Information Technology Resource Document (K – 7)

This document is available only as a resource for teachers and is not an IRP. Neither is it listed on the Education Program Guide Order. It is still expected that students will gain the knowledge, skills, and attitudes described in this document but it is expected that the teaching and learning will be integrated across all other subject areas. Information and communications technology is a tool to support and enhance student learning. The learning outcomes described in this document should be incorporated into all of the learning students are engaged in.

The K-7 Information Technology resource document can also serve to assist schools and districts with requirements for school and district technology plans.

INFORMATION TECHNOLOGY K TO 7

Integrated Resource Package 1996

Province of British Columbia
Ministry of
Education

IRP 034

PREFACE: USING THIS INTEGRATED RESOURCE PACKAGE

INTRODUCTION TO INFORMATION TECHNOLOGY K TO 7

THE INFORMATION TECHNOLOGY K TO 7 CURRICULUM

INFORMATION TECHNOLOGY K TO 7 APPENDICES

Implementation of Information Technology K to 7, 8 to 10, and 11 and 12 will begin in September 1996, with full implementation in September 1997. The K to 12 Education Plan requires the integration of Information Technology K to 7 and 8 to 10 with other curricular areas. Information Technology 11 and 12 is a stand-alone course.

This Integrated Resource Package (IRP) provides some of the basic information that teachers will require to implement the curriculum. The information contained in this IRP is also available through the Internet. Contact the Ministry of Education's home page: http://www.educ.gov.bc.ca/

THE INTRODUCTION

The Introduction provides general information about Information Technology K to 7, including special features and requirements. It also provides a rationale for the subject—why information technology is taught in BC schools—and an explanation of the curriculum organizers.

THE INFORMATION TECHNOLOGY K TO 7 CURRICULUM

The provincially prescribed curriculum for Information Technology K to 7 is structured in terms of *curriculum organizers*. The main body of this IRP consists of four columns of information for each organizer. These columns describe:

- provincially prescribed learning outcome statements for Information Technology K to 7
- suggested instructional strategies for achieving the outcomes
- suggested assessment strategies for determining how well students are achieving the outcomes
- provincially recommended learning resources

Prescribed Learning Outcomes

Learning outcome statements are content standards for the provincial education system. Learning outcomes set out the knowledge, enduring ideas, issues, concepts, skills, and attitudes for each subject. They are statements of what students are expected to know and be able to do in each grade. Learning outcomes are clearly stated and expressed in measurable terms. All learning outcomes complete this stem: "It is expected that students will. . . . " Outcome statements have been written to enable teachers to use their experience and professional judgment when planning and evaluating. The outcomes are benchmarks that will permit the use of criterion-referenced performance standards. It is expected that actual student performance will vary. Evaluation, reporting, and student placement with respect to these outcomes depends on the professional judgment of teachers, guided by provincial policy.

Suggested Instructional Strategies

Instruction involves the use of techniques, activities, and methods that can be employed to meet diverse student needs and to deliver the prescribed curriculum. Teachers are free to adapt the suggested instructional strategies or substitute others that will enable their students to achieve the prescribed outcomes. These strategies have been developed by specialist and generalist teachers to assist their colleagues; they are suggestions only.

Suggested Assessment Strategies

The assessment strategies suggest a variety of ways to gather information about student performance. Some assessment strategies relate to specific activities; others are general. These strategies have been developed by specialist and generalist teachers to assist their colleagues; they are suggestions only.

Provincially Recommended Learning Resources

Provincially recommended learning resources are materials that have been reviewed and evaluated by British Columbia teachers in collaboration with the Ministry of Education according to a stringent set of criteria. They are typically materials suitable for student use, but they may also include information primarily intended for teachers. Teachers and school districts are encouraged to select those resources that they find most relevant and useful for their students, and to supplement these with locally approved materials and resources to meet specific local needs. The *recommended* resources listed in the main body of this IRP are those that have a comprehensive coverage of significant portions of the curriculum, or those that provide a unique support to a specific segment of the curriculum. Appendix B contains a complete listing of provincially recommended learning resources to support this curriculum.

THE APPENDICES

A series of appendices provides additional information about the curriculum and further support for the teacher.

- *Appendix A* contains a listing of the prescribed learning outcomes for the curriculum, arranged by curriculum organizer and by grade.

- *Appendix B* contains a comprehensive listing of the provincially recommended learning resources for this curriculum. As new resources are evaluated, this appendix will be updated.

- *Appendix C* outlines the cross-curricular reviews used to ensure that concerns such as equity, access, and the inclusion of specific topics are addressed by all components of the IRP.

- *Appendix D* contains assistance for teachers related to provincial evaluation and reporting policy. Curriculum outcomes have been used as the source for sample criterion-referenced evaluations.

- *Appendix E* acknowledges the many people and organizations that have been involved in the development of this IRP.

- *Appendix F* contains a glossary of terms specific to the Information Technology K to 7 curriculum.

- *Appendix G* contains a planning guide and suggestions on how to integrate Information Technology K to 7 into a classroom setting.

Grade

GRADES K TO 1 • *Foundations*

Curriculum Organizer

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- identify and describe the effects of technology tools that communicate information in the home and school
- demonstrate a willingness to use information technology tools
- demonstrate an ability to use a graphics program
- enter information on a computer and print it
- demonstrate a willingness to work co-operatively when using information
 technology tools
- follow a sequence of steps to perform a task using information technology tools
- use appropriate terminology to describe the parts of a computer system
- demonstrate the proper care and safe use of equipment
- identify occupations in their community that involve the use of information technology

SUGGESTED INSTRUCTIONAL STRATEGIES

Children are surrounded by information technology tools at home and at school. They need to know how to use these technologies so that they can communicate more effectively with others.

- In an "All About Me" theme unit, discuss the concept of the family with the class. Invite students to create pictures of their families using a graphics program. Have them identify and label their pictures (e.g., Mom, Dad, sister, brother) using the graphics program.
- Have students work individually to identify and match laminated picture vocabulary cards with the parts of a computer (e.g., mouse, keyboard, monitor, printer). Discuss the proper care and safe use of each of these components with students.
- To help students develop their understanding of how information technology is used in the workplace, ask them to create collages showing people using a variety of information technology tools (e.g., fax machines, telephones, video cameras, computers).

Prescribed Learning Outcomes

The Prescribed Learning Outcomes column of this IRP lists the specific learning outcomes for each curriculum organizer or sub-organizer. These aid the teacher in day-to-day planning.

Suggested Instructional Strategies

The Suggested Instructional Strategies column of this IRP suggests a variety of instructional approaches that include group work, problem solving, and the use of technology. Teachers should consider these as examples that they might modify to suit the developmental levels of their students.

Grade

GRADES K TO 1 • *Foundations*

Curriculum Organizer

SUGGESTED ASSESSMENT STRATEGIES

In the early primary years, young children begin to explore technology formally and to acquire fundamental skills for handling information technology tools. Playing games and using simple graphics and text programs with partners provide children with the opportunity to gain confidence using information technology tools. By observing students as they work and listening to their conversations, teachers can assess knowledge, understanding, and care of information technology tools, as well as ability to work co-operatively with others.

- Listen to students' conversations as they work with information technology tools. Note the extent to which they use terms correctly (e.g., click, select, space bar, enter, return, escape, cancel, icon, print).
- Observe students as they use graphics software. Note the extent to which they are able to:
  - use a mouse to point, select, and drag
  - access menus and a tool or button bar or palette
  - select and resize shapes
  - print documents
- While students are working with a computer, assess their knowledge of the basic components of a computer system. Note the extent to which they are able to:
  - accurately identify the parts
  - explain the general purpose or function of each part
  - use correct terminology
- Conference with students to discuss their collages showing people using information technology tools. To assess their understanding, ask questions such as:
  - What can you tell me about the information technology tools you have included in your collage?
  - What is the purpose of each tool?
  - Can you think of some information technology tools that you have not included?
  - Which information technology tools have you used before?
  - How were these tools useful to you?

RECOMMENDED LEARNING RESOURCES

Print Materials

- The Technological Classroom

Software

- Microworlds Project Builder
- Storybook Theatre
- Write: OutLoud

Suggested Assessment Strategies

The Suggested Assessment Strategies offer a wide range of different assessment approaches useful in evaluating the Prescribed Learning Outcomes. Teachers should consider these as examples they might modify to suit their own needs and the instructional goals.

Recommended Learning Resources

The Recommended Learning Resources component of this IRP is a compilation of provincially recommended resources that support the Prescribed Learning Outcomes. A complete list including a short description of the resource, its media type, and distributor is included in Appendix B of this IRP.

The development of this Information Technology K to 7 Integrated Resource Package (IRP) has been guided by the principles of learning. These are:

- Learning requires the active participation of the student.
- People learn in a variety of ways and at different rates.
- Learning is both an individual and a group process.

RATIONALE

To participate and make informed decisions in today's world, a global citizen requires technological and information literacy skills that include the ability to gather, process, and manipulate data. These skills are now as essential as traditional numeracy and literacy.

British Columbia is becoming a highly computer-literate and "wired" society with a large percentage of businesses and households connected to the information highway. Information technology and the information highway are also providing new opportunities for learning. Now a student in a remote or rural area in BC can have the same access to resources as a student in a large urban centre.

Information technology is also quickly changing the way we work. Traditional jobs, such as those in the banking industry, are disappearing while new areas of economic activity, such as multimedia production, are growing rapidly. As well, how and where we work continues to evolve as technology impacts on the workplace.

Our era is marked by constant and rapid change. In the time it has taken to develop this curriculum, technology has already made significant advances; by the time the curriculum reaches the classroom, much of what is now considered state-of-the-art will be obsolete.

As well as the rapid development of new technologies that gather, organize, and share information, familiar technologies like television, telephone, and computers are evolving and being expanded by digitized information, causing a convergence of technologies.

The challenge for students and teachers is to develop an understanding of the fundamentals of information literacy and the tools required to prepare for, and participate in, an evolving information-based society. Students need to have a firm grounding in information technology for their careers, for lifelong learning, and for recreation. The Information Technology K to 12 curriculum provides students with the analytical, inter-personal, and technical skills they require to be active participants in an exciting and dynamic world.

Preparing for the Workplace

Today, new and exciting careers are being pioneered by those with the knowledge and skills to use information technology creatively, with whole industries emerging around the information technology revolution.

To meet career challenges, students must be self-reliant as well as good communicators and problem solvers. They require interpersonal, academic, and technical skills, and must demonstrate an ability to work independently and as part of a team. They also need to develop an ethical approach to the use of information. Employers in British Columbia are looking for workers who are adaptable, are committed to lifelong

learning, and show strong leadership qualities. This curriculum builds these skills while ensuring that students acquire a sound knowledge of information technology.

Preparing the Citizen

To be responsible members of society, students must be aware of the ever-growing impacts of information technology. They need to reflect critically on information technology's role in society and consider its positive and negative effects. The information technology curriculum fosters the development of skills and attitudes that increase students' abilities to address the social and ethical issues of technological advancements.

Relevant to Everyone

The Information Technology K to 12 curriculum is designed to provide learning opportunities for all students. The instructional and assessment strategies described in this IRP encourage students to apply the skills and knowledge they gain to solve real-life problems. As students study information technology, they develop research and communication skills and learn how to evaluate their work.

Preparing for Further Education

The skills and knowledge covered by this curriculum will provide students with the level of information literacy they need to succeed in postsecondary education.

AIM AND APPROACH OF THE CURRICULUM

The aim of the Information Technology K to 12 curriculum is to help students develop information literacy and the lifelong learning patterns they need to live and work effectively in an information-rich technological society. To achieve this, the curriculum provides a framework for students to learn how to solve problems using information technology.

The Primary Years

This IRP includes curriculum learning outcomes and support materials that apply to learners in the Primary Years (K to 3). The instructional strategies, assessment strategies, and learning resources are intended to update or supplement many of the related support materials currently contained in the *Primary Program Foundations Document* and the *Primary Resource Document.*

Once all curriculum outcomes pertaining to the Primary Years have been updated, the *Primary Program Foundations Document* and the *Primary Resource Document* will be revised and combined with the updated curriculum to create a Primary Years IRP. Until the Primary Years IRP is available, teachers are encouraged to implement the new K to 7 curriculum and continue to use other portions of the *Primary Program Foundations Document* and the *Primary Resource Document.*

Reporting on Information Technology

As in all subject areas at the Kindergarten to grade 10 level and courses at the grade 11 and grade 12 level, teachers must use the prescribed learning outcomes as the basis for reporting to parents on student performance in information technology.

Information technology is an integrated area of study from Kindergarten to grade 10, so teachers of these grades do not need to report on it as a separate subject. However, teachers should include written comments specific to information technology when reporting on other subject areas. In grades 11 and 12, reporting follows the normal procedures for senior-level courses.

Evolving Information Technology

In this IRP, *information technology tools* refers to the tools and resources in common use at the time this document was prepared. It is expected that as new tools and resources are developed they will be used and taught in the schools to reinforce the concepts in this curriculum.

If teachers use resources such as local area networks (LAN)s, wide area networks (WAN)s, the World Wide Web, or the Internet, they will need to have them authorized (according to district and provincial policies) before using them in the classroom.

Information technology tools and resources include computers, multimedia, and related technologies used for local or global communications. The chart on the following page lists some specific tools.

Information Technology Tools

Category of Tool	Examples
Hardware Devices	• faxes, voice/fax/data modems • electronic day books • video recorders, tape-recorders • MIDI hardware • liquid crystal display panels • digital scanners, laser printers • digital cameras
Software and Computer Accessories	• computer-assisted-instruction (CAI software) • simulations • CD-ROMs • laserdiscs • office and multimedia productivity tools • World Wide Web browsers • hypertext authoring tools • programming languages • multimedia software and tools
Communications Environments	• Macintosh, OS/2, Windows, Unix, DOS • World Wide Web • Gopher, Veronica, Archie, file transfer protocol (FTP) sites • Wide Area Information Servers (WAIS) • Internet service providers • local area network • wide area network • infrared communications • video conferencing

The following chart provides an overview of Information Technology K to 12.

Overview	
▼ **Grades K to 3** Students become aware that information technology is all around them. They become aware of its role in their lives and explore familiar information technology tools. Using these tools, students enhance group interaction and communication, and develop confidence in handling information. Activities are based on classroom themes and their own experiences and interests.	*In grades K to 3, students:* • identify information technology tools that are useful in their daily lives • use information technology tools independently and in groups • demonstrate an awareness that information can be collected, organized, and presented in a variety of ways • consistently apply suitable and safe use of information technology tools
▼ **Grades 4 to 7** Students gain an understanding of the personal, community, and global consequences of information technology tools and develop a concern for their responsible use. They begin to appreciate the impact information technology has on individuals and society. Students become more proficient at accessing, gathering, organizing, and presenting information by using information technology tools to create solutions to relevant problems.	*In grades 4 to 7, students:* • use a variety of information technology tools, applications, and production processes • apply problem-solving skills to meet an information need • practise using a variety of information technology tools • demonstrate a willingness to manage resources and information • demonstrate an awareness of the protocols and ethics involved in the use of information technology
▼ **Grades 8 to 10** Students become more sophisticated in their use of information technology tools. They develop stronger information literacy skills and continue to learn about various careers that use and apply information. They consider the cultural, ethical, and legal implications of information technology.	*In grades 8 to 10, students:* • use a variety of information technology tools to access information • apply information technology to all walks of life, including education and recreation, and to future careers • identify and describe various information technology tools related to careers • demonstrate an understanding of ethics and acceptable use of information when accessing and processing information • develop simple programs for the computer • demonstrate an understanding of safe ergonomic strategies for the use of information technology • apply information technology tools in research
▼ **Grades 11 and 12** Students use sophisticated information technology tools to increase and refine their skills, knowledge, and abilities to solve complex and varied problems. Students prepare for postsecondary and career opportunities through relevant and meaningful experiences within their school and community.	*In grades 11 and 12, students:* • demonstrate an understanding of the integration and use of information technology tools in the workplace • use information technology tools to increase productivity and to enhance communications • demonstrate an ability to draw conclusions about the impact of multimedia communications on society • demonstrate a mastery of media to convey or enhance their own messages • demonstrate an awareness of the power of networked communities • demonstrate an understanding of the networking problems that are common to their own LANs and their community's WANs • identify the potential of the Internet in their daily lives • analyse information received from the Internet • use the Internet as a tool for their own communication requirements

CURRICULUM ORGANIZERS

The prescribed learning outcomes for Information Technology K to 7 are grouped into the following three curriculum organizers:

- Foundations
- Process
- Presentation

These organizers provide an organizational framework for the knowledge, skills, and attitudes contained in the learning outcomes. Because of the dynamic nature of classroom learning, no single organizer should be used in isolation, or as a basis for a lesson or unit of instruction.

Foundations

Foundations provides students with the fundamental knowledge, skills, and attitudes needed for a lifetime of using information technology. Issues of ergonomics, ethics, and the safe use of tools are included, as are connections to larger social issues such as security of information, copyright, and personal freedom. The prescribed learning outcomes emphasize:

- acquiring skills for using information technology tools
- developing the knowledge and skills to formulate questions and to access information from a variety of sources
- exploring careers and occupations related to information technology
- developing suitable attitudes and practices about safety and ergonomics in the use of information technology tools
- developing an understanding of the ethical use of information technology tools
- developing a positive attitude toward using information technology as a tool for lifelong learning

- integrating and applying these skills across all areas of learning

Process

Process allows students to select, organize, and modify information to solve problems. Students develop skills in selecting appropriate information technology tools, and they learn to use these tools to access and structure information to analyse problems, synthesize ideas, and justify opinions or values. Students also gain an understanding of time, resource, and project management. The learning outcomes emphasize:

- awareness of multiple solutions for a problem
- evaluating and selecting information based on specific requirements
- personal relevance of problems involving technology
- developing information literacy by accessing, evaluating, synthesizing, making inferences, validating, and creating information using appropriate information technology tools
- understanding the ethical use of information

Presentation

Presentation provides students with an understanding of how to communicate ideas effectively using a variety of information media. In addition to learning the principles of effective communication, students develop skills in integrating text, graphics, and audio to communicate to a specific audience. The prescribed learning outcomes emphasize:

- developing an understanding of digitized media

- applying the principles of communication and design to develop an effective presentation
- using a variety of information technology tools to synthesize the presentation of ideas and information
- thinking critically to determine and develop the most effective media for presenting ideas and information to an audience

SUGGESTED INSTRUCTIONAL STRATEGIES

The suggested instructional strategies in this IRP include techniques, ideas, and methods that illustrate a variety of approaches to the prescribed curriculum for a diverse population of students. Teachers determine the best instructional methods for their students, the best way to group students for particular studies, and the best way to present material to make it relevant and interesting.

Each set of instructional strategies in this IRP consists of a context statement followed by several suggested instructional strategies.

Context Statements

The context statement links the prescribed learning outcomes with instruction. It states why these learning outcomes are important for the student's development and suggests ways to integrate the learning outcomes into various subject areas.

Strategies

The suggested instructional strategies may be undertaken by individual students, partners, or small groups. Emphasis is given to the following:

- *Strategies that foster the integration of ideas and skills with other curriculum areas.* Information Technology K to 10 is not designed to be a stand-alone curriculum area. At this level, knowledge, skills, and attitudes associated with information technology must be approached within the context of other subject areas.

- *Strategies that recognize and support the progressive development of knowledge, skills, and attitudes.* Learning outcomes and instructional strategies have been designed to recognize the cumulative nature of skill development.

- *Strategies that recognize a variety of learning styles.* Students find the interactive nature of working with information technology tools exciting and challenging. They have opportunities to create, organize, and present information in ways that are unique to their learning and interests.

- *Strategies that develop research, critical-thinking, and problem-solving skills*. To make informed and responsible choices about the appropriate use of technology, students need to listen, view, and read critically. Using information technology tools, students learn to gather, evaluate, synthesize, and present information from a variety of sources, and apply their knowledge using problem-solving strategies.

Problem-Solving Models

Models that describe problem-solving processes should be developed with students so they understand the recurring nature of solving real-world problems (as part of a problem is solved, new problems arise and some steps in the process recur). The following diagrams present a variety of approaches to applied problem solving that can be used in information technology. They are intended to provide teachers with ideas. They are not intended as prescribed models.

A Simple Linear Model

Some models suggest that problem solving is a set of clearly defined and prescribed steps. This is rarely the case.

Identify Problems → Conduct Research → Generate Ideas → Revise Ideas → Produce a Response/Solution → Evaluate
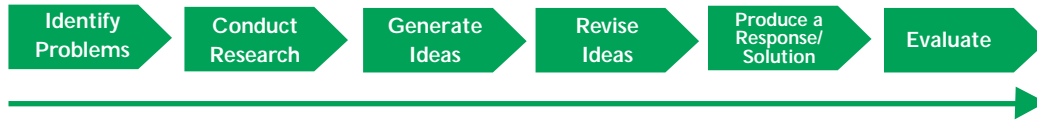
Designing, Troubleshooting, and Social Impact Models

Some specialized problems are approached in unique ways

Designing

Designing is a problem-solving method used to develop solutions leading to the creation of articles, systems, or environments.

Redesign and Refine

Identify Problem

Test and Evaluate

Determine Parameters

Implement Solution

Conduct Research

Choose Best Solution

Generate Solutions
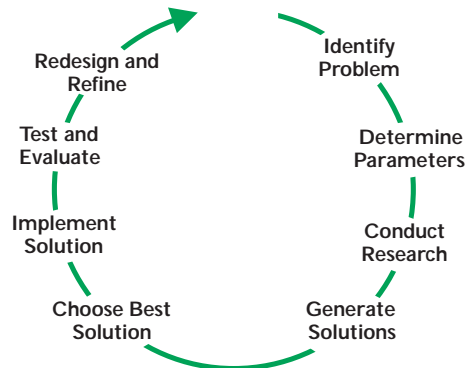
Troubleshooting

Troubleshooting is a method of solving problems used to isolate and diagnose a malfunction

- Identify purpose of system (inputs and outputs)
- Identify purpose of subsystems (inputs and outputs)
- Test subsystems
- Identify cause and implement solution
- Test solution

Social Impact

This is a method of solving problems used to appraise the social, environmental, and ethical implications of technological decisions

- Identify consequences and effects
- Develop a value system through critical thinking
- Judge benefits and disadvantages of technological applications
- Make ethical decisions

Action Model

Some models suggest a continuous flow of activity, from problem identification to the development of a refined product.

8. Revise
7. Test Ideas
1. Identify a Need
6. Produce a Response/Solution
2. Research
5. Plan
3. Clarify Problem Design Brief
4. Explore Ideas
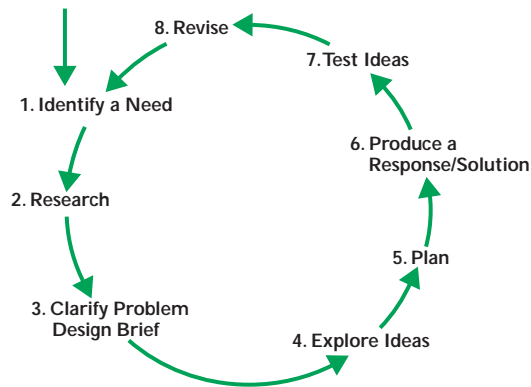
Interactive Model

Interactive models illustrate the complexity of a process, where at any time you might move to any point in the process in order to figure something out.

See a Problem
Evaluate the Product or System
Construct the Product or System
Research and Investigate Alternatives
Develop Prototype
Develop Ideas
Refine the Product or System
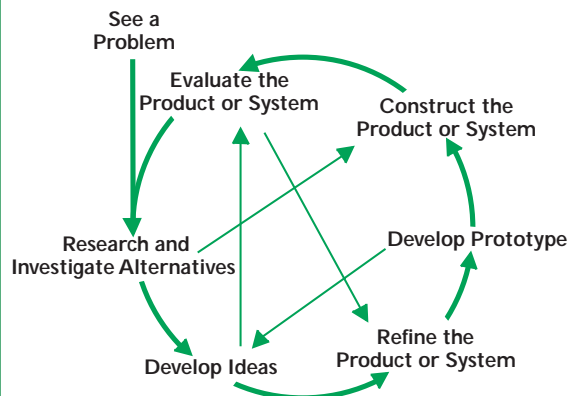
Integration of Cross-Curricular Interests

Throughout the curriculum development and revision process, the advice of experts has been invited to ensure that relevance, equity, and accessibility issues are addressed in all IRPs.

Prescribed learning outcomes, suggested instructional strategies, and suggested assessment strategies components of all curricula have been integrated with respect to the following:

- Applied Focus
- Career Development
- Multiculturalism and Anti-Racism
- English as a Second Language (ESL)
- Special Needs
- Aboriginal Studies
- Gender Equity
- Information Technology
- Media Education
- Science-Technology-Society
- Environment and Sustainability

See Appendix C: Cross-Curricular Interests for more information.

CONSIDERATIONS IN INFORMATION TECHNOLOGY EDUCATION

When selecting and developing learning activities, consideration must be given to health and safety, students with special needs, and gender equity. Thoughtful planning will help the teacher ensure that instruction and assessment safely meet the needs of all students.

Health and Safety

It is the responsibility of the teacher to ensure that students are aware of the potential health and safety hazards in the use of information technology tools. Consideration should also be given to correct ergonomics and related issues such as wrist, eye, and back fatigue.

Adaptations for Students with Special Needs

The following are examples of adaptations that may assist students to achieve success.

Presentation	• Extensions should be made for those students with special gifts or talents. • Provide students with advance organizers of key information technology concepts. • Demonstrate or model new concepts. • Use bilingual peers or volunteers to help ESL students. • Use e-mail to communicate with peers or students in similar circumstances.
Assistance	• Have peers or volunteers help students with special needs. • Have community-based resources suggest alternative hardware adaptations and software modifications. • Have teacher assistants work with individuals and small groups of students with special needs. • Work with consultants and support teachers to develop appropriate problem-solving activities and strategies for students with special needs. • Suit vocabulary to student's level, and use process diagrams and flow charts.
Environment	• Use preferential seating in lab situations. • Change the student's classroom seat. • Make use of co-operative grouping or pairing. • Provide appropriate equipment (e.g., speech recognition software).
Materials and Equipment	• Use techniques to make the organization of activities more explicit (e.g., colour code the steps used to solve a problem). • Use manipulatives or large-print charts. • Use large print on activity sheets. • Use opaque overlays on text pages to reduce the quantity of visible print. • Highlight key points on activity sheets. • Use translated material for information such as instructions on how to use information technology tools. • Have available software that defaults to a larger font size. • Use hardware that can be adapted to students with special needs where appropriate.
Extension and Practice	• Require the completion of only a small amount of work at any given time. • Simplify the way questions are worded to match students' levels of understanding. • Provide functional, practical opportunities for students to practise skills.
Assessment	• Allow students to demonstrate their understanding of information technology concepts in a variety of ways (e.g., murals, displays, models, puzzles, oral and video presentations). • Modify assessment tools to match student needs. For example, oral tests, open-book tests, and tests with no time limit may allow students to better demonstrate their learning than traditional tests. • Set achievable goals. • Use computer programs that provide opportunities for practice and recording results.

Teachers must address the following questions before, during, and after an activity:

- Have students been given specific instruction about how to operate information technology tools?
- Are the tools and equipment in good repair and suitably arranged?
- Has consideration been given to the correct height of chairs, keyboards, and monitors?
- Are students being properly supervised?
- Do the facilities provide adequate lighting and ventilation for the activity?

Students with Special Needs

Students with special educational needs may require resources that are different from those needed by most students.

- Students with special needs may need special directions and more time to practise with equipment, perhaps with the help of a peer.

- Issues of safety in the computer lab, difficulty reading manuals, and special adaptations of computer equipment must be addressed before some students can realistically participate.

- Adaptations may be required to enable students with special needs to successfully meet the prescribed learning outcomes.

For students who have Individual Education Plans (IEPs), adaptations and modifications should be documented on the students' IEPs and considered in the development of the Student Learning Plan. This information may also become important if adjudications for special considerations on examinations are sought at the senior grades.

Regular reporting with letter grades is appropriate for students who are expected to achieve the prescribed learning outcomes. When students are not expected to achieve the prescribed learning outcomes, individual goals should be set and recorded in the IEP. Reporting for students with these modified outcomes should be in the form of structured written comments.

Gender Equity

The education system is committed to helping all students succeed. Teaching, assessment materials, learning activities, and classroom environments should place value on the experiences and contributions of all people from all cultures. Teachers should consider the diversity of learning styles, gender bias in learning resources, and unintentional gender bias when teaching. The following instructional strategies are suggested to help teachers deliver a gender-sensitive Information Technology K to 12 curriculum.

- Think about ways to feature women who make extensive use of information technology in their careers (e.g., guest speakers, subjects of study).
- Design instruction to acknowledge differences in experiences and interests between girls and boys.
- Demonstrate the relevance of information technology to careers and to daily life in ways that appeal to particular students in the class or school.
- Explore not only the practical applications of information technology but also the human elements, such as the ways ideas have changed throughout history, and the social and ethical implications of information technology.
- Provide practical learning opportunities designed specifically to help girls develop

confidence and interest in information technology and non-traditional roles.

• Emphasize that information technology is used by people with various interests and responsibilities.

SUGGESTED ASSESSMENT STRATEGIES

Teachers determine the best assessment methods for their students. The assessment strategies in this document describe a variety of ideas and methods for gathering evidence of student performance. The assessment strategies for a particular organizer always include specific examples of assessment strategies. Some strategies relate to particular activities, while others are general and could apply to any activity. These specific strategies may be introduced by a *context statement* that explains how students at this age can demonstrate their learning, what teachers can look for, and how this information can be used to adapt further instruction.

About the Provincial Learning Assessment Program

The Provincial Learning Assessment Program gathers information on students' performance throughout the province. Results from these assessments are used in the development and revision of curricula and provide information about teaching and learning in BC. Where appropriate, knowledge gained from these assessments has influenced the assessment strategies suggested in this IRP.

About Assessment in General

Assessment is the systematic process of gathering information about students' learning in order to describe what they know, are able to do, and are working toward. From the evidence and information collected in assessments, teachers describe each student's learning and performance. They use this information to provide students with ongoing feedback, plan further instructional and learning activities, set subsequent learning goals, and determine areas requiring diagnostic teaching and intervention. Teachers base their evaluation of a student's performance on the information collected through assessment. They use their insight, knowledge about learning, and experience with students, along with the specific criteria they establish, to make judgments about student performance.

Teachers determine: the purpose, aspects, or attributes of learning on which to focus the assessment; when to collect the evidence; and the assessment methods, tools, or techniques most appropriate to use. Assessment focusses on the critical or significant aspects of the learning to be demonstrated by the student. Students benefit when they clearly understand the learning goals and learning expectations.

The assessment of student performance is based on a wide variety of methods and tools, ranging from portfolio assessment to pencil-and-paper tests. Appendix D includes a more detailed discussion of assessment and evaluation.

Provincial Reference Sets

The provincial reference sets can also help teachers assess the skills that students acquire across curricular areas. These are:

• *Evaluating Reading Across Curriculum* (RB 0034)
• *Evaluating Writing Across Curriculum* (RB 0020 & RB 0021)
• *Evaluating Problem Solving Across Curriculum* (RB 0053)

- *Evaluating Group Communication Skills Across Curriculum* (RB 0051)
- *Evaluating Mathematical Development Across Curriculum* (RB 0052)

A series of assessment handbooks developed to provide guidance for teachers as they explore and expand their assessment repertoires is also available.

- *Performance Assessment* (XX0246)
- *Portfolio Assessment* (XX0247)
- *Student-Centred Conferencing* (XX0248)
- *Student Self-Assessment* (XX0249)

LEARNING RESOURCES

The Ministry of Education promotes the establishment of a resource-rich learning environment through the evaluation of educationally appropriate materials intended for use by teachers and students. The media formats include, but are not limited to, materials in print, video, and software, as well as combinations of these formats. Resources that support provincial curricula are identified through an evaluation process that is carried out by practicing teachers. It is expected that teachers will select resources from those that meet the provincial criteria and that suit their particular pedagogical needs and audiences. Teachers who wish to use non-provincially recommended resources to meet specific local needs must have these resources evaluated through a local district approval process.

The use of learning resources involves the teacher as a facilitator of learning. However, students may be expected to have some choice in materials for specific purposes such as independent reading or research. Teachers are expected to use a variety of resources to support learning outcomes at any particular level. A multimedia approach is encouraged.

Some selected resources have been identified to support cross-curricular integration. The ministry also considers special needs audiences in the evaluation and annotation of learning resources. As well, special-format versions of some selected resources (braille and taped-book formats) are available.

Learning resources for use in British Columbia schools fall into one of two categories: *provincially recommended materials* or *locally evaluated materials.*

All learning resources used in schools must have *recommended* designation or be approved through district evaluation and approval policies.

Provincially Recommended Materials

Materials evaluated through the provincial evaluation process and approved through Minister's Order are categorized as *recommended materials*. These resources are listed in the *Catalogue of Learning Resources.*

Locally Evaluated Materials

Learning resources may be approved for use according to district policies, which provide for local evaluation and selection procedures.

A Note on Authorized Materials

Authorized status will no longer exist as new learning resources are evaluated and selected for all new provincial curricula and courses. Those existing authorized resources that meet the needs of new curricula and courses are given *recommended* status.

CURRICULUM

Information Technology K to 7

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- identify and describe the effects of technology tools that communicate information in the home and school
- demonstrate a willingness to use information technology tools
- demonstrate an ability to use a graphics program
- enter information on a computer and print it
- demonstrate a willingness to work co-operatively when using information technology tools
- follow a sequence of steps to perform a task using information technology tools
- use appropriate terminology to describe the parts of a computer system
- demonstrate the proper care and safe use of equipment
- identify occupations in their community that involve the use of information technology

SUGGESTED INSTRUCTIONAL STRATEGIES

Children are surrounded by information technology tools at home and at school. They need to know how to use these technologies so that they can communicate more effectively with others.

- In an "All About Me" theme unit, discuss the concept of the family with the class. Invite students to create pictures of their families using a graphics program. Have them identify and label their pictures (e.g., Mom, Dad, sister, brother) using the graphics program.
- Have students work individually to identify and match laminated picture vocabulary cards with the parts of a computer (e.g., mouse, keyboard, monitor, printer). Discuss the proper care and safe use of each of these components with students.
- To help students develop their understanding of how information technology is used in the workplace, ask them to create collages showing people using a variety of information technology tools (e.g., fax machines, telephones, video cameras, computers).

SUGGESTED ASSESSMENT STRATEGIES

In the early primary years, young children begin to explore technology formally and to acquire fundamental skills for handling information technology tools. Playing games and using simple graphics and text programs with partners provide children with the opportunity to gain confidence using information technology tools. By observing students as they work and listening to their conversations, teachers can assess knowledge, understanding, and care of information technology tools, as well as ability to work co-operatively with others.

- Listen to students' conversations as they work with information technology tools. Note the extent to which they use terms correctly (e.g., *click, select, space bar, enter, return, escape, cancel, icon, print*).
- Observe students as they use graphics software. Note the extent to which they are able to:
  - use a mouse to point, select, and drag
  - access menus and a tool or button bar or palette
  - select and resize shapes
  - print documents
- While students are working with a computer, assess their knowledge of the basic components of a computer system. Note the extent to which they are able to:
  - accurately identify the parts
  - explain the general purpose or function of each part
  - use correct terminology
- Conference with students to discuss their collages showing people using information technology tools. To assess their understanding, ask questions such as:
  - What can you tell me about the information technology tools you have included in your collage?
  - What is the purpose of each tool?
  - Can you think of some information technology tools that you have *not* included?
  - Which information technology tools have you used before?
  - How were these tools useful to you?

RECOMMENDED LEARNING RESOURCES

Print Materials

- The Technological Classroom

Software

- Microworlds Project Builder
- Storybook Theatre
- Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- use information technology tools to organize information
- create and modify electronic documents
- use information technology tools in a variety of ways to create new meaning

SUGGESTED INSTRUCTIONAL STRATEGIES

By using information technology tools, students develop the skills required to manipulate and organize information in many ways to create meaningful patterns.

- In a discussion with the whole class, point out the features of different graphics programs. Invite students to identify how the different features of these programs can be used to make drawings. Ask them to use a graphics program to produce drawings of themselves (three per student) doing activities that interest them. When they have completed their drawings, ask them to change the colours.
- Suggest that students use a graphics program to draw animals or select them from clip art. Ask them to use copy, paste, and lasso (a cut-and-paste tool) to move the drawings around the document to classify them. For example, students might each draw an elephant, monkey, and squirrel; use the lasso to group the monkey and the squirrel together; and then explain the reason for that grouping (e.g., they both live in trees).
- As part of a larger project on environmental awareness, have students use a graphics program to create and print posters that illustrate the concept of reduce, reuse, and recycle.
- When studying addition, suggest that students draw symbols (e.g., circles, squares) using a graphics program. Ask them to use the symbols they create to make number sentences to represent basic addition (e.g., $\blacksquare + \blacktriangle = 5$). What two numbers can be substituted for the symbols?
- In a language-arts activity, have students, working in groups, use the cut, paste, and copy features of a graphics program to create alphabet or number books. Ask each group to compare its book with those produced by other groups.

SUGGESTED ASSESSMENT STRATEGIES

By exploring a variety of software, students learn to create and modify documents and use information technology tools to organize information. To assess students' knowledge and understanding, invite them to discuss their explorations and share their creations. Look for growth over time.

• Suggest that students generate and save a variety of documents and then work with partners to organize these printed documents into file folders (e.g., pictures, stories, games). Conference with students about their work. Assess each student's ability to categorize the documents, name the file folders, and organize them in some logical way. Ask questions such as:
  - How did you decide what to put in each folder?
  - How did you decide on a name for each folder?
  - How are these folders helpful to you?
• After students have each created and modified an electronic document, invite them to discuss their work. To assess their understanding, ask questions such as:
  - What can you do with this program?
  - What did you enjoy about this program?
  - Was there anything you couldn't figure out?
  - What would you want to tell a friend about the program?
• Have students collect printed samples of their work in portfolios. Review their work periodically, looking for evidence of change over time. Consider:
  - sophistication of software use
  - creative use of various software
  - use of a variety of information technology tools
  - use of information technology tools in different curricular areas

RECOMMENDED LEARNING RESOURCES

Software

• Microworlds Project Builder
• Storybook Theatre
• Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- present ideas using electronic documents

SUGGESTED INSTRUCTIONAL STRATEGIES

Students are exposed to many different electronic communications tools so that they will be able to use a variety of tools to communicate.

- In an art class, invite each student to create a picture for a special occasion (e.g., Halloween, a seasonal celebration) using a paint program. Encourage students to include specific elements of composition (e.g., houses, trees, people) in their pictures.
- In the "All About Me" unit at the beginning of the school year, ask students to create pictures of themselves using a paint or draw program.
- In language arts, suggest that students each use an information technology tool (e.g., a video camera, a tape-recorder, computer software with sound-recording capability) to record another student reciting a nursery rhyme, poem, song, or story about a special event.
- Ask each student to use a graphics program to select or create a colouring worksheet. Students can then exchange their worksheets with partners, colour them, and then present their creations to the class.
- Students can use a story-starter program to create and print stories with a multicultural theme. Encourage them to create figures or icons to accompany their stories. Ask them to produce a slide show from the printouts with the assistance of a buddy class (e.g., from Grade 6 or Grade 7). They can then present their show to other students.

SUGGESTED ASSESSMENT STRATEGIES

As students become more familiar with computers and software, they learn to use these tools to convey ideas creatively. By observing them and listening to their conversations, assess their abilities to use software features and to integrate text and graphics successfully.

- Conference with students after they have completed a project (e.g., a card or poster for a special occasion). Ask questions such as:
  - How did you use the computer to make this card (poster)?
  - How did the computer help you make this card (poster)?
  - How did you decide on your picture (border)?
- As students discuss their work, note the extent to which they can:
  - explain the creation process in detail
  - justify their choices (e.g., of graphics, font style, font size)

RECOMMENDED LEARNING RESOURCES

Software

- Microworlds Project Builder
- Storybook Theatre
- Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- enter, save, and retrieve information using a computer or other information technology tool
- use word-processing and graphics software to present ideas
- demonstrate an understanding of data-storage practices
- describe how a disk is installed and stored
- use appropriate terminology when using information technology tools
- demonstrate a willingness to work co-operatively when using information technology tools
- identify information technology tools used in the home, school, and community
- demonstrate the proper care and safe use of equipment

SUGGESTED INSTRUCTIONAL STRATEGIES

At this level, students become more proficient and self-reliant in their use of information technology. They are introduced to the concepts of ergonomics, safety, and security in the use of information technology tools. They become aware of the importance of developing the skills required to use these tools in their daily lives.

- Demonstrate to the class the steps used in turning on and off a variety of information technology tools (e.g., computer, monitor, tape-recorder, VCR). In addition, have students role-play in co-operative groups the safe and unsafe uses of information technology tools, including telephones, computers, television sets, and fax machines.
- To help introduce the writing process in language arts, have each student launch a word-processing program, write a story, save it to a disk, and print it. Encourage students to write letters using the computer and fax them to pen pals.
- As an opening activity for science, suggest that students create a daily weather report for a week, using a tape-recorder to record it each day. Then, with the assistance of a knowledgeable Grade 6 buddy, ask each student to create a calendar of the week's weather using a calendar-making program. Have students select graphics to represent the weather conditions each day.
- As part of a project for a thematic unit in science (e.g., on dinosaurs), first demonstrate how to retrieve information from a CD-ROM and then invite students to try it.

SUGGESTED ASSESSMENT STRATEGIES

Students improve their basic skills as they create electronic documents such as stories, pictures, and reports. The teacher can assess students' abilities to organize, store, and retrieve information by observing them as they create and manipulate text and graphics and save their data to disks or the hard drive, or as they explore other information technology tools (e.g., overhead projectors, audio-recording devices, VCRs) used at home and at school.

- As students use word-processing and graphics software, note the ease and confidence with which they are able to:
    - launch (open) applications
    - close (exit) applications
    - successfully save and retrieve files
    - access the tool bar and menus
    - use the features of the program (e.g., align and format text, move the cursor within the document, insert and delete text)
    - print documents
- Listen to students' conversations as they work with information technology tools. Note the extent to which they use accurate terminology (e.g., *run, launch, open, save, write-protect, select, icon*).
- Observe students as they work and listen to their conversations. Note the extent to which they:
    - take turns communicating
    - share materials
    - incorporate the ideas of others

RECOMMENDED LEARNING RESOURCES

Print Materials

- The Technological Classroom

Software

- Graph Links
- Microworlds Project Builder
- Storybook Theatre
- Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- demonstrate an understanding that tasks on a computer can be done in a variety of ways
- identify and use different methods of organizing information
- identify suitable information technology tools to express ideas or concepts
- create and modify electronic documents that express ideas or concepts
- locate and retrieve information using information technology tools

SUGGESTED INSTRUCTIONAL STRATEGIES

Students begin to develop an understanding of ways to organize information. They explore different ways to use information technology tools in their daily lives and to employ problem-solving techniques when using these tools.

- In a social studies unit on "Community," encourage students to:
  - develop ideas for advertising a school event (e.g., a concert or bake sale)
  - examine different printed ads as part of a problem-solving activity and identify the elements in the ads (text, graphics)
  - use a computer program to create posters that include several presentation elements
  - print two copies of their posters, first using a menu command and then a keyboard command
  - create a strategy for reaching all members of the community by including translations into other languages or by using graphics
  - distribute the posters throughout the school and the community
- As part of a project on dinosaurs, ask each student to find a picture of a dinosaur on a CD-ROM or from clip art, create a drawing, and then colour or paint it using a graphics program.
- In a science unit on animal adaptation, invite students to import clip art of animals into a paint program. Using cut-and-paste commands, students can choose the head of one animal, the body of another, and the tail of a third to create a new animal. Students can also use a paint program to create an environment for the animal.
- In personal planning, have students research and communicate school emergency procedures using a variety of information technology tools (e.g., videos, word-processing programs, the PA system).

SUGGESTED ASSESSMENT STRATEGIES

Accessing information is a necessary skill in a rapidly changing world. As students gain experience in using a variety of tools to locate and retrieve information, their inquiries become more refined. Assess students' level of proficiency by observing them as they solve problems using information technology tools and by examining their work.

- Conference with students to assess abilities in the area of information retrieval. Pose questions such as:
  - How did you locate the desired information?
  - How did you decide which information technology tools to use?
  - Where else might you find useful information?
  - What would you do differently next time?
- Observe students as they retrieve information using information technology tools (e.g., tape-recorders, VCRs), noting whether they:
  - use the counter accurately to stop at a desired location
  - take advantage of both high- and low-speed search functions
- Have students organize information (e.g., list the contents of their desks in alphabetical order, develop personal timelines). To assess their understanding, ask questions such as:
  - How did you decide to organize this information?
  - What made you choose this way of organizing information?
  - Is there another way to organize this information?
  - How did you use the computer to help you?
- Have students conduct surveys to collect data on other students (e.g., age, hobbies, favourite foods) and use computer software to graph their findings. To assess their abilities to express ideas or concepts using electronic documents, observe students as they create their graphs and note the extent to which they are able to:
  - categorize the information logically
  - enter raw data into a spreadsheet template
  - use graphics or integrated software to create graphs

RECOMMENDED LEARNING RESOURCES

Software

- Graph Links
- Microworlds Project Builder
- Storybook Theatre
- Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- present ideas using a variety of information technology tools
- describe the components of electronic presentations

SUGGESTED INSTRUCTIONAL STRATEGIES

Students need to be able to communicate their ideas effectively. They learn to identify the components of electronic presentations (e.g., text, sound, graphics, and design) and to combine these elements to present information.

- On a computer, have students open a prepared text or graphics document (e.g., a poem about themselves, a drawing of the community or the school). Ask them to modify the information by changing the style, the font or point size of the text, or the layout of the text and graphics. Have students work with partners to compare their versions of the document.
- In a language arts activity, discuss with the class the advantages and disadvantages of print and electronic versions of a story or book. In the discussion, have students focus on graphics, sound, and ease of use.
- In an art activity, invite students to plan an invitation for a special occasion using software that integrates graphics and text. Have them design several layouts using the same graphics and text but altering the placement, size, and style. Encourage students to choose the layout they prefer and post it for display.

SUGGESTED ASSESSMENT STRATEGIES

As young students continue to explore information technology tools, they are better able to express themselves with clarity and emphasis. By viewing and analysing presentations, they develop an appreciation of information technology tools. When students plan and deliver their own presentations, they demonstrate their abilities to use multimedia tools to convey ideas effectively.

- With students, develop a checklist for assessing presentations. During each presentation, use the checklist with the rest of the class to assess the presenter's ability to communicate ideas effectively through the use of information technology tools. Criteria might include:
  - use an information technology tool appropriately for the presentation
  - operate an information technology tool with confidence
  - have a clear purpose for using an information technology tool to communicate a message
- Have a class discussion about the ways in which information technology tools can enhance presentations, and then ask each student to create a two-column chart such as the one below. Look for evidence that students are able to:
  - generate a variety of ideas
  - recognize the ways in which each tool can enhance a presentation

Information Technology Tool	Advantages
VCR/TV	• live pictures allow people to understand better
Overhead projector	• this tool helps many people to see the same thing at once
Tape-recorder	• everyone hears the same message
Computer	• writing is neater and you can use a spell checker

- To check on the scope of students' knowledge of information technology tools, have them work in co-operative groups to make collages of information technology tools.

RECOMMENDED LEARNING RESOURCES

Software

- Graph Links
- Microworlds Project Builder
- Storybook Theatre
- Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- enter, save, and retrieve information using a variety of information technology tools and software
- use suitable keyboard techniques to enter information into a computer
- organize and manage stored electronic information
- use a variety of software to solve problems
- use appropriate terminology while working with information technology tools
- demonstrate a concern for the need to take care of information technology resources and materials
- demonstrate an awareness of health and safety issues when using information technology
- demonstrate a willingness to be self-reliant when using information technology tools
- demonstrate a willingness to work co-operatively when using information technology tools
- identify role models in their community who use information technology tools, being careful to consider all individuals, irrespective of gender, culture, and ability

SUGGESTED INSTRUCTIONAL STRATEGIES

Students develop strategies for managing electronically an increasing volume of information. As their understanding of technology advances, they become more aware of health and safety issues and the need to care for resources. They also become aware of the need to work accurately with software and to become more self-reliant in the use of information technology.

- To apply their understanding of information organization and management, as an art project have each student create an inventory of his or her family's video or CD collection using a database program. Encourage them to include information such as the title, year of production, and artists' names.
- In a personal planning activity, suggest that each student create and maintain a personal database of vocabulary related to information technology careers and equipment.
- In science, discuss with the class the uses of technology in society. Have students brainstorm existing tools and possible new inventions. Ask them to research the development of information technology tools, using a CD-ROM or technology magazines. Invite each student to prepare an illustrated timeline for one of the tools identified during the research and present the timeline to the class.
- Discuss with students the concept of ergonomics and health and safety related to the use of information technology tools (e.g., eye strain, back injury, wrist injuries). Have students practise correct posture and keystrokes as they learn to keyboard. In an art project, they can synthesize their understanding of ergonomics, health, and safety by designing their ultimate information technology home or office environment.

SUGGESTED ASSESSMENT STRATEGIES

As students continue to explore a variety of software, they become proficient in entering, saving, and retrieving information. Developing keyboarding skills enables them to enter data more efficiently and accurately. Observe students as they work with electronic documents and note the confidence with which they approach and use information technology tools. As students use other types of media, they can demonstrate their abilities to express their ideas in a variety of ways.

- Ask each student to generate a variety of files and save them to a disk. Then have students work with partners to organize their files into folders or directories (pictures, stories, games). Conference with students about their work. Assess their abilities to create new folders or directories and to categorize files appropriately. Ask questions such as:
  - How did you create your folders (directories)?
  - How did you decide on a name for each folder (directory)?
  - How did you decide what to put in each folder (directory)?
  - How are these folders (directories) helpful to you?
- Have students work in small groups to create skits illustrating unsafe uses of information technology tools. After each skit, ask audience members to identify the unsafe practices featured. Note the extent to which students recognize problems and are able to suggest safer alternatives.
- As students work with a variety of information technology tools (e.g., computers, VCRs, tape-recorders) and software, note the extent to which they are able to:
  - accurately enter or record information
  - successfully save files to a disk or hard drive, or to videotape
  - efficiently locate and retrieve information

RECOMMENDED LEARNING RESOURCES

Print Materials

- Computers: A Visual Encyclopedia
- The Technological Classroom

Software

- All the Right Type
- Graph Links
- Microworlds Project Builder
- Storybook Theatre
- UltraKey
- Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- retrieve data from a variety of information technology sources
- use information technology tools to organize information from different sources
- use information technology tools to create, modify, and explore documents that express ideas or concepts
- demonstrate the ability to draw simple conclusions from information retrieved from electronic and other sources

SUGGESTED INSTRUCTIONAL STRATEGIES

Students begin to apply their understanding of the ways in which information is organized to access resources. They use information technology tools and structured problem-solving techniques to solve problems that occur in their daily lives.

- In social studies, have students complete a research project on a First Nations people. As part of the project, ask each student to:
  - retrieve information from electronic sources (e.g., CD-ROMs, laserdiscs, automated catalogues using e-mail)
  - retrieve and store an electronic map of BC, and then modify the map to show the areas occupied by the First Nations people they are studying
  - use the text retrieved through research to create a first draft using a word-processing program to cut and paste phrases into a logical sequence
  - add graphics retrieved through the research
  - create a poem using First Nations as a theme and add it to the word-processed document as a final segment of the project
- Invite each student to maintain a reading log by creating a database that includes the following elements:
  - bibliographic information (e.g., title, author, date)
  - a brief plot summary
  - his or her impression of the book, including a rating scale
  - a prediction about the plot line of other books by the same author or of other books of the same genre

SUGGESTED ASSESSMENT STRATEGIES

As students broaden their exploration of information technology tools, they access, retrieve, and sort through electronic data. As they research topics and create electronic documents to express their ideas, they demonstrate their abilities to locate and organize information effectively.

- Have students perform a keyword search on a database (e.g., a CD-ROM encyclopedia, an on-line service) and retrieve the documents located. Note each student's ability to:
  - choose an appropriate keyword for the search
  - correctly enter the keyword
  - display a document containing the keyword on-screen
  - print a document located by the search
  - use the on-line help function
  - narrow the search
- Present students with a research task. (e.g., "Find out all you can about a simple machine such as a lever.") Have them generate lists of possible data sources (e.g., CD-ROM encyclopedia, on-line services, videotapes). Collect and examine students' lists and consider whether they have included a wide variety of sources and how logical, relevant, or current their sources were.
- Discuss the ways in which information technology tools may be useful in each subject area. Record students' ideas and post them in the classroom for reference. Note how often students make use of information technology tools throughout the day.
- While students are researching (e.g., the Haida, simple machines, authors), have them gather and download information from a variety of electronic sources (e.g., CD-ROMs, on-line services, videos, laserdiscs, e-mail). Note the extent to which they are able to:
  - sort through the data, saving only relevant information
  - use the cut, copy, and paste functions to combine related ideas
  - use a strategy to organize files effectively

RECOMMENDED LEARNING RESOURCES

Video

- How To Make Great Videos—With Just a Camcorder
- Virtual Reality

Software

- All the Right Type
- Graph Links
- HyperStudio
- Microworlds Project Builder
- Storybook Theatre
- UltraKey
- Write: OutLoud

CD-ROM

- How Multimedia Computers Work
- The Multimedia Workshop

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- apply information technology to present information to intended audiences
- create multimedia documents
- demonstrate their knowledge of the protocol for crediting sources of information

SUGGESTED INSTRUCTIONAL STRATEGIES

As students explore different ways to make presentations, they learn to consider the kind of audience they are addressing. They also begin to understand how to recognize sources of information for their essays.

- In science, ask students to use multimedia to create a photographic or electronic slide show of their community, field trip, or school, including a soundtrack and credits.
- As part of a class assignment on the culture or history of First Nations, suggest that students use a paint or draw program to design a totem pole illustrating a local legend or story. Have students brainstorm the significance of each totem figure and the clan system as they design the totem pole. Ask them to use a word-processing program to import the totem pole from the paint or draw program into their final report.
- In language arts, invite students to review a popular television commercial (e.g., ad for food, toys, clothing, games) and analyse the lighting, sound, special camera effects, and text to decide which they respond to most. Encourage students to discuss why they like or dislike the commercial and the techniques the creators used to try to persuade them to purchase the product. Record students' responses on chart paper or an overhead transparency.
- In language arts, have students work in co-operative groups to create a message about an upcoming school event (e.g., a sporting or cultural event, a talent show). Encourage them to emphasize the different senses (e.g., sight, sound). For example, suggest that students produce an audiotape for the school announcements, a videotape for viewing at a school assembly, and computer-generated posters to display in the school.

SUGGESTED ASSESSMENT STRATEGIES

When students have an opportunity to express their own ideas using information technology tools, they learn to communicate clearly to an intended audience. Watch students' multimedia presentations and note the ease and confidence with which they effectively incorporate the use of information technology tools.

- Have students work in groups to design and create an advertising campaign (including a poster or an audio or video commercial) for a real or an imaginary product. As students present their advertisements to the class, note the extent to which they:
  - use colour, patterns, font size, and font style effectively to create emphasis
  - successfully integrate graphics and sound
  - use information technology tools confidently in the presentation of ideas
- Have students create bibliographies as they use information technology tools to gather information. Examine the bibliographies and look for evidence that students have cited all sources and used a standard format correctly.

RECOMMENDED LEARNING RESOURCES

Video

- Virtual Reality

Software

- All the Right Type
- DataWonder! The Organizing, Graphing and Reporting Tool
- Graph Links
- HyperStudio
- Microworlds Project Builder
- Storybook Theatre
- UltraKey
- Write: OutLoud

CD-ROM

- How Multimedia Computers Work

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- manipulate electronic documents using a variety of tools
- access on-line resources using telecommunications tools
- develop an awareness of how programming is used in information technology
- demonstrate an understanding of the need for the security and privacy of electronic information
- demonstrate a willingness to be self-reliant when using information technology tools
- demonstrate a concern for the socially responsible use of information
- identify role models in their community who use information technology tools, being careful to consider all individuals irrespective of gender, culture, and ability

SUGGESTED INSTRUCTIONAL STRATEGIES

Students need to become aware of ethical issues related to the use of information technology (e.g., copyright, plagiarism, privacy, the use of on-line resources). Their exploration of these issues will help them understand how to use the tools responsibly.

- Lead a class discussion about the problems created by computer viruses. Have students role-play the following situations:
  - a virus freezes a computer system
  - a virus removes links and stops a set of instructions
- In social studies, discuss with the class some ethical considerations involved in using electronically retrieved information. To confirm their understandings, have students create a list of references or a bibliography that credits the works they accessed for a project.
- As part of personal planning, have students work in co-operative groups, with each to interview an Internet service provider about passwords and security. Encourage students to create a list of rules to follow when creating their own passwords. Suggest that they post these lists beside their computers in the classroom.
- In language arts, have students develop a list of ways to find help when faced with a problem in using information technology tools (e.g., ask a peer, look for help screens, read the manual or guidebook).

Suggested Assessment Strategies

As students explore career opportunities in the field of information technology, they become aware of the need for sophisticated skills and for the responsible use of information technology tools. Students demonstrate their abilities to use software features effectively by creating and modifying electronic documents. The extent to which they work responsibly can be assessed through observation as they use sources such as the Internet and local electronic bulletin boards.

- With the class, generate and post a list of suggestions for problem solving when using information technology tools (e.g., use on-line help, ask a peer, refer to a manual). Note the extent to which students are self-reliant and able to assist others when using information technology tools.
- Discuss the use and potential misuse of information technology tools, including issues such as privacy of information, copyright, and plagiarism. To assess students' understanding, ask:
  - What are some examples of how information technology tools can be misused?
  - What should you do if you find information belonging to someone else (e.g., computer disks, passwords)?
  - Why is it important to cite the sources of your information?
- Discuss proper etiquette or conduct when using electronic messaging systems. Have students save and print their e-mail correspondence and use their collections as a basis for self- and peer assessment. Look for evidence of appropriate content and language.
- Have students interview people who work in various information technology fields and use learning logs to reflect on their experiences. To focus students' thinking, provide sentence starters such as:
  - The most important thing I learned was _____.
  - Something that surprised me was _____.
  - I want to know more about _____.

Recommended Learning Resources

Print Materials

- Computers: A Visual Encyclopedia
- The Technological Classroom

Software

- All the Right Type
- The Cruncher
- DataWonder! The Organizing, Graphing and Reporting Tool
- Digital Chisel
- Graph Links
- Looking Ahead: Earning, Spending, Saving
- Microworlds Project Builder
- UltraKey
- Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- collect and record information electronically using primary and secondary sources of information
- demonstrate an understanding of how and why information is organized
- demonstrate an appreciation of the need for consistency in data entry
- draw conclusions from information retrieved from electronic and other sources
- evaluate information retrieved from electronic sources

SUGGESTED INSTRUCTIONAL STRATEGIES

Students are introduced to the concept of information analysis and the process of discovering relationships in the data they retrieve or create. They make connections between their knowledge base and the information they obtain from electronic sources, helping them to become better learners.

- In math or science, discuss with the class the purpose and structure of surveys and their uses (e.g., election polls, opinion surveys, marketing surveys). Invite students to plan, design, and conduct their own surveys (e.g., survey the school population to discover students' favourite pastimes, television shows, future occupations, or educational aspirations). In preparing the surveys, students should:
  - devise ways to ensure consistency in collecting and entering data
  - create a spreadsheet and enter the raw data from the survey
  - create one or several graphs using the spreadsheet (e.g., bar graph, pie graph, line graph)
  - use a word-processing program to write a short paragraph outlining the conclusions they have drawn after analysing their data
  - copy the graph(s) from the spreadsheet, paste it (them) into the word-processed document, and print the final report
- As part of a research project, ask each student to retrieve and print information from an electronic source (e.g., an encyclopedia on a CD-ROM, an on-line database, the World Wide Web, e-mail). Suggest that they each find an article on the same subject in a print source (e.g., an encyclopedia). Have students compare the information from the two sources for reliability and timeliness.

Suggested Assessment Strategies

As students gain experience using a variety of information technology tools (e.g., CD-ROMs, the Internet) to conduct a search, their inquiries become more focussed and refined. Research projects provide opportunities for students to demonstrate their abilities to access information. By questioning and observing, teachers can assess each student's ability to collect, analyse, and organize electronic data.

- Conference with individuals or small groups of students about the accuracy and the perspective of the information they have gathered about a topic (e.g., the history of First Nations in Canada). Assess students' understanding by noticing the depth of their responses to questions such as:
  - What clues (evidence) did you look for to indicate that the information you obtained is accurate or inaccurate?
  - How could the originator's point of view affect the information?
  - How do you decide if information is true or not?
- Have students perform a search on a database (e.g., a CD-ROM encyclopedia, an on-line service) and retrieve the documents located. To assess students' knowledge of how information is organized, note the extent to which they are able to:
  - narrow the search from a general heading to a specific topic
  - choose appropriate keywords for the search
  - use AND/OR commands to narrow the search
- With students, develop a checklist to assess their accuracy and consistency in data entry. Have them use the checklist for peer assessment. The criteria might include:
  - data are entered with no typographical errors
  - data are entered into the correct field
  - conventional rules of punctuation, spelling, and capitalization have been applied

Recommended Learning Resources

Video

- How To Make Great Videos—With Just a Camcorder
- Virtual Reality

Software

- All the Right Type
- The Cruncher
- DataWonder! The Organizing, Graphing and Reporting Tool
- Digital Chisel
- Graph Links
- Looking Ahead: Earning, Spending, Saving
- Microworlds Project Builder
- UltraKey
- Write: OutLoud

CD-ROM

- How Multimedia Computers Work
- The Multimedia Workshop

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- demonstrate an understanding of how special effects can be used to influence messages
- create and present multimedia documents
- use a variety of information technology tools in presentations
- demonstrate an understanding of how hypertext can enhance presentations

SUGGESTED INSTRUCTIONAL STRATEGIES

To be informed and discerning consumers of information, students need to analyse and evaluate their responses to increasingly sophisticated multimedia messages. They also need to analyse the differences between types of presentations and interactive and passive involvement.

- In language arts, ask each student to create a "Choose Your Own Adventure" story using a hypertext program.
- In a social studies class, have students analyse public documents for use of fonts, graphics, style of presentation, and bias. Suitable documents for analysis could include:
  - newspapers
  - magazines
  - Internet home pages
  - restaurant menus
  - community-events posters
  - school newsletters
  - commercial advertisements
- Ask students to use a word-processing program to prepare a class newsletter as part of a language arts unit. The newsletter should incorporate formatting and design elements such as different font sizes and styles, multiple frames of text, and graphics.

SUGGESTED ASSESSMENT STRATEGIES

Students demonstrate their understanding of multimedia techniques as they design and create presentations using a variety of information technology tools. Examine students' work and assess it on the basis of their abilities to integrate text, graphics, and sound successfully to enhance their presentations.

- Collect students' disks containing hypertext documents (e.g., stories or research). Examine their work and look for evidence that:
  - the buttons have logical names or functions
  - the pathways are correctly connected (button to next card)
  - there is easy access to the home card or main menu
  - any sound and visuals are creatively integrated
  - special effects (e.g., fading, scrolling to the next card) are used
  - ideas are presented or accessed in more than one way (e.g., linear versus non-linear)
- Discuss with the class the ways in which information technology tools can enhance presentations. Have each student create a two-column chart such as the one below. Look for evidence that students are able to:
  - generate a variety of ideas
  - recognize the ways in which each tool may enhance a presentation

Information Technology Tool	Advantages
VCR/TV	• live pictures allow people to understand better
Overhead projector	• this tool helps many people to see the same thing at once
Tape-recorder	• everyone hears the same message
Computer	• writing is neater and you can use a spell checker

RECOMMENDED LEARNING RESOURCES

Video

- Virtual Reality

Software

- All the Right Type
- The Cruncher
- DataWonder! The Organizing, Graphing and Reporting Tool
- Digital Chisel
- Graph Links
- HyperStudio
- Looking Ahead: Earning, Spending, Saving
- Microworlds Project Builder
- UltraKey
- Write: OutLoud

CD-ROM

- How Multimedia Computers Work

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- work co-operatively using information technology tools
- access information using a variety of on-line information tools
- identify and apply a variety of software based on specific needs
- apply troubleshooting strategies when using information technology tools
- demonstrate an understanding of software compatibility when using information technology tools
- practise the socially responsible use of electronic information
- demonstrate an awareness of the impact of information technology on society

SUGGESTED INSTRUCTIONAL STRATEGIES

Students need to understand the impact of information technology both on their own lives and on society. They develop the knowledge and skills required to use a variety of on-line information tools and learn troubleshooting strategies to solve problems.

- Have students work in co-operative groups to solve hypothetical hardware or software problems (e.g., loose connections, incorrect disk formats, "lost files"). Challenge them to develop a diagnostic checklist (e.g., make sure the power is turned on, check the cables) that another member of the group could use when troubleshooting computer problems. Have students record their solutions in a formal document that they can use when problems arise.
- In language arts, have each student demonstrate an understanding of the impact of information technology on society by using a word-processing program to write a story dealing with worldwide power outages. To help students stretch their imagination, prompt them with questions such as: What would happen if you tried to use a bank machine when there was a power outage?
- Ask students to work in co-operative groups and use a browser to search the World Wide Web for information on a specified topic in science. Suggest that each group present its findings in a multimedia presentation.
- As part of a social studies unit, have students use e-mail to correspond with "key pals" (e-mail pen pals) on a particular project (e.g., river pollution).
- In language arts, ask students to demonstrate their keyboarding skills (e.g., keeping their eyes on the copy; making appropriate use of home-row keys, key reaches, key combinations, and shift keys; using correct punctuation consistently) while entering information into a computer.

SUGGESTED ASSESSMENT STRATEGIES

As students become more familiar with information technology tools and use them frequently, their proficiency with basic keyboarding skills, using software features, troubleshooting processes, and the management and organization of information increases. Students can demonstrate their knowledge and skills through discussions, performance activities, and their responsible use of electronic data.

- Have students complete learning logs to explain their thinking as they work through the troubleshooting process. Provide students with prompts such as:
  - What did you do first?
  - Why did you choose to try that solution?
  - Was it successful?
  - Where or how did you find helpful suggestions?
  - What would you do differently next time?
- Have students create bibliographies while researching a topic (e.g., a country, space exploration, First Nations land claims). Examine their bibliographies and note the extent to which they have used information technology tools (e.g., CD-ROMs, e-mail, the Internet) effectively to access information.
- Introduce students to the features of several graphics programs. Have each student create a document (e.g., a poster, greeting card, sign) using one of the programs. To assess a student's ability to choose an appropriate program, provide prompts such as:
  - Why did you choose this particular program?
  - How was this program helpful to you?
  - What specific features of this program did you use?
  - What other programs might have worked?
- With students, develop criteria to assess their keyboarding skills, including the use of the numeric keypad. The criteria might include:
  - consistent use of home-row keys
  - correct key reaches
  - appropriate use of the shift key
  - correct posture (feet on the floor, back straight, correct hand and arm placement) and appropriate distance of the student from the keyboard

RECOMMENDED LEARNING RESOURCES

Print Materials

- All About Computers
- Communicating With Computers
- Computers: A Visual Encyclopedia
- Computers Illustrated
- Que's 1996 Computer & Internet Directory, 6th Edition
- The Technological Classroom

Software

- All the Right Type
- The Cruncher
- DataWonder! The Organizing, Graphing and Reporting Tool
- Digital Chisel
- Graph Links
- Looking Ahead: Earning, Spending, Saving
- Microworlds Project Builder
- UltraKey
- Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- gather information from available resources to solve problems using information technology tools
- use a variety of information technology tools to create, modify, explore, and present electronic documents that express ideas or concepts
- select and apply information technology tools for specific tasks
- use a variety of methods to transfer information using electronic tools
- demonstrate an awareness that all information is biassed

SUGGESTED INSTRUCTIONAL STRATEGIES

Students need to develop critical-thinking skills to analyse the information they are exposed to in their daily lives. They need a structured approach to problem solving to help them determine information bias.

- As a personal planning activity, have teams of students each plan a class or school event (e.g., a field trip, potlatch, camping trip, or school dance). They might proceed as follows:
  - Each team brainstorms ideas for activities for the event the team has chosen.
  - They create a list of jobs and a timeline for the completion of the project.
  - They select media tools (e.g., VCRs, computers, tape-recorders, overhead transparencies) to create a presentation to try to convince the rest of the class to accept the team's proposal.
  - The class determines a set of criteria to evaluate the presentations. The criteria could include the suitability of the media used, the use of correct referencing of sources, the length of the presentation, and how well students worked together to create the project.
- Ask students to work in small groups to develop a set of criteria (e.g., user-friendly, challenging, engaging) to use to select software for the school. Have them evaluate software in various catalogues using their criteria and then propose software purchases. Ensure that students explain and validate their choices.

SUGGESTED ASSESSMENT STRATEGIES

As students select and use information technology tools to solve problems and express ideas, they have the opportunity to practise information-management skills, choose appropriate information technology tools, analyse information with respect to point of view, and create and modify electronic documents. To assess students' level of knowledge and understanding, observe them and invite them to discuss their work.

- Observe students as they complete a project (e.g., a letter, story, report) using a word-processing program. To assess students' abilities to edit their work on-screen, develop a checklist with criteria such as:
  - uses edit functions such as cut, copy, and paste
  - identifies and corrects misspelled words using the spell-check function
  - analyses a document for technical errors (e.g., grammar, omissions, word usage) on-screen before printing
- In conjunction with the personal planning curriculum, have students set personal goals for developing their information technology skills. Conference with individual students about their plans, asking questions such as:
  - What do you see as your current strengths in the area of information technology?
  - In which area would you like to develop your skills further?
  - What is your plan for achieving your goal?
  - What resources are available to you?
  - How will you know when you have reached your goal?
- Discuss point of view with students as they analyse information gathered on a controversial topic (e.g., the origin of the universe, an environmental issue). Assess students' understanding by noticing the depth of their responses to questions such as:
  - What clues (evidence) can you find to indicate that information may or may not be biassed?
  - How does the author's viewpoint affect the information?
  - How do you decide if information is accurate, neutral, and current?

RECOMMENDED LEARNING RESOURCES

Print Materials

- Communicating With Computers
- Computers Illustrated

Video

- How To Make Great Videos—With Just a Camcorder
- Virtual Reality

Software

- All the Right Type
- The Cruncher
- DataWonder! The Organizing, Graphing and Reporting Tool
- Digital Chisel
- Graph Links
- HyperStudio
- Looking Ahead: Earning, Spending, Saving
- Microworlds Project Builder
- UltraKey
- Write: OutLoud

CD-ROM

- How Multimedia Computers Work
- The Multimedia Workshop

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- demonstrate an understanding of how information technology tools can be used to influence presentations
- create and present multimedia documents for intended audiences

SUGGESTED INSTRUCTIONAL STRATEGIES

Students become increasingly sophisticated in their choice of information technology tools. They develop the analytical skills they require to determine the needs of their audience and they tailor their presentations to meet those needs.

- In language arts, have each student create a story or legend (e.g., "How the Monkey Lost Its Tail," "Why Zebras Have Stripes," "How the Rocky Mountains Were Formed") in a multimedia format, using sound effects, transitions, and visual effects. Ask students to share their stories or legends with partners.
- Suggest that students work in co-operative groups to prepare multimedia presentations that include video, text, graphics, and sound. The presentations can be on current-affairs topics in social studies or science-fair topics in science, for example. Students can show their presentations at a school Open House.
- In art, ask each student to use a computer to design two posters for a specific event (e.g., the Terry Fox run or some other cultural, sporting, or community event) and audience (e.g., a Grade 2 classroom, a Grade 7 classroom).
- In science, suggest that students use multimedia to develop an animation sequence based on a natural process (e.g., plant growth from seed, the water cycle, phases of the moon, life cycles) or a storyline.
- At the completion of a school or community event (e.g., a concert, play, powwow, potlatch), have students conduct a survey to obtain feedback from the audience. Encourage students to use a spreadsheet to enter and analyse the survey results before reporting them in a school or class newsletter.

SUGGESTED ASSESSMENT STRATEGIES

Audience characteristics influence the design of a message. Have students create presentations aimed at various target groups, incorporating a wide variety of multimedia techniques into their work. Ask them to provide evidence of their knowledge and understanding by analysing and discussing their choices of tools and processes.

- After students have determined the characteristics of a target audience, assess their understanding by providing prompts, such as:
  - What evidence did you gather to determine these characteristics?
  - In what ways will these characteristics influence the design of your presentation?
  - Which information technology tools did you choose for this presentation?
  - Why did you choose these tools?
  - What specific things will you do to meet the needs of your audience?
- While students are making their presentations to specific audiences (e.g., parents at an Open House), look for evidence that:
  - they have used a variety of appropriate information technology tools
  - their presentations are geared to their audience's level and interests
  - they have used information technology tools to emphasize key points
  - they have used text, graphics, and sound effectively
- With students, develop a checklist for assessing a text-based project (e.g., a class newspaper) and then have students use the checklist to assess their own or other students' work. The checklist criteria might include:
  - the use of a large, bold, and easy-to-read font for the title
  - the use of bolder, larger type for headlines than the type used for articles
  - clearly laid-out pages that effectively combine content, text, and graphics
  - the inclusion of relevant graphics
  - the appropriate use of items from the style menu (e.g., bold, underline, outline, italics) for emphasis

RECOMMENDED LEARNING RESOURCES

Print Materials

- Communicating With Computers

Video

- Virtual Reality

Software

- All the Right Type
- The Cruncher
- DataWonder! The Organizing, Graphing and Reporting Tool
- Digital Chisel
- Graph Links
- HyperStudio
- Looking Ahead: Earning, Spending, Saving
- Microworlds Project Builder
- UltraKey
- Write: OutLoud

CD-ROM

- How Multimedia Computers Work

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- enter, save, modify, and retrieve information using a variety of software
- use appropriate keyboard techniques to enter information into a computer
- describe the basic components of a variety of information technology tools, including computer networks
- practise behaviours that demonstrate self-reliance when using information technology tools
- demonstrate a concern for the responsible use of information technology tools and resources
- demonstrate an understanding of the impact of information technology tools on individuals, careers, and society

SUGGESTED INSTRUCTIONAL STRATEGIES

Students develop an understanding of the impact of information technology on their daily lives, careers, and society. They use information technology tools in their daily lives to solve problems at school and at home. Students become aware of the need to maintain and manage data as they use information technology tools responsibly.

- Have students practise keyboard operations in a computer lab or on portable keyboards. Encourage them to keep their eyes on the copy and to make full use of home-row keystroking, key reaches, key combinations, additional punctuation keys, and shift keys while inputting information from a number of curriculum areas.
- In social studies, ask students to collect newspaper and magazine articles that illustrate socially responsible and irresponsible uses of information technology. After students have presented their examples, choose one or two articles and have a class discussion about whether or not information technology was used appropriately.
- As part of personal planning, have students work in co-operative groups to survey specific groups within different workplaces to determine their use of information technology tools.

SUGGESTED ASSESSMENT STRATEGIES

Students broaden their knowledge as they begin to explore the internal workings of information technology tools and the basic components of computer networks. They are expected to use information technology tools responsibly and to consider the impact of these tools on individuals, careers, and society. Students demonstrate their knowledge and understanding through interviews, research, and performance tasks. To assess students' thinking, ask questions about and discuss the entries in their learning logs.

- Observe students as they use a keyboarding program to improve their speed and accuracy. Use a checklist to assess students' proficiency with specific skills (e.g., correct posture, eyes on the copy, use of home-row keys, correct finger reaches, use of the numeric keypad). Students may use the same checklist to conduct peer assessments.

- After they have interviewed people who work in various information technology fields, ask students to use their learning logs to reflect on their experiences. To focus students' thinking, provide sentence starters such as:
  - The most important thing I learned was _____.
  - Something that surprised me was _____.
  - I want to know more about _____.

- Have individuals or groups of students each research the development of an information technology tool (e.g., the computer, fax machine, video camera, photocopier) focussing on the impact of that tool on individuals, careers, and society. Conference with students to assess their understanding. Pose questions such as:
  - How has this tool developed or evolved?
  - How has this tool made individuals more or less efficient?
  - How has this tool affected career opportunities?
  - What advantages and disadvantages does this tool present to society?

- Have students identify the parts of a computer network on a diagram or on the actual hardware. Look for evidence that students can:
  - accurately identify the network components
  - describe the function of each component
  - use correct terminology

RECOMMENDED LEARNING RESOURCES

Print Materials

- All About Computers
- Communicating With Computers
- Computers: A Visual Encyclopedia
- Computers Illustrated
- How the Internet Works
- How to Use THE INTERNET
- How Virtual Reality Works
- Que's 1996 Computer & Internet Dictionary, 6th Edition
- The Technological Classroom

Software

- All the Right Type
- The Cruncher
- Digital Chisel
- Graph Links
- Looking Ahead: Earning, Spending, Saving
- Microworlds Project Builder
- UltraKey
- Write: OutLoud

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- solve problems using information technology tools and resources
- apply predetermined search criteria to locate and retrieve information using information technology tools
- analyse information retrieved from a variety of electronic sources

SUGGESTED INSTRUCTIONAL STRATEGIES

Students must develop analytical skills to evaluate the authenticity and validity of retrieved information. They learn to apply advanced search-and-retrieval skills to locate information that they can use in their daily lives.

- In language arts, have a class discussion about the nature and structure of a formal debate. After the discussion, ask students to select a current issue (e.g., a global environmental issue, a transportation issue, a health issue). Then proceed as follows:
  - Divide students into two teams (pros and cons).
  - Have students define criteria for searching and retrieving information about the topic (e.g., Boolean operators, keywords).
  - Have students use their search criteria to access a variety of information sources (e.g., news reports, CD-ROMs, on-line information, e-mail, print sources) and use word-processing software to prepare arguments to support their positions.
- As a follow-up activity, challenge students to summarize the key issues of both sides of the debate and prepare reports using a word-processing program.

SUGGESTED ASSESSMENT STRATEGIES

As students become more proficient at manipulating electronic information, they are better equipped to solve problems. By using a variety of information technology tools and resources, they expand their repertoire of effective strategies and processes. Observe students as they work, and assess their abilities to locate, retrieve, and critically evaluate electronic information.

- After students have researched a topic using information technology tools (e.g., CD-ROMs, the Internet, other on-line services), collect a printed or electronic copy of their information searches to assess their use of on-line resources. The assessment criteria may include:
  - the keywords are used to focus the search from a general heading to a specific topic
  - the range and number of resources are accessed
  - the information is relevant
  - the data are successfully downloaded to a disk or hard drive
- Have a class discussion about the ways in which information technology tools may be useful in each of the subject areas and in students' lives outside of school. Record students' ideas and post them in the classroom for reference. Note how often students make use of information technology in their work (e.g., creating a database of books they have read, using a graphics program to create title pages, using a CD-ROM to locate information).
- Provide students with a problem to solve using information technology tools. While students are working, note the extent to which they:
  - identify a variety of possible information technology tools
  - choose the appropriate tools and resources
  - explain their choices
  - use the tools and resources successfully
  - determine the effectiveness of their solutions

RECOMMENDED LEARNING RESOURCES

Print Materials

- Communicating With Computers
- Computers Illustrated
- How the Internet Works
- How to Use THE INTERNET

Video

- How to Make Great Videos—With Just a Camcorder
- Virtual Reality

Software

- All the Right Type
- The Cruncher
- Digital Chisel
- Graph Links
- HyperStudio
- Looking Ahead: Earning, Spending, Saving
- Microworlds Project Builder
- UltraKey
- Write: OutLoud

CD-ROM

- How Multimedia Computers Work
- The Multimedia Workshop

PRESCRIBED LEARNING OUTCOMES

It is expected that students will:

- synthesize information from a variety of electronic sources for their presentations
- apply the principles of good design when developing electronic documents
- develop interactive hypertext documents for presentation
- produce multimedia presentations
- analyse the impact of presentations on the intended audiences

SUGGESTED INSTRUCTIONAL STRATEGIES

Students develop the skills required to determine whether their presentations effectively communicate the intended messages. They also develop the skills and knowledge required to produce effective presentations that incorporate the principles of good design and communication.

- In social studies, have students work in co-operative groups to make videos about social issues (e.g., the dangers of smoking, the harmful effects of drugs) and show them to another class. To determine audience reaction, prompt students to develop surveys that evaluate the effectiveness of their videos. Have them record the survey results on databases and present them to the class in graphic formats.
- In a language arts class, ask students to present to the class examples from popular media (e.g., magazine articles, video clips, radio segments). For each example, have students identify the target audience and the central message.
- In social studies, ask each student to make a submission to an on-line newspaper or electronic bulletin board on a topic relevant to the student's daily life (e.g., the use of bicycle safety helmets, an environmental or a global issue).

SUGGESTED ASSESSMENT STRATEGIES

Students' multimedia presentation skills improve when they receive constructive feedback on the impact of their presentations. Through peer assessment, surveys, and questionnaires, they can analyse and refine their skills. Assessment strategies, including observation and conferencing, should focus on the processes and strategies that students are using to develop their presentations.

- After making a presentation to an audience, have each student conduct a survey or questionnaire to assess the impact of the presentation. To assess students' abilities to evaluate their work objectively, conference with them about their findings. To guide their reflection, ask questions such as:
  - How clearly did the audience receive your message?
  - What parts of your presentation did the audience remember best?
  - To what extent did your presentation affect the audience?
  - What have you learned about making presentations?
  - What might you do differently next time?
- Collect students' disks containing their hypertext documents (e.g., stories or research). Examine students' work and look for evidence that:
  - the buttons have logical names or functions
  - the pathways are correctly connected (from button to next card)
  - there is easy access to the home card or main menu
  - sound and visuals are creatively integrated
  - special effects (e.g., fading, scrolling to next card) are used
- With students, develop criteria to be used as a self- or peer assessment tool for multimedia presentations. The criteria might include:
  - text, sound, and visual elements are effectively integrated
  - appropriate media are chosen for the clear presentation of ideas
  - the main ideas are emphasized
  - the ideas are logically sequenced

RECOMMENDED LEARNING RESOURCES
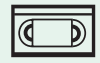
Print Materials

- Communicating With Computers

Video

- Virtual Reality

Software

- All the Right Type
- The Cruncher
- Digital Chisel
- Graph Links
- HyperStudio
- Looking Ahead: Earning, Spending, Saving
- Microworlds Project Builder
- UltraKey
- Write: OutLoud

CD-ROM

- How Multimedia Computers Work

APPENDICES

Information Technology K to 7

APPENDIX A

Prescribed Learning Outcomes

FOUNDATIONS

Foundations provides students with the fundamental knowledge, skills, and attitudes to use information technology tools in all areas of learning.

It is expected that students will:

Grades K to 1	Grades 2 to 3	Grade 4
• identify and describe the effects of technology tools that communicate information in the home and school • demonstrate a willingness to use information technology tools • demonstrate an ability to use a graphics program • enter information on a computer and print it • demonstrate a willingness to work co-operatively when using information technology tools • follow a sequence of steps to perform a task using information technology tools • use appropriate terminology to describe the parts of a computer system • demonstrate the proper care and safe use of equipment • identify occupations in their community that involve the use of information technology	• enter, save, and retrieve information using a computer or other information technology tool • use word-processing and graphics software to present ideas • demonstrate an understanding of data-storage practices • describe how a disk is installed and stored • use appropriate terminology when using information technology tools • demonstrate a willingness to work co-operatively when using information technology tools • identify information technology tools used in the home, school, and community • demonstrate the proper care and safe use of equipment	• enter, save, and retrieve information using a variety of information technology tools and software • use suitable keyboard techniques to enter information into a computer • organize and manage stored electronic information • use a variety of software to solve problems • use appropriate terminology while working with information technology tools • demonstrate a concern for the need to take care of information technology resources and materials • demonstrate an awareness of health and safety issues when using information technology • demonstrate a willingness to be self-reliant when using information technology tools • demonstrate a willingness to work co-operatively when using information technology tools • identify role models in their community who use information technology tools, being careful to consider all individuals, irrespective of gender, culture, and ability

FOUNDATIONS

Foundations provides students with the fundamental knowledge, skills, and attitudes to use information technology tools in all areas of learning.

It is expected that students will:

Grade 5	Grade 6	Grade 7
• manipulate electronic documents using a variety of tools • access on-line resources using telecommunications tools • develop an awareness of how programming is used in information technology • demonstrate an understanding of the need for the security and privacy of electronic information • demonstrate a willingness to be self-reliant when using information technology tools • demonstrate a concern for the socially responsible use of information • identify role models in their community who use information technology tools, being careful to consider all individuals irrespective of gender, culture, and ability	• work co-operatively using information technology tools • access information using a variety of on-line information tools • identify and apply a variety of software based on specific needs • apply troubleshooting strategies when using information technology tools • demonstrate an understanding of software compatibility when using information technology tools • practise the socially responsible use of electronic information • demonstrate an awareness of the impact of information technology on society	• enter, save, modify, and retrieve information using a variety of software • use appropriate keyboard techniques to enter information into a computer • describe the basic components of a variety of information technology tools, including computer networks • practise behaviours that demonstrate self-reliance when using information technology tools • demonstrate a concern for the responsible use of information technology tools and resources • demonstrate an understanding of the impact of information technology tools on individuals, careers, and society

PROCESS

Process allows students to select, organize, and modify information to solve problems.

It is expected that students will:

Grades K to 1	Grades 2 to 3	Grade 4
• use information technology tools to organize information • create and modify electronic documents • use information technology tools in a variety of ways to create new meaning	• demonstrate an understanding that tasks on a computer can be done in a variety of ways • identify and use different methods of organizing information • identify suitable information technology tools to express ideas or concepts • create and modify electronic documents that express ideas or concepts • locate and retrieve information using information technology tools	• retrieve data from a variety of information technology sources • use information technology tools to organize information from different sources • use information technology tools to create, modify, and explore documents that express ideas or concepts • demonstrate the ability to draw simple conclusions from information retrieved from electronic and other sources

PROCESS

Process allows students to select, organize, and modify information to solve problems.

It is expected that students will:

Grade 5	Grade 6	Grade 7
• collect and record information electronically using primary and secondary sources of information • demonstrate an understanding of how and why information is organized • demonstrate an appreciation of the need for consistency in data entry • draw conclusions from information retrieved from electronic and other sources • evaluate information retrieved from electronic sources	• gather information from available resources to solve problems using information technology tools • use a variety of information technology tools to create, modify, explore, and present electronic documents that express ideas or concepts • select and apply information technology tools for specific tasks • use a variety of methods to transfer information using electronic tools • demonstrate an awareness that all information is biassed	• solve problems using information technology tools and resources • apply predetermined search criteria to locate and retrieve information using information technology tools • analyse information retrieved from a variety of electronic sources

PRESENTATION

Presentation provides students with an understanding of how to effectively use information technology tools to communicate ideas and information using a variety of media.

It is expected that students will:

Grades K to 1	Grades 2 to 3	Grade 4
• present ideas using electronic documents	• present ideas using a variety of information technology tools • describe the components of electronic presentations	• apply information technology to present information to intended audiences • create multimedia documents • demonstrate their knowledge of the protocol for crediting sources of information

PRESENTATION

Presentation provides students with an understanding of how to effectively use information technology tools to communicate ideas and information using a variety of media.

It is expected that students will:

Grade 5	Grade 6	Grade 7
• demonstrate an understanding of how special effects can be used to influence messages • create and present multimedia documents • use a variety of information technology tools in presentations • demonstrate an understanding of how hypertext can enhance presentations	• demonstrate an understanding of how information technology tools can be used to influence presentations • create and present multimedia documents for intended audiences	• synthesize information from a variety of electronic sources for their presentations • apply the principles of good design when developing electronic documents • develop interactive hypertext documents for presentation • produce multimedia presentations • analyse the impact of presentations on the intended audiences

APPENDIX B

Learning Resources

WHAT IS APPENDIX B?

Appendix B is a comprehensive list of the *recommended* learning resources for Information Technology K to 7. The titles are listed alphabetically and each resource is annotated. In addition, Appendix B contains information on selecting learning resources for the classroom.

What information does an annotation provide?

1. General Description

5. Curriculum Organizers

2. Media Format

3. Author(s)

4. Cautions

6. Grade Level Grid

Communicating With Computers

Author(s): Martin, Dave

General Description: Student book and teacher's resource book provide a general computer literacy overview for Apple and MS-DOS computers. Students develop skills in word processing, graphics, data management, and spreadsheet programs through numerous activities. Teacher's resource provides specific instructional strategies.

Caution: *(no cautions in this example)*

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
				✓	✓	✓				

Year Recommended: *1995*

Supplier: *D. C. Health Canada Ltd. (Ont.)*
3rd Floor, 200 Adelaide Street West
Toronto, ON
M5H 1W7

Tel: (416) 977-1345   Fax: (416) 977-3135

Price: Student Edition: $14.95
Teacher's Resource Book: $14.95

ISBN/Order No: Student Edition: 0-669-95500-0
Teacher's Resource Book: 0-669-95501-9

7. Category

8. Audience

9. Supplier

1. *General Description:* This section provides an overview of the resource.

2. *Media Format:* This part is represented by an icon next to the title. Possible icons include:

Audio Cassette

CD-ROM

Film

Games/Manipulatives

Laserdisc, Videodisc

Multimedia

Music CD

Print Materials

Record

Slides

Software

Video

3. *Author(s):* Author or editor information is provided where it might be of use to the teacher.

4. *Cautions:* This category is used to alert teachers about potentially sensitive issues.

5. *Curriculum Organizers:* This category helps teachers make links between the resource and the curriculum.

6. *Grade Level Grid:* This category indicates the suitable age range for the resource.

7. *Category:* This section indicates whether it is a student and teacher resource, teacher resource, or professional reference.

8. *Audience:* This category indicates the suitability of the resource for different types of students. Possible student audiences include the following:
- general
- English as a second language (ESL)
- *Students who are:*
  - gifted
  - blind or have visual impairments
  - deaf or hard of hearing
- *Students with:*
  - severe behavioural disorders
  - dependent handicaps
  - physical disabilities
  - autism
  - learning disabilities (LD)
  - mild intellectual disabilities (ID-mild)
  - moderate to severe/profound disabilities (ID-moderate to severe/profound)

9. *Supplier:* The name and address of the supplier are included in this category. Prices shown here are approximate and subject to change. Prices should be verified with the supplier.

What about the videos?

The ministry attempts to obtain rights for most *recommended* videos. Negotiations for the most recently recommended videos may not be complete. For these titles, the original distributor is listed in this document, instead of British Columbia Learning Connection Inc. Rights for new listings take effect the year implementation begins. Please check with British Columbia Learning Connection Inc. before ordering new videos.

SELECTING LEARNING RESOURCES FOR THE CLASSROOM

Selecting a learning resource means choosing locally appropriate materials from the list of recommended resources or other lists of evaluated resources. The process of selection involves many of the same considerations as the process of evaluation, though not to the same level of detail. Content, instructional design, technical design, and social consider-ations may be included in the decision-making process, along with a number of other criteria.

The selection of learning resources should be an ongoing process to ensure a constant flow of new materials into the classroom. It is most effective as an exercise in group decision making, co-ordinated at the school, district, and ministry levels. To function efficiently and realize the maximum benefit from finite resources, the process should operate in conjunction with an overall district and school learning resource implementation plan.

Teachers may choose to use provincially recommended resources to support provin-cial or locally developed curricula; choose resources that are not on the ministry's list; or choose to develop their own resources. Resources that are not on the provincially recommended list must be evaluated through a local, board-approved process.

CRITERIA FOR SELECTION

There are a number of factors to consider when selecting learning resources.

Content

The foremost consideration for selection is the curriculum to be taught. Prospective resources must adequately support the particular learning objectives that the teacher wants to address. Resources on the ministry's *recommended* list are not matched directly to learning outcomes, but they are linked to the appropriate curriculum organizers. It is the responsibility of the teacher to determine whether a resource will effectively support any given learning outcomes within a curriculum organizer. This can only be done by examining descriptive information regarding that resource; acquiring additional information about the material from the supplier, published reviews, or colleagues; and by examining the resource first-hand.

Instructional Design

When selecting learning resources, teachers must keep in mind the individual learning styles and abilities of their students, as well as anticipate the students they may have in the future. Resources have been recom-mended to support a variety of special audiences, including gifted, learning disabled, mildly intellectually disabled, and ESL students. The suitability of a resource for any of these audiences has been noted in the resource annotation. The instructional design of a resource includes the organiza-tion and presentation techniques; the methods used to introduce, develop, and summarize concepts; and the vocabulary level. The suitability of all of these should be considered for the intended audience.

Teachers should also consider their own teaching styles and select resources that will complement them. The list of *recommended* resources contains materials that range from prescriptive or self-contained resources, to open-ended resources that require considerable teacher preparation. There are *recommended* materials for teachers with varying levels of experience with a particular subject, as well as those that strongly support particular teaching styles.

Technology Considerations

Teachers are encouraged to embrace a variety of educational technologies in their classrooms. To do so, they will need to ensure the availability of the necessary equipment and familiarize themselves with its operation. If the equipment is not currently available, then the need must be incorporated into the school or district technology plan.

Social Considerations

All resources on the ministry's *recommended* list have been thoroughly screened for social concerns from a provincial perspective. However, teachers must consider the appropriateness of any resource from the perspective of the local community.

Media

When selecting resources, teachers should consider the advantages of various media. Some topics may be best taught using a specific medium. For example, video may be the most appropriate medium when teaching a particular, observable skill, since it provides a visual model that can be played over and over or viewed in slow motion for detailed analysis. Video can also bring otherwise unavailable experiences into the classroom and reveal "unseen worlds" to

students. Software may be particularly useful when students are expected to develop critical-thinking skills through the manipulation of a simulation, or where safety or repetition is a factor. Print resources or CD-ROM can best be used to provide extensive background information on a given topic. Once again, teachers must consider the needs of their individual students, some of whom may learn better from the use of one medium than another.

Funding

As part of the selection process, teachers should determine how much money is available to spend on learning resources. This requires an awareness of school and district policies, and procedures for learning resource funding. Teachers will need to know how funding is allocated in their district and how much is available for their needs. Learning resource selection should be viewed as an ongoing process that requires a determination of needs, as well as long-term planning to co-ordinate individual goals and local priorities.

Existing Materials

Prior to selecting and purchasing new learning resources, an inventory of those resources that are already available should be established through consultation with the school and district resource centres. In some districts, this can be facilitated through the use of district and school resource management and tracking systems. Such systems usually involve a computer database program (and possibly bar-coding) to help keep track of a multitude of titles. If such a system is put on-line, then teachers can check the availability of a particular resource via a computer.

SELECTION TOOLS

The Ministry of Education has developed a variety of tools to assist teachers with the selection of learning resources.

These include:

- Integrated Resource Packages (IRPs) that contain curriculum information, teaching and assessment strategies, and *recommended* learning resources
- learning resource information via annotation sets, resource databases on disks, and, in the future, on-line access
- sets of the most recently recommended learning resources (provided each year to a number of host districts throughout the province to allow teachers to examine the materials first-hand at regional displays)
- sample sets of provincially recommended resources (available on loan to districts on request)

A MODEL SELECTION PROCESS

The following series of steps is one way a school resource committee might go about selecting learning resources:

1. Identify a resource co-ordinator (for example, a teacher-librarian).

2. Establish a learning resources committee made up of department heads or lead teachers.

3. Develop a school vision and approach to resource-based learning.

4. Identify existing learning resource and library materials, personnel, and infrastructure.

5. Identify the strengths and weaknesses of existing systems.

6. Examine the district Learning Resources Implementation Plan.

7. Identify resource priorities.

8. Apply criteria such as those found in *Selection and Challenge* to shortlist potential resources.

9. Examine shortlisted resources first-hand at a regional display or at a publishers' display, or borrow a set from the Learning Resources Branch.

10. Make recommendations for purchase.

FURTHER INFORMATION

For further information on evaluation and selection processes, catalogues, annotation sets, or resource databases, please contact the Learning Resources Branch at 387-5331 or by fax at 387-1527.

All About Computers

Author(s): *Atelsek, Jean*

General Description: Book introduces the various parts of a computer. Topics cover what is in a computer, memory, storage, I/O devices, DOS, Windows, and some basics of programming. Colourful visuals help explain concepts. Includes activities and an answer key.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓	✓		

Year Recommended: *1995*

Supplier: *Copp Clark Ltd.*
2775 Matheson Boulevard East
Mississauga, ON
L4W 4P7

Tel: (905) 238-6074   Fax: (905) 238-6075

Price: $22.95

ISBN/Order No: 1562761668

All the Right Type

Author(s): *Beaucamp, Ernest*

General Description: Multilevel software program for either Macintosh or MS-DOS uses drills and activities to teach proper keyboarding technique and help build skill and accuracy. Includes a word processor function and automatic record keeping for the teacher, as well as a user's guide with installation instructions and teaching strategies.

System requirements for Macintosh: Macintosh Plus or later; 512 K RAM; System 4.1 or later; high density disk drive. System requirements for MS-DOS: IBM PC compatible; 256 K RAM; double-sided disk drive; CGA card optional; DOS 2.0 or later (DOS 3.2 or later for 3.5" disks).

Audience: *General*
ESL - keyboarding tutorials
LD - keyboarding tutorials

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓	✓	✓	✓	✓		

Year Recommended: *1995*

Supplier: *Didatech Software*
#200 - 4250 Dawson Street
Burnaby, BC
V5C 4B1

Tel: (604) 299-4435   Fax: (604) 299-2428

Price: Macintosh: $89.00
IBM: $67.00

ISBN/Order No: Macintosh: 1-55030-144-6
IBM (3.5"): 1-55030143-8

Communicating With Computers

Author(s): *Martin, Dave*

General Description: Student book and teacher's resource book provide a general computer literacy overview for Apple and MS-DOS computers. Students develop skills in word processing, graphics, data management, and spreadsheet programs through numerous activities. Teacher's resource provides specific instructional strategies.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
				✓	✓	✓				

Year Recommended: *1995*

Supplier: *D. C. Heath Canada Ltd. (Ont.)*
3rd Floor, 200 Adelaide Street West
Toronto, ON
M5H 1W7

Tel: (416) 977-1345   Fax: (416) 977-3135

Price: Student Edition: $14.95
Teacher's Resource Book: $14.95

ISBN/Order No: Student Edition: 0-669-95500-0
Teacher's Resource Book: 0-669-95501-9

Computers: A Visual Encyclopedia

Author(s): *Kinkoph, S.; Fulton, J.; Oliver, K.*

General Description: Book uses extensive visuals to explain computer terms, concepts, and components, including ASCII, bytes, CD-ROMs, DOS, RAM, disks, programming, and Windows. Diagrams, photos, and illustrations enhance text. Includes an index for cross-referencing.

Audience: *General*
ESL - visual emphasis
LD - visual emphasis

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓	✓	✓	✓	✓		

Year Recommended: *1995*

Supplier: *Prentice Hall Ginn Canada (Ont.)*
1870 Birchmount Road
Scarborough, ON
M1P 2J7

Tel: (416) 293-3621 Fax: (416) 299-2539

Price: $22.08

ISBN/Order No: 1567614647

Computers Illustrated

Author(s): *Gertler, Nat*

General Description: Book presents a visual guide to the workings and components of a computer system, including its multimedia aspects. Chapters explore what a computer is, how the various parts work, and what the computer is capable of doing. Includes a detailed glossary.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓	✓		

Year Recommended: *1995*

Supplier: *Prentice Hall Ginn Canada (Ont.)*
1870 Birchmount Road
Scarborough, ON
M1P 2J7

Tel: (416) 293-3621 Fax: (416) 299-2539

Price: $21.41

ISBN/Order No: 1565296761

The Cruncher

General Description: Macintosh spreadsheet program facilitates mathematical problem solving through spreadsheet application, animated tutorials, projects, colour charts and graphs, and an on-line notebook. A comprehensive teacher's guide is included. Software emphasizes presentations that include charts, sounds, and animations. Text-to-speech capability is provided.

System requirements: Macintosh Classic or later; System 7.0 with 2 Mb RAM; 8 Mb free disk space; printer highly recommended. Windows version has not been evaluated.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓	✓	✓	✓	✓		

Year Recommended: *1995*

Supplier: *Davidson & Associates, Inc.*
P.O. Box 2961
Torrance, California
90509

Tel: 1-800-545-7677 Fax: (310) 793-0601

Price: (not available)

ISBN/Order No: (not available)

DataWonder! The Organizing, Graphing and Reporting Tool

General Description: This software program allows students to enter or change data and watch the program create or modify a corresponding graph. Graph types range from bar graphs to stem and leaf, circle, line, scatter, and range graphs. A user's guide accompanies the software.

System requirements: System 6.0.7 or later; 2 Mb RAM. Windows version has not been evaluated.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓						

Year Recommended: *1995*

Supplier: *Addison-Wesley Publishers Limited*
26 Prince Andrew Place
P.O. Box 580
Don Mills, ON
M3C 2T8

Tel: (416) 447-5101   Fax: (416) 443-0948

Price: $53.35

ISBN/Order No: 01-86311-1 / 86311

Digital Chisel

General Description: Macintosh software package for preparing multimedia presentations consists of a detailed reference manual, CD, and installation disks. The HyperCard-type program allows students to incorporate text, pictures, movies, sound, animation, and hypermedia in projects. The CD features a multimedia library of 14 topics.

System requirements: Macintosh LC; 4 Mb RAM; System 6.0.7.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
			✓	✓	✓	✓	✓	✓	✓	✓

Year Recommended: *1995*

Supplier: *Pierian Spring Software*
Suite 570, 5200 S.W. Macadam Avenue
Portland, Oregon
97201

Tel: (503) 222-2044   Fax: (503) 222-0771

Price: Single Copy: $119.95
Site Licence: $995.00

ISBN/Order No: Single Copy: CHIZ 000 B1Z
Site Licence: CHIZ 000R1.2

Graph Links

General Description: Macintosh graphing program allows students to use data to set up a spreadsheet and generate pictographs, line graphs, bar graphs, and circle graphs. Tutorial explanations and examples help clarify concepts. Includes a teacher's guide with detailed instructions. American symbols used.

System requirements: System 6.0.7 or later; 4 Mb RAM.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
	✓	✓	✓	✓	✓					

Year Recommended: *1995*

Supplier: *Harcourt Brace and Company Canada Ltd.*
55 Horner Avenue
Toronto, ON
M8Z 4X6

Tel: (416) 255-4491   Fax: (416) 255-5456

Price: $149.99

ISBN/Order No: (not available)

How Multimedia Computers Work

General Description: Award-winning CD-ROM features tours through the inner workings and components of a multimedia computer. It uses detailed 3-D animation with accompanying narration, music, and sound effects. Includes a glossary of computer terms, answers to common questions, and tips.

System requirements: MPC CD-ROM; IBM compatible; double-speed CD-ROM drive; SVGA colour monitor; 4 Mb RAM; SoundBlaster-compatible sound card.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Presentation*
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓	✓	✓	✓	✓		

Year Recommended: *1995*

Supplier: *Addison-Wesley Publishers Limited*
26 Prince Andrew Place
P.O. Box 580
Don Mills, ON
M3C 2T8

Tel: (416) 447-5101   Fax: (416) 443-0948

Price: $49.99

ISBN/Order No: 0-7911-1569-0

How the Internet Works

Author(s): *Eddings, Joshua*

General Description: Book provides an overview of, and some important particulars on, the Internet. The topics include a description and explanation of the Internet, Telnet, downloading files, e-mail, security issues, and future trends. Step-by-step instructions and attractive visuals help to explain concepts.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
					✓	✓	✓	✓	✓	

Year Recommended: *1995*

Supplier: *Copp Clark Ltd.*
2775 Matheson Boulevard East
Mississauga, ON
L4W 4P7

Tel: (905) 238-6074   Fax: (905) 238-6075

Price: $49.95

ISBN/Order No: 1-56276-249-4

How To Make Great Videos - With Just a Camcorder

General Description: Twenty-five-minute video instructs students in the basic techniques of video production using a camcorder. Also covers how to create a finished program. The issue of saving energy is used as an example topic for a video.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Process*

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓	✓	✓	✓			

Year Recommended: *1995*

Supplier: *McIntyre Media Ltd.*
6845 Rexwood Road, Unit 2
Mississauga, ON
L4L 1S5

Tel: (905) 678-9866   Fax: (905) 678-2403

Price: (not available)

ISBN/Order No: (not available)

How to Use THE INTERNET

Author(s): *Butler, Mark*

General Description: Book provides an overview of, and some important particulars on, what the Internet is, how to access and use the Internet, and Internet-related software. Topics cover e-mail, electronic mailing lists, news groups, transferring files, and browsing. Step-by-step instructions and attractive visuals help to explain concepts. Some specifics about certain software or protocol may vary depending on the carrier.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
					✓	✓	✓	✓		

Year Recommended: *1995*

Supplier: *Copp Clark Ltd.*
2775 Matheson Boulevard East
Mississauga, ON
L4W 4P7

Tel: (905) 238-6074   Fax: (905) 238-6075

Price: (not available)

ISBN/Order No: 1-56276-222-2

How Virtual Reality Works

Author(s): *Eddings, Joshua*

General Description: Book provides an overview of the computer technology known as virtual reality. Topics include operation of the senses, hardware and software, history, professional applications, recreational use, and future trends. Numerous illustrations help explain concepts.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
					✓	✓	✓	✓	✓	✓

Year Recommended: *1995*

Supplier: *Copp Clark Ltd.*
2775 Matheson Boulevard East
Mississauga, ON
L4W 4P7

Tel: (905) 238-6074   Fax: (905) 238-6075

Price: $34.95

ISBN/Order No: 1562762303

HyperStudio

Author(s): *O'Keefe, Michael; Wagner, Roger*

General Description: Software package for Macintosh or Apple IIgs allows students to create multimedia presentations with text, pictures, laserdiscs, sound, and drawing. The program works with QuickTime or Hypermedia. Includes an on-line tutorial and a book on how to use HyperLogo to control HyperStudio. HyperCard experience an asset.

System requirements for Macintosh: 2 Mb RAM with System 6.0.8, 4 Mb RAM with System 7; Macintosh Plus or later; colour monitor recommended. System requirements for Apple IIgs: 1 Mb RAM; 3.5" disk drive. Windows version has not been evaluated.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Presentation*
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓	✓	✓	✓	✓	✓	✓

Year Recommended: *1995*

Supplier: *Roger Wagner Publishing Inc.*
1050 Pioneer Way
El Cajon, California
92020

Tel: 1-800-421-6526   Fax: (619) 442-0525

Price: $120.00

ISBN/Order No: 0-927796-41-D / MRW-023

Looking Ahead: Earning, Spending, Saving

General Description: Macintosh software program allows students to make simulated financial planning decisions for independent living. Students choose a career, determine take-home pay, track expenses, and update their bank balance accordingly. Includes a teacher's guide with instructions, worksheets, and assessment. American terms and spellings.

System requirements: System 6.0.7; 2 Mb RAM.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
			✓	✓	✓	✓				

Year Recommended: *1995*

Supplier: *Harcourt Brace and Company Canada Ltd.*
55 Horner Avenue
Toronto, ON
M8Z 4X6

Tel: (416) 255-4491   Fax: (416) 255-5456

Price: $104.55

ISBN/Order No: (not available)

Microworlds Project Builder

General Description: Resource package for developing multimedia projects consists of Macintosh or MS-DOS program installation disks, teacher's resource guide, "how to" book, project book, and reference book. The Logo-based program allows students to build projects in any curricular area incorporating text, graphics, music, and animation.

System requirements for Macintosh: System 7; 4 Mb RAM; colour monitor. System requirements for MS-DOS: 386 PC; DOS 3.3; 4 Mb RAM; SVGA.

Audience: *General*
ESL - opportunities for different levels of instruction and interaction
Gifted - opportunities for different levels of instruction and interaction
LD - opportunities for different levels of instruction and interaction

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓					

Year Recommended: *1995*

Supplier: *Logo Computer Systems Inc.*
3300 Cote Vertu, Suite 201
Montreal, PQ
H4R 2B7

Tel: (514) 331-7090   Fax: (514) 331-1380

Price: Macintosh: $129.00
IBM: $129.00

ISBN/Order No: Macintosh: 89-371-410-2
IBM: 89-371-432-3

The Multimedia Workshop

General Description: Presentation software for Macintosh and Windows teaches students the elements of designing printed documents and video presentations. It features text, clip art, photos, QuickTime movies, sounds, and music. Standard format files also can be imported. Includes comprehensive print support with suggested projects.

System requirements for Macintosh: LC series or later; System 7.0 or later; 4 Mb RAM for 256 colours; 8 Mb RAM for thousands of colours; 3 Mb free disk space. System requirements for Windows: Windows 3.1 or later; 4 Mb RAM; Super VGA 256 - colour only; 25 MHz 486 or faster; CD-ROM drive (double-speed recommended); hard drive and mouse; audio accessory necessary for optimum audio output, but not required;

Audience: *General*
Gifted - completely open-ended
LD - allows non-readers to express ideas or concepts

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Process*

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓	✓	✓	✓	✓		

Year Recommended: *1995*

Supplier: *Davidson & Associates, Inc.*
P.O. Box 2961
Torrance, California
90509

Tel: 1-800-545-7677   Fax: (310) 793-0601

Price: Macintosh: $129.95
Windows: $129.95

ISBN/Order No: Macintosh: 0-7849-0351-4
Windows: 0-7849-0541-X

Que's 1996 Computer & Internet Dictionary, 6th Edition

Author(s): *Pfaffenberger, Bryan*

General Description: Comprehensive, pocket-sized, softcover dictionary contains more than 3500 definitions of computer, multimedia, and Internet terminology. Includes occasional small graphics and index tabs.

Audience: *General*
Gifted - high vocabulary; in-depth explanations of technology terms

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
				✓	✓	✓	✓	✓	✓	✓

Year Recommended: *1995*

Supplier: *Prentice Hall Ginn Canada (Ont.)*
1870 Birchmount Road
Scarborough, ON
M1P 2J7

Tel: (416) 293-3621   Fax: (416) 299-2539

Price: $14.04

ISBN/Order No: 0-7897-0356-4

Storybook Theatre

General Description: Macintosh software program allows students to create animated stories with text, sound, and colour. The comprehensive teacher's guide contains start-up information and lesson plans.

System requirements: System 6.0.7 or later; 4 Mb RAM with Macintosh LC II; System 7 or later; 12" RGB display monitor recommended; microphone and colour printer recommended.

Audience: *General*
ID (Moderate to Severe/Profound) - adaptable word processing program
Dependent Handicaps - adaptable word processing program
Deaf or Hard of Hearing - adaptable word processing program
Physical Disabilities - adaptable word processing program

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
✓	✓	✓								

Year Recommended: *1994*

Supplier: *Sunburst/Wings for Learning*
920 Mercer Street
Windsor, ON
N9A 7C2

Tel: 1-800-321-7511   Fax: (914) 747-4109

Price: $129.00

ISBN/Order No: 780523482 / 6474HM

The Technological Classroom

Author(s): *Henderson, Dale; Heide, Ann*

General Description: Book provides teachers with an informative foundation for incorporating technology in the classroom. It deals with student progress, discussing technology with parents, integrated learning activities, and making decisions about the costs related to the inclusion of technology.

Audience: *General*
Special Needs - chapter devoted to strategies for inclusion

Category: *Professional Reference*

Curriculum Organizer(s): *Foundations*

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓	✓	✓	✓		

Year Recommended: *1995*

Supplier: *Irwin Publishing*
1800 Steeles Avenue West
Concord, ON
L4K 2P3

Tel: (905) 660-0611   Fax: (905) 660-0676

Price: $29.95

ISBN/Order No: 7725-21417

UltraKey

General Description: Introductory Macintosh keyboarding software program features instruction, skill-building exercises, and timed tests. The Enhancer software allows teachers to input test material. Includes a teacher's guide, technical help, and student's guide.

System requirements: System 7 recommended; 2 Mb RAM; 1.2 Mb free disk space; 4 Mb RAM; MacinTalk or PlainTalk speech extensions required for text-to-speech; colour monitor recommended. Apple II and MS-DOS versions have not been evaluated.

Audience: *General*
ESL - tutorial
LD - tutorial

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓	✓	✓	✓			

Year Recommended: *1995*

Supplier: *Media Duplication*
275 Steelcase Road East
Markham, ON
L3R 1G3

Tel: (905) 940-5115

Price: UltraKey: $495.00
UntraKey Enhancer: $195.00

ISBN/Order No: UltraKey: 67654-13003
UntraKey Enhancer: 0921849060

Virtual Reality

General Description: Thirteen-minute video outlines the origins of virtual reality in military flight simulators and subsequent applications including NASA simulators, architecture, medical techniques, and games.

Audience: *General*

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Presentation*
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
		✓	✓	✓	✓	✓	✓	✓	✓	✓

Year Recommended: *1995*

Supplier: *Canadian Learning Company Inc.*
63 Mack Avenue
Scarborough, ON
M1L 1M5

Tel: (416) 691-9094   Fax: (416) 691-8833

Price: (not available)

ISBN/Order No: (not available)

Write: OutLoud

General Description: Easy-to-use Macintosh word processor lets the user hear words, sentences, or whole paragraphs as they are typed. Spell checker has speech features, and automatic spelling monitor checks words as they are typed. On-screen menu functions allow user to manipulate text, spell check, and change font size. Program features help screens and uses colour to highlight specific words within the text.

System requirements: System 6.0.7 or later; 2 Mb RAM.

Audience:
ID (Moderate to Severe/Profound) - talking word processor
Dependent Handicaps - talking word processor
Physical Disabilities - talking word processor

Category: *Student, Teacher Resource*

Curriculum Organizer(s): *Foundations*
Presentation
Process

Grade Level:

K/1	2/3	4	5	6	7	8	9	10	11	12
✓	✓	✓	✓	✓	✓					

Year Recommended: *1994*

Supplier: *Tash, Inc.*
Unit 1, 91 Station Street
Ajax, ON
L1S 3H2

Tel: (905) 686-4129   Fax: (905) 686-6895

Price: $99.00

ISBN/Order No: J30

APPENDIX C

Cross-Curricular Interests

The three principles of learning stated in the introduction of this Integrated Resource Package (IRP) support the foundation of The Kindergarten to Grade 12 Education Plan. They have guided all aspects of the development of this document, including the curriculum outcomes, instructional strategies, assessment strategies, and learning resource evaluations.

In addition to these three principles, the Ministry of Education wants to ensure that education in British Columbia is relevant, equitable, and accessible to all learners. In order to meet the needs of all learners, the development of each component of this document has been guided by a series of cross-curricular reviews. This appendix outlines the key aspects of each of these reviews. The information here is intended to guide the users of this document as they engage in school and classroom organization and instructional planning and practice.

The areas of cross-curricular interest are:

- Applied Focus in Curriculum
- Career Development
- English as a Second Language (ESL)
- Environment and Sustainability
- Aboriginal Studies
- Gender Equity
- Information Technology
- Media Education
- Multiculturalism and Anti-Racism
- Science-Technology-Society
- Special Needs

APPLIED FOCUS IN CURRICULUM

An applied focus combines the following components in curriculum development, consistent with the nature of each subject area:

Learning Outcomes—expressed as observable, measurable, and reportable abilities or skills

Employability Skills—inclusion of outcomes or strategies that promote skills that will enable students to be successful in the workplace (e.g., literacy, numeracy, critical and creative thinking, problem solving, technology, and information management)

Contextual Learning—an emphasis on learning by doing; the use of abstract ideas and concepts, including theories, laws, principles, formulae, rules, or proofs in a practical context (e.g., home, workplace, community)

Interpersonal Skills—inclusion of strategies that promote co-operative activities and teamwork

Career Development—inclusion of appropriate connections to careers, occupations, entrepreneurship, or the workplace

An applied focus in all subjects and courses promotes the use of practical applications to demonstrate theoretical knowledge. Using real-world and workplace problems and situations as a context for the application of theory makes school more relevant to students' needs and goals. An applied focus strengthens the link between what students need to know to function effectively in the workplace or in postsecondary education and what they learn in Kindergarten through Grade 12.

Some examples of an applied focus in different subjects are:

English Language Arts—increasing emphasis on language used in everyday situations and in the workplace, such as for job interviews, memo and letter writing, word processing, and technical communication (including the ability to interpret technical reports, manuals, tables, charts, and graphics)

Mathematics—more emphasis on skills needed in the workplace, including knowledge of probability and statistics, logic, measurement theory, and problem solving

Science—more practical applications and hands-on experience of science, such as reducing energy waste in school or at home, caring for a plant or animal in the classroom, using computers to produce tables and graphs and for spreadsheets

Business Education—more emphasis on real-world applications such as preparing résumés and personal portfolios, participating in groups to solve business communication problems, using computer software to keep records, and using technology to create and print marketing material

Visual Arts—applying visual arts skills to real-world design, problem solving, and communications; exploring career applications of visual arts skills; experimenting with a variety of new technologies to create images; and a new emphasis on creating and understanding images of social significance to the community

This summary is derived from *The Kindergarten to Grade 12 Education Plan* (September 1994), and curriculum documents from British Columbia and other jurisdictions.

CAREER DEVELOPMENT

Career development is an ongoing process through which learners integrate their personal, family, school, work, and community experiences to facilitate career and lifestyle choices.

Students develop:

- an open attitude toward a variety of occupations and types of work
- an understanding of the relationship between work and leisure, work and the family, and work and one's interests and abilities
- an understanding of the role of technology in the workplace and in daily life
- an understanding of the relationship between work and learning
- an understanding of the changes taking place in the economy, society, and the job market
- an ability to construct learning plans and reflect on the importance of lifelong learning
- an ability to prepare for multiple roles throughout life

The main emphases of career development are career awareness, career exploration, career preparation, career planning, and career work experience.

In the Primary Years

Career awareness promotes an open attitude toward a variety of career roles and types of work. Topics include:

- the role of work and leisure
- relationships among work, the family, one's personal interests, and one's abilities

A variety of careers can be highlighted through the use of in-class learning activities focussing on the students themselves and on a range of role models, including non-traditional role models.

In Grades 4 to 8

The emphasis on self-awareness and career awareness is continued. Topics include:

- interests, aptitudes, and possible future goals
- technology in the workplace and in our daily lives
- social, family, and economic changes
- future education options
- career clusters (careers that are related to one another)
- lifestyles
- external influences on decision making

Games, role-playing, drama, and appropriate community volunteer experience can be used to help students actively explore the world of work. Field experiences in which students observe and interview workers in their occupational environments may also be appropriate. These learning activities will facilitate the development of interpersonal communications and group problem-solving skills needed in the workplace and in other life situations.

In Grades 9 and 10

The emphasis is on providing students with opportunities to prepare for and make appropriate and realistic decisions. In developing their student learning plans, they will relate self-awareness to their goals and aspirations. They will also learn many basic skills and attitudes that are required for an effective transition into adulthood. This will assist in preparing them to be responsible and self-directed throughout their lives. Topics include:

- entrepreneurial education
- employability skills (e.g., how to find and keep a job)
- the importance of lifelong education and career planning
- involvement in the community
- the many different roles that an individual can play throughout life
- the dynamics of the working world (e.g., unions, unemployment, supply and demand, Pacific Rim, free trade)

The examination of personal interests and skills through a variety of career exploration opportunities (e.g., job shadowing) is emphasized at this level. Group discussion and individual consultation can be used to help students examine and confirm their personal values and beliefs.

In Grades 11 and 12

Career development in these grades is focussed more specifically on issues related to the world of work. These include:

- dynamics of the changing work force and changing influences on the job market (e.g., developing technology and economic trends)
- job-keeping and advancement skills (interpersonal skills needed in the workplace, employment standards)
- occupational health issues and accessing health support services
- funding for further education
- alternative learning strategies and environments for different life stages
- mandatory work experience (minimum 30 hours)

Work Experience

Work experience provides students with opportunities to participate in a variety of workplace situations to help prepare them for the transition to a work environment. Work experience also provides students with opportunities to:

- connect what they learn in school with the skills and knowledge needed in the workplace and society in general
- experience both theoretical and applied learning, which is part of a broad liberal education
- explore career directions identified in their Student Learning Plans

Descriptions of career development are drawn from the Ministry of Education's *Career Developer's Handbook, Guidelines for the Kindergarten to Grade 12 Education Plan, Implementation Resource, Part 1,* and the *Career and Personal Planning IRP,* April 1995.

ENGLISH AS A SECOND LANGUAGE (ESL)

ESL assistance is provided to students whose use of English is sufficiently different from standard English to prevent them from reaching their potential. Many students learning English speak it quite fluently and seem to be proficient. School, however, demands a more sophisticated version of English, both in reading and writing. Thus even fluent speakers might require ESL to provide them with an appropriate language experience that is unavailable outside the classroom. ESL is a transitional service rather than a subject. Students are in the process of learning the language of instruction and, in many cases, the content matter of subjects appropriate to their grade level. Thus ESL does not have a specific curriculum. The provincial curriculum is the basis of much of the instruction and is used to teach English as well as individual subject areas. It is the methodology, the focus, and the level of engagement with the curriculum that differentiates ESL services from other school activities.

Students in ESL

Nearly 10% of the British Columbia school population is designated as ESL students. These students come from a diversity of backgrounds. Most are recent immigrants to British Columbia. Some are Canadian-born but have not had the opportunity to learn English before entering the primary grades. The majority of ESL students have a well-developed language system and have had similar schooling to that of British Columbia-educated students. A small number, because of previous experiences, are in need of basic support such as literacy training, academic upgrading, and trauma counselling.

Teachers may have ESL students at any level in their classes. Many ESL students are placed in subject-area classes primarily for the purpose of contact with English-speaking peers and experience with the subject and language. Other ESL students are wholly integrated into subject areas. A successful integration takes place when the student has reached a level of English proficiency and background knowledge in a subject to be successful with a minimum of extra support.

Optimum Learning Environment

The guiding principle for ESL support is the provision of a learning environment where the language and concepts can be understood by the students.

Good practices to enhance the learning of students include:

- using real objects and simple language at the beginning level
- taking into consideration other cultural backgrounds and learning styles at any level
- providing adapted (language-reduced) learning materials
- respecting a student's "silent period" when expression does not reflect the level of comprehension
- allowing students to practise and internalize information before giving detailed answers
- differentiating between form and content in student writing
- keeping in mind the level of demand placed on students

This summary is drawn from *Supporting Learners of English: Information for School and District Administrators*, RB0032, 1993, and *ESL Policy Discussion Paper (Draft)*, Social Equity Branch, December 1994.

ENVIRONMENT AND SUSTAINABILITY

Environmental education is defined as a way of understanding human relationships with the environment. It involves:

- students learning about their connections to the natural environment through all subjects
- students having direct experiences in the environment, both natural and human-built
- students making decisions about and acting for the environment

The term *sustainability* helps to describe societies that "promote diversity and do not compromise the natural world for any species in the future."

Value of Integrating Environment and Sustainability Themes

Integrating these themes into the curriculum helps students develop a responsible attitude toward caring for the earth. Studies that integrate environment and sustainability themes provide students with opportunities to identify their beliefs and opinions, reflect on a range of views, and ultimately make informed and responsible choices.

The guiding principles that should be interwoven in subjects from Kindergarten to Grade 12 are:

- Direct experience is the basis of human learning.
- Analysis of interactions helps humans make sense of their environment.
- Responsible action is both integral to and a consequence of environmental education.

Some organizing principles are:

- Human survival depends on complex natural and human-built systems.
- Human decisions and actions have environmental consequences.

- Students should be provided with opportunities to develop an aesthetic appreciation of the environment.

The theme study units might include: Consumerism, School Operating Systems, Pollution, or Endangered Species.

This summary is derived from *A Plan for Environmental Education,* Curriculum Branch, October 1995.

ABORIGINAL STUDIES

Aboriginal studies focus on the richness and diversity of Aboriginal cultures and languages. These cultures and languages are examined within their own unique contexts and within historical, contemporary, and future realities. Aboriginal studies are based on a holistic perspective that integrates the past, present, and future. Aboriginal peoples are the original inhabitants of North America and live in sophisticated, organized, and self-sufficient societies. The First Nations constitute a cultural mosaic as rich and diverse as that of Western Europe, including different cultural groups (e.g., Nisga'a, KwaKwaka'Wakw, Nlaka'pamux, Secwepemc, Skomish, Tsimshian). Each is unique and has a reason to be featured in the school system. The First Nations of British Columbia constitute an important part of the historical and contemporary fabric of the province.

Value of Integrating Aboriginal Studies

- First Nations values and beliefs are durable and relevant today.
- There is a need to validate and substantiate First Nations identity.
- First Nations peoples have strong, dynamic, evolving cultures that have adapted to changing world events and trends.
- There is a need to understand similarities and differences among cultures to create tolerance, acceptance, and mutual respect.

- There is a need for informed, reasonable discussion and decision making regarding First Nations issues, based on accurate information (for example, as modern treaties are negotiated by Canada, British Columbia, and First Nations).

In studying First Nations, it is expected that the students will:

- demonstrate an understanding and appreciation for the values, customs, and traditions of First Nations peoples
- demonstrate an understanding of and appreciation for unique First Nations communications systems
- demonstrate a recognition of the importance of the relationship between First Nations peoples and the natural world
- recognize dimensions of First Nations art as a total cultural expression
- give examples of the diversity and functioning of the social, economic, and political systems of First Nations peoples in traditional and contemporary contexts
- describe the evolution of human rights and freedoms as they pertain to First Nations peoples

Some examples of curriculum integration include:

Visual Arts—comparing the artistic styles of two or more First Nations cultures

English Language Arts—analysing portrayals and images of First Nations peoples in various works of literature

Home Economics—identifying forms of food, clothing, and shelter in past and contemporary First Nations cultures

Technology Education—describing the sophistication of traditional First Nations technologies (e.g., bentwood or kerfed boxes, weaving, fishing gear)

Physical Education—participating in and developing an appreciation for First Nations games and dances

This summary is derived from *First Nations Studies: Curriculum Assessment Framework (Primary Through Graduation)*, Aboriginal Education Branch, 1992, and *B.C. First Nations Studies 12 Curriculum*, Aboriginal Education Branch, 1994.

GENDER EQUITY

Gender-equitable education involves the inclusion of the experiences, perceptions, and perspectives of girls and women, as well as boys and men, in all aspects of education. It will initially focus on girls in order to redress historical inequities. Generally, the inclusive strategies, which promote the participation of girls, also reach boys who are excluded by more traditional teaching styles and curriculum content.

Principles of Gender Equity in Education

- All students have the right to a learning environment that is gender equitable.
- All education programs and career decisions should be based on a student's interest and ability, regardless of gender.
- Gender equity incorporates a consideration of social class, culture, ethnicity, religion, sexual orientation, and age.
- Gender equity requires sensitivity, determination, commitment, and vigilance over time.
- The foundation of gender equity is co-operation and collaboration among students, educators, education organizations, families, and members of communities.

General Strategies for Gender-Equitable Teaching

- Be committed to learning about and practising equitable teaching.

- Use gender-specific terms to market opportunities—for example, if a technology fair has been designed to appeal to girls, mention girls clearly and specifically. Many girls assume that gender-neutral language in non-traditional fields means boys.
- Modify content, teaching style, and assessment practices to make non-traditional subjects more relevant and interesting for female and male students.
- Highlight the social aspects and usefulness of activities, skills, and knowledge.
- Comments received from female students suggest that they particularly enjoy integrative thinking; understanding context as well as facts; and exploring social, moral, and environmental impacts of decisions.
- When establishing relevance of material, consider the different interests and life experiences that girls and boys may have.
- Choose a variety of instructional strategies such as co-operative and collaborative work in small groups, opportunities for safe risk taking, hands-on work, and opportunities to integrate knowledge and skills (e.g., science and communication).
- Provide specific strategies, special opportunities, and resources to encourage students to excel in areas of study in which they are typically under-represented.
- Design lessons to explore many perspectives and to use different sources of information; refer to female and male experts.
- Manage competitiveness in the classroom, particularly in areas in which male students typically excel.
- Watch for biasses (e.g., in behaviour or learning resources) and teach students strategies to recognize and work to eliminate inequities they observe.

- Be aware of accepted gender-bias practices in physical activity (e.g., in team sport, funding for athletes, and choices in physical education programs).
- Do not assume that all students are heterosexual.
- Share information and build a network of colleagues with a strong commitment to equity.
- Model non-biassed behaviour: use inclusive, parallel, or gender-sensitive language; question and coach male and female students with the same frequency, specificity, and depth; allow quiet students sufficient time to respond to questions.
- Have colleagues familiar with common gender biasses observe your teaching and discuss any potential bias they may observe.
- Be consistent over time.

This summary is derived from the preliminary *Report of the Gender Equity Advisory Committee,* received by the Ministry of Education in February 1994, and from a review of related material.

INFORMATION TECHNOLOGY

Information technology is the use of tools and electronic devices that allow us to create, explore, transform, and express information.

Value of Integrating Information Technology

As Canada moves from an agricultural and industrial economy to the information age, students must develop new knowledge, skills, and attitudes. The information technology curriculum has been developed to be integrated into all new curricula to ensure that students know how to use computers and gain the technological literacy demanded in the workplace.

In learning about information technology, students acquire skills in information analysis and evaluation, word processing,

database analysis, information management, graphics, and multimedia applications. Students also identify ethical and social issues arising from the use of information technology.

With information technology integrated into the curriculum, students will be expected to:

- demonstrate basic skills in handling information technology tools
- demonstrate an understanding of information technology structure and concepts
- relate information technology to personal and social issues
- define a problem and develop strategies for solving it
- apply search criteria to locate or send information
- transfer information from external sources
- evaluate information for authenticity and relevance
- arrange information in different patterns to create new meaning
- modify, revise, and transform information
- apply principles of design affecting appearance of information
- deliver a message to an audience using information technology

The curriculum organizers are:

- *Foundations*—the basic physical skills, and intellectual and personal understandings required to use information technology, as well as self-directed learning skills and socially responsible attitudes

- *Process*—allows students to select, organize, and modify information to solve problems

- *Presentation*—provides students with an understanding of how to communicate ideas effectively using a variety of information technology tools

This information is derived from the *Information Technology K to 12 curriculum.*

MEDIA EDUCATION

Media education is a multidisciplinary and interdisciplinary approach to the study of media. Media education deals with key media concepts and focusses on broad issues such as the history and role of media in different societies and the social, political, economic, and cultural issues related to the media. Instead of addressing the concepts in depth, as one would in media studies, media education deals with most of the central media concepts as they relate to a variety of subjects.

Value of Integrating Media Education

Popular music, television, film, radio, magazines, computer games, and information services—all supplying media messages—are pervasive in the lives of students today. Media education develops students' abilities to think critically and independently about issues that affect them. Media education encourages students to identify and examine the values contained in media messages. It also cultivates the understanding that these messages are produced by others to inform, persuade, and entertain for a variety of purposes. Media education helps students understand the distortions that may result from the use of particular media practices and techniques. All curriculum areas provide learning opportunities for media education. It is not taught as a separate curriculum.

The key themes of media education are:

- media products (purpose, values, representation, codes, conventions, characteristics, production)
- audience interpretation and influence (interpretation, influence of media on audience, influence of audience on media)
- media and society (control, scope)

Examples of curriculum integration include:

English Language Arts—critiquing advertising and examining points of view

Visual Arts—analysing the appeal of an image by age, gender, status, and other characteristics of the target audience

Personal Planning—examining the influence of the media on body concepts and healthy lifestyle choices

Drama—critically viewing professional and amateur theatre productions, dramatic films, and television programs to identify purpose

Social Studies—comparing the depiction of First Nations in the media over time

This summary is derived from *A Cross-Curricular Planning Guide for Media Education*, prepared by the Canadian Association for Media Education for the Curriculum Branch in 1994.

MULTICULTURALISM AND ANTI-RACISM EDUCATION

Multiculturalism Education

Multiculturalism education stresses the promotion of understanding, respect, and acceptance of cultural diversity within our society.

Multiculturalism education involves:

- recognizing that everyone belongs to a cultural group
- accepting and appreciating cultural diversity as a positive feature of our society
- affirming that all ethnocultural groups are equal within our society

- understanding that multicultural education is for all students
- recognizing that similarities across cultures are much greater than differences and that cultural pluralism is a positive aspect in our society
- affirming and enhancing self-esteem through pride in heritage, and providing opportunities for individuals to appreciate the cultural heritages of others
- promoting cross-cultural understanding, citizenship, and racial harmony

Anti-Racism Education

Anti-racism education promotes the elimination of racism through identifying and changing institutional policies and practices as well as identifying individual attitudes and behaviours that contribute to racism.

Anti-racism education involves:

- proposing the need to reflect about one's own attitudes on race and anti-racism
- understanding what causes racism in order to achieve equality
- identifying and addressing racism at both the personal and institutional level
- acknowledging the need to take individual responsibility for eliminating racism
- working toward removing systemic barriers that marginalize groups of people
- providing opportunities for individuals to take action to eliminate all forms of racism, including stereotypes, prejudice, and discrimination

Value of Integrating Multiculturalism and Anti-Racism Education

Multiculturalism and anti-racism education provides learning experiences that promote strength through diversity and social, economic, political, and cultural equity. Multiculturalism and anti-racism education gives students learning experiences that are intended to enhance their social, emotional,

aesthetic, artistic, physical, and intellectual development. It provides learners with the tools of social literacy and skills for effective cross-cultural interaction with diverse cultures. It also recognizes the importance of collaboration between students, parents, educators, and communities working toward social justice in the education system.

The key goals of multiculturalism and anti-racism education are:

- to enhance understanding of and respect for cultural diversity
- to increase creative intercultural communication in a pluralistic society
- to provide equal opportunities for educational achievement by all learners, regardless of culture, national origin, religion, or social class
- to develop self-worth, respect for oneself and others, and social responsibility
- to combat and eliminate stereotyping, prejudice, discrimination, and other forms of racism
- to include the experiences of all students in school curricula

Examples of curriculum integration include:

Fine Arts—identifying ways in which the fine arts portray cultural experiences

Humanities—identifying similarities and differences within cultural groups' lifestyles, histories, values, and beliefs

Mathematics or Science—recognizing that individuals and cultural groups have used both diverse and common methods to compute, to record numerical facts, and to measure

Physical Education—developing an appreciation of games and dances from diverse cultural groups

This summary is derived from *Multicultural and Anti-Racism Education—Planning Guide (Draft)*, developed by the Social Equity Branch in 1994.

SCIENCE-TECHNOLOGY-SOCIETY

Science-Technology-Society (STS) addresses our understanding of inventions and discoveries and of how science and technology affect the well-being of individuals and our global society.

The study of STS includes:

- the contributions of technology to scientific knowledge and vice versa
- the notion that science and technology are expressions of history, culture, and a range of personal factors
- the processes of science and technology such as experimentation, innovation, and invention
- the development of a conscious awareness of ethics, choices, and participation in science and technology

Value of Integrating STS

The aim of STS is to enable learners to investigate, analyse, understand, and experience the dynamic interconnection of science, technology, and human and natural systems.

The study of STS in a variety of subjects gives students opportunities to:

- discover knowledge and develop skills to foster critical and responsive attitudes toward innovation
- apply tools, processes, and strategies for actively challenging emerging issues
- identify and consider the evolution of scientific discovery, technological change, and human understanding over time, in the context of many societal and individual factors
- develop a conscious awareness of personal values, decisions, and responsible actions about science and technology
- explore scientific processes and technological solutions
- contribute to responsible and creative solutions using science and technology

The organizing principles of STS are: Human and Natural Systems, Inventions and Discoveries, Tools and Processes, Society and Change. Each organizer may be developed through a variety of contexts, such as the economy, environment, ethics, social structures, culture, politics, and education. Each context provides a unique perspective for exploring the critical relationships that exist and the challenges we face as individuals and as a global society.

Examples of curriculum integration include:

Visual Arts—recognizing that demands generated by visual artists have led to the development of new technologies and processes (e.g., new permanent pigments, fritted glazes, drawing instruments)

English Language Arts—analysing the recent influence of technologies on listening, speaking, and writing (e.g., CDs, voice mail, computer-generated speech)

Physical Education—studying how technology has affected our understanding of the relationship between activity and well-being

This summary is derived from *Science-Technology-Society—A Conceptual Framework*, Curriculum Branch, 1994.

SPECIAL NEEDS

Students with special needs have disabilities of an intellectual, physical, sensory, emotional, or behavioural nature; or have learning disabilities; or have exceptional gifts or talents.

All students can benefit from an inclusive learning environment that is enriched by the diversity of the people within it. Opportunities for success are enhanced when provincial learning outcomes and resources are developed with regard for a wide range of student needs, learning styles, and modes of expression.

Educators can assist in creating more inclusive learning environments by introducing the following:

- activities that focus on development and mastery of foundational skills (basic literacy)
- a range of co-operative learning activities and experiences in the school and community, including the application of practical, hands-on skills in a variety of settings
- references to specialized learning resources, equipment, and technology
- ways to accommodate special needs (e.g., incorporating adaptations and extensions to content, process, product, pacing, and learning environment; suggesting alternative methodologies or strategies; making references to special services)
- a variety of ways, other than through paper-and-pencil tasks, for students to demonstrate learning (e.g., dramatizing events to demonstrate understanding of a poem, recording observations in science by drawing or by composing and performing a music piece)
- promotion of the capabilities and contributions of children and adults with special needs
- participation in physical activity

All students can work toward achievement of the provincial learning outcomes. Many students with special needs learn what all students are expected to learn. In some cases the student's needs and abilities require that education programs be adapted or modified. A student's program may include regular instruction in some subjects, modified instruction in others, and adapted instruction in still others. Adaptations and modifications are specified in the student's Individual Education Plan (IEP).

Adapted Programs

An adapted program addresses the learning outcomes of the prescribed curriculum but provides adaptations so the student can participate in the program. These adaptations may include alternative formats for resources (e.g., Braille, books-on-tape), instructional strategies (e.g., use of interpreters, visual cues, learning aids), and assessment procedures (e.g., oral exams, additional time). Adaptations may also be made in areas such as skill sequence, pacing, methodology, materials, technology, equipment, services, and setting. Students on adapted programs are assessed using the curriculum standards and can receive full credit.

Modified Programs

A modified program has learning outcomes that are substantially different from the prescribed curriculum and specifically selected to meet the student's special needs. For example, a Grade 5 student in language arts may be working on recognizing common signs and using the telephone, or a secondary student could be mapping the key features of the main street between school and home. A student on a modified program is assessed in relation to the goals and objectives established in the student's IEP.

Ministry Resources for Teachers of Students with Special Needs

The following publications are currently available from the Learning Resources Branch or are under development and will be available soon:

The Universal Playground: A Planning Guide (Ministry of Education, 1991, FCG 129)

Hard of Hearing and Deaf Students—A Resource Guide to Support Classroom Teachers (Ministry of Education, 1994, RB0033)

Special Education Services—A Manual of Policies, Procedures and Guidelines (Ministry of Education, 1995)

Individual Education Planning for Students with Special Needs: A Resource Guide to Support Teachers (Ministry of Education, 1995)

Students with Visual Impairments—A Resource Guide to Support Classroom Teachers (Ministry of Education, 1995)

Gifted Students—A Resource Guide to Support Classroom Teachers (Ministry of Education, 1995)

Students with Intellectual Disabilities: A Resource Guide to Support Teachers (Ministry of Education, 1995)

Teaching for Student Differences—A Resource Guide to Support Classroom Teachers (Ministry of Education, 1996)

Resource Handbook for Adapted Curriculum Software (Ministry of Education, 1995)

Awareness of Chronic Health Conditions: What the Teacher Needs to Know (Ministry of Education, 1995)

This summary is derived from the *Handbook for Curriculum Developers*, February 1994, and *Special Education Services—A Manual of Policies, Procedures and Guidelines*, June 1995.

APPENDIX D

Assessment and Evaluation

Prescribed learning outcomes, expressed in measurable terms, provide the basis for the development of learning activities and assessment and evaluation strategies. After a general discussion of assessment and evaluation, this appendix uses sample evaluation plans to show how activities, assessment, and evaluation might come together in a particular information technology program.

ASSESSMENT AND EVALUATION

Assessment is the systematic gathering of information about what students know, are able to do, and are working toward. Assessment methods and tools include: observation, student self-assessments, daily practice assignments, quizzes, samples of student work, pencil-and-paper tests, holistic rating scales, projects, oral and written reports, performance reviews, and portfolio assessments.

Student performance is evaluated from the information collected through assessment activities. Teachers use their insight, knowledge about learning, and experience with students, along with the specific criteria they establish, to make judgments about student performance in relation to prescribed learning outcomes.

Students benefit most when evaluation is provided on a regular, ongoing basis. When evaluation is seen as an opportunity to promote learning rather than as a final judgment, it shows learners their strengths and suggests how they can develop further. Students can use this information to redirect efforts, make plans, and establish future learning goals.

Evaluation may take different forms, depending on the purpose.

- Criterion-referenced evaluation should be used to evaluate student performance in classrooms. It is referenced to criteria based on learning outcomes described in the provincial curriculum. The criteria reflect a student's performance based on specific learning activities. When a student's program is substantially modified, evaluation may be referenced to individual goals. These modifications are recorded in an Individual Education Plan (IEP).

- Norm-referenced evaluation is used for large-scale system assessments; it is not to be used for classroom assessment. A classroom does not provide a large enough reference group for a norm-referenced evaluation system. Norm-referenced evaluation compares student achievement to that of others rather than comparing how well a student meets the criteria of a specified set of learning outcomes.

CRITERION-REFERENCED EVALUATION

In criterion-referenced evaluation, a student's performance is compared to established criteria rather than to the performance of other students. Evaluation referenced to prescribed curriculum requires that criteria are established based on the learning outcomes listed under the curriculum organizers for Information Technology K to 7.

Criteria are the basis of evaluating student progress; they identify the critical aspects of a performance or a product that describe in specific terms what is involved in meeting the learning outcomes. Criteria can be used to evaluate student performance in relation to learning outcomes. For example,

weighting criteria, using rating scales, or performance rubrics (reference sets) are three ways that student performance can be evaluated using criteria.

Samples of student performance should reflect learning outcomes and identified criteria. The samples clarify and make explicit the link between evaluation and learning outcomes, criteria, and assessment. Where a student's performance is not a product, and therefore not reproducible, a description of the performance sample should be provided.

Criterion-referenced evaluation may be based on these steps:

Step 1 ▶ Identify the expected learning outcomes (as stated in this Integrated Resource Package).

Step 2 ▶ Identify the key objectives for instruction and learning.

Step 3 ▶ Establish and set criteria. Involve students, when appropriate, in establishing criteria.

Step 4 ▶ Plan learning activities that will help students gain the knowledge or skills outlined in the criteria.

Step 5 ▶ Prior to the learning activity, inform students of the criteria against which their work will be evaluated.

Step 6 ▶ Provide examples of the desired levels of performance.

Step 7 ▶ Implement the learning activities.

Step 8 ▶ Use various assessment methods based on the particular assignment and student.

Step 9 ▶ Review the assessment data and evaluate each student's level of performance or quality of work in relation to criteria.

Step 10 ▶ Where appropriate or necessary, assign a letter grade that indicates how well the criteria are met.

Step 11 ▶ Report the results of the evaluations to students and parents.

APPENDIX D

Assessment and Evaluation Samples

The samples in this section show how a teacher might link criteria to learning outcomes. Each sample is based on prescribed learning outcomes taken from one or more organizers. The samples provide background information to explain the classroom context; suggested instruction tasks and strategies; the tools and methods used to gather assessment information; and the criteria used to evaluate student performance.

HOW THE SAMPLES ARE ORGANIZED

There are four parts to each sample:

- identification of the prescribed learning outcomes
- planning for assessment and evaluation
- defining the criteria
- assessing and evaluating student performance

Prescribed Learning Outcomes

This part identifies the organizer or organizers and the specific prescribed learning outcomes selected for the sample.

Planning for Assessment and Evaluation

This part outlines:

- background information to explain the classroom context
- instructional tasks
- the opportunities that students were given to practise learning
- the feedback and support that was offered students by the teacher
- the ways in which the teacher prepared students for the assessment

Defining the Criteria

This part illustrates the specific criteria (based on prescribed learning outcomes), the assessment task, and various reference sets.

Assessing and Evaluating Student Performance

This part includes:

- assessment tasks or activities
- the support that the teacher offered students
- tools and methods used to gather the assessment information
- the way the criteria were used to evaluate the student performance

EVALUATION SAMPLES

The samples on the following pages illustrate how a teacher might apply criterion-referenced evaluation in Information Technology K to 7.

- Sample 1: Grades K to 1
  Plants
  (Page D-8)

- Sample 2: Grades 2 to 3
  Quilting
  (Page D-11)

- Sample 3: Grade 4
  Picture Book
  (Page D-15)

- Sample 4: Grade 5
  Diseases that Affect Body Systems
  (Page D-19)

- Sample 5: Grade 6
  Travel Brochure
  (Page D-22)

- Sample 6: Grade 7
  Hypertext Presentation of a Research Project
  (Page D-27)

▼ SAMPLE 1: GRADES K TO 1

Topic: *Plants*

Prescribed Learning Outcomes:

Foundations

It is expected that students will:

- demonstrate a willingness to use information technology tools
- demonstrate an ability to use a graphics program
- enter information on a computer and print it
- demonstrate a willingness to work co-operatively when using information technology tools

Process

It is expected that students will:

- create and modify electronic documents
- use information technology tools in a variety of ways to create new meaning

Presentation

It is expected that students will:

- present ideas using electronic documents

PLANNING FOR ASSESSMENT AND EVALUATION

The class was studying plant and animal characteristics in science. They completed a number of activities, such as observing seed germination, charting plant growth, and comparing a variety of plant types. As part of the culminating activities for the unit, they used a graphics program to create representations of their favourite plant.

- Students were introduced to a graphics program and worked with partners to explore its features. They learned to choose drawing tools (e.g., pencil, paintbrush, eraser) from the toolbox, and practised using the mouse to create drawings. After completing a picture, students used menu or button commands to print and save their work to a disk.

- In the next few lessons, students became familiar with the lines and shapes in the toolbox. They learned to resize these elements and move them within the document.

- Working with partners, students used a graphics program to draw and label their favourite plant. They were encouraged to create captions for their pictures and worked with buddies to add text to their documents.

DEFINING THE CRITERIA

Using a Computer

To what extent does the student:

- approach the computer with confidence and a positive attitude
- use software to successfully communicate ideas
- save and print files

Working Co-operatively with a Partner

To what extent does the student:

- share the keyboard and mouse
- contribute ideas
- listen to partner's ideas
- encourage partner
- persevere with the task

Using Graphics Software

To what extent is the student able to:

- open and close files
- save and retrieve files
- use appropriate terminology
- choose and use appropriate tools from the software program
- integrate text

ASSESSING AND EVALUATING STUDENT PERFORMANCE

Using a Computer/Working Co-operatively with a Partner

While students worked on their pictures, the teacher used a checklist to assess their willingness to use the computer and their abilities to work co-operatively with their partners. Students used a similar checklist as a self-assessment tool.

Using Graphics Software

To assess students' abilities to use graphics software effectively, a three-point scale was developed.

Using a Computer/Working Co-operatively With a Partner

Criteria	🙂	😐	🙁
• looks forward to using the computer			
• approaches the computer with confidence			
• shares mouse and keyboard fairly with partner			
• listens to partner's ideas			
• encourages partner			
• contributes ideas			
• perseveres with the task			

Using Graphics Software

Rating	Criteria
Capable	• opens and closes files with ease • saves and retrieves files successfully • is aware of and uses tools (e.g., shapes, patterns, lasso) effectively • integrates text (e.g., title, labels) to clarify drawing
Developing	• opens and closes files with ease • saves and retrieves files successfully with little support • is aware of and uses some tools effectively • asks for assistance in integrating text
Beginning	• requires assistance when opening and closing files • saves and retrieves files with assistance • is unaware of tools and their use to assist or enhance drawing • uses little or no text

▼ SMALL 2: GRADES 2 TO 3

Topic: *Quilting*

Prescribed Learning Outcomes:

Foundations

It is expected that students will:

- enter, save, and retrieve information using a computer or other information technology tool
- use word-processing and graphics software to present ideas
- demonstrate an understanding of data-storage practices
- use appropriate terminology when using information technology tools
- demonstrate a willingness to work co-operatively when using information technology tools

Process

It is expected that students will:

- demonstrate an understanding that tasks on a computer can be done in a variety of ways
- identify suitable information technology tools to express ideas or concepts
- create and modify electronic documents that express ideas or concepts

Presentation

It is expected that students will:

- present ideas using a variety of information technology tools

PLANNING FOR ASSESSMENT AND EVALUATION

The class was investigating patterns and relationships in math and in art. Students observed and responded to patterns found at home and in the classroom (e.g., wrapping paper, fabric, wallpaper). The teacher used several lessons designed to help students explore geometric shapes (e.g., square, trapezoid, triangle). Students had an opportunity to create the shapes using a variety of materials (e.g., drawing tools, Plasticine, straws, cutouts, pipe cleaners, beads). In math, students created and completed number, shape, and colour patterns.

- The teacher introduced the students to geometric quilts in literature and pictures, and by showing examples of authentic quilts. In class discussions, students named the shapes used and noticed the way shapes and colours were organized.

- A graphics program was provided for the students to explore, and they learned to use the shapes in the tool bar to create patterns on-screen. Students practised saving their work and retrieving it for subsequent lessons. They also printed their work and spent time sharing their ideas with peers.

- The teacher asked the students to work with partners to create a quilt square with a geometric pattern using a graphics program. With teacher guidance, students photocopied their printed work onto a transparency so each group could present its geometric pattern to the class. They used markers to show a colour pattern.

DEFINING THE CRITERIA

Creating a Pattern

To what extent are students able to:

- create a pattern
- build on or change a pattern

Using a Graphics Program

To what extent is the student able to:

- open and close files
- save and retrieve files
- use appropriate terminology
- choose and use appropriate tools from the software program
- integrate text

Working Co-operatively in a Group

To what extent does the student:

- participate willingly and constructively in the group
- initiate, develop, and sustain group interactions
- contribute ideas and build on the ideas of others

ASSESSING AND EVALUATING STUDENT PERFORMANCE

Creating a Pattern

Before starting the task, the teacher and students developed a list of criteria for the quilt square. Students used a chart to assess their work.

Using a Graphics Program

While students were working on their projects, the teacher used a checklist to assess their abilities to effectively use a graphics program.

Creating a Pattern

Criteria	☺	😐	☹
• We used geometric shapes only.			
• We created a repeating pattern.			
• We used the whole page.			
• We changed our shapes and pattern to make it more interesting.			

Using a Graphics Program

Criteria	With Guidance	With Minimal Support	With Confidence
• opens and closes files			
• saves and retrieves files			
• is aware of and uses tools (e.g., shapes, patterns, lasso)			
• uses correct terminology			

Working Co-operatively in a Group

The teacher used two sections ("Social" and "Ideas") from the reference set *Evaluating Oral Communication Across Curriculum* to assess the way individual students contributed to their groups. The teacher collected information about student performance by observing students as they worked and by collecting their group work self-evaluations.

Working Co-operatively in a Group

Rating	Social Interaction	Ideas Development
5	**▼ shapes the way the group works** The student is able to initiate, develop, and sustain interactions so the group is able to work together harmoniously. The student frequently encourages the efforts of other group members, often asking them questions. The student is comfortable providing leadership when needed, but doesn't feel compelled to do so. In addition, the student attempts to resolve conflicts among other group members, is able to let go of personal ideas to further group progress, and approaches the task with obvious enjoyment, often accompanied by humour.	**▼ develops and extends the group's work** The student participates in all phases of the activity, although contributions may vary according to levels of relevant information or experience. The student provides constructive feedback, offers predictions and hypotheses, and poses intriguing questions. The student is able to offer clarification, elaboration, or explanation as needed, and builds upon—and in some cases synthesizes—the ideas others offer. The student may use comparisons, analogies, examples, or humour to illustrate or emphasize a point.
4	**▼ comfortable and well-developed** The student is comfortable working in a group and contributes to the social dynamics. The student may take a leadership role in organizing how the group will interact. The student takes responsibility for group processes by facilitating and extending discussions and by persevering beyond initial solutions. The student is responsive to other group members and their ideas. While the student tends to interact effectively, he or she may not have much effect on how the other group members work with each other.	**▼ flexible and well-developed** The student contributes ideas, experience, and information that the group is able to use. The student may help to develop ideas by providing details, examples, reasons, and explanations. The student often makes suggestions, asks questions, or adjusts personal thinking after listening to others. The student may also rephrase, paraphrase, or pose questions as a way of challenging or building on ideas from other group members. The student is able to make relevant connections to other situations or ideas. *.../continued*

Working Co-operatively in a Group (continued)

Rating	Social Interaction	Ideas Development
3	▼ **socially engaged** The student takes part in the group discussion and follows the basic rules for working with others: taking turns, listening while others speak, and sometimes offering recognition or support. The student may ask for or offer needed information, is willing to accept group decisions, and may share some responsibility for how the group works.	▼ **ideas are appropriate and related to the task** The student contributes some suggestions and ideas to the group. The student responds and sometimes adds to suggestions others make, participates in brainstorming activities, shows interest in others' ideas, and adds information. The student may not defend personal ideas and tends to give in quickly when someone disagrees.
2	▼ **inconsistent social interactions** The student may begin to show some awareness of the responsibilities of contributing to a group, sometimes recognizes and responds to the needs and ideas of others, and may show appreciation or support. At other times, the student may have difficulty taking turns or accepting suggestions from other students. The student may remain uncommitted, focussing on personal needs rather than the group's task.	▼ **ideas often disconnected** The student contributes ideas that address the task, but these may be unconnected to the ideas of others. The student may offer several suggestions but appears unable to elaborate, explain, or clarify ideas. The student often relates the activity to personal experiences by telling stories. The student may think out loud, judge others' ideas quickly, or drift off-task easily.
1	▼ **largely unaware of others' needs** The student may not understand how personal behaviour affects others and may be disruptive, aggressive, uninvolved, or easily frustrated.	▼ **limited contribution of ideas** The student may remain silent throughout the activity, contribute one idea repeatedly, or recount personal experiences unrelated to the group task. The student may not acknowledge or add to the contributions of other group members, but may respond to direct questions or other prompts from adults.

▼ SMALL 3: GRADE 4

Topic: *Picture Book*

Prescribed Learning Outcomes:

Foundations

It is expected that students will:

- enter, save, and retrieve information using a variety of information technology tools and software
- use suitable keyboard techniques to enter information into a computer
- use a variety of software to solve problems
- demonstrate a willingness to work co-operatively when using information technology tools

Process

It is expected that students will:

- use information technology tools to create, modify, and explore documents that express ideas or concepts

Presentation

It is expected that students will:

- apply information technology to present information to intended audiences
- create multimedia documents

PLANNING FOR ASSESSMENT AND EVALUATION

- The teacher provided students with opportunities to investigate picture books in detail by listening, reading, viewing, and discussing them. The class explored the elements of story structure: setting (where does the story take place?); motive (what does the character want or need?); action (what happens to the character?); resolution (how is the problem solved?);

and theme (what is the story trying to tell us?). Their responses were recorded on chart paper under the appropriate headings.

- With partners, students read a picture book and filled in a chart using headings similar to those developed in the class work. They also created illustrations to reflect their favourite part of the book. Each group shared its findings with the class.

- Students chose several books to investigate, making personal responses in their reading logs. Focus questions included:
  - Why did you choose this book?
  - How did the story capture your attention?
  - How did the pictures enhance the story?

- Using the story structure headings, students created plans for their own picture books.

- Students spent several lessons becoming familiar with the features of graphics and word-processing programs. They explored several options for collecting images for illustrating their stories (e.g., clip art, scanned images, digital camera images, original images).

- When students were comfortable integrating text with graphics, they created original picture books using the computer.

- Students worked with the teacher to develop criteria for assessing their abilities in a variety of areas.

DEFINING THE CRITERIA

Using Computer Software

To what extent is the student able to:

- open, close, and save files
- use basic features of a word-processing program effectively
- use basic features of a graphics program effectively
- integrate text and graphics to create an electronic document
- use correct terminology

Working Co-operatively with a Partner

To what extent does the student:

- share the keyboard and mouse
- contribute ideas
- listen to partner's ideas
- encourage partner
- persevere with the task

Keyboarding Skills

To what extent does the student:

- use correct posture
- keep eyes on the copy
- keep fingers on home-row keys
- use correct finger reaches

ASSESSING AND EVALUATING STUDENT PERFORMANCE

Using Computer Software

While students worked on their picture books, the teacher noted their abilities to use the features of basic text and graphics programs. These observations and the students' final products were assessed using a performance scale.

Working Co-operatively with a Partner

A checklist was used to record observations and assess students' abilities to work co-operatively with their partners.

Keyboarding Skills

A checklist was used to record observations and assess students' keyboarding skills. Both the keyboarding and partners checklists were also used for peer and self-assessment.

Using Computer Software

Rating	Criteria
Capable	• opens, closes, and saves files with ease • effectively uses word-processing program features (e.g., font, font size and style, spell checker, thesaurus) • effectively uses basic features of a graphics program (e.g., shapes, patterns, gradients, lasso) • attempts to use more advanced features (e.g., resize, rotate, group and ungroup, layer) • positions and resizes elements (text and graphics) to achieve an effective layout • successfully copies and pastes images (clip art, scanned images, digital camera images, original images) to another document • uses correct terminology (e.g., *copy, paste, capture, handles*)
Developing	• opens, closes, and saves files with ease • is able to use most features of a word-processing program • effectively uses basic features of a graphics program (e.g., shapes, patterns, gradients, lasso) • asks for assistance when integrating text with graphics • copies and pastes images to another document with little support • uses some correct terminology
Beginning	• able to open, close, and save files • requires assistance to use features of a word-processing program • unaware of tools and their use to assist or enhance drawing • creates original drawings, but is unable to integrate graphics from another document • uses little correct terminology

Working Co-operatively with a Partner

Criteria	☺	😐	☹
• shares mouse and keyboard fairly with partner			
• listens to partner's ideas			
• encourages partner			
• contributes ideas			
• perseveres with the task			

Keyboarding Skills

Criteria	Consistently	Sometimes	Rarely
• uses correct posture			
• keeps eyes on copy			
• keeps fingers on home-row keys			
• uses correct finger reaches			

▼ SAMPLE 4: GRADE 5

Topic: *Diseases That Affect Body Systems*

Prescribed Learning Outcomes:

Foundations

It is expected that students will:

- manipulate electronic documents using a variety of tools
- access on-line resources using telecommunications tools
- demonstrate a willingness to be self-reliant when using information technology tools

Process

It is expected that students will:

- collect and record information electronically using primary and secondary sources of information
- evaluate information retrieved from electronic sources

Presentation

It is expected that students will:

- create and present multimedia documents
- use a variety of information technology tools in presentations

PLANNING FOR ASSESSMENT AND EVALUATION

Students were investigating respiratory, circulatory, and sensory body systems in science. They completed several introductory activities involving the basic structure and function of the organs, and compared human and animal systems. As one of the culminating activities, students researched a disease that could affect one of the systems.

- Students were introduced to a variety of information sources, including CD-ROMs, the Internet, the World Wide Web, and an on-line library catalogue. They spent several lessons using these electronic sources to search for specific information. The teacher helped students use keywords to streamline their searches. Students learned how to save information to a disk and how to retrieve it for later use.

- Throughout the lessons, the teacher provided support. Students kept a journal of their explorations, commenting on what they had learned and what they would work on next time.

- The teacher asked students to complete this assessment task:

  Research a disease that affects the respiratory, circulatory, or sensory system using information technology tools (e.g., CD-ROMs, on-line catalogues, databases, the Internet). Create a multimedia presentation that communicates your understanding of the nature of that disease. This should include prevention, surgical and medical interventions, and rehabilitation options. The multimedia presentation must include graphics, and may also include sound, animation, or both.

- Students created and submitted a presentation plan on a disk.

DEFINING THE CRITERIA

Accessing Electronic Information

To what extent does the student:

- use appropriate electronic-information sources
- use key words to search for information
- access on-line help when needed
- download and save electronic information to a disk
- evaluate electronic data for relevance, timeliness, and bias

Manipulating Electronic Data

To what extent does the student:

- open and close files with ease
- effectively use program features (e.g., editing, formatting, drawing tools)
- successfully save files to disk or hard drive
- access on-line help functions when needed

Multimedia Presentations

To what extent is the student able to:

- use information technology tools effectively in a presentation
- use visual elements for emphasis
- present ideas in a logical order
- use body language and voice effectively

ASSESSING AND EVALUATING STUDENT PERFORMANCE

Accessing Electronic Information

The teacher created a checklist to assess students' abilities to access a variety of electronic information sources and to evaluate, collect, and record data. The students used the same checklist as a self-assessment tool.

Manipulating Electronic Data

To assess students' abilities to manipulate an electronic document, the teacher observed students as they worked and recorded information on a checklist.

Multimedia Presentations

The teacher used a performance scale to assess the multimedia presentations. Students were given the performance scale at the beginning of the project to help them plan their presentation. This scale was also used during the presentations for peer assessment.

Accessing Electronic Information

Criteria	Beginning	Developing	Confident
• uses appropriate electronic-information sources			
• uses key words to search for information			
• accesses on-line help when needed			
• downloads and saves electronic information to a disk			
• evaluates electronic data for relevance, timeliness, and bias			

Manipulating Electronic Data

Criteria	Rarely	Sometimes	Usually	Always
• opens and closes files with ease				
• effectively uses program features (e.g., editing, formatting, drawing tools)				
• successfully saves files to disk or hard drive				
• accesses on-line help functions				

Multimedia Presentations

Rating	Criteria
Outstanding	• several types of information technology tools were effectively used (e.g., overhead projector, computer, TV and VCR, tape-recorder) • visuals (e.g., pictures, charts, slides, graphs, models) were included to emphasize key ideas • ideas were presented in a logical order • body language and voice were used effectively
Good	• a variety of information technology tools were used • some visuals were included to emphasize key ideas • ideas were presented in a logical order • body language and voice were used effectively
Satisfactory	• some information technology tools were used • at least one visual was included for emphasis • ideas were presented in a logical order • body language, voice, or both were used effectively
Minimally Acceptable	• few information technology tools were used • few visuals were included • ideas were difficult to follow • body language and voice were not considered

▼ SAMPLE 5: GRADE 6

Topic: *Travel Brochure*

Prescribed Learning Outcomes:

Foundations

It is expected that students will:

- work co-operatively using information technology tools
- access information using a variety of on-line information tools
- identify and apply a variety of software based on specific needs

Process

It is expected that students will:

- gather information from available resources to solve problems using information technology tools
- use a variety of information technology tools to create, modify, explore, and present electronic documents that express ideas or concepts

Presentation

It is expected that students will:

- demonstrate an understanding of how information technology tools can be used to influence presentations
- create and present multimedia documents for intended audiences

PLANNING FOR ASSESSMENT AND EVALUATION

Students had investigated and researched several cultures in social studies as a class, and the teacher prepared lessons to guide them in an independent exploration.

- Working in small groups, students surveyed their school peers to determine which countries they found interesting and what questions they would want answers to before visiting those countries. Students used the survey data to select a country to investigate and to guide their research. Class discussions were held, and relevant research questions were chosen for each group.

- The class decided that oral presentations and travel brochures would be created by each group to represent students' knowledge. Working with the teacher, students developed assessment criteria for the presentations and brochures. Before beginning their research, students were introduced to—and practised using— resources, including the Internet, CD-ROMs, on-line library catalogues, and local electronic bulletin boards. They also became familiar with word-processing and graphics programs.

- Students spent several class sessions researching their countries, ensuring that the survey questions were answered. They had several opportunities to informally present their findings to the class and to receive feedback about the quality and quantity of relevant information presented. The effective use of presentation tools (e.g., overhead projector, TV and VCR, slides, film) was also discussed.

- Students were expected to develop a plan (task breakdown, timeline, list of possible information sources) for their brochure and presentation to be used in a pre- and post-presentation conference with the teacher.

- As students engaged in the activities, the teacher used checklists to record observations about the students' abilities to access a variety of information sources using on-line tools, and to demonstrate a willingness to work co-operatively. Conferences were also held to assess the effectiveness of the students' plans.

DEFINING THE CRITERIA

Travel Brochure

The teacher and students identified the following criteria for the brochure.

To what extent do the students:

- accurately enter data, using the spell checker for the final copy
- use the columns feature to create a realistic-looking brochure
- integrate graphics to enhance the document
- use program features to create an effective layout
- include relevant information for the intended audience
- include information technology tools in an oral presentation

Presentation

To what extent do the students:

- provide relevant and detailed information
- present information in a logical order
- effectively use information technology tools (e.g., overhead projector, TV and VCR, film, computer)

Working Co-operatively in a Group

To what extent does the student:

- participate willingly and constructively in the group
- initiate, develop, and sustain interactions in the group
- contribute ideas and build on the ideas of others

ASSESSING AND EVALUATING STUDENT PERFORMANCE

Travel Brochure

The teacher collected students' travel brochures and used the performance scale below to assess their abilities.

Travel Brochure

Rating	Criteria
Outstanding	• presents relevant and detailed information that reflects the guiding research questions developed earlier • includes evenly spaced columns positioned for clarity • successfully integrates a variety of relevant graphics from outside sources (e.g., scanned images, other documents, clip art, digital camera images) • effectively positions elements of the document (text and graphics) indicating the use of program features (e.g., rotate, resize, group and ungroup, layer) • is free of spelling errors (indicating use of spell checker)
Good	• presents relevant information that reflects some of the guiding research questions • includes evenly spaced columns • includes some relevant graphics • positions elements of the document (text and graphics) for clarity • is free of spelling errors (indicating use of spell checker)
Satisfactory	• includes a limited amount of relevant information that represents a few of the guiding research questions • does not use columns, but the text is evenly spaced and easy to follow • includes few graphics • pays little attention to the position of the elements (text and graphics) on the page • contains some spelling errors

Presentation

While students were presenting, their peers used a rating scale to guide their assessment of each presenter's ability to use information technology tools to meet the needs of the intended audience.

Presentation		
Topic: _____		
Presenters: _____		
Rate the presentation using this scale.		
Criteria	**Rating**	**Comments**
• provided relevant and detailed information		
• presented information in a logical order		
• effectively used information technology tools (e.g., overhead projector, TV and VCR, film, computer)		

Key: **0**—Not Evident
1—Minimally Acceptable
2—Satisfactory
3—Good
4—Very Good
5—Excellent

Complete the following sentences thoughtfully.

Three things I learned about the country and its culture are:
• _____
• _____
• _____

A question I still have is: _____
_____
_____

The presentation was useful to me in the following ways: _____
_____
_____

Working Co-operatively in a Group

The teacher collected information about students' abilities to work co-operatively by observing them as they worked. The teacher used two sections ("Social" and "Ideas") from the *Evaluating Oral Communication Across Curriculum* reference set to assess the way individual students contributed to their groups. (See the Working Co-operatively in a Group performance scale in Sample 2: *Quilting*.)

Topic: *Hypertext Presentation of a Research Project*

Prescribed Learning Outcomes:

Foundations

It is expected that students will:

- enter, save, modify, and retrieve information using a variety of software
- use appropriate keyboard techniques to enter information into a computer

Process

It is expected that students will:

- apply predetermined search criteria to locate and retrieve information using information technology tools
- analyse information retrieved from a variety of electronic sources

Presentation

It is expected that students will:

- synthesize information from a variety of electronic sources for their presentations
- apply the principles of good design when developing electronic documents
- develop interactive hypertext documents for presentation
- produce multimedia presentations

PLANNING FOR ASSESSMENT AND EVALUATION

- The teacher planned lessons to introduce students to the concept of organizing information. Students sorted and classified a series of word and picture cards on a specific topic. They used coloured yarn to show how these cards could be arranged into stacks and how the stacks themselves could be linked together. Students had the opportunity to organize several sets of cards on different topics and to share their strategies and processes with others. The students also created "table of contents" cards to serve as an overview to the stacks.

- Students spent several lessons exploring and creating stacks using a hypertext program. They were introduced to the home card, linking buttons, and special effects (e.g., fade, checkerboard screen, animation).

- The students learned how to collect pictures and sounds using information technology tools (e.g., camera, scanner, microphone) to enhance their presentations.

- Following guidelines discussed in class, the students created hypertext stacks and used a rating scale to evaluate their own work. They compared their self-assessment with the teacher's feedback, and used the results to modify their work.

DEFINING THE CRITERIA

Accessing Information

To what extent is the student able to:

- make use of a wide variety of information sources
- develop and apply search criteria
- evaluate information for relevance, bias, and timeliness

Hypertext Document

To what extent is the student able to:

- integrate text, graphics, and sound
- use special effects
- develop an effective main menu, home card, and linking buttons
- develop logical pathways

Keyboarding Skills

To what extent does the student:

- use correct posture
- keep eyes on the copy
- keep fingers on home-row keys
- use correct finger reaches
- use the numeric keypad accurately

ASSESSING AND EVALUATING STUDENT PERFORMANCE

Accessing Information

The teacher observed students and held conferences to assess their abilities to use a variety of information sources to access, retrieve, and evaluate information. Their abilities to access information were recorded using a performance scale.

Hypertext Document

Evaluation criteria for the effectiveness of the presentations were developed co-operatively by the teacher and students.

Keyboarding Skills

The teacher and the students developed a list of criteria to assess keyboarding skills. A checklist was created and used for teacher, self-, and peer assessment.

Accessing Information

Rating	Criteria
Capable	• recognizes and makes use of a wide variety of information sources (CD-ROMs, the Internet, e-mail) • successfully applies search criteria to streamline a search from a broad category to a specific topic • consistently and accurately examines information for relevance to topic, bias, and timeliness
Developing	• recognizes a wide variety of information sources, but only accesses familiar resources • uses some keywords to streamline search from a broad category to a specific topic • examines information for relevance, but may have difficulty determining its relevance, bias, or timeliness
Beginning	• uses a limited variety of information resources • has difficulty using keywords to streamline a search • requires assistance when evaluating information for relevance, bias, or timeliness

Hypertext Document

Rating	Criteria
4 Outstanding	• text, graphics, and sound creatively integrated • sophisticated use of special effects • easy access to home card and main menu • buttons function correctly • pathways logically organized
3 Good	• text, graphics, and sound successfully integrated • appropriate use of special effects • easy access to home card and main menu • buttons function correctly • pathways logically organized
2 Satisfactory	• some integration of text, graphics, or sound • few special effects used • limited access to home card and main menu • buttons function correctly • most pathways logically organized
1 Minimally Acceptable	• little integration of text, graphics, or sound • no special effects used • limited access to home card and main menu • most buttons function correctly • pathways may be confusing

Keyboarding Skills

Criteria	Consistently	Sometimes	Rarely
• uses correct posture			
• keeps eyes on copy			
• keeps fingers on home-row keys			
• uses correct finger reaches			
• accurately uses the numeric keypad			

APPENDIX E

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APPENDIX F

Glossary

application

Software designed to accomplish a specific task such as desktop publishing or word processing.

Boolean operators

Words (e.g., AND/OR, NOT) that help focus an information search.

browser *or* **web browser**

An application that allows a user to access information on the World Wide Web.

card

The basic unit of organization in a hypertext document.

CD-ROM (Compact Disc-Read Only Memory)

A device that uses a rigid disc to store information in a form that can be read by a computer.

clip art

Digitized pictures that can be copied and used in other documents.

database

A collection of data that is structured and organized into a chosen format. A computer database makes it easy to create, retrieve, and sort data stored electronically.

digital camera

A camera that digitizes images and stores them on a computer disk.

digitize

A process in which information is converted into a format that allows it to be stored and retrieved by a computer.

directory

An organization structure that allows files to be stored on and retrieved from a disk.

disk

A device on which information is stored for later retrieval on a computer.

download

Retrieve information from one computer and save it on another.

e-mail (electronic mail)

Messages typed into computer terminals or communications networks and sent electronically to other computer users.

electronic document   Any information that is stored in an electronic format (e.g., a computer file, videotape).

electronic slide show   A series of images (e.g., pictures, text) that are created and presented using information technology tools.

ergonomics   The science that studies the relationship of humans to their working environment and seeks to improve working conditions and increase efficiency.

field   A category of information in a database.

file folder   An organizational structure that allows files to be stored on and retrieved from a disk.

font   A complete set of type of one size and style.

format a disk   Prepare a disk for storing information.

graphics bank   A collection of digitized pictures.

graphics program   An application used to create and manipulate pictures.

hard drive   Computer hardware on which information is stored for later retrieval.

hardware   A term used to refer to the components of a computer system.

home page   The opening or title page on a World Wide Web site.

HTML (hypertext markup language) The computer language that is used to format documents for use on the World Wide Web.

hypertext   A method of organizing text that allows it to be accessed in a non-linear fashion.

icon   A graphic symbol used to represent an idea or electronic document.

information highway   A term used to describe the Internet.

information literacy   The ability to access, evaluate, organize, manipulate, and present information (including electronic information).

information technology   Electronic equipment that stores, sends, retrieves, or manages information. It includes computers, networks, electronic databases, CD-ROMs, laserdiscs, video cameras, tape-recorders, and fax machines.

integrated software   Software that combines the features of several different applications in a single program (e.g., word processing, database, spreadsheet, graphics, and communications).

Internet (the)   A global information network linking computers and computer networks.

keyboard commands   Commands selected using a keyboard to accomplish tasks on a computer.

keyword   A word used to search for information on a particular topic.

LAN (local area network)   A local collection of interconnected computers, printers, modems, and other devices.

laserdisc   A disc on which sound and visual images are recorded.

link   A connection between two parts of a hypertext document or two separate hypertext documents.

menu commands   Computer commands selected from a menu or list using a mouse or a keyboard to accomplish tasks on a computer.

multimedia   The combination of text, sound, and video used to present information.

network   A connected system of hardware and software that transmits data.

numeric keypad
A built-in number pad on a computer keyboard that is used to enter information into a computer program.

on-line
When one is connected to the Internet or a network of computers.

on-line help function
A feature built into many applications that provides on-screen help for the user.

on-line services
Services and resources that can be accessed by subscribers using a modem and a computer.

paint program
An application that permits users to "draw" on a computer.

password
A secret combination of characters that a user must enter to access a computer application or network.

pathway
A connection between two parts of a hypertext document. See also *link*.

point size
The size of the characters of a typeface.

software
A computer application or program.

spell checker
Software that checks the accuracy of spelling in a document.

spreadsheet
An application that can manipulate, calculate, and analyse numerical information.

stack
Several cards in a hypertext document that are connected or linked together. See also *card*.

telecommunications tools
Hardware and software that permit users to communicate with one another.

template
An empty or generic document that can easily be adapted to specific user needs.

tool palette
A collection of tools available in a program. These tools allow a user to modify, draw, or select objects.

tool *or* **button bar**	A portion of the screen (in some applications) that contains buttons for common commands.
troubleshooting	Strategies used to define and solve problems encountered while using information technology tools.
Unix	An interactive time sharing operating system invented in 1969.
undo	A feature of many applications that allows a user to reverse the last command.
virus	A program that destroys or alters files. Viruses spread from computer to computer via contaminated disks or applications.
WAN (wide area network)	A collection of networks connected by communication lines to a central computer.
web browser	See *browser*.
word processor	An application that allows text documents to be edited and formatted on-screen before being printed.
World Wide Web	A part of the Internet that allows users to access linked text, graphics, video, and sound via a web browser.
write-protect	A way of ensuring that the contents of a disk or file can be read but not altered.

Appendix G

*Planning an Integrated
Information Technology Program*

The prescribed learning outcomes of the Information Technology K to 7 and 8 to 10 Integrated Resource Packages (IRP)s have been designed for integration into other curricular areas. While there are significant skills, levels of knowledge, and attitudes to be learned in the area of information technology, it is important that students apply these skills to facilitate learning in other areas of study.

ACHIEVING SUCCESSFUL IMPLEMENTATION

Co-ordinators, schools, and districts can assist in the successful implementation of the Information Technology K to 7 curriculum by:

- supporting and encouraging teachers to identify their individual strengths, needs, and interests in the use of information technology tools and resources

- developing school and district goals that can be used as a framework to direct technology acquisition and implementation, and teacher in-service models

- developing and communicating strategies to support teachers before and during implementation of the curriculum

- promoting a climate for teachers to explore a variety of approaches and teaching strategies to incorporate essential information technology skills

The Role of the Teacher

When planning for the implementation of Information Technology K to 7, teachers, schools, and districts should ensure that all prescribed learning outcomes are met. This appendix includes a suggested checklist for designing a lesson (or series of lessons) that integrates information technology into other curricular areas. A suggested lesson-design template is also provided. This lesson-design template will help teachers to:

- ensure that learning outcomes from each of the curriculum organizers are addressed

- provide students with opportunities to explore and feel comfortable with a range of information technology tools (e.g., video camera, sound equipment, computer peripherals) and processes (e.g., constructing flow charts, storyboarding, writing documentation)

- set developmental objectives appropriate to student needs

- plan learning activities that provide for individual and group work

- acknowledge and plan for a range of student learning styles

- include activities and strategies relevant to students and their communities

CONSIDERATIONS PRIOR TO INSTRUCTION

There are several education, social, and technical issues that teachers should consider before starting an information technology program. Thinking through the following issues will help teachers to get new programs off to a good start.

Integration

The key to successfully implementing Information Technology K to 7 lies not in teaching it as a separate subject, but in using it to enhance student learning in other curricular areas. If information technology is integrated successfully, students will complete the learning outcomes of this curriculum as well as those of other subjects.

Exploring Information Technology

Learning can be more meaningful when teachers and students collaborate. Exploring information technology learning strategies may involve some risk for teachers and students, but the potential rewards are worth the effort.

Awareness

Information technology is a part of our daily lives. Today's students require information technology skills to participate in society. The importance of information technology is evident in all curricular areas. Teachers should be aware of information technology tools and their effect on their lives, their students' lives, and on society in general.

Personal Skills and Interests

Teachers should do a personal inventory of their information technology skills. In doing so, they will be able to identify their strengths and weaknesses in the areas of information technology processes and related tools.

Teachers are aware that self-improvement and professional development must occur on a continuing basis. The rapid rate of change in information technology makes it especially important for teachers to keep updating their skills in this area.

Awareness of Equipment, Software, Concepts, and Skills

Since Information Technology K to 7 is a prescribed curriculum to be integrated into all subject areas, teachers need to assess the resources available in their school. Are computers configured as stand-alones or in pods, or is there a networked lab? What software is available to students and teachers? Does the school have specialized equipment that students can use (e.g., digital camera, scanner, printers)?

It is also essential for teachers to have an awareness of the technological capabilities available in the school. In many cases, information technology tools and resources work together to produce results, so that a weakness in one link of the chain may affect the entire process. For example, computers with insufficient memory may not allow a certain software package to function correctly; as a result, the software package may not be suitable for purchase by the school. Likewise, the teacher does not need to be a keyboarding expert but may need to be aware of research on learning proper keyboarding at an early age.

Community

The community offers many opportunities for teachers to increase their information technology skills. Teachers can often use community-based resources. Business and corporate partnerships may provide resource people to bring information technology tools to the classroom. Retail outlets might also be willing to provide equipment and other resources on a review or demonstration basis. In many schools, parents can provide a pool of information technology users who are willing to offer their expertise to the teacher and class.

Extended Education Community

Many postsecondary organizations have expertise, facilities, and resources that they may share with the public school system. By participating in community education, credit and non-credit courses, and specialized workshops provided by postsecondary institutions, teachers can increase their information technology skills.

Platforms

There are a variety of computer platforms and operating systems (e.g., Windows, Unix) that teachers should consider when they begin to determine their program needs. The newer generations of software are capable of working on multiple platforms such as Macintosh and Windows, and teachers may need to be aware of these variables.

Assessing Information Technology as an Integrated Program

The Information Technology K to 7 learning outcomes can be used to enhance students' work in many curricular areas (e.g., English/language arts, social studies, science, mathematics) and to increase the relevance of these subjects and improve student performance. As well, information technology tools can provide a powerful addition to the variety of learning resources available to today's students.

Assessment strategies should recognize the extent to which information technology tools and processes have enhanced student learning. In addition, teachers must evaluate the achievement of learning outcomes that are specific to Information Technology K to 7.

Teachers might use the following strategies to assess the integration of information technology learning outcomes:

1. Evaluate students' achievement of learning outcomes specific to each curriculum.

2. Evaluate students' achievement of the Information Technology K to 7 learning outcomes.

Assessing the integrated learning outcomes for Information Technology K to 7 will improve the level and quality of learning by students who use information technology tools. In the end, the use of information technology tools and processes will enhance the quality of students' learning and decision making.

Models for Integration

The following table and templates will help the individual teacher to answer the question "How do I integrate information technology into my subject area?"

Suggested Lesson Design for Integrating Information Technology

The following chart provides a sample lesson design that could be used to develop a lesson plan for integrating Information Technology K to 7 learning outcomes into other curricular areas.

Step 1. Select curriculum learning outcomes.
- Identify learning outcomes and concepts to use in a curriculum (e.g., science, language arts, math, career and personal planning).

Step 2. Select appropriate Information Technology K to 7 learning outcomes.
- Relate the concepts and learning outcomes of the preceding step to the three Information Technology K to 7 curriculum organizers: Foundations, Process, and Presentation.
- Balance the selection of learning outcomes from each of the organizers.
- Choose learning outcomes that will augment, support, and enhance those from the curricular area selected in Step 1.

Step 3. Determine specific instructional objectives.
- Teachers may want to identify additional criteria for what students should demonstrate at the end of the lesson (derived from the prescribed learning outcomes of Information Technology K to 7 and other curricula).

Step 4. Identify available facilities, software, hardware, and equipment.
- In selecting resources, locations, and facilities, teachers should include their own contacts, parent groups, local businesses, and school and district resources. Use the checklist below as a guide:

❏ Internet Access	❏ E-mail Access	❏ Newsgroups	❏ Desktop Publishers
❏ Desktop Imaging	❏ Digital Video	❏ Video/Audio	❏ Video Camera
❏ Software	❏ Facility Arrangement	❏ Video Conferencing	❏ Class Location

Step 5. Identify available learning resources.
- Preview recommended software.
- Identify resources available in the school.
- Select resources that enable integration of multiple learning outcomes.
- Explore the World Wide Web to find resources in the content area.

Step 6. Develop appropriate instructional strategies.
- Develop a variety of learning activities that encourage the use of information technology tools and processes to explore learning outcomes. (Refer to the suggested instructional and assessment strategies in the IRP for additional learning activities.)

Step 7. Set criteria for assessing learning outcomes.
- Identify criteria and establish the standard of achievement for student learning.
- Provide opportunities for students to demonstrate their learning.
- Refer to Appendix D for more information.

Step 8. Extend learning.
- Develop activities to extend learning, and check for students' understanding through demonstrating, inquiring, and explaining.

Suggested Lesson-Design Template for Integrating Information Technology

Subject: _____

Grade: _____

Topic: _____

Step 1. Select curriculum learning outcomes.

_____

_____

Step 2. Select appropriate Information Technology K to 7 learning outcomes.

_____

_____

Step 3. Determine specific instructional objectives.

_____

_____

Step 4. Identify available facilities, software, hardware, and equipment.

_____

_____

Step 5. Identify available learning resources.

_____

_____

Step 6. Develop appropriate instructional strategies.

_____

_____

Step 7. Set criteria for assessing learning outcomes.

_____

_____

Step 8. Extend learning.

_____

_____

A Sample Lesson Design for Integrating Information Technology

Subject: Physical Education

Grade: 4

Topic: Active Living

Step 1. Select prescribed learning outcomes from the physical education curriculum.

It is expected that students will:
- identify the nutritional needs related to physical activity
- describe and record changes in personal growth and development

Step 2. Select appropriate Information Technology K to 7 learning outcomes.

It is expected that students will:

Foundations
- enter, save, and retrieve information using a variety of information technology tools and software

Process
- use information technology tools to organize information from different sources

Presentation
- apply information technology to present information to intended audiences

Step 3. Determine specific instructional objectives.

Students will learn how to:
- use a video camera, graphics program, and word-processing program
- work in co-operative groups to develop a movement activity that will develop cardiovascular endurance

Step 4. Identify available facilities, software, hardware, and equipment.

Before starting this unit, the teacher should book the computer lab and video camera.

Step 5. Identify available learning resources.

The teacher should work with the teacher-librarian and district or school-based computer teacher to determine what learning resources are available in the school.

Step 6. Develop appropriate instructional strategies.

Students should do the following activities:
- use a word-processing program to list their personal fitness goals in an electronic journal
- use a calendar-making program and activity calendar to record daily participation in activities in and out of school
- use a graphics program to create a poster about active living and use a word-processing program to write a poem on the topic
- videotape each other as they demonstrate a movement sequence that indicates their understanding of active living, and then show the video at a parent night

Step 7. Set criteria for assessing learning outcomes.

Criteria to be determined by the teacher in collaboration with students.

Step 8. Extend learning.

Students present their video to a grade K to 1 "buddy class" as part of the physical education class.