**Youth Explore Trades Skills Design and Drafting – Drafting**

# Drafting Careers

## Description

This Activity Plan introduces students to various drafting-related occupations. Drafting is foundational to most trades careers, including supervisory positions in the construction and manufacturing sectors. The goals of this resource are first and foremost to explain what is involved in being a draftsperson, and to expose students to the existence of these careers to potentially excite their curiosity and interest.

Beginning the Design and Drafting module in Skills Exploration 10-12 by walking students through this information may not be the most engaging approach to the subject matter. Instead, having students actually *do* drafting, beginning with the Activity Plans found in the Board Drafting unit and then moving on to CAD, may be a more engaging approach to the material. At that point students will have a better sense of the range of practices that drafting can involve, which will allow them to better appreciate various potential careers in the field.

## Lesson Objectives

The student will be able to:

* Define *drafting*
* Differentiate between board drafting and CAD drafting
* Differentiate between architectural drafting and mechanical drafting
* Understand the importance of plan reading/interpreting drawings in the manufacturing and trade sectors
* Recognize that drafting is a foundation for success in many industries
* Identify careers in which drafting and reading plans are necessary skills
* Find local and regional post-secondary institutions that offer drafting training
* Understand the working conditions of a drafting technician or technologist
* Understand what is required, and the order of events necessary to become a drafting technician or technologist
* Retrieve information about a selected career through website navigation
* Identify key terminology related to drafting

## Assumptions

The student will have:

* Minimal previous exposure to information about drafting careers
* Minimal knowledge about CAD and board drafting
* Been informed in advance that this Activity Plan material involves completing a small research assignment



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License unless otherwise indicated. **1**

## Terminology

**Artifact**: a product of human art and workmanship.

**Computer Aided Drawing (CAD)**: the use of precision-drawing software programs to accelerate the design process by making it easier to create and modify draft designs. CAD used to be called CADD (Computer Aided Drafting and Design).

**Design**: a plan or drawing that demonstrates the form and function of a building, garment, or other object prior to its being created.

**Domain**: a discrete sphere of activity or knowledge.

**Drafting**: the use of established design standards and specifications to create visual representations of mechanical and architectural structures.

**Manufacturing**: the creation and assembly of materials, components, and parts into objects designed for use or sale. Manufacturing generally refers to the production of these goods in large numbers.

**Occupation**: a job for which people are recruited, retained, and compensated, including self- employment. Occupations comprise many broad activities, called duties, that the incumbent performs. Trades are one occupational subcategory for which apprenticeship training is the traditional method of acquiring skill and knowledge.

**Plan**: a drawing or diagram, particularly one illustrating the layout and constituent components to design a building, made by projection on a horizontal plane. Architectural designs may include separate sets of plans for construction, electrical, plumbing, and mechanical components.

**Schematic**: a representation intended to explain how something works. Schematics are generally simplified diagrams that include all relevant components of a circuit, device, flow, process,

project, or object. Schematics follow conventional design standards to make them useful and easily understandable.

**Technologist**: in Canada, the terms *technician* and *technologist* are professional designations that indicate that a minimum standard of education and experience have been met within

a number of different career specializations. Technicians and technologists must possess certification in one of the following areas in order to be fully recognized by industry:

* + CET (Certified Engineering Technologist)
  + AScT (Applied Science Technologist)
  + CCIT (Certified Computer Information Technologist)
  + RET (Registered Engineering Technologist)
  + TP (Technologue Professionnel)
  + PTech (Professional Technologist)
  + CTech (Certified Technician)

## Estimated Time

45–90 minutes

## Recommended Number of Students

20, based on the *BC Technology Educators’ Best Practice Guide*

## Facilities

Classroom, library, or computer lab

## Tools

Computer with projector, speakers, and Internet access. This activity could be conducted using mobile devices (e.g., tablets or phones) if there is no access to a computer lab.

## Resources

#### Skills Exploration 10-12 Program Guide

See Appendix C: Glossary of Terms (pp. 26–28) in the Skills Exploration 10-12 Program Guide for a comprehensive Glossary of Terms. <http://www.bced.gov.bc.ca/irp/pdfs/applied_skills/2014skills_exploration1012.pdf>

#### Drafting technologists and technicians: National Occupational Classification (NOC)

<http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/QuickSearch.aspx?val65=2253>

#### Education Planner

Type “drafting” in the search engine to find relevant programs. <http://www.educationplanner.ca/>

#### Government of Canada: Job Futures Quebec: Drafting Technologists and Technicians

<http://www.servicecanada.gc.ca/eng/qc/job_futures/statistics/2253.shtml>

#### Job Roles and Responsibilities in Canada: Drafters: Drafting Technologists and Technicians

<http://www.jcfswinnipeg.org/documents/drafters-rolesandresponsibilities.pdf>

***Technology Education 11 and 12: Drafting and Design Integrated Resource Package, 2001***

**(BC Ministry of Education)**

<http://tinyurl.com/z3kzczz>

***Technology Education 11 and 12: Industrial Design Integrated Resource Package, 1997***

**(BC Ministry of Education)**

<http://tinyurl.com/jcmo3n4>

#### WorkBC: Drafting technologists and technicians (NOC 2253)

https://[www.workbc.ca/Job-Seekers/Career-Profiles/2253](http://www.workbc.ca/Job-Seekers/Career-Profiles/2253)

## Teacher-led Activity

Begin by explaining to students that drafting is the use of established design standards and specifications to create visual representations of mechanical and architectural structures.

*Architectural drafting* generally refers to the drawing of buildings, while *mechanical drafting* refers to the drawing of machines and machine parts. The technical drawings created through either of these means are indispensable communication tools in industry and engineering.

Drafting is an integral part of all foundation trades, and drafting and design skills are integral to the success of tradespeople. It is important that tradespeople can read and understand plans and symbols so they can execute a job correctly. The foreman at a job site must interpret plans; if there are discrepancies between plans or between a plan and the physical work site, the foreman must find out what information is correct and make necessary changes.

In the manufacturing sector, prototyping and modelling are essential steps to a complete design and build process. For example, a technologist may print a 3D model of a proposed mechanical part and then test the part to make sure it fits properly. If it doesn’t fit properly, the technologist must go back to the design team for any necessary changes. This step is essential to the successful manufacturing of parts.

## Board Drafting

Board drafting (also known as *manual drafting*) involves creating visual representations on a right-angled sheet of paper laid flat on a smooth surface, typically a drawing board. Various drafting tools are used to facilitate the process of designing on paper.

For a comprehensive list of tools involved in board drafting, see: 2D Architectural Board > Activity 1: Drafting Dictionary

The Drafting Dictionary activity is also included in 2D Mechanical Board. There is a Drafting Dictionary PowerPoint presentation designed to accompany this Activity Plan.

## Computer Aided Drawing

Computer aided drawing (CAD) involves the use of precision-drawing software programs to accelerate the design process by making it easier to create and modify draft designs.

## Drafting Technologists and Technicians: National Occupational Classification

The following information describes the many applications of design and drafting within the workplace. It is from the Government of Canada’s National Occupational Classification (NOC), a framework used as a reference to help organize jobs in Canada’s labour market into meaningful categories.

## Drafting Technologists and Technicians

Drafting technologists and technicians prepare engineering designs, drawings, and related technical information, in multidisciplinary engineering teams or in support of engineers, architects, or industrial designers, or they may work independently. They are employed by consulting and construction companies; utility, resource, and manufacturing companies; all levels of government; and by a wide range of other establishments. Drafting technicians are classified under the National Occupation Classification (NOC) # 2253. Example titles:

* Architectural draftsperson
* Computer aided design and drafting technologist
* Computer aided drafting (CAD) technician
* Design and drafting technologist
* Drafting technician
* Drafting technologist
* Draftsperson
* Electrical draftsperson
* Electromechanical draftsperson
* Electronic draftsperson
* Engineering design and drafting technologist
* Mechanical draftsperson
* Steel detailer – drafting
* Structural draftsperson
* Structural steel drafter-detailer
* Supervisor, drafting office

## Student Activity

The teacher will give a brief explanation of the computer lab activity. The worksheet provided is designed to take approximately 1–2 hours. The sheet directs students to several websites where they can find the answers. Some reflective questions are also asked; the answers are not found on any particular website. The questions are designed to get students thinking a little deeper about working as a drafting technologist or technician, as well as what they have learned in this assignment.

### Part 1: Teacher-led discussion

* + Describe the various careers and training
  + Discuss the fact that drafting is embedded in every trade; provide examples from the SkilledTradesBC website

### Part 2: Web-based activity

* + Retrieve information about a selected drafting career through website navigation

## Extension Activity

Bring in one of the following as a guest speaker:

* + A post-secondary instructor to describe programs or someone employed as a drafting technologist or technician working in the field
  + A tradesperson/foreman who builds homes/buildings
  + An engineer/technologist
  + The maintenance supervisor of your school district who oversees all district maintenance

## Assessment

Student participation in discussion Student completion of activity

# Web-based Activity

### Preparing to Become a Drafting Technologist or Technician

1. What courses can you take in high school (academic or otherwise) if you’re interested in becoming a drafting technologist or technician?
2. List three different activities or hobbies you could do at home that would help you become a drafting technologist or technician.
3. What types of people should you talk to or question if you’re interested in becoming a drafting technologist or technician?
4. What qualities, skills, or talents do you think a prospective employer would want you to have if they were considering hiring you as a drafting technologist or technician?

**Training (Education Planner BC)**

Go to the Education Planner BC website: [http://www.educationplannerbc.ca](http://www.educationplannerbc.ca/)

1. Find a drafting-related program at a college or university in British Columbia. Where is the training institution? What is the name of the program? How long is it?
2. Are you interested in a career as a drafting technologist or technician? Explain your answer.

## National Occupational Analysis (NOA)

Go to the Government of Canada’s National Occupational Classification website: <http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/Welcome.aspx>

What is the NOA’s code number (NOC) for drafting technologists and technicians?

## Related Careers (WorkBC)

Go to the WorkBC website: https://[www.workbc.ca](http://www.workbc.ca/)

1. List five other careers related to becoming a drafting technologist or technician.
2. Select one of the careers you identified above and compare it to being a drafting

technologist or technician. How is it similar? How is it different? Consider the following points of comparison:

* 1. Earnings
  2. Employment outlook
  3. Education, training, and qualifications

1. Describe each of the skills below, all of which are related to being a successful drafting technologist or technician:
   1. Spatial perception
   2. Innovative
   3. Numerical ability
   4. Detail-oriented
2. In a sentence or two, discuss what you think the work environment might be like for a drafting technologist or technician.

## Web-based Activity Answers

Preparing to Become a Drafting Technologist or Technician

1. Answers will vary but could include any number of Applied Design, Skills and Technology (ADST) or Technology Education classes—in particular, Drafting and Design and Industrial Design. Any other classes where reading plans is required may also be of value, including Technology Education 8-10, Carpentry and Joinery, Metal Fabrication and Machining.
2. Answers will vary but could include manual drawing or the use of CAD software to develop plans, building using plans (this could include woodwork, modelling or robotics kits, etc.), as well as reading and/or researching information related to design and drafting.
3. Answers will vary but could include speaking with career counsellors and advisers within the post-secondary system, Technology Education teachers, as well as drafting technologists or technicians, designers, and architects.
4. Students with a background using a variety of CAD software applications will be much better positioned to become a drafting technologist or technician. Model making and woodworking are also valuable skills that can contribute to an understanding of reading and developing plans.

## Training (Education Planner BC)

1. Answers will vary. A search for “drafting” yields results for nine different programs from six different institutions:
   1. British Columbia Institute of Technology (BCIT)
      * Architectural and Structural CADD and Graphics Technician (Architectural Option) Certificate of Technical Studies (40 weeks, full-time)
      * Architectural and Structural CADD and Graphics Technician (Structural Option) Certificate of Technical Studies (40 weeks, full-time)
   2. Kwantlen Polytechnic University
      * Computer Aided Design & Drafting (two-year diploma)
   3. University of the Fraser Valley
      * Architectural Drafting Technician Certificate (10-month certificate)
   4. Camosun College
      * AutoCAD Graphics Certificate (200 hours of instruction)
   5. Thompson Rivers University
      * Architectural and Engineering Technology Diploma (three-year program)
   6. Vancouver Community College
      * Drafting Technician (Architectural Certificate, 10 months)
      * Drafting Technician (Architectural, Civil and Structural Certificate, 10 months)
      * Drafting Technician (Steel Detailing Certificate, 10 months)
2. Answers may vary. Students may be attracted to the technical and/or creative aspects of drafting. Alternatively, working with CAD software means spending long hours in front of a computer screen, which may not be attractive to some students.

## National Occupational Analysis (NOA)

2253: Drafting technologists and technicians

## Related Careers (WorkBC)

1. a. Civil engineering technologists and technicians
   1. Mechanical engineering technologists and technicians
   2. Electrical and electronics engineering technologists and technicians
   3. Architectural technologists and technicians
   4. Industrial designers

The following additional careers are also listed under “Technical occupations in architecture, drafting, surveying, geomatics and meteorology” (NOC 225):

* Land survey technologists and technicians (NOC 2254)
* Technical occupations in geomatics and meteorology (NOC 2255)

1. Answers will vary.
2. Skills definitions from the WorkBC website (https://[www.workbc.ca/general-site-documents/](http://www.workbc.ca/general-site-documents/) skill-definitions.aspx):
3. Spatial perception

Can you draw things accurately?

The ability to perceive or react to the size, distance, or depth of the environment.

* + Recognizes size, distance, or depth
  + Can imagine a 3D form from a diagram
  + Awareness of surrounding environment
  + The ability to draw things accurately
  + Understands geometry

1. Innovative

Do you like to dig deeply to solve problems?

You like to explore things in depth and solve problems by experimenting. You prefer to be challenged with new and unexpected experiences.

Think outside the box

* Adjusts to change easily
* Likes testing and measuring
* In-depth exploration
* Enjoys science

1. Numerical ability

Are you good with numbers?

The ability to understand numbers and perform math.

* Solve numeric problems
* Collect data and analyze statistics
* Solve math problems
* Make accurate measurements
* Work with money

1. Detail-oriented

Can you pick out differences in two similar pictures? Ability to see fine details in objects.

Eye for detail:

* Recognizes small parts
* Sees fine detail in objects
* Visually perceptive
* Inspects objects

1. Answers will vary.