

Public and Catholic District School Board Writing Partnerships

Technological Education

Course Profile Construction Technology

Grade 12
Workplace Preparation
TCJ4E

• *for teachers by teachers*

This sample course of study was prepared for teachers to use in meeting local classroom needs, as appropriate. This is not a mandated approach to the teaching of the course. It may be used in its entirety, in part, or adapted.

Course Profiles are professional development materials designed to help teachers implement the new Grade 12 secondary school curriculum. These materials were created by writing partnerships of school boards and subject associations. The development of these resources was funded by the Ontario Ministry of Education. This document reflects the views of the developers and not necessarily those of the Ministry. Permission is given to reproduce these materials for any purpose except profit. Teachers are also encouraged to amend, revise, edit, cut, paste, and otherwise adapt this material for educational purposes.

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Acknowledgments

Public School Board Writing Team – Grade 12, Construction Technology

Lead Board

Simcoe County District School Board
Robert Emptage, Laura Featherstone, Project Managers

Public Course Profile Writing Team

Robert Fisher, Lead Writer
Robert Stonehouse, Writer

Catholic School Board Writing Team – Grade 12, Construction Technology

Lead Board

Dufferin-Peel Catholic District School Board
Denise Panunte, Project Manager

Catholic Course Profile Writing Team

Paul Owens, Dufferin-Peel Catholic District School Board, Lead Writer
Joanne Durst, Peel District School Board, Writer
Brian Andres, Wellington Catholic District School Board, Writer

Review Team

Carmen Leith, Dufferin-Peel Catholic District School Board
Rosaria Kalino, Dufferin-Peel Catholic District School Board
Denise Panunte, Dufferin-Peel Catholic District School Board

Course Overview

Construction Technology, TCJ4E, Grade 12, Workplace Preparation

Policy Document: *The Ontario Curriculum, Grades 11 and 12, Technological Education, 2000.*

Prerequisite: Construction Technology, TCJ3E, Grade 11, Workplace Preparation

Course Description

This course focuses on advanced residential and more complex construction systems, as well as the introduction of heavy construction, related to commercial, industrial, and/or residential construction; advanced practical workplace applications; and the development of generic employment skills and independent learning skills. Students will examine the materials, processes, labour, tools, and equipment used in the construction industry; technical drawings; auxiliary systems and landscaping. They will also study industry standards and building codes; consider health and safety issues; and explore careers; lifelong learning opportunities and the impact of construction technology on society and the environment.

How This Course Supports the Ontario Catholic School Graduate Expectations

Through the student's years in the secondary system, the Catholic Graduate Expectations have been an integral part of the student's development as a Catholic partner in his/her community. Their final year will allow them to further develop this life skill and allow them to express their beliefs and love for their God, community and self. The design of this program allows for all students regardless of gender or race to improve their skills and knowledge in the area of the construction industry and better themselves, their families and the community. The students' development and continued growth in the Catholic faith can be measured by Catholic Graduate Expectations. The challenges that await the students upon graduation will be varied and new. This personal development that they have experienced in the Catholic education system, will aid in the decision-making process so they can make enlightened and personal decisions with confidence.

The world and its resources are gifts from God and as stewards of His word and world, we must make informed decisions being mindful of both the short and long term consequences on our environment, quality of life and how this relates to our Catholic values as followers of Jesus Christ. The graduate now has the confidence and skills to become a contributing member of society.

Course Notes

- The development of these units allows students to make an enlightened decision about entry into the work force and to further develop their skills as craftspeople. They continue to develop in problem-solving, communication, conflict resolution, and group learning skills as they prepare to enter the world of work.
- Safety, as always, is a prime factor in any course design and the uses of (Appendix 3.1.1) Safety Passport, introduced in earlier years to the students, should be continued.
- Unit activities call for the use of computer-aided drafting programs, Internet research, and printing. The use of a computer lab as a learning tool is required. It should be reserved in order to assure the activities can be completed successfully. A review of proper Internet research practices should be reviewed, along with the school's Internet policy.
- School and board policy regarding trips and the introduction of visitors to the schools should also be reviewed.
- Health and safety issues such as medical conditions of the students (allergies to wood, paint, etc.) should be discussed and the necessary accommodations made. Privacy and confidentiality are essential when discussing this topic with students. Teachers should be sensitive to the personal nature of the experience and support students in the discussion of sensitive issues.

- The use of newspapers, magazines, Internet, journal entries, and other sources of information allows students to demonstrate an understanding of local and world environmental issues as they relate to Christian responsibility.
- Each unit exposes students to many career opportunities and provides insights into the skills required for related professions. The students responsibility comes in making an informed decision using all the skills they have developed over the years. They must be reminded throughout the course of this responsibility and given the opportunity to make the decision wisely.

Units: Titles and Time

* Unit 1	Pre-employment, Apprenticeship, and School to Work	10 hours
Unit 2	Building Project Planning and Management	25 hours
* Unit 3	Interior Finishing	25 hours
Unit 4	Advanced Skills and Construction	50 hours

* These units are fully developed in this Course Profile.

Unit Overviews

Unit 1: Pre-Employment, Apprenticeship, and School To Work

Time: 10 hours

Unit Description

This unit focuses on preparing students for entry into the workplace directly after high school. Emphasis is placed on employability skills, construction careers, small business opportunities, and apprenticeships. Each student produces an individual student portfolio containing a career research paper for two construction-related careers, a résumé, a trade specific skills profile, a business plan for a small business in construction, a health and safety checklist, an employability rubric, and a collection of classroom work. Students also explore and identify issues relating to Catholic values and each person's contribution to the workplace. Students create and add to their portfolios throughout the semester. The first three activities within this unit can be presented at various stages throughout the course. The portfolios are presented at the conclusion of the course.

Unit Overview Chart

Cluster	Learning Expectations	Assessment Categories	Focus
1	ICV.02, IC2.01, IC2.02, IC2.03, IC2.04, IC2.05, IC2.06 CGE 4g, 4f, 4e, 5g	Knowledge/Understanding Thinking/Inquiry Communication	Using portfolios and investigating job possibilities
2	SPV.06, SP5.01, SP5.02, SP5.03, SP5.05, SP5.06, SP5.07 CGE 4g, 5e, 5g	Knowledge/Understanding Thinking/Inquiry Communication Application	Create a business plan for a small construction related business
3	SP5.01, SP5.03, SP5.05, ICV.04, IC3.03, IC3.04 CGE 2b, 2c, 4a, 4e, 4g, 5b	Knowledge/Understanding Communication	Present completed portfolios Present business plans Discuss and make final additions to Student Profiles

Unit 2: Building Project Planning and Management

Time: 25 hours

Unit Description

One of the most important, yet overlooked steps of constructing a building is the planning stage. This unit is designed to expose students to all of the planning that is required before the sod turning ceremony. This includes design review, costing/estimating, permits/codes, and financing/contracts. Teachers may locate an actual project (such as a garage, deck, or cottage), or develop a Project Challenge, and perform all of the pre-construction tasks with their class. Throughout this unit, students are encouraged to consider Christian values and responsibilities when making and dealing with ethical issues.

Unit Overview Chart

Cluster	Learning Expectations	Assessment Categories	Focus
1	TFV.04, TF2.01, TF2.04, SP1.02, SP1.05, SP2.01, SP3.01, SP3.02, SP4.01, SP4.02 CGE 2b, 2c, 3b, 3c, 4f	Application Thinking/Inquiry Knowledge/Understanding	Interpret plans and prepare cost estimation for the project
2	TFV.04, TF2.03, SPV.02, SPV.03, SP1.05, IC1.02 CGE 2a, 2e, 3b, 3c, 3f, 5a, 5b, 7i	Thinking/Inquiry Knowledge/Understanding	Investigate and work within local building codes and by-laws
3	TF1.02, SPV.02, SPV.06, SP1.03, SP1.05, IC1.01 CGE 3c, 5b, 4a, 4c, 7i	Application Thinking/Inquiry Knowledge/Understanding	Financial planning for project, cost analysis, etc.

Unit 3: Interior Finishing

Time: 25 hours

Unit Description

This course investigates all aspects of interior finish carpentry. Using the design process, students plan and cost all of the work that is required to finish an interior stud wall. This includes drywalling, plastering, decorating, hanging doors, and doing trim woodwork. Students also complete a tiled section of a wall, taking colour, pattern, and tile dimensions into consideration. At the end of the unit, students complete a portfolio of their work including photographs, sketches, and design briefs. While working on projects, students are encouraged to investigate career possibilities, as well as how the finishing trades connect to their living environment, e.g., colour affecting mood, aesthetic quality, material handling, effect on the ecosystem, etc.

Unit Overview Chart

Cluster	Learning Expectations	Assessment Categories	Focus
1	TFV.01, TFV.02, TFV.03, SPV.04, TF1.01, TF1.02, TF2.02, SP1.04, SP2.02, SP2.05, SP2.06, ICV.01, IC1.03, IC2.02 CGE 2b, 3c, 4b, 4c, 5a, 7b	Application Thinking/Inquiry Knowledge/ Understanding	Proper handling, installation, and finishing of surface
2	TFV.01, TFV.02, TF1.01, TF1.02, TF2.02, TF2.03, SPV.01, SPV.05, SP1.04, SP2.02, SP2.04, SP2.05, SP2.06, ICV.01, IC1.03 CGE 5g, 5h, 7c	Application Thinking/Inquiry Knowledge/ Understanding	Final selection of trim and necessary materials, then installation

Cluster	Learning Expectations	Assessment Categories	Focus
3	TFV.02, TF1.01, TF1.02, TF2.02, SP1.04, SP2.02, SP2.05, SP2.06, SP5.06, ICV.01, IC1.03, IC2.01 CGE 5a, 5b, 5c, 5h, 7j	Application Thinking/Inquiry Knowledge/ Understanding	Tile selection and application of wall section

Unit 4: Advanced Skills and Construction

Time: 50 hours

Unit Description

This unit focuses on advanced construction projects and the development of practical workplace skills. Students apply the design process using charts, building codes, construction tools, and equipment to construct a variety of complex projects. Students further explore the materials and procedures required to layout and construct projects such as a shed or playhouse, including a gable roof with dormers or a hip roof, and a second floor, if applicable. The project could include ventilation, and electrical and plumbing systems, where appropriate. Emphasis is given to industry standards, methods and safety. Working individually and in groups, students develop their Christian leadership, God-given abilities, and gain a further understanding of their meaningful contribution to society.

Unit Overview Chart

Cluster	Learning Expectations	Assessment Categories	Focus
1	TFV.01, TF2.05, TF3.02, TF3.03, TF3.04, TF3.05, SPV.01, SPV.05, SP2.02, SP3.04 CGE 2a, 2b, 2c, 2e, 3c, 4f, 7i	Knowledge/Understanding Thinking/Inquiry	Identify the construction methods, procedures, and support systems for material selection, ordering, and budgeting
2	SPV.04, SP2.01, SP2.03, SP2.04, ICV.02, IC2.01, IC2.02, IC2.03, IC2.04, IC3.05 CGE 7b, 7i	Knowledge/Understanding Thinking/Inquiry Communication Application	Identify, select, and use equipment and tools in a safe and proper manner
3	TF2.05, SPV.04, SPV.05, SP1.01, SP2.01, SP2.02, SP2.03, SP2.04, SP3.03, IC2.02, IC2.04, IC3.05 CGE 4c, 4f, 5a, 5b, 5c, 5d, 7i	Knowledge/Understanding Communication Application	Use charts, codes, tools, and equipment to measure, layout, cut, and assemble projects

Teaching/Learning Strategies

Teaching/Learning Strategies include the following:

- Brainstorming through group generation of initial ideas expressed without criticism or analysis;
- Collaborative/cooperative small group learning for high levels of student engagement and interdependence;
- Conferencing through student-to-student discussion;
- Design Process is applied the a problem-solving approach using a prescribed series of steps;
- Inquiry conducted through a problem-solving approach using prescribed processes involving a number of steps (e.g., S.P.I.C.E. [Situation, Problem, Investigation, Construction, Evaluation] model);
- Independent Study through an exploration and research of a topic;
- Construction activities in the development of products and services;

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- Report/Presentation using a variety of media both orally and in writing of the researched topics to the class;
 - Daily positive feedback with students to help them remain on task and work at an appropriate level;
 - A clear set of classroom rules, regulations, and expectations are established and reinforced through the semester.

Assessment and Evaluation of Student Achievement

Diagnostic: at the beginning of a term, a unit of study, or whenever information about prior learning is useful;

Formative: during learning; gives ongoing feedback to the teacher about the quality of learning and the effectiveness of instruction;

Summative: usually carried out at the end of a learning process.

Students are assessed using the following strategies:

Personal Communication

- journals/conferencing logs
- learning logs
- student/teacher conferencing
- peer conferencing

Paper-and-Pencil

- unit tests

Performance

- product research
- construction projects
- drawing and sketching

Assessment tools include

- checklists
- marking schemes, e.g., tests, written assignments, presentations
- rubrics
- anecdotal comments with suggestions for improvement
- rating scales

Seventy per cent of the grade will be based on assessments and evaluations conducted throughout the course. Thirty per cent of the grade will be based on a final evaluation in the form of an examination, performance, essay, and/or other method of evaluation.

Teachers should consult individual student IEPs for specific direction for individuals.

Accommodations

The nature of these units and their activities allow for a wide range of course delivery methods.

Accommodations are made to cover the broad spectrum of students identified with learning exceptionalities.

The following are some of the accommodations that may be required in this course. Specific ones will be included in each unit and each activity as appropriate.

- Facilities for students with special needs, e.g., ramps, lowered tables, special tools, protective wear (environment, tools, and materials)
- Written, audio and video taped materials in the form of notes, or samples of completed work, sketches, drawings
- Large print texts, large screen monitors as appropriate

- Pre-testing at the beginning for knowledge and specific vocabulary where appropriate
- Adapt testing and evaluation as required
- Alternative methods of note taking such as scribes, buddy, tape recorder, etc.
- Checklists, outlines, and advanced organizers to assist in assignment completion
- Student demonstration of understanding using a variety of mediums

Resources

Units in this Course Profile make reference to the use of specific texts, magazines, films videos, and websites. Teachers need to consult their board policies regarding use of any copyrighted materials. Before reproducing materials for student use from printed publications, teachers need to ensure that their board has a Cancopy licence and that this licence covers the resources they wish to use. Before screening videos/films with their students, teachers need to ensure that their board/school has obtained the appropriate public performance videocassette licence from an authorized distributor, e.g., Audio Cine Films Inc. Teachers are reminded that much of the material on the Internet is protected by copyright. The copyright is usually owned by the person or organization that created the work. Reproduction of any work or substantial part of any work on the Internet is not allowed without the permission of the owner.

Print

Canadian Electrical Code. Rexdale, Ontario: Canadian Standards Association.

Canadian Home Workshop. Volumes 1–22. Markham, Ontario: Camar Publications.
ISSN 1485-8509 <http://www.canadianhomeworkshop.com> (1-905-475-8440)

Clidero, Robert K. and Kenneth H. Sharpe. *Applications of Electrical Construction*. Don Mills, Ontario: General Publishing, 1979. ISBN 0-7725-1719-3

Electrical Wiring Residential. ISBN/ISSN 0-7668-2429-2

Expanding Your Horizons. McGraw-Hill Ryerson Limited, 1993. ISBN 0-07-551392-7

Fine Homebuilding. Numbers 1–126. Newtown, Connecticut: The Taunton Press.
ISSN 1096-360-X (1-800-477-8727)

Hire Expectations – Employment Strategies for Canada’s Youth. Canadian Federation of Independent Business, 1998. ISBN 0-9693268-4-X

The Home Depot. Kitchen and Bath 1-2-3. Des Moines, Iowa: Meredith Books, 1999.

The Home Depot. Outdoor Projects 1-2-3. Des Moines, Iowa: Meredith Books, 1998.

Hosie, R.C. *Native Trees of Canada*. Canada: Fitzhenry and Whiteside Ltd., 1979.
ISBN 0-88-902-572-X

Kirchner, Harold B. *Wiring Installation and Maintenance*. Toronto: McGraw-Hill Ryerson, 1978.
ISBN 0 070828296

Kirklighter, Clois E. *Modern Masonry Brick, Block, Stone*. South Holland, Illinois: The Goodheart-Willcox Company, 1985.

Landers, Jack M. *Home Repair and Maintenance*. Tinley Park II: Goodheart-Willcox 1991.
ISBN 0-87006-820-2

The Entrepreneurial Spirit. Toronto: McGraw Hill Ryerson, 1991. ISBN 0-07-549931-2

Long, Frank J. *Intermediate Electricity*, 3rd ed. Toronto: General Publishing, 1985. ISBN- 0 773650296

Massey, Howard C. *Plumbers Handbook*, 2nd ed. Carlsbad, California: Craftsman Book Company, 1985.
ISBN 0 91046093

Ontario Hydro Electrical Safety Code. Toronto, Ontario, current.

Ontario Job Futures and the Ontario Ministry of Training, Colleges and Universities.
ISBN 0-7778-8799-1

Ontario Plumbing Code. (current)

Plywood Handbook. Revised. Vancouver, British Columbia: Council of Forest Industries of British Columbia, 1980.

Stirling, Norman. *Fundamentals of Technical Drawing.* Canada: Gage Educational Publishing, 1984. ISBN 0-7715-0327x

Tech Prep Career Programs – A Practical Guide to Preparing Students for High-Tech, High-Skill, High-Wage Opportunities. Thousand Oaks, California, Corwin Press Inc.: 1997. ISBN 0-8039-6510-9

Transitions – A Practical Guide to the Workplace. Collier MacMillan Canada, Inc., 1989.

Wood, Robert W. *All Thumbs Guide to Home Plumbing.* Blue Ridge Summit, Pennsylvania: Tab Books, 1992. ISBN 0 830625461

Woodsmith. Numbers 1–126. Des Moines, Iowa: August Home Publishing Company. ISSN 0164-4114 (Tel: 1-800-333-5075)

Websites

Note: The URLs for the websites have been verified by the writer prior to publication. Given the frequency with which these designations change, teachers should always verify the websites prior to assigning them for student use.

<http://www.edu.gov.on.ca>

Human Resources Development Canada links to Government of Ontario links to college, apprenticeship and work opportunities

<http://www.caf-cfa.org>

Canadian Apprenticeship Forum, Human Resources Development Canada – links to apprenticeship opportunities and job training

<http://www.americantech.org/main.cfm>

American Technical Publishers – online resource of technical trades, books, and other resources

<http://www.newapprenticeships.gov.au>

New Apprenticeships, Australia – a Government of Australia source for job training and opportunities

<http://www.edu.gov.on.ca/eng/training/apprenticeship>

Ministry of Training, Colleges and Universities – a government resource for training, upgrading and job opportunities

<http://www.ibew.com/education.htm>

International Brotherhood of Electrical Workers – an Electrical Workers Union that has information about training, rules, apprenticeships, etc, in the United States

<http://www.lafarge.com>

La Farge Construction Materials, Technical Services Group, 7880 Keele St., Concord, Ontario, L4K 4G7. 1-800-523-2743 – international building material contractor site that gives resources and material information

<http://www.scc.ca>

Publications of the Standards Council of Canada. Rexdale, Ontario. – mandated by the Federal Government to standardise and promote at home and export standards

<http://www.finehomebuilding.com>

Fine Homebuilding – online resource for books and other information relating to the construction industry (roofing, framing, etc.)

<http://www.augusthome.com>

August Home Publishing Company – magazine and book publisher for home and garden renovation

<http://www.algonquincollege.com>

Algonquin College – resource for the community college and its programs

<http://www.mohawkc.on.ca>
Mohawk College – community college website

<http://www.humberc.on.ca>
Humber College – community college website

<http://www.recycle.net>
Recycled Furniture Info – website dedicated to the re-use of materials from steel to plastic

<http://www.wood.ca>
Canadian Wood Council. (613) 747-0755

www.msbigday.com
Microsoft Free Seminar Series

<http://www.hrdc-drhc.gov.ca>
Assistance for Small Business – government sponsored site for the starting of small business

<http://www.homeadvisor.msncom/improve/walls/drywall>:
Home Advisor – site for the installation and repair to drywall and its related products

www.drywalltextures.com.
construction tips on textures and instructions

www.tapingtools.com
source for tools, service, and technical support

<http://www.painterschatroom.com>
Painters Chat Room, painting and decorating website

<http://www.profilepaint.com>
Profile Paint Interior Finishing, paint and decorating website

Video Resources

www.icbo.org/gateway
a construction and safety video tape dealer

www.ibhs.org
a resource for construction video tapes on loan

www.fso.icbo.org/gateway/250x97.html
a resource for American Construction Training Series

www.taunton.com
video resource of drywall taping, repair and taping techniques

Ground Fault Circuit Interrupters Video. ISBN/ISSN 0-7668-2437-3

Miscellaneous and Custom Installations Video, 1st ed. ISBN/ISSN 0-7668-2440-3

Community Resources

Co-op placements, job shadows, speakers, local businesses

Municipal, Provincial, and Federal Government Agencies

Local clubs (gardening and landscape)

Royal Botanical Gardens (Burlington)

Human Resources and Development Canada

Local school and public libraries

Municipal Offices of local communities

Ministry of Municipal Affairs and Housing. Ontario Building Code, (1997). Housing Development and Buildings Branch, 777 Bay Street, 2nd Floor, Toronto, Ontario, M5G 2E5.

OSS Policy Considerations

To prepare students effectively for the challenges that await them, Ontario's schools should offer an education program that promotes a high standard of achievement, that provides all students with the learning opportunities and support they need, and that is relevant to society's needs and expectations.

In order to earn their diploma for graduation, students must complete a total of 30 credits. These credits are made up of 18 compulsory and 12 optional, plus 40 hours of community involvement.

Technological Education Programs in Construction Technology allow the students the opportunity to investigate areas with direct entry into the work force, or to pursue an apprenticeship program. These positions are critical in today's industry which is seeing the average age of the workforce increase each year.

Apprenticeship is hands-on training for people who enjoy learning by doing. The training provides access to well-paying jobs that demand a high level of skills, judgement, and creativity. Apprentices are paid while gaining work experience, and their wage increases with their level of skills.

Apprenticeship is a method of training in which employer train workers to become skilled tradespeople through on-the-job training and classroom instruction. Apprenticeship training program are available for many skilled trades in Ontario. The Ontario Youth Apprenticeship Program (OYAP) opens the door to apprenticeship in a wide range of exciting careers.

This course allows the student to investigate job opportunities in construction trades, work on the management of projects to their successful completion, learn new construction techniques, and improve their finishing carpentry skills. All the units have a direct relationship to future job prospects.

Anti-discrimination education, equity/social justice issues, career goals/co-operative education, conflict resolution/violence prevention, and community partnerships are addressed in the course. These support many of the Ontario secondary school policies. Career exploration throughout the document is made available with *Choices in Action: Guidance and Career Education Program Policy for Elementary and Secondary School, 1999*.

Technology programs can accommodate students of all abilities with diverse, challenging, and applicable projects. The use of open-ended, project-driven challenges ensures the courses appeal to students.

Teachers should be aware of students that require modification to the mandated expectations for this course. Ontario Secondary Schools (page 24) allows teachers to modify the learning expectation for exceptional students in order to support the contents of the student's IEP. This may apply also to students who have not been identified as exceptional but are receiving special education programs and services. However, consultation with the principal is advised in order that the students' credit will not be place at risk.

The following Ontario Ministry of Education Policy Documents are the basis upon which Technology courses are developed:

Ontario Secondary Schools Grades 9 to 12, The Ontario Curriculum, Program and Diploma Requirements, 1999;

Technological Education, Grades 11 and 12, 2000.

Coded Expectations, Construction Technology, Grade 12, Workplace Preparation, TCJ4E

Theory and Foundation

Overall Expectations

TFV.01 · apply the design process to develop solutions, products, processes, or services for a variety of complex construction renovation and landscaping projects;

TFV.02 · describe the properties of, and use where applicable, a variety of building and landscaping materials, techniques, and processes, including those involved in the production, assembly, and installation of prefabricated units and in renovation projects;

TFV.03 · describe a variety of construction technologies, materials and manufactured products, tools, and equipment used in construction projects;

TFV.04 · identify the building codes, regulations, and standards applicable to construction, including those for electrical, mechanical, and structural systems.

Specific Expectations

The Design Process

TF1.01 – explain how a human need or want can be met through a new or improved product;

TF1.02 – apply the following steps of the design process to solve a variety of construction technology challenges or problems:

- identify what has to be accomplished (the problem);
- gather and record information, and establish a plan of procedures;
- brainstorm a list of as many solutions as possible;
- identify the resources required for each suggested solution, and compare each solution to the design criteria, refining and modifying it as required;
- evaluate the solutions (e.g., by testing, modelling, and documenting results) and choose the best one;
- produce presentation and working drawings, sketches, graphics, mathematical and physical models, or a prototype of the best solution;
- evaluate the prototype and determine the resources, including computer applications, required to produce it;
- communicate the solution, using one or more of the following: final drawings, graphs, charts, sketches, technical reports, electronic presentations, flow charts, mock-ups, models, prototypes, and so on;
- obtain feedback on the final solution and repeat the design process if necessary to refine or improve the solution.

Building Materials and Methods

TF2.01 – describe the properties (physical, structural, and thermal) of natural and manufactured building materials, and describe the processes used to produce or modify them;

TF2.02 – describe the materials used, and methods of applying them, for the various components of a construction project (e.g., footings, foundations, floors, walls, roofs, windows, doors, millwork, interior and exterior finishes, hardware, landscaping);

TF2.03 – identify the building codes, regulations, and standards applicable to complex construction projects;

TF2.04 – describe the relative strength of a variety of construction materials (e.g., wood, steel, concrete, masonry);

TF2.05 – identify the thermal and moisture protection properties of a variety of materials, as well as the methods of applying them.

Electrical, Mechanical, and Structural Systems

TF3.01 – describe the various systems applicable to the construction industry, including electrical, plumbing, heating, ventilation, and air-conditioning systems;

TF3.02 – identify the requirements for the various systems used in different construction projects, using technical resources such as charts, tables, and building codes, regulations, and standards;

TF3.03 – identify the structural elements (including materials, spans, loads, forces, and methods of assembly) of complex construction projects;

TF3.04 – identify materials with a range of structural properties used for different parts of complex construction projects (e.g., footings, bearing walls, columns, beams and lintels, floor systems, ceiling and roof systems, retaining walls);

TF3.05 – identify the size of the structural members required for a variety of projects, using technical resources such as charts, tables, and building codes, regulations, and standards.

Skills and Processes

Overall Expectations

SPV.01 · apply the design process to a variety of construction projects;

SPV.02 · demonstrate an ability to use resources such as technical data, reports, charts, tables, and building codes, regulations, and standards;

SPV.03 · describe heavy construction systems in terms of predetermined criteria, type of construction, building use, and building codes, regulations, and standards;

SPV.04 · demonstrate an ability to use construction tools, materials, and equipment;

SPV.05 · demonstrate mathematical and estimation skills for a variety of construction projects;

SPV.06 · demonstrate the entrepreneurial, business, and management skills required in the construction industry.

Specific Expectations

Design, Planning, and Communication Skills

SP1.01 – design, produce, repair, and maintain a variety of complex construction and landscaping projects;

SP1.02 – use both conventional and computer-aided methods to produce working drawings (e.g., site plans, floor plans, assembly drawings) – including elevations, sections, and details – for various construction projects;

SP1.03 – gather information and resources, and present solutions to construction problems;

SP1.04 – evaluate and document construction projects in relation to type of building, structural elements, aesthetics and architectural style, efficiency, and compliance with building codes, regulations, and standards;

SP1.05 – prepare accurate documents for complex construction projects, including cost estimates, bidding proposals, lists of material and labour costs, work orders, building permits, and specifications.

Building and Materials Application Skills

SP2.01 – use various tools and equipment to calculate the dimensions of and to lay out appropriate structural members for footings, floors, walls, roofs, openings, walkways, retaining walls, slopes, elevations, and other parts of an advanced construction project;

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- SP2.02** – identify suitable materials for a variety of components of a construction project;
SP2.03 – use a variety of tools, equipment, and materials to complete a construction project;
SP2.04 – apply a variety of methods and procedures to assemble, join, and complete construction projects;
SP2.05 – prepare accurate working drawings for a variety of advanced construction projects;
SP2.06 – explain the type of structure and the materials used for a particular construction project.

Skills Relating to Electrical, Mechanical, and Structural Systems

- SP3.01** – prepare and interpret drawings to identify the components of a variety of electrical and mechanical systems used in construction;
SP3.02 – determine the components of the mechanical and electrical systems required for a construction project using charts, tables, and technical data;
SP3.03 – design and install where appropriate the mechanical systems of a building project (including those related to electrical, plumbing, heating, ventilation, and air-conditioning systems) in accordance with building codes, regulations, and standards;
SP3.04 – describe and calculate the sizes of the structural members required for a complex construction project, using technical resources such as charts, tables, and building codes, regulations, and standards.

Estimating Costs

- SP4.01** – describe the units of measurement applicable to a variety of building products and materials;
SP4.02 – calculate the quantities of materials and costs of labour for a project, using the quantity take-off method of estimation and technical data in charts and tables.

Entrepreneurial Skills

- SP5.01** – describe the attitudes, attributes, and skills of an entrepreneur;
SP5.02 – describe the characteristics of a construction industry organization that promotes an entrepreneurial spirit (e.g., the skills of creative thinking and decision making, flexible work schedules, a team approach, opportunities for management training and promotion, profit sharing);
SP5.03 – describe the organization and management functions in a small construction company;
SP5.04 – identify and describe the skilled construction trades;
SP5.05 – identify and describe the role of the skilled professionals involved with a small construction company (e.g., lawyers, accountants, architects, technologists, technicians);
SP5.06 – demonstrate entrepreneurial skills (e.g., managerial, critical and creative thinking, communication);
SP5.07 – prepare a business plan for a venture related to the construction industry.

Impact and Consequences

Overall Expectations

- ICV.01** · explain the effects of technological change in the construction industry on society and on the environment;
ICV.02 · apply appropriate health and safety legislation; general shop and site safety rules; and rules specific to the use of materials, tools, and equipment;
ICV.03 · describe careers in construction technology, identifying the skills, education, and training required for each;
ICV.04 · identify and describe the employability skills required and the need for lifelong learning in the construction industry.

Specific Expectations

Economic, Social, and Environmental Impacts

- IC1.01** – explain how the local economy is directly linked to the construction industry;
- IC1.02** – explain the social and environmental impacts on the construction industry of urban planning, land use by-laws, and building codes, regulations, and standards;
- IC1.03** – identify and describe renovations and modifications to various buildings and construction projects that could have an economic, social, and/or environmental impact on the community.

Health and Safety

- IC2.01** – identify hazards related to materials, processes, and equipment used in a construction work environment;
- IC2.02** – demonstrate safe shop and construction site practices for the use of hand and power tools, materials, and equipment;
- IC2.03** – describe the basic health and safety needs of workers on construction sites;
- IC2.04** – explain the need for, and apply where appropriate, health and safety codes, standards, and regulations applicable to construction projects and the workplace;
- IC2.05** – explain health and safety legislation and practices related to the construction industry such as the Workplace Hazardous Materials Information System (WHMIS), the Worker’s Compensation Act, the Ontario Building Code, and local by-laws;
- IC2.06** – explain how to handle hazardous materials in accordance with the Workplace Hazardous Materials Information Systems (WHMIS) guidelines.

Education, Training, and Career Opportunities

- IC3.01** – identify career opportunities in a variety of sectors of the construction industry;
- IC3.02** – describe the education and training required for employment in construction-related careers;
- IC3.03** – explain the importance of lifelong learning for someone choosing a career in the construction field;
- IC3.04** – produce the necessary documentation (e.g., portfolios, résumés of experience and skills, references) for entry into the workplace;
- IC3.05** – demonstrate the skills required to meet employer expectations in the construction industry.

Ontario Catholic School Graduate Expectations

The graduate is expected to be:

A Discerning Believer Formed in the Catholic Faith Community who

- CGE1a** -illustrates a basic understanding of the **saving story** of our Christian faith;
- CGE1b** -participates in the **sacramental life** of the church and demonstrates an understanding of the centrality of the Eucharist to our Catholic story;
- CGE1c** -actively reflects on **God’s Word** as communicated through the Hebrew and Christian scriptures;
- CGE1d** -develops attitudes and values founded on Catholic **social teaching** and acts to promote social responsibility, human solidarity and the common good;
- CGE1e** -speaks the **language of life**... “recognizing that life is an unearned gift and that a person entrusted with life does not own it but that one is called to protect and cherish it.” (Witnesses to Faith)
- CGE1f** -seeks intimacy with God and celebrates **communion** with God, others and creation through prayer and worship;
- CGE1g** -understands that one’s purpose or **call in life** comes from God and strives to discern and live out this call throughout life’s journey;
- CGE1h** -respects the **faith traditions**, world religions and the life-journeys of **all people of good will**;
- CGE1i** -integrates faith with life;
- CGE1j** -recognizes that “sin, human weakness, conflict and forgiveness are part of the human journey” and that the cross, the ultimate sign of forgiveness is at the heart of **redemption**. (Witnesses to Faith)

An Effective Communicator who

- CGE2a** -listens actively and critically to understand and learn in light of gospel values;
- CGE2b** -reads, understands and uses written materials effectively;
- CGE2c** -presents information and ideas clearly and honestly and with sensitivity to others;
- CGE2d** -writes and speaks fluently one or both of Canada’s official languages;
- CGE2e** -uses and integrates the Catholic faith tradition, in the critical analysis of the arts, media, technology and information systems to enhance the quality of life.

A Reflective and Creative Thinker who

- CGE3a** -recognizes there is more grace in our world than sin and that hope is essential in facing all challenges;
- CGE3b** -creates, adapts, evaluates new ideas in light of the common good;
- CGE3c** -thinks reflectively and creatively to evaluate situations and solve problems;
- CGE3d** -makes decisions in light of gospel values with an informed moral conscience;
- CGE3e** -adopts a holistic approach to life by integrating learning from various subject areas and experience;
- CGE3f** -examines, evaluates and applies knowledge of interdependent systems (physical, political, ethical, socio-economic and ecological) for the development of a just and compassionate society.

A Self-Directed, Responsible, Life Long Learner who

- CGE4a** -demonstrates a confident and positive sense of self and respect for the dignity and welfare of others;
- CGE4b** -demonstrates flexibility and adaptability;
- CGE4c** -takes initiative and demonstrates Christian leadership;
- CGE4d** -responds to, manages and constructively influences change in a discerning manner;
- CGE4e** -sets appropriate goals and priorities in school, work and personal life;
- CGE4f** -applies effective communication, decision-making, problem-solving, time and resource management skills;
- CGE4g** -examines and reflects on one's personal values, abilities and aspirations influencing life's choices and opportunities;
- CGE4h** -participates in leisure and fitness activities for a balanced and healthy lifestyle.

A Collaborative Contributor who

- CGE5a** -works effectively as an interdependent team member;
- CGE5b** -thinks critically about the meaning and purpose of work;
- CGE5c** -develops one's God-given potential and makes a meaningful contribution to society;
- CGE5d** -finds meaning, dignity, fulfillment and vocation in work which contributes to the common good;
- CGE5e** -respects the rights, responsibilities and contributions of self and others;
- CGE5f** -exercises Christian leadership in the achievement of individual and group goals;
- CGE5g** -achieves excellence, originality, and integrity in one's own work and supports these qualities in the work of others;
- CGE5h** -applies skills for employability, self-employment and entrepreneurship relative to Christian vocation.

A Caring Family Member who

- CGE6a** -relates to family members in a loving, compassionate and respectful manner;
- CGE6b** -recognizes human intimacy and sexuality as God given gifts, to be used as the creator intended;
- CGE6c** -values and honours the important role of the family in society;
- CGE6d** -values and nurtures opportunities for family prayer;
- CGE6e** -ministers to the family, school, parish, and wider community through service.

A Responsible Citizen who

- CGE7a** -acts morally and legally as a person formed in Catholic traditions;
- CGE7b** -accepts accountability for one's own actions;
- CGE7c** -seeks and grants forgiveness;
- CGE7d** -promotes the sacredness of life;
- CGE7e** -witnesses Catholic social teaching by promoting equality, democracy, and solidarity for a just, peaceful and compassionate society;
- CGE7f** -respects and affirms the diversity and interdependence of the world's peoples and cultures;
- CGE7g** -respects and understands the history, cultural heritage and pluralism of today's contemporary society;
- CGE7h** -exercises the rights and responsibilities of Canadian citizenship;
- CGE7i** -respects the environment and uses resources wisely;
- CGE7j** -contributes to the common good.

Unit 1: Pre-employment, Apprenticeship, and School To Work

Time: 10 hours

Unit Description

This unit focuses on preparing students for entry into the workplace directly after high school. Emphasis is placed on employability skills, construction careers, small business opportunities, and apprenticeships. Each student produces an individual student portfolio containing a career research paper for two construction related careers, a résumé, a trade specific skills profile, a business plan for a small business in construction, a health and safety checklist, an employability rubric, and a collection of classroom work. Students also explore and identify issues relating to Catholic values and each person's contribution to the workplace. Students create and add to their portfolios throughout the semester. The first three activities within this unit can be presented at various stages throughout the course. The portfolios are presented at the conclusion of the course. Students are to be encouraged to update and modify their portfolio (personal résumé) through pictures, prints written materials and assignments to help display their skills.

Unit Synopsis Chart

Activity	Time	Learning Expectations	Assessment Categories	Tasks
1.1 Preparing an Individual Student Profile	3 hours	ICV.02, IC2.01, .02, .03, .04, .05, .06 CGE 4e, 4f, 4g, 5g	Knowledge/ Understanding Thinking/ Inquiry Communication	Introduce portfolios Study and develop a workplace health and safety checklist Identify essential employability skills
1.2 Let's Start a Small Business	5 hours	SPV.06, SP5.01, .02, .03, .05, .06, .07 CGE 4g, 5e, 5g	Knowledge/ Understanding Thinking/ Inquiry Communication Application	Identify the characteristics and entrepreneurial aspects of a small business Create a business plan for a small construction-related business
1.3 Presentation and Discussion	2 hours	SP5.01, .03, .05, ICV.04, IC3.03, .04 CGE 2b, 2c, 4a, 4e, 4g, 5b	Knowledge/ Understanding Communication	Present completed portfolios Present business plans Discuss and add to student portfolios

Activity 1.1: Preparing an Individual Student Profile

Time: 3 hours

Description

Students identify their strengths using a personal inventory of one's skills. Students also examine current employability skills and safety issues required for today's workforce. Then, using the list of employability skills and the safety information, students create checklists in order to set goals and track progress. Using the lists, students self-evaluate and set personal goals at the beginning, midterm, and conclusion of the course. Finally, students study portfolio structures and develop a portfolio that displays a range of their workplace skills. The portfolio, similar to a résumé, will be added to throughout the course illustrating several samples of student work including: a personal inventory (completed projects, drawings, etc.), a career research paper, a résumé, interview skills, an employment and skills profile, a safety checklist, a small business plan, sample classroom work, work demonstrating Catholic values, and a reflection. The complete portfolio will be presented at the conclusion of the course.

Strand(s) & Learning Expectations

Ontario Catholic School Graduate Expectations

CGE 4e - set appropriate goals and priorities in school, work, and personal life;

CGE 4f - apply affective communication, decision-making, problem-solving, time and resource management skills;

CGE 4g - examine and reflect on one's personal values, abilities and aspirations influencing life's choices and opportunities;

CGE 5g - achieve excellence, originality, and integrity in one's own work and supports these qualities in the work of others.

Strand(s): Impact and Consequences

Overall Expectations

ICV.02 - apply appropriate health and safety legislation; general shop and site safety rules; and rules specific to the use of materials, tools, and equipment.

Specific Expectations

IC2.01 - identify hazards related to materials, processes, and equipment used in a construction work environment;

IC2.02 - demonstrate safe shop and construction site practices for the use of hand and power tools, materials, and equipment;

IC2.03 - describe the basic health and safety needs of workers on construction sites;

IC2.04 - explain the need for, and apply where appropriate, health and safety codes, standards, and regulations applicable to construction projects and the workplace;

IC2.05 - explain health and safety legislation and practices related to the construction industry such as the Workplace Hazardous Materials Information System (WHMIS), the Worker's Compensation Act, the Ontario Building Code, and local by-laws;

IC2.06 - explain how to handle hazardous materials in accordance with the Workplace Hazardous Materials Information Systems (WHMIS) guidelines.

Prior Knowledge & Skills

- Cooperative learning skills
- Research skills using the Internet, library/resource centre, and other resources
- Time management skills
- Decision-making skills

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- Awareness of employability skills and safety issues in the workplace
 - Knowledge of handling and safety procedures for construction materials (MSDS and WHMIS)
 - Knowledge of safe and correct use of industry standard tools and equipment
 - Knowledge of safe shop and construction site practices

Planning Notes

- Develop a work sheet to record discussion items regarding individual student profiles with an area to list indicators of student achievement, knowledge and performance.
- Gather examples of previous portfolios or examples from other courses.
- Create a template for portfolios listing items to include and a brief description of expectations for each item. Include an area to set dates and track progress.
- Prepare copies of the Portfolio Assessment Checklist (Appendix 1.3.1).
- Prepare a personal inventory activity to assess personality in relation to potential careers. This activity could involve the use of an Internet program for personality inventories.
- Prepare a form or tracking method that document each students ability to operate machinery components and safety (see Appendix 3.3.1 – Safety Passport).

Teaching/Learning Strategies

- The teacher introduces the major assignment for this unit – the Individual Student Profile, and leads a discussion relating to indicators of student achievement, knowledge, and performance that would be relevant to potential employers.
- The teacher shows examples of portfolios and discusses their relevance and usefulness to students and employers.
- The teacher distributes the template for Portfolio construction and briefly discusses each major item. The portfolio should be kept in a folder and include a title page and table of contents. Key items in the portfolio could include the following: personal inventory, career research paper, résumé, interview skills (list of skills, record of practice interviews – video or audio taped, with a review and critique), skills profile (1. employability 2. trade specific), documentation of competent and safe use of machinery, small business plan, sample work (demonstrating knowledge of safety, knowledge of design process communication, computer use, Catholic values and collaboration), and Reflection (showing self evaluation and changes to original work).
- The teacher and students select various times throughout the semester to review structure and add to portfolios.
- The teacher distributes the Portfolio Assessment Checklist (Appendix 1.3.1) and presentation criteria so that students are clear on expectations and grading format.
- Students complete a personal inventory using a teacher-generated or Internet researched personality profile matched to careers. Students should assess their skills, aptitudes, values, needs, training and experience, personality, interests, work preferences, and life goals.
- The teacher presents a lesson, and leads a discussion regarding current employability skills and safety requirements in the workplace.
- In small groups students discuss and report on safety items: safe and correct use of tools and equipment, WHMIS, shop safety, site safety, material uses and safety using Material Data Safety Sheets (MSDS), list of occupational health and safety issues, etc.
- Students use their knowledge of safety from the Grade 11 course and further develop their knowledge and understanding throughout the Grade 12 course.
- Working in groups, students discuss a teacher-generated rubric to assess employability skills and evaluate themselves based on their current performance. The students will use the rubric several times throughout the course to self-evaluate and set goals.

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- Employability Skills may include: ability to communicate, manage information, think and problem solve, personal management skills, and teamwork skills. Items included in the portfolio demonstrating employability could include: record of attendance, cooperative education employer's evaluation, volunteer activities, pictures of projects, certificates/awards and recommendations from school.
 - A large portion of the portfolios should be a collection of regular classroom work. Students should be instructed to keep all rough copies and items that represent the design process for grading at the conclusion of the course. The table of contents can include a section for all of the rough copies.

Assessment & Evaluation of Student Achievement

- Formative assessment of students' contribution to group and class discussions using observation and anecdotal comments (personal and group evaluation forms may also be used)
- Formative assessment of each students' research skills and learning skills using an anecdotal comment and checklist sheet (Appendix 1.3.1)

Accommodations

- Allow written scripts or handouts.
- Provide samples and exemplars for students.
- Group students of differing abilities, and allow for peer tutoring.
- Allow students to give verbal responses or solutions to challenges.
- Allow extra time to complete tasks.
- Break down tasks as necessary.
- Monitor progress and provide feedback frequently.

Resources

Employability Skills: Creating My Future – Student Booklet, Nelson Canada, 1996. ISBN 0-17-604668-2

Employability Skills: Creating My Future – Instructor's Guide, Nelson Canada, 1996.

ISBN 0-17-604665-8

New on the Job – Homebuilding Health and Safety Training Program CD-ROM – Construction Safety Association of Ontario.

Safety: Getting the Hang of It – Employee Safety Induction Video. Industrial Accident Prevention Association, Toronto, Ontario.

Skill, High Wage Opportunities. Corwin Press Inc., Thousand Oaks, California, 1997.

ISBN 0-8039-6510-9

The Edge, Ministry of Education and Training, Queen's Printer for Ontario, 1998.

ISBN 0-7778-7887-9

The First Step, Student Safety Handbook, London Occupational Safety and Health Information Service, London, Ontario, 2000. ISBN 0-9681735-1-9

Tech Prep Career Programs – A Practical Guide to Preparing Students for High-Tech, High

You and the Job Market, Quick Reference to Today's Job Market, Ontario Ministry of Education,

Queen's Printer for Ontario, 2001, ISBN 0-7794-0388-6

Websites

www.csa.org – Construction Safety Association of Ontario

www.coc.org/cathsoct.html – Catholic Social Teaching

Community Resources

Public, University and School libraries

Human Resources and Development Canada

School Resources

Library/Resource Centre, Computers, Coop/OYAP office, Communications department.

Video Resources

www.home-construction-remodelling.com – site for home remodelling, estimating

www.constructionvideos.com – video for construction project and remodelling

www.hometechonline.com video source for construction projects and estimating

<http://dmoz.org> – resource for construction and engineering

www.tsunh.edu/video – University of New Hampshire video library

<http://dcsd.k12.nv.us> – curriculum both written and video taped on Ethics and Employability

Appendices

Appendix 1.3.1 – Portfolio Assessment Checklist

Activity 1.2: Let's Start a Small Business

Time: 5 hours

Description

Students build on their understanding of business plans. Discussion includes the purpose of a business plan and analysis of examples to provide students with the important elements to include in a small business plan. Students are challenged to explore and examine one or more business plans, and then choose a construction related business of interest and prepare a plan. Emphasis is given to characteristics of construction companies, roles of skilled professionals, entrepreneurship, and each student's abilities, aspirations, and choices as they relate to life's business opportunities. Consideration will also be given to ethical decision making in a business context. Students modify their personal résumé and portfolio as they work through this activity.

Strand(s) & Learning Expectations

Ontario Catholic School Graduate Expectations

CGE 4g - examines and reflects on one's personal values, abilities and aspirations influencing life's choices and opportunities;

CGE 5e - respects the rights, responsibilities and contributions of self and others;

CGE 5g - achieves excellence, originality, and integrity in one's own work and supports these qualities in the work of others.

Strand(s): Skills and Processes

Overall Expectations

SPV.06 - demonstrate the entrepreneurial, business, and management skills required in the construction industry.

Specific Expectations

SP5.01 - describe the attitudes, attributes, and skills of an entrepreneur;

SP5.02 - describe the characteristics of a construction industry organization that promotes an entrepreneurial spirit;

SP5.03 - describe the organization and management functions in a small construction company;

SP5.05 - identify and describe the role of the skilled professionals involved with a small construction company;

SP5.06 - demonstrate entrepreneurial skills;

SP5.07 - prepare a business plan for a venture related to the construction industry.

Prior Knowledge & Skills

- Cooperative learning skills
- Research skills using the Internet, library/resource centre, and other resources
- Time management skills
- Decision-making skills

Planning Notes

- Review and gather information for the discussion about entrepreneurship.
- Research and prepare a short presentation of two small local construction-related companies or arrange for two guest speakers from the community to discuss their business.
- Prepare a review of business plans and create a list/template of items to include in the student's business plan.
- Copy the Portfolio Assessment Checklist (Appendix 1.3.1) and create an assessment form for the business plans including a checklist for each item.

Teaching/Learning Strategies

- The teacher distributes a copy of the assessment criteria for the portfolio and business plan presentation (for the next activity at the conclusion of the course).
- The teacher leads a discussion involving the attitudes and attributes of an entrepreneur. The discussion should also include the characteristics of an organization, management, and the skills of the professional.
- Students list all the aspects and characteristics.
- The teacher then presents description of two local small businesses for the class to examine.
- Students add to the list/summary of business characteristics, management, and professional skills.
- The teacher reviews business plans and discusses the purpose and features. Business plans are usually lengthy and contain extensive information about a company (as many as 50 pages). They should stand out and be clear, well written, and attractive. The teacher should simplify and identify several key elements for students to consider, research, and include in their business plan. Students, working in groups of two, create a business plan approximately 7 to 10 pages in length.
- Businesses could include new home construction, renovations, deck construction, shed construction, painting, drywalling, or general maintenance.
- Working in groups, students discuss and decide how the business plan should be tailored for: financing and/or clarification and direction for the entrepreneur. The business plan should illustrate a very thought-out process, including research, identified needs, current market situation, and a proposal of how this business will meet those needs. It should communicate the students' plans to others.
- Features of the Business Plan should include: Cover Page, Introduction, Table of Contents including identified need(s), type of company, location, key individuals, size of company with future projections, product or service, defined market (profile of who would use such a product or service), cost of product or service, marketing strategy, identified competition, equipment, resources and facility required, and financing.
- Students should also identify past experience and how it applies to the business plan.
- Students should conclude their business plan with a one-page executive summary, discussing why someone should invest and/or partner with this business venture. They will also list recommendations and benefits of the venture, and reflect on their individual aspirations, abilities, and personal values in relation to Gospel values and the workplace.

Assessment & Evaluation of Student Achievement

- Formative assessment of students' contribution to group and class discussions using observation and anecdotal comments
- Personal communication both diagnostic and formative (teacher/student conferencing)
- Summative evaluation of completed business plans – using a rating scale or rubric

Accommodations

- Provide exemplars and samples of student work.
- Simplify instructions, choice, and scheduling.
- Provide opportunities for open-ended inquiry.
- Establish timelines and allow extra time to complete tasks.
- Provide checklists to help with organization and assignment completion.

Resources

Brand, Margaret. *Success in the Workplace*, Second Edition, Copp Clark Pitman Ltd. Canada, 1996. ISBN 0-7730-5552-5

Grady, Kimbrell. *Succeeding in the World of Work*, Fifth Edition, New York, Glencoe McGraw Hill, 1992. ISBN 0-02-675583-1

Kimberly and Vineyard, *Entering the World of Work*, Glencoe/McGraw-Hill, 1989. ISBN 0-02-676730-9
The Holy Bible.

Community Resources

Co-op placements, speakers, local business.

Public and school libraries

Human Resources and Development Canada

Local Chamber of Commerce

Video Resources

www.home-construction-remodelling.com – site for home remodelling, estimating

www.constructionvideos.com – video for construction project and remodelling

www.hometechonline.com – video source for construction projects and estimating

<http://dmoz.org> – resource for construction and engineering

www.tsunh.edu/video – University of New Hampshire video library

Appendix 1.3.1

Portfolio Assessment Checklist

Item	Yes	No
Cover page <ul style="list-style-type: none"> • A title-Student name • School name-Completion date • A pictorial representation of your portfolio 		
Table of Contents <ul style="list-style-type: none"> • A title • Listing of contents with page references 		
Personal Inventory <ul style="list-style-type: none"> • Student name • Picture-Hobbies/sports/interests • Personality/Career Match assignment 		
Career Research Paper Item shows research and understanding of a construction related career and the necessary skills		
Resume Item includes a completed student resume		
Practice Interview Participated in a practice interview		
Business Plan Item shows a business plan for a construction related business		
Safety Documentation of knowledge of safety for industry standard tools, equipment and the work place and record of individual proficiency		
Design Process Item demonstrates understanding and application of the design process		
Communication Item shows that the student can communicate ideas, designs and information through a variety of media		
Computer Use Item shows a variety of computer software applications for research and design		
Collaboration Item shows respect for the rights, responsibilities and contributions of self and others within group activities		
Reflection Item shows understanding of how to evaluate self, group contributions, and project work		

** Items mentioned in the rubric can be defined as: parts of the cover page; personal information missing from Personal Inventory; topics or information that help make the whole.*

Activity 1.3: Presentation and Discussion

Time: 2 hours

Description

Students present their individual portfolios and group business plans to the class. Students are asked to select three significant items from their portfolio that they feel demonstrate their employability, entrepreneurship, and preparedness for the workplace. Students also reflect on the purpose of work and God's calling on their life in relation to the workplace. Students, in pairs, present their small construction related business plan. Students are asked to comment on the attitudes, attributes, and skills of the entrepreneur and the organization of a small business. The remaining time in the class is used for discussion and making final additions and/or modifications to the students' portfolios.

Strand(s) & Learning Expectations

Ontario Catholic School Graduate Expectations

CGE 2b - reads, understands, and uses written materials effectively;

CGE 2c - presents information and ideas clearly and honestly and with sensitivity to others;

CGE 4a - demonstrates a confident and positive sense of self and respect for the dignity and welfare of others;

CGE 4e - sets appropriate goals and priorities in school, work and personal life;

CGE 4g - examines and reflects on one's personal values, abilities and aspirations influencing life's choices and opportunities;

CGE 5b - thinks critically about the meaning and purpose of work.

Strand(s): Skills and Processes, Impact and Consequences

Overall Expectations

ICV.04 - identify and describe the employability skills required and the need for lifelong learning in the construction industry.

Specific Expectations

SP5.01 - describe the attitudes, attributes, and skills of an entrepreneur;

SP5.03 - describe the organization and management functions in a small construction company;

SP5.05 - identify and describe the role of the skilled professionals involved with a small construction company;

IC3.03 - explain the importance of lifelong learning for someone choosing a career in the construction field;

IC3.04 - produce the necessary documentation for entry into the workplace.

Prior Knowledge & Skills

- Effective verbal communication skills
- Ability to self- and peer assess (forms provided by instructor, see Planning Notes)
- Experience critiquing, modifying, and problem solving to improve work

Planning Notes

- Prepare a discussion outline to review presentation criteria and delivery.
- Prepare a presentation checklist with an area for anecdotal comments. The checklist should include the presentation criteria outlined to the students.
- Prepare copies of self- and peer assessment to be used to evaluate portfolios and presentations.
- Prepare copies of the Portfolio Assessment Checklist (Appendix 1.3.1) for final portfolio assessment.

Teaching/Learning Strategies

- The teacher reviews the assessment criteria for the presentations. Presentation content could include a list of the minimum requirements such as: introduction, presentation of materials (including work that demonstrates employability, entrepreneurship and preparedness for the workplace), and key questions (God's calling on one's life, attitudes, attributes, and skills of the entrepreneur and the organization of a small business).
- The teacher stresses the importance of body language, eye contact, dress, hand gestures, clarity of voice, etc. The presentations should end with a conclusion and/or summary statement. The reflection of Catholic values and the workplace article (from the portfolio) could be used as the summary statement.
- Students present their portfolios and business plans in groups of two. Within the groups of two, each student presents their individual portfolio and then works with their partner to present the business plan.
- The teacher distributes the evaluation handout for self- and peer assessment.
- The teacher leads a discussion regarding the individual student profiles. Students are given the opportunity to discuss, conference with one another, and make alterations and additions to the portfolios.
- Students submit their finished portfolios for grading by the teacher.

Assessment & Evaluation of Student Achievement

- Formative assessment of students' rough copies and portfolio design process
- Formative assessment of individual and group performance using a peer and self-evaluation handout
- Formative assessment of presentation of final business plans and portfolio
- Summative assessment of completed projects including portfolios and content

Accommodations

- Allow extra time as needed.
- Allow written scripts and prepared notes for presentations.
- Allow students a variety of media to demonstrate their understanding.
- Simplify and adapt the presentation requirements as necessary.

Resources

The Holy Bible.

Appendices

Appendix 1.3.1 – Portfolio Assessment Checklist

Unit 3: Interior Finishing

Time: 25 hours

Unit Description

This course investigates all aspects of interior finish carpentry. Using the design process, students plan and cost all of the work that is required to finish an interior stud wall. This includes drywalling, plastering, decorating, hanging doors, and doing trim woodwork. Students also complete a tiled section of a wall, taking colour, pattern, and tile dimensions into consideration. At the end of the unit, students complete a portfolio of their work including photographs, sketches, and design briefs. While working on projects, students are encouraged to investigate career possibilities, as well as how the finishing trades connect to their living environment, e.g. colour affecting mood, aesthetic quality, material handling, effect on the ecosystem, etc.

Unit Synopsis Chart

Cluster	Time	Learning Expectations	Assessment Categories	Focus
3.1 Drywall, Taping, and Plaster	5 hours	TFV.01, TFV.02, TFV.03, SPV.04, TF1.01, TF1.02, TF2.02, SP1.04, SP2.02, SP2.05, SP2.06, ICV.01, IC1.03, IC2.02	Application Thinking/Inquiry Knowledge/ Understanding	Proper costing, handling, installation, and finishing of surface
3.2 Interior Trim and Finish Carpentry	15 hours	TFV.01, TFV.02, TF1.01, TF1.02, TF2.02, TF2.03, SPV.01, SPV.05, SP1.04, SP2.02, SP2.04, SP2.05, SP2.06, ICV.01, IC1.03	Application Thinking/Inquiry Knowledge/ Understanding	Final selection of trim and necessary materials, then installation
3.3 Tile Installation	5 hours	TFV.02, TF1.01, TF1.02, TF2.02, SP1.04, SP2.02, SP2.05, SP2.06, SP5.06, ICV.01, IC1.03, IC2.01	Application Thinking/Inquiry Knowledge/ Understanding	Tile selection and application of wall section

Activity 3.1: Drywall, Taping, and Plaster

Time: 5 hours

Description

Students design, cost, and construct a frame wall corner section (approximately 2.0 metres by 3 metre by 4 metre) with one door opening, two window openings, and four electrical boxes. The students install drywall sheeting with particular attention being devoted to laying out the panels mathematically and avoiding non-feathered butt joint tape joints. Next, students tape seams, mud seams, and drywall screws in preparation for a professional finish. The drywall must be painted with a primer paint prior to finishing.

Strand(s) & Learning Expectations

Strand(s): Theory and Foundations, Skills and processes, Impact and Consequences

Overall Expectations

TFV.01 - apply the design process to develop solutions, products, processes, or services in response to complex renovation or landscaping projects;

TFV.02 - describe the properties of, and use where applicable, a variety of building and landscaping materials, techniques, and processes, including those in the production assembly, and installation of prefabricated units and in renovation projects;

TFV.03 - describe a variety of construction technologies, materials, and manufactured products, tools and equipment used in construction projects;

SPV.04 - demonstrates the ability to use construction tools, materials, and equipment;

ICV.01 - explain the effects of technological change in the construction industry on society and the environment.

Specific Expectations

TF1.01 - explain how a human need or want can be met through a new or improved product;

TF1.02 - apply the followings steps of the design process to solve a variety of construction technology challenges or problems;

- identify what has to be accomplished;
- gather and record information, and establish a plan of procedures;
- brainstorm a list of as many solutions as possible;
- identify the resources required for each suggested solution, and compare each solution to the design criteria, refining and modifying it as required;
- evaluate the solutions (e.g., by testing, modeling, and documenting results) and choose the best one;
- produce presentation and working drawings sketches, graphics, mathematical and physical models or a prototype of the best solution;
- evaluate the prototype and determine the resources, including computer applications, required to produce it;
- communicate the solution, using one or more of the following: final drawings, graphs, charts, sketches, technical reports, electronic presentations, flow charts, mock-ups, models, prototypes, and so on;
- obtain feedback on the final solution and repeat the design process if necessary to refine or improve the solution.

TF2.02 - describe the material used, and methods of applying them, for the various components of a construction project (e.g., footings, foundations, floors, walls, roofs, windows, doors, millwork, interior and exterior finishes, hardware, landscaping);

SP1.04 - evaluate and document construction projects in relation to type of building, structural element, aesthetics, and architectural style, efficiency, and compliance with building codes, regulations and standards;

SP2.02 - identify suitable materials for a variety of components of a construction project;

SP2.05 - prepare accurate working drawings for a variety of advanced construction projects;

SP2.06 - explain the type of structure and the materials used for a particular construction project;

IC1.03 - identify and describe renovations and modifications to various buildings and construction projects that could have an economic, social, and/or environmental impact on the community;

IC2.02 - demonstrate safe shop and construction site practices for the use of hand or power tools, materials, and equipment.

Prior Knowledge & Skills

- Measurement and layout techniques in both imperial and metric measurement systems
- Ability to frame a stud wall, with doors and windows
- Ability to install electrical boxes.
- Interactive and collaborative learning skills
- Communication skills (both written and verbal)
- A general awareness of safety, as it relates to shop practices (use of the sample safety passport Appendix 3.3.1)
- Ability to use a design process for problem solving

Planning Notes

- Ensure that all necessary tools and equipment required for this activity are available.
- Obtain required supplies from various sources.
- Prepare layout and measurement quiz (Appendix 3.1.1).
- Provide examples of good quality work for students to look at.
- Determine student groups, usually four per group.

Teaching/Learning Strategies

- Students and the teacher review the safety passport and its proper use.
- Student groups brainstorm the differences between careers in the finishing trades and in the rough carpentry trades. Each group creates a list, which is shared with the rest of the class.
- Students and the teacher review the procedure for framing a stud wall 2 metres high and 3 – 4 metres long, with a corner including: one door opening, two windows, and 4 electrical boxes. One side of the wall should be considered an outside wall and one an inside wall.
- Students and the teacher review measurement and layout. When laying out drywall it is imperative that the drywall installer would make the most efficient use of time and material.
- Using the design process (Appendix 3.3.2), students sketch the layout and cutting of their drywall in order to be most cost effective, both in time and material.
- Students complete quiz on layout and measurement. (Appendix 3.1.1)
- The teacher demonstrates safe ways to cut and fasten drywall to the stud wall.
- After completing a set of drawings, the students cost and order the materials for sheeting.
- After constructing the stud frame wall, the students begin to layout drywall sheets for installation.
- Students install drywall following all safety rules when cutting and using a screw gun.
- Once the drywall has been installed, the students tape joints, install corner bead, and mud and sand drywall using the three-coat method in preparation for finish.

Assessment and Evaluation of Student Achievement

Task/Product	Tool	Purpose	Achievement Chart Categories
Quiz on layout and measurement Appendix 3.1.1	Marking Scheme	Formative	Knowledge/Understanding
Design Brief	Checklist Anecdotal Rubric	Formative Summative	Thinking/Inquiry Communication
Dry Wall Demonstration Wall Construction and Dry Wall Installation	Checklist Conferencing Rubric	Formative Summative	Application Application

Accommodations

- For enrichment, assign the task of completing textured effects, such as stippling.
- Review students' IEPs and adapt the activity and teaching/learning and assessment strategies to meet the students' needs.
- Provide instructions both verbally and visually, as required.
- Provide supports for exceptional students to ensure safety.
- Adapt instructions, choices, and scheduling as required.
- Allow for flexible pacing in keeping with the student's needs and abilities.

Resources

Ferguson, Myron R. *Drywall*. Taunton Press ISBN 156158133X

Goad, Karen. *Drywall Installation and Finishing.*, 1993. ISBN 0827356056

Spence, William. *Installing and Finishing Drywall*. Sterling Publishers. ISBN 0806938854

Wagner, John D. *Drywall*. Creative Homeowner Press. ISBN 1580110673

Video

Drywall Video ASIN 1565220137

Drywall (Hometime series) ASIN 6301415027

Drywall Hanging and Taping ASIN 63046810X

Websites

www.remodelonline.com

A web site with many useful tips on remodelling with helpful advice to homeowners.

www.drywalltextures.com – Professional web site on drywall refinishing.

www.taunton.com/video

A publishing company that publishes books and magazines on home improvement topics.

Appendix 3.1.1

Measurement and Layout Test

On a $8 \frac{1}{2} C$ by $11C$ (portrait orientation) sheet of paper, layout the following points:

(Two marks each, for a total of 20)

1. Point 1 is located $3 \frac{1}{16} C$ from the left, and $4 \frac{11}{16} C$ from the top.
2. Point 2 is located $3 \frac{1}{16} C$ from the left, and $3 \frac{7}{8} C$ from the bottom.
3. Point 3 is located $4 \frac{7}{8} C$ from the bottom, and $1 \frac{7}{16} C$ from the right.
4. Point 4 is located $1 \frac{7}{16} C$ from the right, and $3 \frac{5}{8} C$ from the top.
5. Point 5 is located $2 \frac{1}{2} C$ from the top, and $2 \frac{5}{8} C$ from the right.
6. Point 6 is located $3 \frac{7}{16} C$ from the top, and $2 \frac{1}{8} C$ from the left.
7. Point 7 is located $\frac{7}{8} C$ from the left, and $4 \frac{5}{8} C$ from the top.
8. Point 8 is located $\frac{7}{8} C$ from the left, and $4 \frac{1}{16} C$ from the bottom.
9. Join the dots, from 1 to 8.
10. Join dots 1 and 7, 1 and 6, 1 and 4, 2 and 8.

What do you see? _____

Activity 3.2: Interior Trim and Finish Carpentry

Time: 15 hours

Description

Students learn to apply a finish to their drywalled area. The finish may be wallpaper, faux paint effects, polished plaster, stucco, texture spray, or any other finish. If a textured effect is desired, the students may elect to practise trowelling and stippling. Once this is completed, using the design process, students develop a variety of wood products to enhance the aesthetic quality of their wall. Such products may include door and window casing, baseboard, crown moulding, wainscot, chair rail, or a plate shelf. Students install and finish the trim product they have selected.

Strand(s) & Learning Expectations

Strand(s): Theory and Foundations, Skills and Processes, Impact and Consequences

Overall Expectations

TFV.02 - describe the properties of, and use where applicable, a variety of building and landscaping materials, techniques, and processes, including those in the production assembly, and installation of prefabricated units and in renovation projects;

SPV.01 - apply the design process to a variety of construction projects;

SPV.05 - demonstrate mathematical and estimation skills for a variety of construction projects;

ICV.01 - explain the effects of technological change in the construction industry on society and the environment.

Specific Expectations

TF1.01 - explain how a human need or want can be met through a new or improved product;

TF1.02 - apply the followings steps of the design process to solve a variety of construction technology challenges or problems:

- identify what has to be accomplished;
- gather and record information, and establish a plan of procedures;
- brainstorm a list of as many solutions as possible;
- identify the resources required for each suggested solution, and compare each solution to the design criteria, refining and modifying it as required;
- evaluate the solutions (e.g., by testing, modeling, and documenting results) and choose the best one;
- produce presentation and working drawings sketches, graphics, mathematical and physical models or a prototype of the best solution;
- evaluate the prototype and determine the resources, including computer applications, required to produce it;
- communicate the solution, using one or more of the following: final drawings, graphs, charts, sketches, technical reports, electronic presentations, flow charts, mock-ups, models, prototypes, and so on;
- obtain feedback on the final solution and repeat the design process if necessary to refine or improve the solution;

TF2.02 - describe the material used, and methods of applying them, for the various components of a construction project (e.g., footings, foundations, floors, walls, roofs, windows, doors, millwork, interior and exterior finishes, hardware, landscaping);

TF2.03 - identify the building codes, regulations, and standards applicable to complex construction projects;

SP1.04 - evaluate and document construction projects in relation to type of building, structural elements, aesthetics, and architectural style, efficiency, and compliance with building codes, regulations and standards;

SP2.02 - identify suitable materials for a variety of components of a construction project;
SP2.04 - apply a variety of tools, equipment, and materials to complete a construction project;
SP2.05 - prepare accurate working drawings for a variety of advanced construction projects;
SP2.06 - explain the type of structure and the materials used for a particular construction project;
IC1.03 - identify and describe renovations and modifications to various buildings and construction projects that could have an economic, social, and/or environmental impact on the community.

Prior Knowledge & Skills

- Ability to use both imperial and metric measurement systems
- Ability to use shop tools safely and proficiently
- Work collaboratively
- Communication skills (both written and verbal)
- General awareness of safety as it relates to shop practices
- Ability to use a design process for problem solving

Planning Notes

- Ensure that all necessary tools and equipment required for this activity are available.
- Obtain required supplies from various sources.
- Provide examples of good quality work for students to look at.
- Ensure that there are woodworking and home design magazines in the classroom for research purposes.

Teaching/Learning Strategies

- Students, working in the same groups as the previous activity, research the finish they would like to apply to their drywalled area. Each student researches and presents a different type of finish to their group. The group decides which finish to apply.
- Students apply a finish to their drywalled area. It will likely be necessary to touch up after wood installations.
- Using magazines and real life examples, the teacher provides a lesson and/or a sketching activity on styles, shape, proportion, and definition.
- Using the design process, students must document the process and complete the finish on the window and door openings. All work must be approved by the instructor.
- Students determine what style of trim they would like to have on their wall.
- Students cost out the purchase cost of the baseboard, casing, and decorative mouldings needed to complete their wall.
- Emphasizing safety, the teacher demonstrates to students how to create variations in shape using a simple router table or a shaper. The teacher reviews the safety requirements.
- Students demonstrate to the teacher competent and safe use of a router table or shaper.
- Students determine if they will finish their trim prior to installation on the wall or after installation.
- Students finish their trim with appropriate finish (if required) and install their baseboard on their wall section.
- Students complete the finish woodwork on their wall section. The teacher assesses the finished wall using The Finished Wall Section Rubric (Appendix 3.2.1).

Assessment & Evaluation of Student Achievement

Task/Product	Tool	Purpose	Achievement Chart Category
Design Brief Appendix 3.1.2	Checklist Anecdotal Comments Rubric	Formative Summative	Thinking/Inquiry Communication
Interior Carpentry	Checklist Conferencing	Formative	Application
Finished Wall Section Appendix 3.2.1	Rubric	Summative	Application Thinking/Inquiry Knowledge/Understanding

Accommodations

- Review students' IEPs and adapt the activity and teaching/learning and assessment strategies to meet the students' needs.
- Groups may be selected to balance different abilities.
- Provide instructions both verbally and visually as required.
- Allow for flexible pacing in keeping with the students needs and abilities.

Resources

Black and Decker Home Improvement Library. *The Complete Guide to Home Carpentry: Carpentry Skills and Projects for Homeowners*. Creative Publishing International. ISBN 0865735778

Feirer, Mark. *Trim (Quick Guide)*. Creative Homeowner Press. ISBN 1880029278

Ireton, Kevin. *Finish Carpentry: The Best of Fine Homebuilding*. Taunton Press. ISBN 1561583316

Neumann, R. P. *Finish Carpentry: A Complete Interior and Exterior Guide*. Sterling Publications ISBN 0806907002

Savage, Craig. *Trim Carpentry Techniques: Installing Doors, Windows, Base and Crown*. Taunton Press ISBN 094239108X

Tolpin, Jim. *Finish Carpenter's Manual*. Craftsman Book Co. ISBN 0934041822

Ziegner, Rich. *Stairs and Railings (Quick Guide)*. Creative Homeowner Press ISBN 188002988X

Video

Finish Carpentry, ASIN 630141506X

Activity 3.3: Tile Installation

Time: 5 hours

Unit Description

Students tile a portion of the wall they have drywalled at the corner junction. Each student in the group researches and prepares a sample book of various tiles for bath and kitchen. Each student presents their sample book to the group. Colour schemes, types of tiles recommended, and sealants used must be presented. Each group must choose one tile product to be installed on their wall. During the application process, the students investigate the many careers that relate to interior decorating as well as reflect on environmental and social issues. Teachers may approach local tile contractors for donations of leftover tiles.

Strand(s) & Learning Expectations

Strand(s): Theory and Foundations, Skills and Processes, Impact and Consequences

Overall Expectations

TFV.02 - describe the properties of, and use where applicable, a variety of building and landscaping materials, techniques, and processes, including those in the production assembly, and installation of prefabricated units and in renovation projects;

ICV.01 - explain the effects of technological change in the construction industry on society and the environment;

Specific Expectations

TF1.01 - explain how a human need or want can be met through a new or improved product;

TF1.02 - apply the followings steps of the design process to solve a variety of construction technology challenges or problems:

- identify what has to accomplished;
- gather and record information, and establish a plan of procedures;
- brainstorm a list of as many solutions as possible;
- identify the resources required for each suggested solution, and compare each solution to the design criteria, refining and modifying it as required;
- evaluate the solutions (e.g., by testing, modeling, and documenting results) and choose the best one;
- produce presentation and working drawings sketches, graphics, mathematical and physical models or a prototype of the best solution;
- evaluate the prototype and determine the resources, including computer applications, required to produce it;
- communicate the solution, using one or more of the following: final drawings, graphs, charts, sketches, technical reports, electronic presentations, flow charts, mock-ups, models, prototypes, and so on;
- obtain feedback on the final solution and repeat the design process if necessary to refine or improve the solution;

TF2.02 - describe the material used, and methods of applying them, for the various components of a construction project (e.g., footings, foundations, floors, walls, roofs, windows, doors, millwork, interior and exterior finishes, hardware, landscaping);

SP1.04 - evaluate and document construction projects in relation to type of building, structural element, aesthetics, and architectural style, efficiency, and compliance with building codes, regulations and standards;

SP2.02 - identify suitable materials for a variety of components of a construction project;

SP2.05 - prepare accurate working drawings for a variety of advanced construction projects;

SP2.06 - explain the type of structure and the materials used for a particular construction project;

SP5.06 - demonstrate entrepreneurial skills in creative thinking and communication;

IC2.01 - identify hazards related to materials, processes and equipment used in construction work;

IC1.03 - identify and describe renovations and modifications to various buildings and construction projects that could have an economic, social, and/or environmental impact on the community.

Prior Knowledge & Skills

- Ability to maintain a clean and healthy shop environment
- Interactive and collaborative learning skills
- Good communication skills (both written and verbal)
- General awareness of safety, as it relates to shop practice.
- Ability to use the design process

Teaching/Learning Strategies

- Review safety practices, as they relate to tile application. This may include the safe handling and storage of solvents and adhesives.
- Review health and safety issues regarding the cleaning and disposal of waste.
- Check with students for any allergy concerns when using adhesives or solvents.
- Using the design process, students research various tile options available for completing a bathroom or a kitchen in a residence (Glass tile, glazed tile, marble, granite, slate, porcelain, stone, ceramic tiles, quarry tile etc.). Each option must contain a choice of at least three types of tile, three sizes of tile, and two complementary colours in a pattern. The student recommends the best type of tile for the area, e.g., on a bathroom floor tiles may become unsafe when wet, etc.
- From this research, each student creates a presentation (as though they were presenting information to a client), to be made to their group, on the various choices they have in tiles, including size and colour schemes. Once a tile choice has been made, each student completes a rendered sketch of the finished room showing tile size, colour scheme, and pattern.
- The teacher provides a lesson on WHMIS as it relates to solvents and cement based adhesives.
- Students complete a WHMIS quiz.
- The teacher demonstrates how to begin tile layout, with plumb lines and pattern to avoid small slivers of tiles at corners or edges. The teacher demonstrates tile installation.
- Students install tiles on their walls, ensuring that the tiles are plumb straight and compensate for irregularities at corners, ceilings, or floors.
- The teacher demonstrates finishing of tile, using grout, cleaning techniques, and sealants.
- Students finish their tiles with grout and sealant, if required.
- Students complete a portfolio on the work they have done in this unit, including photographs, diagrams, sketches, and detailing techniques.

Assessment & Evaluation of Student Achievement

Task/Product	Tool	Purpose	Achievement Chart Categories
Design Brief	Checklist Anecdotal Comments Rubric	Formative Summative	Thinking/Inquiry Communication
Presentation to Group	Peer Assessment Checklist	Formative	Knowledge/Understanding Thinking/Inquiry
WHMIS Test	Marking Scheme	Summative	Knowledge/Understanding
Tile installation	Checklist Conferencing	Formative	Application
Portfolio	Rubric	Summative	Knowledge/Understanding Thinking/Inquiry Communication

Accommodations

- Review students' IEPs and adapt the activity and teaching/learning and assessment strategies to meet the students' needs.
- Groups can be selected to balance abilities.
- Provide models or examples of completed projects so students can visualize the project.
- Make necessary changes for students with mobility impairments.

Resources

- Atkinson, Scott. *Decorating With Paint and Wall Coverings*. Oxmoor House. ISBN 0376090634
- Barnes, Christine. *Color For Your Home*. Sunset Publishing, 1999. ISBN 0376012641
- Black and Decker. *The Complete Guide to Painting and Decorating*. Creative Publishing International, 1999. ISBN 0865736324
- Black and Decker. *Flooring Projects and Techniques*. Creative Publishing International, 1997. ISBN 0865736790
- Canadian Electrical Code*. Rexdale, Ontario: Canadian Standards Association.
- Canadian Home Workshop*. Volumes 1-22. Markham, Ontario: Camar Publications. ISSN 1485-8509 <http://www.canadianhomeworkshop.com> (1-905-475-8440)
- Clidero, Robert K. and Kenneth H. Sharpe. *Applications of Electrical Construction*. Don Mills, Ontario: General Publishing, 1979. ISBN 0-7725-1719-3
- Donegan, F. *Paint Your Home: Skills, Techniques, and Tricks of the Trade For Professional Looking Interior*. Painting Reader's Digest, 1997. ISBN 0895778386
- Fine Homebuilding*. Numbers 1-126. Newtown, Connecticut: The Taunton Press. ISSN 1096-360-X (1-800-477-8727)
- Hennigs, Louise. *Painting Techniques and Faux Finishes*. Creative Publishing International, 1999. ISBN 0865731829
- Lutes, Rob. *Complete Paint and Wall Coverings*. Sunset Publishing, 1999. ISBN 0376013966
- Selden, Linda. *Decorative Paint and Faux Finishes*. Sunset Publishing, 1999. ISBN 0376013885
- Sunset Book. *Ideas For Great Home Decorating*. Sunset Publishing, 1996. ISBN 0376012579
- Woodsmith*. Numbers 1-126. Des Moines, Iowa: August Home Publishing Company. ISSN 0164-4114 (Tel: 1-800-333-5075) construction techniques

Websites

- <http://www.homeadvisor.msncom/improve/walls/drywall>—Home Advisor - site for the installation and repair to drywall and its related products
- <http://www.painterschatroom.com>—Painters Chat Room - painting and decorating website
- <http://www.profilepaint.com>—Profile Paint Interior Finishing - paint and decorating website

Video

- Interior Paint and Wallpaper Video, ASIN 1565220129
- Paint and Wallpaper, ASIN 6301415183

Appendix 3.3.1

Sample Safety Passport

This is a sample of a generic safety passport that may be adopted for use in a number of technology classrooms. The purpose of the safety passport is to ensure that students are fully aware of all safety features on each piece of equipment in the technical facility prior to using it independently. This process may be adapted to suit the needs of the teacher and student.

The general process is as follows:

1. The student records the date of the safety demonstration on the safety passport. It is initiated by the teacher (see sample below) when a new piece of equipment, e.g., lathe, is introduced. The teacher demonstrates techniques for the safe operation of the machine and personal protective equipment, e.g., using proper eye wearing protection, securing loose hair, removing jewellery, protective clothing, etc. The student takes notes of the demonstration and records the information in a notebook along with the signed passport slip. If a student is absent on the day of a safety demonstration, a makeup opportunity must be provided.
2. Each student must complete a written (or oral) test on the safe operation of the machine tool, outlining all safety features that must be observed. The student must record the written tests in a notebook. These individual machine tests are designed to compliment any general facility safety rules. The student dates the “tested” column and the teacher initials this as complete when the test is completed satisfactorily. Next, students must demonstrate to the teacher that they have a thorough knowledge of the safety rules for the equipment and are able to demonstrate their competency on the equipment. Once the teacher has observed the required safe setup and operation of the equipment by a student, the teacher signs off that portion of their passport.
3. The teacher signs the final column of student’s safety passport once the student has completed steps 1, 2, and 3. The student is now able to use that piece of equipment. Students must be able to provide the teacher with their signed passport for that equipment each time they wish to use it. A summary document of all the various permissions may be created by the student and signed by the teacher (as permissions are earned); these summary safety passports may be protected with page protectors or laminated for protection. See the sample summary passport below.

Sample Equipment Safety Passport

Student Name: _____							
Equipment: _____							
See notebook for the note on safe setup and operation of the equipment.							
Attended Teacher Safety Instruction and Demonstration (and note recorded)			Passed Written or Oral Testing		Demonstrated Safe Setup and Operation of Equipment to Teacher		Granted Permission to use Equipment by Teacher
Date of Lesson	Teacher Initial	Date Tested	Teacher Initial	Date of Demo	Teacher Initial	Date	Teacher Initial

Appendix 3.1.2

Sample Design Process*

Open Ended Problem Solving and the Design Process

Design is the act of inventing and innovating new products or services to satisfy needs or a change in needs. Design is a creative problem-solving activity. Like most creative processes, there are no correct procedures, but there are guidelines that assist the designer in ensuring the optimal solution is met. These guidelines are called the design process.

Students analyse, at the beginning of the design process, a given set of conditions in order to identify a technological problem, challenge, or need. Students then work through a number of stages in order to arrive at a solution. Design processes include all stages in the development of a product. Although the design process may have distinctive stages, they are not followed in a rigid, step-by-step sequence. For example, students must evaluate their work at each stage of the process. As they do so, students may discover that they need to return to an earlier stage to make modifications or complete a particular step sooner than originally planned. A portfolio and/or a design report is used to document the design process.

Identification and Clarification of a Technological Problem

Students identify the technological problem and begin keeping a record of the design process. Students initially outline the broad aims of the project and describe in a general way what needs to be done to achieve those aims. Students may periodically revise the initial broad plan to reflect what is actually happening. Students need to translate the information given to them by the teacher into the sub-stages below. This provides an understanding of each sub-stage so students can independently complete the stage in later grades. Possible sub-stages for the design report are:

- context;
- problem situation;
- technological problem statement;
- performance specifications and constraints;
- planned sources of information.

Generation of Multiple Solutions

Students identify possible solutions for the technological problem and the resources required to achieve each proposed solution. Students determine the availability of required resources and record their findings. Students during this stage may discover they need to redefine the problem. Possible sub-stages for the design report include:

- brainstorming to generate ideas/solutions for the technological problem;
- selecting several ideas from the solutions generated in the brainstorming exercise (typically three);
- drawing rough sketches for these ideas;
- completing an analysis for each idea, i.e., indicate details on the rough sketches;
- identifying the materials and tools needed for each idea;
- making scale models of technological problem ideas to work out initial details of complexity and feasibility (scale models are not always required - they are used only if they help to clarify ideas).

Appendix 3.1.2 (Continued)

Sample Design Process*

Selection of a Best Solution

Students establish evaluation criteria for the selection of a best solution. They consider such factors as: what materials, tools, and resources are available; the amount of time needed to carry out difficult procedures; and any relevant ergonomic and aesthetic requirements. Students choose the best solutions based on the results of these activities. They record the reasons for choosing a particular solution.

Possible sub-stages for the design report include:

- establishing evaluation criteria for the best solution based on performance specifications, constraints, attribute analysis (details from rough sketches of ideas), and available materials;
- evaluating ideas according to the established evaluation criteria for the best solution by creating a chart to rate each idea;
- creating a working drawing of the idea selected as the best solution.

Production Plan

Students determine ways of producing the best solution and then construct a prototype of the product. Students produce a model size prototype using production-type materials, where possible. Students first draft a revised or working drawing and develop a production plan. Students may modify their best solution while moving through the production phase to incorporate ideas that emerge during constructions. Students document all such changes.

Possible sub-stages for the design report include:

- creating drawings of the selected ideas;
- calculating the materials needed to produce the selected idea and the associated costs;
- ordering supplies for the project;
- developing a critical path, incorporating key dates;
- completing the project, producing, in detail, the sequential steps used, and all modifications made.

Project and Process Evaluation

Students evaluate the project and their design report. They consider their own expectations and criteria and the reactions of their peers, teachers, and if applicable, their client.

Present the Results

The final project and design reports are presented to communicate the results.

*This design process is adapted from the work of Dr. Ann Marie Hill, Queens University.

Appendix 3.2.1

Finished Wall Section Rubric

Categories/ Criteria	Level 1 (50-59%)	Level 2 (60-69%)	Level 3 (70-79%)	Level 4 (80-100%)
Knowledge/ Understanding Demonstrates knowledge of the design process SPV.01, SP2.06	- demonstrates limited knowledge of the design process when designing the finish for the wall	- demonstrates some knowledge of the design process when designing the finish for the wall	- demonstrates considerable knowledge of the design process when designing the finish for the wall	- demonstrates thorough knowledge of the design process when designing the finish for the wall
Thinking/Inquiry Uses thinking skills SP2.05	- uses thinking skills with limited effectiveness when planning	- uses thinking skills with some effectiveness when planning	- uses thinking skills with considerable effectiveness when planning	- uses thinking skills with a high degree of effectiveness when planning
Application Application of procedures, equipment and technology SP2.04	- uses procedures, equipment, and technology when building wall and installing drywall safely with limited skill	- uses procedures, equipment, and technology when building wall and installing drywall safely with some skill	- uses procedures, equipment, and technology when building wall and installing drywall safely with considerable skill	- uses procedures, equipment, and technology when building wall and installing drywall safely with a high degree of skill

Note: A student whose achievement is below Level 1 (50%) has not met the expectations for this assignment or activity.