

Communications Technology 2104

Curriculum Guide 2017



Education and Early Childhood Development

***Department of Education and Early
Childhood Development
Mission Statement***

The Department of Education and Early Childhood Development will improve provincial early childhood learning and the K-12 education system to further opportunities for the people of Newfoundland and Labrador.

Table of Contents

Acknowledgements	v
Section One: Newfoundland and Labrador Curriculum	
Outcomes Based Education.....	1
Context for Teaching and Learning	4
Inclusive Education.....	4
Literacy	10
Learning Skills for Generation Next.....	12
Assessment and Evaluation.....	15
Section Two: Curriculum Design	
Rationale.....	19
Curriculum Outcomes Framework	19
Course Overview.....	22
Suggested Yearly Plan	22
How to use a Four Column Layout.....	24
How to use a Strand Overview.....	26
Section Three: Specific Curriculum Outcomes	
Unit 1: Introduction to Communications Technology	27
Unit 2: Graphics Production	38
Unit 3: Audio Productions.....	50
Unit 4: Animation Production.....	62
Unit 5: Video Production	72
References	87

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Section One:

Newfoundland and Labrador Curriculum

Introduction

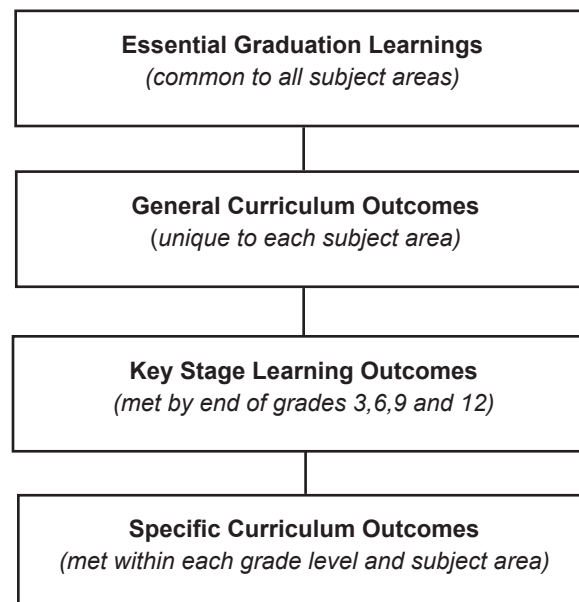
There are multiple factors that impact education: technological developments, increased emphasis on accountability, and globalization. These factors point to the need to consider carefully the education students receive.

The Newfoundland and Labrador Department of Education and Early Childhood Development believes that curriculum design with the following characteristics will help teachers address the needs of students served by the provincially prescribed curriculum:

- Curriculum guides must clearly articulate what students are expected to know and be able to do by the time they graduate from high school.
- There must be purposeful assessment of students' performance in relation to the curriculum outcomes.

Outcomes Based Education

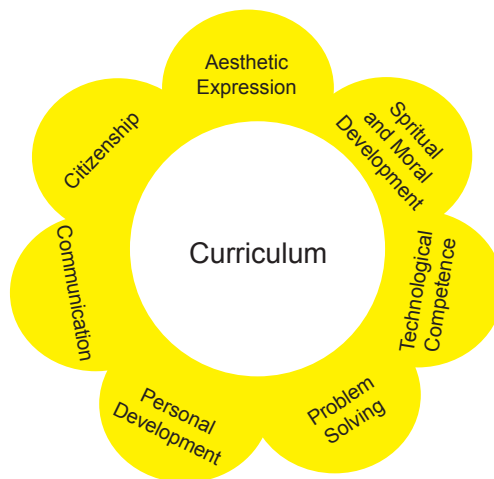
The K-12 curriculum in Newfoundland and Labrador is organized by outcomes and is based on *The Atlantic Canada Framework for Essential Graduation Learning in Schools* (1997). This framework consists of Essential Graduation Learnings (EGLs), General Curriculum Outcomes (GCOs), Key Stage Curriculum Outcomes (KSCOs) and Specific Curriculum Outcomes (SCOs).



Essential Graduation Learnings

EGLs provide vision for the development of a coherent and relevant curriculum. They are statements that offer students clear goals and a powerful rationale for education. The EGLs are delineated by general, key stage, and specific curriculum outcomes.

EGLs describe the knowledge, skills, and attitudes expected of all students who graduate from high school. Achievement of the EGLs will prepare students to continue to learn throughout their lives. EGLs describe expectations, not in terms of individual subject areas, but in terms of knowledge, skills, and attitudes developed throughout the K-12 curriculum. They confirm that students need to make connections and develop abilities across subject areas if they are to be ready to meet the shifting and ongoing demands of life, work, and study.



Aesthetic Expression – Graduates will be able to respond with critical awareness to various forms of the arts and be able to express themselves through the arts.

Citizenship – Graduates will be able to assess social, cultural, economic, and environmental interdependence in a local and global context.

Communication – Graduates will be able to use the listening, viewing, speaking, reading and writing modes of language(s), and mathematical and scientific concepts and symbols, to think, learn and communicate effectively.

Problem Solving – Graduates will be able to use the strategies and processes needed to solve a wide variety of problems, including those requiring language, and mathematical and scientific concepts.

Personal Development – Graduates will be able to continue to learn and to pursue an active, healthy lifestyle.

Spiritual and Moral Development – Graduates will demonstrate understanding and appreciation for the place of belief systems in shaping the development of moral values and ethical conduct.

Technological Competence – Graduates will be able to use a variety of technologies, demonstrate an understanding of technological applications, and apply appropriate technologies for solving problems.

Curriculum Outcomes

Curriculum outcomes are statements that articulate what students are expected to know and be able to do in each program area in terms of knowledge, skills, and attitudes.

Curriculum outcomes may be subdivided into General Curriculum Outcomes, Key Stage Curriculum Outcomes, and Specific Curriculum Outcomes.

General Curriculum Outcomes (GCOs)

Each program has a set of GCOs which describe what knowledge, skills, and attitudes students are expected to demonstrate as a result of their cumulative learning experiences within a subject area. GCOs serve as conceptual organizers or frameworks which guide study within a program area. Often, GCOs are further delineated into KSCOs.

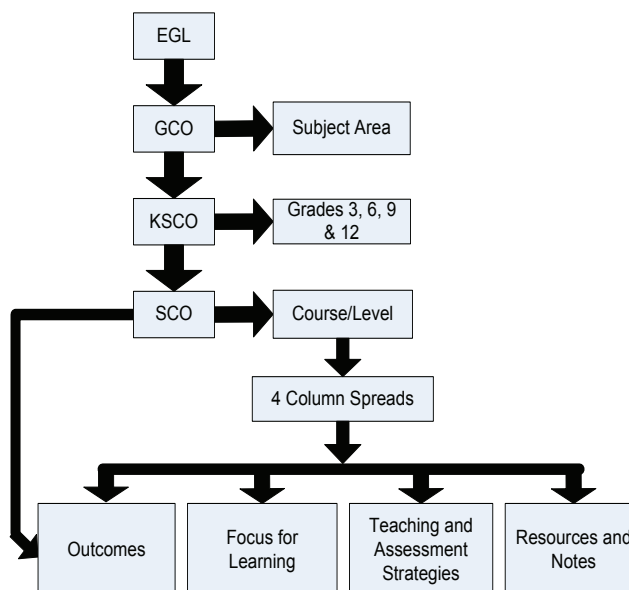
Key Stage Curriculum Outcomes (KSCOs)

Key Stage Curriculum Outcomes (KSCOs) summarize what is expected of students at each of the four key stages of grades three, six, nine, and twelve.

Specific Curriculum Outcomes (SCOs)

SCOs set out what students are expected to know and be able to do as a result of their learning experiences in a course, at a specific grade level. In some program areas, SCOs are further articulated into delineations. *It is expected that all SCOs will be addressed during the course of study covered by the curriculum guide.*

EGLs to Curriculum Guides



Context for Teaching and Learning

Teachers are responsible to help students achieve outcomes. This responsibility is a constant in a changing world. As programs change over time so does educational context. Several factors make up the educational context in Newfoundland and Labrador today: inclusive education, support for gradual release of responsibility teaching model, focus on literacy and learning skills in all programs, and support for education for sustainable development.

Inclusive Education

Valuing Equity and Diversity

Effective inclusive schools have the following characteristics: supportive environment, positive relationships, feelings of competence, and opportunities to participate. (The Centre for Inclusive Education, 2009)

All students need to see their lives and experiences reflected in their school community. It is important that the curriculum reflect the experiences and values of all genders and that learning resources include and reflect the interests, achievements, and perspectives of all students. An inclusive classroom values the varied experiences and abilities as well as social and ethno-cultural backgrounds of all students while creating opportunities for community building. Inclusive policies and practices promote mutual respect, positive interdependencies, and diverse perspectives. Learning resources should include a range of materials that allow students to consider many viewpoints and to celebrate the diverse aspects of the school community.



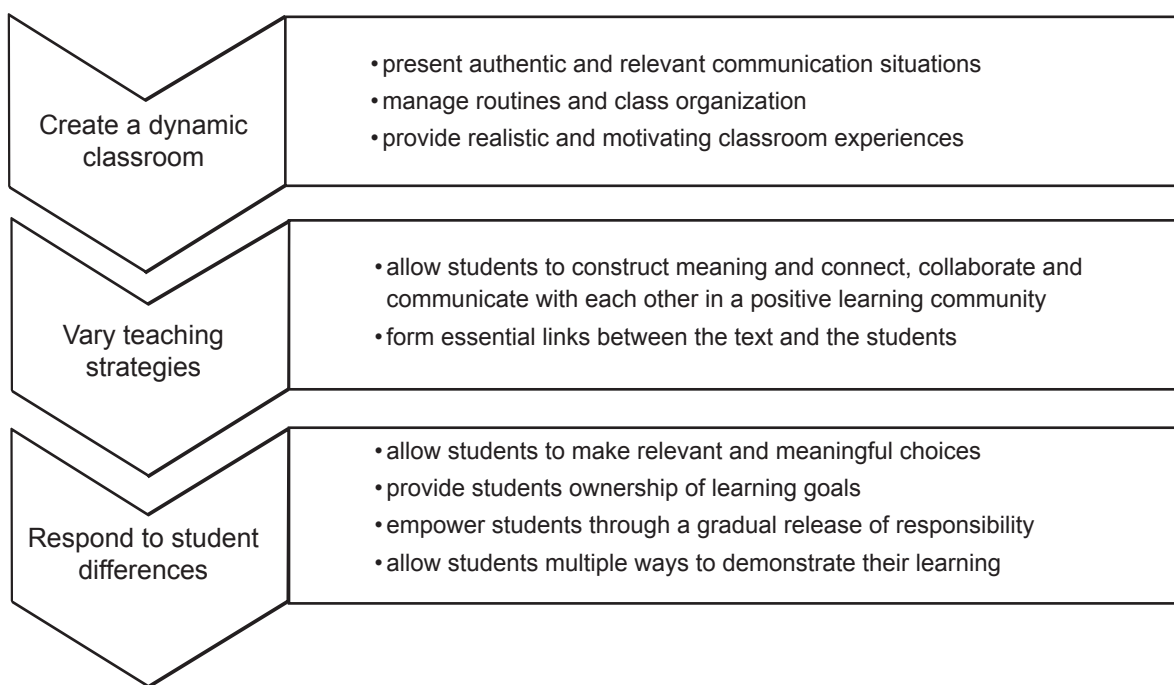
Differentiated Instruction

Differentiated instruction is a teaching philosophy based on the premise that teachers should adapt instruction to student differences. Rather than marching students through the curriculum lockstep, teachers should modify their instruction to meet students' varying readiness levels, learning preferences, and interests. Therefore, the teacher proactively plans a variety of ways to 'get it' and express learning. (Carol Ann Tomlinson, 2008)

Curriculum is designed and implemented to provide learning opportunities for all students according to abilities, needs, and interests. Teachers must be aware of and responsive to the diverse range of learners in their classes. Differentiated instruction is a useful tool in addressing this diversity.

Differentiated instruction responds to different readiness levels, abilities, and learning profiles of students. It involves actively planning so that the process by which content is delivered, the way the resource is used, and the products students create are in response to the teacher's knowledge of whom he or she is interacting with. Learning environments should be flexible to accommodate various learning preferences of the students. Teachers continually make decisions about selecting teaching strategies and structuring learning activities that provide all students with a safe and supportive place to learn and succeed.

Planning for Differentiation



Differentiating the Content

Differentiating content requires teachers to pre-assess students to identify those who require prerequisite instruction, as well as those who have already mastered the concept and may therefore apply strategies learned to new situations. Another way to differentiate content is to permit students to adjust the pace at which they progress through the material. Some students may require additional time while others will move through at an increased pace and thus create opportunities for enrichment or more indepth consideration of a topic of particular interest.

Teachers should consider the following examples of differentiating content:

- Meet with small groups to reteach an idea or skill or to extend the thinking or skills.
- Present ideas through auditory, visual, and tactile means.
- Use reading materials such as novels, websites, and other reference materials at varying reading levels.

Differentiating the Process

Differentiating the process involves varying learning activities or strategies to provide appropriate methods for students to explore and make sense of concepts. A teacher might assign all students the same product (e.g., presenting to peers) but the process students use to create the presentation may differ. Some students could work in groups while others meet with the teacher individually. The same assessment criteria can be used for all students.

Teachers should consider flexible grouping of students such as whole class, small group, or individual instruction. Students can be grouped according to their learning styles, readiness levels, interest areas, and/or the requirements of the content or activity presented. Groups should be formed for specific purposes and be flexible in composition and short-term in duration.

Teachers should consider the following examples of differentiating the process:

- Offer hands-on activities for students.
- Provide activities and resources that encourage students to further explore a topic of particular interest.
- Use activities in which all learners work with the same learning outcomes but proceed with different levels of support, challenge, or complexity.

Differentiating the Product

Differentiating the product involves varying the complexity and type of product that students create to demonstrate learning outcomes. Teachers provide a variety of opportunities for students to demonstrate and show evidence of what they have learned.

Teachers should give students options to demonstrate their learning (e.g., create an online presentation, write a letter, or develop a mural). This will lead to an increase in student engagement.

Differentiating the Learning Environment

The learning environment includes the physical and the affective tone or atmosphere in which teaching and learning take place, and can include the noise level in the room, whether student activities are static or mobile, or how the room is furnished and arranged. Classrooms may include tables of different shapes and sizes, space for quiet individual work, and areas for collaboration.

Teachers can divide the classroom into sections, create learning centres, or have students work both independently and in groups. The structure should allow students to move from whole group, to small group, pairs, and individual learning experiences and support a variety of ways to engage in learning. Teachers should be sensitive and alert to ways in which the classroom environment supports their ability to interact with students.

Teachers should consider the following examples of differentiating the learning environment:

- Develop routines that allow students to seek help when teachers are with other students and cannot provide immediate attention.
- Ensure there are places in the room for students to work quietly and without distraction, as well as places that invite student collaboration.
- Establish clear guidelines for independent work that match individual needs.
- Provide materials that reflect diversity of student background, interests, and abilities.

The physical learning environment must be structured in such a way that all students can gain access to information and develop confidence and competence.

Meeting the Needs of Students with Exceptionalities

All students have individual learning needs. Some students, however, have exceptionalities (defined by the Department of Education and Early Childhood Development) which impact their learning. The majority of students with exceptionalities access the prescribed curriculum. For details of these exceptionalities see www.gov.nl.ca/edu/k12/studentsupportservices/exceptionalities.html

Supports for these students may include

1. Accommodations
2. Modified Prescribed Courses
3. Alternate Courses
4. Alternate Programs
5. Alternate Curriculum

For further information, see Service Delivery Model for Students with Exceptionalities at www.cdli.ca/sdm/

Classroom teachers should collaborate with instructional resource teachers to select and develop strategies which target specific learning needs.

*Meeting the Needs
of Students who are
Highly Able
(includes gifted and
talented)*

Some students begin a course or topic with a vast amount of prior experience and knowledge. They may know a large portion of the material before it is presented to the class or be capable of processing it at a rate much faster than their classmates. All students are expected to move forward from their starting point. Many elements of differentiated instruction are useful in addressing the needs of students who are highly able.

Teachers may

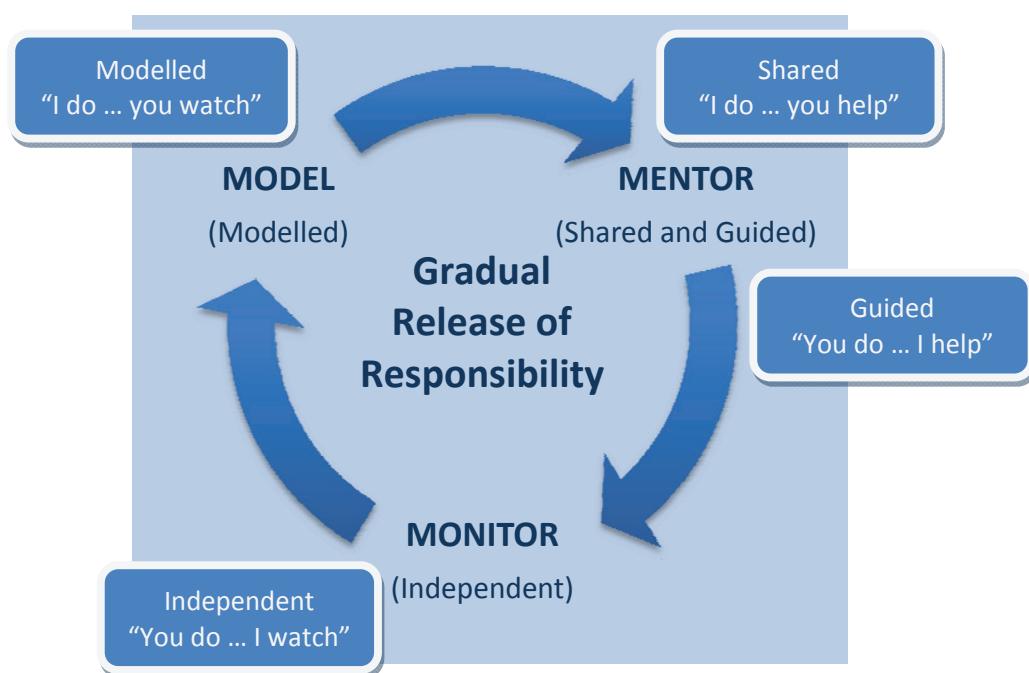
- assign independent study to increase depth of exploration in an area of particular interest;
- compact curriculum to allow for an increased rate of content coverage commensurate with a student's ability or degree of prior knowledge;
- group students with similar abilities to provide the opportunity for students to work with their intellectual peers and elevate discussion and thinking, or delve deeper into a particular topic; and
- tier instruction to pursue a topic to a greater depth or to make connections between various spheres of knowledge.

Highly able students require the opportunity for authentic investigation to become familiar with the tools and practices of the field of study. Authentic audiences and tasks are vital for these learners. Some highly able learners may be identified as gifted and talented in a particular domain. These students may also require supports through the Service Delivery Model for Students with Exceptionalities.

Gradual Release of Responsibility

Teachers must determine when students can work independently and when they require assistance. In an effective learning environment, teachers choose their instructional activities to model and scaffold composition, comprehension, and metacognition that is just beyond the students' independence level. In the gradual release of responsibility approach, students move from a high level of teacher support to independent work. If necessary, the teacher increases the level of support when students need assistance. The goal is to empower students with their own learning strategies, and to know how, when, and why to apply them to support their individual growth. Guided practice supports student independence. As a student demonstrates success, the teacher should gradually decrease his or her support.

Gradual Release of Responsibility Model



Literacy

“Literacy is the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society”. To be successful, students require a set of interrelated skills, strategies and knowledge in multiple literacies that facilitate their ability to participate fully in a variety of roles and contexts in their lives, in order to explore and interpret the world and communicate meaning. (The Plurality of Literacy and its Implications for Policies and Programmes, 2004, p.13)

Literacy is

- a process of receiving information and making meaning from it; and
- the ability to identify, understand, interpret, communicate, compute, and create text, images, and sounds.

Literacy development is a lifelong learning enterprise beginning at birth that involves many complex concepts and understandings. It is not limited to the ability to read and write; no longer are we exposed only to printed text. It includes the capacity to learn to communicate, read, write, think, explore, and solve problems. Individuals use literacy skills in paper, digital, and live interactions to engage in a variety of activities:

- Analyze critically and solve problems.
- Comprehend and communicate meaning.
- Create a variety of texts.
- Make connections both personally and inter-textually.
- Participate in the socio-cultural world of the community.
- Read and view for enjoyment.
- Respond personally.

These expectations are identified in curriculum documents for specific subject areas as well as in supporting documents, such as *Cross-Curricular Reading Tools* (CAMET).

With modelling, support, and practice, students' thinking and understandings are deepened as they work with engaging content and participate in focused conversations.

Reading in the Content Areas

The focus for reading in the content areas is on teaching strategies for understanding content. Teaching strategies for reading comprehension benefits all students as they develop transferable skills that apply across curriculum areas.

When interacting with different texts, students must read words, view and interpret text features, and navigate through information presented in a variety of ways including, but not limited to

Advertisements	Movies	Poems
Blogs	Music videos	Songs
Books	Online databases	Speeches
Documentaries	Plays	Video games
Magazine articles	Podcasts	Websites

Students should be able to interact with and comprehend different texts at different levels.

There are three levels of text comprehension:

- Independent level – Students are able to read, view, and understand texts without assistance.
- Instructional level – Students are able to read, view, and understand most texts but need assistance to fully comprehend some texts.
- Frustration level – Students are not able to read or view with understanding (i.e., texts may be beyond their current reading level).

Teachers will encounter students working at all reading levels in their classrooms and will need to differentiate instruction to meet their needs. For example, print texts may be presented in audio form, physical movement may be associated with synthesizing new information with prior knowledge, or graphic organizers may be created to present large amounts of print text in a visual manner.

When interacting with information that is unfamiliar to students, it is important for teachers to monitor how effectively students are using strategies to read and view texts:

- Analyze and think critically about information.
- Determine importance to prioritize information.
- Engage in questioning before, during, and after an activity related to a task, text, or problem.
- Make inferences about what is meant but not said.
- Make predictions.
- Synthesize information to create new meaning.
- Visualize ideas and concepts.

Learning Skills for Generation Next

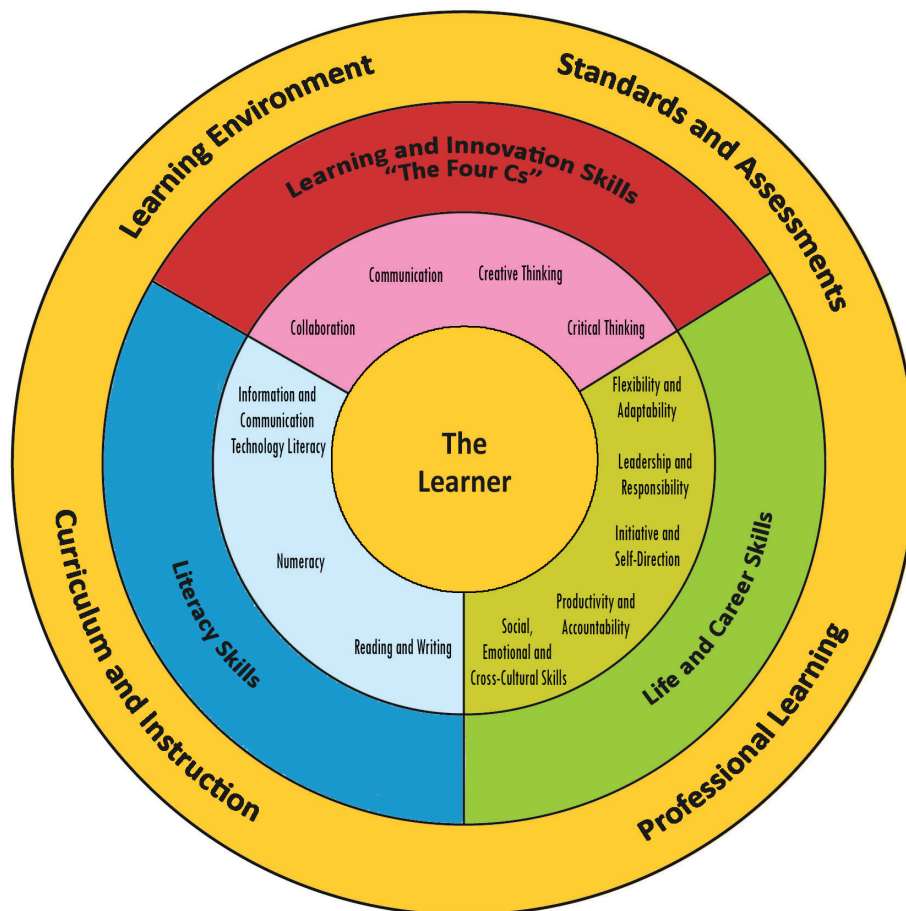
Generation Next is the group of students who have not known a world without personal computers, cell phones, and the Internet. They were born into this technology. They are digital natives.

Students need content and skills to be successful. Education helps students learn content and develop skills needed to be successful in school and in all learning contexts and situations. Effective learning environments and curricula challenge learners to develop and apply key skills within the content areas and across interdisciplinary themes.

Learning Skills for Generation Next encompasses three broad areas:

- Learning and Innovation Skills enhance a person's ability to learn, create new ideas, problem solve, and collaborate.
- Life and Career Skills address leadership, and interpersonal and affective domains.
- Literacy Skills develop reading, writing, and numeracy, and enhance the use of information and communication technology.

The diagram below illustrates the relationship between these areas. A 21st century curriculum employs methods that integrate innovative and research-driven teaching strategies, modern learning technologies, and relevant resources and contexts.



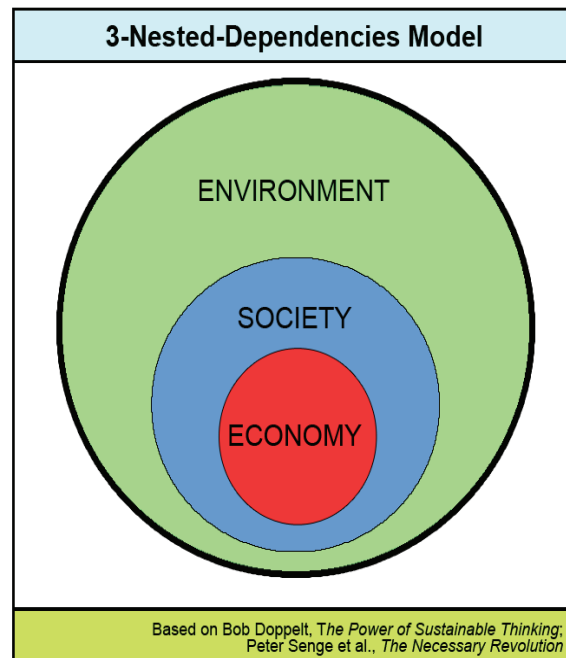
Support for students to develop these abilities and skills is important across curriculum areas and should be integrated into teaching, learning, and assessment strategies. Opportunities for integration of these skills and abilities should be planned with engaging and experiential activities that support the gradual release of responsibility model. For example, lessons in a variety of content areas can be infused with learning skills for Generation Next by using open-ended questioning, role plays, inquiry approaches, self-directed learning, student role rotation, and Internet-based technologies.

All programs have a shared responsibility in developing students' capabilities within all three skill areas.

Education for Sustainable Development

Sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. (Our Common Future, 43)

Sustainable development is comprised of three integrally connected areas: economy, society, and environment.



As conceived by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) the overall goal of Education for Sustainable Development (ESD) is to integrate the knowledge, skills, values, and perspectives of sustainable development into all aspects of education and learning. Changes in human behaviour should create a more sustainable future that supports environmental integrity and economic viability, resulting in a just society for all generations.

ESD involves teaching *for* rather than teaching *about* sustainable development. In this way students develop the skills, attitudes, and perspectives to meet their present needs without compromising the ability of future generations to meet their needs.

Within ESD, the knowledge component spans an understanding of the interconnectedness of our political, economic, environmental, and social worlds, to the role of science and technology in the development of societies and their impact on the environment. The skills necessary include being able to assess bias, analyze consequences of choices, ask questions, and solve problems. ESD values and perspectives include an appreciation for the interdependence of all life forms, the importance of individual responsibility and action, an understanding of global issues as well as local issues in a global context. Students need to be aware that every issue has a history, and that many global issues are linked.

Assessment and Evaluation

Assessment

Assessment is the process of gathering information on student learning.

How learning is assessed and evaluated and how results are communicated send clear messages to students and others about what is valued.

Assessment instruments are used to gather information for evaluation. Information gathered through assessment helps teachers determine students' strengths and needs, and guides future instruction.

Teachers are encouraged to be flexible in assessing student learning and to seek diverse ways students might demonstrate what they know and are able to do.

Evaluation involves the weighing of the assessment information against a standard in order to make a judgement about student achievement.

Assessment can be used for different purposes:

1. Assessment *for* learning guides and informs instruction.
2. Assessment *as* learning focuses on what students are doing well, what they are struggling with, where the areas of challenge are, and what to do next.
3. Assessment *of* learning makes judgements about student performance in relation to curriculum outcomes.

1. Assessment for Learning

Assessment *for* learning involves frequent, interactive assessments designed to make student learning visible. This enables teachers to identify learning needs and adjust teaching accordingly.

Assessment *for* learning is not about a score or mark; it is an ongoing process of teaching and learning:

- Pre-assessments provide teachers with information about what students already know and can do.
- Self-assessments allow students to set goals for their own learning.
- Assessment *for* learning provides descriptive and specific feedback to students and parents regarding the next stage of learning.
- Data collected during the learning process from a range of tools enables teachers to learn as much as possible about what a student knows and is able to do.

2. Assessment as Learning

Assessment *as* learning involves students' reflecting on their learning and monitoring their own progress. It focuses on the role of the student in developing metacognition and enhances engagement in their own learning. Students can

- analyze their learning in relation to learning outcomes,
- assess themselves and understand how to improve performance,
- consider how they can continue to improve their learning, and
- use information gathered to make adaptations to their learning processes and to develop new understandings.

3. Assessment of Learning

Assessment *of* learning involves strategies designed to confirm what students know in terms of curriculum outcomes. It also assists teachers in determining student proficiency and future learning needs. Assessment *of* learning occurs at the end of a learning experience and contributes directly to reported results. Traditionally, teachers relied on this type of assessment to make judgements about student performance by measuring learning after the fact and then reporting it to others. Used in conjunction with the other assessment processes previously outlined, assessment *of* learning is strengthened. Teachers can

- confirm what students know and can do;
- report evidence to parents/guardians, and other stakeholders, of student achievement in relation to learning outcomes; and
- report on student learning accurately and fairly using evidence obtained from a variety of contexts and sources.

Involving Students in the Assessment Process

Students should know what they are expected to learn as outlined in the specific curriculum outcomes of a course as well as the criteria that will be used to determine the quality of their achievement. This information allows students to make informed choices about the most effective ways to demonstrate what they know and are able to do.

It is important that students participate actively in assessment by co-creating criteria and standards which can be used to make judgements about their own learning. Students may benefit from examining various scoring criteria, rubrics, and student exemplars.

Students are more likely to perceive learning as its own reward when they have opportunities to assess their own progress. Rather than asking teachers, "What do you want?", students should be asking themselves questions:

- What have I learned?
- What can I do now that I couldn't do before?
- What do I need to learn next?

Assessment must provide opportunities for students to reflect on their own progress, evaluate their learning, and set goals for future learning.

Assessment Tools

In planning assessment, teachers should use a broad range of tools to give students multiple opportunities to demonstrate their knowledge, skills, and attitudes. The different levels of achievement or performance may be expressed as written or oral comments, ratings, categorizations, letters, numbers, or as some combination of these forms.

The grade level and the activity being assessed will inform the types of assessment tools teachers will choose:

Anecdotal Records	Photographic Documentation
Audio/Video Clips	Podcasts
Case Studies	Portfolios
Checklists	Presentations
Conferences	Projects
Debates	Questions
Demonstrations	Quizzes
Exemplars	Role Plays
Graphic Organizers	Rubrics
Journals	Self-assessments
Literacy Profiles	Tests
Observations	Wikis

Assessment Guidelines

Assessments should measure what they intend to measure. It is important that students know the purpose, type, and potential marking scheme of an assessment. The following guidelines should be considered:

- Collect evidence of student learning through a variety of methods; do not rely solely on tests and paper and pencil activities.
- Develop a rationale for using a particular assessment of learning at a specific point in time.
- Provide descriptive and individualized feedback to students.
- Provide students with the opportunity to demonstrate the extent and depth of their learning.
- Set clear targets for student success using learning outcomes and assessment criteria.
- Share assessment criteria with students so that they know the expectations.

Evaluation

Evaluation is the process of analyzing, reflecting upon, and summarizing assessment information, and making judgements or decisions based on the information gathered. Evaluation is conducted within the context of the outcomes, which should be clearly understood by learners before teaching and evaluation take place. Students must understand the basis on which they will be evaluated and what teachers expect of them.

During evaluation, the teacher interprets the assessment information, makes judgements about student progress, and makes decisions about student learning programs.

Section Two: Curriculum Design

Rationale

Technological competence is one of the Essential Graduation Learnings common to all curricular areas in the Newfoundland and Labrador Curriculum. The International Society for Technology in Education (ISTE) outlines Empowered Learner, Knowledge Constructor, Innovative Designer and Creative Communicator as four of its seven standards for students. The Conference Board of Canada Employability Skills Profile lists the ability to communicate with information and communications technology as a fundamental employability skill. Multimedia technology has become increasingly ubiquitous in the day to day lives of students. It has become an essential form of communications.

This communications technology course is designed to help high school students build practical skills in the production of multimedia artefacts. While involved in these activities students will be using open source and free software. The course does suggest an application for each of the skill building units; however, a component of the problem solving in this course is in selecting application options for the tasks in each unit and learning how to be productive in that application. This is authentic problem solving that reflects the technological lives of students and reinforces the principles of continuous learning.

Curriculum Outcomes Framework

Technology Education

Technology education engages students directly in constructing technological solutions to everyday, real-world problems. Technology education employs a wide variety of hands-on activities. Students are exposed to a broad range of technological issues, systems, and problem situations in a systemic, systematic fashion. They employ a wide range of technological resources and processes to design, fabricate, and test solutions to familiar and unfamiliar problems. Outcomes, learning experiences, and evaluation of student achievement reflect and are geared towards engagement. Technology education provides a naturally integrative function that helps students identify contextual relationships between technological activity and principles, and the underlying scientific, mathematical, and other concepts, principles, laws, and theories.

Communications Technology 2104

This communications technology course is designed to help high school students build practical skills in the production of multimedia artefacts. The International Society for Technology in Education (ISTE) outlines Empowered Learner, Knowledge Constructor, Innovative Designer and Creative Communicator as four of its seven standards for students. The Conference Board Employability Skills Profile lists the ability to communicate with information and communications technology as a fundamental employability skill. Multimedia technology has become increasingly ubiquitous in the day to day lives of students. It has become an essential form of communications.

Key Stage Curriculum Outcomes

The Key stage curriculum outcomes, based on the general curriculum outcomes, identify what students are expected to know and be able to do at the end of the primary/elementary, intermediate and high school grades in order to meet the essential graduation learnings. Key stage outcomes are identified for each of the dimensions. These key stage curriculum outcomes serve as the basis for the development of specific programs and courses for Technology Education.

Specific Curricular Outcomes

The specific curriculum outcomes are statements that describe what students will know, value, and be able to do as a result of study in a specific course or program at a grade level. These are

General Curriculum Outcomes (GCOs)	Key Stage Curriculum Outcomes (KSCOs)
	By the end of grade 12, students will be expected to:
<p>GCO 1: Technological Problem Solving</p> <p>Students will be expected to design, develop, evaluate, and articulate technological solutions.</p>	<p>[1.401] articulate problems that may be solved through technological means</p> <ul style="list-style-type: none"> • assess diverse needs and opportunities • construct detailed design briefs that include design criteria and a work schedule <p>[1.402] conduct design studies to identify a technological solution to a problem</p> <ul style="list-style-type: none"> • investigate related solutions • document a range of options to solve this problem • determine and justify the best option • determine resource requirements and availability • develop detailed action plans, including technical drawings and sequences of action <p>[1.403] develop (prototype, fabricate, make) technological solutions to problems</p> <ul style="list-style-type: none"> • match resources and technical processes for specific tasks • construct and test models and prototypes as needed • construct the solution with adherence to the design criteria • document activities, decisions, and milestones

General Curriculum Outcomes (GCOs)	Key Stage Curriculum Outcomes (KSCOs) By the end of grade 12, students will be expected to:
	<p>[1.404] critically evaluate technological solutions and report their findings</p> <ul style="list-style-type: none"> • develop detailed evaluations of both their own and others' technological solutions, with reference to independently developed criteria • employ a continuous assessment methodology with the purpose of continuous improvement of the design • document and report their changes, the rationale for change, and conclusions <p>[1.405] communicate ideas and information about technological solutions through appropriate technical means</p> <ul style="list-style-type: none"> • accurately present technical information by using a representative sample of analog and digital tools, including, for example, two- and three-dimensional, computer-assisted drafting and modelling tools • create accurately scaled models and prototypes
<p>GCO 2: Technological Systems</p> <p>Students will be expected to operate and manage technological systems.</p>	<p>[2.401] operate, monitor, and adjust technological systems of increasing complexity</p> <p>[2.402] manage technological systems of increasing complexity</p> <p>[2.403] modify programming logic and control systems to optimize the behaviour of systems</p> <p>[2.404] deconstruct complex technological systems into their simpler systems and components</p> <p>[2.405] troubleshoot and maintain systems</p>
<p>GCO 3: History and Evolution of Technology</p> <p>Students will be expected to demonstrate an understanding of the history and evolution of technology, and of its social and cultural implications.</p>	<p>[3.401] evaluate technological systems in the context of convergence where one system has multiple functions, or divergence where multiple systems have the same function</p> <p>[3.402] evaluate the symbiotic roles of technology and science in modern society</p> <p>[3.403] analyse the symbiotic relationship between technology and education, including factors that influence standards for technological literacy and capability, and ways that the community responds</p> <p>[3.404] critically evaluate the effects of accelerating rates of technological change on self and society</p> <p>[3.405] account for effects of cultural diversity on technological solutions</p> <ul style="list-style-type: none"> • critically examine the effects of cultural diversity on market forces and technological products, and viceversa • incorporate knowledge of cultural diversity into development of technological solutions

General Curriculum Outcomes (GCOs)	Key Stage Curriculum Outcomes (KSCOs)
	By the end of grade 12, students will be expected to:
GCO 4: Technology and Careers Students will be expected to demonstrate an understanding of current and evolving careers and of the influence of technology on the nature of work.	[4.401] assess and evaluate employability profiles for a variety of workplaces and careers and determine the level of technological literacy and capability they would need to achieve for job entry [4.402] employ design and invention as tools to create entrepreneurial activity [4.403] envision their short- and longer-term future and develop a plan for acquiring the technological literacy/capability required to achieve their vision
GCO 5: Technological Responsibility Students will be expected to demonstrate an understanding of the consequences of their technological choices.	[5.401] demonstrate responsible leadership in employing legal and ethical rules and principles. [5.402] demonstrate responsible leadership in employing health and safety rules and standards [5.403] demonstrate responsible leadership in taking proper measures to manage current and future technological risk

Course Overview

Communications Technology 2104 is designed to introduce students to a variety of multimedia technologies. Students acquire the requisite skills and knowledge to be proficient multimedia designers in graphics, audio, animation and video production. Although the course is organized in a linear arrangement there is tremendous flexibility in the order the units can be offered. In addition, the units can be offered as autonomous modules or they can be associated with a common theme such as a promotional campaign for a school or community group. The course is organized into five units:

- Unit 1: Introduction
- Unit 2: Graphic Production
- Unit 3: Audio Production
- Unit 4: Animation Production
- Unit 5: Video Production

Suggested Yearly Plan

Communications Technology 2104 is a 55 hour course. It is a one credit course and is intended to be offered in one semester. Historically, Communications Technology 2104 has been offered in semester one from September to January. Communications Technology 3104 is then offered in the second half of the year from February to June. While this arrangement is still recommended, it is important to note that Communications Technology 2104 is not a prerequisite for Communications Technology 3104. The content of the courses is completely different.

Communications Technology 2104 is written in a linear fashion with each unit covering a different media. The course can be offered as it is written but lends itself very well to a modular approach where students are working through skill building activities through a centre type organization then produces multimedia artifacts for a common purpose in one large design challenge in the last third of the course.

Unit 1 contains three subtopics. This unit should require approximately four hours to complete. A breakdown of the suggested hours of instruction are provided below:

Subtopic	# of classes
Evolution of Multimedia	2
Getting Organized	1
Media and Digital Citizenship	1

Unit 2 contains two subtopics. This unit should require approximately 12 hours to complete. A breakdown of the suggested hours of instruction are provided below:

Subtopic	# of classes
Introduction to Digital Graphics	4
Creating Digital Graphics	8

Unit 3 contains two subtopics. This unit should require approximately 12 hours to complete. A breakdown of the suggested hours of instruction are provided below:

Subtopic	# of classes
Introduction to Audio Production	4
Creating an Audio Production	8

Unit 4 contains two subtopics. This unit should require approximately 12 hours to complete. A breakdown of the suggested hours of instruction are provided below:

Subtopic	# of classes
Introduction to Animation	4
Plan and Create an Animation	8

Unit 5 contains two subtopics. This unit should require approximately 15 hours to complete. A breakdown of the suggested hours of instruction are provided below:

Subtopic	# of classes
Introduction to Video Production Devices	3
Plan and Create a Video Production	12

How to Use the Four Column Curriculum Layout

Outcomes

Column one contains specific curriculum outcomes (SCO) and accompanying delineations where appropriate. The delineations provide specificity in relation to key ideas.

Outcomes are numbered in ascending order

Delineations are indented and numbered as a subset of the originating SCO.

All outcomes are related to general curriculum outcomes.

Focus for Learning

Column two is intended to assist teachers with instructional planning. It also provides context and elaboration of the ideas identified in the first column.

This may include:

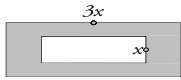
- references to prior knowledge
- clarity in terms of scope
- depth of treatment
- common misconceptions
- cautionary notes
- knowledge required to scaffold and challenge student's learning

Sample Performance Indicator(s)

This provides a summative, higher order activity, where the response would serve as a data source to help teachers assess the degree to which the student has achieved the outcome.

Performance indicators are typically presented as a task, which may include an introduction to establish a context. They would be assigned at the end of the teaching period allocated for the outcome.

Performance indicators would be assigned when students have attained a level of competence, with suggestions for teaching and assessment identified in column three.

SPECIFIC CURRICULUM OUTCOMES	
<i>GCO 1: Represent algebraic expressions in multiple ways</i>	
Outcomes	Focus for Learning
<p>Students will be expected to</p> <p>1.0 model, record and explain the operations of multiplication and division of polynomial expressions (limited to polynomials of degree less than or equal to 2) by monomials, concretely, pictorially and symbolically. [GCO 1]</p> <p>1.2 model division of a given polynomial expression by a given monomial concretely or pictorially and record the process symbolically.</p> <p>1.3 apply a personal strategy for multiplication and division of a given polynomial expression</p>	<p>From previous work with number operations, students should be aware that division is the inverse of multiplication. This can be extended to divide polynomials by monomials. The study of division should begin with division of a monomial by a monomial, progress to a polynomial by a scalar, and then to division of a polynomial by any monomial.</p> <p>Division of a polynomial by a monomial can be visualized using area models with algebra tiles. The most commonly used symbolic method of dividing a polynomial by a monomial at this level is to divide each term of the polynomial by the monomial, and then use the exponent laws to simplify. This method can also be easily modelled using tiles, where students use the sharing model for division.</p> <p>Because there are a variety of methods available to multiply or divide a polynomial by a monomial, students should be given the opportunity to apply their own personal strategies. They should be encouraged to use algebra tiles, area models, rules of exponents, the distributive property and repeated addition, or a combination of any of these methods, to multiply or divide polynomials. Regardless of the method used, students should be encouraged to record their work symbolically. Understanding the different approaches helps students develop flexible thinking.</p>
	<p>Sample Performance Indicator</p> <p>Write an expression for the missing dimensions of each rectangle and determine the area of the walkway in the following problem:</p> <ul style="list-style-type: none"> • The inside rectangle in the diagram below is a flower garden. The shaded area is a concrete walkway around it. The area of the flower garden is given by the expression $2x^2 + 4x$ and the area of the large rectangle, including the walkway and the flower garden, is $3x^2 + 6x$. 

SPECIFIC CURRICULUM OUTCOMES

GCO 1: Represent algebraic expressions in multiple ways

Sample Teaching and Assessment Strategies

Teachers may use the following activities and/or strategies aligned with the corresponding assessment tasks:

Modeling division using the sharing model provides a good transition to the symbolic representation. For example, $\frac{3x+12}{3} = \frac{3x}{3} + \frac{12}{3}$. To model this, students start with a collection of three x -tiles and 12 unit tiles and divide them into three groups.



For this example, $x + 4$ tiles will be a part of each group, so the quotient is $x + 4$.

Activation

Students may

- Model division of a polynomial by a monomial by creating a rectangle using four x^2 -tiles and eight x -tiles, where $4x$ is one of the dimensions.

Teachers may

- Ask students what the other dimension is and connect this to the symbolic representation.

Connection

Students may

- Model division of polynomials and determine the quotient

- $(6x^2 + 12x - 3) \div 3$
- $(4x^2 - 12x) \div 4x$

Consolidation

Students may

- Draw a rectangle with an area of $36a^2 + 12a$ and determine as many different dimensions as possible.

Teachers may

- Discuss why there are so many different possible dimensions.

Extension

Students may

- Determine the area of one face of a cube whose surface area is represented by the polynomial $24s^2$.
- Determine the length of an edge of the cube.

Resources and Notes

Authorized

- Math Makes Sense 9*
- Lesson 5.5: Multiplying and Dividing a Polynomial by a Constant
- Lesson 5.6: Multiplying and Dividing a Polynomial by a Monomial
- ProGuide: pp. 35-42, 43-51
- CD-ROM: Master 5.23, 5.24
- See It Videos and Animations:
 - Multiplying and Dividing a Polynomial by a Constant, Dividing
 - Multiplying and Dividing a Polynomial by a Monomial, Dividing
- SB: pp. 241-248, 249-257
- PB: pp. 206-213, 214-219

Resources and Notes

Column four references supplementary information and possible resources for use by teachers.

These references will provide details of resources suggested in column two and column three.

Suggestions for Teaching and Assessment

This column contains specific sample tasks, activities, and strategies that enable students to meet the goals of the SCOs and be successful with performance indicators. Instructional activities are recognized as possible sources of data for assessment purposes. Frequently, appropriate techniques and instruments for assessment purposes are recommended.

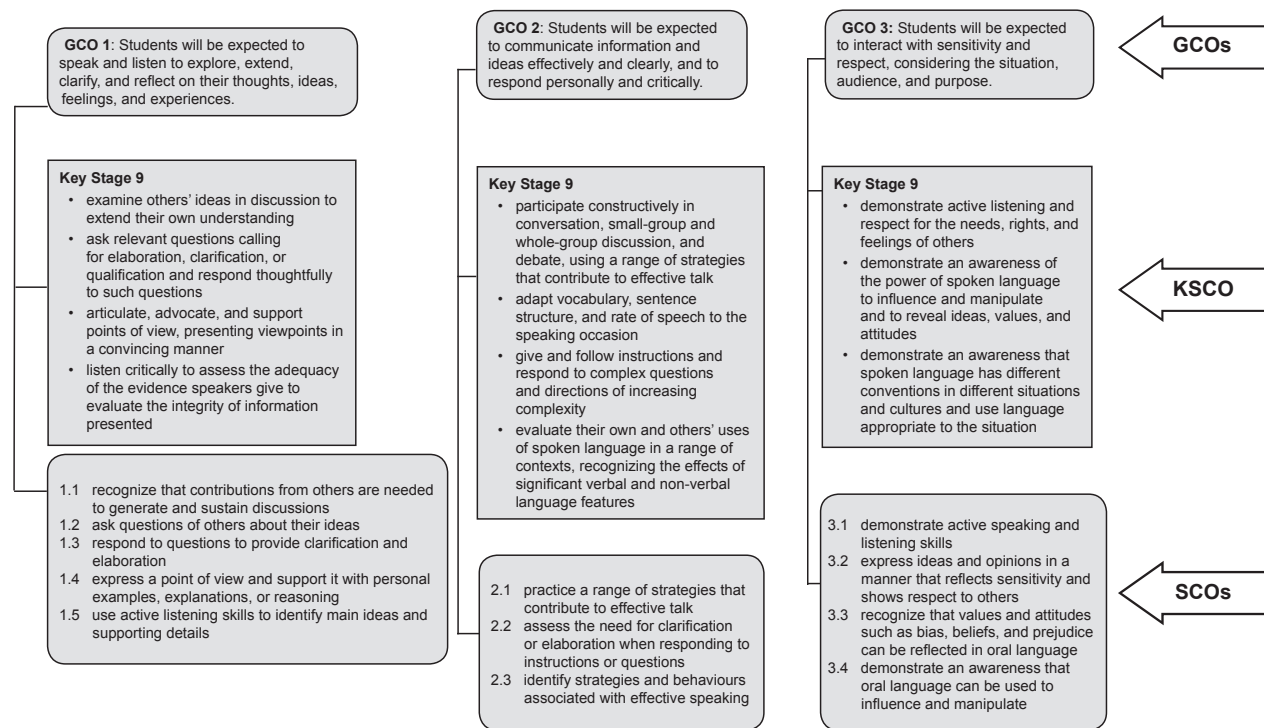
Suggestions for instruction and assessment are organized sequentially:

- Activation - suggestions that may be used to activate prior learning and establish a context for the instruction
- Connection - linking new information and experiences to existing knowledge inside or outside the curriculum area
- Consolidation - synthesizing and making new understandings
- Extension - suggestions that go beyond the scope of the outcome

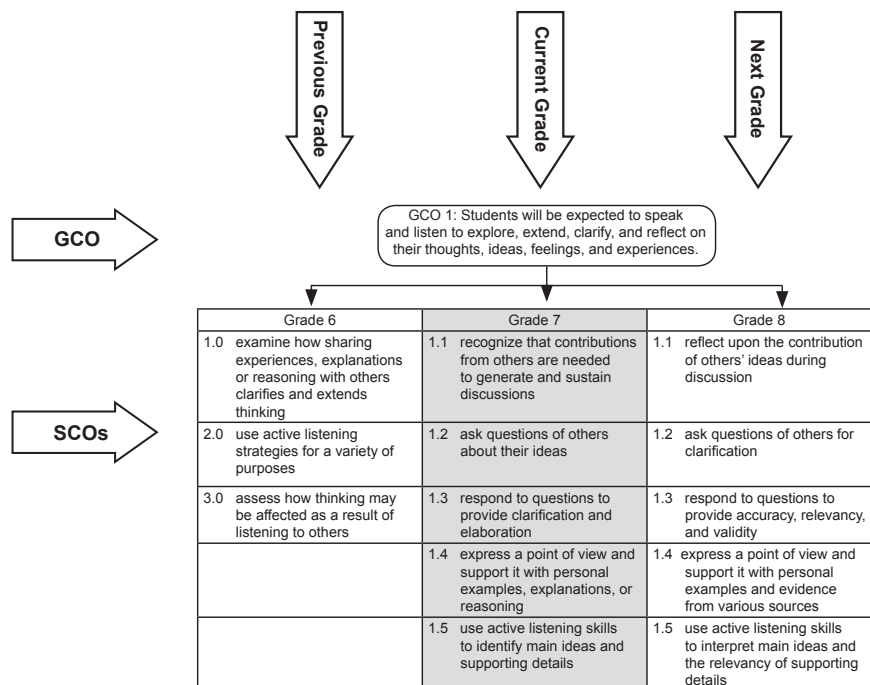
These suggestions provide opportunities for differentiated learning and assessment.

How to use a Strand overview

At the beginning of each strand grouping there is explanation of the focus for the strand and a flow chart identifying the relevant GCOs, KSCOs and SCOs.



The SCOs Continuum follows the chart to provide context for teaching and assessment for the grade/course in question. The current grade is highlighted in the chart.



Section Three: Specific Curriculum Outcomes

Unit 1: Introduction to Communications Technology

Focus

In this introductory unit students will explore concepts in multimedia and its significance in the world around them. Emphasis will be placed on forms of media, careers, media convergence, and digital citizenship. This unit will also provide the student the opportunity to get organized with the setup of their digital portfolio.

Outcomes Framework

GCO 1 (Technological Problem Solving): Students will be expected to design, develop, evaluate, and articulate technological solutions.

4.0 create a digital portfolio structure to present course work

GCO 3 (History and Evolution of Technology): Students will be expected to demonstrate an understanding of the history and evolution of technology, and of its social and cultural implications.

1.0 differentiate forms of media
3.0 identify examples of media convergence

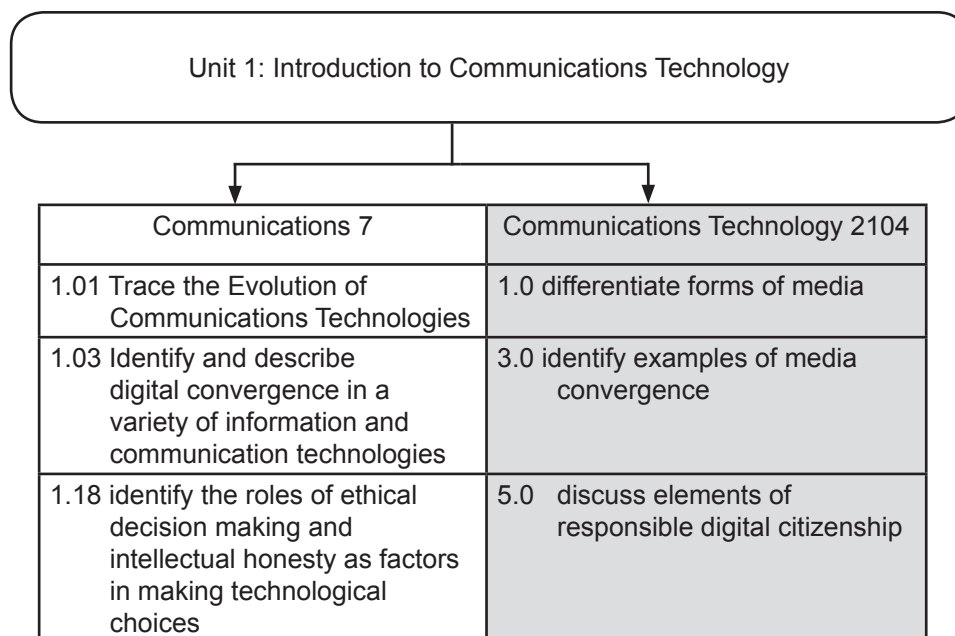
GCO 4 (Technology and Careers): Students will be expected to demonstrate an understanding of current and evolving careers and of the influence of technology on the nature of work.

2.0 identify careers associated with Information and Communication Technology

GCO 5 (Technological Responsibility): Students will be expected to demonstrate an understanding of the consequences of their technological choices.

5.0 discuss elements of responsible digital citizenship

SCO Continuum



Suggested Unit Plan

The suggested time for the introductory unit is four hours. Approaches to delivery of this unit may vary depending on the teacher preference. For example, teachers may wish to infuse the outcomes from this unit into the other units rather than deliver it separately.

Evolution of Multimedia

Outcomes

Students will be expected to

1.0 differentiate forms of media
[GCO 3]

2.0 identify careers associated
with Information and
Communication Technology
(ICT)
[GCO 4]

Focus for Learning

This outcome is intended to provide an overview of the forms of media used in communication technology.

Media is any means of encoding and recording information such that another person can retrieve and decode the content. Media is also what is produced when technological resources are used to communicate. Multimedia is the field concerned with the computer-controlled integration of text, graphics, drawings, still and moving images (video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally.

Teachers should briefly discuss and illustrate various forms of modern media such as audio (i.e., music and voice), print (i.e., text, pictures and drawings) and moving images (i.e., video and movies). Students should understand the various uses of the term media such as mass media, multimedia, social media, and streaming media.

Sample Performance Indicator

Create a graphic to represent the types of media and their interconnectedness.

Students should have the opportunity to explore some of the occupations and labor market trends in technology and telecommunications fields.

Teachers should emphasize the following points:

- Careers in technology can be organized into a variety of categories, which include occupations related to satellite, radio, television, cellular phone, computer and network hardware and software systems.
- Careers include design and construction of hardware and software for the ICT sector, as well as installation, service and maintenance.
- The ever changing nature of ICT ensures there will be future career opportunities for students that do not exist at the present time. As an example, the job of Mobile App Development Specialist did not exist ten years ago. It would be a valuable exercise if students were given the opportunity to predict how occupations will change in the future based on advances of ICT.

Students are not expected to conduct in depth research into specific occupations. The intent is to spark curiosity in students. This outcome can be infused into class time throughout the duration of the course rather than addressed in a specific block of time.

Sample Performance Indicator

In your course portfolios, reflect on three careers in the ICT industry and identify labor market trends that may affect these careers.

Evolution of Multimedia

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Lead a discussion about the evolution of different forms of media from print to digital media.
- Present the Technology cluster of occupations from the My Blueprint website. This information could be used in connection and extension activities.

Connection

Students may

- Identify the various forms of media associated with smartphone use.
- Create a graphic to represent the variety of career categories within the ICT industry.

Extension

Students may

- Complete a research project with on occupations in the ICT sector of the labor market.

Resources and Notes

Authorized

How Computers Work (Teacher Resource [TR])

- pp. 172, 176, 262, 276

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/introduction.html

- Media of Canada
- Evolution of News
- Social Media
- Digital Talent
- Technology Sector Analysis
- Skills Canada

Evolution of Multimedia

Outcomes

Students will be expected to

- 3.0 identify examples of media convergence
[GCO 3]

Focus for Learning

Students should have an opportunity to explore various examples of how media has converged to create common devices.

Media convergence is defined as the interlinking of computing and other information technologies, media content, and communication networks that have arisen as the result of the evolution and popularization of the Internet. In the early stages of this electronic age media forms were mostly separated. Television is an early example of convergence, as is the World Wide Web by the late 1990's and the smartphone in the present day.

For the past century, media has been thought of more in terms of the medium used to communicate, such as newspapers, magazines, radio, television, and movies, audio tape, CDs and DVDs. These are broadcast mediums.

Examples of media convergence include the following:

- Newspapers as a medium existed independently. As media technologies evolved, newspapers converged with digital network to create large news network accessible instantly from any mobile device.
- Televisions initially existed as stand alone units that pulled video and audio signals from the airwaves. When technologies converged the television became hardwired to large media networks initially called cable TV. Currently these devices are converging with more advanced networks and streaming services such as Netflix.
- Some automatic washers and dryers have converged with network technologies so that they can currently be controlled by mobile devices.

It is common for students to reflect on devices such as a smartphone as simply a communications device. It is important to see the context of how a variety of previously independent technologies converge to make the smartphone.

Students do not need to do in-depth research on media convergence. They should be challenged, however, to view common devices as the convergence of a variety of technologies each with a history of their own.

Sample Performance Indicator

Select a technological device and discuss how you think it is the result of the convergence of a variety of other technologies.

Evolution of Multimedia

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Demonstrate various media formats and how these formats can be combined to form multimedia documents.

Connection

Students may

- Create a timeline highlighting ten significant events in media development.

Consolidation

Students may

- Create a presentation on a form of media that explains why this is an example of media convergence.

Extension

Students may

- Demonstrate the use of social media and how it is a convergence of media.
- Examine consumer devices in commercials and determine the convergence that has taken place for those devices to be functional.

Resources and Notes

Authorized

How Computers Work (TR)

- pp. 172, 176-177

Getting Organized

Outcomes

Students will be expected to

- 4.0 create a digital portfolio structure to present course work
[GCO 1]

Focus for Learning

The purpose of this outcome is to have each student document their work in the form of a digital portfolio.

The digital portfolio is a significant assessment tool for this course. It will be the place where students will store and display most of their course work.

It should contain

- a daily log of activities,
- an area to publish student work,
- a log entry for each class, and
- an area for reflection activities.

Because of time restraints teachers may wish to provide a prescribed structure for the digital portfolio. All portfolios should have the same structure but should also have opportunities to show creativity and personalization.

Sample Performance Indicator

Using your personal web space, create a well planned site for a digital portfolio of your course work. The portfolio should reflect your own creativity but should include a separate page for the documentation and final product of each project you will complete throughout the course. Use the evaluation scheme for the course to guide your organization. Please ensure there is adequate navigation between the pages of your portfolio.

Getting Organized

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Use portfolios from previous years as samples of what a digital portfolio should look like.

Students may

- Students may brainstorm ideas to make their digital portfolio reflect their own creativity while still maintaining its functionality as a repository of their work throughout the course.

Resources and Notes

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/introduction.html

- 7 Important Questions

Media and Digital Citizenship

Outcomes

Students will be expected to

- 5.0 discuss elements of responsible digital citizenship
[GCO 5]

Focus for Learning

The importance of copyright and ownership issues when creating, remixing and/or using other people's intellectual property should be emphasized to students.

Teachers should emphasize best practices for finding legal use web media. Choose a freeware or open source tool from those suggested by your teacher to create a bitmap image for a specific purpose. Google®, for example, has a search tools option that will allow users to filter searches based upon usage rights granted. There are other websites that host a repository of legal use media files. In addition, a variety of websites provide high quality legal use media files for student projects.

Teachers should emphasize

- privacy rights in online environments;
- the importance of accessing, referencing and utilizing legal use sources of information in projects;
- realities of cyberbullying and its legal ramifications; and
- moderation of "screen time" and "real world" activities.

Sample Performance Indicator

- Collect five high quality media files that are legal-use and appropriate for future projects.
- Using a spreadsheet, graph your screen time activities for one week.

Media and Digital Citizenship

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Demonstrate proper online etiquette and referencing of resources.
- Discuss with students the concepts of intellectual property and copyright, and the importance of referencing sources.

Connection

Students may

- Use the key elements (i.e., privacy, legal use, and cyber-bullying) of responsible digital citizenship to create a trivia challenge that will focus on good and bad digital etiquette.

Consolidation

Students may

- Practice the creation of references and bibliographies for digital media.

Resources and Notes

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/introduction.html

- Media Smarts
- Common Sense Media
- Digital Citizenship

Section Three: Specific Curriculum Outcomes

Unit 2: Graphics Production

Focus

In this unit students will explore concepts and build skills in creating both vector and bitmapped graphics. They will first explore the technical elements of digital graphics, become familiar with the main differences of bitmapped and vector graphics and then using principles of visual design, they will create original bitmapped and vector graphics. Once this unit is complete students should be familiar with open source options for graphic design software and be proficient in creating original images with a clear purpose.

Outcomes Framework

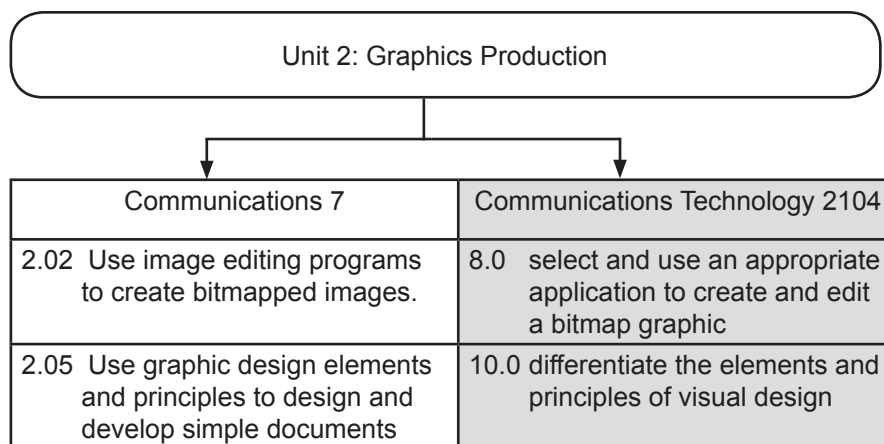
GCO 1 (Technological Problem Solving): Students will be expected to design, develop, evaluate, and articulate technological solutions.

- 8.0 select and use an appropriate application to create and edit a bitmap graphic
- 9.0 select and use an appropriate application to create a vector graphic
- 10.0 differentiate the elements and principles of visual design

GCO 2 (Technological Systems): Students will be expected to operate and manage technological systems.

- 6.0 identify the technical elements of digital graphics
- 7.0 differentiate between bitmap and vector graphics
- 10.0 differentiate the elements and principles of visual design

SCO Continuum



Suggested Unit Plan

The Graphic Production Unit should take approximately 12 hours to complete. Approaches to delivery of this unit may vary depending on the teacher preference. There is flexibility in its approach and how it can be integrated with other units in this course. It is recommended that, wherever possible, teachers incorporate problem solving into the day to day activities of this course.

Introduction to Digital Graphics

Outcomes

Students will be expected to

- 6.0 identify the technical elements of digital graphics [GCO 2]

Focus for Learning

This outcome will give students the opportunity to explore technical elements of image production and reproduction. This will require examination of fundamentals of capture technologies, storage formats, and display technologies. Examination should include dimension, resolution, pixel, colour depth, file size, storage format.

- Image resolution is usually expressed in pixels per inch, or ppi. This is also called dots per inch, or dpi.
- Higher resolution means bigger file size. Resolution of a screen is determined by the dot pitch. Smaller dot pitch gives more pixels to the inch, and means higher resolution.
- Image bit depth works the same as monitor bit depth. Each pixel's colour can be set independently.
- The higher the bit depth, the more colours available. More colours means a better quality image and a larger file size.

All software have native proprietary formats that have the ability to export to other needed formats. Coreldraw© for example, uses files that have a .cdr extension. If you create a file in Coreldraw© and need to use it on a web page, it has to be exported as a .jpg, .gif, or some other format that a web browser will display.

Emphasis should be placed on the basics of how digital imagery is manipulated by various current display technologies. While display technologies are constantly evolving, they are built on the same basic technological elements.

Sample Performance Indicator

Use image editing software to create different types of images at various colour and bit depth to demonstrate the effects on image quality.

Introduction to Digital Graphics

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Present to the students images of varying quality. Each subsequent image should have a higher resolution and in turn higher file size demonstrating the differences of dpi and colour depth.

Consolidation

Students may

- Create a variety of images (such as with a scanner, digital camera, paint program) with different resolutions and comment on the impact of the different resolutions.
- Identify low resolution images in a variety of publications.
- Download a low resolution image from the Internet and analyze its true size and resolution using graphic design software.

Extension

Students may

- Use technical knowledge of image creation to submit work in an appropriate format/resolution.

Resources and Notes

Authorized

How Computers Work (Teacher Resource [TR])

- p. 86

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/graphics.html

- Design Elements

Creating Digital Graphics

Outcomes

Students will be expected to

- 7.0 differentiate between the elements and principles of visual design
[GCO 1/2]

Focus for Learning

Graphics are composed of the basic elements line, shape, form, texture and colour. These may appear as defined, or physical, features. But sometimes a line, shape or form may be implied by the arrangement of the elements in a graphic.

The principles of visual design are: proportion, balance, contrast, pattern, proximity, alignment, repetition, rhythm, whitespace and unity.

Sample Performance Indicator

Go to a creative commons image site. Select five images and describe in detail how these images use the elements and principles of design.

Creating Digital Graphics

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Using examples from a creative commons image site, discuss the elements and principles of visual design with the class.

Connection

Students may

- Explain how elements and principles of visual design are used with images that are provided by the teacher.
- Using paper and pencil, create a sketch that incorporates three principles of design.

Extension

Students may

- Analyze a series of images and describe the effects created by the elements and principles of design.

Resources and Notes

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/graphics.html

- Elements and Principles
- Incredible Art
- Interactive Design

Introduction to Digital Graphics

Outcomes

Students will be expected to

- 8.0 differentiate between
bitmap and vector graphics
[GCO 2]

Focus for Learning

Bitmap graphics, also called raster graphics, are digital images that are composed of tiny rectangular pixels, or picture elements, that are arranged in a grid or raster of x and y coordinates (includes a z coordinate in case of 3D) in such a way that it forms an image. It is also referred to as bitmap since it has information that is mapped directly to the display's grid.

The file size of a bitmap image depends also on the size of the image, which is determined by the number of pixels being used in the image. This means that an image with a 1280x720 resolution will contain 921 600 pixels while a full HD 1920x1080 image will have 2 073 600 pixels, which will obviously give it a bigger file size when compared to the former.

Vectors are constructed from mathematical formulae which describe lines, shapes, colours, position, and orientation. Information includes line colour and fill colour. A variety of fills are possible including solid colours, patterns, graduated fills and texture fills. Because the image is described in mathematical terms

- the file size is very small when compared to a bitmap;
- the image can be made larger or smaller without any loss of quality;
- all objects in the image retain their separate identity and can be edited at any time;
- text is also a vector object and can be stretched, twisted, and distorted to fit any outline you wish; and
- lines and fills can be given varying levels of transparency.

Every effort should be made to make connections between previously taught mathematics concepts and mathematical concepts in vector images.

Vector images are best used for logos and illustrations. Raster images are the standard in digital photography and are commonly used for all graphics once they are published digitally.

Sample Performance Indicator

Analyze a series of graphic design problems and suggest the best solution by selecting the best image format and resolution. Include the best solution for a graphic that will be used in a

- webpage,
- brochure,
- video titling,
- newspaper, and
- technical design.

Introduction to Digital Graphics

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Discuss bitmap and vector graphics with students outlining what each is, when each would be used, and give examples of each.
- Make connections between coordinate systems used in bitmap graphics and coordinate systems used in mathematics.

Connection

Students may

- document the images they encounter in a day and tell whether they are bitmap or vector images. They should explain their choice for each example.

Consolidation

Students may

- Use their knowledge of bitmap and vector graphics and Complete an activity on whether a specific image should be a bitmap or a vector image. For example:
 - Graduation pics are an example of _____.
 - Billboard graphics are an example of _____.

Extension

Students may

- Apply their knowledge of bitmap and vector graphics to select the correct image format as they create and use graphics throughout this course.

Resources and Notes

Authorized

How Computers Work (TR)

- p. 100

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/graphics.html

- What is a Raster Graphic
- Vector Graphics

Creating Digital Graphics

Outcomes

Students will be expected to

9.0 select and use an appropriate application to create and edit a bitmap graphic
[GCO 1]

10.0 select and use an appropriate application to create a vector graphic
[GCO 1]

Focus for Learning

Students should select appropriate tools to create, edit and publish bitmap graphics

When creating bitmap graphics, the graphic designer has to be aware of proper resolution, colour bit depth, and export format. The image has to be suitable to the output format it is being designed for.

There are a variety of tools that can be used to capture and manipulate graphics (e.g., camera, scanner, stock images).

Once graphics are created they can be edited through the use of basic editing software and basic tools such as; selection, crop, drawing tools, type tools, retouching, layering. editing tools could include GIMP®, Adobe PhotoShop®, Corel Photo Paint®, Microsoft Paint®, or a variety of web-based or tablet-based options.

When creating or editing a graphic, consideration must be given to audience and the type of medium to be used for display. For example, an image for website selling natural cosmetics will have different technical specifications and format than an image of an automobile to be published on a billboard.

Sample Performance Indicator

Choose a freeware or open source tool from those suggested by your teacher to create a bitmap image for a specific purpose.

Student should select appropriate tools and use those tools to create, edit and publish vector graphics. Students should manipulate layers, vectors, arrangement of layers, node editing, and shape tools. Students can use tools such as Coreldraw(c), Inkscape(c), or Google Sketchup(c). The selection of the tool will depend on what is installed on the computer and what web based applications they have access to.

When creating vector graphics, the graphic designer has to be aware of proper selection of resolution, colour bit depth, and export format suitable to the output format they are designing for.

Consideration must be given to audience and the type of medium to be used for display. Students need to consider the following:

- Is the image appealing to young professionals, youth or seniors?
- Will the image be used online or in a magazine?

Sample Performance Indicator

Choose a freeware or open source tool from those suggested by your teacher to create a vector image for a specific purpose..

Creating Digital Graphics

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Clone him or her self from one graphic into another to demonstrate the manipulation of a bitmap image.
- Demonstrate the use of a graphics software to create and edit a vector graphic. This will include the demonstration of a variety of tools and layering methods.

Connection

Students may

- Create one graphic from two source graphics.
- Use an application to manipulate a vector graphic.

Consolidation

Students may

- Create their own graphic from two source graphics.
- Create a new profile picture.
- Create their own graphic logo. It could be a personal brand or a brand for an organization or company.

Resources and Notes

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/graphics.html

- GIMP Tutorials
- Shortcut Keys
- GIMP Basics
- YouTube Videos
- Inkscape for Beginners
- How to Convert a .jpeg

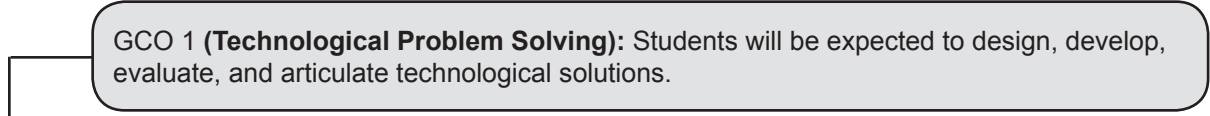
Section Three: Specific Curriculum Outcomes

Unit 3: Audio Production

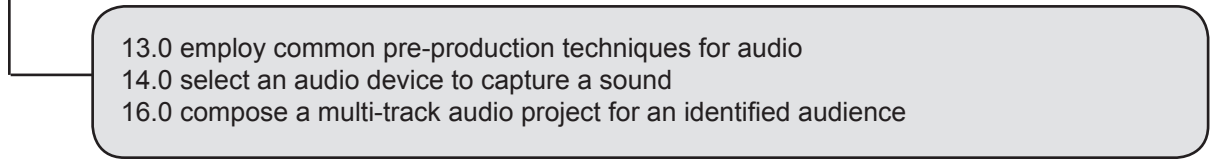
Focus

In this unit students will explore concepts and build skills in creating audio productions. They will first explore the technical elements of an audio file; they will become familiar with common devices for capturing audio; then using preproduction techniques will plan an audio production. Once this unit is complete students should be familiar with open source options for audio production and be proficient in creating multi track audio products for a specific application.

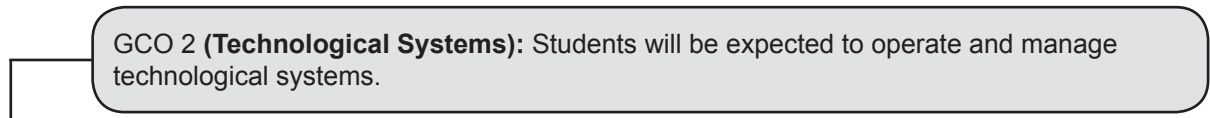
Outcomes Framework



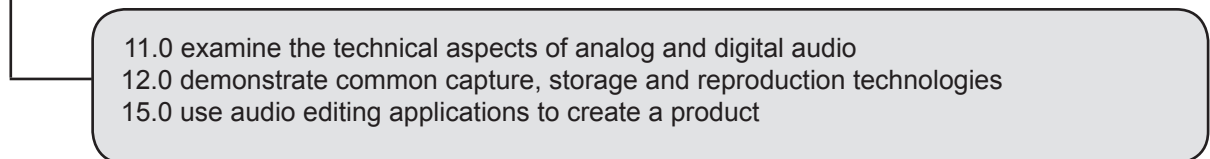
GCO 1 (Technological Problem Solving): Students will be expected to design, develop, evaluate, and articulate technological solutions.



13.0 employ common pre-production techniques for audio
14.0 select an audio device to capture a sound
16.0 compose a multi-track audio project for an identified audience

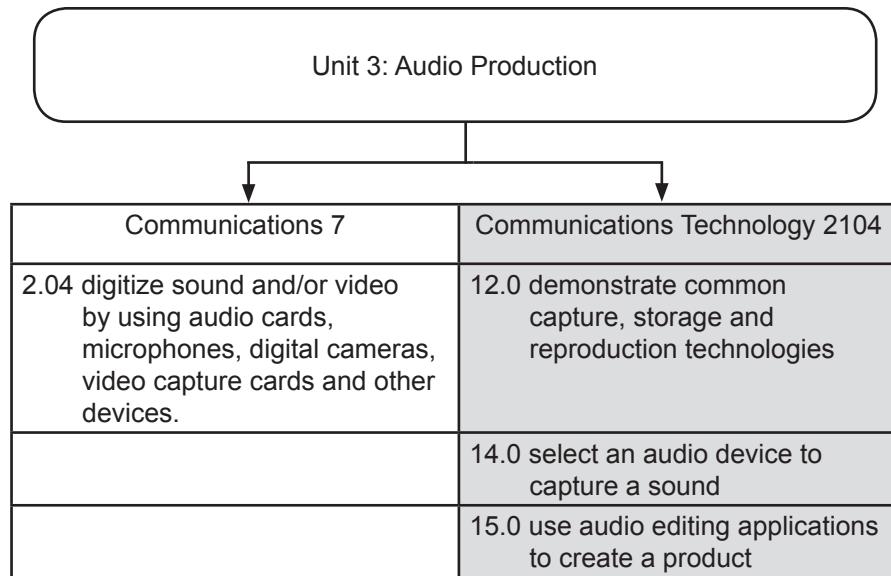


GCO 2 (Technological Systems): Students will be expected to operate and manage technological systems.



11.0 examine the technical aspects of analog and digital audio
12.0 demonstrate common capture, storage and reproduction technologies
15.0 use audio editing applications to create a product

SCO Continuum



Suggested Unit Plan

The audio production unit should take approximately 12 hours to complete. Approaches to delivery of this unit may vary depending on the teacher preference. There is flexibility in its approach and how it can be integrated with other units in this course. It is recommended that wherever possible, teachers incorporate problem solving into the day to day activities of this course.

Introduction to Audio Production

Outcomes

Students will be expected to

11.0 examine the technical aspects of analog and digital audio
[GCO 2]

12.0 use common audio capture, and storage and technologies
[GCO 2]

Focus for Learning

Audio refers to sound which may be captured and stored in a medium in either analog or digital formats. Analog refers to audio recorded using methods that replicate the original sound waves. Vinyl records and cassette tapes are examples of analog mediums. Digital audio is recorded by taking samples of the original sound wave at a specified digital sampling rate which is used to store and later reproduce the sample as an analog - audible sound.

Students should be able to identify analog sound capture devices, and reproduction devices such as transducer microphones, vinyl records and cassette tapes, and sound amplifiers.

After attaining this outcome students should be able to identify digital sound storage methods and formats. They should be familiar with sound sampling rates for analog to digital conversion (ADC), and the process of reproducing and amplifying sound from digital files, digital to analog conversion (DAC).

Digital audio only refers to a capturing and storage format. All audio must be converted to an analog audio wave for hearing to take place. The human ear can only sense analog pressure waves.

Sample Performance Indicator

Analyze graphical representations of analog and digital waves.
Record the similarities and differences between the two waveforms.

Teachers should discuss how sound is captured and stored using devices such as a standalone microphone or a built in microphone in various devices such as a smartphone or tablet.

Students should

- explore various applications such as Audacity© and Itunes© for saving and formatting audio captures as storage files;
- be able to select appropriate audio file formats based presentation platform. Consideration should be given to playback devices and how the file is going to be used as a final product;
- be aware of key characteristics of audio file formats such as files size and compatibility; and
- be aware of the major categories of audio files and the major formats:
 - Uncompressed audio formats (PCM, WAV, AIFF)
 - Lossy Compressed audio formats (MP3, AAC, OGG)
 - Lossless Compressed audio formats (FLAC, ALAC, WMA)

Sample Performance Indicator

Create a graphic organizer that depicts capture, storage, and reproduction methods.

Introduction to Audio Production

Sample Teaching and Assessment Strategies

Activation

Teacher may

- Demonstrate analog (cassette tapes, vinyl records, etc.) and digital (CD, MP3, DVD, etc) audio technologies.
- Demonstrate the use of common tools, such as Microsoft Sound Recorder®, to capture sound files, play back the clip and store the clip.

Connection

Students may

- Capture sound clips onto their computer or digital device, play back the clip and store the clip in a particular format.

Consolidation

Students may

- Research analogue devices and identify how they have been upgraded to newer digital technology, such as cassette to MP3 format.
- Test and evaluate sound captures with various capture devices and software applications.

Resources and Notes

Authorized

How Computers Work (Teacher Resource [TR])

- pp. 16, 170, 217-219, 240-241, 245

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/graphics.html

- Evolution
- Analog vs Digital
- Audacity Manual
- Alalog to Digital Conversion
- Recording with Audacity
- Various Mediums
- Using Smartphones

Introduction to Audio Production

Outcomes

Students will be expected to

13.0 employ common pre-production techniques for audio
[GCO 1]

Focus for Learning

Students should employ appropriate production planning techniques:

- Consider your audience. Students should be able to articulate who their particular sound track is designed for. They should also take the time to articulate some of the traits of the audience that may influence the sound track.
- Write a script/storyboarding. The script and the storyboard is key to minimizing recording and editing time. They are the guides that control the whole production. Students need be aware of the importance of a solid plan for any media production.
- Gather needed background/content music/sound. In this stage students should be adhering to rules of copyright. Any non-original content must come from a creative commons source.
- Consider the recording software and device. Selecting software and hardware to complete a specific project is a significant learning opportunity. Students should consider the location of the recording and the type of microphone that would be appropriate. Sometimes keeping the hardware and software straight forward is the best decision.

Sample Performance Indicator

Submit a thorough plan for an audio production that includes the appropriate planning techniques.

Introduction to Audio Production

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Play a local radio station advertisement and engage students in a discussion of the planning of this advertisement.

Connection

Students may

- Listen to their favourite ad, either radio or tv, and analyze it based on the selected audience, background noises/music, etc.

Consolidation

Students may

- Plan a radio advertisement for a local product/business.

Resources and Notes

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/audio.html

- Templates for Pre-Production

Creating an Audio Production

Outcomes

Students will be expected to

14.0 select an audio device to capture a sound
[GCO 1]

15.0 use audio editing applications to create a product
[GCO 2]

Focus for Learning

Teachers should demonstrate selecting suitable recording device(s) and recording software. Consideration can be given to using

- computers with microphones (built in or external);
- mobile devices such as tablets with built in microphones, and smartphones;
- built in audio recording utilities or third party applications; and
- selecting appropriate file output formats for project editing versus final output format for end user use on selected platforms.

Time should be spent discussing the different kinds of microphones and their particular application. Microphone types could include

- condenser microphone,
- dynamic microphone,
- electret microphone, and
- MEMS microphone.

Sample Performance Indicator

Capture an audio sample using two different audio devices. Discuss which was the better device and provide reasons why you made this choice.

Teachers should demonstrate a variety of audio editing skills:

- Record an original clip.
- Find and utilize sound files from copyright-legal libraries.
- Import from an audio file.
- Manipulate a sound clip by applying a variety of features, such as
 - copy / paste,
 - fade in / fade out,
 - timeshifting,
 - change speed, and
 - amplify.
- Edit single track and multitrack projects.

Once this outcome is completed, students should be able to manipulate audio editing software and create a final product using multiple tracks.

Sample Performance Indicator

Create an audio file of a radio ad that uses at least two original sound tracks.

Creating an Audio Production

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Demonstrate the use of an audio device to capture a sample.
- Demonstrate various editing techniques in an audio editing application. These techniques should include: cut, copy, paste, move, trim, delete, mute.

Connection

Students may

- Work through a step by step tutorial to capture and save audio files.
- Work through skill building activities to employ the basic audio editing tools (e.g., cut, copy, paste, move, trimming, delete, mute, etc).

Consolidation

Students may

- Plan and build an audio file and save it in the appropriate format.
- Use editing skills to create their own audio project, such as a radio ad for a local business or product.

Extension

Students may

- Use proper file format for audio files for various uses and audiences.

Resources and Notes

Authorized

How Computers Work (TR)

- pp. 240-241, 170

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/audio.html

- Recording with Audacity
- Various Mediums
- Using Smartphones

Creating an Audio Production

Outcomes

Students will be expected to

16.0 compose a multi-track audio project for an identified audience [GCO 1]

Focus for Learning

Students will create and share a multi-track audio project for a specific audience. This product will demonstrate the use of three separate audio tracks. Two of the three tracks will need to be original work. The third track can be a creative commons or copyright free element.

This will involve planning, recording / importing and editing of single tracks, and exporting of a product. Post-production should involve screening and revising prior to final sharing of the product.

Assessment of the project should include documentation of the three stages of production which should include a storyboard or script plan and submission of both the project audio file and the final exported audio file.

Sample performance Indicator

Create a 30 second radio-style sound file that incorporates only original or legal use sounds.

Creating an Audio Production

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Demonstrate the multitrack capabilities of an audio software such as Audacity®.

Connection

Students may

- Work through skill building activities to create a product on multiple tracks. Links to suggested skill builders are provided in column four.

Consolidation

Students may

- Use the multitrack editing software to create their own audio project such as a radio ad for a local business or product.

Resources and Notes

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/audio.html

- Recording with Audacity

Section Three: Specific Curriculum Outcomes

Unit 4: Animation Production

Focus

In this unit students will explore concepts and build skills in creating animation productions. They will first explore the techniques used in animation production; they will become familiar with common preproduction methods for animation planning; then using preproduction methods will plan and compose an animation. Once this unit is complete students should be familiar with open source options for animation production and be proficient in creating 2D animations.

Outcomes Framework

GCO 1 (Technological Problem Solving): Students will be expected to design, develop, evaluate, and articulate technological solutions.

17.0 differentiate among animation techniques used in production
19.0 compose an animation to complement an audio track
20.0 select and use digital animation tools to create a frame-by-frame animation

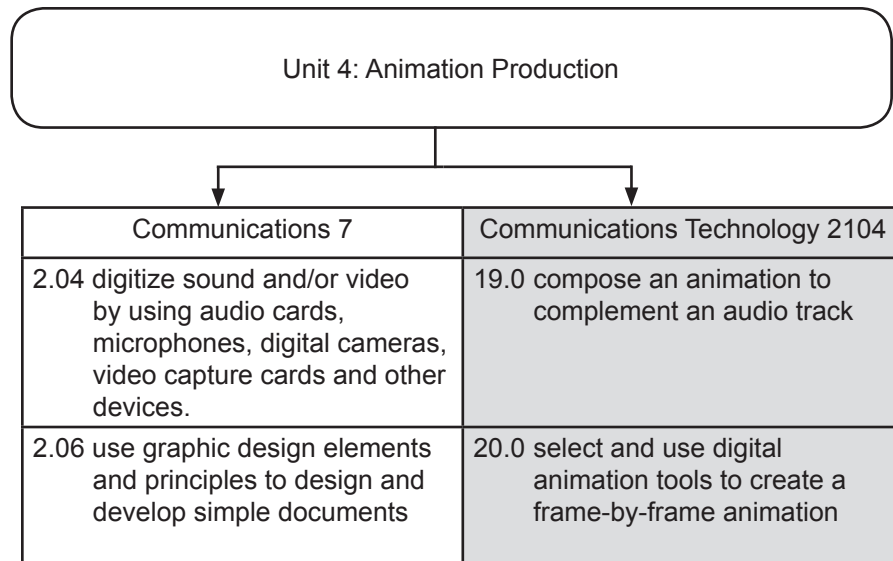
GCO 2 (Technological Systems): Students will be expected to operate and manage technological systems.

19.0 compose an animation to complement an audio track
18.0 employ common pre-production techniques for digital animation planning

GCO 5 (Technological Responsibility): Students will be expected to demonstrate an understanding of the consequences of their technological choices.

20.0 select and use digital animation tools to create a frame-by-frame animation

SCO Continuum



Suggested Unit Plan

The animation production unit should take approximately 12 hours to complete. Approaches to delivery of this unit may vary depending on the teacher preference. There is flexibility in its approach and how it can be integrated with other units in this course. It is recommended that wherever possible, teachers incorporate problem solving into the day to day activities of this course.

Introduction to Animation

Outcomes

Students will be expected to

17.0 differentiate among animation techniques used in production.
[GCO 1]

Focus for Learning

Students should explore the different types of animation techniques used in production. Students should be able to differentiate between the following techniques:

- Stop motion is an animation technique that physically manipulates an object so that it appears to move on its own. The object is moved in small increments between individually photographed frames, creating the illusion of movement when the series of frames is played as a fast sequence.
- Computer animation is the process of manipulating a series of digital images with an animation application to produce a finished product.
- Claymation is a type of stop motion animation where the figures being animated are made of malleable clay and are photographed in a series of positions. The photographs are then assembled digitally to show motion.
- Animatronics is the use of electronic sensors, motors and actuators to give an inanimate object life like qualities. Animatronics is widely used in the movie industry.
- Cel animation is short for celluloid animation. It is the traditional approach to animation where artists drew a series of images on transparent sheets of celluloid. This process has been in some cases modernized to incorporate computer animation techniques to make the finished product.
- Image warping is the process of digitally distorting an image either for artistic purposes or correcting distortions in an image.

Sample Performance Indicator

Search the internet for samples of each of these techniques. Link the samples from your course portfolio and explain why you think the sample is an example of animation techniques.

*Introduction to Animation***Sample Teaching and Assessment Strategies****Activation**

Teachers may

- In a whole group discussion, provide students with samples of each animation technique.

Connection

Students may

- List basic animation techniques used in movies, television shows, and commercials.
- Students may collect samples of a variety of animation techniques and display them in their digital portfolio.

Resources and Notes**Suggested**

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/animation.html

- Types of Animation

Plan and Create an Animation

Outcomes

Students will be expected to

18.0 employ common pre-production techniques for digital animation planning [GCO 2]

Focus for Learning

This outcome will allow for the discussion of the succession from pre-production to completed product.

The pre-production techniques used for animation are similar to those used for audio production:

- Consider your audience. Students should be able to articulate who their animation is designed for. They should also take the time to articulate some of the traits of the audience that may influence the animation.
- Write a script/storyboarding. The script and the storyboard are key to minimizing production time. They are the guides that control the whole production. Students need be aware of the importance of a solid plan for any media production.
- Gather needed background/content. In this stage students should be adhering to rules of copyright. Any non-original content must come from a creative commons source.
- Consideration of software and devices. Selecting software and hardware to complete a specific project is a significant learning opportunity. Students should consider the final location of the animation. They should consider the types of file formats that would be best for the final product.

Sample Performance Indicator

Create a storyboard in your digital portfolio that follows the concepts of pre-production.

Plan and Create an Animation

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Demonstrate storyboarding by using a sample of a storyboard retrieved from the Internet.
- Introduce an idea for an animation in class and then, working along with the students, create a pre-production plan.

Connection

Students may

- Generate pre-production ideas for a given animation production. Students can predict the audience, storyboard and other details of the pre-production work.

Extension

Students may

Reflect on the connection between pre-production techniques in animation and other types of planning in areas such as Science and English Language Arts.

Resources and Notes

Authorized

How Computers Work (TR)

- pp. 98, 100, 102

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/animation.html

- Bouncing Ball
- The Story of Animation
- The Animation Production

Plan and Create an Animation

Outcomes

Students will be expected to

19.0 compose an animation to complement an audio track
[GCO 1/2]

Focus for Learning

Students should build their skills in the art of creating an animation that corresponds with the tempo and beat of a sound track. Students will experience first hand the importance a sound track plays in the development of good animation production. The development of the audio track should be in conjunction with the storyline of the animation. Students should keep in mind that key frames require key sound cues to emphasize the storyline. The audio track could be the track produced in the audio unit or students could provide their own audio track. Alternatively, the teacher could provide a royalty free track for each student to work with. Regardless of how this is completed the goal is for students to create an animation that corresponds well with a piece of audio.

The tracks the student uses for this particular animation should be limited to a maximum of ten seconds. Students may use whatever animation technologies they prefer to create this product.

This outcome is a great opportunity for students to practice a guided design challenge that incorporates the concepts of pre-production from the previous outcome. Teachers can actively take students through the stages of pre-production.

Sample Performance Indicator

Create a short animation that complements an audio track of approximately ten seconds in length.

20.0 select and use digital animation tools to create a frame-by-frame animation
[GCO 1/5]

Students should create a cel animation. This animation should be created using the skills acquired in this unit. This outcome provides an opportunity for students to complete a culminating activity.

Students will need to plan out their animation using pre-production techniques. During this process, it is important that students make choices as to which applications or combinations of applications they will have to use to create their product. The final product should have at least one sound track and a video track.

Sample Performance Indicator

Using animation techniques learned in this unit, create an animation with at least one audio track and one video track to create an emotion or deliver a message to the viewer.

Plan and Create an Animation

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Show the students a series of examples of animations that use a soundtrack only.
- Lead a discussion with students about the types of emotion the sound track creates in its support of the video track.
- Review the concepts and skills acquired through previous outcomes to prepare students for creating their own animation project.

Connection

Students may

- View samples of animations and reflect on what emotions are being supported by the sound track.
- Create a short ten second animation for a given audio track.
- Work in design teams to plan and create an animated production.

Extension

Students may

- Analyze the sound tracks from feature length animations and reflect on how the soundtrack supports the video track.
- Select an appropriate current events issue and create an animation that makes a statement on that issue.
- Interview a representative from an organization with the intent of creating a custom animation for their particular cause.

Resources and Notes

Authorized

How Computers Work (TR)

- pp. 240-247

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/animation.html

- Adding Sound to Pencil
- Pencil Animation
- The Vision for Pencil
- Pencil 2
- How to Use Pencil

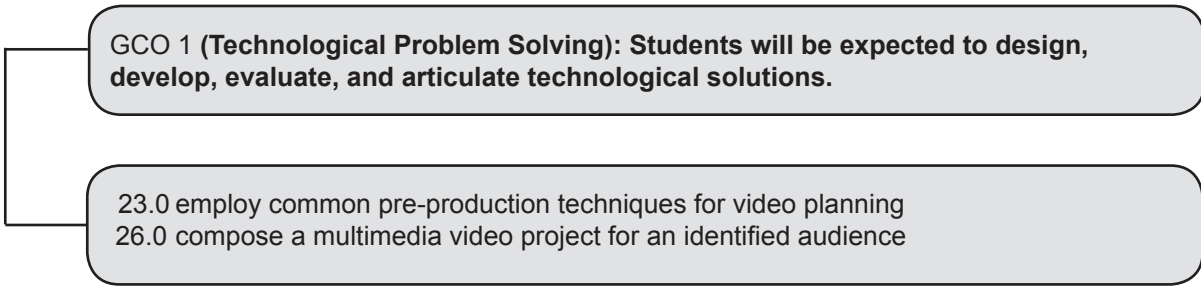
Section Three: Specific Curriculum Outcomes

Unit 5: Video Production

Focus

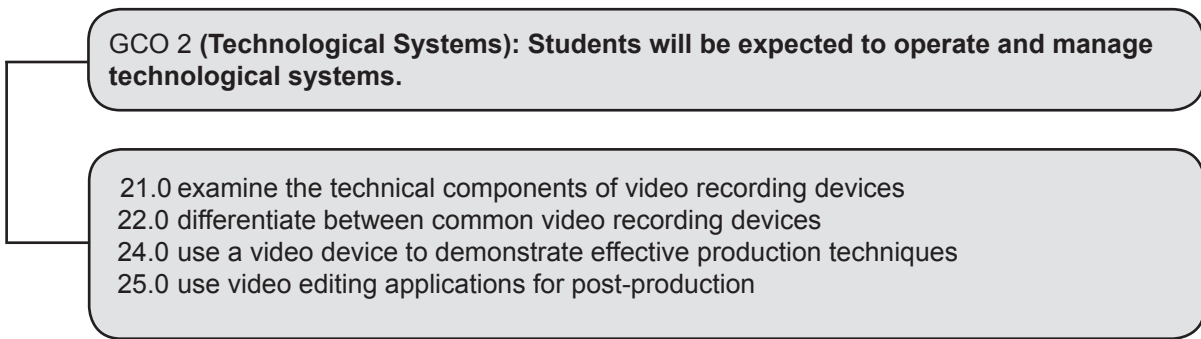
In this unit students will explore concepts and build skills in creating video productions. They will first explore the technical elements of a variety of video capture devices; then using pre-production techniques will plan a video production. Students will use a recording device and skills learned in the pre-production stage to create a video production. Once this unit is complete students should be familiar with open source options for video production and be proficient in creating multi track video production for a specific application.

Outcomes Framework



GCO 1 (Technological Problem Solving): Students will be expected to design, develop, evaluate, and articulate technological solutions.

23.0 employ common pre-production techniques for video planning
26.0 compose a multimedia video project for an identified audience



GCO 2 (Technological Systems): Students will be expected to operate and manage technological systems.

21.0 examine the technical components of video recording devices
22.0 differentiate between common video recording devices
24.0 use a video device to demonstrate effective production techniques
25.0 use video editing applications for post-production

Suggested Unit Plan

The Video Production unit should take approximately 15 hours to complete. Approaches to delivery of this unit may vary depending on the teacher preference. There is flexibility in its approach and how it can be integrated with other units in this course. It is recommended that wherever possible, teachers incorporate problem solving into the day to day activities of this course.

Introduction to Video Production Devices

Outcomes

Students will be expected to

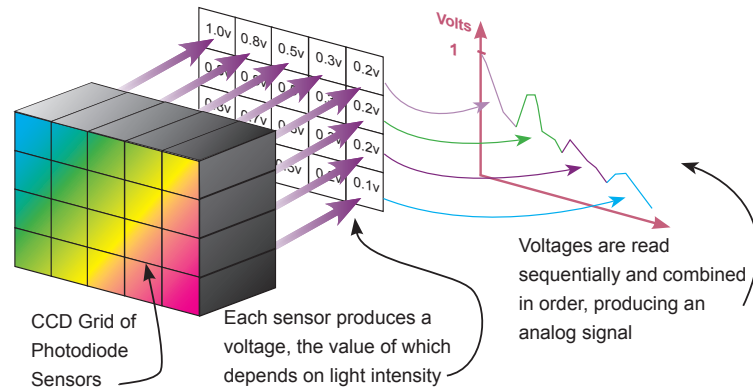
21.0 examine the technical components of video recording devices
[GCO 2]

Focus for Learning

This outcome will provide the student with information about the technical aspects of video capture/recording devices.

- lens
- sensors
- charge coupled device
- audio inputs
- storage

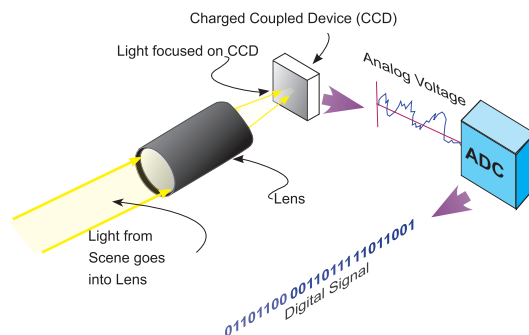
For both analog and digital video the lens and Charge Coupled Device (CCD) work the same way, converting light energy into a voltage. In digital video the analog signal then goes to an Analog to Digital Converter (ADC) and is converted into a digital data stream.



Analog video is captured using a lens which is focused on a CCD. The CCD has an array of 300 000 to 500 000 photodiode light sensors (photosites). Each sensor corresponds roughly to a pixel. The photodiodes respond to light colour and intensity. As light falls on a point, there is a corresponding voltage produced.

The photodiodes convert each “spot” to a corresponding voltage which is combined with the total number in the array to produce one analog signal.

These signals are read at least thirty times per second which is why so much information is produced. Each read is called a “frame”.



It is at this point the cameras vary in how the information (images and sound) is stored. Digital video records the signal as a series of 0's and 1's in digital format.

Introduction to Video Production Devices

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Demonstrate how analog and digital recording devices work.
- Bring artifacts into the classroom that represent analog and digital recording technology.

Connection

Students may

- Create a game that incorporates the technical components of video recording devices.
- Complete a report in their digital portfolio reflecting on how their own smartphone or tablet records and stores video.

Consolidation

Students may

- Create a presentation on the evolution and changes in recording devices in the past 25 years.

Resources and Notes

Authorized

How Computers Work (Teacher Resource [TR])

- pp. 192-199

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/video.html

- Video History and Format

Introduction to Video Production Devices

Outcomes

Students will be expected to

22.0 differentiate between
common video recording
devices
[GCO 2)

Focus for Learning

Student should become familiar with common recording devices such as

- digital Single Lense Reflex (DSLR) Cameras,
- point and shoot digital cameras,
- action cameras,
- camcorders,
- smartphones, and
- tablets.

All recording devices are not the same. The intent here is that students can recognize the capabilities of several recording devices so that they can select the best device for a particular project.

Students should explore the advantages and disadvantages of each device. They should consider

- size,
- standard definition versus high definition,
- quality of image produced,
- functions like depth of field and steady technology,
- ability to shoot action versus a relatively static subject,
- audio recording,
- video resolution,
- output file type, and
- battery life.

Sample Performance Indicator

Use a T-Chart to document advantages and disadvantages of each recording device category.

Introduction to Video Production Devices

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Challenge students to reflect on the various video recording devices they have at home and then have a discussion about how their capabilities reflect what they are used for.

Connection

Students may

- divide into groups of four to six. Each group will research a camera type becoming an expert group. They will then present what they have discovered about their particular camera to the rest of the class.

Consolidation

Students may

- Bring along personal recording devices to demonstrate.

Extension

Students may

- Analyze online marketing materials and specifications for a variety of video cameras.

Resources and Notes

Authorized

How Computers Work (TR)

pp. 193-199

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/video.html

- Choosing a Camera
- Common Recording Devices

Plan and Create a Video Production

Outcomes

Students will be expected to

23.0 employ common pre-production techniques for video planning [GCO 1)

Focus for Learning

This is an essential part of any video production. It is very important that students take the time to document their plan for the final product.

The pre-production techniques used for video production are similar to those used for animation production.

- Consider your audience. Students should be able to articulate who their video is designed for. They should also take the time to articulate some of the traits of the audience that may influence the final product.
- Write a script/storyboarding. The script and the storyboard are key to minimizing production time. They are the guides that control the whole production. Students need be aware of the importance of a solid plan for any media production.
- Gather needed background/content. In this stage students should be adhering to rules of copyright. Any non-original content must come from a creative commons source.
- Consideration of software and devices. Selecting software and hardware to complete a specific project is a significant learning opportunity. Students should consider the final location of the animation. They should consider the types of file formats that would be best for the final product.

Sample Performance Indicator

In your digital portfolio create a plan for a video production. The entry should include information on

- audience,
- shot selection,
- shot sequence (storyboard), and
- script.

Plan and Create a Video Production

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Demonstrate a video storyboard by using exemplars from a video production.
- Analyze with the class choice of shot selection for a given video.

Connection

Students may

- Create a storyboard for an existing music video.

Consolidation

Students may

- Create a plan and create a storyboard for an original video.

Resources and Notes

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/video.html

- Storyboard Templates
- Storyboard Instruction Video

Plan and Create a Video Production

Outcomes

Students will be expected to

24.0 use a video device to demonstrate effective production techniques [GCO 2)

Focus for Learning

Students should use a video capture device to record video using various angles and filming techniques.

Consideration needs to be given to

- Hand held versus tripod: Using a camera without a tripod provides a completely different effect than using a tripod.
- Camera movement (panning and tilting): Panning and tilting are horizontal and vertical movements and are very deliberate to create a specific effect. Pans and tilts are a combination of movements including a still shot before the movement, the movement and the pause after the movement is complete.
- Camera angles are also used purposefully to create an effect. A low camera angle shooting up at a subject creates a different effect than a high camera angle shooting down.
- Shot selection between closeup, medium or wide shots are also important in creating the overall effect in the finished product. It is always wise to use a variety of shots to keep the viewer engaged.
- Framing and composition: Each shot needs to be purposefully framed for the desired effect. A common composition technique is the rule of thirds. This technique requires that a subject's eyes must be in the top third of the screen when recording.
- Lighting is an essential consideration when recording video. As with camera angles lighting may be manipulated to produce various effects depending on the purpose of the finished product.

Effective video production depends heavily on the mastery of production techniques. These techniques make a significant difference in the quality of a production. Different techniques are suited for different purposes. The producers select specifics on lighting, angles, and camera movement in the pre-production stage of a project.

Manipulating camera techniques is a very hands on skill. Purposeful use of these techniques is very important. Students need to have the experience of setting up the shots and using the equipment. They need to experience the effects these techniques have on the final product.

Sample Performance Indicator

Record a piece of video that incorporates high angle, low angle, and close-up camera techniques.

Plan and Create a Video Production

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Demonstrate effective use of camera, angles, movement and lighting. Provide examples for students to reflect on the effect created by these camera techniques.

Consolidation

Students may

- Examine a professional quality video/movie to identify camera shots and the effects they create for the viewer.
- Complete a “video scavenger hunt” that incorporates a variety of camera angles, shots, and movement. In this activity students will use a video camera to record a variety of shots in sequence.
- Shoot a piece of video that uses a variety of techniques and analyze the effect the technique has on the final product.

Resources and Notes

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/video.html

- Framing and Composition
- Camera Angles

Plan and Create a Video Production

Outcomes

Students will be expected to

25.0 use video editing applications for post-production [GCO 2)

26.0 compose a multimedia video project for an identified audience [GCO 1)

Focus for Learning

Students should use video editing software to create a final video project.

The following editing tools are available in most video editing software and should be utilized:

- import,
- timeline,
- clip editing (trim, split, fade, speed),
- title and credits,
- adjust audio, and
- export.

In this part of the video production process students will use video editing software to create a final product from raw footage. This stage of the process provides opportunities for students to explore the relationship between pre-production planning, shooting and post-production editing. It is significant that students understand that planning is essential so that they have the footage they need when they begin the editing process.

Sample Performance Indicator

Create a six word, six shot video by telling a story in six distinct shots and six specific words.

Students will combine all previous skills to plan and build a multimedia project.

Consideration must be given to

- workflow (Plan - Record - Edit - Share);
- selection of audio files (assets);
- recording of voice/music, and special effects;
- editing of independent tracks; and
- blend/export to a final product.

Students may draw on products created in previous units of this course to enhance their final video production. It is essential that students employ skills in pre-production planning for this project. It is also important for teachers to set limits on the size and complexity of the video production required.

Sample Performance Indicator

Create a 60 - 90 second video that incorporates only original video content. You are expected to complete the editing of the video during class time using school equipment. Your product should include documentation of pre-production (storyboard), production (video shots) and post-production (video editing).

Plan and Create a Video Production

Sample Teaching and Assessment Strategies

Activation

Teachers may

- Demonstrate the use of video editing software.
- Show video exemplars that were created by previous classes.

Connection

Students may

- Take a piece of raw video and edit it into a finished product.
- Shoot a piece of raw video and then exchange it with a classmate to edit. This will demonstrate how difficult it is to edit raw footage shot by someone else.

Consolidation

Students may

- Approach a school group or a non-profit organization in the community and propose a promotional video for that group.

Extension

Students may

- Search out video contests and produce short products to enter into those contests.

Resources and Notes

Suggested

Resource Links: www.k12pl.nl.ca/curr/10-12/te/ct2104/links/video.html

- Open Source Video Editors
- Community Based Video Competitions

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