

# Course Profile

## Integrated Technologies

Grade 9

Open

• *for teachers by teachers*

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## **Acknowledgements**

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Central Ontario Catholic Curriculum Cooperative

**Institute for Catholic Education**

# Unit # 1

## Title: Construction and Manufacturing

**Time:** 20 hours

**Unit Developers:** Paul Owens, Joanne Durst, DPCDSB

**Development Date:** March 16, 1999

### Unit Description

In this unit, students will develop design process and problem solving skills. They will increase their knowledge of the problem solving process, technical terminology, procedures and standards of product testing. Students will demonstrate their learning through discussion, designing drawings and creating of their own construction product (a roller coaster).

**Strands and Expectations:** Theory and Foundation, Skills and Processes, Impact and Consequences

### Ontario Catholic School Graduate Expectations:

- makes decisions in light of gospel values with an informed moral conscience
- takes initiative and demonstrates Christian leadership
- applies effective communication, decision making, problem solving, time and resource management skills
- works effectively as an interdependent team member
- contributes to the common good
- seeks and grants forgiveness

**Overall Expectations:** TFV.01X, TFV.02X, SPV.01X, SPV.02X, SPV.03X, ICV.01X

**Specific Expectations:** TFS.01X, TFS.02X, SPS.01X, SPS.02X, SPS.03X, SPS.04X, SPS.07X, SPS.08X, ICS.01X, ICS.03X

### Activity Titles (Time + Sequence)

<b>Activity 1</b>	Introduction to Roller Coaster Design	60 min
<b>Activity 2</b>	Introduction to the Design Process (SPICE)	120 min
<b>Activity 3</b>	Communicating Ideas: Sketching and Drafting	240 min
<b>Activity 4</b>	Communicating Ideas: Advertising	120 min
<b>Activity 5</b>	Safety Rules and Procedures	120 min
<b>Activity 6</b>	Fabrication and Troubleshooting	360 min
<b>Activity 7</b>	Initial Testing and Reporting	120 min
<b>Activity 8</b>	Formal Presentation and Evaluation	60 min

## Unit Planning Notes

The focus of this unit is to engage students in a group activity which promotes open discussion and creativity, utilizes peer mentors (senior physics students) and uses sketching, drafting and other technical avenues and facilities to complete the design and building of a roller coaster.

## Prior Knowledge Required

- basic mathematics (fractions)
- problem solving techniques
- working co-operatively in a group environment

## Teaching/Learning Strategies

1. Students are to be grouped to include special-needs students and to ensure that groups have a balance of visual and analytical thinkers (question and answer students for strengths and weaknesses)
2. Students work individually and in groups to complete the activities. The teacher needs to stress the importance of working both ways.
  - individually for understanding of terms and processes
  - in groups in order to draw on expertise of all members of a design team

## Assessment/Evaluation

This unit will introduce students to the design and problem solving model, which will provide opportunities for them to assess their participation, responsible behaviour and skills with working in a group. The teacher and students will collect evidence of learning, using observational checklists, rubrics and personal communication tools.

## Resources

### Print

- Foundation Course  
Collins, CDT  
M. Finney, P. Fowler  
@ Lincolnshire County Council 1986  
ISBN 0.00.322053.2

- By Design  
Technology Exploration and Integration  
Trifobin Books  
Editor: Julie Czernada ISBN 1.895579.78.3

### Computer Software

Internet searches (see Activity 1)

### Miscellaneous

- Grade 12 and OAC physics students as mentors
- architects and engineers
- Canada's Wonderland, Maple, Ont. (905) 832-7000
- public library
- Safety Care Videos  
Safety Care Inc.  
40 Wynford Drive  
Don Mills, Ont  
(416) 391-3511

## Assessment Rubrics

1. OAJE-OAME/OMCA Problem Solving Rubric - Linking Assessment and Instruction in Mathematics, pg. 33-35

2. Achievement chart, Grade 9-10 Technological Education

- Technology Ideas

Integrating Design Education Activities for Students

Bill Reynolds, Bob Carney, Norm Dale

@ 1993 Maxwell MacMillan Canada Inc.

ISBN 0.02.954154.9

- Fundamentals of Technical Drawing

Norman Stirling

1984 Gage Education Publishing

ISBN 0.7715.0327.X

# Activity #1

## Title: Introduction to Roller Coaster Design

**Time:** 60 minutes

### Description

Students will participate in an open-ended problem solving project that will result in the designing and building of a scale model roller coaster. Through the interactions of group members and in discussion with other groups, students will be guided to the completion of the model. Students are to be encouraged to have lively discussions of experiences on actual roller coasters and to use their imaginations, to foster participation of all group members. The students will discuss the proper, safe use and care of tools and materials.

### Strands and Expectations

#### Ontario Catholic School Graduate Expectations:

The graduate is expected to:

- create, adapt and evaluate new ideas in light of the common good.
- take initiative and demonstrate Christian leadership.

**Strands:** Theory and Foundation, Skills and Processes, Impact and Consequences

**Overall Expectations:** TFV.01X, TFV.03X, SPV.01X

**Specific Expectations:** TFX.01X, SPS.02X, SPV.03X

### Planning Notes

- The first day should be an open discussion promoting participation by all.
- Internet searches should be included.
- Special-needs students must be addressed at this time (group or facility modifications).
- The construction/manufacturing room should be introduced. Special attention should be paid to safety and emergency procedures and first aid and eye wash stations.
- Have students start a reflective log on personal growth and Christian development and leadership. The log will be submitted at the completion of the unit for evaluation, so ensure that students are familiar with the evaluation criteria.
- Establish criteria for assessing participation, working safely and behaving properly.

### Prior Knowledge Required

- mathematical skills
- understanding of the basic concepts of motion and how it acts upon a body

### Teaching/Learning Strategies

#### Students will

- understand the basic concept of roller coaster design.
- learn about potential and kinetic energy.
- learn about acceleration and velocity (terms and unit of measure).
- begin a daily reflective log book that outlines their role as a Christian individual and valued group member.

- share the gifts God has given each of us for the building of the faith community.

### **Teachers will**

(whole group)

- introduce the project and expectations to the class (Appendix 1).
- discuss the impact of technology on the community and how technology relates to Catholic values (e.g., to value people over things; value sharing; technology is a service to others; have respect for the environment).
- show a video on roller coasters.
- generate an open discussion on the rides the students have personally experienced. Topics should include the scariest, most fun, favourite part of the ride, where, when, etc.
- remind students that they are gifts from God.

Students read handouts on Energy and Learning Science language and write down definitions. The teacher needs to demonstrate how these terms are used in relationship to the design of roller coasters (Appendix 1, Energy).

### **Assessment/Evaluation**

- Teacher checks that definitions are written down and that students understand terms (not assessed).
- A formative self-assessment using a daily reflection log to be checked but not evaluated.
- Students should address issues that would possibly effect the lives of people that would have a new facility such as this (roller coaster, amusement park) in their local community.

### **Accommodations**

- Group students to pair special-needs students with stronger students for peer mentoring.
- Ensure that visual aids and other devices are available for special-needs students.
- Enriched students should be encouraged to work at an enhanced level.

### **Resources**

- movies on roller coasters
- Internet locations:  
[www.nlpublishing.com/](http://www.nlpublishing.com/)  
[www.demon.co.uk/arvis/wwg/xwc.html](http://www.demon.co.uk/arvis/wwg/xwc.html)  
[www.middleweb.com/coaster.html](http://www.middleweb.com/coaster.html) (interactive design page)

## Activity #2

### Title: Understanding the Design Process

Time: 120 minutes

### Description

Students will demonstrate an understanding of the basics of design through drawings and verbal communication. They will communicate their ideas using the appropriate language, and then apply skills and strategies of the design process.

### Strands and Expectations

#### Ontario Catholic School Graduate Expectations:

The graduate is expected to:

- make decisions in light of gospel values with an informed moral conscience.
- take initiative and demonstrate Christian leadership characterized by service to others.
- work effectively as a team member.

**Strands:** Theory and Foundations, Skills and Processes

**Overall Expectations:** TFV.01X, TFV.03X, SPV.03X

**Specific Expectations:** TFS.02X, SPS.02X, SPS.01X

### Planning Notes

- Work through the SPICE model or similar problem solving model and demonstrate its proper use.
- Group member responsibilities should be discussed and assigned. Students should be encouraged to take initiative and show their leadership skills.
- Agree on product development, research and communication formats.

### Prior Knowledge Required

- mathematical skills; understanding of the basic concepts of motion speed and how it acts upon a body

### Teaching/Learning Strategies

#### Students will

- understand the basic concept of roller coaster design .
- learn about potential and kinetic energy.
- learn about acceleration and velocity (terms and units of measure).

#### Teachers will

(whole group)

- introduce the project and expectations to the class.
- show a video on roller coasters.
- generate an open discussion on the rides the students have personally experienced, topics should include the scariest, most fun, favourite part of the ride, where, when, etc.

There should be a class discussion on various types of problem solving methods (examples to be shown). Students should choose the one they are most comfortable with and then complete a sample. Small groups that include special needs students may then be formed by the teacher.

## Assessment/Evaluation

- personal growth log checked but not evaluated (comments added as required)
- students participation should be noted, but not evaluated at this time
- rubric of group evaluation of Problem Solving and Individual Self-evaluation Rubric (Appendix 3)
- decisions should be morally and ethically correct

## Accommodations

- Use groups to pair weaker and stronger students for peer mentoring.
- Allow for changes in group structures.
- Provide completed assignments for special-needs students.
- Use a variety of teaching styles to accommodate all students.

## Resources

- Model of SPICE or other forms of design process solving models (Appendix 2) Foundation Course, Collins, CDT, 1986, ISBN 0.00.322053.2
- Technology In Your World, 2nd Edition, Michael Hacker, Robert Barden, pg. 34, ISBN 0.8273.4425.2

## Activity #3

### Title: Communications Sketching and Drafting

Time: 240 minutes

### Description

Students will communicate their ideas to other group members by means of sketches and completed drafting drawings. Proper engineering symbols and language will be used. All ideas will be presented visually, accurately and effectively.

### Strands and Expectations

#### Ontario Catholic School Graduate Expectations:

The graduate is expected to:

- read, understand and use written materials effectively.
- take initiative and demonstrate Christian leadership.
- work effectively as an interdependent team member.

**Strands:** Theory and Foundation, Skills and Practices, Impact and Consequences

**Overall Expectations:** TFV.03X, SPS.05X

**Specific Expectations:** TFS.04X, SPS.02X, SPS.03X

### Planning Notes

- Share samples of engineering drawings, orthographic projection and sketches.
- Provide scale rulers (tri-angle scales) for each group.
- Discuss samples of drafting symbols.

## **Prior Knowledge Required**

- working knowledge of scale, sketching and basic drafting tools
- group working skills
- safety practices when working in construction room
- communication skills

## **Teaching/Learning Strategies**

### **Students will**

- produce rough sketches and drawings for discussion.
- produce scaled drawings and orthographic drawings of the project.
- use proper engineering symbols where applicable.

### **Teachers will**

(whole group)

- introduce thumbnail sketches as a way to communicate ideas.
- instruct the use of scaled rulers.
- introduce and provide samples of orthographic drawings.

## **Assessment/Evaluation**

- Students should demonstrate a knowledge of the design process.
- Students should be evaluated on leadership and being an interdependent team member (App. 2).

Students drawings and sketches will be assessed individually, based upon accuracy and attention to detail (Rubric of Drafting Appendix 3). A formative evaluation will be used to assess participation in problem solving, communication and design ideas in the group.

## **Accommodations**

- Provide samples of various types of sketches, engineering drawings etc., for discussion.
- Provide computers with drawing programs.
- Provide extra instructions to groups as required.

## **Resources**

*Fundamentals of Technical Drawing*, Norman Sterling — Chapters 3, 4, 5 (as background)

## **Activity #4**

### **Title: Communications Advertising and Logo**

**Time:** 120 minutes

### **Description**

Students will communicate ideas for advertising and/or a ride logo. The completed product(s) should accurately reflect their ideas and represent the group.

## Strands and Expectations

### Ontario Catholic School Graduate Expectations:

The graduate is expected to:

- contribute to the common good.
- take initiative and demonstrate Christian leadership.
- work effectively as an interdependent team member.

**Strands:** Theory and Foundation, Skills and Processes

**Overall Expectations:** TFV.03X

**Specific Expectations:** TFS.01X, SPS.02X, SPS.03X

## Planning Notes

- Teacher should have samples of the various types of advertising he/she wants the students to use.
- The individual groups can use these samples as resources, but the final product must be new and innovative.
- Students are to be made aware of copyright laws and are not to copy any existing symbols or slogans.

## Prior Knowledge Required

- group working skills
- understanding of personal responsibilities assigned by group
- communication skills

## Teaching/Learning Strategies

### Students will

- provide examples of visual advertising (using typography, photography, symbols and animation).
- provide a logo completed and agreed on by the group.
- provide a full page colour advertisement for the roller coaster.
- understand the impact of advertising on Christian values and the development of personal growth.

### Teachers will

(whole group)

- discuss and show samples of typography, animation, photography and symbols in advertising.
- discuss the impact advertising may have on personal beliefs, attitudes and behaviours.
- discuss the impact of advertising on self-esteem (morals and ethics of role model advertising).  
(individual group)
- demonstrate potential avenues to follow so all groups will produce different ideas.
- encourage students reflect on the image portrayed by their logo and advertising campaigns.

Students will provide examples of print advertising and be able to explain their choices for likes and dislikes in written form. They should provide thumbnail sketches and final sketches of both the logo and the full page advertisement. Computer programs may be used, but clip-art should not be allowed, as this is a new product.

## Assessment/Evaluation

- Each student will be evaluated on the attention to detail and creativity of their sketches, full page sketch and final drawing; moral content should be part of the evaluation.
- Social values should be reflected in the advertising campaign. Nothing that could be considered racial, sexual or religiously unacceptable should be included.

- Student's initiative, Christian leadership and participation in a group should be noted (Appendices 1 and 2).

Once all group members have been evaluated, students in the group will select the drawing/logo that they feel is the best, and use it to represent them. Personal reflective logs should be checked, with discussions regarding the students' personal growth to be done in private. Formative evaluation of communication skills, problem solving, completion of assigned tasks and work habits (safety included) is to be entered into the teacher's log.

### **Accommodations**

- Provide work that may be already started.
- Provide a standard of conduct for all groups to follow.

### **Resources**

- Newspaper, magazines, flyers etc...

## **Activity #5**

### **Title: Safety Rules and Procedures**

**Time:** 120 minutes

### **Description**

In this activity, the students will be introduced to the facilities, tools and equipment that they will be using. Health and safety is the focus. A written test may be used if necessary.

### **Strands and Expectations**

**Strands:** Theory and Foundations, Skills and Processes, Impact and Consequences

#### **Ontario Catholic School Graduate Expectations:**

The graduate is expected to:

- accept accountability for ones own actions.
- respect the environment and use resources wisely.

**Overall Expectations:** TFV.01X, SPV.01X, ICV.01X

**Specific Expectations:** SPS.08X

### **Planning Notes**

- Teacher must provide safety videos for all equipment to be used.
- Teachers will provide materials (tools, equipment).
- Safety quiz is recommended.

### **Prior Knowledge Required**

- a respect for the safety and well being of others
- completion of safety quiz and the ability to demonstrate the safe operation of tools

## **Teaching/Learning Strategies**

### **Students will**

- review and understand safety rules and procedures.
- demonstrate the proper and safe operation of tools and equipment.
- understand the emergency procedures for the classroom in case of fire or accident.
- be aware of his/her environment and look out for the well-being of others.

### **Teachers will**

(whole group)

- introduce the safety procedures for the classroom.
- provide safety videos and a quiz.
- introduce criteria for material selection (include environmental concerns in the discussion).

(small groups)

- provide demonstrations on proper use of equipment.
- (individual students)
- be aware of special-needs students and provide for their well-being.

Students will observe the videos and complete a quiz on shop safety. They will understand the safe operation of the tools to be used and be able to demonstrate that understanding. The proper storage and use of the materials should also be demonstrated.

## **Assessment/Evaluation**

- accountability and leadership skill development should be noted (Appendix 1 for help)
- selection of materials and their use should include environmental concerns and waste disposal

Students will write and pass a quiz on safety. Test must include proper dress, tool identification and its proper use. They must then demonstrate a working knowledge of how the tool is used, including its cleaning and storing.

## **Accommodations**

- Use a variety of instructions techniques on safety.
- Provide modified tools where necessary to ensure safe completion of product.
- Group stronger/more experienced students with those of special needs for peer teaching.
- A teacher's assistant may be required depending upon class make-up or structure.

## **Resources**

- safety videos, safety handout and quiz
- tools and equipment to be used.
- materials to be used in construction

## Activity #6

### Title: Roller Coaster Fabrication

Time: 360 minutes

#### Description

Students will begin to fabricate their roller coaster using the sketches and drawings they have completed. Daily logs will contain progress reports as well as any difficulties encountered and how they were overcome.

#### Strands and Expectations

##### Ontario Catholic School Graduate Expectations:

The graduate is expected to:

- demonstrate effective communication, decision making, problem solving, time and resource management skills.
- take initiative and demonstrate Christian leadership.
- work effectively as an interdependent team member.

**Strands:** Theory and Foundations, Skills and Processes, Impact and Consequences

**Overall Expectations:** TFV.01X, SPV.01X, ICV.01X

**Specific Expectations:** TFS.01X, SPS.07X, ICS.01X, ICS.03X

#### Planning Notes

- Students will be supplied with materials and given an assigned work area (environmental and waste concerns should be addressed again).
- Groups should observe one another and question design and fabrication techniques.
- The facilities in the room will determine the types and sizes of materials used.
- Groups are to be encouraged to use their own fabrication techniques, such as wood glue, nails, hot melt glue, various wood joints, welding etc.

#### Prior Knowledge Required

- understanding of the SPICE method or similar model
- understanding of the safe operation of tools and equipment
- understanding of the expectations of their completed drawings and specifications

#### Teaching/Learning Strategies

##### Students will

- use thinking and problem solving skills.
- use equipment and technology safely with regard for others.
- construct a roller coaster to their design specifications.
- problem solve and brainstorm when new problems arise.

##### Teachers will

(whole group)

- distribute materials and equipment.
- ensure all groups are aware of time lines and product expectations.

(individual work)

- do roving conferencing.

- ensure daily logs are complete.
- ensure special needs students are provided for (i.e., peer mentoring, special tools, additional time, completed samples, etc.).

### **Assessment/Evaluation:**

- leadership and initiative should be noted
- communication skills and participation as a group member are to be evaluated (Appendices 1 and 2)

The Rubric Model (Appendix 1) is to be used to evaluate problem solving skills as the roller coaster is being constructed. Teacher should be doing roving conferencing and assessing group interaction. Christian reflections should be noted and discussed as required.

### **Accommodations**

- Prepare partially completed samples to demonstrate various construction techniques.
- Provide modified work areas (tools, tables, lighting, etc.).

### **Resources**

- Materials selected by the instructor
- Tools and equipment distributed by the instructor
- Residential Carpentry; Ch. 4 Safety Unit (handout and quiz) John L Freirer

## **Activity #7**

### **Title: Initial Testing and Product Evaluation**

**Time:** 120 minutes

### **Description**

Students are now ready to start the evaluation stage of the project. They are to conduct a series of test runs on the roller coaster and observe and report any design or operational concerns. Once noted, they may be corrected and the trial process repeated. Accurate notes are to be kept. Students must describe concerns and solutions to the teacher prior to any changes to design.

### **Strands and Expectations**

#### **Ontario Catholic School Graduate Expectations:**

The graduate is expected to:

- create, adapt and evaluate new ideas in light of the common good.
- read, understand and use written materials effectively.
- think reflectively and creatively to evaluate situations and solve problems.
- respect the rights, responsibilities and contributions of self and others.

**Strands:** Theory and Foundations, Skills and Processes

**Overall Expectations:** TFV.03X, SPV.03X

**Specific Expectations:** TFS.01X, SPS.02X, SPS.03X, SPS.01X

## Planning Notes

- Students will be given time to run a series of tests on their roller coaster. Tests should include approximately 30 trial runs with the marble or ball bearing and notes must be taken on results that will include the number of successful runs, any areas of concern (corners, loops, speed, track design etc..), potential repairs and design modifications. They may then complete necessary changes once the reasons have been explained to the teacher and another set of trials has been completed.

## Prior Knowledge Required

- use of peer and self-evaluation sheets and criteria for marking
- an understanding of problem solving methods for use in modifications

## Teaching/Learning Strategies

### Students will

- understand and use a design process model in their evaluation.
- transfer new concepts, skills and procedures to new context.

### Teachers will

(whole group)

- review the evaluation process so students can make the connection between ideas, product and development modifications.

(individual groups)

- distribute peer and self evaluation sheets.
- distribute project evaluation sheets.
- ensure testing procedures are followed.

Students are to work collaboratively in the evaluation of the roller coaster and agree to any design changes and be able to support their decision. They should be able to operate the coaster for a series of trial runs (30) and record all data to support their decision whether or not to do any modifications.

## Assessment/Evaluation

- response to design problems and changes should be noted and evaluated (Appendix 1)
- daily logs and reflections are complete and show personal growth (Appendices 1 and 2)

Students will write a report outlining the design process and resulting design. The report will include all rough and finished drawings, all test data and a reflection of the improvements and modifications. A second set of results must be included after changes are made and should reflect the improvements made. Evaluation using OAJE-OAME/OMCA Rubric.

## Accommodations

- Provide various examples of measuring and evaluating.
- Modify group assignments and structure as required to ensure all members participate.
- Provide facilities for special needs and stronger students (computer programs for evaluation).

## Resources

- Completed roller coaster
- Test run results and all data sheets
- OAJE-OAME/OMCA Problem Solving Rubric- Linking Assessment and Instruction in Mathematics, pg33-35
- Achievement chart grade 9-10 Technological Education

## Activity #8

### Title: Formal Presentation and Final Evaluation

**Time:** 60 minutes

#### Description

Students will present their final version of the roller coaster to their instructor and the class. They will display all drawings, sketches, advertising and logo for evaluation. They will demonstrate the roller coaster's operation while noting any unique design ideas the group used. Other groups may question and then evaluate the members.

#### Strands and Expectations

##### Ontario Catholic School Graduate Expectations:

The graduate is expected to:

- read, understand and use written materials effectively.
- create, adapt and evaluate new ideas in light of the common good.
- think reflectively and creatively to evaluate situations and solve problems.
- take initiative and demonstrate Christian leadership.

**Strands:** Theory and Foundation, Skills and Procedures, Impact and Consequences

**Overall Expectations:** TFV.01X, TFV.03X, SPV.01X, SPS.05X

**Specific Expectations:** TFS.01X, SPS.02X, SPS.03X, ICV.01X

#### Planning Notes

- All group members actively participate in the presentation of the model. Teacher should encourage an exciting atmosphere with students being allowed to be dramatic in the presentation.
- All data supporting the final product must be available for final evaluation.
- Teachers may allow students to complete a confidential evaluation on group members.
- All students must complete a reflection on the project that would include personal growth, environmental strategies, what they have learned from others and how they have helped others grow personally during the module.

#### Prior Knowledge Required

- an understanding of the design process
- ability to evaluate finished product to design concept standards

#### Teaching/Learning Strategies

##### Students will

- demonstrate an understanding of the evaluation method for their final project.
- present all background material for evaluation and justify all decisions with back-up data.
- present ideas honestly and with sensitivity to others (tying in Catholic values of respecting the dignity of all group members).
- complete all peer and self-evaluation forms.
- complete a project evaluation form.

##### Teachers will

(whole group)

- review project expectations.

- encourage students to be creative in their presentations to the class (use various media).
- ensure full/equal participation by group members.
- encourage open discussion which shows respect for the opinions of others.

### **Assessment/Evaluation**

- care and accommodation for the environment should be noted in final evaluation
- use of written word for both evaluation of final product and personal growth are to be evaluated
- Christian leadership and respect for others to be evaluated
- creativity and problem solving skills to be evaluated

### **Accommodations**

- Provide facilities for presentation by special needs/stronger students so they may work at their full potential.
- Ensure full participation by providing necessary materials (overheads, computers, etc.).

### **Resources**

- Video camera, radio
- All evaluation forms

## Assessment/Evaluation

	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
Understanding of concepts	demonstrates limited understanding of concepts such as force, energy and momentum	demonstrates some understanding of concepts such as force, energy and momentum	demonstrates considerable understanding of concepts such as force, energy and momentum	demonstrates thorough and insightful understanding of concepts such as force, energy and momentum
Thinking skills	uses thinking skills with limited effectiveness in the design process	uses thinking skills with moderate effectiveness in the design process	uses thinking skills with considerable effectiveness in the design process	uses thinking skills with a high degree of effectiveness in the design process
Communication of information	communicates ideas and information such as drawings, sketches or daily logs with limited clarity and accuracy	communicates ideas and information such as drawings, sketches or daily logs with moderate clarity and accuracy	communicates ideas and information such as drawings, sketches or daily logs with considerable clarity	communicates ideas and information such as drawings, sketches or daily logs with a high degree of clarity and accuracy
Application of procedure, equipment and technology	uses technical equipment correctly and safely only with supervision	uses technical equipment correctly and safely only with some supervision	uses technical equipment correctly and safely	demonstrates and promotes correct and safe use of technical equipment
Making connections	makes the connection between force and momentum in the model and real-life vehicles with limited effectiveness	makes the connection between force and momentum in the model and real-life vehicles with moderate effectiveness	makes the connection between force and momentum in the model and real-life vehicles with considerable effectiveness	makes the connection between force and momentum in the model and real-life vehicles with a high degree of effectiveness

## Assessment/Evaluation of Personal and Christian Development

	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
Effective communicator CGE2c	demonstrates limited understanding of how to present information and ideas clearly, honestly and with sensitivity	demonstrates some understanding of how to present information and ideas clearly, honestly and with sensitivity	demonstrates considerable understanding of how to present information and ideas clearly, honestly and with sensitivity	demonstrates insightful understanding of how to present information and ideas clearly, honestly and with sensitivity
Reflective and creative thinker CGE3c	shows limited ability to think reflectively and creatively to evaluate situations and solve problems	shows moderate ability to think reflectively and creatively to evaluate situations and solve problems	shows considerable ability to think reflectively and creatively to evaluate situations and solve problems	shows a thorough and insightful ability to think reflectively and creatively to evaluate situations and solve problems
Collaborative contributor CGE5a	demonstrates limited ability to work effectively as an interdependent team member	demonstrates some ability to work effectively as an interdependent team member	demonstrates considerable ability to work effectively as an interdependent team member	demonstrates a thorough and insightful understanding and ability to work as an interdependent team member
Responsible citizen CGE7i	demonstrates a limited understanding and respect for the environment and uses resources wisely	demonstrates some understanding and respect for the environment and uses resources wisely	demonstrates considerable understanding for the environment and uses resources wisely	demonstrates a thorough and insightful understanding for the environment and uses resources wisely
Self directed, responsible, life-long learner CGE4a	demonstrates a confident and positive sense of self and respect for the dignity and well being of others only with supervision	demonstrates a confident and positive sense of self and respect for the dignity and well being of others with some supervision	demonstrates a confident and positive sense of self and the respect for the dignity and well being of others with limited supervision	demonstrates a confident and positive sense of self and the respect for the dignity and the well being of others all the time

## Unit #2

### Title: A Computer Studies Theme

**Time:** 1440 minutes

### Unit Developer

Roy Parteno, DPCDSB

**Development Date:** March, 1999

### Unit Description:

Through this unit, students will learn computer concepts as a base for further studies. Students will learn and apply an information science problem solving method, use software tools to research and solve specific problems, and study the impact of computer technology at home and in the world of work. Students will explore the fundamental concepts needed to design a computer program, write and document simple computer programs and explain the roles of various computer components and products.

### Strands and Expectations

**Ontario Catholic School Graduate Expectations:** CGE 1i; 2a, b, c, d; 3b, c, f; 4b, f; 5a, e; 7c, j

**Strands:** Theory and Foundation, Skills and Processes, Impact and Consequences

**Overall Expectations:** TFV.01X, TFV.02X, TFV.04X, TFV.05X, SPV.02X, SPV.03X, SPV.05X, ICV.01X, ICV.02X, ICV.01X

**Specific Expectations:** TFS.02X, TFS.06X, TFS.07X, SPS.03X, SPS.04X, SPS.05X, SPS.06X, ICS.02X, ICS.05X, ICS.07X

### Activity Titles & Sequence

Activity #1	What is Computer Technology?	210 minutes
Activity #2	Use of Computer Technology	210 minutes
Activity #3	Computer Technology at Home and Work	210 minutes
Activity #4	Problem Solving and Programming	700 minutes

### Prior Knowledge Required

It is assumed that students may have little or no experience with computer hardware and programming, but that most would have some keyboarding background and some experience with the use of common Ministry-licensed software tools such as a word processing, spreadsheet and database programs. If most students do not have some background with these types of software, extra time should be taken to provide brief instruction, with experienced students acting as peer guides and tutors.

### Teaching/Learning Strategies

The delivery of this unit will provide students with different delivery modes including brainstorming, conferencing, peer practice and teaching, research, class discussions, interviews, process notes, hands-on computer activities, and Socratic lessons.

## **Assessment and Evaluation**

### **Diagnostic and Formative Assessment**

The nature of computer studies is such that some students will already have considerable computer knowledge and skills while others will have very little. A diagnostic test may help identify knowledge and skills levels and allow teachers to make sure that all students are challenged. A mixture of assessment strategies including assignments, computer skill demonstration, quizzes and tests, roving conferences, presentations and a unit end project will be used to gather assessment information towards a unit evaluation.

### **Summative Evaluation**

A unit test after the fourth activity and final applied programming assignment are appropriate methods of gathering information for a summative evaluation

## **Resources**

### **Software**

- current Ministry of Education licensed software (Corel Suite, Filemaker Pro)
- a programming language, one already in use in Grade 10-12 Computer Studies courses

### **Print**

- The Don't Panic Guide to Programming, Holt Software Associates, 1999
- Computer Science An Overview, J. Glenn Brookshear, Addison-Wesley, 1997, ISBN 0-8053-4632
- Teaching Thinking, Edward DeBono, Pelican Books, 1986, ISBN 0-14-0221163-8
- Learning to Use Microsoft QuickBasic, Microsoft, 1990
- Filemaker Pro User's Guide, Claris, 1992
- An Introduction to Programming Using Visual Basic 5.0, David Scheider, Prentice Hall, 1998, ISBN 0-13-875857-3

### **Websites**

<http://cs.dpcdsb.org/stjoes/computers/tricomm/ex1.html>  
<http://ei.cs.vt.edu/~cs3604/lib/WorldCodes/WorldCodes.html>  
<http://www.uwo.ca/IP/policies/wwwpol.html>  
<http://www.comlab.ox.ac.uk/archive/other/museums/computing.html>  
<http://www.cs.cmu.edu/People/Xavier/>  
<http://www.net.org/>

### **Unit Planning Notes:**

- The focus of the unit is for students to learn about computer technology and its appropriate use from several different viewpoints, and to create computer technology in the form of simple computer programs.
- The software and computer programming languages used in this unit depend upon what software is available in the school.

# Activity #1

## Title: What is Computer Technology?

Time : 210 minutes

### Description

Students will explore the roles of computers, operating systems and networks. Through group work and class discussion, students will gain an understanding of the function and cost of common computer components. They will use application software to create a tool that will compute the total price of various computer systems.

### Strands and Expectations

**Ontario Catholic School Graduate Expectations:** CGE5a

**Strands:** Theory and Foundations, Skills and Processes

**Overall Expectations:** TFV.04X

**Specific Expectations:** TFS.07X, SPS.05X , SPS.06X

### Planning Notes

- Do an inventory of software packages that students will have access to in the classroom or computer lab.
- Review and modify the initial diagnostic self-assessment to reflect the local resources, this assessment information is for use throughout the unit (Appendix 1.0).
- Review the Computer Technology Role/Tasks Chart and modify for local use (Appendix 1.1).
- Gather pricing information on computer components in various media formats (print, electronic).

### Prior Knowledge Required

- keyboarding skill
- some experience with software tools (spreadsheet, database)

### Teaching Learning Strategies

#### Students will:

- use brainstorming, research, and class discussion to explore the roles and tasks of key computer technology components.
- complete the computer Technology Roles/Tasks Chart as the unit progresses (Appendix 1.1).
- research the pricing of current computer components using available sources such as newspapers, computer publications and web sites,
- use available software resources to research, analyze and organize and communicate computer component pricing information based upon current Canadian information.
- compare Canadian and foreign pricing of computer components and identify leaders in Canadian hardware and software development.
- construct a web page with links to and descriptions of Canadian computer hardware sites (extension activity).

#### Teachers will:

- administer a diagnostic self-assessment to determine current knowledge, skills and strengths (Appendix 1.0).

- introduce the concepts of computer hardware, operating systems and networks via a brainstorming session and subsequent class discussion.
- direct students to research sources if more information is required.
- distribute the Computer Technology Roles chart (Appendix 1.1) to be completed as the unit progresses.
- teach students the login/start-up practice for the classroom computers.
- group students to research computer component pricing and use software applications such to create an analysis tool such as a spreadsheet of components to price out systems, or a database to compare component pricing of Canadian and foreign goods.
- assist students in selection of what they believe is the most appropriate tool for the task.
- make students aware of related resources in the school resource centre.
- assist the class or small groups in the use of application software.

### **Assessment/Evaluation**

The teacher and students will gather assessment information based upon the specific expectations outlined for this activity.

- a formative self-assessment using multi-group meetings to informally assess the required research, analysis, organization and communication of computer component pricing information
- a summative assessment at the end of the unit (Appendix 1.2)

### **Accommodations**

- Use grouping as a means of allowing stronger students to develop enhanced work and/or to pair students for peer teaching.
- Provide adaptive physical devices (eg specially designed keyboards) for identified students.
- Use visual aids to assist students as needed.
- Use a variety of teaching styles to accommodate learning styles.

### **Resources**

- <http://cs.dpcdsb.org/stjoes/computers/tricomm/ex1.html>
- Computer advertisements from various media
- The “Don’t Panic” Guide to Programming

## Activity #2

### Title: Use of Computer Technology

Time : 210 minutes

### Description

Students will use a conventional Computer Studies problem solving method and the local existing acceptable use policy to create a set of procedures and guidelines for correct and acceptable use of computer technology.

### Strands and Expectations

**Ontario Catholic School Graduate Expectations:** CGE2b, CGE2d, CGE4a

**Strands:** Theory and Foundations, Skills and Processes, Impact and Consequences

#### Overall Expectations

At the end of Grade 9, students will: SPV.03X, ICV.05X

#### Specific Expectations

Students will: TFS.02X, SPS.03X, ICS.02X

### Planning Notes

- Ensure that students have access to local (school/district) acceptable–computer–use policy (or use one from another district or organization).

### Prior Knowledge Required

- familiarity with login/start-up procedures from Activity #1

### Teaching/Learning Strategies

#### Students will:

- apply a conventional Computer Studies problem solving method
- use the problem solving method and the local existing acceptable use policy to create a set of procedures and guidelines for correct and acceptable use of computer technology
- decide what roles group members should take
- choose a medium for the development of the procedures and guidelines
- share guidelines and procedures with other groups as a means of seeing other solutions and getting feedback
- complete the Computer Technology Roles/Task chart on the basis of how computers, operating systems and networks are included in the procedures and guidelines (integration of Activity #1)
- research other Canadian institutions acceptable use policies and report similarities and differences.(Extension activity)

#### Teachers will:

- introduce the problem solving process and apply it to a simple non-computer situation (Appendix 2.1).
- instruct the students to use the problem solving process to develop a useful and easy to understand login guide and a guideline for computer use.
- outline local safe practice in the handling of all computer hardware.
- relate acceptable–use policies to respect for property and the rights of others to the use of technology in light of Catholic teaching.

- encourage students to look at the use of technology from a user point of view.
- make students aware of related resources in the school resource centre.
- discuss care for the environment as a type of acceptable use (eg use of recycled paper, vegetable inks).

### **Assessment/Evaluation**

Assessment information will be gathered through:

- a formative assessment using a quiz to test knowledge and application of the problem solving process
- a formative assessment in the form of a group checklist of their completed product (Appendix 2.2)
- a summative assessment of the final product (Appendix 2.3)

### **Accommodations**

- Allow students to modify existing guidelines and procedures as opposed to creating them.
- Be prepared to modify the composition of the groups.
- Provide extra instructions on a group by group means.
- Provide adaptive physical devices (e.g. specially designed keyboards) for identified students.
- Use a variety of teaching styles to accommodate learning styles.

### **Resources**

#### **Software**

- current Ministry of Education licensed software (Corel Suite, Filemaker Pro)
- a programming language preferably one already in use in Grade 10 - 12 Computer Studies courses

#### **Print**

- Computer Science An Overview, J. Glenn Brookshear, Addison-Wesley, 1997, ISBN 0-8053-4632
- Teaching Thinking, Edward DeBono, Pelican Books, 1986, ISBN 0-14-0221163-8
- Filemaker Pro User's Guide, Claris, 1992

#### **Websites**

<http://cs.dpdsb.org/stjoes/computers/tricomm/ex1.html>  
<http://ei.cs.vt.edu/~cs3604/lib/WorldCodes/WorldCodes.html>  
<http://www.uwo.ca/IP/policies/wwwpol.html>

## Activity #3

### Title: Computer Technology in the Workplace

Time : 210 minutes

### Description

Students research the effect of new technology on the workplace and their community through the design and administration of a survey of people in the community. Students use the software tools of their choice to construct a computer presentation of their findings at the end of the unit.

### Strands and Expectations

**Ontario Catholic School Graduate Expectations:** CGE2a, CGE2c

**Strands:** Theory and Foundations, Skills and Processes, Impact and Consequences

**Overall Expectations:** TFV.04X, ICV.03X, SPV.02X, TFV.01X

**Specific Expectations:** SPS.03X, ICS.05X, TFS.08X

### Planning Notes

- Review the sample survey ( Appendix 3.1).
- Review local standards or guides for class presentations and the specific expectations for use in construction of a presentation rubric.

### Prior Knowledge Required

- use of e-mail if available used in the activity
- use of classroom tool software

### Teaching Learning Strategies

#### Students will:

- design and administer a survey to people in the community to gather information about the use and effects of computer technology at home and work.
- use software tools of their choice to construct a computer presentation of their findings including a visual representation of the collected data.
- complete a personal reflection that relates the effects of computer technology on people's lives to Gospel values.
- complete the Computer Technology Roles/Task Chart on the basis of how computers, operating systems and networks were mentioned in their surveys (integration of Activity #1).

#### Teachers will:

- distribute a sample survey for discussion.
- remind students to keep in mind the roles and tasks of computers, operating systems and networks in the design of their surveys.
- suggest ways that students may direct and modify the survey (eg; a particular type of industry) to allow students to set their own goals within the activity.
- ask students to relate the computer skills they are learning to those used in the world of work.
- instruct students as to how to send and gather surveys by e-mail or fax.
- assist students in the location of related resources in the school resource centre.
- start a class discussion that relates the impact of technology on people's lives to Catholic teachings.

## **Assessment/Evaluation**

- a formative assessment in the form of a roving conference to discuss survey design with small groups
- a formative assessment using a skill demonstration of e-mail or fax distribution/collection of community surveys
- a summative assessment in the class presentation of survey findings including visual representation of data
- a summative assessment in the completion of personal reflection that relates survey findings to Gospel values (*see Assessment/Evaluation of Personal and Christian Development in Unit #1*)

## **Accommodations**

- Provide application software instruction as needed.
- Allow students to create non-verbal guidelines.
- Provide adaptive physical devices (eg specially designed keyboards) for identified students.
- Use a variety of teaching styles to accommodate learning styles.

## **Resources**

### **Software**

- current Ministry of Education licensed software (Corel Suite, Filemaker Pro)
- a programming language preferably one already in use in Grade 10 - 12 Computer Studies courses

### **Print**

- Computer Science An Overview, J. Glenn Brookshear, Addison-Wesley, 1997, ISBN 0-8053-4632
- Filemaker Pro User's Guide, Claris, 1992

### **Websites**

- <http://cs.dpcdsb.org/stjoes/computers/tricomm/ex1.html>
- <http://www.comlab.ox.ac.uk/archive/other/museums/computing.html>
- <http://www.cs.cmu.edu/People/Xavier/>
- <http://www.net.org/>

## Activity #4

### Title: Problem Solving and Programming

Time : 700 minutes

### Description

Students use a programming environment to write, save, load and modify simple programs. Students apply a problem solving method to computer programming and explain and use the fundamental concepts of sequence, selection and repetition. They will document and debug programs and apply the problem solving and programming skills to complete a final programming project. They should apply the problem solving process to select a program, decide how to approach, design, implement and test it to see if any changes are needed.

### Strands and Expectations

**Ontario Catholic School Graduate Expectations:** CGE3c, CGE5a

**Strands:** Theory and Foundations, Skills and Processes, Impact and Consequences

**Overall Expectations:** TFV.05X, SPV.05X

**Specific Expectations:** TFS02X, SPS.09X, SPS.04X, ICS.05X

### Planning Notes

- Gather existing local resources.
- Review graphics capability of programming language.

### Prior Knowledge Required

- use of application software from previous activities
- no prior knowledge of computer programming should be assumed or required

### Teaching Learning Strategies

#### Students will:

- apply a problem solving method to computer programming (Appendix 4.3).
- explain and use the fundamental concepts of sequence, selection and repetition
- document and debug programs.
- apply problem solving and programming skills to complete a final programming project involving the selection of a program, the decision as to how to design, implement and test it.
- complete the Computer Technology Roles Task chart on the basis of how computers, operating systems and networks are involved in the computer programming process (integration of Activity #1).

#### Teachers will:

- introduce a programming environment.
- demonstrate the writing and use of simple computer programs;
- program documentation; and
- debugging strategies and methods.
- explain and demonstrate the fundamental concepts underlying the creation of a computer program (Appendix 4.3).
- provide sample well-written programs that use the fundamental concepts.

- relate to the handling of graphics in a program, as in a computer game, to the fundamental programming constructs.
- assist students in the selection of a programming idea for the programming project.
- assist students in the location of related resources in the school resource centre.
- provide oral feedback for students' programs.
- discuss the use of computer programs in light of Catholic values (such as the writing of computer viruses, or programs to hack into companies and organizations)
- relate program tasks studied in class to world of work computer programs.
- provide an introduction to related co-operative education programs in the school.

### **Assessment/Evaluation**

- formative assessment in roving conferences to see that students can explain and use simple programming commands.
- formative assessment in the completion of a small programming assignment using a simple programming rubric (Appendix 4.2)
- summative assessment of the final programming project (Appendix 4.2 )

### **Accommodations**

- prepare programs for students to modify instead of having create them
- use group work to organize peer teaching and tutoring

### **Resources**

#### **Software**

- a programming language, one already in use in Grade 10 - 12 Computer Studies courses

#### **Print**

- The Don't Panic Guide to Programming, Holt Software Associates, 1999
- Computer Science An Overview, J. Glenn Brookshear, Addison-Wesley, 1997, ISBN 0-8053-4632
- Learning to Use Microsoft QuickBasic, Microsoft, 1990
- An Introduction to Programming Using Visual Basic 5.0, David Scheider, Prentice Hall, 1998, ISBN 0- 13-875857-3

#### **Websites**

<http://cs.dpcdsb.org/stjoes/computers/tricomm/ex1.html>

## Appendix 1.0

Sample Unit Timeline - based upon 20 periods

Period	Activity #	Planned Activity / Student Work
1	1	Diagnostic Assessment, Computer
2	1	Cost of Computer Components Activity
3	1	Cost of Computer Components Activity
4	2	Introduction to Problem Solving
5	2	Acceptable Use Activity
6	2	Acceptable Use Activity
7	3	Use of Computer Technology Survey
8	4	Introduction to Programming Environment
9	4	Fundamental Concepts - Sequence, Problem Solving
10	4	Fundamental Concepts - Selection
11	4	Fundamental Concepts - Repetition
12	4	Fundamental Concepts - Program Documentation
13	4	Fundamental Concepts - Program Debugging
14	4	Programming Project
15	4	Programming Project
16	4	Programming Project
17	4	Programming Project
18	3	Use of Computer Technology Group Presentations
19	3	Use of Computer Technology Group Presentations
20		Unit Test

### Unit 2 Diagnostic Self-Assessment

Please check the areas that best describe you Name: \_\_\_\_\_

Skill Area	I have no experience	I have some experience	I am very comfortable	I could assist others
Word Processing				
Spreadsheet				
Database				
Web Pages				
Drawing Package				
Programming				
Other (specify)				

## Appendix 1.1

### Computer Technology Roles/Task Chart and Rubric

*Describe the role and/or task of computers, operating systems and networks as they apply to each of activities #2, #3 and #4.*

	Activity #2	Activity #3	Activity #4
Computers			
Operating Systems			
Networks			

## Appendix 1.2

### Computer Technology Roles/Task Chart Rubric

Criteria	1	2	3	4
Knowledge of facts and concepts TFV.04X SPS.06X	demonstrates limited knowledge of computer systems and costs	demonstrates some knowledge of the computer systems and costs	demonstrates considerable knowledge of computer systems and costs	demonstrates thorough knowledge of computer systems and costs
Thinking Skills TFS.07X	demonstrates limited ability to analyse and categorize tasks and roles of computer systems	demonstrates some ability to analyse and categorize tasks and roles of computer systems	demonstrates considerable limited ability to analyse and categorize tasks and roles of computer systems	demonstrates thorough ability to analyse and categorize tasks and roles of computer systems
Communication of information CGE5a	demonstrates limited effectiveness as a team member	demonstrates some effectiveness as a team member	demonstrates considerable effectiveness as a team member	demonstrates high effectiveness as a team member
Application of computer technology SPS.05X	demonstrates limited ability to research and solve problems using software applications	demonstrates some ability to research and solve problems using software applications	demonstrates considerable ability to research and solve problems using software applications	demonstrates high ability to research and solve problems using software applications
Making Connections ICS.05X	demonstrates limited ability to relate knowledge to technology in the workplace	demonstrates some ability to relate knowledge to technology in the workplace	demonstrates considerable ability to relate knowledge to technology in the workplace	demonstrates high ability to relate knowledge to technology in the workplace

## Appendix 2.1

### The Problem Solving Process

Stage	Actions	Example: buying a new CD player
Problem Definition	gather all information needed to solve the problem	read up on CD players in magazines, find out about features that some players offer
Analysis	look at various means of solving the problem	compare various models that are for sale for the set of features that you want
Design	choose one method of solving the problem and form a detailed plan	decide on the CD player that you want, look for the best pricing on that unit
Implementation	put the plan into action	go to the store with your money, ask to see the player
Testing	make sure that the plan works	try out all features of the CD player
Maintenance	make adjustments to the plan based upon testing and use it	buy the CD player and use it

### The Problem Solving Process Applied to the Login Guide

Stage	General Actions	Login Guide
Problem Definition	gather all information needed to solve the problem	determine purpose and contents of a login guide
Analysis	look at various means of solving the problem	compare various types of solutions such as a handout, index cards, or a poster. Look at the advantages and disadvantages of each and select one.
Design	choose one method of solving the problem and form a detailed plan	plan the contents and organization of the chosen solution e.g. poster, handout
Implementation	put the plan into action	create the login guide
Testing	make sure that the plan works	get informal peer and teacher input
Maintenance	make adjustments to the plan based upon testing and use it.	then update the guide based upon testing input and put the new guide into use in the classroom

## Appendix 2.2

### Login/Start-up Procedure & Class Guideline Group Checklist

Item	Yes / No
<b>Login Procedure</b>	
The procedure is complete.	
The procedure is correct.	
The procedure is ordered correctly.	
The procedure demonstrates thinking of how a user will interpret it.	
There are no spelling and grammar errors.	
The procedure is written clearly.	
<b>Computer Use Guidelines</b>	
The guidelines reflect the acceptable–use policy material made available.	
There are no spelling and grammar errors.	
The procedure is written clearly.	
The group can identify ideas used by other groups that would improve their work.	

## Appendix 2.3

### Computer Use Procedures and Classroom Guidelines Rubric

Criteria	1	2	3	4
Knowledge of facts and concepts TFS.02X	demonstrates limited knowledge of the problem solving process	demonstrates some knowledge of the problem solving process	demonstrates considerable knowledge of the problem solving process	demonstrates thorough knowledge of the problem solving process
Thinking Skills CGE2b	demonstrates limited comprehension and usage of acceptable use policy (written materials)	demonstrates some comprehension and usage of acceptable use policy (written materials)	demonstrates considerable comprehension and usage of acceptable use policy (written materials)	demonstrates thorough comprehension and insightful usage of acceptable use policy (written materials)
Communication of information CGE2d, SPS.03X	demonstrates limited ability to speak and write clearly in the creation of procedures and guidelines and to share information	demonstrates some ability to speak and write clearly in the creation of procedures and guidelines and to share information	demonstrates considerable ability to speak and write clearly in the creation of procedures and guidelines and to share information	demonstrates high ability to speak and write clearly in the creation of procedures and guidelines and to share information
Application of computer technology SPV.03X ICS.02X	demonstrates limited ability to handle computer hardware and electrical opponents	demonstrates some ability to handle computer hardware and electrical opponents	demonstrates considerable ability to handle computer hardware and electrical opponents	demonstrates ability to handle computer hardware and electrical opponents
Application of computer technology SPV.03X	demonstrates limited ability to use software applications to research and solve problems	demonstrates some ability to use software applications to research and solve problems	demonstrates considerable ability to use software applications to research and solve problems	demonstrates high ability to use software applications to research and solve problems
Application of computer technology ICS.05X	demonstrates limited ability to apply an acceptable policy to a local situation	demonstrates some ability to apply an acceptable policy to a local situation	demonstrates considerable ability to apply an acceptable policy to a local situation	demonstrates extensive ability to apply an acceptable policy to a local situation
Making Connections CGE4a	demonstrates limited ability to relate acceptable use to the dignity and welfare of others	demonstrates some ability to relate acceptable use to the dignity and welfare of others	demonstrates considerable ability to relate acceptable use to the dignity and welfare of others	demonstrates insight in the ability to relate acceptable use to the dignity and welfare of others

## Appendix 3.1

### Sample Computer Use Survey

This survey is a sample of one that could be used with people who are currently using some form of computer technology in their work.

Question		
How long have you used a computer at work?		
Have you completed computer training for your job?	Yes	No
If YES, did your company provide the training?	Yes	No
Do you see a need for computer training in the future?	Yes	No
Please describe how computer technology has changed your job.		

## Appendix 3.2

### Computer Technology in the Home and Workplace Rubric

Criteria	1	2	3	4
Knowledge of facts and concepts TFV.04X ICS.05X	provides limited description of scope and impact of technology at home, leisure, school and work	provides some description of scope and impact of technology at home, leisure, school and work	provides considerable description of scope and impact of technology at home, leisure, school and work	provides insightful description of scope and impact of technology at home, leisure, school and work
Thinking Skills ICV.03X CGE 2a	demonstrates limited ability to interpret survey results and draw conclusions as to how developments in technology influence people's lives in light of Gospel values	demonstrates some ability to interpret survey results and draw conclusions as to how developments in technology influence people's lives in light of Gospel values	demonstrates considerable ability to interpret survey results and draw conclusions as to how developments in technology influence people's lives in light of Gospel values	demonstrates ability to thoroughly interpret survey results and draw conclusions as to how developments in technology influence people's lives in light of Gospel values
Communication of information SPS.03X CGE2c	demonstrates limited ability to share information clearly and honestly using media tools	demonstrates some ability to share information clearly and honestly using media tools	demonstrates considerable ability to share information clearly and honestly using media tools	demonstrates thorough ability to share information clearly and honestly using media tools
Application of computer technology SPS.09X	demonstrates limited ability to share information using communication tools such as e-mail	demonstrates some ability to share information using communication tools such as e-mail	demonstrates considerable ability to share information using communication tools such as e-mail	demonstrates thorough ability to share information using communication tools such as e-mail
Making Connections ICS.05X	demonstrates limited ability to identify the impact of technology at home, work, and school	demonstrates some ability to identify the impact of technology at home, work, and school	demonstrates considerable ability to identify the impact of technology at home, work, and school	demonstrates insightful ability to identify the impact of technology at home, work, and school

## Appendix 4.1

### Using Selection - A Sample Problem

Write a program that asks the user their age and determines if they are old enough to vote.

#### Input/Processing/Output

<b>Input</b>	user's age
<b>Processing</b>	compare age to 18, 18 or above can vote, otherwise no
<b>Output</b>	message about voting status

#### Pseudo Code

```
get age of user
if age < 18
    display can't vote message
else
    display can vote message
```

### Using Repetition-A Sample Problem

Write a program that determines appears to move a character or graphics across the screen.

#### Input/Processing/Output

<b>Input</b>	starting position, limit of movement
<b>Processing</b>	move character or graphic from starting position until ending position is reached
<b>Output</b>	character or graphic in final position

#### Pseudo Code

```
get the starting position and end limit

while graphic position is not at end limit
    move graphic (or character)

Show the final position on-screen
```

## Appendix 4.2

### Computer Problem Solving and Programming Rubric

Criteria	1	2	3	4
Knowledge of facts and concepts TFV.05X	demonstrates limited knowledge of fundamental concepts underlying the creation of a computer program	demonstrates some knowledge of fundamental concepts underlying the creation of a computer program	demonstrates considerable knowledge of fundamental concepts underlying the creation of a computer program	demonstrates thorough knowledge of fundamental concepts underlying the creation of a computer program
Thinking Skills TFS.05X CGE3c	demonstrates limited usage of problem solving model to develop a program algorithm	demonstrates limited usage of problem solving model to develop a program algorithm	demonstrates considerable usage of problem solving model to develop a program algorithm	demonstrates insightful usage of problem solving model to develop a program algorithm
Communication of information SPS.04X	demonstrates limited ability to use a variety of software applications in the creation of internal and external documentation	demonstrates some ability to use a variety of software applications in the creation of internal and external documentation	demonstrates considerable ability to use a variety of software applications in the creation of internal and external documentation	demonstrates thorough ability to use a variety of software applications in the creation of internal and external documentation
Application of computer technology SPS.09X	demonstrates limited ability to use program plan to write a computer program	demonstrates some ability to use program plan to write a computer program	demonstrates considerable ability to use program plan to write a computer program	demonstrates thorough ability to use program plan to write a computer program, uses advanced programming features
Making Connections ICS.05X	demonstrates limited ability to relate programming assignment to commercial software	demonstrates some ability to relate programming assignment to commercial software	demonstrates considerable ability to relate programming assignment to commercial software	demonstrates insightful ability to relate programming assignment to commercial software

## Appendix 4.3

### Computer Studies Project Worksheet

<b>Stage</b>	<b>Actions</b>	<b>Your Actions</b>
Problem Definition	What should the program do? Input, Processing, Output	
Analysis	What is the best way to do this?	
Design	Write a plan. (pseudo code)	
Implementation	Write the program.	
Testing	Test the program.	
Maintenance	Make changes to the program based upon testing.	