

Public and Catholic District School Board Writing Partnerships

Technological Education

Course Profile Technological Design

Grade 12
Workplace Preparation
TDJ4E

• *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.

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Course Overview

Technological Design, Workplace Preparation

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

Prerequisite: Technological Design, Grade 11, Workplace Preparation

Course Overview

This course helps students develop a systematic process to design products or services based on an understanding and analysis of consumer needs, material characteristics, fabrication methods, and design principles. Students will develop design briefs, conduct marketing surveys, create freehand and computer-generated illustrations, make models, generate technical reports, design packaging, and become aware of design trends. They will also examine careers and small business opportunities in design, architecture, manufacturing, or marketing.

How This Course Supports the Ontario Catholic School Graduate Expectations

The role of Technological Education in the Catholic faith community is to enable students to develop and utilize their gifts and talents while creating products that benefit others in a way that models gospel values. The focus of the curriculum is to enable students to become critical and innovative problem-solvers who question the use of resources and understand the implications of technological innovations. Placing an emphasis on the societal implications of technological innovations and the use of our natural resources ensures that students create products and provide services that recognize our societal responsibility to respect the dignity and value of the individual and the global community. Collaboration and leadership are emphasized as students work in teams to create a work/learning environment that is safe, welcoming, and respectful of individual differences.

Course Notes

This course is designed to further develop and add to the skills and knowledge acquired in Grade 11, leading to workplace positions, entrepreneurship, apprenticeship, job-training programs, or other endeavours involved in the development of products, services, and environments. The skills developed in this course are transferable and can be applied to a wide variety of careers. A list of careers directly involved in design are outlined in Human Resources Development Canada's (HRDC) National Occupational Classifications (NOC) database (see Resources), including:

NOC Code	Occupation Category
2225	Landscape and Horticulture Technician and Specialist
2231	Civil Engineering Technologist and Technician
2232	Mechanical Engineering Technologist and Technician
2241	Electrical and Electronic Engineering Technologist and Technician
2251	Architectural Technologist and Technician
2253	Drafting Technologist and Technician
5241	Graphical Designers and Illustration Artists
5242	Interior Designers
5243	Theatre, Fashion, Exhibit, and Other Creative Designers

Students focus on entry-level career skills. This course destination leads to careers such as drafting technicians, CAD operators, graphic illustrators, or technical or entrepreneurial jobs in architectural, artistic, or engineering firms. Problems that require students to generate their own designs may have prescriptive/restrictive criteria that limit the scope of design choices. Students may focus on communicating, constructing, and testing designs. Students develop the practical skills involved in designing and are given opportunities to practise and apply those skills on both an individual basis and as a member of a team.

The delivery of the course emphasizes teaching practical elements and processes of technical drawing, illustrating, modelling, testing, and fabrication. This course focuses on evaluating existing products or environments and provides a basis for innovating practical designs. Students should apply Gospel teachings in examining the safe, ethical use of technology and the environmental and sociological impacts technology may have.

Design is a broad-based activity in which illustration, drafting, communication, fabrication techniques, and the safe use of tools and equipment must remain an important focus. The flow of activities follows the design process, allowing students to develop skills related to all stages of the process. Students learn to connect the stages together in a logical, coherent manner.

Unit 1 examines the process of designing and producing ideas for commercial products. Activities develop idea generation, 3-D sketching, modelling, technical drawing, and 3-D virtual modelling techniques.

Unit 2 examines the design of commercial environments. Students plan the layout, fixtures, colours, and textures of a commercial retail space.

In Unit 3, students practise the skills developed in the previous units by applying them to the design and manufacturing of furniture for the retail spaces designed in Unit 2. The manufacturing process, cost estimates, and layout of the manufacturing facility are examined.

Unit 4 examines the process of marketing. Graphic design skills are developed through the branding and marketing of products developed in Unit 1.

To facilitate classroom and resource management, students can rotate through various tasks within activities, work in groups or teams, or simultaneously work on individual activities. Teachers should provide students with the list of course projects at the beginning of the semester, to help students with planning options in advance. Activity resources should be prepared before the activity begins.

Local experts from engineering, manufacturing, architectural, or design firms should be introduced throughout the course activities to provide students with opportunities to investigate and explore career and apprenticeship choices.

In any aspect of model building, testing, or product fabrication, safety is of the utmost importance. Safe operating procedures should be reviewed, both before commencement of the activity and before the use of each tool and process. The use of a Sample Safety Passport (see Appendix A) is recommended for recording and maintaining safe work practices in a workshop environment.

Safety should be reinforced throughout the course. Following initial lessons, demonstrations, and testing of general lab and machine safety at the beginning of the course, the teacher reintroduces topics at the time required (e.g., before cutting wood on a table saw, the teacher reviews specific table-saw safety). The approach of learning safety at the beginning and then reinforcing the learning with the Just-In-Time (JIT) method ensures students have more than one opportunity to learn important skills. Students become qualified for specific equipment by:

- watching a teacher-led or video demonstration of proper use;
- reading about proper use in a textbook or a safety sheet hand-out;
- writing a test or quiz on the equipment and demonstrating safe work habits while using the equipment. The teacher observes the safe work habits and the information is recorded on the Student Safety Passport (Appendix A).

Units: Titles and Times

Unit 1	Commercial Product Design	25 hours
* Unit 2	Interior Design	25 hours
* Unit 3	Furniture Design	35 hours
Unit 4	The World of Graphic Design	25 hours

* These units are fully developed in this Course Profile.

Unit Overviews

Unit 1: Commercial Product Design

Time: 25 hours

Unit Description

The process of designing commercial products is the main focus of this unit. Students examine the generation and development of ideas for products. Students learn essential skills for product development, such as 3-D sketching, technical drawing, rendering, modelling, virtual modelling, and marketing. The principles and elements of industrial design and manufacturing are examined along with techniques for assessing critical design elements. Catholic faith traditions are applied to the development and evaluation of products and ideas. The value of work and achieving excellence in all ones does for the common good is examined.

Unit Overview Chart

Cluster	Learning Expectations	Assessment Categories	Focus (organizing principle for learning)
1	TFV.01, TF1.01, TF1.02, SP1.02 CGE 2e, 3b, 3c	Knowledge/ Understanding Communication	Students use brainstorming, research, speed sketching, and 3-D sketching techniques to generate ideas for commercial products.
2	SPV.03, SP2.02, SP2.03, ICV.03, IC2.01 CGE 5b, 5g	Knowledge/ Understanding Thinking/Inquiry Communication Application	Students develop and produce 3-D virtual and physical models of the commercial products.
3	TFV.03, TFV.04, TF2.01, TF2.02, TF2.03, SPV.04, SP2.01, SP2.02, SP2.03 CGE 2b, 2e, 3e, 5g, 7i	Knowledge/ Understanding Application Communication	Students produce technical drawings and hand-rendered illustrations of the commercial products.

Unit 2: Interior Design

Time: 25 hours

Unit Description

Students examine the concepts of designing commercial environments through the design of a retail space for the product developed in Unit 1. Students plan the layout, fixtures, traffic patterns, display patterns, colours, and textures of the retail space, based on interior design and marketing concepts. Students examine the ways that our physical environments affect the way we feel and think. Students apply Catholic values and ethical business practices to their design solutions.

Unit Overview Chart

Cluster	Learning Expectations	Assessment Categories	Focus (organizing principle for learning)
1	TFV.01, TF1.02, TF1.03, TF30.1, SP3.01, SPV.01, SP1.01, SP1.02 CGE 3d, 3f	Knowledge/ Understanding Thinking/Inquiry	Students develop a marketing strategy for a retail space for the commercial product developed in Unit 1, including layout, display designs, and display structures.
2	TF2.01, TF2.02, SPV.04, SP2.01, SP2.02, SP2.03 CGE 2e, 3b, 3c, 5e, 7i	Knowledge/ Understanding Inquiry	Students design the interior commercial environment based on criteria derived from an analysis of researched information.
3	TFV.03, TF2.01, TF2.02, TF3.01, SPV.03, SPV.05, SP1.04, SP2.04, ICV.03 CGE 5b, 5g	Communication Application	Students develop a scale model and presentation of the retail environment.

Unit 3: Furniture Design

Time: 35 hours

Unit Description

Students design furnishings for commercial needs based on their work in previous units. Students examine considerations in furniture design, materials, structural properties, and manufacturing processes. Students fabricate and test full-scale mock-ups and develop a catalogue to present the various display fixtures. Ethical issues regarding the negative impacts of consumerism, excessive marketing, and the proper handling of materials and waste are examined.

Unit Overview Chart

Cluster	Learning Expectations	Assessment Categories	Focus (organizing principle for learning)
1	TFV.03, TF1.03, SP1.01, ICV.01, ICV.02, IC1.01, IC1.02 CGE 1g, 2e, 3c, 4f, 7f, 7g	Knowledge/ Understanding Thinking/Inquiry Communication Application	Students research retail furniture considerations and design a particular product for the display of products developed in Unit 1.
2	TFV.01, TF2.03, TF3.01, SPV.04, SP1.01, SP2.02, SP2.03, SP3.01, IC1.01, IC2.02 CGE 2e, 3d, 5g, 7f	Communication Application	Using the manufacturing process layout in Activity 2, students develop a scale model of the product.
3	TFV.02, TF3.02, SPV.03, SP1.04, SP2.04, ICV.03, IC2.03 CGE 5a, 5b, 5e, 5g, 7i	Communication Application	Using both manual and computer-aided drafting techniques, students draft the layout of the manufacturing facility.

Unit 4: The World of Graphic Design

Time: 25 hours

Unit Description

Students explore the topics of user surveys, branding, and marketing of commercial products by developing environmental graphics and advertising. Students produce illustrations, technical drawings, physical models, and virtual models of their product. Students apply and practise the skills developed throughout the course through activities 1, 2, and 3. Students develop their understanding of the design process, creative and critical-thinking skills, and proficiency in producing illustrations, technical drawings, and models. Issues of ethics in advertising are explored and students apply gospel values in the development of an effective and appropriate marketing strategy. Career opportunities are also explored through job shadowing within the design industry. The integration of ethics and Gospel values into one's work is examined.

Unit Overview Chart

Cluster	Learning Expectations	Assessment Categories	Focus (organizing principle for learning)
1	TFV.01, TF1.01, TF1.02, TF1.03, TF3.01, SP1.02 CGE 2b, 2c, 3b, 3c, 3d, 3f, 5e	Knowledge/ Understanding Thinking/Inquiry Communication Application	Students analyse and develop a user-needs survey and marketing plan for the commercial product developed in Unit 1.
2	SP3.03, ICV.01 CGE 4c	Knowledge/ Understanding Thinking/Inquiry	Students develop a logotype and brand name for the product from Unit 1.
3	TFV.01, TF3.01, SPV.05, SP3.02 CGE 3e, 3f, 5c, 5g, 7a	Knowledge/ Understanding Communication Application	Students produce environmental retail and advertising graphics for the Unit 1 product.
4	ICV.04, ICV.05, IC3.01, IC3.02, IC3.03 CGE 3e, 5b, 5c, 5d, 5h	Knowledge/ Understanding Thinking/Inquiry	Students job shadow a person who works in graphical design and/or marketing field. The use of career exploration software, such as www.careercruising.com , Canada's School Net (www.schoolnet.ca), or Career Paths Online (www.careerpathsonline.com/) can be substituted.

Teaching/Learning Strategies

Students work through the process for designing and developing products. Activities are hands-on and student-centred, with opportunities to work individually and as part of a design team. Through problem-solving activities, students develop skills in the areas of technical drawing, illustration, modelling, and fabrication techniques. Design challenges focus on commercial products and interior designs and are derived from existing concepts. Students can redesign or make modifications to improve a situation, product, or environment.

Technological Design involves generating solutions to human needs or problems. This requires a hands-on, project-based approach that incorporates individual and team efforts, a flexible process for creative idea generation, and a variety of materials and tools to model, test, and communicate solutions. In a typical design project, teachers provide students with a design brief, which describes the problem to be solved, the constraints or criteria to be met in solving the problem, and, in many cases, possible paths to take to develop a viable solution. Activity initiation may take place with the whole classroom or with select groups.

Teachers may provide students with a list of the course projects at the beginning or introduce them in sequence. This lends itself to various learning strategies that are dependent on the project, the level of student understanding, experience, and the availability of local facilities and resources. Possible teaching/learning strategies in a design project include:

Group Collaboration

Students work in teams or with partners to accomplish specific tasks, modelled after design or engineering firms in which individuals with differing strengths, skills, and knowledge work together to solve problems or issues. Collaboration is particularly effective for large projects. Groups of three or four students may be more manageable than groups of five or more.

Individual Work

Students work individually to accomplish specific tasks. Individual work may include working through the design process to develop a product or individual tasks related to a group project, such as drawing, drafting, model building, or presentation preparation.

Class Discussion

Students actively participate by taking turns discussing current issues. The teacher directs discussion by:

- posing initial questions;
- demonstrating specific procedures (e.g., proper, safe tool operation);
- presenting a media topic related to the current activity (e.g., a video or newspaper clipping).

Relevant issues may include the job market as it relates to careers in technology, the effects of technology on the environment, and the impact of a historical technology on today's society.

Case Study

Students learn concepts and theory in application through the study and analysis of case studies. They test and observe scientific and engineering principles through experimentation, through Socratic lessons provided by the teacher or invited guests, or through testing a solution to a problem (e.g., building a kite, observing how well it flies, then making appropriate modifications to improve its performance).

In Technological Design, the computer may be used extensively as an instructional tool to:

- generate illustrations and drafted drawings;
- research online resources;
- communicate with peers and experts in the field;
- download images, papers, and software;
- produce finished prints, reports, and presentations.

If there are insufficient computer resources, teachers provide activities that involve conventional illustration, sketching, library or text research, hand modelling, and testing.

Design ideas and concepts are generated through a variety of methods, including:

- group brainstorming;
- conducting surveys or interviews of clients or end users;
- developing and testing of prototypes or models;
- holding discussions with workers in the relevant field of study.

A key component of this course is for students to be made aware of career opportunities in the field of technological design. Strategies include inviting guest speakers, conducting field trips or industry visits, participating in community-based projects, and encouraging job shadowing, co-op, or apprenticeship placements.

Assessment & Evaluation of Student Achievement

Assessment and evaluation of student achievement should be based on both formative and summative techniques. Formative assessments include teacher, peer, and self-assessment. An integral part of the learning process is continual self-assessment and group assessment, through the testing and evaluation of models and products that demonstrate student recognition of a structured process for problem solving. Throughout the course, students demonstrate skill, knowledge, and gospel values.

Assessment and evaluation tasks include:

- design briefs (rubric);
- design proposals (checklist and conference with student);
- technical and/or design reports (rubric);
- research reports (rubric and/or marking scheme);
- drawings, illustrations, and blueprints (marking scheme based on specific criteria);
- finished models, prototypes, and products (marking scheme based on specific criteria and conference with student);
- presentations (rubric and conference with student);
- competition deliverables (marking scheme based on criteria);
- daily log or work journal (see Appendix B – Daily Log).

By measuring their own work against examples of previous work, students develop the skills necessary to assess their own projects and products. Comparisons of the teacher's evaluation of a skill and the student's self-assessment through teacher/student discussion often clarifies the standards that are expected. The addition of a peer-assessment component, especially in a group work situation, also helps to identify achievement. The ability to combine skills and knowledge successfully in practical work tasks is demonstrated by students in their planning and implementation of projects, work assignments, and problem-solving activities. The teacher assesses the progress of each student's achievement on these assignments through daily observation.

Self-assessment encourages students to reflect on their growth and learning, giving them a sense of where they have been, where they are, and where they are going. Self-assessment is a valuable skill and aids students in developing their God-given potential. With the use of self-, peer, and teacher assessment, students are provided with ample feedback on their work.

Summative assessment, usually carried out at the end of a learning process and which includes feedback and evaluation resulting in a grade, is an important component in the evaluation of student achievement. Students should be able to articulate knowledge of design processes through oral and written methods such as design reports. Students demonstrate proficiency in the variety of practical skills developed throughout the course.

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 methods of evaluation. The work completed in the activities demonstrates students' understanding of the design process, their creative and critical-thinking skills, and their proficiency in producing illustrations, technical drawings, and models.

Accommodations

Teachers should consult individual student IEPs for specific direction on accommodation for individuals. A range of teaching/learning and assessment strategies is employed to ensure that students with special needs are successful in the course. The teacher chooses strategies to accommodate learning styles.

- The teacher develops activities around students' strengths and needs (e.g., limiting the amount of reading and writing activities).
- The teacher keeps instructions simple and provides fewer steps at a time (e.g., oral instructions with demonstration as opposed to written instructions). This accommodation is particularly important when teaching manufacturing processes and the safe use of machines.
- The teacher provides the option for oral testing and student demonstrations of acquired skills (e.g., students demonstrate the safe, proper use of a piece of equipment, tool, or manufacturing process, in cooperation with or instead of a written test).
- The teacher allows oral presentations to small groups rather than to the whole class. Students may present design ideas/proposals to their peers for assessment and feedback. Having students present in smaller groups gives the presenters more confidence and allows for more constructive feedback.
- The teacher provides adaptation of student resources and equipment. Students who experience difficulty reading can be provided with more graphic handouts or be allowed to use visual resources (e.g., use videos to outline the proper procedures for using a piece of equipment instead of written instructions).
- Students are given opportunities for enrichment and extension. This course restricts the theory and research stages of the design process to focus on practical skills. Students who are more creative and innovative and demonstrate proficiency with practical skills can be given more challenging design problems or given fewer restrictions with the design challenges provided.
- The teacher provides classroom accessibility. Resources, equipment, and facilities may need to be adapted to meet the physical needs of students. Consult manufacturer's manuals before making modifications to machines or tools.

Resources

Units in this Course Profile make reference to 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.

Books

Browning, Heighington, Parvu, and Patillo. *Design and Technology*. Toronto: McGraw-Hill Ryerson, 1993. ISBN 0.07.549650.X

Gordon, J.E. *The New Science of Strong Materials*. Markham, Ontario: Penguin Books, 1999. ISBN 0-306-80151-5

Gordon, J.E. *Structures, or Why Things Don't Fall Down*. Markham, Ontario: Penguin Books, 1999. ISBN 0-306-80151-5

Gradwell, Welch and Martin. *Technology Shaping Our World*. Tinley Park, Illinois: The Goodheart-Willcox Company, 1996. ISBN 1.56637.217.8

Huchinson, Karsnitz. *Design And Problem Solving*. New York: Glencoe/McGraw Hill, 1994. ISBN 0-8273-5244-1

Norman, Donald A. *The Design of Everyday Things*. New York: Doubleday, 1988. ISBN 0-385-26774-6

Papanek, Victor. *Design for the Real World: Human Ecology and Social Change*. Chicago: Academy Publishers, 1999. ISBN 0897331532

Salvadori, Mario. *The Art of Construction, Projects and Principles for Beginning Engineers and Architects*. Chicago: Chicago Review Press, 1990. ISBN 1.55652.080.8

Wright, Smith. *Understanding Technology*. Tinley Park, Illinois: The Goodheart-Willcox Company, 1998. ISBN 1.56637.374.3

Periodicals

International Technology Education Association (ITEA). *Tech Directions*.

Popular Mechanics (see <http://popularmechanics.com/>)

Popular Science (see <http://popsci.com>)

Wired (see <http://wired.com>)

Various architecture and home improvement magazines (e.g., *Architecture Today*, *Better Homes and Gardens*, *Architecture Digest*, *This Old House*)

Other Print Publications

ASTM testing standards

Canadian Standards Association publications

ITEA (International Technology Education Association) publications

Machinery's Handbook.

Model-making manuals and magazines are available from local hobby stores

Ontario Building Code (see <http://obc.mah.gov.on.ca/branch3.shtml>)

Sweet's Catalogue.

Publications on many aspects of architectural design considerations and research are available from Canada Mortgage and Housing Canadian Housing Information Centre, Ottawa, ON, phone 613-748-2367

Videos

Videos on designing products, such as washing machines, bicycles, toys, and mobile homes, are available from: Classroom Video, 107 1500 Hartley Avenue, Coquitlam, BC, V3K 7A1, phone 604-523-6677.

Websites

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.

Design

Core77 Design Network (information on design careers, competitions, events) – <http://www.core77.com/>

Frog Design – <http://www.frogdesign.com/>

Industrial Designers Society of America – <http://www.idsa.org/>

International Directory of Design (universities, associations, journals, events, etc.)

– <http://www.penrose-press.com/IDD/search.html>

The Design Exchange (Canadian) – <http://www.designexchange.org/>

Related Careers

Human Resources Development Canada NOC database – <http://www.hrdc-drhc.ca/noc>

Ontario Prospects (career explorations) – <http://www.edu.gov.on.ca>

Trends and Innovation

History of Technology (list of resources on the development of technology)

– <http://www.englis.cornell.edu/ice/lists/historytechnology/historytechnology.html>

How Things Work – <http://www.howthingswork.com>

Human Factors Bad Designs (examples of problems in consumer design) – <http://www.baddesigns.com>

Popular Mechanics (latest information of innovations and inventions)

– <http://www.popularmechanics.com>

Popular Science (latest innovations in industrial/architectural design) – <http://www.popularscience.com>

Vocabulary definitions – <http://www.whatis.com/index.htm>

Wired Magazine (trends and future directions of technology) – <http://www.wired.com>

Standards

American Standards for Testing and Materials (ASTM) – <http://www.astm.com>

CSA International – <http://www.csa.ca>

Tech Streets (standards and information [ASTM, CSA, ISO, etc.]) – <http://www.techstreet.com>

Course Development Resources

Blueprints: A Resource Tool for Writing Catholic Secondary School Profiles. Catholic Curriculum Cooperative, Central Region.

Choices Into Action: Guidance and Career Education Program Policy for Ontario Elementary and Secondary Schools, 1999.

The Ontario Curriculum, Grades 9 and 10, Technological Education, 1999.

The Ontario Curriculum, Grades 11 and 12, Technological Education, 2000.

Ontario Secondary Schools, Grades 9 to 12, Program and Diploma Requirements, 1999.

Trafford, Larry. *Educating the Soul: Writing Curriculum for Catholic Secondary Schools*. Toronto: Institute for Catholic Education, 1998. ISBN 0-9699178-5-6

OSS Considerations

Grade 12 Technological Design is designated as a Technological Education program in which students develop an understanding of the design industry. Students are provided with a broad educational base to prepare them for direct entry into the workplace or for admission to apprenticeship programs and other training programs. The goal of this program is to empower students to become productive participants in society. Students are introduced to practical aspects of design and fabrication of products to benefit society. The curriculum provides opportunities for students to undertake hands-on practical activities, as well as to conduct research and analysis. However, students should be encouraged to take part in a cooperative education program, Ontario Youth Apprenticeship Program, or other program that provides workplace experience. Students may count this course as an optional credit or an additional compulsory credit for diploma purposes.

Potential for career exploration is made available to students throughout all units with specific reference to *Choices Into Action: Guidance and Career Education Program Policy for Elementary and Secondary Schools, 1999.*

Apprenticeship Opportunities in Ontario

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 wages increase with their level of skills

Apprenticeship is a method of training in which employers train workers to become skilled tradespeople through on-the-job training and classroom instruction. Apprenticeship training programs 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. Students entering Grade 11 and at least 16 years old, can work towards a career in a skilled trade as a registered apprentice, and eventually a certified skilled worker or journeyperson, while completing an Ontario Secondary School Diploma. Eligible students should contact their guidance counsellor, technical director, or local apprenticeship office.

For more information

– <http://www.edu.gov.on.ca/eng/training/apprenticeship/skills/splash.html>

Appendix A

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 complement 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 a 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

Coded Expectations, Technological Design, Grade 12, Workplace Preparation, TDJ4E

Theory and Foundation

Overall Expectations

- TFV.01** · demonstrate an understanding of how the design process is used to create products or services for the marketplace;
- TFV.02** · evaluate the suitability of materials and methods of fabrication for a variety of products;
- TFV.03** · explain the principles and fundamentals of design;
- TFV.04** · consult appropriate technical reference materials for specific projects and services.

Specific Expectations

Planning

- TF1.01** – plan an appropriate marketing survey for a particular product or service;
- TF1.02** – analyse the results of a marketing survey to determine consumer needs and requirements;
- TF1.03** – explain how to develop a needs analysis based on research into consumer products or services;
- TF1.04** – assess a variety of materials and fabrication techniques used for different custom and mass-manufactured products.

Preparing Designs

- TF2.01** – use the principles of symmetrical and asymmetrical balance, rhythm, repetition, and spatial proportions when creating models and illustrations;
- TF2.02** – use the fundamentals of line and direction, pattern, light and shadow, shape and space, texture, and colour when creating models and illustrations;
- TF2.03** – demonstrate an ability to consult reference materials such as codes, *Machinery's Handbook*, *Sweet's Catalogue*, *Architectural Graphic Standards*, and trade literature and catalogues.

Evaluating and Documenting Designs

- TF3.01** – explain project designs in terms of satisfying consumer needs and meeting design criteria;
- TF3.02** – identify design constraints for specific projects.

Skills and Processes

Overall Expectations

- SPV.01** · produce effective design briefs outlining the design challenges they face and the design criteria they will use to meet the challenges;
- SPV.02** · estimate the costs of projects;
- SPV.03** · prepare effective models, prototypes, and finished products;
- SPV.04** · create appropriate drawings using either traditional or computer-based methods;
- SPV.05** · prepare appropriate promotional materials and write effective technical reports for the products they create.

Specific Expectations

Planning

- SP1.01** – identify design problems, list relevant criteria, and propose solutions;
- SP1.02** – produce effective design briefs that include analyses of consumer needs, design criteria, and considerations in meeting design challenges;
- SP1.03** – estimate the costs of project materials and labour;
- SP1.04** – identify appropriate materials for models and finished products by analysing material characteristics and properties.

Preparing Designs

- SP2.01** – prepare effective technical drawings using standard scales, lettering techniques, and symbols;
- SP2.02** – use computer-aided design methods effectively to produce illustrations (e.g., floor plans, perspectives and elevation views, details, auxiliaries, and assembly drawings) as required;
- SP2.03** – illustrate design solutions effectively using orthographic and pictorial techniques;
- SP2.04** – build effective displays and product prototypes.

Evaluating and Documenting Designs

- SP3.01** – evaluate the appropriateness of project solutions against design criteria;
- SP3.02** – design promotional materials that are suitable for potential clients or investors;
- SP3.03** – prepare technical reports documenting the design process, needs analyses, comparisons of existing solutions, and testing and evaluation procedures.

Impact and Consequences

Overall Expectations

- ICV.01** · describe safety features and ethical issues that must be addressed in technological design;
- ICV.02** · describe problems caused by improper or inadequate design;
- ICV.03** · handle the tools and equipment used in technological design safely;
- ICV.04** · identify career opportunities in design-related businesses;
- ICV.05** · identify the requirements for joining a professional association.

Specific Expectations

Design Impacts

- IC1.01** – describe how project solutions address efficiency and ergonomic issues, comparing proposed products or services to existing ones;
- IC1.02** – identify how existing products could be improved to address problems that result from improper or inadequate design.

Environmental and Safety Issues

- IC2.01** – handle tools and materials safely;
- IC2.02** – explain how project solutions affect the environment;
- IC2.03** – evaluate the procedures used in processing materials, taking into consideration safety issues and environmental concerns;
- IC2.04** – identify the environmental concerns related to a product’s life.

Education, Training, and Career Opportunities

- IC3.01** – identify career opportunities in design, architecture, or manufacturing;
- IC3.02** – describe the educational qualifications required for the career opportunities identified;
- IC3.03** – identify the requirements for joining a professional association and describe the association’s code of ethics.

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 2: Interior Design

Time: 25 hours

Unit Description

Students examine the concepts of designing commercial environments through the design of a retail space for the product developed in Unit 1 – Commercial Product Design. Students plan the layout, fixtures, traffic patterns, display patterns, colours, and textures of the retail space, based on interior design and marketing concepts. Students examine the ways that our physical environments affect the way we feel and think. Students apply Catholic values and ethical business practices to their design solutions.

Unit Synopsis Chart

Activity	Time	Learning Expectations	Assessment Categories	Tasks
2.1 Assessing the Needs of the Retailer	5 hours	TFV.01, TF1.02, TF1.03, TF3.01, TF3.02, SPV.01, SP1.01, SP1.02, SP3.01	Knowledge/ Understanding Thinking/Inquiry	Students complete a needs analysis for a retail space for the commercial product developed in Unit 1, including layout, display designs, and display structures.
2.2 Designing a Retail Space	15 hours	TFV.04, TF2.01, TF2.02, SPV.04, SP2.01, SP2.02, SP2.03	Knowledge/ Understanding Thinking/Inquiry Communication	Students design the interior commercial environment based on criteria derived from an analysis of researched information.
2.3 Presenting the Design	5 hours	TFV.03, TF2.01, TF2.02, TF3.01, SPV.03, SPV.05, SP1.04, SP2.04, SP3.01, ICV.03	Communication Application	Students develop presentation materials for the retail environment.

Activity 2.1: Assessing the Needs of the Retailer

Time: 5 hours

Description

Students develop a needs analysis and an interior design for a retail space to sell the products developed in Unit 1 – Commercial Product Design. Based on results of the survey and research into potential customer characteristics (gathered in Unit 1), students determine the nature of the retail space, furnishings, traffic patterns, and display signage. Design concepts generated in this activity are used in the subsequent activities.

Strand(s) & Learning Expectations

Strand(s): Theory and Foundation, Skills and Processes

Theory and Foundation

Overall Expectations

TFV.01 - demonstrate an understanding of how the design process is used to create products or services for the marketplace.

Specific Expectations

TF1.03 - explain how to develop a needs analysis based on research into consumer products or services;

TF3.01 - explain project designs in terms of satisfying consumer needs and meeting design criteria;

TF3.02 - identify design constraints for specific projects.

Skills and Processes

Overall Expectations

SPV.01 - produce effective design briefs outlining the design challenges they face and the design criteria they will use to meet the challenges.

Specific Expectations

SP1.01 - identify design problems, list relevant criteria, and propose solutions;

SP1.02 - produce effective design briefs that include analyses of consumer needs, design criteria, and considerations in meeting design challenges;

SP1.04 - identify appropriate materials for models and finished products by analysing material characteristics and properties;

SP3.01 - evaluate the appropriateness of project solutions against design criteria.

Prior Knowledge & Skills

Students understand the concepts involved in writing a design brief and are able to use word processing or desktop-publishing to produce an attractive document.

Planning Notes

Students need to be aware of current layouts of stores and trends in commercial interior design through observation of local shops, magazine illustrations, guest speakers who specialize in interior design, or creating displays in stores. Before initiating this activity (at least a week or weekend before), the teacher distributes the observation questionnaire (see Appendix 2.1.1 – Retail Space Observations) and asks students to record their observations of local retail stores (ideally, stores selling similar merchandise to the products developed in Unit 1 – Commercial Product Design). At the teacher’s discretion, students may be encouraged to discuss the layout of the store and methods of merchandising with the store manager and/or employees. A school field trip to a retailer or mall, guided by someone with merchandising experience, should also be considered.

Teaching/Learning Strategies

1. The teacher initiates discussions of retail space design by reviewing student’s observations of local stores, through prearranged guest speakers and/or images of shops from magazines (see Planning Notes). Students list their favourite stores and discuss the reasons why. During class discussions, students develop a draft needs analysis for the retail space to promote the product developed in Unit 1 – Commercial Product Design. Students are made aware of how this analysis phase fits into a sequential design process. Topics to be discussed include:
 - minimum required square footage for sales area;
 - techniques used to lead customers through retail space, encourage browsing and purchasing;
 - product display methods (e.g., racks, rails, shelves, mannequins, bins, etc.);
 - methods of lighting;
 - the mood that best promotes the product (e.g., industrial/high tech, English Country, Shabby Chic, Modern);
 - paint, flooring, cabinetry, etc., used to evoke the mood;
 - safety and security issues.

- From class discussions and personal observations, students individually appraise the requirements for retailing the products developed in Unit 1 – Commercial Product Design and write a design brief/needs analysis to outline their ideas and plan for the retail space. See Sample Needs Analyses.

Assessment & Evaluation of Student Achievement

Task/Product	Tool	Purpose	Achievement Chart Categories
Needs Analysis	Checklist (Appendix 2.1.2) Conferencing	Formative	Knowledge/Understanding Thinking/Inquiry
Design Brief	Checklist	Formative	Thinking/Inquiry Communication Application

Accommodations

- As an enhancement, students further research and analyse current practices (nationally or global).

Resources

Books

Abramson, Susan and Marcie Stuchin. *Shops & Boutiques 2000: Designer Stores and Brand Imagery*. PBC International, 2000. ISBN 0866366873

Conran, Terence. *On Design*. Vancouver, BC: Raincoast Books, 1996. ISBN 1-55192-053-0

Zelinsky, Marilyn. *New Workplaces for New Work Styles*. Montreal, PQ: McGraw-Hill, 1997. ISBN 0-07-063324-X

Publications

Magazines, such as *Style at Home*, *Canadian House and Home*, *Victoria*, and *Metropolitan Home* (for current styling ideas). See their respective websites at:

– <http://www.canadianhouseandhome.com>

– <http://www.styleathome.ca>

Video

Packaging Design. Classroom Video, Unit C, 9003 Centaurus Circle, Burnaby, BC, V3J 7N4 phone (604) 420-3066. Although this movie is about packaging, it does explain the use of colour, line, shape, texture, etc.

Websites

American Society of Interior Designers (ASID) – <http://www.asid.org/>

Contract Magazine (commercial interior design and architecture) – <http://www.contractmagazine.com/>

Design4Design: The Architecture and Interior Design Directory – <http://www.design4design.com/>

Ideas, Canadian design firm – <http://www.id-eas.ca/>

Institute of Store Planners – <http://www.ispo.org/>

New Era Design, specialists in retail design – <http://www.neweradesign.com/>

Appendix 2.1.1

Retail Space Observations

Upon visiting a store, record the following observations:

Store Name:

Type of Merchandise:

Date:

1. How is merchandise displayed, e.g., kind of display structures, materials used (chromed metal, wood, hangers, hooks, shelves, etc.)?
2. How are the floor displays arranged for traffic and customer flow?
3. How do customers collect purchases (basket – plastic or wicker, shopping cart)?
4. Where is the sales area (cash registers/checkouts) located?
5. Describe the sight lines of the sales area (straight aisles, radiant, etc.).
6. What do you see upon entering the store?
7. What is it about the space that encourages you to shop there?
8. What kind of lighting was used?
9. What are the main colours used (walls, furnishings, signs)?
10. What materials and textures are used for furnishings and walls?
11. How does the store address security and safety for customers?
12. Are there general classifications of store layouts that you can see?
13. How does the decoration of the store support/promote the products?

Appendix 2.1.2

Needs Analysis Evaluation Checklist

General Criteria	Yes	No
Describes how observations of current practices are used to create new designs in the analysis phase of the design process.		
Explains how their design will satisfy customer needs in shopping for the product in question.		
Identifies a list of design criteria.		
Explains how the new design meets the design criteria.		
Identifies design constraints (i.e., costs, location, retail space size, and security/safety issues).		
Identifies materials to be used in display installations and interior walls (material properties and characteristics desired to enhance sales of product).		
Specifics		
Provide general information about the space (description of product and related products, size of space, location (e.g., strip mall, industrial mall, front of manufacturing facility))		
<ul style="list-style-type: none"> • mood the space should evoke, and why • locations of displays, checkouts, signs, and why • display methods for the product and related products, and why • colours and textures used in displays and interior finishes, and why • how the space promotes the consumer interest and purchasing of the product • an analysis of lighting required • an analysis of display methods (racks, rails, bins, etc.) • an analysis of colour/texture of display structures, signs, and walls • an analysis of traffic patterns • an analysis of the display area layout, and sight lines • an analysis of the entrance view • an analysis of security requirements • an analysis of customer and employee safety (i.e., fire, theft, safe movement, and storage) • an analysis of the sales counter (ease of movement, number of employees it can accommodate, ability to see the floor from a position behind the counter) 		

Appendix 2.1.3

Sample Needs Analyses

1. Dectonage

Background

Dectonage is a housewares and lifestyle store. The first store was opened by Kathryn Brown in cottage country, north of Toronto; a second one will be opened in southwestern Ontario in 2002. Customer-friendly and highly attractive, the store's purpose is to provide a hospitable and enjoyable atmosphere for the average shopper. The goal of the business is to provide the consumer with the highest quality product at the lowest possible prices.

Mood of the Store

The mood of the store is classic but with a modern edge. A leather 1930s club chair is at home beside an English Country pie-safe. Majolica pottery sets a Swedish table. The emphasis is on natural fibres, textures, deep colours, favourite pieces, and continuity.

Analysis

Based on observation and interviews with Ms. Brown, we have determined:

- the product is house-oriented;
- there will be small items and breakable items;
- clerks at cash register need to be able to see the back wall displays;
- small items which can be easily shoplifted should be located near the till;
- there should be room for two clerks behind the till for customer service;
- there should be room for large items of furniture, such as tables, dining chairs, arm chairs, lamps, and side tables;
- customer browsing is encouraged;
- to carry items, customers pick up wicker shopping baskets at the front of the store.

Recommendations

We therefore make the following recommendations:

As a housewares purveyor, Dectonage needs lots of shelf space no more than 12" deep. Shallow shelves limit the type of merchandise that can be displayed; too deep, and the consumer may break the product by reaching in. There will be a minimum height difference between shelves of 16". Products get maximum exposure when displayed at a height that falls between the waist and top of head of the shopper.

Merchandise displayed below this area will need to be attractive to catch the eye of the browser. Shelves will be located along the walls, and freestanding units will be placed near the till.

Aisles between shelves should be a minimum of 4'. This will allow browsers with baskets to feel comfortable as they move through, without fear of breaking products.

The entry to the store should be narrow. The space will widen out as the customer enters. This gives a feeling of mystery and encourages the customer to explore.

The colours should be warm and inviting spice tones and natural materials, such as wood and stone.

Appendix 2.1.3 (Continued)

2. Go Fishing!

Background

Go Fishing! is a store aimed at the outdoors enthusiast. Its products are mainly hunting and fishing gear. The store is 49' by 15'. There is a storeroom in the back. It is located in a mall and there are two glass display cases at the front with the store entrance between them.

Analysis

- the products are to be used in the outdoors;
- there will be some clothing items;
- clothes can be bought by non-campers too;
- there will be some camping items;
- there are some expensive items that need to be kept locked up;
- the store will carry guns that will need to be locked up;
- lures are small items that can be difficult to display effectively;
- the owners want to offer fly-tying courses in the store.

Recommendations

Along one wall, there should be shelves to hold the camping equipment, backpacks, fishing rods and reels and hunting equipment. To the right of the sales area there should be a locked glass display case to hold the expensive things, such as binoculars, and the dangerous things, such as knives. Behind the sales area there should be a locked glass gun/ammunition display case. Clothes will be on circular racks at the front of the store, to attract the shopper who wants to “look outdoorsy”. Fishing lures will be displayed on sliding bulletin boards. Behind the boards will be bins to hold the different lures. The clerk matches the number of the lure to the number on the bin to get the lure the customer wants. Small hunting accessories can be displayed the same way. The two front windows will have mannequins posed in outdoor activities, such as fly casting or sitting by an imitation campfire.

In keeping with an outdoors store, the colours will be natural greens, browns, and beiges. The cash register will be made of wood and glass. The racks are chrome.

Activity 2.2: Designing a Retail Space

Time: 15 hours

Description

Students design and produce technical drawings of a layout of the retail space for the sale of the product developed in Unit 1 – Commercial Product Design, and based on the needs analysis performed in Activity 2.1 – Assessing the Needs of the Retailer. Students plan the layout, traffic patterns, fixtures, colours, and textures of the retail environment and develop orthographic drawings of floor plans and elevations.

Strand(s) & Learning Expectations

Strand(s): Theory and Foundation, Skills and Processes

Theory and Foundation

Overall Expectations

TFV.04 - consult appropriate technical reference materials for specific projects and services.

Specific Expectations

TF2.01 - use the principles of symmetrical and asymmetrical balance, rhythm, repetition, and spatial proportions when creating models and illustrations;

TF2.02 - use the fundamentals of line and direction, pattern, light and shadow, shape and space, texture, and colour when creating models and illustrations.

Skills and Processes

Overall Expectations

SPV.04 - create appropriate drawings using either traditional or computer-based methods.

Specific Expectations

SP2.01 - prepare effective technical drawings using standard scales, lettering techniques, and symbols;

SP2.02 - use computer-aided design methods effectively to produce illustrations (e.g., floor plans, perspectives and elevation views, details, auxiliaries, and assembly drawings) as required;

SP2.03 - illustrate design solutions effectively using orthographic and pictorial techniques.

Prior Knowledge & Skills

Students are familiar with CAD software and basic architectural drawing conventions. Students should be familiar with orthographic drawing principles and understand how to create elevation and floor plan views, dimensioning, and scale. Students should also be familiar with the principles of perspective drawing.

Planning Notes

- The teacher refers to Appendix 2.2.1 – Floor Plan Evaluation Checklist and conveys any new information regarding items to be included on the drawing to students if they were not covered in the design brief (Activity 2.1 – Assessing the Needs of the Retailer). The teacher prepares to review the principles of perspectives drawing.
- It may be helpful for some students to develop simple models to visualize their ideas. The teacher gathers cardboard, foam core, putty, etc., and associated tools.

Teaching/Learning Strategies

1. The teacher reviews the design criteria established in Activity 2.1. – Assessing the Needs of the Retailer. The teacher also reviews design concepts of line, shape, shadow, balance, rhythm, and scale. The teacher gives students a speed sketch exercise (given a word like “balance,” sketch the meaning of the word in a quick fashion) to illustrate the concepts.
2. Students develop sketches and/or simple models of their ideas of the retail environment for the product from Unit 1 – Commercial Product Design. Students seek approval from the teacher to continue to the next stage of developing technical drawings of the space.
3. The teacher may establish design teams to expedite drawing production, ensuring individual students are allocated various tasks.
4. Upon approval, students develop technical drawings of the retail environment. Students draw fully-dimensioned floor plans, noting placement of openings, such as doors and windows, placement of any electrical fixtures, and any fittings. Also included are door and window schedules, and elevations of each wall, noting height of cabinetry, openings, shelves, and rails. A sample floor plan is provided (see Appendix 2.2.3 – Sample Floor Plan for a Car Dealership Showroom).
5. Students create a rendered pictorial view of the room (direction to be from the door facing into the sales area). This drawing is mounted on a display board in Activity 2.3.

Assessment & Evaluation of Student Achievement

Task/Product	Tool	Purpose	Achievement Chart Categories
Design Drawings	Checklist (Appendix 2.2.1) Anecdotal comments	Formative	Communication Application
Final Presentation of Design	Rubric (Appendix 2.2.2)	Summative	Knowledge/Understanding Thinking/Inquiry Communication

Resources

Books

Ching, Frank and Francis D. Ching. *Architectural Graphics*, 3rd ed. John Wiley & Sons, 1996. ISBN 0471287539

Doyle, Michael E. *Color Drawing: Design Drawing Skills and Techniques for Architects, Landscape Architects, and Interior Designers*, 2nd ed. John Wiley & Sons, 1999. ISBN 0471292451

Jefferis, Alan and David A. Madsen. *Architectural Drafting and Design*, 4th ed. Delmar Publishers, 2000. ISBN 0766815463

Video

Architecture and Interior Design. Classroom Video, Unit C, 9003 Centaurus Circle, Burnaby, BC, V3J 7N4, phone (604) 420-3066. This video discusses the ways that an architect communicates with the client and includes examples of rendering techniques.

Visual Design, Elements and Principles. Burnaby, BC: Classroom Video. This video describes the elements of design and the three principles of design.

Websites

American Society of Interior Designers (ASID) – <http://www.asid.org/>

Contract Magazine (commercial interior design and architecture) – <http://www.contractmagazine.com/>

Design4Design: The Architecture and Interior Design Directory – <http://www.design4design.com/>

Ideas, Canadian design firm – <http://www.id-eas.ca/>

Institute of Store Planners – <http://www.ispo.org/>

New Era Design, specialists in retail design – <http://www.neweradesign.com/>

Appendix 2.2.1

Floor Plan Evaluation Checklist

Criteria	Yes	No
floor plans are drawn according to the architectural standards, (i.e., 6" wall thickness, single-glazed interior windows, door swings, approved symbols for fittings and fixtures)		
title block includes store name, "Main Floor," scale, date, drafter's name, and drawing #.		
electrical fittings and fixtures are noted		
size of doors conforms to Fire Code		
countertops, closets, and custom fittings are included and noted		
the retail area may be secured from the manufacturing area or from the administration area		
there is space for		
- washrooms		
- breaks for staff		
- storage of stock		
the cash register is visible from all point in the store		
merchandise arranged for visibility		
access for restocking is adequate		
flexibility for rearranging exists		
it is easy to clean the retail area		
arrangement encourages customer		
traffic and visibility of product		
display space is adequate		
Door and Window Schedules		
information is arranged in chart form		
all doors are noted		
all doors have correct width and height		
all doors have correct material listed		
all windows are noted		
all windows have correct width and height		
all windows have the correct material listed		
individual drawings of door elevations and window elevations are supplied (to scale)		
Elevation Drawings		
elevation drawings show wall in normal view, noting height of cabinetry, openings, shelves, rails, and any electrical fixtures		
sizes are standard (i.e., counter height, door widths, door heights)		
all dimensions are present		
all dimensions are neatly placed according to the Rules of Dimensioning		
all dimensions are read from left to right or from bottom to top		
all individual dimensions total the overall dimensions		
an elevation drawing exists for each wall		
Pictorial View		
is taken from perspective of door, facing the sales counter		
shows the "first impression" that a customer has of the space		
denotes colours and materials		
follows the rules of one-point perspective		

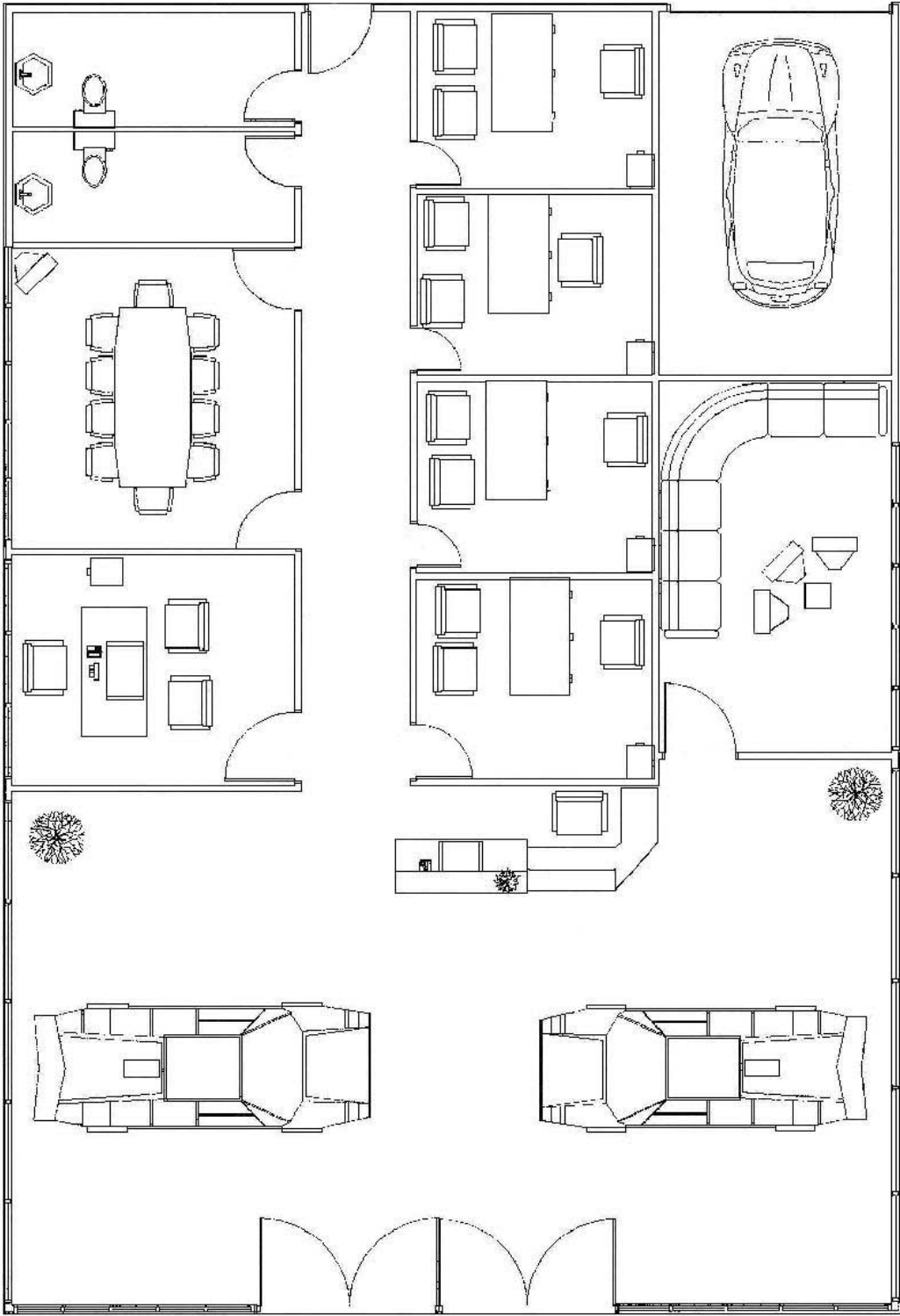
Appendix 2.2.2 – Technical Drawing Evaluation Rubric

Criteria	Level 1 (50-59%)	Level 2 (60-69%)	Level 3 (70-79%)	Level 4 (80-100%)
<p>Knowledge/ Understanding Demonstrates knowledge of technical references and technical drafting standards</p> <ul style="list-style-type: none"> • building codes • window, door, lightning standards • standards for dimensions lettering symbols 	<p>- applies limited knowledge of the major rules of the Building and Electrical Codes</p> <p>- applies window, door, and lighting standards with limited accuracy</p> <p>- uses industry standards dimensions, scales, lettering, and symbols with limited effectiveness</p>	<p>- applies some knowledge of the major rules of the Building and Electrical Codes</p> <p>- applies window, door, and lighting standards with some accuracy</p> <p>- uses industry standards dimensions, scales, lettering, and symbols with some effectiveness</p>	<p>- applies considerable knowledge and applicable rules of the Building and Electrical Codes</p> <p>- applies window, door, and lighting standards with considerable accuracy</p> <p>- uses industry standards dimensions, scales, lettering, and symbols with considerable effectiveness</p>	<p>- applies all or almost all of the rules of the Building and Electrical Codes</p> <p>- applies all or almost all of window, door, and lighting standards</p> <p>- uses industry standards dimensions, scales, lettering, and symbols with high level of effectiveness</p>
<p>Thinking/ Inquiry Uses suitable materials</p> <p>Identifies design criteria</p>	<p>- uses suitable materials in design with limited effectiveness</p> <p>- identifies design criteria with limited applications</p> <p>- identifies few design problems</p> <p>- identifies few associated solutions</p>	<p>- uses suitable materials in design with some effectiveness</p> <p>- identifies design criteria with some applications</p> <p>- identifies some design problems</p> <p>- identifies some associated solutions</p>	<p>- uses suitable materials in design with considerable effectiveness</p> <p>- identifies design criteria with considerable applications</p> <p>- identifies many design problems</p> <p>- identifies many associated solutions</p>	<p>- uses suitable materials in design with high degree of effectiveness</p> <p>- identifies design criteria that are highly applicable</p> <p>- identifies most or all design problems</p> <p>- identifies most or all creative associated solutions</p>
<p>Communication Use principles and fundamentals of design illustration</p> <p>Prepares effective drawings</p>	<p>- applies few of the fundamentals of illustration</p> <p>- pictorial view has limited effectiveness in showing the customer's first impression of the space</p>	<p>- applies some of the fundamentals of illustration</p> <p>- pictorial view has some effectiveness in showing the customer's first impression of the space</p>	<p>- applies many fundamentals of illustration</p> <p>- pictorial view is considerably effective showing the customer's first impression of the space</p>	<p>applies most or all fundamentals of illustration</p> <p>- pictorial view is highly effective showing the customer's first impression of the space</p>

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

Appendix 2.2.3

Sample Floor Plan for a Car Dealership Showroom



Activity 2.3: Presenting the Design

Time: 5 hours

Description

In this activity, students create display boards to illustrate their design ideas for the retail space developed in previous activities. Students use principles of design and their previous research to complete presentation materials. Students use the display boards to present the solutions to their classmates.

Strand(s) & Learning Expectations

Strand(s): Theory and Foundation, Skills and Processes, Impacts and Consequences

Theory and Foundation

Overall Expectations

TFV.03 - explain the principles and fundamentals of design.

Specific Expectations

TF2.01 - use the principles of symmetrical and asymmetrical balance, rhythm, repetition, and spatial proportions when creating models and illustrations;

TF2.02 - use the fundamentals of line and direction, pattern, light and shadow, shape and space, texture, and colour when creating models and illustrations;

TF3.01 - explain project designs in terms of satisfying consumer needs and meeting design criteria.

Skills and Processes

Overall Expectations

SPV.03 - prepare effective models, prototypes, and finished products;

SPV.05 - prepare appropriate promotional materials and write effective technical reports for the products they create.

Specific Expectations

SP1.04 - identify appropriate materials for models and finished products by analysing material characteristics and properties;

SP2.04 - build effective displays and product prototypes;

SP3.01 - evaluate the appropriateness of project solutions against design criteria.

Impact and Consequences

Overall Expectations

ICV.03 - handle the tools and equipment used in technological design safely.

Prior Knowledge & Skills

Students are familiar with word processors, graphic applications, and/or desktop-publishing applications. Students should also be familiar with basic drawing and sketching techniques.

Planning Notes

- This activity could involve utility and/or x-acto knives as well as glues, paints and solvents. Ensure that all students are properly safety trained and observe safety throughout the activity.
- The teacher should have tri-fold display boards, foam-core boards, or Bristol board available, along with glue sticks, scissors, etc.
- The teacher should consider contacting suppliers or local merchants beforehand. Before initiating the activity, the teacher collects samples from hardware stores, building supply stores, paint and wallpaper stores, and manufacturers. The teacher may give students the responsibility of collecting material samples. Student displays should include samples of materials to be used in the designs.
- It would be helpful to have sample display boards to show students examples of professional work (see Resources or collect display boards from local interior designers).

Teaching/Learning Strategies

1. The teacher discusses the concept of presentation boards and shows examples to initiate the activity. The teacher discusses the elements of the boards and describes the uses of boards in presenting ideas to clients. The teacher distributes a handout of the presentation criteria to students (see Appendix 2.3.1 – Presentation Board Checklist).
2. The teacher may assign design teams (or use the same arrangements from the previous activity). The teacher ensures that each student contributes to the production for assessment and evaluation purposes. The use of individual daily logs of activities is recommended.
3. Students sketch a layout for their own boards and seek approval from the teacher before continuing.
4. Students collect samples of paint, wallpaper, tile, carpet, laminate, etc. Many retailers will supply these pamphlets or will donate outdated catalogues. **Note:** Students should not be asked to pay for these materials. (Alternatively, the teacher may collect samples beforehand). Samples of cabinets and lighting fixtures are not necessary – a photo or sketch of the fixture style is adequate.
5. Students create a schedule of materials to be posted on the board and utilize pertinent drawings and sketches from the previous activity.
6. Students mount all drawings, schedules, samples, and rendered views on tri-fold display board. When completed, students present their display board to the class, describing their design choices and explaining how their design meets the client and customer needs.
7. Students develop a short technical report of their design rationalizations.

Assessment & Evaluation of Student Achievement

Task/Product	Tool	Purpose	Achievement Chart Categories
Sketch Layout	Anecdotal Comments Conferencing	Formative	Thinking/Inquiry Communication Application
Presentation	Rubric	Summative	Knowledge/Understanding Thinking/Inquiry Communication Application

Accommodations

- One example of an enhancement to this activity is the construction of a scale model of the store layout to accompany the presentation board. The teacher may also decide to vary the level of detail required in the presentation board.

Resources

Non-print

Hardware stores, building suppliers, paint and wallpaper vendors, carpet stores, and manufacturers are sources for samples of wall, floor, shelving, and counter samples. See your local yellow pages.

Print and Web

Drpic, Ivo. *Sketching and Rendering Interior Spaces*. Whitney Library of Design, 1988. ISBN 0823048535

Ivillage – <http://www.ivillage.com/home/decorate/>

Portal for several interior design magazines, such as *Style at Home*, *Victoria*, and *Metropolitan Home*.

Mitton, Maureen. *Interior Design Visual Presentation: A Guide to Graphics, Models, and Presentation Techniques*. John Wiley & Sons, 1999. ISBN 0471292591

Catalogues from shops such as Laura Ashley Home Furnishings, Spiegel, or Ikea (see also local merchants) – <http://www.ikea.ca>, <http://www.spiegel.com>, <http://www.goodhome.com>

Appendix 2.3.1

Presentation Board Checklist

Your boards require the following elements:

the rendered pictorial view (Activity 2.2)	
the elevation views (Activity 2.2)	
the floor plan (Activity 2.2)	
clearly labelled samples of paint, trim, counter laminate, and flooring	
vendor photographs or drawings of light fixtures	
vendor photographs or drawings of cabinetry/display furnishings	
samples neatly-mounted on a tri-fold display board	
clearly-labelled samples	
technical report describing design decisions and rationalizations	

Unit 3: Retail Furniture Design

Time: 35 hours

Unit Description

Students design furnishings for commercial needs, based on their work in previous units. Students examine considerations in furniture design, materials, structural properties, and manufacturing processes. Students fabricate and test full-scale mock-ups and develop a catalogue to present the various display fixtures. Ethical issues regarding the negative impacts of consumerism, excessive marketing, and the proper handling of materials and waste are examined.

Unit Synopsis Chart

Activity	Time	Learning Expectations	Assessment Categories	Tasks
3.1 Investigating Retail Store Fixture Design	8 hours	TFV.03, TF1.03, SP1.01, ICV.01, ICV.02, IC1.01, IC1.02 CGE 1g, 2e, 3c, 4f, 7f, 7g	Knowledge/ Understanding Thinking/Inquiry Communication Application	Students research retail store fixtures and display considerations for specific products. Students then prepare a photo essay to share their findings with the class.
3.2 Designing Store Fixtures and Displays	12 hours	TFV.01, TF2.03, TF3.01, SPV.04, SP1.01, SP2.02, SP2.03, SP3.01, IC1.01, IC2.02 CGE 2e, 3d, 5g, 7f	Communication Application	Using both manual and computer-aided drafting techniques, students design retail store fixtures to display the product developed in Unit 1 – Commercial Products Design.
3.3 Scale Modelling	15 hours	TFV.02, TF3.02, SPV.03, SP1.04, SP2.04, ICV.03, IC2.03 CGE 5a, 5b, 5e, 5g, 7i	Communication Application	Students develop a scale model of the retail store fixture or display. They document the process and present their model to the class.

Activity 1: Investigating Retail Store Fixture Design

Time: 8 hours

Description

Students investigate retail furniture display design as it pertains to a particular product. Students choose from products in the areas of home improvement, electronics, clothing, sporting goods, food/produce, music/entertainment, and jewellery. Students gather information about the display of these products through research on the World Wide Web, and by visiting various retail stores in the community. The information gathered is critically analysed for issues regarding the ethical use of marketing techniques as they relate to Gospel teachings. Students then organize this information and prepare a photo essay to share their findings with the class. This activity provides students with the necessary skills to develop ideas for designs in subsequent activities.

Strand(s) & Learning Expectations

Ontario Catholic School Graduate Expectations

CGE1g - respect the faith traditions, world religions, and the life-journeys of all people of good will;
CGE2e - use and integrate the Catholic faith tradition, in the critical analysis of the arts, media, technology, and information systems to enhance the quality of life;
CGE3c - think reflectively and creatively to evaluate situations and solve problems;
CGE4f - apply effective communication, decision-making, problem-solving, time, and resource management skills;
CGE7f - respect and affirm the diversity and interdependence of the world's peoples and cultures;
CGE7g - respect and understand the history, cultural heritage, and pluralism of today's contemporary society.

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

Theory and Foundation

TFV.03 - explain the principles and fundamentals of design;
TF1.03 - explain how to develop a needs analysis based on research into consumer products or services;
TF1.04 - assess a variety of materials and fabrication techniques used for different custom and mass-manufactured products.

Skills and Processes

SP1.01 - identify design problems, list relevant criteria, and propose solutions.

Impact and Consequences

ICV.01 - describe safety features and ethical issues that must be addressed in technological design;
ICV.02 - describe problems caused by improper or inadequate design.

Prior Knowledge & Skills

A working knowledge of computer operations, such as word processing, creating graphics, printing, and file management, is required. Students have some knowledge of Internet research techniques and are familiar with computer usage regulations as defined at the local level. Students with little or no knowledge in computer operations should be paired with students who have expertise. Students should be familiar with the use of a 35mm point-and-shoot camera or digital camera. Students may have knowledge of acquiring and manipulating digital images.

Planning Notes

- The teacher ensures that students have access to computers equipped with Internet capabilities by reserving the computer lab in advance.
- The teacher follows board and school policy about out of school activities and prepares copies of the form letter (Appendix 3.1.2), on school letterhead, for students to take when they visit retail stores in the community. The teacher may call stores in advance to find out about company policy regarding the use of cameras in the store. Due to company policy, some larger retail chain stores may not allow students to photograph their displays.
- For safety, students should visit stores in pairs or small groups. Students should always obtain permission from the store manager before photographing any of the displays. If retail stores are unwilling to cooperate, there are alternatives. Most stores purchase their fixtures from a particular supplier who would have similar displays. Students could place a call to the head office of a retail chain store to find out the name of their supplier.
- The teacher arranges for digital or instant cameras and processing the film. The teacher also gathers appropriate art supplies (e.g., glue sticks, construction paper, Bristol board, markers, scissors, printer paper, toner, etc.).

Teaching/Learning Strategies

1. The teacher introduces the topic of Retail Store Fixture Design by distributing copies of Appendix 3.1.1 – Shopping In Our Community. Students are divided into small groups of three or four and are given 15 minutes to complete the task. The teacher then uses the group results to generate a chart that is representative of the entire class. The chart is displayed on chart paper or the overhead projector.
2. The teacher then leads students in a discussion as to why certain stores were chosen over others. Factors affecting this decision include location, pricing, product selection, store décor, commercial advertising, and celebrity endorsement. In any case, students must be able to support their opinions clearly and intelligently. When discussing any product, especially clothing and footwear, teachers should discourage references to particular name brands, as this may be a sensitive topic for some students. Teachers should use their discretion in leading discussions so that they comply with Catholic education guidelines.
3. The teacher leads a class discussion about the ethical and moral issues of marketing and the negative impacts of consumerism. Marketing practices and the handling of materials and waste are also examined. The use of celebrity endorsements, graphics, colours, sex, sex roles in marketing, etc., impulse buying displays, and over packaging for display purposes can be discussed. Students are encouraged to analyse these issues in relation to Catholic values as well as an economic viewpoint, and weigh the implications of various marketing techniques.
4. In groups of three to four, students select a particular product and investigate how the product is displayed in the retail world. The teacher ensures that each group selects a different product. However, the teacher may want to focus on a product similar to the one developed in (Unit 1 Commercial Product Design) and use the findings for subsequent activities.
5. The teacher provides students with a copy of a form letter (Appendix 3.1.2 – Form Letter) and photo essay evaluation form (Appendix 3.1.3 – Photo Essay Assignment). Students go to various retail stores that sell the product of their choice and photograph (digital or still camera) or sketch how their product is displayed. Upon arriving at the store, students should request to speak to the manager and present the letter (Appendix 3.1.2 – Form Letter). After receiving permission to undertake their assignment, students make note of the location of the display within the store (i.e., proximity to entrance and counter), colour, materials used, portability, and versatility (can it be used for other products?).
6. Students use class time to organize and prepare their photo essay. The final hour of the activity is allocated for group presentations.

Assessment & Evaluation of Student Achievement

Students are assessed on their ability to research and prepare a photo essay on Retail Store Fixture Design. Informal assessment takes place during class discussions as to the amount and quality of student participation, in particular their abilities to apply gospel values to issues regarding ethical marketing techniques. A summative evaluation of the photo essay is undertaken by the teacher. (Appendix 3.1.3 – Photo Essay Assignment.)

Resources

Websites

Atlantic Store Décor Inc. – www.asd.ca

The largest manufacturer of custom retail fixtures in Atlantic Canada. Students can find examples of fixtures for clothing, sporting goods, bakery goods, retail gifts, and kiosks.

Great Brook Furniture – www.greatbrookfurniture.com

Designer and manufacturer of store fixtures, kiosks, display cabinets, point of sale counters, and institutional furniture.

Retail Source – www.retailsource.com

A large list of companies that provide furniture for retail design, construction, and visual merchandising.

– www.exhibittechnology.com

A company that specializes in the design and construction of custom fixtures that meet specific user needs. Photos of unique displays of products are provided.

– www.robertham.com/store_fixtures.htm

Store fixtures and wholesale store fixtures for retail stores, jewellery, clothing, and floral stores. Every fixture is pictured with a price.

Publications and Catalogues

AZURE Magazine (design, architecture, art). Azure Publishing Inc., 20 Maud St., Suite 200, PO BOX 15464, STN BRM B, Toronto, Ontario, M7Y 2W1

Display & Design Ideas Magazine (product news and design solutions for store planning and visual merchandising). Published by Bill Communications – Atlanta, 1115 Northmeadow Parkway, Roswell, GA 30076. – www.ddimagazine.com

OBJEKT Living In Style Magazine (interior, architecture, art, and design). A publication of Hans Fonk Publications. Contact for Canada: OBJEKT, 450 Erb Street, Suite 117, Waterloo, Ontario, N2T 1H4.

VM+SD Visual Merchandising and Store Design Magazine. A publication of ST Publications Inc., 407 Gilbert Ave, Cincinnati, Ohio, 45202-2285. – www.visualstore.com

Appendix 3.1.1

Shopping In Our Community

Task: In your groups, complete the table by writing down the names of as many stores as you can where you can purchase each of the following items:

	Food/ Produce	Clothing	Footwear	Electronics	Home Improvement	Sporting Goods	Music/ Entertainment	Jewellery
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
*								

For each of the categories, write the name of the store in the last row (*) where your group is most likely to make a purchase.

Choose one of the categories listed above and consider the following questions:

- What are some similarities and differences between the displays in each of the different stores?
- What is the single most important reason why you chose the store in the last row (*)?
- Is this a store where you and your family would shop? Why? Why not?
- Is this a store that most of your friends go to?
- What does the outside of the store look like?
- Describe the interior of the store?
- How are the various products displayed in the store?
- What are the hours of operation for this particular store?
- Are there any sales associates and are they always helpful?
- Does this store sell any of the other products?

Group Members

- 1.
- 2.
- 3.
- 4.

Appendix 3.1.2

Form Letter

Note: This letter is to be typed on school letterhead and signed by the teacher and principal.

Date:

Dear Store Manager/Owner:

As part of a school assignment, students have been asked to investigate how products are displayed in a retail setting. Students are required to obtain photographs of displays in a store of their choosing and will be required to share their findings with their classmates.

The students will then design and build their own display for a product.

To this end, we ask that you kindly allow these student(s) to photograph the displays in your store, and we thank you in advance for your cooperation.

Should you have any questions or concerns, please feel free to contact me at _____.
I will be happy to address any concerns you might have.

Yours sincerely,

Technology Teacher

Principal

Appendix 3.1.3

Photo Essay Assignment

Background

A photo essay is the organization of a series of photographs that can be used to tell a story, demonstrate how to accomplish a task or to show a collection of similar ideas. Although the photographs are usually taken with a camera, they can be acquired from the Internet or cut out from a magazine. Each photograph is accompanied by a short explanation.

Objective

Students take photographs to show the various ways in which a particular product is displayed in retail stores. Students display photographs either in a slide show or on poster board and share their findings with their classmates. In doing so, students develop their research and organizational skills and are provided with an opportunity to learn more about the community and appreciate the resources around them.

Requirements

- 10 photos related to the topic chosen. Students are encouraged to take actual photographs; however, the essays may be supplemented with hand-drawn pictures, magazine photos, or images acquired from the Internet (copyright free).
- Explanations for each photo.
- Completed poster board with all photos and explanations attached.
- Presentation of their findings to the class, highlighting similarities and differences.

Evaluation

Photo Essay	
Organization of Information	/5
Criteria and Number of Photos	/10
Overall Appearance	/5
Written Explanations	
Spelling, Punctuation, and Grammar	/5
Content	/10
Presentation	
Delivery	/5
Organization	/5
Visual Support Material	/5
Total	/50

Activity 2: Designing Store Fixtures and Displays

Time: 12 hours

Description

This activity is designed to allow students to apply the knowledge gained in the previous activity towards the design of a display for the product developed in Unit 1 – Commercial Product Design. This display must be in keeping with the interior layout designed for the commercial space in Unit 2 – Interior Design. Students take into consideration the size, shape, style, function, materials, and cost in the development of a computer-generated drawing of their store fixture.

Strand(s) & Learning Expectations

Ontario Catholic School Graduate Expectations

CGE2e - use and integrate the Catholic faith tradition, in the critical analysis of the arts, media, technology, and information systems to enhance the quality of life;

CGE3d - make decisions in light of gospel values with an informed moral conscience;

CGE5g - achieve excellence, originality, and integrity in one's own work and support these qualities in the work of others;

CGE7f - respect and affirm the diversity and interdependence of the world's peoples and cultures.

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

Theory and Foundation

TFV.01 - demonstrate an understanding of how the design process is used to create products or services for the marketplace;

TF2.03 - demonstrate an ability to consult reference materials such as codes, *Machinery's Handbook*, *Sweet's Catalogue*, *Architectural Graphic Standards*, and trade literature and catalogues;

TF3.01 - explain project designs in terms of satisfying consumer needs and meeting design criteria.

Skills and Processes

SPV.04 - create appropriate drawings using either traditional or computer-based methods;

SP1.01 - identify design problems, list relevant criteria, and propose solutions;

SP2.02 - use computer-aided design methods effectively to produce illustrations (e.g. floor plans, perspectives and elevation views, details, auxiliaries, and assembly drawings) as required;

SP2.03 - illustrate design solutions effectively using orthographic and pictorial techniques;

SP3.01 - evaluate the appropriateness of project solutions against design criteria.

Impact and Consequences

IC1.01 - describe how project solutions address efficiency and ergonomic issues, comparing proposed products or services to existing ones;

IC2.02 - explain how project solutions affect the environment.

Prior Knowledge & Skills

Students have experience with the design process as a way of developing solutions to design problems. A working knowledge of computer operations, such as word processing, creating graphics, printing, and file management, is required. Students have knowledge of CAD design software or manual drafting techniques and are familiar with computer usage regulations as defined at the local level.

Planning Notes

- Design briefs are prepared in advance and clearly outline the purpose and parameters of the activity. A sample design brief is provided see Appendix 3.2.1 – Designing Retail Furniture.
- The teacher ensures that students have access to a variety of resources, including access to the school library/resource centre and a computer lab equipped with Internet capabilities and CAD software. Manual drafting tools should be provided as an alternative.
- The teacher could contact architectural and design firms as sources for trade magazines and catalogues.

Teaching/Learning Strategies

1. After having investigated the characteristics of various retail store fixtures in the previous activity, students apply their knowledge in the design of their own retail fixture. The teacher presents students with copies of Appendix 3.2.1 – Designing Retail Furniture and informs them of the expectations.
2. Students may work in groups to develop a design or they may be required to develop their own designs.
3. The teacher consults with the class on the product to design. Based on the activities in Unit 1 – Commercial Product Design and Unit 2 – Interior Designs, there are two options.
Option 1: Each student designs a store fixture to display the product developed in Unit 1. – Commercial Product Design. The result is a variety of designs for a fixture that displays the same product.
Option 2: Based on the interior design layout activity in Unit 2, students design the various fixtures throughout the store. Each fixture would display products in its own unique way while maintaining the overall look and feel of the retail store.
4. Once the teacher and students have arrived at a decision, the teacher leads a discussion about trends in store fixture designs and materials. Results of a recent survey of retailers in North America have been provided to facilitate discussion and provide students with a clearer sense of user needs. See Things to Consider in (Appendix 3.2.1 – Designing Retail Furniture.)
5. Students design the displays using manual-drafting techniques or the use of a CAD drawing program. The design should clearly indicate all required measurements and views.
6. Students complete their designs in the time provided and present their ideas to the rest of the class. Students should be able to justify their design solutions clearly and intelligently. All designs are accompanied by a parts list and cost estimate for each part.

Assessment & Evaluation of Student Achievement

- Ongoing informal assessment of students' effective use of class time is made.
- Designs are evaluated according to the criteria outlined in (Appendix 3.2.1 – Designing Retail Furniture.)

Accommodations

- Some students may want to incorporate electronics and/or mechanical motion devices in their displays. The teacher makes available the necessary resources.

Resources

Websites

Atlantic Store Décor Inc. – www.asd.ca

The largest manufacturer of custom retail fixtures in Atlantic Canada. Students can find examples of fixtures for clothing, sporting goods, bakery goods, retail gifts, and kiosks.

Great Brook Furniture – www.greatbrookfurniture.com

Designer and manufacturer of store fixtures, kiosks, display cabinets, point of sale counters, and institutional furniture.

Retail Source – www.retailsource.com

A large list of companies that provide furniture for retail design, construction, and visual merchandising. www.exhibittechnology.com

A company that specializes in the design and construction of custom fixtures that meet specific user needs. Photos of unique displays of products are provided.

www.robertham.com/store_fixtures.htm

Store fixtures and wholesale store fixtures for retail stores, jewellery, clothing, and floral stores. Every fixture is pictured with a price.

Publications and Catalogues

AZURE Magazine (design, architecture, art). Azure Publishing Inc., 20 Maud St., Suite 200, PO BOX 15464, STN BRM B, Toronto, Ontario, M7Y 2W1

Display & Design Ideas Magazine (product news and design solutions for store planning and visual merchandising). Published by Bill Communications – Atlanta, 1115 Northmeadow Parkway, Roswell, GA 30076. www.ddimagazine.com

OBJEKT Living In Style Magazine (interior, architecture, art, and design). A publication of Hans Fonk Publications. Contact for Canada: OBJEKT, 450 Erb Street, Suite 117, Waterloo, Ontario, N2T 1H4.

VM+SD Visual Merchandising and Store Design Magazine. A publication of ST Publications Inc., 407 Gilbert Ave, Cincinnati, Ohio, 45202-2285. www.visualstore.com

Appendix 3.2.1

Designing Retail Furniture

Introduction

Over the years, the amount of time that has gone into the planning of a retail store has increased dramatically. Gone are the days of buying a storefront property, putting up some shelves and hanging a sign on the front door. In the past, most retailers relied on adult customers for the majority of their business. Today, retailers have recognized the new buying power of teenagers and have invested countless hours and financial resources to attract this new consumer. To do this, retailers have to develop an image with which their customers can associate. Retailers are now, more than ever, concerned about their image, and their stores clearly reflect that. They hire focus groups, interior designers, consultants and contractors to create this image and make it a reality. Retailers that fail to change their look often wind up closing their doors for business. Sometimes retailers have similar products, but what sets them apart is the way they present them to their prospective customers.

Objective

To design a unique and functional display fixture for a specific product that will be displayed prominently in a retail store.

Requirements	Evaluation
Detailed dimensioned drawing of fixture	
Orthographic View	/25
Pictorial View	/25
Parts List (with dimensions)	/10
Cost Estimate (including labour)	/10
Assembly Instructions	/10
Product Data Sheet (highlighting features)	/20
<i>Total</i>	<i>/100</i>

Things to Consider

According to a recent survey of retailers in North America, retailers are looking for fixtures that are:

- affordable – due to smaller budgets;
- functional, flexible, and mobile;
- cleaner, sleeker, and more modern;
- higher in capacity (i.e., able to store more items);
- less residential in feeling;
- more ergonomic;
- simplified and streamlined;
- more detailed (with use of CAD);
- stylish and brighter in colours;
- easy to assemble;
- universal (i.e., less brand specific);
- electronic, but must have more usefulness;
- easy to maintain.

Activity 3: Scale Modelling

Time: 15 hours

Description

Students construct a scale model of the display fixture developed in the Activity 2 – Designing Store Fixture and Displays. Students safely use tools and machines throughout the construction process. The wise use of materials and their impact on the environment are considered. Students document the process so an estimate of costs of project materials and labour can be made. Students share their models with the rest of the class in the form of a presentation.

Strand(s) & Learning Expectations

Ontario Catholic School Graduate Expectations

CGE5a - work effectively as an interdependent team member;

CGE5b - think critically about the meaning and purpose of work;

CGE5e - respect the rights, responsibilities, and contributions of self and others;

CGE5g - achieve excellence, originality, and integrity in one's own work and support these qualities in the work of others;

CGE7i - respect the environment and use resources wisely.

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

Theory and Foundation

TFV.02 - evaluate the suitability of materials and methods of fabrication for a variety of products;

TF3.02 - identify design constraints for specific projects.

Skills and Processes

SPV.03 - prepare effective models, prototypes, and finished products;

SP1.03 - estimate the costs of project materials and labour;

SP1.04 - identify appropriate materials for models and finished products by analysing material characteristics and properties;

SP2.04 - build effective displays and product prototypes.

Impact and Consequences

ICV.03 - handle the tools and equipment used in technological design safely;

IC2.03 - evaluate the procedures used in processing materials, taking into consideration safety issues and environmental concerns.

Planning Notes

- The teacher ensures that students have access to sufficient tools, machines, and materials to carry out the fabrication of their displays.
- Students may require specific products that are unavailable in the school and for which a price list is required.

Teaching/Learning Strategies

1. A range of materials can be used to fabricate the model. Materials are dependent on the available facilities and equipment. Options include woods, metals, acrylic, corrugated plastic, foam core, cardboard, paper mache, etc.
2. The teacher reviews the technology lab safety policies and procedures with students. A discussion of the reasons for the policies and procedures may be required. The teacher introduces new techniques, procedures, and safety considerations as required (e.g., cabinet-making skills, welding metals, shaping acrylics, electrical wiring, etc.).

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3. Students must submit their design ideas and a materials list for the teacher's approval before they begin construction. The teacher guides students to the completion of their projects, distributes materials and equipment, introduces new technologies, and demonstrates safe operation of tools and equipment. Students complete the fabrication of their store fixtures in the time provided.
 4. Upon completion of their display fixtures, students demonstrate how the fixtures would be used in a retail setting.

Assessment & Evaluation of Student Achievement

The focus of this activity is on the fabrication process. Students are assessed on their ability to work safely with tools and machinery, their final product, and their presentation to the class, according to a teacher designed assessment rubric. A design report is not required; however, students are required to keep a daily log to record their progress.

Accommodations

- Students with physical disabilities may need to use some form of specialized material and/or equipment. Equipment may need to be adapted to allow students with physical needs full or partial use (consult the manufacturer's manuals before making any modifications to any machine or tool). The teacher may need to assist these students in the safe operation of the equipment.
- Where available and where applicable, provide specialized equipment such as:
 - electronic reading systems, which allow printed material to be scanned and, through the use of a voice synthesizer, the scanned text to be spoken aloud;
 - voice amplifiers, calling devices, or voice output technologies;
 - alternatives to mouse and keyboard input, such as scanning keyboards, overlays, single switch access, head mouse, voice recognition, software, peripherals, and the virtual reality mouse.

Resources

Gordon, J.E. *The New Science of Strong Materials*. Markham, Ontario: Penguin Books, 1978.
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Groneman, Chris. *General Woodworking*. Toronto: McGraw-Hill Ryerson Ltd., 1978.
ISBN 0-07-082763-X

Pender, James. *Welding*. Toronto: McGraw-Hill Ryerson Ltd., 1986. ISBN 0-07-548953-8

Petruzella, Frank. *Essentials of Electronics*. New York: Glencoe McGraw Hill, 1999.
ISBN 0-07-821048-8

Petruzella, Frank. *Introduction to Electricity & Electronics*. Toronto: McGraw-Hill Ryerson Ltd., 1986.
ISBN 0-07-548899-X

Umstatted, William. *Modern Cabinetmaking*. South Holland, Illinois: The Goodheart-Willcox Co., 1990.
ISBN 0-87006-697-8