About This Resource

Open School BC’s Youth Explore Trades Skills resource development project involves creating learning resources to support the implementation of the BC Ministry of Education’s Youth Explore Trades Skills Program Guide.

On December 7-9, 2015 a Drafting and Design resource development planning session took place in Victoria, B.C. The purpose of the planning session was to develop an instructional design plan and draft Activity Plans for a Design and Drafting module, to be used within the Youth Explore Trades Skills course. The planning session brought together Drafting and Design educators who teach their students about the design process, as well as fundamental drafting (drawing) skills needed within all trades.

These resources have been designed to meet a range of students’ and teachers’ needs. Each activity has been created as a foundation lesson, many with suggested extension activities for students to further expand their knowledge.

This module introduces students to Board Drafting and Computer Aided Drafting (CAD). The Activity Plans cover both Architectural and Mechanical standards. Activity Plans are designed with flexible use in mind; lesson content has been divided into discrete chunks to allow for standalone use for ease of navigation by teachers, but can also be followed in sequence.

The Architectural Drafting Activity Plans can align directly to the Carpentry, Plumbing and Electrical modules of Youth Explore Trades Skills. The Mechanical Drafting module correlates with the Automotive module, but can also compliment the Metal Work module.

The planning team created broad activities in order that teachers can use the equipment available to them—both manual/board drafting equipment and computer software.

In this resource you will find:

• Detailed terminology related to the fields of design and drafting
• Detailed lists and descriptions of board drafting equipment
• Detailed information regarding current CAD software programs
• Detailed Activity Plans with activities, images and supporting instructional videos

All Activity Plans are available in both PDF Format and Word formats on the Youth Explore Trades Skills website: http://www.mytrainingbc.ca/skills-exploration/index.html
Module Structure
The Design and Drafting module is structured as follows:

Design
Defining Design
Working as a Designer
Design Challenge – the Gift-Giving Experience
Design and Social Responsibility – Disaster Relief Shelter

Information Handouts
Problem-Solving Models
The Design Process in Manufacturing

Drafting
Drafting Careers
2D Architectural Board Drafting
1. Drafting Dictionary
   Drafting Dictionary PPT resource
2. Introduction to Title Blocks
3. Drawing Objects
4. Scale and Dimensioning
5. Orthographic Drawing
6. Isometric Drawing

2D Mechanical Board Drafting
1. Drafting Dictionary
   Drafting Dictionary PPT resource
2. Introduction to Title Blocks
3. Drawing Objects
4. Scale and Dimensioning
5. Orthographic Drawing
6. Isometric Drawing
2D Mechanical and Architectural CAD

1. Computer and Network Orientation
2. CAD Orientation
   - Teacher Video 2.1 - Intro to CAD Software for the Teacher
   - 2.1 CAD Program Interface (MCAD)
   - 2.2 Basic Command Line Entry and Page Setup for Activity 2 (MCAD)
   - 2.3 Absolute and Relative Coordinate Entry (MCAD)
   - 2.4 Polar Coordinate Entry and Mouse Entry (MCAD)
   - 2.5 Offset Command-2 (MCAD)
   - 2.6 Fillet Command (MCAD)
   - 2.7 Move Command and Object Snap (MCAD)
   - 2.8 Trim Command (MCAD)
   - 2.9 Drawing a Simple Border (MCAD)
   - 2.10 Inserting Text into a Title Block (MCAD)
   - 2.11 Plotting or Printing Your Drawing

3. Set Up Your Model Space
   - 3.1: Setting Up Your Model Space (Part 1)
   - 3.2: Setting Up Your Model Space (Part 2)

4. Draw Your Border
   - 4.1 Open a Drawing Template
   - 4.2 Draw a Border and Title Block
   - 4.3 Complete the Lines of the Title Block
   - 4.4 Inserting Labels into Your Title Block
   - 4.5 Drawing a Logo to Complete the Title Block and Border
   - 4.6 Save Your Completed Border and Title Block as a Drawing Template

5. Create an Orthographic Drawing
   - 5.1 Creating an Orthographic Drawing (Part 1)
   - 5.2 Creating an Orthographic Drawing (Part 2)
   - 5.3 Creating an Orthographic Drawing (Part 3)

6. Draw an Isometric Drawing
   - 6.1 Creating an Isometric Drawing

7. Save Your Border and Title Block
   - 7.1 Scaling Your Title Block
8. Dimension an Orthographic Drawing
   8.1 Dimensioning an Orthographic Drawing
9. Fill in Your Title Block, Including Scale
   9.1 Filling in Your Title Block
10. Set Up Your Plot Window, Print on 8.5 × 11 Paper
    10.1 Plotting Your Drawing
Extension Activity – Setting Up to Export to Other Programs
   1. AutoCAD to Laser
   2. Exporting a Drawing

3D Modelling – Architectural CAD
11. Symbols and Standards
    11.1: Changing Your Model Space
    11.2: Drawing Architectural Blocks for a Building
12. Drawing a Simple Building
    12.1: Drawing the External Walls of a Building
    12.2: Placing Architectural Blocks into a Drawing
    12.3: Scaling Your Border and Dimensioning a Floor Plan
13. Exploring SketchUp Make
    13.1: Exploring SketchUp Make
14. Creating a Simple Architectural Structure
    14.1 Creating a Simple Architectural Structure (Part 1)
    14.2 Creating a Simple Architectural Structure (Part 2)
    14.3 Creating a Simple Architectural Structure (Part 3)
    14.4 Creating a Simple Architectural Structure (Part 4)
15. Modelling Your Structure
    15.1: Modelling Your Structure
Extension Activity – Prototyping Your Model Using Printing and CNC Technology

3D Modelling (Inventor) – Mechanical CAD
11. 3D Modelling a Set of Stairs
    11.1: Constraining and Dimensioning 2D Sketches
    11.2: Drawing Your Stairs
    11.3: Extruding Your Stairs
12. Drawing and Assembling

12.1: Drawing Side 1 of the Die
12.2: Adding a Sketch to a Surface of a Part
12.3: Assembling Your Die

Extension Activity – 3D Mode to 3D Printer – CNC Software

Exporting Your Final Part or Assembly to 3D Printer Software

Extension Activity – 3D Model to Laser Engraver Software

Exporting Parts to Be Cut on a Laser Engraver MCAD