select desired pieces of information from a search request. You can think of a database as an electronic filing system.

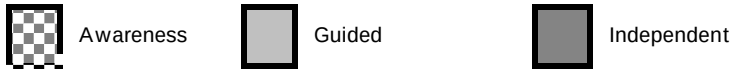
10. Telecommunications - Refers to all types of data transmission, from voice to video using a variety of media such as copper cable, fibre optics, satellites, wireless technology, etc.

11. Web Authoring - The act of developing a web site. Software is available that will generate the required HTML coding for the layout of the particular Web page.

Each skill area of the outcome continuum is identified by grade level and progress as follows:

Awareness - the student is exposed to the technology as it is being used by others.
Guided - the student begins to use the technology with the help of others.
***Summative Assessment**- beyond this grade level, students will be expected to meet the outcome independently.
Independent - the student uses the technology without assistance.

Computer Systems



	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A1.1	make use of help features to independently find solutions to problems													
B1.1	login, open and close a program, open, save and close a file with mouse													
B1.2	demonstrate proper use of login numbers and names, set-up and change passwords, and be aware of implications of multiple logins													
B1.3	begin to work with more than one file open at once (multi-task)													
B1.4	differentiate between “Save” and “Save as…”													
B1.5	be able to identify the common windows components of a given software screen (eg. menu bar, button bar, cursor, insertion point)													
B1.6	have an understanding of file management (drives and folders, rename, select, move, copy, paste, delete, display format, backup, etc.)													
B1.7	understand how to display file properties													
B1.8	understand the difference between software and hardware													
B1.9	identify system specifications and be aware of compatibility issues between the hardware and the software (processor speed and type, RAM, hard drive size, optical drive, connection types, video card, sound card, monitor, network cards)													
B1.10	understand how and when to re-boot (warm boot vs cold boot)													
B1.11	describe networks, file servers, connections (wireless, line types and speeds)													
B1.12	demonstrate proper use of network printing, choose proper printer, recognizes process and purpose of Print Queues													
B1.13	identify computer viruses, how they are transmitted and how anti-virus software is used to protect or clean a computer													
B1.14	identify SPAM, pop-up ads, spyware and other invasive software coding													
B1.15	modify and utilize master pages/templates													
B1.16	import and export files to other formats (.html, .pdf)													
C1.1	identify technologies that are found in everyday life													

Social, Ethical, and Health

 Awareness  Guided  Independent

	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A2.1	identify aspects of an ergonomic workstation (lighting, monitor angle, work placement, keyboard height, seat height, posture, etc.)													
B2.1	demonstrate proper touch keyboarding techniques (ie: home row, quick key strokes, proper reaches)													
C2.1	examine current Canadian law governing the use of technology													
D2.1	determine the technological requirements for specific career goals													
E2.1	respect equipment and other student's work													
E2.2	work co-operatively at work station													
E2.3	adhere to acceptable use agreement for work station/network/Internet													
E2.4	use electronic communication etiquette													
E2.5	adhere to rules of freeware, shareware and commercial ware													
E2.6	adhere to copyright and privacy laws, give credit to sources of information (MLA, APA)													
E2.7	identify ethical issues involved with Internet content, awareness of inappropriate use of technology													
E2.8	demonstrate caution before sending personal information over the internet													
E2.9	follow publishing etiquette (suitable language, no discrimination, etc.). Adhere to the guidelines for school web pages as outlined by PEI Department of Education.													

Internet

 Awareness  Guided  Independent

	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A3.1	demonstrate awareness of the Internet as a source of information													
A3.2	use various tools (search engines and directories) and strategies necessary to carry out research													
A3.3	obtain/download material (text, graphics, files) from Internet													
B3.1	Use the various browser navigation tools (back, forward, history)													
B3.2	manage bookmarks/favorites													
B3.3	distinguish among various file formats (file extensions), required plugins, file compression/decompression utilities													
C3.1	discuss ways in which the Internet is evolving													
E3.1	critically evaluate information and its source based on pre-determined criteria													

Concept Maps

 Awareness  Guided  Independent

	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A4.1	use brainstorming techniques to generate ideas													
A4.2	create a web (i.e.: literary, concept, character, word, Venn Diagrams, and timelines)													
A4.3	categorize ideas graphically													
A4.4	create links between ideas, re-link or delete links between ideas													
A4.5	elaborate on ideas (i.e. adding notes, annotations, etc.)													
B4.1	add fonts, graphics, sound, and colours to enhance ideas													
B4.2	create hyperlinks to files, web sites, or multimedia content													

Graphics

 ***Awareness***  ***Guided***  ***Independent***

	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A5.1	create illustrations or graphics by using the various drawing tools													
A5.2	apply principles of design													
B5.1	demonstrate various object editing features (ie. select, unselect, resize, crop, area fill, add colour and pattern, size adjustment using the mouse or scale, various erasing techniques, object orientation, changing font and text size, colour or appearance, creating text blocks, change text wrap selection and other text manipulation functions)													
B5.2	carry out various object manipulations (ie. object alignment, creation of graphics in layers, grouping/un-grouping components of an image)													
B5.3	use other graphic creation tools (i.e. clone brush, colour replacements, effects and filters, hexidecimal (RGB and CMYK colour values)													
B5.4	convert various graphic formats between vector (ie: .png, .psp, .cdr) and bitmap images (ie: .wmf, .tif, .bmp, .gif, jpeg, .jpg), import a graphic file from another source													

Spreadsheets

 Awareness  Guided  Independent

	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A6.1	plan / design a spreadsheet to organize and tabulate data from various sources (to make a schedule, tally/score sheet, solve a mathematical word problem)													
A6.2	correct errors, modify or delete data in a cell													
A6.3	design own formulas incorporating functions {if SUM(B1..D1) > 0, @SUM(B1..D1), 0} and absolute / relative cell references													
A6.4	use different types of graphs / charts (line, pie, bar) to visually represent data; label graph components (legend, title, x-y axis, colour, fill pattern)													
B6.1	identify spreadsheet components and terminology (rows and columns, cell addresses, data entry bar)													
B6.2	identify different types of cell data (text, numeric, function, date)													
B6.3	enter data into simple preexisting spreadsheets, auto fill data, data entry bar, sort data													
B6.4	edit spreadsheet layout (insert and delete rows or columns, select a range of cells, alter column widths and row heights, locking row and column headings, lock and unlock cell(s), fixed titles)													
B6.5	enter formulas to perform calculations across columns, rows, cells, move/copy data or formulas from one area of spreadsheet to another													
B6.6	format numbers (decimal places, currency, etc.), format text (font, colour, size)													
B6.7	create links [between notebooks (tabs or sheets), external files, graphs, charts, website]													

Word Processing

 Awareness  Guided  Independent

	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A7.1	create and edit data files and form documents to perform a merge													
A7.2	identify examples of desktop publishing (i.e. newspaper, catalogue, ads, brochure)													
B7.1	use a grade level appropriate wordprocessor to create and edit written work													
B7.2	locate characters on a keyboard and identify functions of word processing (ie. cursor, insertion point, enter key, space bar, upper case, backspace, shortcut key)													
B7.3	use editing tools to revise work (i.e. spell check, thesaurus, find and replace)													
B7.4	change font, size, colour, style (ie. bold, italics, underline, insert special characters, drop capitals)													
B7.5	format text (ie. justification, line spacing, outlines and bullets, text wrap)													
B7.6	format documents (ie. using margins, tab rulers, indents, page center, border, watermark)													
B7.7	insert a graphic and manipulate, (ie. resize, add borders and fill, create text art)													
B7.8	insert and format tables and text boxes (ie. lines, fill, columns, rows, borders, alignment)													
B7.9	format multi-page documents with headers, footers, page numbers, page breaks and keep text together function, change page orientation/size (ie. text presentation features)													
B7.10	insert automated features (ie. date and file stamp)													

Multimedia

 Awareness  Guided  Independent

	Students are expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A8.1	apply planning strategies, (storyboards, scripts, graphic organizing, brainstorming)													
A8.2	create an age/grade appropriate slide show presentation that may contain one or more of the following objects (text, graphics, images, animations, audio and video)													
A8.3	describe situations where streaming video and audio is appropriate													
A8.4	create graphics, audio and video special effects (animation, virtual reality, panorama)													
A8.5	select appropriate medium to convey a message (be conscious of file size, formats and storage location)													
B8.1	navigate multimedia resources such as slide shows, online resources or CD rom interactive educational activities													
B8.2	use multimedia creation and editing tools (screen captures, scanner, sound recording, digital image editing software: still and video)													
B8.3	convert file formats for a particular application (.jpg, gif, .bmp, mp3, wav, avi, mpeg, mov, etc.)													
B8.4	use proper tools and procedures to enhance product quality. (Microphones, lighting, camera movement, instrumentation, teleprompters, assign various responsibilities to a production team.)													

Database

 ***Awareness***  ***Guided***  ***Independent***

	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A9.1	use an existing database (CD ROM, Microcat, Dynex, Internet search engine) to find information (sign up for Provincial Library Card - Abbycat)													
A9.2	perform searches on a database file using logical and Boolean operators (understands commands, scope, filters, and conditions)													
A9.3	design/plan a database to use as a method of organizing information													
A9.4	create and modify a form (add graphics, and error checking routines)													
A9.5	use databases to analyze data and look for trends													
B9.1	enter data into a pre-existing database, edit data, and use automated text													
B9.2	create fields and with variable field types (numeric, text, date) and properties (color, width, font, etc.)													
B9.3	restructure database (add / delete fields, change field width)													
B9.4	sort records alphabetically, numerically and by multiple fields													
B9.5	create a report from the entire database or selected records													
B9.6	create a report with automated summaries and calculations (understand logic, date and summary field types)													
B9.7	bring database information into a word processing environment ie: (Mail Merges)													
B9.8	distinguish between the two general types of database management systems (flat and relational)													
E9.1	examine functions and implications of database driven websites (ie: online purchasing, searching, and password secured sites)													

Telecommunications

 Awareness  Guided  Independent

	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
	Email:													
B10.1	send messages													
B10.2	open messages													
B10.3	manage mail/folders													
B10.4	manage address books													
B10.5	use distribution lists													
B10.6	send and open attachments													
B10.7	create signatures													
B10.8	apply filters and rules													
B10.9	use calendar features such as appointments, tasks, reminder notes/memos													
	E-Learning/Collaborative tools:													
	Students will be expected to:													
A10.1	collaborate using software: (ie. whiteboard, slideshow, application sharing, chat, messaging, send and receive files, photos, group file sharing, resource sharing (links), online content creation and sharing, assignment drop box, video and audio, discussion forums, journal.)													
B10.10	use the organizational features of collaborative tools such as scheduling, calendaring, and interactive syllabus													

Web Authoring

 *Awareness*  *Guided*  *Independent*

	Students will be expected to:		1	2	3	4	5	6	7	8	9	10	11	12
A11.1	identify web page creation possibilities													
A11.2	create appropriate text and image file formats													
A11.3	create an interactive webpage. (online surveys, forms, interactive database, polls)													
B11.1	examine html tags													
B11.2	create a basic web page (may include backgrounds, images, hyperlinks, tables)													
B11.3	indicate where file or page is hosted (server, web server, hosting service)													
B11.4	apply website file management and transfer files to and from web servers (ftp), edit pages online													
B11.5	use special features (image maps, cascading style sheets, frames, rollovers, layers)													
B11.6	embed objects (audio, video, pdfs, animation, Flash, Java Script Applet,)													
E11.1	describe standards which guide web based publication (W3C accessibility guidelines)													

How to Use this Document

Paper Document

The first section of the document includes background material, definitions, philosophy, advantages of technology integration, an overview of the APEF curriculum, and grade 1-12 general outcomes for information and communication technologies.

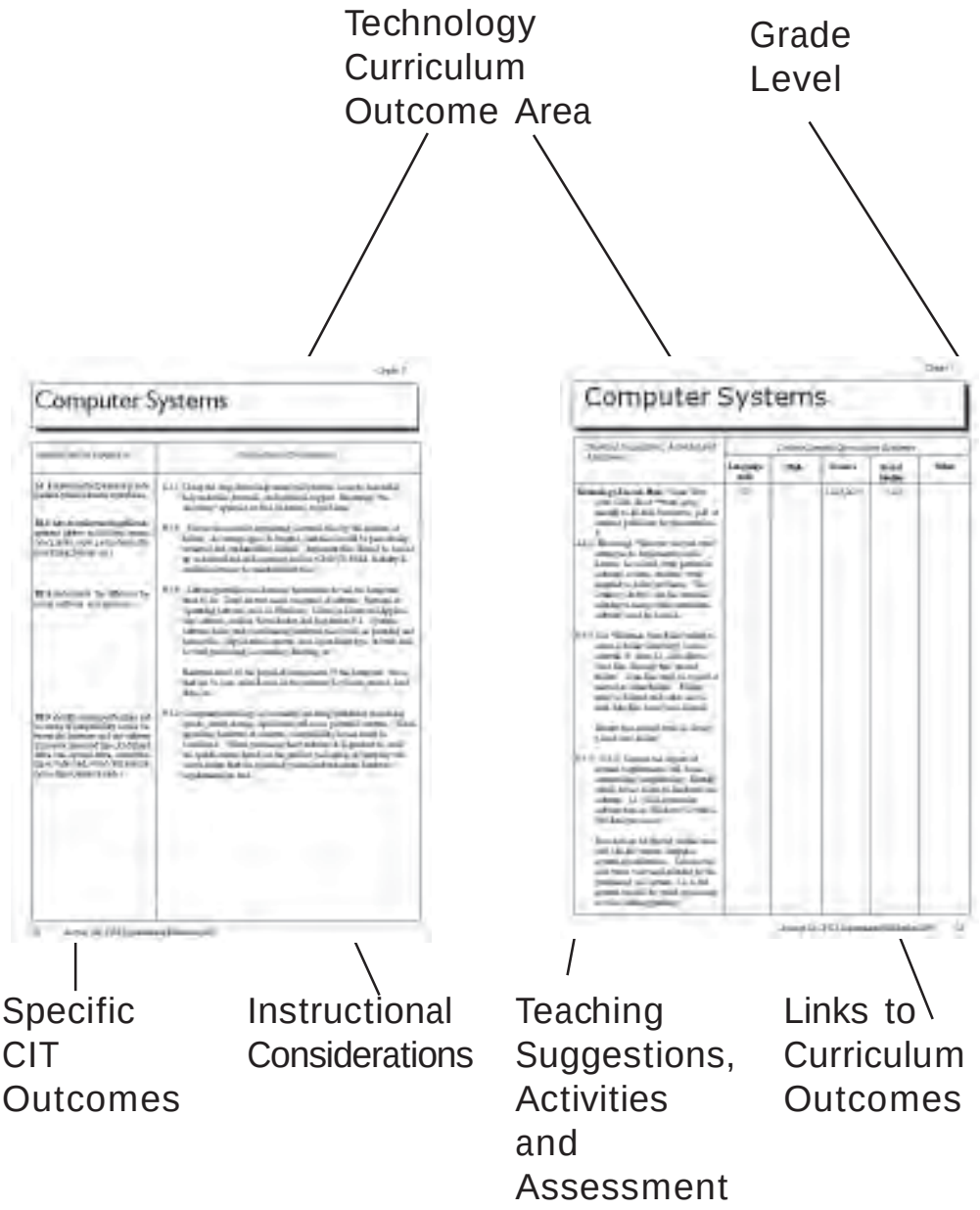
The remainder of the document addresses the level and defines specific knowledge and CIT skills expected of students as they work toward technology competency. Practical considerations are given for incorporating CIT into the curriculum and accompanying lesson plans. The information is presented in a two-page layout as outlined on the following pages.

On-line Document

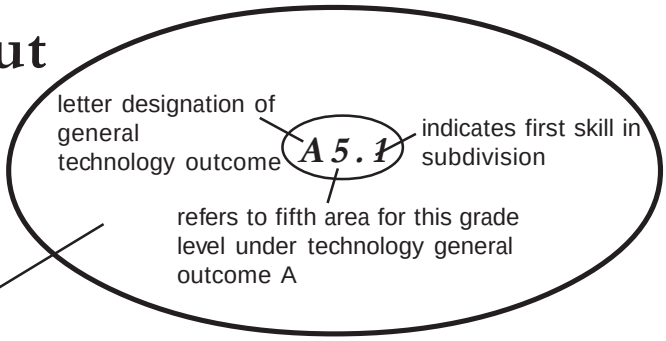
An on-line version of this document will be developed. Having a document on-line has a number of advantages. It enables teachers to easily cross-reference material in the document with on-line help manuals and curriculum documents. It can encourage a greater level of collaboration among all educational partners. An on-line document can be easily revised and updated without having to copy and redistribute. It is our intent to revise, modify, and add new materials in the future only to the on-line version of *Journey On* (www.edu.pe.ca/journeyon).

Two Page-Layout

Four major sections are found on these pages as you go from left to right: 1) specific CIT outcomes, 2) instructional considerations, 3) teaching suggestions or names of grade specific lesson plans, and 4) links to curriculum outcomes. The applicable technology curriculum outcome area is found in a box at the top of each page along with the grade level.



Two Page-Layout in Detail



Specific Outcomes
- are steps towards accomplishing the general technology outcomes and lettered as subdivisions of GTOs

Grade 7

Computer Systems

Students will be expected to:	*Instructional Considerations*
A1.1 make use of help features to independently find solutions to problems	A1.1 Using the drop-down help menu will p… help materials, tutorials, and technical… discovery" approach to find solutions…
B1.6 have an understanding of file management (drives and folders, rename, select, move, copy, paste, delete, display format, backup, etc.)	B1.6 Discuss the need for organizing electr… folders. As storage space is limited, d… reviewed and outdated files deleted. I… up or archived to a disk, memory stick or CD/DVD ROM. A utility is… available for users to maintain their files.
B1.8 understand the difference between software and hardware	B1.8 Software provides the electronic instructions to tell the computer what to do. There are two main categories of software: Systems or Operating software, such as Windows, Solaris or Linux and Applica…

Instructional Considerations
- useful information for teachers on terminology and/or purpose and background of specific technologies

Teaching Suggestions, Activities and Assessment
- readiness considerations
- may be suggestions for activities or name of lesson plan

…aluate and select information using…

Teaching Suggestions and Activities	*Links to Specific Curriculum Outc…*		
	Language Arts	**Math**	**Science**
Grade 2 **Language Arts Theme**: *New Perspectives* **Lesson Plan**: *Through a Bug's Eyes*	**A1, A3, A4, D1, D3 E1, E1.3, E1.5 G1, G1.1, G2, G2.1, G2.2, G3, G3.1**		
Grade 3 **Language Arts Theme**: *Vanishing Animals* **Internet Sites**:	**A1, A3, A4 D1, D3 E1, E1.3, E1.4, E1.5 G1, G1.1, G2, G2.1, G2.2, G3, G3.1 H2, I1, J5**		

Links to Curriculum Outcomes
- letters and numbers representing curriculum outcomes as defined in other APEF (CAMET) documents

Database

Students will be expected to:	*Instructional Considerations*
B9.6 create a report with automated summaries and calculations (Independent)	B9.6 A database may be used to track the characteristics of native plants found on PEI. A report may be generated with specific fields i.e. common name, group name, family name, characteristics such as flower colour, flowering period, foliage colour, foliage texture, height, habitat, rarity, etc. Fields may be selected to group information in a report such as family name, flowering period and habitat. These may be listed in alphabetical order with automated summaries indicating the number of plants falling into particular categories i.e. those plants that flower in May and are found in the forest. At the end of the report, final total summaries may be calculated i.e. number of all plants that flower in May.
B9.7 bring database information into a word processing environment (Guided 10)	B9.7 Database data may be accessed and used to fill form fields (merged) in a word processing document. Form letters and mailing address labels are examples of database information used to create individualized documents. Fields must be created in the word processing document, along with spacing and punctuation, that specify the location for the variable data (That data which changes from one document to another). Paper size and margins must be selected for custom documents such as envelopes. From our example above, form letters might be generated that specify a flower, its characteristics and time of year it is flowering. These woud be sent to individuals, at the appropriate time, who have agreed to survey and report statistices on the status of that flower for the current year.

Database

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
Technology Lesson Plan:				
Researching PEI Ecosystems *Pg. 60* Outcomes A3.2, B9.6, B9.8	**116-1, 213-7, 214-3, 331-6, 331-7, 318-3, 318-4**			
Preserving PEI Wetlands Pg. 65 Outcomes A3.2, A3.3, B9.6, B9.8	**116-1, 213-7, 214-3, 331-6, 331-7, 318-3, 318-4**			
World Weather Pattern Prediction *Pg. 83* Outcomes A3.3, B9.7	**115-2, 116-1, 117-6, 118-7, 213-6, 213-7, 214-3, 214-11, 331-1, 331-2, 331-3, 331-4**			
B9.6 Discuss various ways data may be organized or summarized to provide useful information. Create summary groups in a report. Add summary fields to perform calculations, such as total and average, after each group listing. Report summary fields may be placed at the end of the report to calculate a final total or average of all items found in the report. B9.7 Construct a survey that will contain information tailored for a particular person and his/her community and occupation. Create a survey that gathers information about weather events on PEI from the point of view of farmers, fishermen, tourist operators, etc.				

Database

Students will be expected to:	*Instructional Considerations*
B9.8 distinguish between the two general types of database management systems (Guided 10, 11)	B9.8 Databases may be termed "Flat" or "Relational". A flat data base stores data in the form of one table. This structure has the advantage that it is easy to set up and understand. Flat databases are especially useful for simple applications where there are few fields or pieces of data. As the number and types of fields increase the limitations of the flat structure become apparent. The user is forced to read large amounts of text data and must enter the same information in many different records. It is time-consuming to update changes in records and it may be impossible to search or create reports containing the exact information required. A relational database is one that stores information in several tables that are linked together by a special key field such as student ID. For example Trevlac is a relational database. The database would be set up with one table to hold student contact information. A second table might hold the timetable information. A third table may hold grades for all courses that the student has taken. A fourth table may be used to track student attendance. The computer may search and combine information from all four tables into a report very easily. If data changes are necessary only the table that contains that data needs to be accessed and updated.

Database

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
B9.8 Create a flat database using software such as MS-Works 2000 (available in the CIT lab) to record data or group items (such as classification of organisms: Kingdom, Phylum, etc). Visit sites such as Air Canada (http://www.aircanada.ca) to view an example of a relational database. Note the various possible separate tables that may be accessed by the database ie. customer profile, book flight, timetables, flight status, baggage tracer, hotels, cars, etc. and fields in which queries may be made. Discuss a scientific application where the sophistication of a relational database would be required. Suggest fields that would be included in separate tables. What would be the "key field" that would link one table to the next? Keep a two week record of various meteorological data such as temperature, minimum and maximum temperatures, barometric pressure, etc. Generate a report specifying particular fields. Provide Total and Average summaries.				

Multimedia

Students will be expected to:	*Instructional Considerations*
A8.3 describe situations where streaming video and audio is appropriate (Independent)	A8.3 Multimedia files may be viewed by downloading or streaming them from the Internet. "Downloading" involves placing a hyperlink on a web site whereby the whole file is downloaded to the users computer before it becomes viewable. This may involve a long wait depending on the file size and line speed. "Streaming" allows the media to commence playing after partial download and is appropriate for very large files. There are several formats for the creation of streaming video (Windows Media Macromedia, Real Media, Quicktime, MPEG-4) Streaming is also used in the delivery of "live events" through web casting.

Multimedia

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
Technology Lesson Plan:				
Measuring Motion With MovieMaker *Pg. 73* Outcomes A8.3, A8.4, A8.5, B8.2, B8.4	**212-6, 213-3, 214-5, 214-8, 214-10, 325-1, 325-2, 325-3, 325-4**			325-2, 325-7
Animating Scientific Concepts *Pg. 78* Outcomes A8.3, A8.4, A8.5, B8.2, B8.4	**319-1, 321-1**	Biology 521 314-8, 317-1 Biology 621 313-2, 317-1	Chem 521 321-4a/b, 321-5, 323-4 Chem 621 321-3	Phy 521/621 325-6, 325-8, 326-3, 327-1, 327-4, 327-7, 327-8
Do You Have An Issue With That? *Pg. 81* Outcomes A8.3, A8.4, A8.5, B8.2, B8.4	**114-1, 213-7, 215-1, 118-9, 114-5, 118-1**	Biology 521 118-10, 117-4, 215-4, 214-15; 118-6 Biology 621 212-1, 213-6; 219-7, 316-4; 118-6, 213-6, 316-3	Chem 521 117-4, 213-7, 215-3 Chem 621 117-6, 118-2, 118-8, 118-9, 118-10; 114-5, 213-6, 213-7, 215-4; 118-6	Phy 521/621 116-6, 117-2; 116-7, 117-2, 118-2, 213-7; 115-5, 117-11,118-2, 118-4, 214-15, 215-4, 215-5, 329-6
Music To My Ears (and Eyes) *Pg. 106* Outcomes A8.4, B8.2 A8.3 There are many scientific sites that provide learning objects for science. Discuss why some resources seem to take a long time before they can be viewed while others appear relatively quickly. Use 3-D models to demonstrate concepts such as balancing equations, chemical reactions, creating electrical circuits, wave properties, animal disections, etc. This allows students to better visualize how natural systems operate and scientific concepts are applied.				**Phy 521 212-4, 212-7, 213-7, 214-8, 214-14, 327-1, 327-2, 327-8**

Multimedia

Students will be expected to:	*Instructional Considerations*
A8.4 create graphics, audio and video special effects (Guided)	A8.4 Digital cameras have the capacity to create digital stills with special effects and short audio/video segments. Note that quality of this media is low. For best results, consider using a digital video camera. Network software have the capacity to create animations and video clips such as Paintshop Pro [Animation Shop], Corel Presentations, Movie Maker [XP].
A8.5 select appropriate medium to convey a message (Independent)	A8.5 Select a medium to convey the message. Medium includes text and graphics (illustrated posters, brouchures), audio, animation, and video. Multimedia production includes combining two or more media together to satisfy the viewers preferred learning style.

Multimedia

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
A8.4 Discuss how the use of graphics, audio and video special effects enhance the presentation and support the "message". Create a digital model of a science concept using animation techniques ie. sound wave. Incorporate a commentary or explaination of the visual. A8.5 Use text to explain a concept. Use audio to reinforce the message and to provide atmosphere. Still images or video provide visual context. Animation may be used to illustrate the concept in ways that would be impossible in real life. Provide an opportunity to choose a media that will effectively demonstrate the concept. (poster, radio ad, animated short, collage of still photos, video, etc.) Explain reasons for choice of media.				

Multimedia

Students will be expected to:	*Instructional Considerations*
B8.2 use multimedia creation and editing tools (Independent)	B8.2 Hardware resources such as digital cameras that can capture still as well as video/audio footage, video cameras, web cams, microphones,and scanners are reasonably priced and widely available. Graphics programs allow the user to capture screen shots from the computer monitor, edit digital pictures, create animations and combine graphics and text. Video/audio editing capability is available on Windows XP computers. Home computer systems are now being marketed with multimedia features and software that appeal to the multimedia consumer.
B8.4 use proper tools and procedures to enhance product quality (Independent)	B8.4 Skill in multimedia development will continue to evolve as equipment becomes available at lower grade levels and in the home. The experiences of individual group members and expertise of other colleagues in the school must be taken full advantage of to create quality multimedia content. Be aware of the surroundings in which multimedia content is acquired. For instance, environmental noise from pop machines, fans, conversations, etc. interfere with audio quality. Shadows, traffic, lighting type affect video quality.

Multimedia

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
B8.2 Review one or more of the following multimedia creation tools to support an activity. Use Paintshop Pro to capture a screen image. A microphone, with Audacity or Inspiration 7.5, may be used to create an audio file. Scan a source document, modifying dimensions. Take a digital photograph or video and edit it. B8.4 Story board the multimedia sequence. Plan so that interferences are kept to a minimum. Images/ videos are best shot outdoors or in natural light. If available, use tripod lighting or flash. A hand held microphone may reduce peripheral noise. Add sound track with voice overs and sound effects with editing software. Multimedia activities require collaborative teamwork. Higher levels such as analysis, synthesis, and evaluation in Bloom's Taxonomy are addressed.				

Web Authoring

Students will be expected to:	*Instructional Considerations*
A11.2 create appropriate text and image file formats (Independent)	A11.2 Graphics programs allow more control over font styles, size, colour and format. eg. text with specialized font face, elongated appearance, neon variable colours, and presented in a spiral shape. Use a maximum of two fonts. Use one font for text passages and one for accents such as titles, buttons, etc. Use common fonts on web pages as speciality fonts are replaced when viewed on the users' computer. Designers can provide the font for download, however, they must be aware of copyright for the fonts. Most people will leave a site rather than download the font as it takes time and they often are concerned about downloading files. A second consideration is that each installed font will consume computer memory. Gif, .png and .jpeg are the main graphics file formats for web publishing. To reduce download times, use the smallest graphic size possible (file size not physical size) Use .jpeg for complex graphics such as photographs, art, images with shadows and shading. Use .gif for graphics with a few colours and transparency. Strategies to reduce the file size of an image include cropping the image to include only focal information, resizing the image to particular dimensions, and reducing its colour depth and resolution.
A11.3 create an interactive webpage (Independent)	A11.3 Interactive components of webpages require databases and server side scripting which are unavailable to students. However, there are various online companies that offer free services that may be incorporated into a static website. i.e. polls, surveys, web counters, guest books, etc. Embedded objects such as Flash allow for interactive elements such as site navigation, animated icons and sound effects.
B11.1 examine HTML tags (Guided 10)	B11.1 While web editors are easy to use and automate many web page construction tasks, there are times when a knowledge of html coding is helpful for trouble shooting and customizing pages. Web page editors allow pages to be displayed in webpage and html views.

Web Authoring

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
Technology Lesson Plan:				
Supermarket CSI (Chemical Substance Investigation) *Pg 87* Outcomes B11.1, B11.2, B11.6, E2.9, E3.1, E11.1 ***The Science Blog*** *Pg 100* Outcomes A11.3, B11.3, B11.4, B11.6	114-1, 118-9, 213-7, 214-3, 215-1, 215-5	Biology 521 117-4, 118-6, 118-10, 214-2 Biology 621 117-2, 117-4, 118-2, 118-6, 315-10	**Chem 521** **212-5, 213-6, 213-7, 214-3** Chem 621 114-5, 117-6, 118-2, 118-8, 118-10, 213-6, 213-7, 215-4	Phy 521/621: 116-6, 116-7, 117-2 115-5, 117-11, 118-2, 118-4
The PEI Biodiversity Class Page *Pg 102* Outcomes A3.2, A11.2, B3.3, B11.1, B11.2, B11.4	Science 421: 213-7, 214-1, 215-1, 318-3, 318-6	**Biology 521:** **213-6, 214-1, 215-1, 215-6, 316-5** Biology 621: 116-2, 116-7, 213-5, 213-7, 215-2		
A11.2 Create main headings as text images using a graphics program; save these graphics in .gif format. Ensure that image files are saved in .jpg format.				
A11.3 Search for free interactive online tools using such terms as "online polls interactive web page tools" to find online companies providing these services. For example Bravenet (http://www.bravenet.com) provides a variety of website tools. (site active August, 2006) Incorporate the required coding necessary to embed the selected interactive tool within the web page.				
B11.1 Web editors allow the user to view the html coding. Create a table and view the resulting code. Discuss the characteristics of html coding. Locate further information on particular .html tags by referring to an online source or tutorial.				

Web Authoring

Students will be expected to:	*Instructional Considerations*
B11.2 create a basic web page (Independent)	B11.2 Web page editors allow the user to select templates that provide suggestions for layout, background and a navigation system. Should a user choose to create an original design, s/he must be careful that the background chosen does not make the text unreadable and that the colours chosen match. By convention, elements in a web page are designed inside a table with its borders turned off. Formatting web pages in this way allows the page to be viewed, in proportion, using various monitor resolutions. For example, in the school system the monitor resolution is set at 800 X 600 pixels and many home users set their monitor resolution to 1024 X 768 or 1280 X 1024 pixels.
B11.3 indicate where file or page is hosted (Independent)	B11.3 The anatomy of a URL demonstrates the entire site structure. The initial section after http:// is the server address (eg. www.edu.pe.ca) Folders and subfolders are separated by a backslash (www.edu.pe .ca/ journeyon/). Individual files finish the URL with a file extension (eg. .htm, .asp, .php, .jpg, .avi, etc.) www.edu.pe.ca/journeyon/pd.htm Files are initially created and the structure is maintained locally on the users' computer system. This structure is transferred to a web file server. The web file server is owned by the department of education, but they pay a fee to the Internet Service Provider (ISP) to connect to the Internet.
B11.4 apply website file management and transfer files to and from web servers, edit pages online (Independent)	B11.4 Image files are placed in their own folder in the website file structure. Different sections of a web site are placed in separate folders, as well. This allows the web site to be more easily maintained as files related to particular sections can be identified. The transfer of files to and from a web server and editing of content online requires the use of a FTP program (file transfer protocol), username and password. Depending on individual school procedures, the school web master will perform these activities and work with students as they perform file management. Some FTP software may be set up so that particular users have logins and passwords to access the sections of the web site for which they are responsible.

Web Authoring

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
B11.2 Create a basic webpage relating to a science curriculum topic. Provide criteria or create a rubric.				
B11.3 Use Inspiration 7.5 to draw the file structure for the following URL: http://www.edu.pe.ca/journeyon/pro_d_pages/frontpage/class_webpage_exercise.htm The structure of a web URL is [server], [folder], [subfolder], [file]. The server address (www.edu.pe.ca) would be found at the top level of an organizational chart structure.				
B11.4 Consult with the school web master to determine how files will be transferred to the server. Ascertain if there are any special file naming or formatting considerations. Internal web sites: Teachers may transfer files to folders on the network M: drive on behalf of students. The web site can only be viewed by those on the school local area network. A link may be placed on the school web page that would make the information easier to find. i.e. < a href = "m:\mr_smith\ecosystems\index.html" > PEI Ecosytems < /a > An explanatory note should be provided for Internet visitors that indicates the link is available only from within the school network.				

Web Authoring

Students will be expected to:	*Instructional Considerations*
B11.5 use special features (Independent)	B11.5 Image maps are a combination of image and HTML coding. The code creates "hot spots" on the image which may be linked to files or web pages. Often hot spots are used as navigation elements in web pages. Should this be done, the designer must include an alternative navigation bar in case the image map does not work with a particular browser. Large images can be "sliced" into smaller portions held together by an invisible table. Each part of the image loads at the same time and encourages the visitor to remain as the image is revealed. Elements of the image can be used to link to files, webpages, popups, etc. similar to a hot spot. A Cascading Style Sheet may be defined and placed in the header of an HTML document to automatically apply formatting to the page ie. spacing, font, colour, etc. Frames break the page into areas that load from separate HTML files. A disadvantage of using frames is that a page cannot be printed as displayed. Rollovers and mouseovers may be programmed using script or automatically through the use of a web editor such as Front Page or Dreamweaver. Layering techniques are used to overlap images or other elements on a web page.
B11.6 embed objects (Independent)	B11.6 An embedded object is multimedia content or simply a file (.pdf) created with one application and placed into a webpage with HTML coding. Embedding the object, ensures that the object retains its original format. Video that is included on a site must include information about its size so that users can decide whether or not they want to wait the time required to view the media. Provide a link to a plugin source for a downloadable file (e.g. Quicktime). Never incorporate the automatic downloading of a video/audio file into the loading of a page. Audio must be produced on the best quality sound equipment the user can obtain. Reeves and Nass (1996) found that users will tolerate poor video but are very affected by poor audio. Care must be taken not to overload the user with competing visual and audio information. People have difficulty reading text and listening to unrelated audio at the same time.

Web Authoring

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
B11.5 Investigate how to apply a special feature that will improve the communicative intent of the website. View examples of websites that have a combination of sliced images and hot spots. Determine where the hot spots and slices are located. Critique a web site created with hot spots. Recognize and describe the hot spots. Identify the function of the hot spot. Does the site provide a text based navigation? Evaluate the effectivenesss of these special features. Examples of special graphic features may often be found in news, weather, arts and government sponsored websites. Here are some current examples: Royal Academy of Arts: www.royalacademy.org.uk/ Weather: www.weatheroffice.ec.gc.ca/ Collaborate with Computer Literacy or Creative Multimedia classes to apply special features. B11.6 Search for free java applets from the Internet for displaying stylized text, images, and video. Download the selected .zip file, uncompress and insert original works into these "display containers". Embed or link audio, video, animation or data files (.pdf, .wpd, etc.). Remember to describe the contents of the linked files as well as their file size.				

Web Authoring

Students will be expected to:	*Instructional Considerations*
E11.1 describe standards which guide web based publication (Guided 10)	E11.1 The World Wide Web Consortium (W3C) found at http://www.w3c.org provides guidelines for creating online content and research relating to new Internet tools. Many of the guidelines relate to consideration of the broader Internet audience and suggest ways to make content available to all users. This may include factors such as making sure that colours selected may be seen by people who are colour blind, alternative navigation schemes other than by graphics. Pictures may be identified with "ALT" text and provide choices for format and/or file sizes of multimedia content.

Web Authoring

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
E11.1 Visit the World Wide Web Consortium (W3C) page at http://www.w3c.org List five considerations that must be taken into account to make web sites accessible for all users. Ensure that web site produced follows accessbility guidelines.				

Social, Ethical and Health

Students will be expected to:	*Instructional Considerations*
C2.1 examine current Canadian law governing the use of technology (Independent)	C2.1 Many changes to Canadian laws governing technology use are "reactive" in nature as new technology and applications are developed. Extensions to laws have been made related to Electronic Contracts, Copyright, Trademarks, Internet Consumer Protection, Internet Advertising, Personal Information Protection, Criminal Law and Securities Law. Technology issues have implications for cultural identity and protection initiatives.

Social, Ethical, and Health

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
Technology Lesson Plan:				
Do You Have An Issue With That? *Pg. 81* Outcomes A8.5, B8.2, B8.4, D2.1	**114-1, 213-7, 215-1; 118-9, 114-5, 118-1**	Biology 621: 212-1, 213-6; 219-7, 316-4; 118-6, 213-6, 316-3 Biology 521: 118-10; 117-4, 215-4, 214-15; 118-6	Chem 621: 117-6, 118-2, 118-8, 118-9, 118-10; 114-5, 213-6, 213-7, 215-4; 118-6 Chem 521: 117-4, 213-7, 215-3	Phy 521/621: 116-6, 117-2; 116-7, 117-2, 118-2, 213-7; 115-5, 117-11, 118-2, 118-4, 214-15, 215-4, 215-5, 329-6
SuperMarket CSI (Chemical Substance Invest.) *Pg. 87* Outcomes A11.2, B11.1, B11.2, B11.6, E3.1, E2.9, E11.1	114-1, 118-9, 213-7, 214-3, 215-1, 215-5	Biology 521: 117-4, 118-6, 118-10, 214-2 Biology 621: 117-2, 117-4, 118-2, 118-6, 315-10	**Chem 521: 212-5, 213-6, 213-7, 214-3** Chem 621: 114-5, 117-6, 118-2, 118-8, 118-10, 213-6, 213-7, 215-4	Phy 521/621: 116-6, 116-7, 117-2 115-5, 117-11, 118-2, 118-4
Preparing For Debate Using Discussion Forum *Pg. 126* Outcomes A3.2, A10.1, B10.10, C2.1, E3.1 C2.1 Visit the Canadian IT Law Association (http://www.it-can.ca/en/resources.html). Assign a group to a particular area of law that required revision because of advances in technology. Have each group report findings. Discuss controversial issues.	114-1, 213-7, 215-1; 118-9, 114-5, 118-1	**Biology 621: 212-1, 213-6; 219-7, 316-4; 118-6, 213-6, 316-3** Biology 521: 118-10; 117-4, 215-4, 214-15; 118-6	Chem 621: 117-6, 118-2, 118-8, 118-9, 118-10; 114-5, 213-6, 213-7, 215-4; 118-6 Chem 521: 117-4, 213-7, 215-3	Phy 521/621: 115-5, 117-11, 118-2, 118-4, 214-15, 215-4, 215-5, 329-6 116-6, 117-2; 116-7, 117-2, 118-2, 213-7

Social, Ethical and Health

Students will be expected to:	*Instructional Considerations*
D2.1 determine the technological requirements for specific career goals (Independent)	D2.1 Technology competence is identified as an "Essential Skill" by Human Resources and Skills Development Canada. Statistics Canada has identified technology skills as important as numeracy and literacy to career success. Earning potential of persons possessing numercy, literacy, and technological skills is five fold higher than those who have equivalent numeracy and literacy skills. *(Murray, T. Scott. Statistics Canada. A Presentation To Cabinet, Charlottetown, PE. January 28, 2005)*
E2.9 follow publishing etiquette. Adhere to the guidelines for school web pages as outlined by PEI Department of Education (Independent)	E2.9 The Journey On website (http://www.edu.pe.ca/journeyon/tech_support_pages/GuidelinesforSchoolWebPages.html) provides many suggestions and guidelines for online publishing. Note that pictures and student names should never appear together in an online document. Parental and student release forms must be signed for student names, pictures or works to appear in an online document. Release forms may be downloaded from the Journey On site.

Social, Ethical, and Health

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
D2.1 Visit HRDC Essential Skills (http://www.hrsdc.gc.ca/en/home.shtml) or HRDC Career Handbook - Second Edition (http://www23.hrdc-drhc.gc.ca/ch/e/docs/ch_welcome.asp) web sites to investigate Communication and Information Technology requirements of careers involving science and math.				
E2.9 A more formal writing style must be used when publishing material for a wider audience. Discuss how student writing will change and the role of the "editor" in publishing. Peer review of written material will improve the quality of the publication. Adhere to the guidelines for school web pages when publishing to the Internet. (Found on the Journey On site at http://www.edu.pe.ca/journeyon/tech_support_pages/GuidelinesforSchoolWebPages.html)				

Internet

Students will be expected to:	*Instructional Considerations*
A3.2 use various tools and strategies necessary to carry out research (Independent)	A3.2 Regardless whether one searches a database, the Internet, a digital encyclopedia or similar digital containers of information, the quality of information will be contingent upon the formulation of the query. This observation gives rise to the consideration that "new age intelligence" does not depend upon the knowledge of a particular piece of information but instead depends upon the skill with which one can obtain required information. The tools(search engines and directories) and/or strategies employed in a query will depend upon the source of information (Internet, database, etc.) Boolean operators (AND, OR, NOT, AND NOT and for the Internet: ADJ, and NEAR) are common to each. In databases, queries often require the use of Logic operators, such as: less than (<), greater than (>), less or equal (< =), greater or equal (< =), not equal (< >), and equal (=). Utilize the various Help features of Internet search engines. Search engines may differ among each other in the way a query must be formulated. For example, a number of search engines require Booleans to be written in capitals.
A3.3 obtain/download material from Internet (Independent)	A3.3 Material (text, graphics, files) may copied and pasted, downloaded to the users computer, or "captured" with a screen capture feature of a graphics program from the Internet. Be aware of copyright issues when doing this.
B3.3 distinguish among various file formats, requiredplug-ins, file compression/decompression utilities (Independent)	B3.3 When downloading or accessing remote files, users must be familar with conventions used with that particular file format(file extension). The software program with which the file was created must be located on the user's computer. Many software vendors will provide a viewer or browser "plug-in" which extend the capability of the user to view creations formatted with their particular software applications eg. Powerpoint, Shockwave, Flash, Quicktime, etc. In addition,vendors may use a file compression/decompression utility (codec) so that files can be made smaller when sending over the Internet. Once the file has been transferred to the user's computer it is decompressed or "expanded" when viewed.

Internet

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
Technology Lesson Plan:				
Using GIS to Compare Canadian Biomes *Pg. 110* Outcomes A3.2, A3.3, B3.3	213-7, 318-3	**Biology 521 213-6, 214-1, 215-3, 318-7**		
Preparing For Debate Using Discussion Forum *Pg. 126* Outcomes A3.2, A3.3, A10.1, E3.1 ***Using Discussion Forums For Research*** *Pg. 128* Outcomes A3.2, A3.3, A10.1, E3.1	114-1, 213-7, 215-1; 118-9, 114-5, 118-1	Biology 521 118-10; 117-4, 215-4, 214-15; 118-6 **Biology 621 212-1, 213-6; 219-7, 316-4; 118-6, 213-6, 316-3**	Chem 621 117-6, 118-2, 118-8, 118-9, 118-10; 114-5, 213-6, 213-7, 215-4; 118-6 Chem 521 117-4, 213-7, 215-3	**Physics 621 115-5, 117-11, 118-2, 118-4, 214-15, 215-4, 215-5, 329-6** Physics 521 116-6, 117-2; 116-7, 117-2, 118-2, 213-7
A3.2 Search engines, such as Google, scirus, and sciseek will provide links to sites. Key the search term, such as *genetics* or *bird flu.* Possible links to thousands of sites related to each word will be returned. Narrow the search by determining key words closely related to your chosen topic and place quotation marks around these i.e. "genetic disorders chromosomal". Look in the search engine results for ideas on other search terms i.e. rare genetic conditions, human genetics syndromes, etc. A3.3 Check that the material is free for educational use or contact the author/webmaster for permission to use downloaded content. Provide acknowledgement for the source of downloaded information. B3.3 Search for a topic related file on the Internet containing the extension .pdf This file will automatically open with Adobe Acrobat Reader on school computers. Research the .pdf format to explain why the author chose to save the file in this manner.				

Internet

Students will be expected to:	*Instructional Considerations*
E3.1 critically evaluate information and its source based on pre-determined criteria (Independent)	E3.1 The validity of information contained in a particular web site may be evaluated by critically examining several factors. Dalhousie University Library provides a summary and evaluation checklist at http://www.library.dal.ca/how/criteval.htm that breaks the evaluation process into the following six general areas: (Sue Hunter, 1999) • Authority or creditials of the author. Has he/she written other articles? Is he/she educated or have experience in the area? Is the author writing for an organization, such as a university or government? • Purpose. Who is the intended audience? eg. adults, toddlers or teens? Is the site trying to persuade or sell something? Is there a hidden agenda or bias? • Coverage. Is information factual, detailed and presented in its full and proper context? Does the presentation seem to make sense? • Currency. Is the site up-to-date and references recent research or facts on the topic? • Objectivity. Is material presented with balanced and fair arguments? Is there consistency in that arguments do not contradict one another? • Accuracy. Is the information provided in the site corroborated or supported in other sources? Is a bibliography provided? Should a weakness be found in any one of the above areas, the reader should be careful about relying on information found on that particular site. Stress that anyone can easily create a professional looking web site without it being edited or supported by factual information. The tilde symbol (~) in a URL indicates that the resource was constructed and belongs to a particular individual, such as student or faculty member in an educational organization. There are many "fringe groups" who use the Internet to convey their "message" or "view of the world" to an unsuspecting public.

Internet

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
E3.1 Vist the Media Awareness Network site to critically assess the validity of online resources. (http://www.media-awareness.ca/english/teachers/wa_teachers/fact_or_folly_teachers/index.cfm) Search for sites which contain fictitious information using terms such as "critical literacy", "fact or fiction", "online", “crop circles”, “sasquatch”, “ufo” in a search string. Teachers should preview selected sites carefully, and provide the URL of pertinent pages. Using the criteria found under "Instructional Considerations", judge the validity of these sites.				

Telecommunications

Students will be expected to:	*Instructional Considerations*
A10.1 collaborate using software (Independent)	A10.1 Within the classroom, collaborative tools (i.e. whiteboard, slideshow, application sharing, chat, messaging, send and receive files, photos, group file sharing, resource sharing (links), online content creation and sharing, assignment drop box, video and audio, discussion forums, journal) make it possible for students and teachers to work together in a virtual workspace. This is particularly useful when students are involved in groupwork outside of class time and live a distance apart. These tools may also make it possible for students with illness to stay in touch with peers and class activities. Establishing connections with classrooms in different parts of Canada or the world can be a powerful tool for the classroom teacher in all subject areas. Student assignments take on another level of authenticity when they are shared with other classes via telecommunications.
B10.10 use the organizational features of collaborative tools such as scheduling, calendaring, and interactive syllabus (Guided 10)	B10.10 Online learning content management systems rely on specific instructions linking content to activities and completion dates (interactive syllabus). These tools ensure that activities are performed in sequence and are not overlooked. They allow larger activities to be subdivided into smaller, manageable parts.

Telecommunications

Teaching Suggestions, Activities and Assessment	*Links to Specific Curriculum Outcomes*			
	Grade 10	**Biology**	**Chemistry**	**Physics**
Technology Lesson Plan: ***Organ and Tissue Transplantation*** *Pg. 94* Outcomes A10.1, A11.2, B11.1, B11.4, E2.9, E11.1		**Biology 521** **115-5, 317-1, 317-4, 317-8**		
Preparing For Debate Using Discussion Forum *Pg. 126* Outcomes A3.2, A10.1, B10.10, E3.1	114-1, 213-7, 215-1; 118-9, 114-5, 118-1	**Biology 621** **212-1, 213-6; 219-7, 316-4; 118-6, 213-6, 316-3** Biology 521 118-10; 117-4, 215-4, 214-15; 118-6	Chem 621 117-6, 118-2, 118-8, 118-9, 118-10; 114-5, 213-6, 213-7, 215-4; 118-6 Chem 521 117-4, 213-7, 215-3	Physics 621 115-5, 117-11, 118-2, 118-4, 214-15, 215-4, 215-5, 329-6 Physics 521 116-6, 117-2; 116-7, 117-2, 118-2, 213-7
Lets Review *Pg. 130* Outcomes A10.1, B10.10 (assessment in all areas)				
A10.1 Use of collaborative tools expands the resources available to the classroom. The teacher and students can communicate with each other regarding questions from discussion in class. Teachers can model the information process by accessing online experts. This demonstrates that teachers, just like students, do not have all the answers but have the skills to find out. Online tools may be used to prepare for a class debate or a guest speaker. Use of file sharing or threaded discussion forum features allow the monitoring of individual contributions to group activities.				
B10.10 Ensure that timelines and instructions for assignment are complete. Post assignments / homework within an online content management system or on the school web page. Use "Hand in Folder" feature. E-mail assignments/instructions (.pdf files are useful for attachments)				

Lesson Plans

Integrating CIT Outcomes by Core Subject Area

Outcomes from the CIT curriulum continuum that are identified as Awareness, Guided or first year Independent at the senior high level must be integrated into core subjects areas. These outcomes have been allocated to core areas by grade level so that students experience computer information technology being applied throughout all content areas during their high school years. This strategy also limits the number of CIT outcomes that must be addressed in any one subject.

SENIOR HIGH CIT OUTCOME DISTRIBUTION				
Grade	Social Studies	English	Math	Science
10	Web Authoring Social/Ethical	Internet Telecommunications	Graphics Spreadsheets Computer Systems	Multimedia Database
11	Internet Telecommunications	Multimedia Database	Graphics Spreadsheets Computer Systems	Web Authoring Social/Ethical
12	Multimedia Database	Web Authoring Social/Ethical	Graphics Spreadsheets Computer Systems	Internet Telecommunications

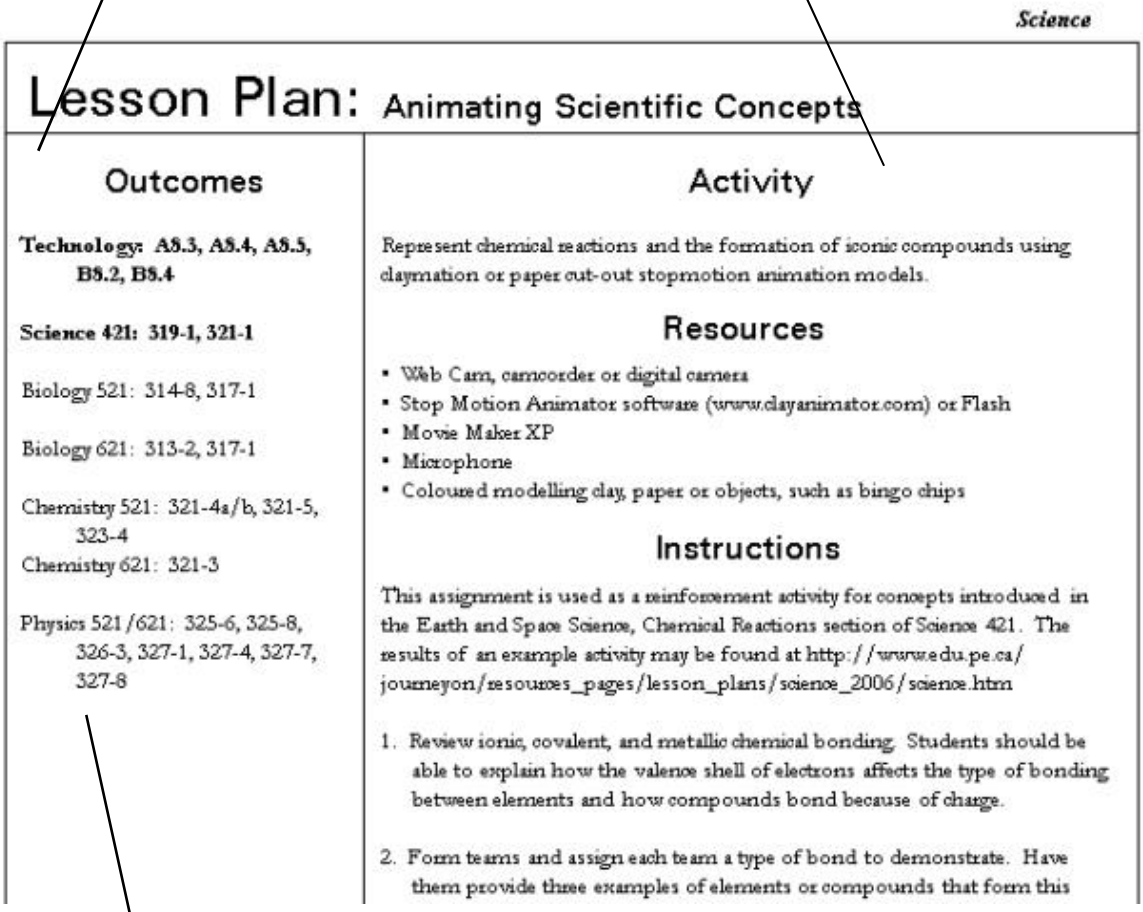
Within the science curriculum, lesson plans have been developed that integrate the CIT curriculum outcomes into specific subject content areas. Teachers are encouraged to incorporate tools and concepts introduced in lesson plans at one grade level, e.g.: Science 421, Animating Processes, into others by referring to the "Links to other subject outcomes". On page 50, notice that links are provided to Biology 521/621, Chemistry 521/621 and Physics 521/621 where animation may be used to meet the listed outcomes. Lesson plan activities are meant to be suggestions. They may be adapted, changed or applied to different content providing the CIT outcomes, as outlined for that area, have been met.

SCIENCE CIT OUTCOME DISTRIBUTION	
Subject	Outcome Area
Science 421	Multimedia Database
Biology 521 Chemistry 521 Physics 521	Web Authoring Social Ethical
Biology 621 Chemistry 621 Physics 621	Internet Telecommunications

Lesson Plan Layout

Outcomes For Suggested Subject Area are indicated in Bold print

Activity, Resources, Instructions and Suggestions



Science

Lesson Plan: Animating Scientific Concepts

Outcomes

Technology: A8.3, A8.4, A8.5, B8.2, B8.4

Science 421: 319-1, 321-1

Biology 521: 314-8, 317-1

Biology 621: 313-2, 317-1

Chemistry 521: 321-4a/b, 321-5, 323-4

Chemistry 621: 321-3

Physics 521/621: 325-6, 325-8, 326-3, 327-1, 327-4, 327-7, 327-8

Activity

Represent chemical reactions and the formation of iconic compounds using claymation or paper cut-out stopmotion animation models.

Resources

- Web Cam, camcorder or digital camera
- Stop Motion Animator software (www.clayanimator.com) or Flash
- Movie Maker XP
- Microphone
- Coloured modelling clay, paper or objects, such as bingo chips

Instructions

This assignment is used as a reinforcement activity for concepts introduced in the Earth and Space Science, Chemical Reactions section of Science 421. The results of an example activity may be found at http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm

1. Review ionic, covalent, and metallic chemical bonding. Students should be able to explain how the valence shell of electrons affects the type of bonding between elements and how compounds bond because of charge.

2. Form teams and assign each team a type of bond to demonstrate. Have them provide three examples of elements or compounds that form this

Links to other Science subject outcomes that may be met with a similar activity

Lesson Plan Index

Lesson Plan: Researching PEI Ecosytems

Outcomes

Technology: A3.2, A3.3, B9.6, B9.8

Science 421: 116-1, 213-7, 214-3, 331-6, 331-7, 318-3, 318-4

Activity

Collect local environmental data from online sources. Analyze this information and write an overview or "report card" for PEI from an environmental point of view.

Resources

- Internet
- Statistics Canada ESTAT Account
- Inspiration 7.5
- Word Perfect

Instructions

1. Each Island high school should be registered with an ESTAT account. (http://estat.statcan.ca) Choose "Accept and Enter" at the bottom of the page. Access to ESTAT materials on the STATS Canada site should occur automatically. If not, check with your librarian or STC.

2. Statistics Canada data is stored in a series of database "tables". (Think of each table resembling a spreadsheet grid). The power of the database is provided by the ability of the user to make queries that will search and retrieve data from many different tables at one time. This type of database is termed a "relational database" as relationships or connections are established between the data found in each separate table. The type of database found in simple programs such as Appleworks or MS-Works is called a "flat" database. A flat database contains only one table and does not provide the flexiblilty required for more sophisticated "real world" applications. Statistics Canada uses the term "time series retrieval" to allow the user to select data from several tables at one time. "Table retrieval" will provide information from one table only, much the same as in a flat database. Review this terminology.

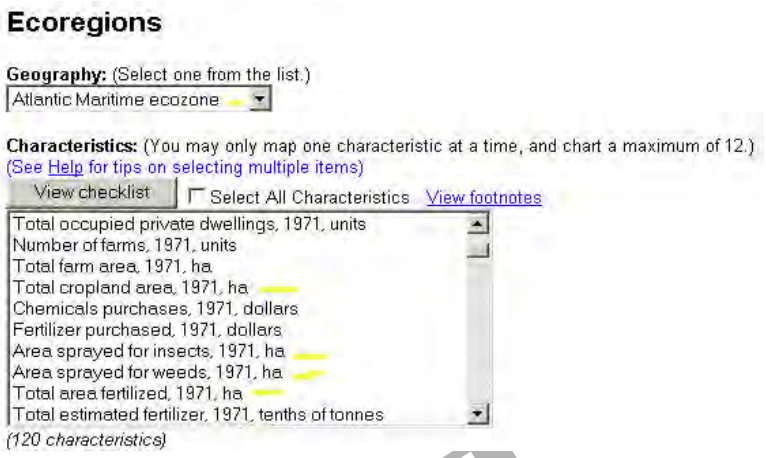
2. Assign student groups and have participants divide up the research work-load.

3. At the E-STAT Table of contents page, select Data.
   - Under the heading, Land and Resources, select Environment.
   - Under Environment module, select Environmental impact.
   - Under Environment Statistics, Ecoregions, select Ecoregions.
   - Under Geography, select Atlantic Maritime ecozone.

4. Hold down the ctrl key and select the following:
   - Total cropland area, 1971, ha
   - Area sprayed for insects, 1971, ha
   - Area sprayed for weeds, 1971, ha
   - Total area fertilized, 1971, ha
   - Select the same 4 characteristics for 1981 and 1991 and 1996 data

Lesson Plan: Researching PEI Ecosytems

Instructions (continued)



5. Under Choose an output format, Click Reduce or Sort Geo List. Select Prince Edward Island from the list provided.

6. From Screen Outputs, select "Bar Chart" to see the relationships graphically.

7. Select "Table Area as rows" to see the numerical data. Record this data.

8. At the E-STAT Table of contents page, select Data.
   - Under the heading, Land and Resources, select Environment.
   - Under Environment module, select Environmental impact.
   - Under Environment Statistics, Select Provinces

9. Record the following data for the years indicated:

   - Forestry - hectares clearcut & replanted for '91,'95, '99, '01
   - Energy use - industry, transportation, residential & farm, government for '91,'95, '99, '01
   - Protected Lands - '89, '96, '97, '03
   - Sulfur Dioxide emissions - '85, '90, '95
   - Nitrogen Oxide emissions - '85, '90, '95
   - Carbon Monoxide emissions - '85, '90, '95
   - Suspended particles emissions - '85, '90, '95
   - Carbon Dioxide emissions - '85, '90, '95
   - Total Greenhouse Gas emissions - '91, '95, '00
   - Volatile organic compound emissions - '85, '90, '95
   - Government spending on environment - '91, '95, '99, '01
   - Packaging used / packaging recycled - '90
   - Ground water extracted - '81, '91, '96

Lesson Plan: Researching PEI Ecosytems

Other Activities

- assign each group of students a different province or ecoregion

Instructions (continued)

10. Visit the Canadian Atlas at http://atlas.nrcan.gc.ca/site/english/index.html

11. Select: "Environments" - "Ecology". Examine the Atlantic portions of the following maps:

    - sewage treatment
    - mines
    - industrial discharge
    - protected areas/species at risk
    - ecozones/rare plants/endemic plants/wet lands
    - road density/population variance by ecoprovince
    - agriculture/change in area of potatoes/productive forests

    * Outline maps of the Maritime Provinces and Quebec may be helpful to record data. See "Explore Our Maps" - "Reference Maps" - "Outline Maps"

12. Use library or web resources to locate the major ocean currents, drainage basins into the Northumberland Strait and prevailing wind currents in Eastern Canada. Draw these on the outline maps, if you have chosen to use them. Are there any sources of "contaminants" found in the Canadian Atlas maps that might make their way to PEI?

13. Use Inspiration to organize your findings.

14. Arrive at a group concensus regarding the health or continued health of the PEI ecosystem.

Suggestions For Assessment

- Summarize the most significant findings in a page or less.

- Present the Inspiration diagram and support/explain most significant findings.

Activities Adapted from:

Statistics Canada, "A look at 20 years of pesticide, herbicide and fertilizer use on farms in one ecozone", http://www.statcan.ca/english/kits/pesti2.htm

The Atlas of Canada, "Pollution and contaminants in the northern environement", http://atlas.nrcan.gc.ca/site/english/learningresources/lesson_plans/high_school/nu_hs.html#1

Lesson Plan: Researching PEI Ecosytems

Solution (Estat Data):

Total Cropland (hectares 000)	'71	'81	'91	'96
Area sprayed for insects	150	180	185	190
Area sprayed for weeds	25	35	50	50
Total area fertilized	45	95	95	100
	60	120	120	130
Provinces - PEI - Forestry Land	'91	'95	'99	'01
Clear cut (sq. kms)	11	31	58	49
Tree Replentishment - Seedlings	10	8	11	17
Energy Use (%)				
Industry	8	8	7	n/a
Transportation	38	39	42	n/a
Residential and farming	33	30	30	25
Government and commercial	21	23	22	23
Protected Lands (sq. kms)	'89	'96	'97	'03
	60	78	101	148
Emmissions (000 tons)	'85	'90	'95	
Sulfur dioxide	2	4	3	
Nitrogen oxide	6	8	8	
Carbon monoxide	64	68	54	
Suspended particles	8	6	90	
Volatile organic compounds	11	19	10	
carbon dioxide	1370	1280	1400	
Total greenhouse gases (000 tons)	'91	'95	'00	
	1930	1870	2150	
Gov't Spending on environment (millions)	'91	'95	'99	'01
	7	7	18	13
Packaging used (000 tons)	'90			
Packaging recycled	47			
	4			
Municipal ground water withdrawal (million cubic meters)	'91	'96	'98	
	7.4	8.3	9.1	

Student evaluation of data trends will vary. It is helpful to convert numerical data to percentage increase or decrease for analysis.

Lesson Plan: Researching PEI Ecosytems

Solution (Map Data):

Consider the following information from map analysis:

Sewage treatment - rural PEI and Atlantic Canada have private sewage treatment systems. This increases the changes of ground water contamination or improper treatment.

Mines- no mines exist on PEI. However, our air or water may be affected by activities in NS, NB and the Gaspe of Quebec. Students may argue effect differently depending upon area on PEI in which they reside.

Industrial discharge - a relatively low number of industries discharge waste into the local PEI environment. However, a glance at the St. Lawerence River indicates a heavy discharge, especially in the upper regions. This water flows into the Gulf of St. Lawerence and Northumberland Strait.

Protected areas - PEI, NB and NS have 1-5% protected lands. Students will express opinions as to the adequacy of this number.

Ecozones/rare plants/endemic plants/wet areas - PEI is found in the Atlantic Martime ecozone. There are a low number of rare plants or those that are only found in Canada. PEI has a low per centage of wet lands.

Productive Forests - 10-25% of PEI is productive forest land. This provides habitat for wildlife.

Change in area of potatoes - Western and central PEI have experienced 1-50% growth in potato acreage. The Eastern part of the province has grown by 51-100%. This is due to land being taken out of tobacco production.

Population variance by ecoprovince - NS, NB and PEI regions appear in the 50,000-250,000 people. The higher the number of people in an ecozone the greater harm to an ecosystem. Students will weigh this level of population.

Road density - 10,000-15,000 km of roads per ecosytem. PEI is very high in this area. Roads have a negative impact upon ecosystems.

Species at risk - PEI is in a very low area 1-3 species are at risk of extinction.

Other maps - relevant information ... please share feedback

Other research - ocean currents in the Gulf come from the north (St. Lawerence River, Gaspe and Western Newfoundland). Prevailing winds are from the West and South-West. Air polution (acid rain) from the South-Eastern United States and industrial areas around the Great Lakes make their way to Atlantic Canada.

Lesson Plan: Preserving PEI Wetlands

Outcomes

Technology: A3.2, A3.3, B9.6, B9.8

Science 421: 116-1, 213-7, 214-3, 331-6, 331-7, 318-3, 318-4

Activity

Research PEI wetland areas. Suggest a wetland area to preserve based upon predetermined criteria.

Resources

- Internet (http://www.peilandonline.com)
- Word Perfect

Instructions

The PEI Land On-Line GIS system provides information to the public concerning properties on PEI. The part of this site containing information relating to property owners, renters, field boundaries and Enhanced Environmental Farm plans is password protected. Information pertaining to GPS coordinates are not provided in either the public or private areas of the site.

Visit http://www.peilandonline.com for the PEI Land Online site. (Part of this site is password protected. Click on the logo in the top right of the page for the public materials section)

Lesson Plan: Preserving PEI Wetlands

Instructions (continued)

Discriptions of map tools and navigational aids follow:

 use to center map where the mouse clicks

 click to zoom in or draw a square around area of interest in map

 click to zoom out or draw a square around area of interest

 select a land parcel (must be zoomed in on map) its boundary will be marked in red

 provides information about a parcel in a pop-up window (password area only)

 measures distance between mouse clicks on the map

 provides area between selected points (use ruler tool to select)

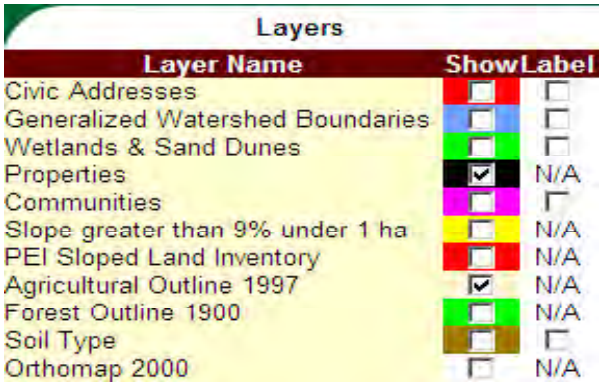
select miles or kilometer units

select acres or hectares

 data layer information that can be enabled. Tools appear at right of map.

 search map for civic address or community. Replaces layer tools at the right of the map.

The data layers that may be enabled for the map are shown below:



Lesson Plan: Preserving PEI Wetlands

- Impress upon students that the functionality of the GIS application is made possible through the use of a relational database. Discuss the features of a relational database.

Instructions (continued)

Before changes made in the data layer selections will show on the map, "Apply Changes" must be clicked. (See layers image on previous page) The map must be zoomed in quite far before the orthomap layer will apply, providing actual images of the landscape.

Part I

The following activities are designed to familarize users with features found in the PEI Land Online GIS application.

1. Select the community where you live in the search area and click on "find"

2. Use the zoom tool and draw a square around the area on the map close to where you live or where your school is located. Repeat if you have not located the proper location.

3. Select the "center" tool and click the map to center to place the property in the center of the map display.

4. Click on the "layers tool". Place a check in the Properties "show" area. "Apply Changes".

5. Use the "selection tool" to select the property. Note that a red line shows the boundary around the property.

6. Select the "ruler tool" and click at the front of the property and click once again at the back of the property. How long is the property measured in meters? What tool button do you have press if the distance is expressed in feet?

7. Use the "ruler tool" and click on points all of the way around the outside boundary of the property. Use the area tool to find the area of the property in acres. What was the area? Does this seem accurate?

8. Click on the "layers tool". Place a check in the Civic Addresses "show" and "label" area. "Apply Changes". What is the civic address of the property you have selected?

9. Uncheck the civic address boxes. Check the Orthomap 2000. "Apply Changes". An aerial map of the property and surrounding area should appear. Are there noticeable changes in the area since the time the photo was taken?

10. Examine other areas in the community from the Orthomap. Are there recognizable landmarks? New roads? buildings? logging? farm land?

Lesson Plan: Preserving PEI Wetlands

Instructions (continued)

11. Uncheck the orthomap. "Apply Changes". Select an area near your community where there is swampy land, ponds or streams. Check "Wetlands and Sand Dunes". "Apply Changes". Zoom in to the area if the "green" low lying areas are not showing.

12. Uncheck "Wetlands and Sand Dunes". Locate another area near your community that is "hilly". Check "Slope greater than 9%". "Apply Changes". Zoom closer to the area if "yellow" areas are not displayed indicating slopes of 9% or over.

13. Check "PEI Sloped Land Inventory". "Apply Changes". How did this effect your map?

14. Select a farming area near your community from the map. Uncheck any selected layers. Check "Agricultural Outline 1997". "Apply Changes". Zoom closer if required. Does the agricultural land area appear to be mapped accurately?

15. Enable the "Forest Outline 1900" layer. Compare this to the areas shown from the "Agricultural Outline 1997". Is there more or less farmland in the area selected in 1997 as compared to 1900? Did your finding surpirse you. What are some of the factors that might explain the change?

16. Uncheck any layers. Check the Soil Type "Show" and "Label" boxes. Use the information tool to find more information about the soil found in various areas surrounding your community. What are some types of information provided for soil in a location. (from the pop-up window after the information tool is used) Alternatively, zoom in on the map until the soil types are displayed.

Part II

Use the "Wetlands & Sand Dunes" layer to examine the location of these areas on PEI. The PEI Government has given your group the task of identifying an area of Wetlands and/or Sand Dunes to become a protected area.

1. Construct a list of criteria for determining the protected area. The criteria may include:

- be of a particular size i.e.: between 500 and 1000 acres
- have alternative recreational uses
- home to rare plant/animal species or large numbers i.e.: geese, ducks
- fragile environmental area
- alternative reasons (protect water source, fish or shellfish habitat)

- rare plant and animal species may be found at http://www.accdc.com/products/PECounties.htm interpretation of "Srank code" is found at http://www.accdc.com/data/ranks.html

- visit http://www.bsc-eoc.org/iba/IBAsites.html Select "Prince Edward Island" in the search criteria. Data is provided on 6 areas of PEI

Lesson Plan: Preserving PEI Wetlands

Other Activities

- Visit http://eservices.gov.pe.ca/pei-icis/address-locator/maps-search.jsp to find community property numbers, street and road names, etc. CA Communities provides information about particular communities. Note that GPS points are provided at the bottom of the map display. (The Address Locator is a free online tool that is available to everyone. Most other areas of this online GIS tool are for registered users and fees are charged for information supplied.)
- the satellite view in Google Maps (http://maps.google.ca) will provide more recent images of land areas of the province
- prepare an ATutor blog entry instead of a 1 page report about the protected area

Instructions (continued)

2. Examine the "Wetland & Sand Dune" areas identified on the map. (The "Generalized Watershed Boundaries" layer may be helpful, as well). Find an area that meets the criteria identified in step 1. i.e.: use the "area tool" to determine approximate size. Is the area close to an urban center or tourist attraction? Is it close to where recent fish kills occurred? If local, students may identify rare plants or animals, and other reasons why an area is environmentally important.

3. View the orthographic map of the area (leave the "Wetlands & Sand Dune" layer checked. "Apply Changes". Do you notice any other factors that might be considered? Potato fields, apparent logging or housing in the area?

4. Write a brief 1 page report about your protected area. Include:
   - where it is located (community, near roads or near a particular civic address. (The Address Locator tool found under "Other Activities" would allow GPS latitude and Longitute points to be determined)
   - take a screen capture of the area from PEI Land Online using Paint Shop Pro. Insert this image in your report.
   - the selected area size in acres
   - reasons why this particular area should be protected

5. Share with the class or with another group.

Suggestions For Assessment

- demonstrate the map tools and layer features. Have individuals practice with the tool to ensure they understand how they work.
- pair students together to check each others calculations.
- use the school or another public property from which students will collect data. This will give an indication of whether students are able to use the map tools properly.
- criteria was developed prior to searching for a "protected area"
- criteria was followed and reasons for protection are plausible
- report contains the screen capture, criteria clearly outlined and supported

Lesson Plan: Preserving PEI Wetlands (Agriculture)

Technology: A3.2, A3.3, B9.6, B9.8

Agriculture 801: "Determine the relationship between water and soil in our environment and the recommended practices for conserving these resources (outcome number framework not assigned in this guide)

Other Activities

"Staking Your Claim" activity was created by Carla Buchanan for the Agriculture Educators Workshop held during the summer of 2007. The background information to support this activity was provided by the "Preserving PEI Wetlands" CIT lesson.

Use PEI Land Online GIS resource to claim PEI farmland property. Explore soil type, land slope and buffer regulations that apply to this property.

Resources

- Internet (http://www.peilandonline.com)
- Word Perfect

Instructions

1. Perform the Part I exercises to become acquainted with the PEI Land Online resource.

Part II. Stake Your Claim

1. Choose farm property based upon the following criteria:
   - the farm must have ten fields
   - the fields can be close to each other or in neighbouring communities
   - at least four fields must border rivers, steams or wetlands
2. For each field determine the following to identify/locate the property:
   - assign a number from 1 to 10 to each field (made up by student to keep track of each property)
   - a civic address of a property nearby
   - the community in which the field is found
   - the road from which the property is accessed
3. Research the following farm regulations:
   - visit the Department of Agriculture website under "Legislation and Actis" to find information on the Agricultural Crop Rotation Act. (http://www.gov.pe.ca/af/agweb/index.php3?number=69939) What does the Act say about land slope? What are regulated crops? (look under definitions at the beginning of the document)
   - what is the minimum buffer required if planting an agricultural crop? This information, and other information about buffer zones can be found at http://www.gov.pe.ca/af/agweb/index.php3?number=74083&lang=E

Lesson Plan: Preserving PEI Wetlands (Agriculture)

Instructions (continued)

Part III. Explore The Farm Property

1. Field Dimensions

- determine the approximate acreage for each field
- calculate the total acreage of the farm
- for two fields, convert acres to hectares
- for two fields measure the length and width

2. Soil Types

- find the soil types found in each field

3. Slope

- based upon the research conducted on slope legislation, are there areas of any of your fields that can not be planted with regulated crops? (Hint: PEI Sloped Land Inventory layer)
- Approximately how many acres would this be?

4. Buffer Zones (for fields near water)

- examine the orthomap for each field that is near water. Determine the width of the buffer zone at the time the aerial photo was taken. Does this buffer meet current regulation?
- Approximately how many acres are taken by buffer zones. (Assuming that current regulations are met)

5. Assess the impact of slope and buffer legislation on island farmers based upon your findings from the 10 fields selected.

Suggestions For Assessment

- the accuraccy of information provided by students regarding field dimensions, soil types, slope and buffer zones will be hard to ascertain as each is working from different field data. Check with students as they are working through the activity to ensure they understand concepts and are using the tools properly.

- ask each student to select a field near water from a classmate. Have the student demonstrate and explain how answers were determined. Do both agree that the answer is reasonable? Repeat so each student has the opportunity to defend his/her answer.

- arguments, reasoning and further investigation into the impact of slope and buffer legislation on island farmers may be assessed

Lesson Plan: Preserving PEI Wetlands (Agriculture)

	Community	Road	Civic Address	Acreage	Hectares*	Width*	Length*	Soil Types	Buffer Zone (in meters)	Acres in Buffer Zone	Acres of slope >9%
Field 1											
Field 2											
Field 3											
Field 4											
Field 5											
Field 6											
Field 7											
Field 8											
Field 9											
Field 10											

* - for two fields only

Lesson Plan: Measuring Motion with MovieMaker

Technology: A8.3, A8.4, A8.5, B8.2, B8.4

Science 421: 212-6, 213-3, 214-5, 214-8, 214-10, 325-1, 325-2, 325-3, 325-4

Physics 521/621: 325-2, 325-7

Activity

Design and conduct an experiment to measure the position and speed of various objects. Graph and analyze the data using a spreadsheet.

Resources

- DV Camcorder (with timecode feature)
- Quattro Pro (spreadsheet)
- XP Movie Maker (video editing software)
- Cones or other distance markers
- Other resources as determined by experiment selected

Instructions

Students design and construct an experiment that measures position of an object over various clock readings. i.e. running, walking, dropping a ball, progress of a windup toy or thrust provided by ballons attached to a drinking straw on a tightly-strung string, etc. The distance over which the experiment will be conducted is measured and marked. A camcorder, on a tripod, is used to record the movement and time taken to reach each measurement marker. Record and graph the data in a spreadsheet. Analyze the results.

The results of an example activity may be found at http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm

The following suggestions may be helpful in designing this activity:

1. Demonstrate how to set the timecode feature on the camcorder and how MovieMaker can display this information. Explain that speed can be calculated by counting the number of seconds and frames it takes an object to travel a given distance. (The camcorder captures video at a rate of 29.97 frames per second. Time code format is hrs:mins:secs:frames on most cameras and video editing software. MovieMaker time code display uses hrs:mins:secs:hundredths of second)

2. Group students to brainstorm experiment scenarios. Discuss the need for the establishment of a consistent measurement point on the object i.e. waist or shoulder of a person or the front bumper of a car reaching a marker. Have a person from each group demonstrate how their object will be measured in relation to the marker. This will ensure consistent and accurate reading of data points.

3. Groups must determine an appropriate distance to place makers for their particular object/experiment. Remind them that they may require an area on either side of the "measuring zone" for acceleration and slow-down.

Lesson Plan: Measuring Motion with MovieMaker

Instructions (continued)

4. Design the details of the experiment and assemble objects required outside of class time. Groups should do a "dry-run" of the experiment prior to shooting to make sure they have considered all needs. Should students have access to a camcorder outside of class the "shoot" may be completed out of class as well.

5. While shooting, ensure the camera is positioned far enough way from the activity to catch the entire movement of the object. It should be positioned at right angles to the measurement zone and close to the height of the markers. Ensure that there is sufficient lighting.

6. Start recording approximately 3 seconds prior to the beginning of the event (i.e.: dropping the ball) and film approximately 3 seconds after the event. Extra footage may be trimmed in the video editing software. Stop the camera between the filming of individual experiments. This will ensure that each will become a separate "clip" when transferred to MovieMaker.

7. From within MovieMaker "capture" the video clips from the camcorder. Individual clips should be identified, named and saved. Clips may be distributed by placing them on CD/DVD, emailing or placing them on the network M: drive.

8. Each group will open their clip in MovieMaker. Move the playhead so that the object is in line with the first measuring point. Note the time code reading. Repeat for each of the other markers in the experiment.

9. Record the clock reading (time code) at various positions.

10. Record the position and clock reading data in a spreadsheet.

11. Use the data to calculate the time interval, displacement and average velocity in the columns

12. Prepare graphs displaying Displacement vs. Time, Position vs. Time and Average Velocity vs. Time

13. Do you feel the speed calculated is reasonable? What factors might effect the accuracy of the measurements? Are there real-world applications for determining speed in this way?

14. Present findings.

Lesson Plan: Measuring Motion with MovieMaker

Other Activities

- design an experiment using the GLX Xplorer and motion Probeware (see Probeware resource listing in appendix)

Suggestions For Assessment

- approve experiment ideas/designs
- identify objects required/obstacles that must be overcome
- ensure that time code feature is invoked on camera and that time interval is accurately calculated from MovieMaker
- reflect on questions from item # 13
- prepare a rubric for the activity considering the specific cirriculum outcomes for the "Physical Science: Motion" section. An example is provided below.

MEASURING MOTION WITH MOVIEMAKER			
Example Rubric			
Criteria:	Below Exp. - 1	Meets Exp. - 2	Exceeds Exp. - 3
Concepts/Understanding: - showed accurate and complete calculations with units - accurately described the motion of the experimental object - factors that effect reasonableness identified			
Experimentation: - idea and design was innovative - construction materials assembled, care taken - data collection and reporting was accurate and complete - interpretation and analysis of data was accurately and explicitly shown			
Technology: - time code feature enabled - extra footage before and after shot - consider distance, shadows/lighting, use of tripod, camera angle - data recorded and graphed in spreadsheet - graphs transferred to presentations			
Communication: - submitted a formal lab report including data in table form and resulting graphs - presentation to class, use of good grammar, experiment explained, graphs shown, questions answered			
Collaboration: - deadlines met - participated and made significant input into idea, planning and experiment design - all members were helpful and respectful to each other			

Lesson Plan: Measuring Motion with MovieMaker

Example Data

Example data & graphs:

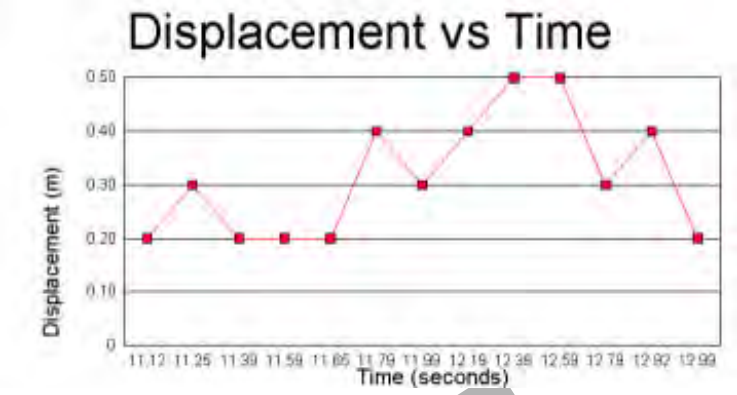
	A	B	C	D	E
1	BALLOON MOTION EXPERIMENT DATA				
2					
3	t	d	Δt	Δd	Vavg
4	10.99	0.10	0.00		
5	11.12	0.30	0.13	0.2000	1.54
6	11.25	0.60	0.13	0.3000	2.31
7	11.39	0.80	0.14	0.2000	1.43
8	11.59	1.00	0.20	0.2000	1.00
9	11.65	1.20	0.06	0.2000	3.33
10	11.79	1.60	0.14	0.4000	2.86
11	11.99	1.90	0.20	0.3000	1.50
12	12.19	2.30	0.20	0.4000	2.00
13	12.39	2.80	0.20	0.5000	2.50
14	12.59	3.30	0.20	0.5000	2.50
15	12.79	3.60	0.20	0.3000	1.50
16	12.92	4.00	0.13	0.4000	3.08
17	12.99	4.20	0.07	0.2000	2.86
18					

1. Position vs. Time

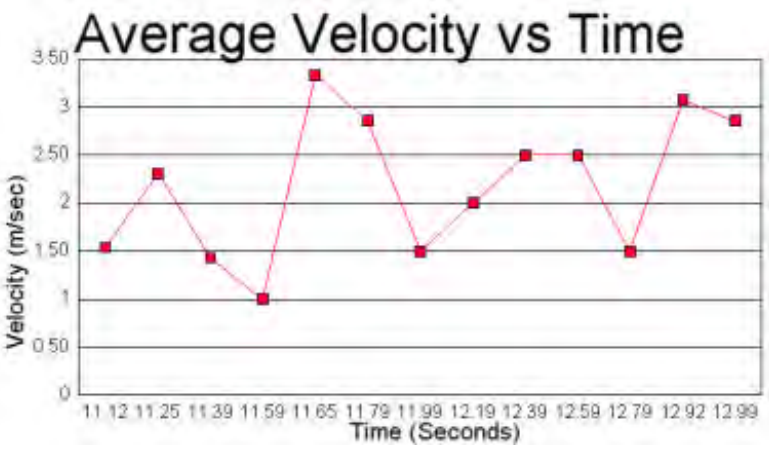
Lesson Plan: Measuring Motion with MovieMaker

Example Data

2. Displacement vs. Time



3. Average Velocity vs. Time



Questions relating to graphs:

1. Where was acceleration? (positive and negative)

2. At what time intervals was there constant velocity?

3. Compare the "Displacement vs Time" and the "Average Velocity vs. Time" graphs. Explain similarities and differences.

4. Use the "Average Velocity vs Time" graph to explain the "Position vs. Time" graph or vice versa.

Lesson Plan: Animating Scientific Concepts

Outcomes

Technology: A8.3, A8.4, A8.5, B8.2, B8.4

Science 421: 319-1, 321-1

Biology 521: 314-8, 317-1

Biology 621: 313-2, 317-1

Chemistry 521: 321-4a/b, 321-5, 323-4
Chemistry 621: 321-3

Physics 521/621: 325-6, 325-8, 326-3, 327-1, 327-4, 327-7, 327-8

Activity

Represent chemical reactions and the formation of iconic compounds using claymation or paper cut-out stopmotion animation models.

Resources

- Web Cam, camcorder or digital camera
- Stop Motion Animator software (www.clayanimator.com) or Flash
- Movie Maker XP
- Microphone
- Coloured modelling clay, paper or objects, such as bingo chips

Instructions

This assignment is used as a reinforcement activity for concepts introduced in the Earth and Space Science, Chemical Reactions section of Science 421. The results of an example activity may be found at http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm

1. Review ionic, covalent, and metallic chemical bonding. Students should be able to explain how the valence shell of electrons affects the type of bonding between elements and how compounds bond because of charge.

2. Form teams and assign each team a type of bond to demonstrate. Have them provide three examples of elements or compounds that form this type of bond.

3. Select one of the examples from #2 and prepare a diagram along with a written description of how the bonds form during this chemical reaction. Check this preliminary work for accuracy.

4. An understanding of the Periodic Table is essential to demonstrating the transfer of electrons during chemical reactions. Have students create clay or paper models showing the valance shell and electrons in the elements that they will be using. Agree on standard colours to represent protons, neutrons and electrons.

5. Demonstrate how to animate a model using Stop Motion Animator and a web cam or camcorder. Point out that video is normally captured at the rate of 30 frames per second. For Stop Motion animation the number of frames is often set to 12 to 15 frames per second as this is adequate to show movement and keep the completed file size smaller. You will find that the animation is very short when captured frames are displayed at the rate of 12-15 frames each second. The software will allow you to set the frame capture rate from the camera in the range from 1 to 10+ frames. Set a frame capture rate of 4 and the frames per second to 12 under "File" - "Capture Options" in Stop Motion Animator.

Lesson Plan: Animating Scientific Concepts

Other Activities

- many scientific concepts and processes may be animated in order for students to demonstrate understanding i.e.: a paramecium ingesting food; representation of a body system; osmosis and diffusion; object movement; vectors; etc.

Instructions (continued)

Alternatively, images from a digital camera may be imported into Movie Maker to make the animation. Set the duration of each image in the timeline to .5 seconds and the transition between each to .25 seconds.

6. Quality of the animation may be enhanced with the use of lighting. Natural light from windows works well. In professional photography 3 point lighting (triangle lighting) is used to reduce shadows. Light sources are placed at 45 degree angles on either side of the front of the scene and another directly behind the set. In most rooms, lighting is bright enough to provide acceptable quality images. Avoid creating shadows on the set with hands or by standing in front of a light source.

   Quality of the animation may also be improved through the use of the "onion skin" software feature. This will show a "ghost" image of the last position of the objects on the computer screen as they are moved to new locations in the set. These allows for a smooth, uniform motion in the animated objects.

   Consider fastening the web cam to a steady surface or use a tripod to ensure that it does not move during the capturing process. Differences in camera angle can be detected when the animation is played.

7. Use your diagram or models to prepare an animation of the bonding process for the selected element/compound. Display each atom/element separately with its protons, neutrons, and electrons and overall charge. The animation must clearly demonstrate how charges and valence shell structures contribute to the type of bond this element produces.

8. Export the animation from Stop Motion Animator in .avi video file format. Open this file with Windows Movie Maker XP. Add titles, transitions, special effects and credits. Voice-over audio explaination of the bonding process may be added. The completed video file may be viewed with software such as Windows Media Player or Real Player.

9. Present the completed animations to the class. Answer questions.

Teaching Suggestions

- Models for animation may be constructed outside of class time.
- The animated project may be assigned outside of class time. Many students have access to web cams at home and the Stop Motion Animator software may be freely downloaded. Provision must be made to provide those students without access to computer equipment at home the opportunity to complete the project during or after school.

Lesson Plan: Animating Scientific Concepts

Suggestions For Assessment

- check diagram and model from step #3
- question different team members to ensure that they understand the bonding process
- provide students with an opportunity to animate a test model. Ensure they can set frame and capture rates. Have them demonstrate how to use the onion skin feature and how to adjust lighting.
- present completed model and answer questions
- prepare a rubric for the activity considering the specific cirriculum outcomes for the "Earth and Space Science: Chemical Reactions" section. An example is provided below.

ANIMATING SCIENTIFIC CONCEPTS			
Example Rubric			
Criteria:	Below Exp. - 1	Meets Exp. - 2	Exceeds Exp. - 3
Concepts/Understanding: - formula for common ionic compounds named and written - chemical reactions and the conservation of mass, using modular models and balanced symbolic equation represented - examples of bond types provided			
Animation: - description/diagrams completed on time and were technically accurate - models of valance shell and electrons completed - creativity was used in design - construction materials assembled, care taken - animation contained multiple elements such as original text, graphics, and sound - animation is fluent from beginning to end			
Technology: - frame capture rate and frames per second set properly - animation quality was good (procedures in lighting, tripod, onion skin, camera angle) - titles, transitiions, voice-overs and special effects were technically accurate			
Communication: - animation contained an introduction, body and conclusion - presentation to class, use of good grammar, concept well explained, questions answered			
Collaboration: - deadlines met - participated and made significant input into idea, planning and animation design - all materials were cared for and stored properly - all members were helpful and respectful to each other			

Lesson Plan: Do You Have An Issue With That?

Outcomes

Technology: A8.5, B8.2, B8.4, D2.1

Science 421: 114-1, 213-7, 215-1; 118-9, 114-5, 118-1

Biology 521: 118-10; 117-4, 215-4, 214-15; 118-6

Biology 621: 212-1, 213-6; 219-7, 316-4; 118-6, 213-6, 316-3

Chemistry 521: 117-4, 213-7, 215-3

Chemistry 621: 117-6, 118-2, 118-8, 118-9, 118-10; 114-5, 213-6, 213-7, 215-4; 118-6

Physics 521/621: 116-6, 117-2; 116-7, 117-2, 118-2, 213-7; 115-5, 117-11, 118-2, 118-4, 214-15, 215-4, 215-5, 329-6

Activity

Present evidence, information and perspectives that influence a science-related decision or issue in the form of a public service announcement.

Resources

- Web Cam or camcorder
- Movie Maker XP or Corel Presentations
- Microphone
- Internet

Instructions

In this assignment, students research an issue from the Life Science: Sustainability of Ecosystems section of Science 421. They will plan and produce a public service announcement that will deliver a short, clear message on the topic selected. Example topics may include watershed enhancement, logging practices, pesticide useage, land use, farming practices, endangered species, fishing practices, oil exploration, pollution, garbage disposal, etc. The purpose of the public service announcement is to educate people about an issue and have them support "positive action". The results of an example activity may be found at http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm

1. Identity environmental issues that we should be concerned about as a society. Discuss why these problems exist. What can be done to solve these problems? Does the general public have the information they need to make an informed decision about the issue? Would all "the public" feel the same way about the issue?

2. Select a particular issue for research. Determine the target audience (age group, rural, urban, male, female, etc.) that can influence positive change. How will the information or "message" be best presented in order to get the attention of this group?

3. Research information relating to the issue using the Internet and other sources. Develop a storyboard that will include the information that should be presented, the target audience and the manner in which the information will be presented to have maximum effect on this audience.

   This assignment may be as simple as collecting educational friendly images and audio files from the Internet on a topic such as "Save the Rainforest". These resources would be assembled in Movie Maker XP along with titles and transitions to effect the emotions of the viewer. The type of music and the speed at which images are displayed will be dependent upon the "target audience". More elaborate productions might have students discussing the issue on-camera and include student captured local footage showing P.E.I. logging practices. The music track may be student performed/created.

Lesson Plan: Do You Have An Issue With That?

Other Activities

- Movie Maker XP or Corel Presentations may be used by Biology, Chemistry and Physics students to present research on a wide variety of scientific topics i.e: the contributions of scientific pioneers, monumental discoveries, or information on a subject such as "bird flu" or "AIDS".
- document an experiment using Movie Maker XP. e.g.: catepillar to butterfly life cycle, hatching of frog/chicken eggs, fruit fly propagation
- produce a local watershed documentary or element commercial i.e.: name, symbol, atomic number, the atomic mass, picture, where it is found and industrial uses. Properties of the element would be included such as colour, density, conductivity, texture, hardness, luster, malleability, ductility, boiling point, and melting point
- document local environmental concerns such as roadside trash, old tires, burning of trash, abandoned car bodies, run-off into streams, erosion, soap from washing of cars, etc.

Instructions (continued)

4. Use Movie Maker XP or Corel Presentations to assemble resources as indicated in the storyboard. Include titles, video footage, still images and audio files.

5. View the public service announcements. Have students indicate any obstacles that had to be overcome and answer questions. Classmates may be given the opportunity to provide positive feedback on the work. Discuss occupational opportunities and training requirements identified in student works.

Suggestions For Assessment

- approve the topic selected, help students narrow the focus
- check the storyboard plan prior to production work commencing
- prepare a rubric for the activity considering the specific curriculum outcomes for the "Life Science: Sustainability of Ecosystems" section. An example is provided below.

DO YOU HAVE AN ISSUE WITH THAT?			
Example Rubric			
Criteria:	Below Exp. - 1	Meets Exp. - 2	Exceeds Exp. - 3
Concepts/Understanding: - information from various print and electronic sources or from several parts of the same source were integrated - multiple perspectives that influence a science related decision or issue were identified - a position or course of action, based on findings was developed/presented/or defended			
Presentation: - presentation contained multiple elements such as text, graphics, and sound - graphics and audio clips were acquired from educational friendly sites and credit for source provided. - design elements such as contrast between text and background; graphics and video are not intrusive and enhance the presentation - creativity was used in the design - presentation fluent from beginning to end			
Technology: - storyboard used to enhance product quality and to anticipate project needs/obstacles - titles, transitiions, voice-overs and special effects were technically correct - medium selected supported the "message"			
Communication: - target audience was identified - message was clear and effective - presentation to class, questions answered			
Collaboration: - deadlines met/on task - participated and made significant input into idea, planning and presentation design - all materials were cared for and stored properly - all members were helpful and respectful to each other			

Lesson Plan: World Weather Pattern Prediction

Outcomes

Technology: B9.7, B9.8

Science 421: 115-2, 116-1, 117-6, 118-7, 213-6, 213-7, 214-3, 214-11, 331-1, 331-2, 331-3, 331-4

Activity

Research weather data for geographic locations in Canada to determine if a correlation exists between mean monthly temperatures, total monthly precipitation and El Nino temperature measurements taken over various years.

Resources

- Internet
- Quattro Pro Spreadsheet
- Word Perfect

Instructions

El Nino water temperature changes occurring in the Pacific Ocean have dramatic weather impacts on areas found thousands of kilometers away. In other geographic locations the weather impact may not be noticeable. In this activity students will search the Environment Canada Weather database to determine if there is a correlation between winter temperature and precipitation rates in selected Canadian cities and the El Nino water temperature cycle.

Scientists use numerous remote sensory weather buoys located in the Pacific Ocean off the coast of Chile and Central America to collect data regarding ocean warming. Visit http://www.pmel.noaa.gov/tao/disdel/ to view real-time or historical data collected from these remote sensory devices. Of particular interest is the reading for SST (ocean sub-surface temperature) which is collected within a 1 meter depth of the surface. Other temperature readings are recorded from currents at various depths. Demonstrate how data may be obtained from this site.

1. Select a particular buoy from the display by drawing a box around it with the mouse. Note that each buoy is identified by its geographical co-ordinates.

2. Ensure that time series is displayed and enter a recent date in the date field to the left. (Today's date will be found in the date field to the right). Make sure that "one variable" and "SST" are checked and select "Display". Water temperature charts will be generated from the database data for the selected time period. Explain the symbols and view data for 1 or 2 more variable data that are collected.

3. Visit http://www.cpc.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml to see a chart of data that has been compiled into a monthly index of water temperatures from 1950 to the present. Examine this table to determine when El Nino's have occurred in the last 25 years. (A .pdf file of this data may be found at http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm)

Lesson Plan: World Weather Pattern Prediction

Other Activities

- The weather database contains basic data from 1840 and detailed information beginning in the 1950's. Look for weather trends over this period of time. ie: has it been getting warmer in winter? Are there higher summer temperatures? Have there been changes in precipitation patterns? Changes in wind? When did these changes appear?

- assign each student a buoy from step 1 to monitor over time. Find the exact location of this buoy from a map. Average the data from all buoys for each date monitored. Over time, is the average water temperature increasing or decreasing? Would this data be reliable for predicting the El Nino cycle and future weather in Canada?

- Environment Canada databases exist for Nature & Wildlife, Pollution, Sustainable Development, and water resources. (See http://www.ec.gc.ca/data_e.html) Investigate species at risk, pollutants, waste disposal, human activity and water use statistics by geographic region within Canada.

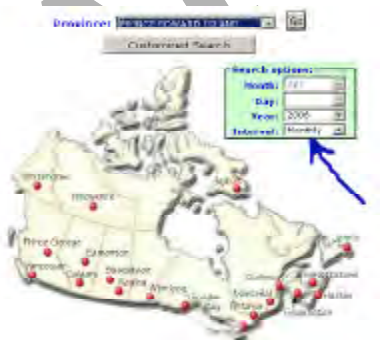
Instructions (continued)

4. Visit the Environment Canada's weather database found at http://www.climate.weatheroffice.ec.gc.ca/climateData/canada_e.html Notice that there is an interactive image-map of Canada with various cities listed.

5. Select different geographic locations from across the country to search for monthly mean temperature and precipitation rates. (Note that weather information may be found for other weather stations outside the main city centers. For example there are five locations shown for PEI).

6. Determine which winter month will be the "representative month" so that all students or groups will select data from a similar time period. Winter months are chosen as we expect the temperature to be milder and precipation amounts greater when there is an El Nino period.

7. Collect the mean temperature and total precipitation amounts for the month selected. If you have trouble finding the section of the database that provides monthly data make sure you place the monthly interval in the selection box before clicking on the city. See the diagram below.



8. Enter the data collected into a spreadsheet. Prepare a line graph that shows Temperature Vs. Time and another that displays Precipitation vs. Time.

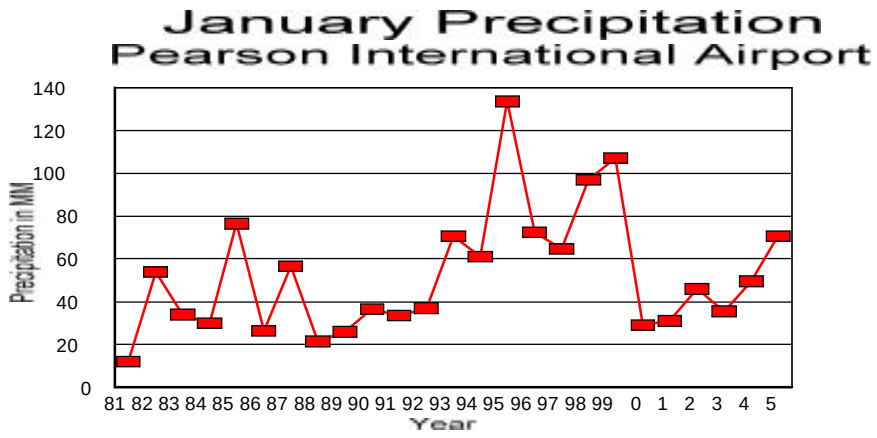
9. Compare the temperature and precipitation highs found in the graphs to the "Cold & Warm Episodes by Season" chart from step #3. Is there a correlation between these and the occurance of El Nino? Point out that a warm El Nino may need to be present for a period of time before it would have an effect on the winter weather in Canada.

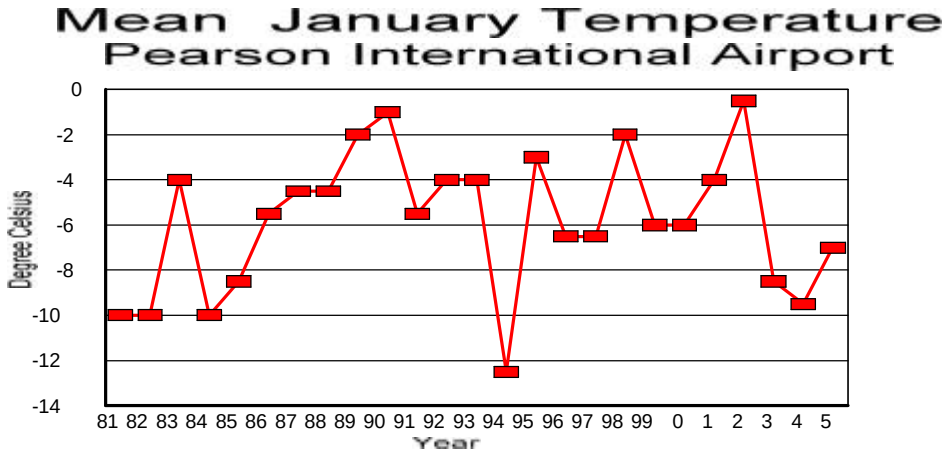
10. Copy and Paste the spreadsheet data and charts into Word Perfect. Provide a title page and comment on the results of the investigation. Does El Nino have an effect on the weather in the area of Canada you studied? Have you noticed any other climate trends in the time period studied?

Lesson Plan: World Weather Pattern Prediction

Solution (Pearson Airport Data)

Year	Temp	Precip	Year	Temp	Precip
81	-10	12	94	-12.5	61
82	-10	54	95	-3	133.5
83	-4	34	96	-6.5	72.5
84	-10	30	97	-6.5	64.6
85	-8.5	76.5	98	-2	97
86	-5.5	26.5	99	-6	107
87	-4.5	56.5	0	-6	29
88	-4.5	21.5	1	-4	31
89	-2	25.9	2	-0.5	46
90	-1	36.5	3	-8.5	35.5
91	-5.5	33.5	4	-9.5	49.5
92	-4	37	5	-7	70.5
93	-4	70.5			





Lesson Plan: World Weather Pattern Prediction

Solution (Pearson Airport Data)

El Nino periods effect northern climates through milder winters with more precipitation. These effects are noticeable in only some geographic locations in Canada.

Data collected at Person International Airport for January from 1981 to 2005 (Great Lakes Region) suggest that the heaviest precipitation occurred during the years 1985, 1993, 1994, 1995, 1996, 1997, 1998, 1999 and 2005. (60 mm and over from the graph). Highest mean temperatures occurred during 1983, 1989, 1990, 1992, 1993, 1995, 1998, 2001 and 2002. (-4 and above from the graph). Years that indicate both high temperatures and high precipitation are 1993, 1995 and 1998.

The Ocean Nino Index indicates that prolonged El Nino activity occurred during January of the following years 1983, 1987, 1988, 1992, 1995, 1998, 2003 and 2005. Only two years, 1995 and 1998 resulted in a correlation. The weak correlation for Pearson Internation Airport may be explained. First, there is a time-lag from the onset of El Nino activity and when effects are noticed on distant weather (often a 12-18 month difference). Second, large bodies of water have moderating effects on temperature and results in normally high percipitation levels. Finally, temperatures in the Great Lake region have been getting progressively warmer during the past decade regardless of the presence of El Nino activity.

Suggestions For Assessment

- approve the weather location selected for study
- ensure students have selected the correct years for El Nino activity from the "Cold & Warm Episodes by Season" table
- round data to the nearest half degree or mm when recorded into the spreadsheet
- separate graphs are prepared for precipitation and temperature, with titles and X and Y axis properly labelled.
- evidence of data analysis with rationale for why there might be a discrepancy from their findings and the El Nino activity records
- a Word Perfect document submitted with a title page, a description of the activity, data collected, two graphs and a summary findings section.

Lesson Plan: Supermarket CSI (Chemical Substance Investigation)

Outcomes

Technology: A11.2, B11.1, B11.2, B11.6, E3.1, E2.9, E11.1

Chemistry 521: 212-5, 213-6, 213-7, 214-3

Science 421: 114-1, 118-9, 213-7, 214-3, 215-1, 215-5

Biology 521: 117-4, 118-6, 118-10, 214-2

Biology 621: 117-2, 117-4, 118-2, 118-6, 315-10

Chemistry 621: 114-5, 117-6, 118-2, 118-8, 118-10, 213-6, 213-7, 215-4

Physics 521: 116-6, 116-7, 117-2

Physics 621: 115-5, 117-11, 118-2, 118-4

Activity

Research the ingredients or additives found in a consumer food product. Present findings in the form of a web page that includes one or more multimedia content componets (text, graphics, images, slideshow, animation, audio or video).

Resources

- FrontPage or Dreamweaver Web Editor
- Internet
- Corel Presentations 12

Instructions

In this activity students will display their research findings in a slide show that will be converted to a Macromedia Flash .swf format for display (embedded) within a web site. The assignment/assessment guidelines may be modified for students wishing to include alternative multimedia elements (e.g. animation) into their web page. Additional background information for the this assignment is provided in the "Chemistry & Consumer Products" section of the "From Structures to Properties" unit of the Chemistry 521 curriculum guide.

1. Identify a consumer food and assess the validity of the information collected relating to its history, additives and other criteria. Evaluate the company's claims about the product's safety, ingredients, and effectiveness. (See evaluating web sources on page 52 of this guide). Discuss factors that effect consumer purchase decisions.

2. Select a food substance (chemical ingredient or additive) identified above, and follow its development from raw material to a consumer product, paying particular attention to preparation and processing. Examples of additives may include MSG, aspartame, caffeine, and nitrites. Report on the substance with respect to: bond type; structure; strength; reactivity; interesting facts or stories; its development; single, double, or triple bonds; and flavour. Include diagrams, charts, graphs, and research credits.

3. Organize findings into a Corel 12 presentation.

4. Convert the completed presentation to a Fash file. Steps to convert are found below:
   - Select File - Internet Publisher
   - Internet Publisher "Wizard" begins - select "next"
   - Pick one of the "Existing Layouts" - select "next"
   - Choose the "Flash" radio button - select "next"
   - Pick the 1st "Page Style" displayed - select "next"
   - Select "Display Size" of 800 x 600 - select "next"

Continued on the next page ...

Lesson Plan: Supermarket CSI (Chemical Substance Investigation)

Instructions (continued)

- Check "Number" in page options - select "next"
- Leave "e-mail" and "web site URL" sections empty - select next
- Choose "browser colours" - select next
- Pick a "button style" - select next
- Enter the "Title" of the presentation and the directory path where the wizard will save the completed files (e.g.: G:/CSI) - select "next"
- Choose "Finish"
- View the resulting HTML page generated.

5. The HTML page produced by the Wizard is rather awkward. The Flash presentation "object" may be easily placed into a web page using an editor such as Front Page or Dreamweaver. Create a web page to house your presentation. Include a Title, background information relating to the assignment and related introductory graphics.

6. Locate the file with the .swf three letter extension in the G:/SCI folder. This file contains the complete presentation in Flash format. (No other files that were created by the wizard are needed)

7. Insert the .swf flash file into your web page. [Dreamweaver instructions: Insert - Media - Flash - select file] Code that the web editor will generate is found below:

```
< object classid = "clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase = "http://download.macromedia.com/pub/shockwave/cabs/
flash/swflash.cab#version = 6,0,29,0" width = "600" height = "450" >
< param name = "movie" value = "file://G:/CSI/pres.swf" >
< param name = "quality" value = "high" >
< embed src = "file://G:/CSI/pres.swf" quality = "high" pluginspage = "http://
/www.macromedia.com/go/getflashplayer" type = "application/x-shockwave-
flash" width = "600" height = "450" > < /embed >
< /object >
```

The quality and size of the slideshow may be altered by adjusting those variables in the code, above.

8. Web designers must be considerate of users who are viewing web materials. Notice that the wizard supplied a link to the Macromedia website where "Flash Player" may be downloaded. Consider the large file size of video/ presentation objects and provide users with information and choices concerning how they are best viewed on a particular computer system. i.e.: low, med, high compressed video or information supplied in "text only" html, .jpeg or .pdf formats.

Provide users with information on the website regarding the use of the Flash presentation and a link to where FlashPlayer may be downloaded.

Lesson Plan: Supermarket CSI (Chemical Substance Investigation)

Other Activities

- create a collage of food items highlighting the ingredients and additives in a poster, web page or Inspiration document
- Chemistry 521 outcomes 117-4, 213-7, 215-1, 215-3 may be accomplished through a similar lesson plan
- transfer completed .swf presentation files to ATutor class workspace for viewing. Provide written peer feedback through a discussion forum thread assigned to each presentation. A likert test/survey assessment based upon assignment rubric may be completed for each presentation.

Instructions (continued)

9. Completed files may be submitted to the instructor through the M:/mr_x/handin folder. The instructor (Mr. X) may transfer the files to his shared folder e.g. M:/mr_x/chem521 so that classmates can view the presentations. Alternatively, the .swf file may be displayed from within a blog or posted to the Internet linked from a class webpage.

   An example of a Corel Presentation file that has been converted to Flash format may be found at http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm

Suggestions For Assessment

- choice of chemical ingredient submitted for prior approval
- provide a rationale as to why information on a particular web site may be relied upon or not
- enhance data or explaination through the use of diagrams, charts or graphs
- present multimedia content with a structure and documentation that allows accessiblility to information
- present findings to classmates and answer questions

Lesson Plan: Thermo Chemistry 621 Presentations

Outcomes

Technology: A10.1, A11.2, B11.1, B11.4, E2.9, E11.1

Chemistry 621: 117-6, 118-2, 118-8,118-10, 324-1, 324-7

Activity

Convert completed presentations to Flash format and transfer these files online. Link these files to Blog posts and view using a web brower. Peer assess presentations from a class developed rubric using an online "Test and Survey" tool.

Resources

- Corel Presentations 12
- ATutor (http://atutor.edu.pe.ca/atutor)
- ATutor Backup File
- Online File Hosting (http://www.mediamax.com)

Instructions

Describe a scenario where a community and/or family has to select a fuel and justify which is best for a long-term plan. This STSE Project suggestion is found within the "Thermochemsitry" unit of the Chemistry 621 curriculum.

1. research a fuel during the course of the unit and prepare a Corel presentation containing findings.

2. develop or provide an assessment rubric for the project

3. convert the completed Corel Presentation to Flash format by following these steps:
   - Select File - Internet Publisher
   - Internet Publisher "Wizard" begins - select "next"
   - Pick one of the "Existing Layouts" - select "next"
   - Choose the "Flash" radio button - select "next"
   - Pick the 1st "Page Style" displayed - select "next"
   - Select "Display Size" of 800 x 600 - select "next"
   - Check "Number" in page options - select "next"
   - Leave "e-mail" and "web site URL" sections empty - select next
   - Choose "browser colours" - select next
   - Pick a "button style" - select next
   - Enter the "Title" of the presentation and the directory path where the wizard will save the completed files (e.g.: G:/chem) - select "next"
   - Choose "Finish"
   - Do not view the resulting HTML page generated.

4. The Flash presentation "object" may stand on its own and be easily placed into a web page or blog. Locate the file with the .swf three letter extension in the G:/chem folder. This file contains the complete presentation in Flash format. (No other files that were created by the wizard are needed and may be deleted)

Lesson Plan: Thermo Chemistry 621 Presentations

Instructions *(continued)*

5. Transfer the Flash presentation file to an online hosting service such as http://www.mediamax.com (available October, 2006)

6. Browse to the .swf file found on your local computer. Add a description for the file, and select "Upload File"

7. Follow the onscreen instructions. Press the link to the location where the file is stored online. Copy this URL.

8. In a Blog posting that indicates the associated assignment, enter a descriptive name for your presentation, select "link" in the Blog toolbar. Paste the URL location of the online file next to "http://" which appears in the blog.

The tools and instructions for this assignment may be re-created in ATutor from a backup file. (instructions, handouts, blog, and test/survey tool) To perform this setup follow these directions:

1. Visit http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm and locate the backup file for this assignment. Save this .zip file to your local computer. (do not open it)

2. Login into your ATutor account. (http://atutor.edu.pe.ca/atutor) At the "My Start Page" select "Create Course". Enter the course details and ensure the course has been created as "Private". Select "Create".

3. From within the new course workspace select "Manage" - "Backups" - "Upload" - "Browse" to the .zip file on your computer and select "upload". Materials from this file will automatically be inserted into the new workspace.

4. Add students to the workspace in one of two ways: (please ensure that students using ATutor use their Netmail login as a username and provide their Netmail email address)

A. students log into ATutor and "Browse for Course" - "Request Enrollment". The instructor selects "Manage" - "Enrollment" - "Pending Enrollment" and admits the students to the workspace. or

B. The instructor may enter students manually. "Manage" - "Enrollment" - "Create Course List". Enter student names and Netmail email addresses. Select "Add to Course List". **At this stage, ATutor will provide information about whether the student is already a user of ATutor or if the account will be created. Please notice that the username for unregistered users will change i.e.: John Smith jpsmith@netmail.edu.pe.ca will show as j_smith. Please change j_smith back to jpsmith on the screen and resubmit. The account will then be created properly.

Lesson Plan: Thermo Chemistry 621 Presentations

Instructions *(continued)*

After students have been admitted to the workspace they must be assigned to groups to be able to use the blog and test tools. Default groups were set up if the "backup" .zip file was used. To assign students to groups:

1. Select "Manage" - "Groups".
2. Select the radio button in front of the "Presentations" group and click "Members".
3. Use the "Groups" pull down menu to the right of each student to assign him/her to a particular group.
4. Inform students to which group they have been assigned.

Blogs are now available for use. Students may only add blog entries from within the group to which they are assigned. They may read the blog entries of other groups that have not be designated as "Private". To post the URL of the Flash presentation file (see step 8 from page 125):

1. Select "Blog" or "Groups" from the "Home" workspace area. Enter the group assigned by the teacher.
2. Select "Add" at the top of the blog. (If "Add" is not found at the top of the blog the student is not a member of that group)
3. Enter the title of the presentation and a brief description.
4. Select "Link" found just below the Emoticons in the blog.
5. "Http://" will be inserted in the blog. Paste the URL of the file found on www.savefile.com next to this. (make sure that there are no spaces and that http:// does not appear twice)
6. Select "Post". Ensure that your blog entry is available and that the link works.

Tests (Likert Scale rubrics) pre-exist for each group. The release dates for these must be set. To do this:

1. Select "Manage" - "Tests & Surveys"
2. Select the radio button next to "Group 1"
3. Set the "Start" and "End" date and time. Save.
4. Repeat for each of the other Groups.

Provide a hard copy of the assessment rubric to students. Ask them to view each presentation and assess the items found in the rubric. Record the assessment information for each group by completing the "Test & Survey" associated with that group.

* Note that there are two open ended questions as well. Students are asked to identify parts of the presentation that were particularly well done and provide at least one constructive comment for improvement.

Lesson Plan: Thermo Chemistry 621 Presentations

Suggestions For Assessment

- involve students in development of rubric criteria. This will ensure that they understand the partimeters of the assignment. The Likrert scale questions may be easily changed within ATutor.
- provide students with the opportunity to give an oral "executive summary" of their Corel Presentation and answer questions.
- ask students to assess their own presentation using the "Test & Survey" tool.
- check "Manage" - "Tests & Surveys" - "Submissions" to ensure that all students completed the assessment of presentations when asked
- select "Manage" - "Question Statistics" to view overall class evaluation on each rubric item for a particular presentation. If desired, individual assessments for each project may be viewed.
- filter and provide feedback to students regarding information provided by peers.

Other Suggestions

- initial viewing of peer presentations may occur during class time. Complete the process outside of class.
- provide dates and deadlines for completion of presentations, posting to the blog and peer assessment.
- The teacher may assign presentations that a particular student will assess. In this way students may still be required to view all presentations but provide detailed assessment on a smaller number. (e.g.: in a class of 36 students there would potentially be 18 group presentations prepared. 18 assessments may be too many. Assign each student 6 presentations to assess in detail)

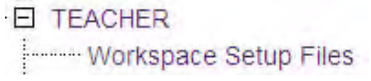
Lesson Plan: Organ & Tissue Donation

Outcomes

Technology: A10.1, A11.2, B11.1, B11.4, E2.9, E11.1

Biology 801: Organ Systems

Biology 521: 115-5, 317-1, 317-4, 317-8



Activity

Research issues surrounding organ and tissue donation and transplantation. Examine individual case studies analyzing the data provided and recommending a particular course of action based upon the background information provided or from further research. Organize findings into a slide show presentation

Resources

- Corel Presentations
- ATutor (http://atutor.edu.pe.ca/atutor)
- ATutor Backup Files (available from "Biology Teacher - Organ & Tissue Donation" ATutor workspace in the "Teacher" area)

Instructions

This activity is based upon the resource "Organ & Tissue Donation and Transplantation" produced, in part, by The Kidney Foundation and the Multi-organ Transplant Program, London Health Sciences Centre, Ontario. Permission has been obtained to transmit materials from this resource electronically within a password enabled environment.

Review research findings and case analysis using an ATutor discussion forum or meet in groups in the face-to-face classroom. Prepare a slide show presentation to present findings.

ATutor setup instructions follow.

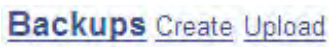
1. Login into ATutor and access the "Biology Teacher - Organ & Tissue Donation and Transplantation" workspace. (Request "Enrollment" if it is the first time you have accessed this area; also email the senior high technology specialist with your request to ensure the request is processed.)

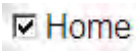
2. The teacher workspace contains a TEACHER section in the content area at the left of the screen. This teacher area hosts "Workspace Setup Files" and solutions for the case study questions.

3. Select the "Workspace Setup Files" folder. Directions are provided online for downloading these files to your computer. The files will be used for you to create an ATutor workspace for your students that will have the activities and resources ready to use.

4. Create your ATutor class workspace from the ATutor "My Start Page" - "Create Course". (You must have an instructor level ATutor account. Contact the senior high technology specialist if you have a student level account and are not able to create courses)

Lesson Plan: Organ & Tissue Donation





Instructions *(continued)*

4. Inside the new workspace created select the "Manage" tab and "Backup" - "Upload" from the popup list. "Browse" to the file Biology_Organ_Transplant_Activity.zip on your computer. Select "Open" and "Upload". (It may take two or three minutes for the file to transfer)

5. After the transfer is completed ATutor will display a new screen displaying the file just uploaded. Check the radio button in front of this file and select "Restore".

6. On the following screen for "Material" - check "Select All" and for "Action" - check "Append" and click "Restore". Content, groups, and the evaluation rubric will be placed into the class workspace.

7. When a workspace is created student tools may not be assigned. Select "Manage" - "Student Tools". Place a check mark next to "Glossary"; "Forums" and "Groups" tools. Select "Save". Click on Home to see that these tools have been assigned.

8. Have students self-register at http://atutor.edu.pe.ca/atutor and "Browse for Courses" - Category - [your school] - [your course]. Admit students to the workspace through "Manage" - "Enrollment" - "Pending Enrollment".

   As an alternative the teacher may register and enroll students at the same time through "Manage" - "Enrollment" - "Create Course List". If accounts are created in this manner ensure that they match the LAN username. Username and password will be identical until the student changes the password on the "My Start Page" - "Profile" - "Change Password".

9. Create discussion forum "threads" for each group. (The number of threads will be dependant upon the number of student groups) This may be done in the main full-class discussion area. e.g.: Age Issue Group 1; Age Issue Group 2; Age Issue Group 3; Age Issue Group 4; Commercialization Group 1; Commercialization Group 2; Commercialization Group 3; Commercialization Group 4; Organ Donation Group 1; Organ Donation Group 2; Organ Donation Group 3; Organ Donation Group 4; Innovation Group 1; Innovation Group 2; Innovation Group 3; Innovation Group 4; Transplant Access Group 1; Transplant Access Group 2; Transplant Access Group 3; Transplant Access Group 4. (Alternatively, forums may be created in the "Manage" - "Groups" area. Assign students to groups and provide access to the forums by placing a check next to this tool. Forums created using "Groups" are private to group members.)

Lesson Plan: Organ & Tissue Donation

Instructions *(continued)*

Planning Notes:

- customize activity components to reflect capabilities of students
- read the "requirements" section first
- explain your assessment & evaluation expectations for this activity
- photocopy or have students print a copy of the Assessment Recording Chart found within "Decision-Making in Organ Donation" section of the ATutor workspace
- locate the "One Life ... Many Gifts" CD and decide if the supporting video clips are useful for introducing the topic. These clips are played using a computer. Alternatively, a guest speaker may be asked to provide a presentation regarding the topic of organ donation in PEI.
- photocopy or have students print 2 copies of the "Case Prepartation Worksheet"

1. View the "Decision-making in Organ Donation and Transplantation" student survey and complete the "Assessment Recording Chart". This will assess student prior knowledge, awareness and misconceptions as they relate to the topic.

2. Initiate discussion about organ donation. Students will read the section "Personal Perspective: Donor family" and "Personal Perspective: Transplant recipient".

3. Read the "Class Case Study - Organ Allocation". Model in authentic terms how a candidate for transplantation would be represented to a hospital organ transplant team for assessment and recommendations. The teacher assumes the role of surgeon who is presenting the case to his team (students).

   - complete the "Case Preparation Worksheet" by determining the pertinent information and completing the background questions

   - identify the key decisions or issues to be addressed - point of view of surgeon. Answer "Focus for discussion" and "Background questions"

   - present the case; i.e: facts, content issues, analysis, alternatives, decision-making criteria, actions, missing information/assumptions.

   - make a recommendation (has enough information been provided?)

   **ATutor discussion Forum may be used to identify the four areas above if students are completing the activity outside of class.

Lesson Plan: Organ & Tissue Donation

Instructions *(continued)*

4. Assign student groups to analyze and present one of the case studies following the "Class Case Study". Presentation will be in the form of a Corel Presentation slide show.

5. Read the case study and any related information provided in the "Backgound documents". Further information may be obtained from library or Internet sources. Students may discuss and organize their thoughts on the information provided, focus and discussion questions through the use of the ATutor "Discussion forum tool". This work may occur in the classroom or from home.

6. Prepare the Corel Presentation slide show analyzing the case.

7. Print a hard copy of the assessment rubric. Assess the items found in the rubric for each group presentation.

   * Note that there are two open ended questions as well. Students are asked to identify parts of the presentation that were particularly well done and provide at least one constructive comment for improvement.

Suggestions For Assessment

- participation in class case discussion
- group contribution (peer assessment)
- contribution to case analysis & presentation (discussion forum, if used)
- completion and revision of "Assessment Recording Chart"
- groups may summarize presentation findings verbally and accept questions (class de-briefing session)

Note: Once you have created one "Organ & Tissue Donation and Transplantation" workspace simply select the first workspace as the "model" when creating the new one. All files and content are generated automatically. The only work you need do is register and admit students into the workspace. i.e.: steps 1-6 on pages 94-95 may be ommitted.

Lesson Plan: The Science Blog

Outcomes

Technology: A11.3, B11.3, B11.4, B11.5, B11.6

All Areas:

Activity

Maintain a scientfic journal using a blog. Share text, audio, image, presentation or video files through blog links.

Resources

- Blog (ATutor tool - http://atutor.edu.pe.ca/atutor)
- File Hosting Service
- Quattro Pro (Spreadsheet)
- Internet

Instructions

A weblog, (Blog), is a website where regular entries are made and presented in reverse chronological order. A Blog may combine text, images, and links to other blogs, web pages, or media content. An advantage of a Blog over a regular website is that the "author" does not need extensive HTML coding and formating knowledge. Further, FTP programs are not required when transferring files to a Blog or file hosting site.

Within all CAMET science curriculum documents under the section "Tasks for Instruction and/or Assessment" there are numerous instances where students demonstrate learning, provide feedback or provide their own perceptions on a particular topic through the use of a journal entry. Examples include: course feedback at the beginning/middle/end of specific units, preferred learning style, personal interests related to science, particularly meaningful information provided by a guest speaker or from a field trip, career exploration commentaries, etc. The blog is a useful forum for presenting writing and reflection activities that may be shared with classmates or a wider audience.

Lesson plans within this guide offer suggestions that multimedia content be developed to explain or demonstrate a scientific concept. The use of a Blog with links to a file hosting site allows for the management and sharing of these potentially large files.

The ATutor blog is recommended as public blog services may contain advertisements directed at users and links to unsavory materials.

1. Set up an ATutor Blog by selecting "Manage" and "Groups" with the class workspace. Select "Create Groups" and "Create Multiple Groups Automatically".

2. Key a "Group Type" of "Science Journals" and a "Group Prefix" of "Journal". Enter "1" in the "Number of Students per Group" and select "Blogs" under "Tools".

3. A separate group will be created for each student in the class. This will provide each student with his/her own blog space.

Lesson Plan: The Science Blog

Instructions (continued)

4. Provide students with the blog name to which they have been assigned by ATutor. i.e.: Journal 1, Journal 2, etc. A student may only "Add" or create a blog from within the group to which they belong. The last post will always appear at the top of the blog while the others are placed below in chronological order by date posted.

5. Students may post a blog so all others may read the material entered or they may check "Private" before posting so that the information may only be accessed by the instructor.

6. Posts that have not been checked as "Private" may be read by all other students in the class. Students may "Comment" on any indivdual post.

7. The first journal entry suggested in the Physics 521A curriculum guide (Kinmatics - Presenting Vectors) is "What does the speedometer of a car measure: speed, velocity or both? Explain.

Suggestions

- the first Blog entry may be of a more social nature so that students have an opportunity to use the composition tools. For example, the first post may consist of a paragraph on "Why are you taking Physics?" and "What do you hope to learn this semester?".

- Students may discuss problems and make brief notes in class. Ask them to prepare a formal online entry or "reflective" post outside of class time.

- Provide a date when particular entries must be complete and available.

- Online journals may be easily checked at any point in time. Immediate feedback is important to participants in online environments. Blogs allows visitors to enter comments relating to each post. This would be useful for general positive feedback such as "You have made an interesting observation" or "You have covered all the aspects of the problem well". If a grade or correctional comment is needed, this should be done personally in the face to face classroom or through a private email message.

- Create a teacher Blog workspace (See step #1) Select "Create a Single Group Manully". "Group Type" may be set to "Teacher" and "Title" to "Class Information". Check "Blogs".

- Should you create a Blog, your own workspace may contain assignment information, notes, etc. and be a "class resource page". This would be especially useful for students who are absent for a particular class.

Lesson Plan: The Science Blog

Other Activities

- create a Corel Presentation and link it from within a Blog for others to view.
- design a rubric to evaluate the presentation content.
- convert the rubric to a likert scale rating and add it to ATutor "Tests and Surveys".
- peer assess presentations using the "Tests and Surveys" tool.

Instructions (continued)

Free file hosting services, such as www.mediamax.com or www.savefile.com, currently allow uploading of files that do not exceed a particualr size i.e.: 50 megabytes. A URL or link to the file is provided by the hosting site. The URL link may be inserted into the Blog and the file downloaded or viewed.

For example, In the "Elaborations and Strategies for Learning and Teaching" in Physics 521A curriculum guide (Kinmatics - Presenting Vectors) several senarios are provided for studying motion. These are similar to the "Measuring Motion with MovieMaker" lesson found on page 53 in this guide. Should students video tape an experiment the footage may be linked to the Blog.

For this lesson, the uploading of a Flash .swf file will be described*.

1. From the "Tasks for Instruction and/or Assessment" section in Physics 521A curriculum guide (Kinmatics - Presenting Vectors) students are asked to present data and graphs collected during motion experiments.
2. Enter collected data in the form of a table into a Quattro Pro Spreadsheet
3. Prepare d/t and v/t graphs using Quattro pro based upon the table information. Supply titles and proper units for the graphs.
4. Prepare a Corel Presentations slide show that briefly explains the experiment conducted, displays the data collected, the graphs prepared and explainations for what each graph displays.
5. Convert the presentation to .swf format. (File-Internet Publisher) The Wizard will appear. Select "Flash" for the file type when asked. Answers for each of the other questions asked by the wizard is not important.
6. Locate the .swf file prepared by the conversion process. (All other files that were created can be deleted)
7. Visit the hosting service selected (e.g.: http://www.mediamax.com)
8. Browse to the .swf file found on your local computer. Add a description for the file, and select "Upload File"
9. Follow the onscreen instructions. Press the link to the location where the file is stored online. Copy this URL.

Lesson Plan: The Science Blog

Instructions (continued)

10. In a Blog posting that indicates the associated assignment, enter a descriptive name for your presentation, select "link" in the Blog toolbar. Paste the URL location of the online file next to "http://" which appears in the Blog.

11. Post the Blog entry when complete.

12. Select the presentation file link that was just created. The file host, typically, will require the user to wait 15 seconds for the file to become available. The count down is shown on the screen. Select "Download File" once it becomes available.

13. Select "Open" in the dialogue box that follows. The presentation should load automatically to your computer screen.

14. Use the left mouse button to navigate through the .swf slide presentation. If all has gone well, the presentation is available to anyone who views your Blog.

Samples with linked files from a hosting service may be found at http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm

Suggestions

- maintain backup copies of files that are submitted to online hosting services
- visit the links to hosted files, periodically, to ensure that they do not expire before the end of the project
- the presentation may be peer reviewed using the "Comments" area of the Blog post or using a Likert rating scale from within "Tests and Surveys".
- assign students to "peer review" particular classmates work, rather than all work that is created

Lesson Plan: The PEI Biodiversity Class Page

Outcomes

Technology: A3.2, A11.2, B3.3, B11.1, B11.2, B11.4

Biology 521: 213-6, 214-1, 215-1, 215-6, 316-5

Biology 621: 116-2, 116-7, 213-5, 213-7, 215-2

Science 421: 213-7, 214-1, 215-1, 318-3, 318-6

Activity

Collect digital images of organisms found in local habitats. Identify these organisms and discuss how they are interrelated. Create a class website to organize and document findings.

Resources

- Dreamweaver or Front Page (web editors)
- Fireworks or Paintshop Pro (graphic editors)
- ATutor Group File Storage Tool
- Digital Camera
- Web Design Tutorial (http://www.edu.pe.ca/journeyon/pro_d_pages/frontpage/index.htm)

Instructions

This activity will provide the opportunity for students to engage in biology fieldwork. PEI is especially suited for this activity due to the rich biodiversity found within various habitats that are found within close proximinity to one another.

1) Identify the various habitats found locally (farmland buffer area, swamp, forest, ponds, streams, sea shore, etc.)

2) Discuss the expectations of this class assignment.

- Identify and document local populations of trees, plants, insects, birds, animals or acquatic life. Take digital pictures of organisms found within a habitat (and the habitat itself). What are the common names of these organisms? Research their scientific names. (including species, genus and family) Are they native to PEI?
- Will attempts be made to count populations of these organisms? What may be some strategies to reflect a population in a given area?
- Following the collection of data discuss relationships that exist among organisms found within a particular habitat. Are there risks to the species or organisms in a particular habitat? Provide ideas for preserving the habitat or organism. Were invasive species found? What are the apparent effects of an invasive species in the habitat?
- Are there other areas to investigate? e.g.: apparent effects of human interaction with the habitat.
- Provide or collaboratively develop a rubric for the project with the class. Will students provide "updates" or submit "work to date" prior to completing the website?

Lesson Plan: The PEI Biodiversity Class Page

Instructions (continued)

3) Assign groups to research habitats and particular organisms. e.g.: Forest - Group 1: identify trees found in the area. How many of each type are found within a selected area? Group 2: identify insects found in particular tree species. How might you determine population? Group 3: identify birds or animals observed in the area. How might you determine population? Group 4: identify fungus or plants found in area. How many are in selected area? Group 5: identify organisms in the soil or found in rotting wood. Determine a method to report population sizes. (Instead of a separate group for birds or animals, everyone could be made responsible for this category. Often animals are seen "by chance". Obtaining pictures of these is even more "by chance")

4) Research scientific names of organisms, including the species, genus and family. Is there further interesting information listed about the organism? Provide links to this information from the appropriate section of your website.

5) Create or provide a main class web page that provides information about the project to visitors. Create a navigation link to each sub-section of the website from this page e.g.: forest, streams, ponds, swamp, sea shore, etc. A Dreamweaver or Front Page templete may be used for the assignment. This ensures that the design is consistent throughout the site. Alternatively, students may wish to create their own web design for the project. The main entry page is named by convention "index.htm". (See the web design tutorial for FrontPage on the Journey On web site http://www.edu.pe.ca/journeyon/pro_d_pages/frontpage/index.htm)

6) Student groups studying a particular habitat may share digital pictures and written work through the used of the ATutor group file storage tool. Discussion Forum tool would be helpful for students to collaborate. Review organisms that were found and discuss how they are inter-dependent.

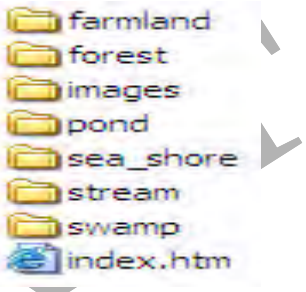
7) Images from a digital camera are often well over 1 megabyte in size. This is far too large for use on web pages and for managing on the school networks. Use Paintshop Pro or Macromedia Fireworks graphics programs to reduce the size and resolution of photographs to between 175 and 250 kilobytes. Images may be cropped so that only the focal information is presented. (See http://www.edu.pe.ca/journeyon/pro_d_pages/using_psp/using_psp6/index.htm for a tutorial on Paintshop Pro)

Lesson Plan: The PEI Biodiversity Class Page

Instructions (continued)

8) Each student habitat group will collaborate to complete their section of the web site e.g.: forest_main; forest_trees; forest_insects; forest_plants, etc. Group website files may be housed in ATutor Group File Storage areas so they may be easily shared as they are developed or updated. (Encourage those who have experience and knowledge creating web sites to assist others. They may also assist the teacher in assembling the final website)

9) Assemble files from each group together as they are completed. Place files from each group in its own folder. A sample directory structure is shown below:



10) Link the navigation in the index.htm page (created in step 5) to the main page found in each folder. i.e.: link the "forest" link in "index.htm" to the "forest_main.htm" file found in the forest folder. Repeat for each of the other links.

11) The completed website may be transferred to a USB memory stick or CD for viewing on individual computers. Teachers may transfer the files and folders to their folder in M: drive where students may access the website from within the school LAN by selecting "open" from Internet Explorer and navigating to M:/mr_teacher/ index.htm Alternatively, the site may be published to the school website with the help of the school webmaster or STC.

Lesson Plan: The PEI Biodiversity Class Page

Other Activities

- use electronic publishing to celebrate and share the results of student investigation or creation
- contact a local "stream enhancement" group or researchers from the Department of Fisheries, Forestry or Agriculture who may be working in the local area. Student group may arrange to photograph and obtain information from these professionals concerning invasive species/ or the protection of species
- The Biology class has been asked to create an ecosystem for Mars colony that will represent the "best" aspects of a PEI habitat. What trees, plants, insects, birds and animals would be suggested for inclusion? How are these species dependent upon each other?

Suggestions For Assessment

- timelines were followed, progress reports were provided
- groups shared the work load and worked co-operatively
- selection of organisms were photographed and identified with scientific names along with species, genus and family. Links were provided to sources of online information
- interdependancies of species were clearly identified and articulated. Ways to protect species were suggested
- images were cropped and reduced in size
- information provided was organized and accurate
- navigation worked; no broken links in content

Lesson Plan: Music To My Ears (and Eyes)

Outcomes

Technology: A8.4, B8.2

Physics 521: 212-4, 212-7, 213-7, 214-8, 214-14, 327-1, 327-2, 327-8

Activity

Study sound waves using information provided by an audio editor.

Resources

- Audacity Sound Editing Software
- PC microphone & speakers/headsets
- Piano Note Audacity Project File (.aup) download (http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm)

Instructions

Audio editors will supply users with visuals of sound waves along with a variety of other information including pitch, amplitude, speed and tempo for selected audio. Different terminology is used in the disciplines of science and music when the theory of wave motion is discussed. This activity provides an opportunity for dialogue and collaboration between the science and music classrooms.

A note is a sign used in music to represent the relative duration and pitch (frequency) of sound. The "pitch class" uses the first seven letters of the latin alphabet: A, B, C, D, E, F, and G (in order of rising pitch).

Key number	Note name	Frequency (Hz)
51	B4	493.883
50	A#4/Bb4	466.164
49	A4 (A440)	440.000
48	G#4/Ab4	415.305
47	G4	391.995
46	F#4/Gb4	369.994
45	F4	349.228
44	E4	329.628
43	D#4/Eb4	311.127
42	D4	293.665
41	C#4/Db4	277.183
40	C4 (middle C)	261.626

Selected keys (notes) for the piano keyboard are shown to the right. The white keys are normal notes while the black keys indicate “flats” or “sharpes” (in relation to position to a particular white normal key). This range of notes is called an octave. Since the physical causes of music are vibrations of mechanical systems, they are often measured in hertz (Hz), with 1 Hz = 1 complete vibration per second. In Western music, only twelve notes of fixed frequencies are used. These fixed frequencies are mathematically related to each other, and are defined around the central note, A4. The current "standard pitch" or "concert pitch" for this note is 440 Hz.

**Sections of this document are derived from the Wikipedia article Piano key frequencies (http://en.wikipedia.org/wiki/Piano_key_frequencies). In accordance with their licensing rules, this page is licensed to the public under the GNU Free Documentation License (GFDL).

Lesson Plan: Music To My Ears (and Eyes)

Other Activities

- Select the "Audio Track" pull-down menu. View the Pitch EAC and Spectrum charts. What information do these provide?

Instructions (continued)

1. Further octaves are shown in the chart to the right. What is the mathematical relationship between the frequencies of octaves as shown on the charts? (e.g.: C4 to C5; C5 to C6, C6 to C7)

2. Launch Audacity and open the project piano.aup which contains separate audio clips of the notes A, B, C, D, E, F and G in the middle C octave.

3. Use the I-Beam tool  to select a portion of one audio clip . Choose "Effect" from the pull-down menu and "Change Pitch".

4. Note the frequency of this audio track. Find it as closely as possible in the table on the previous page. Identify the note.

5. Repeat and identify each of the remaining 6 notes. Is the piano in tune? Why or why not?

6. Mute each of the audio tracks with the exception of "C". The track should become "greyed out".

7. Listen to track "C".

8. Mute track "C" and click the mute button on one of the other tracks. Listen to this track.

76	C7	2093.00
75	B6	1975.53
74	A#6/Bb6	1864.66
73	A6	1760.00
72	G#6/Ab6	1661.22
71	G6	1567.98
70	F#6/Gb6	1479.98
69	F6	1396.91
68	E6	1318.51
67	D#6/Eb6	1244.51
66	D6	1174.66
65	C#6/Db6	1108.73
64	C6	1046.50
63	B5	987.767
62	A#5/Bb5	932.328
61	A5	880.000
60	G#5/Ab5	830.609
59	G5	783.991
58	F#5/Gb5	739.989
57	F5	698.456
56	E5	659.255
55	D#5/Eb5	622.254
54	D5	587.330
53	C#5/Db5	554.365
52	C5	523.251

Lesson Plan: Music To My Ears (and Eyes)

Instructions (continued)

9. Select the track and change its pitch to match that of "C". Listen to the "C" track and the "changed" track. Do they sound the same?

10. Choose "Edit" and "Undo Change Pitch".

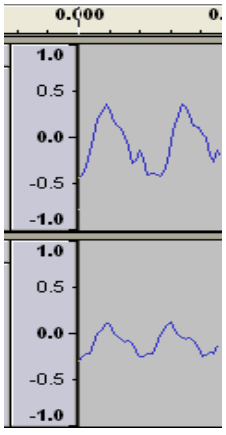
11. Use the zoom tool  to examine the wave patterns of each of the notes.

12. Identify the following parts of the wave: amplitude, cycle, wavelength. Can frequency be calculated manually using the graph and timeline? This may be done as a demonstration from the projector.

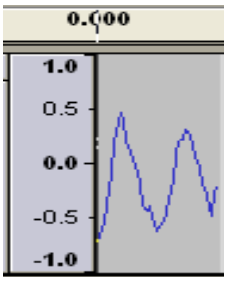
13. Does each note have a particular wave formation? Would you be able to identify the note just by visually inspecting its' wave pattern? If so, what feature(s) of the wave allow you to do this?

14. Select part of the wave. Select "Effect" - "Amplify". Does the frequency change when the selected audio is made louder?

Constructive interference occurs when waves having the same wave pattern are combined. The resulting wave is stronger as shown in greater amplitude.



Resulting in



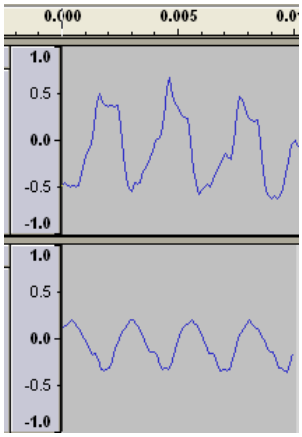
Lesson Plan: Music To My Ears (and Eyes)

Other Activities

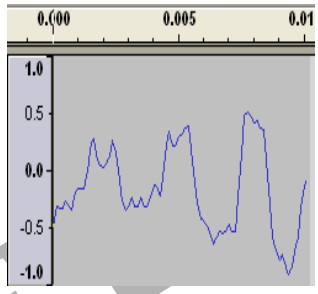
- record an "A" note on a variety of instruments. Note the wave pattern and frequency created.
- record the voice of several students. Is there a range in frequencies? A difference between male and female voices?
- tune a guitar. Check if it is in tune using Audacity. i.e.: Record each string using Audacity. sixth (lowest tone) string: E (a minor thirteenth below middle C—82.4Hz) fifth string: A (a minor tenth below middle C—110Hz) fourth string: D (a minor seventh below middle C—146.8Hz) third string: G (a perfect fourth below middle C—196.0Hz) second string: B (a minor second below middle C—246.92Hz) first (highest tone) string: E (a major third above middle C—329.6Hz) Using this method a guitar can be tuned. The 5th fret on one string is the same note as the next string i.e. a 5th fret note on the 6th string is the same note as the 5th string. An exception is that the 4th fret of the second string is used to tune the 3rd string.
- record the wave motion created by tuning forks

Instructions (continued)

Destructive interference occurs when waves having different wave pattern are combined. The resulting wave is weaker as shown in decreased amplitude.



Resulting in



1. Model constructive interference or destructive interference.
2. Zoom in on tracks for desired pattern. Delete those tracks that are not needed.
3. Select the desired section of the first track. Choose "Edit" - "Trim". Repeat for the second track.
4. Select "Project" - "Align Tracks" - "Align Tracks with Zero" so that the trimmed material will appear next to the decible scale.
5. To combine the tracks select "File" - "Export as WAV" or "Export as MP3"
6. Save the file.
7. Open the .wav or .mp3 file created. Examine the wave structure. Did you get results expected?

Suggestions For Assessment

- use proper terminology when discussing wave structures
- describe the relation of wave frequency to music notes
- demonstrate constructive and destructive wave interference

Teaching Suggestions

- encourage students to bring their personal headsets to class for this activity
- Audacity is "open source" software and may be downloaded from http://audacity.sourceforge.net Download the Lame file utility separately to export files to MP3 format
- Students may design an experiment or work through activities outside of class.

Lesson Plan: Using GIS to Compare Canadian Biomes

Outcomes

Technology: A3.2, A3.3, B3.3

Biology 521: 213-6, 214-1, 215-3, 318-7

Science 421: 213-7, 318-3

Activity

Examine geographic information system (GIS) map and database data to compare Canadian biomes.

Resources

- Internet Connection
- ArcExplorer - Java Edition for Education (GIS viewer)

Instructions

Geographic information systems (GIS) link global positioning system coordinates with database statistical data, maps, aerial photographs and other objects such as web links, audio, video and digital images. GIS is widely used in govenment, industry and to document data collection in a variety of scientific research projects. e.g.: transportation, school bussing, civic addresses, property information, location of utility lines, 911 emergency coverages, agriculture, forestry, etc.

In this activity ArcExplorer Java for Education (AJEE) will be used to view GIS data that is available on the "Geography Network" related to Canadian ecozones and biomes. 15 terrestrial and 5 marine ecozones have been identified in Canada.

Identify the Canadian biomes of tundra, boreal coniferous forest, temperate deciduous forest and grassland.

1. Save the files "blank_ecozone_outline.axl"; "canadian_ecozones.axl"; "canada_with_grid.axl"; "candadian_physical.axl"; "canadian_climate.axl"; "canadian_agriculture.axl" and "canadian_wwf_conservation_need.axl" found at http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm to your G: drive.

2. Launch ArcExplorer and open the file "blank_ecozone_outline.axl". Print this map and photocopy for each student in the class.

3. Open "canadian_ecozones.axl" found on G: This map displays the 15 Canadian ecozones. Carefully, shade the outline map to identify the main Canadian Biomes as follows:

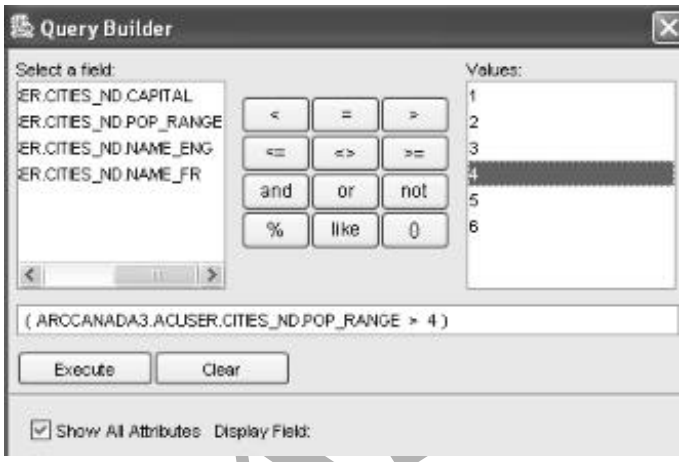
   - Praire ecozone = grassland
   - Mixed Wood Plain ecozones = temperate deciduous forest
   - Taiga Cordillera, Artic Cordillera, Hudson Plains, Northern Artic ecozones = Tundra
   - All remaining ecozones = boreal coniferous forest

4. Provide a legend identifying each biome.

Lesson Plan: Using GIS to Compare Canadian Biomes

Instructions (continued)

5. ArcExplorer allows the user to "search" associated data tables and results of queries are highlighted on the map layer. Place a check beside "City" and make sure the "city layer" is selected. Use Query Builder and select "ARCCANADA3.ACUSER.CITIES.ND.POP_RANGE" > 4



Select "Execute" after search instructions have been completed. The names of larger Canadian cities will appear in a "Results Table" and the locations will become highlighted on the "Cities Layer". Which biome has the greatest number of large cities?

6. Open the file "canadian_physical.axl". Examine "Dominant Landform" section. Which landform comprises the largest portion of each Biome? Indicate major mountain, valley and plateau areas on your map. (Label within a legend)

7. Examine "Dominant Surface Materials" section. Which biome is mostly made up of organic soil?

8. Examine "Dominant Vegetation Cover". Identify the dominant vegetation for each biome.

9. Examine "Permafrost" section. How does the permafrost boundary compare with the outline of your biome map?

10. Open the file "canadian_agriculture.axl". Examine "Increase in number of farms" section. Which biomes are experiencing the greatest increase in people farming?

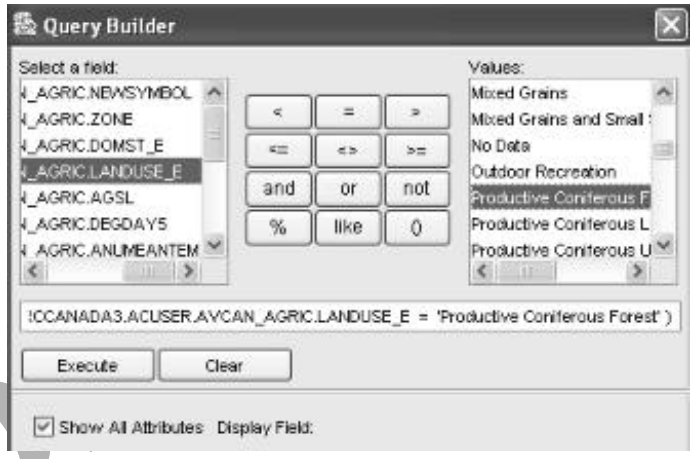
Lesson Plan: Using GIS to Compare Canadian Biomes

Instructions (continued)

11. Examine "Average Growing Season" section. Estimate the average growing season for each Biome? What role does latitude play in the length of the growing season?

12. Examine "Dominant Land Use" section. In general, which biomes have the greatest agricultural pressure, as indicated by the most number of colours in the legend?

13. Use Query Builder and select ..landuse_E = Productive Coniferous Forests



14. Select "Execute" after search instructions have been completed. The map will have the areas that meet the criteria highlighted on the map. Choose "Productive Coniferous Forests Uplands", "Productive Coniferous Forests Lowlands", "Productive Mixed Forests" and "Productive Hardwood Forests" in separate searches. Examine the resulting map after each. Which forest is most prevalent?

15. Open the file "canadian_climate.axl". Examine the "Annual Mean Temperature" section. Estimate the mean temperature for each biome? (Divide the biome between South and North if distinctive)

16. Examine the "Average Minimum Temperature" and "Average Maximum Temperature" sections. Estimate an average for each biome.

17. Examine "Total Rain" and "Total Snow" sections. In which biomes are the highest precipitation rates?

Lesson Plan: Using GIS to Compare Canadian Biomes

Other Activities

Use the "Hot Link" tool feature to add clickable links on the map that provides further information (i.e.: online web sites, photographs, statistical data, etc.)

Instructions (continued)

18. Open the file "canadian_wwf_conservation_need.axl". Which biome areas are listed as high or very high? (For a description of what is mean't by each, use the "Query Builder" tool and select MAPDATA.MAPDATA. WWF.Conservation.need.DESCRIPT")

19. Were you surprised by any data provided from the Geography Network files relating to Prince Edward Island?

Suggestions for Assessment

- Discuss the data that is provided by the maps
- individually, evaluate completed maps
- present findings

Suggested Solution

The four Canadian biomes relate, roughly, to the ecozone maps in the following way. The white land masses show the Boreal Coniferous Forest.

#5. The deciduous forest biome has 18 large cities within its borders.

#6. Deciduous forest - plain; Grassland - plain; Boreal coniferous forest - plain (sizeable mountain & plateau, as well); Tundra - plain

#7. The deciduous forest has half its area labelled as organic soil

#8. Deciduous Forest - croplands; Grasslands - rangeland and prairie; Boreal coniferous forest - coniferous trees and mixed forest; Tundra - transitional forest.

Lesson Plan: Using GIS to Compare Canadian Biomes

Suggested Solution (continued)

#9. The southern Tundra boundary follows the permafrost boundary.

#10. A slight increase in farming may be found in the Eastern Boreal coniferous forest (Quebec) and South East (Nova Scotia). A significant increase in farming may be found North Western Boreal coniferous forest (Southern Yukon) and the South Western Tundra (Northern Yukon).

#11. Answers will vary. Deciduous forest ~ 152-194 days; Boreal coniferous forest ~ 80-108 days; Grasslands ~ 109-124 days; Tundra ~ 54-79 days. There is a clear correlation between latitude and temperature in Canada. However, the growing season extends further north in the North West region (Eastern side of the Rocky Mountains) of the Boreal coniferous forest biome.

#12. The Grassland biome has seven different types of farming (colours) while the Deciduous forest has four within a relatively small area.

#14. Productive coniferous forest upland found in the central-northern Boreal coniferous biome makes up the largest productive wood source. This is followed by the "Productive mixed forest" found in the south eastern area of the Boreal coniferous biome and mountain areas in the west of the biome. There is very little Productive coniferous lowland and almost no productive hardwood forests.

#15. Deciduous forest 5 to 10 celsuis (C); Southern Boreal coniferous 0 to -5 C; Northern Boreal coniferous -5 to 0 C; Grasslands 0 to -5 C; Tundra -15 to -10 C to the north, -10 to -5 C towards the south.

#16. Deciduous minimum temperature -20 to -10 C; Boreal -30 to -20 C; Grassland -30 to -20 C; Tundra -40 to -30 C. Deciduous maximum temperature +25 C; Boreal 20 to 25 C; Grassland +25C; Tundra 15 to 20 C.

#17. In general, the Deciduous and Eastern Boreal regions receive high rainfall. The coastal regions receive very high rainfall (West Coast of BC; South coasts of NS and NFLD)

#18. Deciduous forest is very high; Grassland is high; Boreal southern regions are high or very high; Tundra is low or very low.

#19. Answers will vary, may include moderate climate (max 20-25 C, Min -20--10 C, mean 5-10 C), long growing season, mostly dry land, one of very few best agriculture locations in Canada, southerly latitude.

Lesson Plan: Equilibrium Laboratory - Graphing Data

Outcomes

Technology: B5.4, B6.7 (Math Outcomes)

Chemistry 621: 213-5, 323-3, 323-4

Activity

Enter data collected during the Chemistry 621 equilibrium lab into the TI-83 calculator and graph the results. Alternatively, enter the data into a Quattro Pro spreadsheet and plot the results.

Resources

- TI-83 calculator
- Quattro Pro Spreadsheet

Instructions

The equilibrium laboratory is found within the "From Solutions to Kinetics to Equilibrium" unit of the Chemistry 621 curriculum.

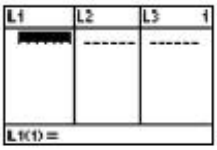
Entering Data on the TI-83 Calculator

1. Press **STAT**

   The following screen will appear:

2. Select **1:Edit**

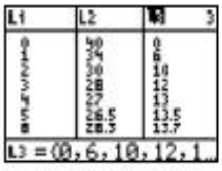
   The following screen will appear:



   Note: If necessary clear $\mathbf{L_1}$, $\mathbf{L_2}$, and $\mathbf{L_3}$ by:

   - Move cursor up to the top of $\mathbf{L_1}$
   - Press **CLEAR**
   - Press **ENTER**
   - Repeat steps 1-3 if necessary for $\mathbf{L_2}$ and $\mathbf{L_3}$

3. **Enter Data**: Input the number / measurement and press **ENTER** after each entry OR input number / measurement and press the **UP** or **DOWN** arrow key



For this experiment:

L1 data represents **Number of Readings**
L2 data represents **Volume of Reactant**
L3 data represents **Volume of Product**

Lesson Plan: Equilibrium Laboratory - Graphing Data

Instructions (continued)

Note 1:

To correct data input errors, simply place the cursor on the error and type new number / measurement followed by ENTER or ARROW keys

Note 2:

If the entered data is being rounded to a set number of decimal place by the calculator then the **MODE** must be adjusted.

1. press **MODE**
2. select **FLOAT** which allows the TI-83 calculator to accept all decimal places. (If a specific number of decimal places is desired then select a number)

Graphing data on the TI-83 Calculator

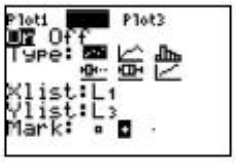
1. Select **STAT PLOT (2nd Y=)**

2. Select **PLOT 1**

3. Set the **PLOT 1** preferences as follows:

4. Select **PLOT 2**

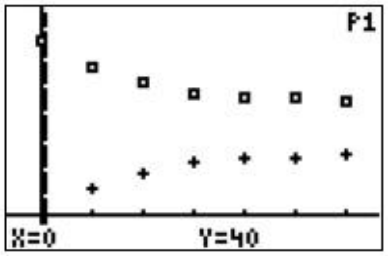
5. Set the **PLOT 2** preferences as follows:

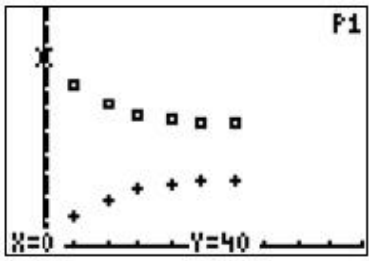


Lesson Plan: Equilibrium Laboratory - Graphing Data

Instructions (continued)

6. Select **Graph**





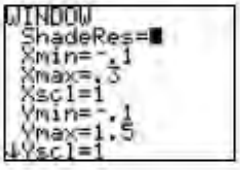
NOTE: If the data is not showing in the window or only a portion of the data is showing then the **WINDOW** must be adjusted

Graphing Method One (top left)

1. Select **ZOOM**
2. Select 9:**ZoomStat**

Graphing Method Two

1. Select **WINDOW**
2. Set Max and Min value for **x** and **y** (Allow data to fit in window as desired; above right)



Graphing Data Using Quattro Pro

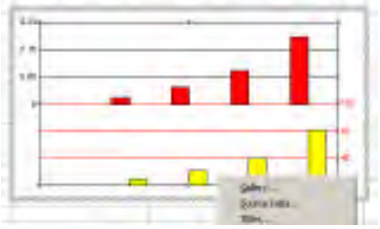
1. Enter experiment data into QPro

	A	B	C
1	Number of Reading	Volume of Reactant	Volume of Product
2	0	40	0
3	1	34	6
4	2	30	10
5	3	28	12
6	4	27	13
7	5	26.5	13.5
8	6	26.3	13.7

Lesson Plan: Equilibrium Laboratory - Graphing Data

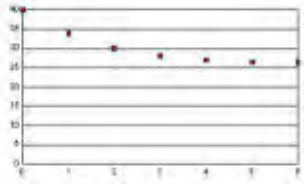
QPro Instructions (continued)

2. Select the data from A2 to B8

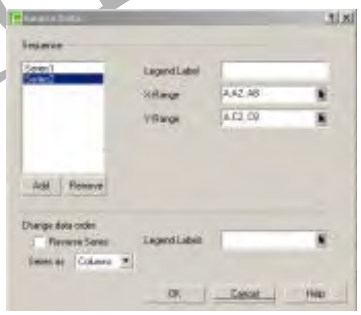


3. Use the chart tool  to draw a box under the data i.e.: B11 to F27

4. Double click the resulting graph (lines should appear around the outside) and right click inside the graph. A menu should appear in the lower right corner.

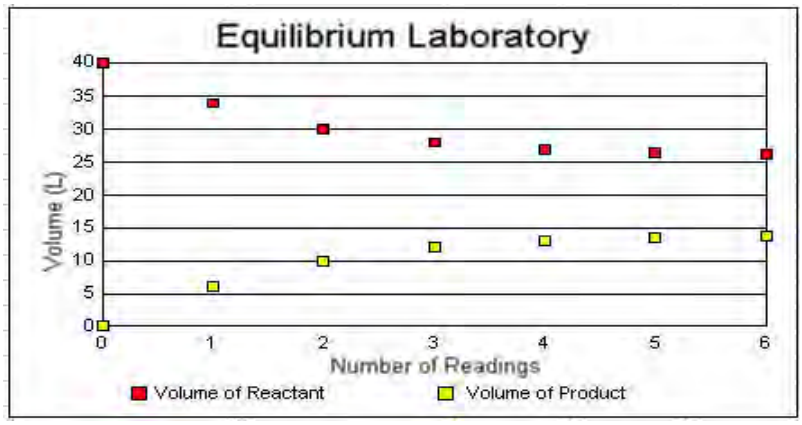


5. Choose "Gallery" and "Scatter" for the graph type. (Note: Make sure that "Add Secondary Y-Axis" is unchecked or you will get an error message) Select the middle scatter graph option (without lines).



6. From the menu (see step 4) choose "Add" to add a second data set "Series 2". Select XRange to be A2 to A8; YRange to be C2 to C8

7. Choose "Titles" from the menu generated in step 4. Add a suitable title, X-axis and Y-Axis title. The graph of the Reactant and Product should appear similar to the one below:



Lesson Plan: Colorimetry Lab - Data Measurements

Outcomes

Technology: B5.4, B6.7 (Math Outcomes)

Chemistry 621: 213-5, 214-10, 323-7

Activity

Enter data collected during the Chemistry 621Colorimetry lab into the TI-83 calculator and perform a regression analysis. Alternatively, enter the data into a Quattro Pro spreadsheet and perform the regression analysis.

Resources

- TI-83 calculator
- Quattro Pro Spreadsheet

Instructions

The colorimetry laboratory is found within the "Properties of Solutions" unit of the Chemistry 621 curriculum.

Purpose: To observe the proportional relationship between solution concentration and absorbance (Beer's Law). To determine the concentration of an unknown CuSO4 solution. (The lab procedure may be found online at http://www.gov.pe.ca/educ/index.php3?number=78767&lang=E)

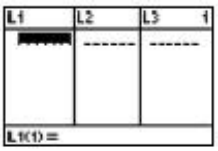
Entering Data on the TI-83 Calculator

1. Press **STAT**

   The following screen will appear:

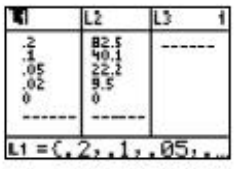
2. Select **1:Edit**

   The following screen will appear:



   Note: If necessary clear $\mathbf{L_1}$, $\mathbf{L_2}$, and $\mathbf{L_3}$ by:
   - Move cursor up to the top of $\mathbf{L_1}$
   - Press **CLEAR**
   - Press **ENTER**
   - Repeat steps 1-3 if necessary for $\mathbf{L_2}$ and $\mathbf{L_3}$

3. **Enter Data**: Input the number/measurement and press **ENTER** after each entry OR input number/measurement and press the **UP** or **DOWN** arrow key



For this experiment:

L1 data represents **Concentration**
L2 data represents **Absorbance**

Lesson Plan: Colorimetry Lab - Data Measurements

Instructions (continued)

Note 1:

To correct data input errors, simply place the cursor on the error and type new number / measurement followed by ENTER or ARROW keys

Note 2:

If the entered data is being rounded to a set number of decimal place by the calculator then the **MODE** must be adjusted.

1. press **MODE**
2. select **FLOAT** which allows the TI-83 calculator to accept all decimal places. (If a specific number of decimal places is desired then select a number)

Graphing data on the TI-83 Calculator

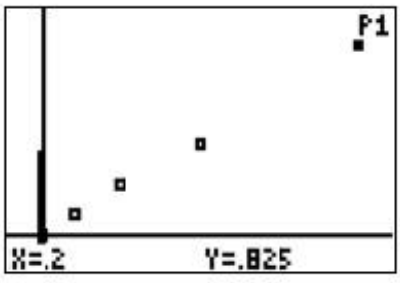
1. Select **STAT PLOT (2nd Y=)**

2. Select **PLOT 1**

3. Set the **PLOT 1** preferences as follows:

4. Select **GRAPH**

(This is one of two possible methods. See the next page for instructions)



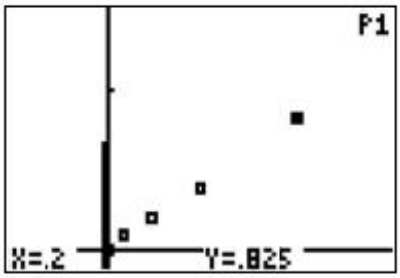
NOTE: If the data is not showing in the window or only a portion of the data is showing then the **WINDOW** must be adjusted

Lesson Plan: Colorimetry Lab - Data Measurements

Instructions (continued)

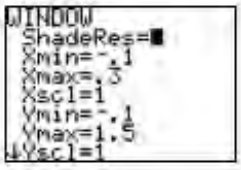
Graphing Method One

1. Select **ZOOM**
2. Select 9:ZoomStat (Automatically fits all data in the window on page 80)



Graphing Method Two

1. Select **WINDOW**
2. Set Max and Min value for **x** and **y** (Allow data to fit in window as desired; above right)



Lesson Plan: Colorimetry Lab - Data Measurements

Linear Regression/Line of Best Fit

TI-83 Calculator

1. Select STAT

2. Select CALC

3. Select 4:LinReg(ax + b)
   (The window will appear)

4. Press: **L_1, L_2, VARS**
   Note: L_1 (2^{nd} 1) and L_2 (2^{nd} 2)

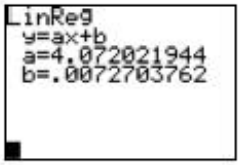
5. Select **Y-VARS**

6. Select **1:Function**

7. Select **1:Y_1** The following appears

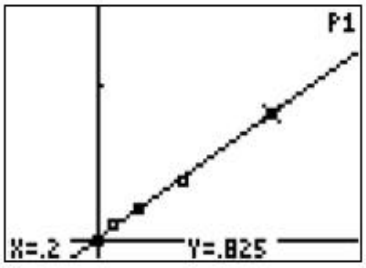
8. Press **ENTER**

   The following window will appear containing the linear regression data:
   y = absorbance
   x = concentration
   y = 0.407x + 0.007



9. Press **GRAPH**

   The following window will appear containing the original data and a line of best fit (regression line):



For this experiment, the concentration of the unknown can be found in the following two ways:

1. Using the Regression Equation ($y = 0.407 x + 0.007$) Substitute in the absorbance (y) value and solve for concentration (x)

2. Press **TRACE**
   Note: The UP/DOWN arrow keys toggle the trace cursor to/from the data points and regression line. (Toggle to the regression line) The LEFT/RIGHT arrow keys move the cursor along either the regression line or the data point and displays the corresponding **x** and **y** values.

Lesson Plan: Colorimetry Lab - Data Measurements

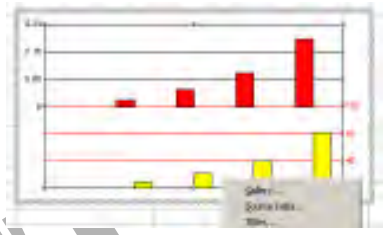
Graphing Data Using Quattro Pro

1. Enter experiment data into QPro

2. Select the data from A2 to B6

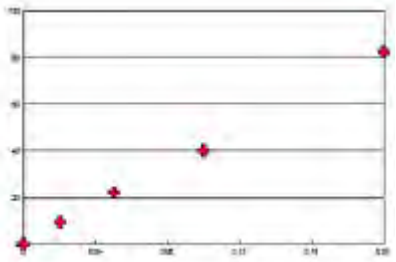
	A	B
1	Concentration	Absorbance
2	0.00	0
3	0.02	9.5
4	0.05	22.2
5	0.10	40.1
6	0.20	82.5
7		

3. Use the chart tool to draw a box under the data i.e.: B8 to I29

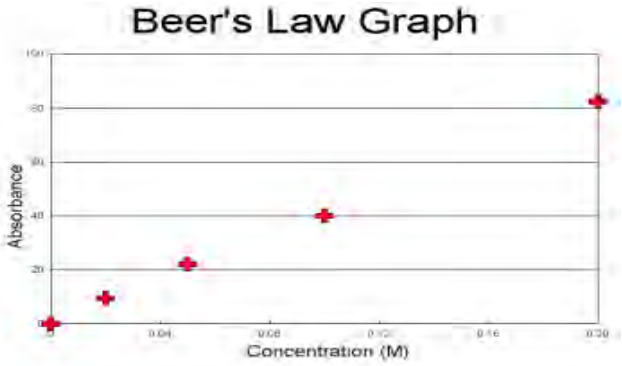


4. Double click the resulting graph (lines should appear around the outside) and right click inside the graph. A menu should appear in the lower right corner.

5. Choose "Gallery" and "Scatter" for the graph type. (Note: Make sure that "Add Secondary Y-Axis" is unchecked or you will get an error message) Select the middle scatter graph option (without lines).



6. Choose "Titles" from the menu generated in step 4. Add a suitable title, X-axis and Y-Axis title. The graph of the known substance should appear similar to the one below:



Lesson Plan: Colorimetry Lab - Data Measurements

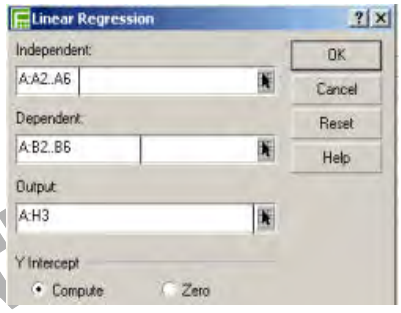
Regression Using Quattro Pro

1. Select "Tools" from the pull-down menu and "Numeric Tools" from the submenu. Choose "Regression" from the tools available.

	A	B
1	Concentration	Absorbance
2	0.00	0
3	0.02	9.5
4	0.05	22.2
5	0.10	40.1
6	0.20	82.5
7		

2. Choose the concentration data as the independent variable and the absorbance as the dependent.

3. Select an empty location on the spreadsheet i.e.: cell H3 for the regression data to be displayed.



4. In general, the equation of a straight line is $y = mx + b$

   Substituting information from the output generated by Quattro Pro:

   $y = 407x + 0.727$

   where:
   y = absorbance
   x = concentration

H	I	J	K
	Regression Output:		
Constant			0.727038
Std Err of Y Est			1.167367
R Squared			0.999035
No. of Observations			5
Degrees of Freedom			3
X Coefficient(s)		407.2022	
Std Err of Coef.		7.30747	

5. For this experiment, the concentration of the unknown can be found by substituting the value of absorbance (y) and solving for the concentration (x)

Lesson Plan: Colorimetry Lab - Data Measurements

Regression Using Quattro Pro

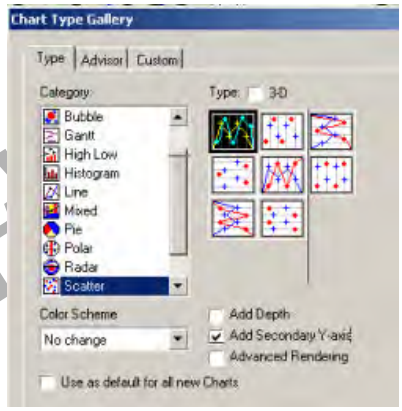
A regression "Line of Best Fit" may be constructed by using the formula y = 407 x + .727 and substituting the various values of concentration (x)

	A	B	C	D
1	Concentration	Absorbance	Absorbance Calc	
2	0.00	0	0	
3	0.02	9.5	8.87	
4	0.05	22.2	21.08	
5	0.10	40.1	41.43	
6	0.20	82.5	82.13	

1. Solve for each concentration .02, .05, .1 and .2, in this example.

2. Enter the calculated values of Y in the spreadsheet.

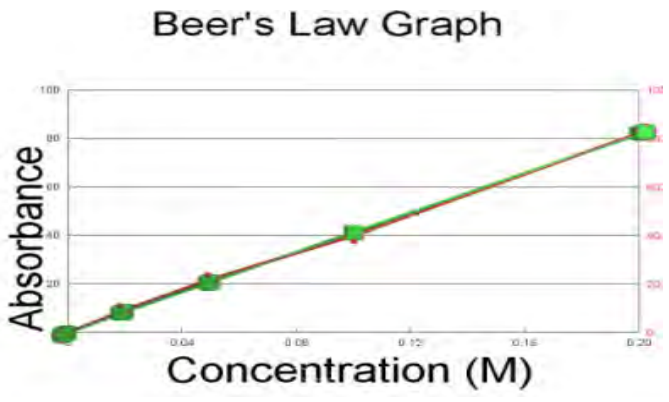
3. Right click the graph constructed on page 83. Select "Source Data" and "Add Series".



4. Select the Concentration data (A2..A6) for the X-Range and the calculated absorbance (C2..C6) for the Y-Range.

5. Check "Add Secondary Y-Axis" as shown on the right. (From the Gallery option when the graph is right clicked)

6. The calculated Line of Best Fit and the experiment data points will appear on the same graph. If the two data sets fall close together the unknown solution may be identified.



Lesson Plan: Preparing For Debate Using Discussion Forum

Outcomes

Technology: A3.2, A10.1, B10.10, C2.1, E3.1

Biology 621: 212-1, 213-6; 219-7, 316-4; 118-6, 213-6, 316-3

Science 421: 114-1, 213-7, 215-1; 118-9, 114-5, 118-1

Biology 521: 118-10; 117-4, 215-4, 214-15; 118-6

Chemistry 521: 117-4, 213-7, 215-3

Chemistry 621: 117-6, 118-2, 118-8, 118-9, 118-10; 114-5, 213-6, 213-7, 215-4; 118-6

Physics 521: 116-6, 117-2; 116-7, 117-2, 118-2, 213-7

Physics 621: 115-5, 117-11, 118-2, 118-4, 214-15, 215-4, 215-5, 329-6

Activity

Research a topic from Biology 621 where multiple perspectives influence a science related decision or issue. Prepare arguments supporting (pro) or against (con) a particular issue using a threaded discussion forum. Debate the issue in the face-to-face classroom.

Resources

- Internet
- Threaded Discussion Forum (ATutor - http://atutor.edu.pe.ca/atutor)
- Word Perfect

Instructions

Various opportunities for debate are suggested within the Biology 621 curriculum. Examples include:

- doctors prescribe HGH as a treatment for individuals who have normal homone levels but are simply genetically shorter than average
- steriods be legalized for use by all athletes
- random drug testing is an invasion of privacy
- homones be used within the farming industry (milk, beef or chicken) to increase production
- genetically modified food is required to feed a hungry planet
- corporations be allowed to patent genetic information they discover
- human activity is causing the sixth "mass extinction"

1. Present a topic for debate and assign groups

2. Use various tools and strategies necessary to carry out research

3. Critically evaluate information and its source (authority, purpose, coverage, currency, objectivity and accuracy).

4. Consider/examine Canadian laws that may apply to the use of technology

5. Organize group issues, points and arguments through the use of the ATutor threaded discussion forum. (Small group discussion forum. This activity may occur outside of class time)

6. Cut and paste each person's debate points into a Word Perfect document to produce a printed copy. Individuals will use this copy to stay focused during the face-to-face debate.

7. Conduct the debate in the face-to-face classroom.

Lesson Plan: Preparing For Debate Using Discussion Forum

Other Activities

- create visuals or chart data to support positions
- prepare a slide or multimedia presentation on the topic instead of an oral debate

Creating Groups in ATutor

Each group requires its own private discussion forum area.

1) Ensure that "Forum" and "Groups" Tools are assigned for the workspace. ("Manage" - "Student Tools". Place a check mark beside these two tools. Choose "Save")

2) Create groups. (Note: students should be admitted to the ATutor workspace prior to creating groups.)

- choose "Manage" - "Groups" - "Create Groups"
- check "Create multiple groups automatically" and choose "Continue"
- "Group Type" enter the topic of the activity e.g. Invasive Species
- "Group Prefix" enter the word "Group" (As groups are created they will be listed as "Group 1", "Group 2", etc.
- Enter a short description for the activity (e.g.: the Debate Question)
- Enter the "Number of students per group"
- Choose "Fill groups randomly"
- Tools - ensure that "Forums" is checked and choose "Create"
- a "Groups" screen will be presented. Place a check in front of the main heading in the group created and check "Members" at the bottom of the screen
- review the group memberships and reassign individuals as required

3) Two forum areas will be available when students open the "Forum" tool from the "Home" page. The top will be full class discussion and the second will be listed under the group to which they were assigned.

Suggestions For Assessment

- visit discussion forum to examine the collaboration and contribution of members. Has there been an attempt to collaborate evidence concerning a point that is surprising or appears baised?
- prepare a rubric (e.g. addresses the issue, supports arguments with facts, persuasiveness, organization, participation, respect, oration skill)

Lesson Plan: Using Discussion Forums For Research

Outcomes

Technology: A3.2, A10.1, B10.10, E3.1

Physics 621: 115-5, 117-11, 118-2, 118-4, 214-15, 215-4, 215-5, 329-6

Science 421: 114-1, 213-7, 215-1; 118-9, 114-5, 118-1

Biology 521: 118-10; 117-4, 215-4, 214-15; 118-6

Biology 621: 212-1, 213-6; 219-7, 316-4; 118-6, 213-6, 316-3

Chemistry 521: 117-4, 213-7, 215-3

Chemistry 621: 117-6, 118-2, 118-8, 118-9, 118-10; 114-5, 213-6, 213-7, 215-4; 118-6

Physics 521: 116-6, 117-2; 116-7, 117-2, 118-2, 213-7

Activity

Post findings from research in a threaded discussion forum. Read the findings of group members and prepare a response.

Resources

- Internet or Written Text
- Threaded Discussion Forum (ATutor - http://atutor.edu.pe.ca/atutor)
- Word Processor

Instructions

There are a number of strategies that may be employed to encourage discussion forum participants to interact with content and to engage one another. Examples of two common approaches are provided below:

Clarifying Position:

- read article or investigate the issue(s)
- post a summary/personal reaction to the content
- read other group members posts and points-of-view
- contribute a response, reflection, feedback, or request for more information to one post that holds interest or personal significance

Jigsaw Activity - Investigating New Material:

- research an assigned topic or read an article from within a given area of study (each participant researches a separate piece of content)
- post summary of findings
- read summaries of all others in group. Incorporate information into own understanding. Ask for further information or clarification, if required.
- write a summary of the overall topic, individually, that will be submitted for assessment

1. Assign student groups a topic to research. Open ended topics are best where the students must research, discuss, judge and evaluate. e.g.: Which physicist contributed most significantly to Science? Justify your choice. Does fission or fusion hold the greater promise as a future energy resource? Fully support your conclusion.

2. Use various tools and strategies necessary to carry out research. Critically evaluate information and its source (authority, purpose, coverage, currency, objectivity and accuracy)

3. Adhere to timelines for posting and response. Ensure that postings demonstrate thoughful process, reflection and precise writing technique. Compose all material using a word processor before posting.

Lesson Plan: Using Discussion Forums For Research

Other Activities

- directions, Internet links and electronic articles may be provided from within ATutor
- an expert or mentor accept and answer questions through discussion forum
- maintain a class FAQ (frequently asked questions) through discussion forum. Students may provide information for classmates or assist with explaination of concepts

Creating Groups in ATutor

Each group requires its own private discussion forum area.

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2) Create groups. (Note: students should be admitted to the ATutor workspace prior to creating groups.)
   - choose "Manage" - "Groups" - "Create Groups"
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   - Enter the "Number of students per group"
   - Choose "Fill groups randomly"
   - Tools - ensure that "Forums" is checked and choose "Create"
   - a "Groups" screen will be presented. Place a check in front of the main heading in the group created and check "Members" at the bottom of the screen
   - review the group memberships and reassign individuals as required

Suggestions For Assessment

- stress quality of posts over quantity. Posts should be composed and edited "off line" in a word processor prior to sharing. Social or "off topic" posts should not be tolerated. Convey an expectation of individual "excellence".
- ensure that students have critically evaluated the information and source on which they are relying. (authority, purpose, coverage, currency, objectivity and accuracy)
- provide clear timelines for initial post and response. Follow up immediately with those who do not adhere to deadlines as they prevent others from completing their activity. If the activity is "out-of-class" ensure that those who do not have Internet access at home have an opportunity to gain access at school. (before classes commence, during lunch, after school, etc.)
- provide individual written feedback to participants after initial post and/or at the end of the activity. This is essential for ongoing student engagement in the online learning environment.
- do not repeat the exercise or discussion in the face-to-face classroom. Provide closure, clarification or take comments. Move along to higher order learning activities using the acquired content or begin a new topic area.

Lesson Plan: Let's Review

Outcomes

Technology: A10.1, B10.10

All Areas: Assessment of knowledge outcomes

Activity

Prepare unit questions, with study prompts, for the ATutor test bank database. Write an online quiz, with immediate feedback option set, as a review for an in-class assessment.

Resources

- ATutor "Tests & Surveys" tool
- Class Notes and Text Book

Instructions

The ATutor "Tests & Survey" tool allows instructors to create objective and open-ended questions. Once created these questions are categorized and added to a "question database". Quizes are created by selecting specific questions from this database. The software will immediately "grade" and provide "study prompts" for wrong objective question answers. Open-ended questions must be assessed by a person.

1. Agree with students that a percentage of questions for an upcoming assessment will be taken from student submitted questions.

2. E-Mail or submit questions and answers through discussion forum for inclusion in the question database. Instructors may enter these questions or assign rights to particular individuals to do this task on behalf of the class.

3. Select questions from the database for inclusion in an online review quiz. Ensure that values are assigned for each question and that "Release Results: Once quiz has been submitted" is selected.

4. Select a time period for the quiz to become available. Complete the review quiz, noting the "study prompts" for wrong answers. (These could be "See diagram on pg. 23" or might take the form of a direct explaination or hint)

5. Instructor read and provide feedback on any open-ended questions that may be included in the online reveiw.

6. Select questions to be included on the in-class assessment. (The in-class assessment may be traditional or written online through ATutor. Select "Random Questions" so that each user is given the quiz questions in a different order. This will discourage "looking at a classmates computer screen".)

Note: Instructions for setting up quizes and surveys may be found in the ATutor workspace "ATutor Training and Demonstration". If you are not a member of this workspace, "Browse For Course" and request "Enrollment". Email the senior high technology specialist to be enrolled.

Lesson Plan: Let's Review

Other Activities

- conduct online surveys using ATutor. (Assign only the Test/Survey tool and direct participants to the Authenticated Access URL that may be found under "Manage" - "Properties" to complete the survey.)
- use ATutor "Poll" feature to gather information about class attitudes towards a particular issue. It might be interesting to perform a pre and post poll on the issue to see if class activities changed student perceptions.

Suggestions For Assessment

- review questions for clarity. Ensure that there is only one correct answer per question.
- check that all students submitted questions for the database. Is there evidence of thoughtfulness and appropriateness?
- check the online review results. Are there particular questions with which all students are experiencing difficulty? Follow up problem areas in-class or with individual students.
- provide opportunity for students to seek help or clarification of review content before administering the unit assessment.

Lesson Plan: 25 Questions Game Review

Outcomes

Technology: A10.1

All Areas: Assessment of knowledge outcomes

Activity

Select categories and brainstorm questions for a unit review. Organize questions into the chosen categories and enter into a Presentation slideshow 25 Questions game template. Play the game in preparation for a formal assessment.

Resources

- Class Notes and Text Book
- Corel Presentations
- 25 Questions Game Template File (available for download http://www.edu.pe.ca/journeyon/resources_pages/lesson_plans/science_2006/science.htm)

Instructions

During the game, competitors are given a clue in the form of an answer. To be awarded points they must give a response in the form of a question.

1. Select unit outcome or theme categories.

2. Assign students (or student groups) to develop and submit three or more questions for each category. Use email to submit electronically.

3. The teacher will select questions for each category. Rank questions according to difficulty level. 1pt - easiest, 5pt level - most difficult.

Lesson Plan: 25 Questions Game Review

Instructions (continued)

4. Teacher or student designate enters question data into the Corel Presentations template file.

5. Divide students into teams to play the 25 questions game as review for a class quiz. Rules may be established for the order of who may answer each question for a team.

6. Teacher or student designate acts as "Host" and "Judge" regarding the acceptability of a phrase that is used as "The Question".

7. Record team scores. Points are awarded based upon question value - 1pt, 2pts, 3 pts, etc. Declare a winner. (Often token prizes are awarded to the members of a winning team, eg. jelly beans to share, etc.)

Suggestions For Assessment

- note participation
- review areas where students experienced difficulty
- rephrase questions that were ambigious and change in the Presentation file
- archive the file for use with another class or semester (share file with colleagues)
- make file available as a reveiw for absent students. (email, M: drive, or online)

PROBEWARE IN SCIENCE

The following hardware was allocated to each senior high school in September of 2007 to support the Physics curriculum:

8 Xplorer GLX PS-2002
8 Motion Sensor PS-2103
8 Force Sensor PS-2104
2 Temperature Probe PS-2135
1 Voltage Probe PS-2165

A CD containing the following resources was provided to physics teachers from each senior high school. Should this CD be misplaced please contact the senior high science/math specialist. Biology and Chemistry activities included on the CD can not be completed with the probeware provided. These activities are referenced as further probeware may become available in the future.

Folder GLX Projector Utility: (E:\PasPort Hardware\07 GLXProjectorXP)

File: dotnetfx.exe This is a program for projecting the screen of an attached Xplorer GLX into a window on a PC.

Folder 01 Tutorials: (E:\PasPort Hardware\01 Tutorials)

Using Data Studio Software (on computer) attached to GXL Xplorer (USB connection)

Files: (.doc Microsoft Word format. Word Perfect 12 will open these files. Alternatively, a free viewer may be downloaded from http://office.microsoft.com/en-us/downloads/CD010225841033.aspx)

1. 00 First Time Use - DataStudio.doc (First Time Use – Datastudio)
2. 01 DataStudio Basics PasPort2005.doc (Using PasPort Sensors)
3. 04 Motion Sensor Basics PasPort.doc (Motion Sensor Basics - Pasport)
4. 05 Using Enter Data.doc (Using Enter Data – the Datastudio Graphing Program)
5. 06 Using Graph Equation.doc (Using Graph Equation)
6. 07 Impulse and Change in Momentum.doc (Impulse and Change in Momentum)
7. 10 Using Enter Data (Photoelectric Effect).doc (Using Enter Data)
8. 11Using Start and Stop Conditions in DataStudio.doc (Using Start and Stop Conditions in Data Studio)

Folder 03 GLX Tutorials: (E:\PasPort Hardware\03 GLX Tutorials)

Files: (.doc Microsoft Word format)

1. 01 Introduction to the GLX Xplorer.doc (Introduction to the GLX Xplorer)
2. 02 Using the GLX Xplorer with Two Sensors at one time.doc (Using Two Sensors)
3. 04 Using the GLX Signal Generators to produce Beats.doc (Produce Beats)
4. 05 Using the GLX Sound Level Sensor.doc (GLX Sound Level Sensor)
5. 06 Using the GLX Sound Sensor.doc (Using the GLX Sound Sensor)

PROBEWARE IN SCIENCE (continued)

Files: (.doc Microsoft Word format - continued)

6. 10 Built-in sound sensor - scope and FFT on computer.doc (Using Built-in Sound Sensor on GLX)
11. 11 Soil Temperature as a Function of Depth.doc (Soil Temperature as a Function of Depth)
12. 12 Motion Sensor Basics GLX.doc (Motion Sensor Basics – GLX "Stand Alone" Version)
13. 13 Newton's Second Law.doc (Newton's Second Law – GLX version)

Folder: 04 Motion Intro Handout Word (E:\PasPort Hardware\04 Motion Intro Handout Word)

Files: (.doc Microsoft Word format student handouts; .ds Data Studio file to prepare the interface)

1. 00 Teacherguidekinematics.doc (Teacher Guide Document Contents)
2. 01 motion1.doc (Motion Activity 1 – What are We Measuring?)
3. 02 ConstantV1.doc (Studying Constant Velocity Motion - Part 1)
4. 03 Matchgraph creation.doc (Creating a Position – Time Match Graph in Datastudio)
5. 04 Motion2.doc (Motion Basics – Part 2 – Additional Measurements)
6. 05 ConstantV2.doc (Studying Constant Velocity Motion - Part 2)
7. 06 Instantaneous and Average Velocity.doc (Instantaneous and Average Velocity)
8. 07 Acceleration.doc (Acceleration)
9. 08 Free Fall.doc (Free Fall)
10. 011 Motion1 answers.doc
11. 021 ConstantV1 answers.doc
12. 041 Motion2 answers.doc
13. 051 ConstantV2 answers.doc
14. 061 Instantaneous and Average Velocity.doc
15. 071 Acceleration answers.doc

Folder: Pasco GLX Training (E:\PasPort Hardware\Pasco GLX Training)

1. Xplorer GLX Essentials - Lessons (Xplorer GLX Essentials L1-5 vF144.pdf)

   A 46 page .pdf file containing the following 5 lessons:

   Lesson 1: Getting Started
   Lesson 2: Graph Annotation & Analysis
   Lesson 3: Managing Multiple Measurements
   Lesson 4: Manual Sampling
   Lesson 5: GLX Calculator

2. Xplorer GLX Essentials - Lab Activities (Xplorer GLX Essentials Lab Activities vF144.pdf)

   A 126 page .pdf file containing the following lab activities:

   Biology #1: Respiration of Germinating Seeds *
   Biology #2: Role of Buffers in Biological Systems *
   Biology #3: Transpiration in a Plant Leaf *
   *no sensor provided to complete this activity

PROBEWARE IN SCIENCE (continued)

A 126 page .pdf file containing the following lab activities (continued):

Chemistry #1: Heat of Fusion & Vaporization
Chemistry #2: Acid-Base Titration *
Chemistry #3: Determining Ion Concentration in a Solution *

Earth/Environmental #1: Differential Heating & Cooling of Land vs. Water
Earth/Environmental #2: Runoff Effect & Water Quality *
Earth/Environmental #3: Soil Respiration *

Math in Science: Temperature of the Sun
Physics #1: Acceleration & Force
Physics #2: Conservation of Momentum
Physics #3: Electromagnetic Induction *

*no sensor provided to complete this activity

Folder 08 Investigations: (E:\PasPort Hardware\08 Investigations)

Files: Biology.pdf, Chemistry.pdf, Physics.pdf, Data Studio files for each activity

Biology.pdf

98 page document with the following exploration activities:

1. Exercise and pulse rate *
2. House of the rising yeast *
3. Organisms and PH *
4. Transpiration *
5. Why, oh why, did he swallow the fly? *
6. Acid rain *

Chemistry.pdf

80 page document with the following exploration activities:

1. Acid base titration *
2. In with a whimper, out with a bang!
3. Antacid action *
4. In a perfect world, we'd all be ideal *
5. Under pressure *

*no sensor provided to complete this activity

PROBEWARE IN SCIENCE (continued)

Physics.pdf

90 page document with the following exploration activities:

1. Actions/noitcaeR (action/reaction)
2. Heat vs. Temperature: What's the difference?
3. How current is your voltage?
4. Newton's Second Law: Constant Force
5. Positing about position

Folder 09 PasPortManuals: (E:\PasPort Hardware\09 PasPort Manuals)

Files (.pdf)

Motion Sensor - Quick Start Guide (2103-QuickStart.pdf)

Force Sensor - Quick Start Guide - (2104-QuickStart.pdf)

Temperature Sensor - Quick Start Guide (2101-QuickStart.pdf)

Online resources relating to Pasco Probeware:

Video Introduction to GLX Explorer: http://www.pasco.com/training/glxgettingstarted/home.html

Online Experiments:
http://www.pasco.com/experiments/physics/home.html

WHAT CAN I DO TO ADAPT THE COMPUTER TO MEET THE NEEDS OF ALL STUDENTS?

Listed below are some quick, easy, no cost strategies that teachers can use to make the computer more accessible to students of all needs. Most of the suggestions below are options that are available through Windows, the computer's operating system. Teachers may request the assistance of the School Technical Contact or your school's technician to implement these strategies. The following strategies have been divided into four areas for clarification; however, they may apply to many situations.

Most of the strategies listed below are available on Windows XP, while only some of them are available on Windows 98. In Windows XP, the strategies can be activated through the Accessibility Wizard (Start-Programs-Accessories-Accessibility-Accessibility Wizard). In Windows 98, they can be activated through the Control Panel: the Mouse, Keyboard and Display icons

It is important to note that if any of the following strategies are implemented on a particular computer, these settings will be enabled for all users of that computer.

Visual

- Windows Magnifier -Windows XP
- Increase size of monitor (17 inch or larger)
- Lower the screen resolution (ex. 800 x 600) - Windows XP and 98
- Enlarge icons - Windows XP and 98
- Enlarge the mouse, change its color, and assign mouse pointer trails - Windows XP and 98
- Change the speed of the mouse pointer - Windows XP and 98
- Slow down the cursor blink rate - Windows XP and 98
- Customize the size of font on desktop and menu bars - Windows XP
- Maximize the window to fill the screen - Windows XP and 98
- Customize the colour of screen, font and window title bars - Windows XP and 98
- Increase the size of the scroll bars and window borders - Windows XP

Hearing

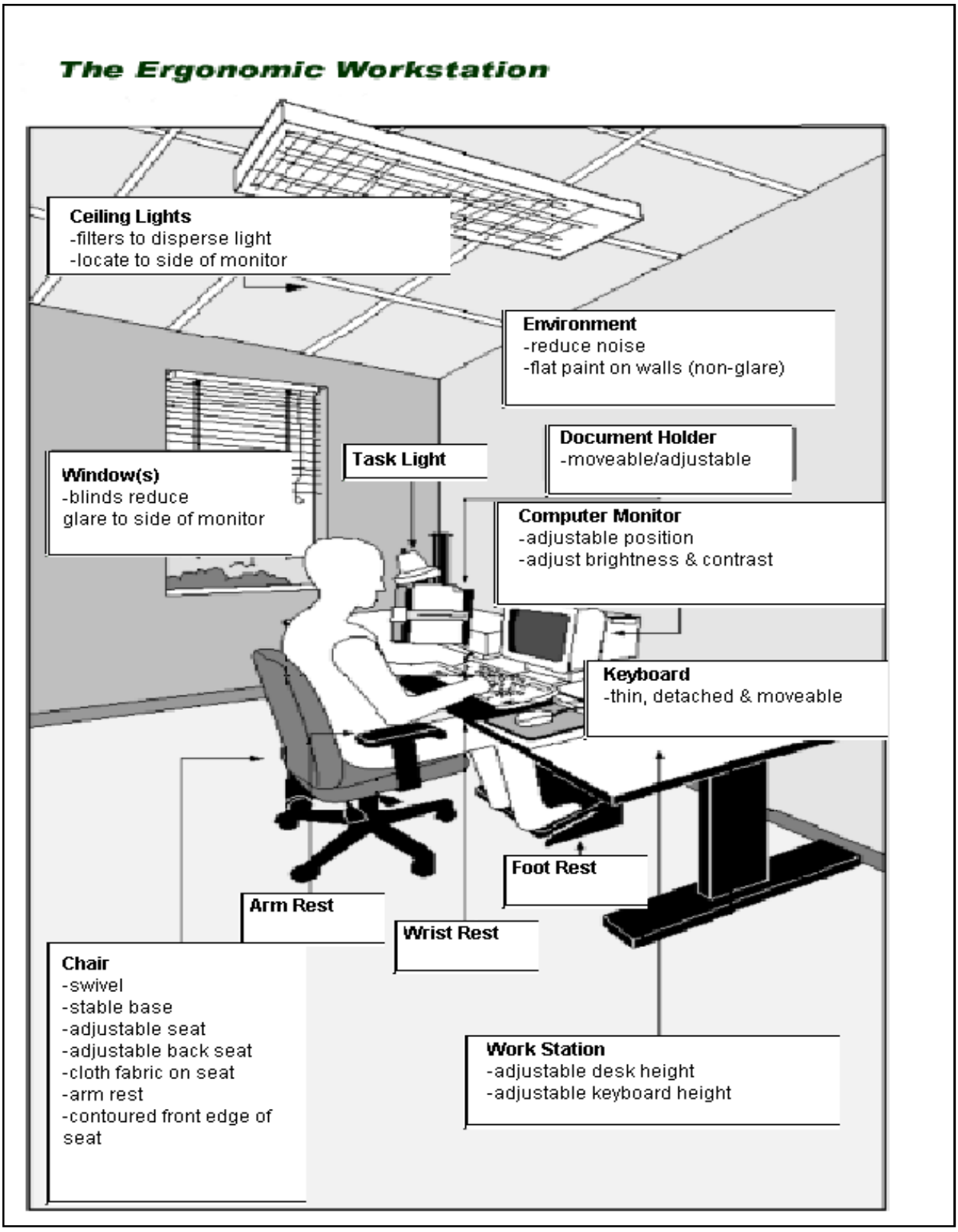
- Display captions for speech and sounds - Windows XP
- Play sounds when you press CAPS lock, NUM lock or SCROLL lock. - Windows XP
- Make sure all students are facing you when giving instructions in the computer lab
- Use of personal headphones

Mobility

- Changing the response rate of the keyboard so that letters will not be repeated if the student holds down too long on a key - Windows XP and 98
- Ensure that the mouse is on the appropriate side of the computer depending on the dominant hand of the student. For left handed users, change the left and right mouse click buttons so that it matches with the students left hand. - Windows XP and 98
- On Screen keyboard - Windows XP
- Use sticky keys - this enables a user to press key combinations like CTRL + ALT + DEL that usually have to be held down at the same time to press them one keystroke at a time. - Windows XP
- Use keystrokes to perform mouse functions ie. use the numeric keypad to move the mouse up and down and to the left and right. - Windows XP

Other

- Develop peer support programs or buddy systems that involve classmates helping classmates, students with disabilities can play role of helper as well.
- Colour code the keyboard using small dot stickers. For example, right of centre is green, left of centre is red. Small stickers can be placed on the back of the student's hand, corresponding to the side of the keyboard.
- Use a slant board to position the keyboard (1" or 2" binders can be used as slant boards)
- Seat the student facing the computer monitor with keyboard and computer monitor at the appropriate height.
- Identify specific function keys such as Spacebar, Enter, Backspace, Tab and Shift, etc. with coloured dot stickers to highlight their position on the keyboard.
- Some software such as Ultimate Writing and Creativity Center, Inspiration 7.5, Understanding Numeration, ATutor have accessibility features. Check the help section of these programs to determine how to access available.


The Ergonomic Workstation
Ceiling Lights
-filters to disperse light
-locate to side of monitor
Environment
-reduce noise
-flat paint on walls (non-glare)
Document Holder
-moveable/adjustable
Task Light
Window(s)
-blinds reduce
glare to side of monitor
Computer Monitor
-adjustable position
-adjust brightness & contrast
Keyboard
-thin, detached & moveable
Foot Rest
Arm Rest
Wrist Rest
Chair
-swivel
-stable base
-adjustable seat
-adjustable back seat
-cloth fabric on seat
-arm rest
-contoured front edge of
seat
Work Station
-adjustable desk height
-adjustable keyboard height

Glossary

Abbycat: PEI Public library database system

Absolute: a cell reference that remains constant in a formula. Dollar signs are used to force the spreadsheet to keep the cell reference in a formula the same when it is copied. (i.e. when the formula = A6/B6 is copied the numerator A6 will change to A7, A8, etc. while the denominator B6 will stay the same)

APA: abbreviation of American Psychological Association. The APA standard is used for quoting references for the sciences.

Applet: An application, written in Java, that can run inside a web page but is not limited by the functionality of HTML. Java applet and Java script differ that a Java applet needs to be downloaded. Java script is incorporated in a web page with HTML tags.

Application sharing: a program that is installed on the server computer which allow all computers on the network to have access to that software.

Assignment drop box: a mechanism for uploading electronic assignment files for an instructor using an online content management system such as WebCT or ATutor.

Attachment: file that is attached to an email

Auto fill data: spreadsheet feature that will complete a series of entries such as the "days of the week" or "months of the year". (i.e. enter January, February and select the corresponding cells with the mouse and select "auto fill". The remaining 10 months will be automatically entered)

Automated text: database input form feature that will automatically fill a field with a predetermined value (i.e. current year, telephone area code, etc.)

Background: display behind graphics and text on a web page. A background can be a colour or a tiled graphic.

Bitmap: pixel (picture element) representation of a graphic. The image is made by small dots (pixels) of different colors.

Bookmark (Favorite): a saved link to a specific place on the Internet.

Boolean operators: logic system that returns "true or false", "yes or no", "AND", "OR", "NOT". These terms are used to set parameters for searching.

Browser: a program that accesses and displays files and other data available on the Internet and other networks. (i.e. Internet Explorer, Netscape)

Bullets: a symbol appearing before items in a list.

Button bar: a bar of graphical buttons found in a program that contain "short cuts" for commonly used tasks.

Cascading style sheet (CSS): a feature of HTML that allows users to create style templates (sheets) that specifies how different text elements (paragraphs, headings, hyperlinks, etc.) appear throughout a website.

Cell address: coordinate of a cell. It is represented by a letter and a number such as A2

Cell: the area in a spreadsheet where rows and columns intersect. Data and formulas are placed in cells. Cells are identified by the alphabetical column and numeric row i.e. A1

Clone brush: a graphics tool used to copy all or part of an image.

CMYK: a subtractive color model used in color printing. This color model is based on mixing pigments of cyan, magenta, yellow and black in order to make other colors.

CODEC: abbreviation for COmpression/DECompression. Software or hardware that compresses and decompresses audio and video data streams into smaller sizes while maintaining the quality. (.wmv, .ra, SVCD, MPEG, mp3, etc.)

Cold boot: powering off the computer completely and restarting it.

Column: vertical section of a spreadsheet, identified by a letter

Commercial ware: commercial software which requires purchase and registration.

Compatibility: whether or not hardware or software will work on a computer.

Compression: process of encoding data, video, or audio in order to reduce its size (.zip, .jpg).

Connection line type: how a computer is linked to a network (i.e. T3, modem, DSL, etc.)

Connection speed: the speed of information transfer among networked devices.

Cursor (Pointer): the symbol used to represent the movement of the mouse. (i.e. arrow)

Data entry bar: space in the spreadsheet to enter the cell data or formulas.

Database report: data from fields specified in a search query sorted into a particular order. Calculations and formatting may be applied to the reports generated.

Database: collection of structured, searchable electronic data (i.e. search engines are data bases)

Decompression: process of decoding or reading encoded data.

Desktop publishing: combination of text, images and graphics to produce publications such as newsletters, posters and brochures

Display format: the way the files and folders are being displayed in the windows (i.e. thumbnails, icons, details, etc.)

Distribution list: a list of email addresses that are grouped together so that one email message may be sent to all members of the group. (i.e. all students in a class, all teachers on a particular committee)

Download / Upload: refers to the transfer of information between computers. The person/computer sending the information refers to the transfer as an upload, while the person/computer receiving the information refers to it as a download.

Drive: name that refer to a storage location such as C:, G:, or A:

Dynex: PEI (French) school library database system

Effect: graphical manipulation that applies special effects to objects (i.e. chrome, neon).

Embed object: objects (audio, video, animation, etc.) that load with the HTML tags when the page is visited. Those items will be downloaded and run automatically

Ergonomic: workplace designed for maximum comfort, efficiency, safety, and ease of use.

Error checking routine: features in a database input form that checks to see that entered data corresponds to some pre-defined criteria (i.e. ticket number must fall within the range of 1-500, and no two records may have the same ticket number)

Export: to transfer information to another format for use in a different program.

Field types: identifies the type of information that is to be entered into a field in a database (i.e. date, numeric, text)

Fields: different categories in a database (i.e. first name, middle initial, last name, street)

File extension: alphanumeric characters located after the period at the end of a filename. This identifies the type of software than can open the file. (i.e. .mp3, .wpd, .gif, .html, etc.)

File management: process of organizing files into folders and sub-folders and selecting storage medium (i.e. hard disk, floppy disk, CD)

File properties: detailed information on the file. (i.e. size, date, extension)

File size: storage space taken by a file in the computer system (i.e. kilobytes - kb, megabytes - mb, gigabytes - gb)

Filter (graphic): graphical manipulation that applies special effects to images (i.e. blur, sharpen).

Filters: search criteria that allow particular emails to be located. Filters may be set with "rules" that provide directions on tasks to perform with selected emails.

Fixed/locked titles: feature in spreadsheet program to keep certain cells showing (i.e. headings) while scrolling

Flash: developed by Macromedia, Flash is a software used to create web content that interacts with the users by providing animations, audio, games, etc.

Flat database: is a single database table structure (i.e. Appleworks, MS-Works) Searches can be performed within this table but it is not capable of organizing complex applications.

Folder (Directory): an electronic storage area that can contain a group of files and/or other directories.

Font: the style of text characters. (Times New Roman, Arial, Garamond, etc.)

Footer: text placed automatically at the bottom of each page in a document

Frame: a webpage that has separate divisions (windows) within the web browser. The content for each frame area comes from a different .html file.

Freeware: software distributed by the creator free of charge under certain conditions.

Functions: pre-defined mathematical rules that are available in spreadsheet programs i.e. mean, round, standard deviation, exponents, payment amount, etc.

Graphics in layers: objects placed over other objects to create one image. This allows for easier editing and manipulation.

Group file sharing: a specific network folder that a workgroup member can share

Grouping: creating one single object made up of several other objects. This allows for resizing the object as a whole.

Hardware: all physical parts of a computer (i.e. monitor, mouse, keyboard, etc.).

Header: text placed automatically at the top of each page in a document

Hexadecimal: a numbering system with base of 16 includes only the digits 0 through 9 and the letters A, B, C, D, E, and F. Used to identify large numbers accurately i.e. identify colors, network addresses.

Hosting service: service that companies provide to store data on their server

HTML tags: Hypertext Markup Language tags are instructions within brackets < > that tell the web browser how to display the page information.

Image map: an alternative navigational structure whereby an image on a webpage has "programmed coordinates" that allow the user to navigate the site intuitively, using the mouse.

Import: to bring in external information

Insertion point: the insertion point is where the next character typed from the keyboard will appear. (i.e. "I beam")

Interactive syllabus: an electronic course outline

Java Script: a scripting language developed by Netscape to enhance the capability of HTML language

Justification: adjustment of text to ensure that margins will align throughout the document (i.e. left, center, right)

Layer: visualized as electronic "transparencies" which allow users to display and manipulate information separately.

Link (Hyperlink): a clickable link to another file (i.e. web page).

Lock cell: locking a cell will prevent any changes on its content. It doesn't hide the content of the cell.

Logical operators: used to compare variables such as greater (>) greater or equal (> =), equal (= =), less or equal (< =) and less (<).

Macro: a group of repeated commands that are recorded and saved for later use.

Mail merge: a word processing feature that allows a user to create a "data records" database to record information about a number of people, and a form letter template. Based upon a search criteria, names, addresses and other recorded data are combined with fields found in the form letter. Completed forms may be displayed on the screen or sent directly to a printer.

Menu bar: a horizontal bar at the top of a window, below the title bar, that contains drop-down menus.

Microcat: PEI (English) school library database system

MLA: abbreviation of Modern Language Association. The MLA standard is used for quoting references for the humanities.

Multimedia: the use of several media to convey information (text, audio, graphics, animation, video).

Multiple logins: simultaneously logging into multiple computers on the same network using the same username.

Network: a communication system connecting two or more computers.

Notebook: another name for an individual spreadsheet.

Object alignment: positioning of an object with respect to other objects.

Panorama: a series of picture "stitched" together using software to create a picture wider than what the camera is normally capable of capturing. Some panorama can offer user a 360 degree view.

Plug-in: an auxiliary program that works within a browser to enhance its capability. The plug-in can be a third party product. (adobe reader for .pdf, Real Audio, Shockwave, etc.)

Pop-up ads: a form of online advertising that open a new window automatically to display advertisements.

Principles of design: five universally recognized principles are contrast, unity, pattern, movement, and rhythm. Used in combination these principles create a esthetically pleasing product.

Print queues: set of printing tasks waiting to be processed.

Publishing etiquette: acceptable guidelines for publishing. (i.e. non-biased, inclusive language).

Record: all fields relating to one "object" in a database (i.e. all information regarding one student)

Relational database: is the creation of multiple tables linked to each other through a common "key" such as a customer number. (i.e. a travel agency may have customer contact information in one table, airline reservations in a second, hotel and car reservations in a third. If any piece of information changes only one table needs to be updated.)

Relative: a cell reference that will automatically update itself in a formula when it is copied. (i.e. a formula = A6/B6 will update itself to = A7/B7, = A8/B8, etc. as it is copied downward in a column)

Rename: change the name of the file or folder to another name.

RGB: a color model that utilizes the additive model in which red, green, and blue light are combined in various ways to create other colors (i.e. pixels on a computer monitor). Colours created on the computer monitor sometimes may not be able to be reproduced when printed.

Rollover (mouse over): a "change of state" when the mouse is positioned above an object.(i.e. colour changes, cursor changes, image changes)

Row: horizontal section of a spreadsheet, identified by a number

Rule: a task to perform on emails that meet a particular criteria. (i.e. send a return message for all incoming emails, such as "on vacation until ..", delete message from particular sources, or automatically place mail in a particular folder)

Save as: same as "Save" but allows user to save a copy of current file under a new name or location.

Save: permanently record data to a storage medium such as a floppy disk or hard disk.

Screen capture: saving a portion of the current screen as an image file to be inserted into a document. Paintshop Pro includes a screen capture utility.

Search engine: a program designed to help find information on the Internet. (i.e. Google, Ask Jeeves, Yahooligans)

Server: the central computer in a network. (i.e. contains shared data, programs, etc.)

Shareware: trial version of any commercial software.(i.e 30 days) Shareware is also known as demoware, trialware and many other names.

Signature: text added automatically at the end of an email (i.e. name, position, return address, phone/fax number, email address)

Software: program or application that runs on a computer.

SPAM: acronym of the words: Stupid Pointless Annoying Messages. These messages are often advertising emails sent out massively on the internet.

Spreadsheet: a grid which helps you organize data in rows and columns. Calculations may be performed by inserting formulas. Charts or graphs may be generated from the data.

Spyware: computer software that gathers and reports information about the computer usage without the user's knowledge or consent.

Streaming video and audio: refers to a technique of transferring media over the Internet to the user's computer so that it is available without having to download the whole file. The media will begin to play once a predetermined amount of data is transferred to the computer "buffer"

Tab rulers: guides found in word processors allowing the user to graphically set and delete tab indents

Text art: tool found in Word Perfect that allows the user to create text in 2D and 3D formats in a variety of shapes

Text wrap: word processing feature that automatically places the text on the next line

Touch keyboarding: the ability to type without looking at the keyboard.

Un-grouping: separating objects that were previously grouped.

Unlock cell: this allows modification be to performed on cells that were previously "locked"

Vector: mathematical representation of a graphic. The image is made from mathematical equations that represent the curves, lines, area, color, etc. This form of representation allows for small file sizes while maintaining detail when increasing picture size.

Virtual reality: an artificial environment created with computer technology

Virus: a virus is a program or piece of code that causes an unexpected, usually negative, event.

W3C accessibility guidelines: World Wide Web Consortium organization that provides standards for web page creation. These include accessibility issues (challenged users, slow line speeds, older processing equipment) and equipment compatibility.

Warm boot: restarting the computer using reset button, Ctrl + Alt + Del, etc.

Watermark: a graphic or text appearing in the background of a page (i.e. the word "Draft" or a graphic of a soldier in a Remembrance Day poem)

Web Server: a computer that stores data (i.e.: web sites) for the world wide web

Whiteboard: a whiteboard is a shared electronic workspace. Each participant can add text, make drawings or paste pictures on the whiteboard. Other participants can immediately see the result on their workstation.

Wireless connection: connection to another device without physically connecting a wire.

WYSIWYG: Acronym for"What You See Is What You Get". WYSIWYG is used to describe applications that let you see what documents will look like