Career Exploration—Metal Trades

Description
Students who are interested in investigating careers in the metal trades need to understand the pathways available to them. In this activity plan, students will learn about the various metal trades and the qualifications required throughout the process of becoming certified. Most metal trades involve a four level apprenticeship program. Each level consists of a block of hours of technical training and approximately 1500–1700 hours of on-the-job, practical training. To begin an apprenticeship, a person must become registered as an apprentice with a sponsor.

Foundation metal training gives students the opportunity to receive Level 1 technical training and practical skills. This may encourage an employer to register and hire the student as an apprentice. Some school districts in British Columbia offer partnership programs with post-secondary institutions that allow students to gain their foundation level of training while in high school. Students also need to understand the role that the ITA (Industry Training Authority) plays in the apprenticeship process.

Once the apprentice has completed the necessary hours and training with an accredited institution, the apprentice becomes a journeyman.

Lesson Objective
The student will be able to:

• Understand the apprenticeship system and work-based training
• Identify the minimum educational requirements to get into the metal trades
• Know the educational strengths needed to succeed as a metal tradesperson
• Investigate apprenticeship opportunities within their school district
• Find post-secondary institutions that offer metal trades training within their region
• Understand the ITA's role in the apprenticeship process
• Retrieve information about the metal trades through website navigation

Assumptions
• The student is interested in investigating a potential career in the metal trades.
• The student has access to a computer or tablet for this activity plan (recommended but not necessary).
Terminology

**Apprentice:** someone who works for a skilled or qualified person in order to learn a trade or profession.

**Foundation program:** provides the basic knowledge and skills needed for entry into a trade. It is typically taught in both the classroom and an in-school shop setting. You do not need an employer or sponsor to participate.

**Industry Training Authority (ITA):** the organization responsible for leading and coordinating the skilled trades training and credentialing system for the province of BC. ITA provides strategic leadership, policy support, and customer services to help apprentices, employers, and industry. ITA sets program standards, maintains credential records, and issues the highly regarded Interprovincial Red Seal (IP) and BC Certificate of Qualification (CofQ) credentials.

**Interprovincial Red Seal and BC Certificate of Qualification:** through the Red Seal program, certified tradespeople can obtain a “Red Seal” endorsement on a BC Certificate of Qualification. The Red Seal allows qualified tradespeople to practise their trade in any province or territory in Canada where the trade is designated, without having to write further examinations. See [www.red-seal.ca](http://www.red-seal.ca) for additional information on the Red Seal Program. CofQ is only recognized in the province where it is obtained.

**Training providers:** if the training is to be counted toward an apprenticeship, institutions that offer technical training must be approved by the ITA to become an ITA-Recognized Training Provider.

**Work-based training:** on-the-job training that requires specific learning outcomes.

**Estimated Time**

2–3 hours

**Recommended Number of Students**

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

**Facilities**

Computer lab with access to the Internet or class set of tablets. Teacher: Projector with computer and speakers, Internet access

**Tools**

Pen, pencil
Materials
Printed question sheet

Optional
If a class set of computers is not available, the teacher could lead a discussion about how to become a metal tradesperson using projector and computer/laptop to navigate through websites and explain them. This could also be an opportunity to go on a field trip to a local training provider and tour a training facility.

Resources
6 Steps to Success: Industry Training Authority
http://www.itabc.ca/managing-apprentices/6-steps-success

Industry Training Authority: Home Page
http://www.itabc.ca

WorkBC
http://www.workbc.ca

Career Trek BC
http://www.careertrekbc.ca/

Apprenticeship Basics: Industry Training Authority
http://www.itabc.ca/about-apprentices/apprenticeship-basics

Teacher-led Activity
Use a projector with computer to show the ITA website and explain the apprenticeship model.

1. Explain the apprenticeship process so students understand the apprenticeship model. See the Apprenticeship Basics link in the Resources section. The Red Seal Program is also explained on this page.

   Please note: The ITA BC website is subject to change, so you may have to search the site to find the appropriate sections before the classroom demonstration.

2. Go to the Youth section and then choose Programs from the menu at the top right of the screen. This section explains the ACE IT and SSA programs.

3. Go to All Trades and select one of the manufacturing trades: Ironworker, Millwright, Metal Fabricator, Aircraft Structural Technician, Sheet Metal Worker, Tool & Die Maker, etc. View the information provided.
4. Go back to the Trades page and choose one profile from the Apprentice Program Listing at the bottom of the page. Download the Program Profile, which explains the apprenticeship pathway and educational requirements to complete that particular profile.

5. Go to All Trades and select one of the construction trades: Welder, Boilermaker, Industrial Mechanic (Millwright), Machinist, Metal Fabricator (Fitter), Motor Vehicle Body Repair, Steamfitter/Pipefitter. View the information provided.

6. Go back to the Trades page and choose one profile from the Apprentice Program Listing at the bottom of the page. Download the Program Profile, which explains the apprenticeship pathway and educational requirements to complete that particular profile.

7. From the menu at the top right on the ITA BC home page, choose Trade Training System and then Training Providers. This section shows all public and private training providers for trade programs.

Student Activity

Option 1: Class Set of Computers or Tablets Is Available
Students navigate through the WorkBC website and answer the questions found on the Metal Trades Exploration Activity sheet regarding the metal trades.

Option 2: Class Set of Computers or Tablets Is Not Available
The teacher uses a projector and laptop to navigate through websites and leads a discussion about how to become qualified in a chosen metal trade. Students complete the Metal Trades Exploration Activity sheet as the teacher moves through the sites. Once complete, have students draw a graphical representation of the apprenticeship process showing foundation-level training and the school and work portions of each level of training, culminating with the Red Seal qualification.

Assessment
Consider co-creating the assessment criteria with your students at the beginning of the activity/project. You may want to include the following:

The student:

• Completes the answer sheet accurately
• Actively participates in the activity
• Actively participates in class discussion
• Actively participates in the optional extension activity
Optional Extension Activity

Students could create an account on the ITA website and, in the Discover Apprenticeship Programs section, select the Essential Skills section. If students enter the site and create an account, they may complete a free Essential Skills assessment. This assessment should take about an hour and should give the students a good idea of the skills they have and the skills they need to develop to be successful in the manufacturing and construction trades.
Metal Trades Exploration Activity

Find out some facts about the manufacturing and construction trades. Use the website www.workbc.ca

It’s time to do some career exploration.

1. Select the Explore Careers & Industries tab on the main WorkBC page.

2. Select the Career Profiles in the dropdown menu.

3. Enter a manufacturing trade in the search box: Example: Welder and related Machine Operators. List your chosen occupation here:

   ________________________________________________________________

   a. List six main duties of your chosen profile:

      ________________________________________________________________

      ________________________________________________________________

      ________________________________________________________________

      ________________________________________________________________

      ________________________________________________________________

   b. List five facts about your chosen profile’s working conditions:

      ________________________________________________________________

      ________________________________________________________________

      ________________________________________________________________

      ________________________________________________________________

      ________________________________________________________________

   c. How many weeks in total will an apprentice spend getting his or her classroom educational training?

      ________________________________________________________________
4. Answer the following questions concerned with demographic information:
   a. What is the median hourly wage of a full-time employee in the current workforce for your chosen profile?
   
   b. What percentage of workers in the industry have full-time employment?

   Find the Employment Outlook.

5. What is the expected change in the unemployment rate between 2014 and 2024?

6. Watch the video for your chosen profile (link is on the WorkBC page under Career Trek Videos). Note: Some profiles do not include this portion.
   a. How many hours of training are required to complete your certification, according to the video?

   b. What are the typical working hours for your profile?

   c. What five skills are required, according to the video?

7. Why are math skills important for your chosen profile?
8. What is a common general misconception about the job duties of your profile, according to the tradesperson interviewed in the video?

Optional Extension Activity
Go to www.mytelus.com and search for two contractors in your area. List them on this sheet.
(Sample: Welder)

3. a. Welders perform some or all of the following duties:
   
   • read and interpret blueprints or welding process specifications
   
   • operate manual or semi-automatic welding equipment to fuse metal segments using processes such as:
     - gas tungsten arc welding (GTAW)
     - gas metal arc welding (GMAW)
     - flux-cored arc welding (FCAW)
     - plasma arc welding (PAW)
     - shielded metal arc welding (SMAW)
     - oxy-acetylene welding (OAW)
     - resistance welding submerged arc welding (SAW)
     - operate manual or semi-automatic flame-cutting equipment as well as brazing and soldering equipment
     - operate brakes, shears, and other metal straightening and bending machines
     - repair worn parts of metal products by welding on extra layers

   See more at: https://www.workbc.ca/Jobs-Careers/Explore-Careers/Browse-Career-Profile/7237#section-duties

   b. Five facts about welders' working conditions could include:

   • Most welders and related machine operators work 40 hours per week in factories and machine shops and on construction sites. Those working at mills, factories, and processing plants may work nights and weekends, or do shift work.

   • Machine welders almost always work in controlled factory environments. Those working in manufacturing may work at sawmills, pulp and paper mills, or mines.

   • The oil and gas industry hires welders to work on oil and gas rigs and pipelines. Welders and related machine operators who work in construction or in the oil and gas industry often work outdoors in various weather conditions.

   • They may also be required to work from scaffolds or platforms.

   • Other potential hazards to welders include exposure to fumes, intense light, and burns. Safety precautions must be taken to avoid injury.

   • Welders in the construction industry often relocate to different job sites, sometimes in remote regions.

   • Short periods of unemployment between projects are also common.
See more at: https://www.workbc.ca/Jobs-Careers/Explore-Careers/Browse-Career-Profile/7237#section-duties

c. Classroom training:
   - Welders do not need trade certification to work in BC. However, there are three levels of welding certification in BC.: levels C, B, and A. Each level requires 8 weeks of classroom training; a total of 24 weeks would be needed to earn all three levels.
   - Level C certification is a prerequisite for level B certification, which is a prerequisite for level A.

4. a. Median hourly wage will be $26.40/hour
   b. % of full-time employment = 51% of welders are employed full time

5. The unemployment rate will drop from 10.4% to 9.6%.

6. There is no video for welding on the WorkBC website.

(Sample: Machinist)

3. a. Machinists perform some or all of the following duties:
   - inspect machined parts and tooling in order to maintain quality control standards
   - work for machinery, equipment, motor vehicle, automotive parts, aircraft, and other metal products manufacturing companies and for machine shops
   - work in wood manufacturing and food processing plants, as well as in refineries
   - have an interest in mechanization
   - must have strong attention to detail and be able to communicate complicated technical ideas with precision and clarity
   - need to have good physical mobility, as well as be able to lift heavy objects and handle production pressures calmly

See more at: https://www.workbc.ca/Jobs-Careers/Explore-Careers/Browse-Career-Profile/7231#sthash.E5PhfgBS.dpuf

- read and interpret engineering drawings, blueprints, charts, and tables or study sample parts to determine machining operations to be performed, and plan best sequence of operations
- compute dimensions and tolerances; measure and lay out work pieces; set up, operate, and maintain a variety of machine tools, including computer numerically controlled (CNC) tools to perform precision machining operations such as sawing, turning, milling, boring, planing, drilling, precision grinding, and other operations
- fit and assemble machined parts and subassemblies using hand and power tools
- verify dimensions of products for accuracy and conformance to specifications using precision measuring instruments
- may set up and program machine tools for use by machining tool operators
b. Five facts about a machinist’s working conditions:

• Machinists and machining and tooling inspectors typically work 40 hours per week. However, some overtime may be required to meet production schedules. Some larger operations require shift work.

• Machinists and machining and tooling inspectors typically work indoors in machine shops or manufacturing plants.

• The working conditions can be noisy and dirty, and workers may also be exposed to unpleasant odours. Hazards include physical injuries due to possible machinery-related accidents, hearing damage from noise, and sickness caused by exposure to toxic lubricants or coolants. The increased use of enclosed, automated equipment has reduced the risk of such injuries and removed much of the noise and dirt created in traditional machine shops and plants. Safety procedures (from the WorkSafeBC Act) are strictly enforced to reduce potential injuries.

• Machinists and machining and tooling inspectors are required to stand for most of the work day.

• At times, these workers may also be required to lift moderately heavy objects, which may increase their risk of back injury. However, modern shops and factories now employ autoloaders and overhead cranes that reduce the need to lift heavy objects.

See more at: https://www.workbc.ca/Jobs-Careers/Explore-Careers/Browse-Career-Profile/7231#sthash.jCQaajHB.dpuf

c. Classroom training:

Four classroom training sessions of 5 weeks each, for a total of 20 weeks

4. a. The median hourly wage will be $31.25/hour

b. % of full-time employment = 63% of employees are mostly full time

5. The unemployment rate will drop from 6.8% to 6.6%.

Video-related questions:

6. a. # of hours of training = 3–4 years

b. Working hours: 6:30 a.m.–3 p.m.

c. 5 skills required:

• verbal and written communication
• attention to detail
• object-oriented
• understand the operations of a variety of machine tools
• read and interpret blue prints
7. Math skills are important so the employee is able to read and interpret blue prints and then use that information to machine parts.

8. Interviewee does not state any common misconceptions for his job.