



Skills Trades Worker Course

A course designed to prepare learners for training or work in the skilled trades.



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Skills for Success Curriculum Resource Cover Page

Organization

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Curriculum Resource

Skilled Trades Worker Curriculum

*This curriculum is based on the **Skills for Success** framework, helping learners build key workplace skills like reading, communication, problem solving, teamwork, and using documents. It is designed to support learners preparing for work as a **Skilled Trades Helper**, with checklists to track progress in both reading and hands-on learning activities.*

The training is divided into five main modules:

- **Module 1: Before You Begin** – Introduces the role of a trade helper, types of tradespeople, what employers look for, communication skills, problem solving, and using timesheets.
- **Module 2: Tools** – Teaches safe use of common hand tools, power tools, and construction machines, plus reading blueprints and drawings.
- **Module 3: Trades Math** – Covers practical math skills used on the job, including measurements, geometry, fractions, and work-related calculations.
- **Module 4: Safety** – Focuses on workplace safety, personal protective equipment (PPE), WHMIS, and knowing your rights and responsibilities at work.
- **Module 5: Teamwork** – Highlights the importance of collaboration, communication, and working well with others on the job.

OALCF Alignment

Competency	Task Group	Level
Competency A -Find and Use Information	A1. Read continuous text	2
Competency A -Find and Use Information	A2. Interpret documents	2
Competency A -Find and Use Information	A3. Extract information from films, broadcasts and presentations	N/A
Competency B - Communicate Ideas and Information	B2. Write continuous text	2
Competency B - Communicate Ideas and Information	B3. Complete and create documents	2
Competency C - Understand and Use Numbers	C2. Manage time	2
Competency C - Understand and Use Numbers	C3. Use measures	2
Competency C - Understand and Use Numbers	C4. Manage data	2
Competency D - Use Digital Technology	N/A	2
Competency E - Manage Learning	N/A	2
Competency F - Engage with Others	N/A	2

Goal Paths (check all that apply)

- | | |
|---|--|
| ☒ Employment | ☐ Postsecondary |
| ☒ Apprenticeship | ☐ Independence |
| ☒ Secondary School Credit | |

Embedded Skills for Success (check all that apply)

- | | |
|---|---|
| ☒ Adaptability | ☒ Numeracy |
| ☒ Collaboration | ☒ Problem Solving |
| ☒ Communication | ☒ Reading |
| ☒ Creativity and innovation | ☒ Writing |
| ☒ Digital | |

Notes:

Updated 2025

Skilled Trades Helper Skills for Success Tracker

Use this checklist to track your training progress.

	Reading	Learning Activity
Introducing Skills for Success	☐	☐
MODULE 1: BEFORE YOU BEGIN	Reading	Learning Activity
What is a Skilled Trades Helper	☐	☐
Other Trades People	☐	☐
What Employers Want	☐	☐
Communicating with Others	☐	☐
Problem Solving	☐	☐
Timesheets	☐	☐
MODULE 2: TOOLS	Reading	Learning Activity
Ladder Safety Tips	☐	☐
Electric Tool Basic Safety	☐	☐
Hand Tool Basic Safety	☐	☐
Wrenches	☐	☐
Tin Snips	☐	☐
Screwdrivers	☐	☐
Handsaws	☐	☐
Pliers	☐	☐
Clamps	☐	☐
Hammers	☐	☐
Level and Plumb	☐	☐
Table Saws	☐	☐
Drills	☐	☐
Sanders	☐	☐
Belt Sanders	☐	☐
Routers	☐	☐
Band Saws	☐	☐
Circular Saws	☐	☐
Mitre Saws	☐	☐
Push Blocks	☐	☐
Pneumatic Tools	☐	☐

Construction Machines	☐	☐
Blueprints and Drawings	☐	☐

MODULE 3: TRADES MATH	Reading	Learning Activity
Multiplication	☐	☐
Imperial Measurement	☐	☐
Metric Measurement	☐	☐
Basic Geometry	☐	☐
Fractions and Decimals	☐	☐
Circles	☐	☐
3,4,5 Rule for Squaring	☐	☐
Calculations at Work	☐	☐

MODULE 4: SAFETY	Reading	Learning Activity
Electrical Safety	☐	☐
Fire Extinguishers	☐	☐
General Safety Tips	☐	☐
Personal Protection Equipment	☐	☐
Risk Management	☐	☐
Contact Lenses at Work	☐	☐
Slips Trips and Falls	☐	☐
WHMIS Overview	☐	☐
Ergonomics	☐	☐
Employee Rights	☐	☐

MODULE 5: TEAMWORK AND COLLABORATION	Reading	Learning Activity
Teamwork, Collaboration and Communication	☐	☐
Acknowledgements and Credits	☐	

Introduction to the Skills for Success



Skills for Success are important skills for workers because they are the ones most needed in learning, work, and life.

Having these skills helps workers interact well with others and do their jobs efficiently. Practicing these nine skills leads to being a successful worker.

The skills for success were chosen as the most important skills for workers by Employment and Social Development Canada (ESDC).

ESDC works to promote a well-trained labour force and to make sure that the Canadian labour force is inclusive for everyone.

The Skills to Success are also important to employers. Employers seek workers who can adapt to changes, use technology, communicate well, and work well (collaborate) with others.

Having these skills makes employees more reliable, productive, and capable. Having these skills leads to a positive work environment. Whether



on a construction site, in a workshop, or in any other trade, these skills are valuable for both individual and team success.

What are the Skills for Success

Read the information below to learn more about each skill for success.

This information contains descriptions, examples and reasons why employers value each skill.

1. Adaptability

Description: The ability to adjust to new conditions and changes in the workplace.

Example: A construction worker must switch from one project to another when a delay happens, moving to new tasks, tools, and team members.

Why Employers Value This Skill: Employers look for adaptable workers who can handle changes and remain productive during unexpected challenges, which helps keep work on schedule.

2. Collaboration

Description: The ability to work well with others to achieve goals.

Example: A team of electricians works together to install the wiring in a new building. Each worker handles different parts of the job, communicating with the others to make sure everything works correctly.

Why Employers Value This: Collaboration is key in most trades, as workers need to share their tasks, communicate information, and solve problems together to complete work successfully.

3. Communication

Description: The ability to share information clearly and effectively, both in writing and speaking.

Example: A mechanic explains to a customer in clear, simple language what repairs are needed for their vehicle and why.

Why Employers Value This: Employers value employees who can communicate and listen well because it makes sure that tasks are understood. Communication prevents mistakes and accidents, and promotes better teamwork and client service.

4. Creativity and Innovation

Description: The ability to come up with new ideas and solutions to challenges.

Example: A carpenter comes up with a way to build new shelves out of extra pieces of wood on the job.

Why Employers Value This: Creativity and innovation help employers improve, find better ways to do things, and solve problems.

5. Digital Skills

Description: The ability to use technology to complete tasks and solve problems.

Example: A plumber uses a digital blueprint on a tablet to identify the best locations for pipes and fittings before starting a project.

Why Employers Value This: As technology becomes more a part of business, employers look for workers who can use digital tools in the workplace.

6. Numeracy (Math Skills)

Description: The ability to use numbers and measurements correctly in the workplace.

Example: A mason measures and calculates the amount of material needed for a project, double checking to make sure the correct amount is ordered.

Why Employers Value This: Workers who can measure and use numbers help prevent costly mistakes and delays, improving their job performance.

7. Problem Solving

Description: The ability to find solutions to challenges or obstacles that arise on the job.

Example: A client changes their mind about paint colours after all the orders have been placed. The painter must decide what to do next.

Why Employers Value This: Problem-solving skills are important because problems can arise on job sites, and employers rely on workers who can think on their feet and solve issues without constant supervision.

8. Reading

Description: The ability to read and understand written materials, such as instructions, blueprints, and safety guidelines.

Example: A welder reads and follows a policy about safety on the job.

Why Employers Value This: Being able to read and understand instructions, plans, and safety plans is important for workers to perform tasks correctly and safely, reducing errors and keeping things safe.

9. Writing

Description: The ability to write clearly for various purposes, including notes, reports, and instructions.

Example: A construction foreman writes a daily log that records the progress of the project, any safety incidents, and all materials used, so everything is documented properly for the team to reference.

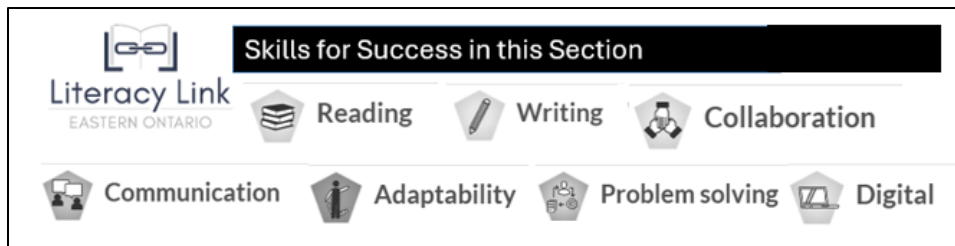
Why Employers Value This: Employers value workers who can write to communicate important information, keep records, and fill out workplace documents.

Whether on a construction site, in a workshop, or in any other trade, these skills are valuable for both individual and team success.

Skills for Success in the Course

As you begin working on LLEO's Skilled Trades Helper Course, you will notice a banner at the top of each section, which shows the Skills for Success discussed in that unit.

Example:



This will show you which skills for success you will be learning in each unit of this course.

Want to learn more?



To learn more about The Skills for Success training initiatives you can visit the Government of Canada's Skills for Success website at:

<https://www.canada.ca/en/services/jobs/training/initiatives/skills-success.html>

Or, use a search engine to search Skills for Success Canada to find this site.

The site has videos, online self-assessments and links to further training options.

Learning Activity

Read each example below.

Match each example to one of the nine Skills for Success that you have just learned about.

Write the correct skill next to each example.

Examples

1. After a construction supervisor gives feedback on her drywall work, Juana listens carefully and asks questions to make sure she understands how to improve next time.

Skill: _____

2. Ahmed has just started his first day on a job site. To make sure he stays safe and follows the correct steps, he carefully reads the safety instructions and procedures for his tasks.

Skill: _____

3. James is using a new tool he has not seen before. He watches an instructional video online to learn how to operate it safely.

Skill: _____

4. Lucy is working with a team to build a deck. She listens to everyone's ideas, shares her own, and works with the team to make decisions together.

Skill: _____

5. Carlos realizes that some materials are missing from the site for today's task. He quickly brainstorms other tasks the team can

complete while waiting for the supplies.

Skill: _____

6. During a job, Maria notices that one wall measurement does not match the plans. She calculates the correct measurement and makes sure it matches with the blueprint before starting her task.

Skill: _____

7. Raj notices that the team's current tool arrangement makes it difficult to access items quickly. He comes up with a plan to organize the tools in a way that could save time and effort.

Skill: _____

8. When Tyler is assigned to write the end-of-day report for the site, he uses clear sentences to explain what was done and what is needed for the next shift.

Skill: _____

9. Akiko is working on a roofing project where money is tight. She decides to be very careful with materials so as not to go over budget. She uses her calculator to make sure that all her numbers are accurate before cutting so as not to waste any materials.

Skill: _____



Skills for Success in this Section



Reading



Communication



Writing

What is a Skilled Trades Helper?

Construction trades helpers and labourers assist skilled trades persons and perform labouring activities at construction sites. They are employed by construction companies and trade and labour contractors.

(HRSDC Essential Skills Profiles - Construction Trades Helpers and Labourers NOC 7611)

Other trades helpers and labourers, not classified on the HRSDC website, assist skilled trades persons. They perform labouring activities in the following areas:

- installation, maintenance, and repair of:
 - ✓ industrial machinery
 - ✓ refrigeration
 - ✓ heating and air conditioning equipment
- maintenance and repair of transportation and heavy equipment
- installation and repair of telecommunication and power cables
- in other repair and service work settings.

They are employed by a wide variety of manufacturing, utility, and service companies.

(HRSDC Essential Skills Profiles - Other Trades Helpers and Labourers NOC 7612)

These modules focus on **Construction Trades Helpers and Labourers**.

They will also refer to them as **skilled trades helpers**.

There is a lot to know about working on a construction site. These modules will discuss these categories:



- Expectations
- Health & Safety
- Numeracy
- Equipment & Materials
- Oral Communications
- Thinking Skills

As a skilled trades helper, you might be asked to:

- carry loads of wood or materials
- clean work site areas
- build items using a variety of basic tools



You might also need to:

- read work orders
- read and follow safety procedures
- use maps to locate work sites
- complete timesheets

Skilled trades helpers have a general knowledge of work sites, tools, equipment, measurements, and basic carpentry skills. The work can be hard, but it makes a worker feel satisfied when a job is well done.

You may have days that are physically exhausting. You may have days when you are asked to do the same job over and over.

You will also have days where you learn something new and feel great about it. There will be days when your boss tells you that you are doing a good job.



This course will give you a general overview of the basics of the skilled trades helper occupation.

Some information you may already know. Work through these areas to make sure you know it or to refresh your skills.

There is always the chance that you might learn something new. If you are working in a group setting, there is always a chance you might help someone else learn something new too!

If there are areas that you are interested in, do some research on your own. There is a lot of information out there that is not included in these modules. If you want to learn more, your instructor can help you find more information.

Good luck and enjoy learning about skilled trades helpers!

Understanding Your Role on the Jobsite

Some of the employer's expectations are going to be clear because they will be written down in an Employee Handbook or in a Memo. However, others will not be written down.

You can ask questions at work to find out more.

On a job site, you will work with other people. Employers want workers who can work with others and have confidence.

When you first start working, your boss will watch how you work.

They want to see that you are a hard worker and serious about learning the trade. It is part of workplace culture to "test" new workers. This means that during the training period, your boss will be watching you to make sure you are learning the job well.

You want to make a good impression, so it is important to focus on learning the job.

You will want to be seen as a good worker, who can work well with others. This will make your training period a success.

You are there to help your employer make money. This is important for you too, because if the company is making money, then you get to keep your job.

You need to communicate well with your supervisor and co-workers and to understand what you are being asked to do.

English might be your second language, or you might work with people who do not speak English well. There might also be workers who have trouble communicating.



Note: It is important to try hard to communicate with others for safety.



Not communicating well or understanding directions can cause problems such as accidents.

Employers want people who can solve problems and make decisions. They value workers who can do this.

You can show these skills to your employer by suggesting different and better ways of getting the job done and planning and managing your time well.

On the job, you are expected to act professionally. This means knowing about changes in your field and having the proper tools to do the job.

What is a Skilled Trades Helper?

Learning Activity

1. According to the reading, skilled trades helpers are also called “construction trades helpers and labourers”.

What do these people do?

2. Who employs skilled trades helpers?

3. What might you be asked to do if you are working as a skilled trades helper? (List as many duties as you can think of.)

4. What is **your** definition of a skilled trades helper?

5. What would you like to get out of this course? What is your goal? What kinds of things would you like to learn?

I am hoping to get the following out of this course:

My goal is to:

I would like to learn



Skills for Success in this Section



Reading



Numeracy



Writing



Digital

Other Trades People on the Job Site

from: **Steps to Employment in Ontario**

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Construction Trades



Construction trades in Ontario are divided into two kinds. Some have compulsory certification and others have a voluntary certification.

Compulsory certification means that a trades person must have a certificate in order to work in Ontario.

Construction trades with **compulsory** certification are:

- electrician,
- hoisting engineer (mobile and tower crane operators),
- plumber,
- refrigeration and air conditioning mechanic,
- sheet metal worker,
- steamfitter.

Voluntary certification means that you **do not** need a certificate to work in this trade in Ontario.

You can become certified if you want to present yourself more professionally to employers and clients.

Construction trades with **voluntary** certification are:

- brick and stone or cement mason,
- construction boilermaker,
- construction millwright,
- general carpenter,
- glazier,
- ironworker,
- lather,
- construction linesperson,
- painter (commercial and residential),
- plasterer,
- sprinkler, and fire protection installer.

Construction Labourers

Construction labourers work for construction companies, trade and labour contractors, and manufacturing, utility, and service companies.

Construction labourers assist skilled tradespeople. There is no certification required.

Some of the **main duties** of construction labourers are:

- move, load, and unload materials
- erect and dismantle structures
- mix, pour, spread, and rake materials
- install, operate, maintain, and repair equipment and machinery
- use oil and grease equipment
- tend and feed machines such as mixers and compressors
- direct traffic near construction sites
- mix fertilizers, herbicides, pesticides
- assist in land surveying by holding and moving stakes and rods

Labour Market Information

- Approximately 48,600 people work in this occupation in Ontario.
- 44% of construction trades helpers and labourers work all year.
- 56% work only part of the year.
- 16% of workers in these occupations are self- employed and this has been increasing.

The employment outlook will be good for Construction trades helpers and labourers (NOC 75110) in Ontario for the 2024-2026 period.

The main trends affecting this positive outlook are:

- construction activity is expected to be favourable across Ontario
- large infrastructure investments
- steady demand and investments in new housing

Working Conditions

The average earnings of full-time workers in these occupations in 2022-223 was \$25/hour. These earnings are among the lowest for occupations in trades, transport, and equipment operation. Shortage of work is high because the work is mostly seasonal.

Source: <https://www.jobbank.gc.ca/marketreport/summary-occupation/8451/ca>

Construction Trades

Learning Activity 1

1. Use these words to complete the sentences.

equipment	materials	herbicides and pesticides
Structures	traffic near construction sites	mixers and compressors
Holding and moving stakes and rids	equipment and machinery	

Construction labourers ...

- A) ... move, load, and unload _____
- B) ... erect and dismantle _____
- C) ... mix, pour, spread, and rake _____
- D) ... install, operate, maintain, and repair _____
- E) ... oil and grease _____
- F) ... tend and feed machines such as _____
- G) ... direct _____
- H) ... mix fertilizers, _____
- I) ... assist in land surveying by _____
2. Which of the main duties can you do? I can / I know how to... / I am able to ... / I have experience ...

Carpenters

What does a carpenter do?

Carpenters construct, erect, install, maintain, and repair structures and parts of structures made of wood, wood-substitutes, and other materials.

They work for construction companies, contractors, maintenance departments in factories, plants, and other companies or they may be self-employed.

What are a Carpenter's Main Duties?

- Read and interpret blueprints, drawings, and sketches to determine specifications and calculate requirements.
- Prepare cost estimates for clients.
- Supervise apprentices and other construction workers.
- Build foundations, install floor beams, lay subflooring, and erect walls and roof systems.
- Fit and install trim items such as doors, stairs, molding, and hardware.
- Maintain, repair, and renovate houses and wooden structures in mills, hospitals, industrial plants, and other establishments.
- Measure, cut, shape, assemble, and join materials made of wood, wood substitutes, and other materials.
- Use building codes to prepare layouts, using measuring tools.

Job Titles

Apprentice
carpenter
Carpenter
Finish carpenter
Journeyman/woma
n carpenter
Maintenance
carpenter
Renovation

Training

Carpentry is a skilled trade. You can train to become a carpenter through an apprenticeship program offered by the United Brotherhood of Carpenters and Joiners of America.

Ontario Community colleges have courses for skilled trades that you can take before you make an apprenticeship agreement with an employer.



Employment Requirements

Some secondary school education is usually required.

Completion of a three to four- year apprenticeship program or a combination of over four years of work experience in the trade and some high school, college, or industry courses in carpentry is usually required to be eligible for trade certification.

Working Conditions

The average yearly earnings of full-time carpenters is \$31,000. The average hourly wage for a unionized carpenter is \$33.00/hour.

Union carpenters receive good wages and benefits, including a medical and dental plan as well as a pension plan.

Carpenters

Learning Activity 2

1. Complete the sentences.

Carpenters read _____

Carpenters build _____

Carpenters erect _____

Carpenters install _____

2. What kind of tools do you think carpenters use? (List at least 5 tools.) You can use the Internet to research this question.

3. Name four kinds of structures and buildings that carpenters build. You can use the Internet to research this question.

4. What three benefit plans can unionized carpenters get?

5. What is the average yearly earning of a unionized carpenter?

6. What is the average hourly wage?

Cement Masons and Finishers

What do cement masons and finishers do?

Cement masons and finishers make sure that cement forms have been built well. They spread the concrete by pushing or pulling a screen or template over the surface texture, and they install fixtures such as anchor bolts, steel plates, and door sills.



They finish vertical surfaces by wetting the concrete and rubbing it with abrasive stone.

Cement masons make expansion joints and edge the concrete, using edging tools, rulers, jointers, and straight edges. They remove rough spots with chisels, hammers, and grinders, and then they patch them with fresh cement.

Training

Training for cement masons and finishers is available through an apprenticeship program offered by the Operative Plasterers, Cement Masons and Restoration Steeplejacks of the United States and Canada.

Apprenticeships can also be done through employers who are willing to train new workers.

Certification for this trade is voluntary.

Working Conditions

Cement masons and finishers are required on almost every kind of construction job. They work both outdoors in all types of weather conditions and indoors.

The work is fast-paced and tough. This job exposes workers to water, noise, vibrations, and situations requiring a lot of attention to safety.

The work can also involve artistic ability and a great attention to detail.

Labour Market Outlook



In the future, there will be more demand for cement masons and finishers skilled in the operation of computer-controlled (digital) equipment. Higher knowledge of material properties will be required.

Work in this trade will change with the introduction of new methods, machines, and tools for measuring, placing, and finishing concrete. In addition, the need for super-flat floors and tighter tolerances in formed construction will raise skill levels for the job.

Replacement technology could have a negative impact on the demand for cement masons and finishers. Employment prospects vary with the seasons and with economic conditions.

Employment for concrete finishers is expected to grow over the next few years.

Job Search Methods

Most apprenticeship positions are never advertised or are only found through word-of-mouth (information told from person to person).

Entry to apprenticeship requires a job offer. The job seeker searches for companies that hire apprentices and talks directly to the employer, union, or joint industry committee for an apprenticeship.

Another way is to join a program that provides the in-school portion of the training. This is followed by working with an employer and learning on-the-job skills.

Cement Masons and Finishers

Learning Activity 3

1. Complete the sentences. What do cement finishers do?

A) Cement finishers spread _____

B) Cement finishers install _____

C) Cement finishers finish _____

2. Name seven tools that cement finishers use. You can use the Internet to research this.

3. How can you get training to be a cement finisher? _____

4. Is it mandatory to have a certificate in Ontario to be a cement finisher?
Yes, or No? _____

5. Employment prospects vary with the: (two things)

A) _____

B) _____

6. What kinds of workers will have the best opportunities in the future?

7. Circle one. Cement masons and finishers

work: outside inside both

8. What organization offers training for this field?

Industrial Painters

What do industrial painters do?

Industrial painters prepare and paint surfaces in new and old construction.

The preparation may involve the removal of old paint, using blowtorches, liquid paint remover, and scrapers. Then the surfaces are ready for a specialized ready-mix paint using brushes, rollers, or spray guns.

In some cases, the industrial painter may be required to mix different paints to make more decorative colours.



Training

Training to become an industrial painter is available through an apprenticeship program offered through the International Brotherhood of Painters and Allied Trades, or through private employers.

Working Conditions

The work performed by the journeyperson is both inside and outside, with working outside being seasonal. This is not a career for people who are bothered by the smell of paint, nor is it a job for those who are afraid of heights.

Working 40 hours per week is standard, and there could be overtime hours needed to complete the job.

Union Work

Unionized industrial painters belong to the International Brotherhood of Painters and Allied Trades.

As such, you will be working under the protection of a union contract with insurance, pension, and health and welfare benefits.

Industrial Painters

Learning Activity 4

1. Industrial painters prepare and paint surfaces in:

2. How do they prepare surfaces?

3. Name three tools that industrial painters use. You may use the Internet to research this.

4. What organization offers training?

5. Describe the standard working hours.

6. Does the journeyperson do both inside and outside work? Yes, or no?
What affects outside work?

Plumbers

What do plumbers do?

Plumbers install, repair, and maintain pipes, fixtures, and other plumbing equipment used for water distribution and waste disposal in residential, commercial, and industrial buildings.

They are employed in maintenance departments of factories, plants, and similar establishments, by plumbing contractors or they may be self-employed.

Job Titles

Maintenance
plumber
Plumber
Plumber apprentice
Plumbing mechanic

Main Duties of Plumbers

- Read blueprints, drawings, and specifications to determine layout of plumbing system, water supply network, and waste and drainage system.
- Install, repair, and maintain domestic, commercial, or industrial plumbing fixtures and systems.
- Test pipes for leaks using air and water pressure gauges.
- Locate and mark floor positions for pipe connections, passage holes, and fixtures in walls and floors.
- Cut openings in walls and floors to accommodate pipe and pipe fittings.
- Measure, cut, bend, and thread pipes using hand tools, power tools or machines.
- Join pipes using couplings, clamps, screws, bolts, cement, soldering, brazing, and welding equipment.

Salary

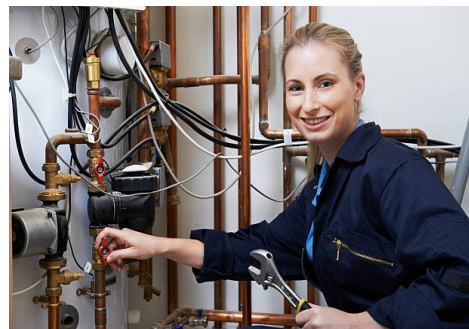
The average yearly salary is about \$55,000-\$65,000.

Employment Requirements

Some secondary school courses are usually required. Completion of a four to five-year apprenticeship program or a combination of over five years work experience in the trade and some high school, college, or industry courses in plumbing are usually required to be eligible for trade certification.

Trade certification is compulsory in Ontario.

Training



Training to become a plumber is available through a union apprenticeship program offered by the United Association of Journeypersons and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada, the Union is known as “The U.A.”

Plumbers

Learning Activity 5

1. Vocabulary match-up. Draw a line from the word to its meaning.

install	an instrument to measure water
pressure repair	sinks, toilets, etc.
maintain	to keep something in good condition
waste water	dirty water (from toilet or sink)
plant	to put in (a toilet, sink, pipe, etc.)
establishment	a place that produces something
fixtures	a place (plant, factory, building, etc.)
leak	to fix something
gauge	example: when water comes out of the wrong pipe

2. Complete the sentences.

Plumbers cut openings in walls to accommodate _____ and _____.

Plumbers test pipes for leaks using _____ and _____ gauges.

Plumbers join pipes using _____, _____, _____,
_____, _____, _____, _____,
_____.

Plumbers read blueprints, drawings, and specifications to determine
layout and plumbing system, _____ supply network, and _____
and _____ system.

Plumbers install, repair, and maintain _____, commercial, or
_____ plumbing fixtures in _____ and _____.

Plumbers measure, cut, bend, and thread pipes using _____ and
_____ tools.

Plumbers locate and mark positions for pipe connections, _____
holes, and fixtures in _____ and _____.

Roofers and Shinglers

What do roofers and shinglers do?

Roofers install, repair, or replace flat roofs and shingles, shakes, or other roofing tiles on sloped roofs.

Shinglers install and replace shingles, tiles, and similar coverings on sloped roofs.

They are employed by roofing contractors, or they may be self-employed.

Main Duties

- Install sheet metal flashings.
- Install and repair metal roofs using hand and power tools.
- Set up scaffolding to provide safe access to roofs.
- Apply waterproof coatings to concrete or other masonry surfaces below or above ground level.
- Install, repair or replace single-ply roofing systems with waterproof sheet metal materials such as modified plastics, elastomeric, or other asphaltic compositions.
- Install, repair or replace shingles, shakes, and other roofing tiles on sloped roofs of buildings.



- Install, repair, or replace built-up roofing systems with materials such as asphalt-saturated felts and hot asphalt and gravel.
- Install or replace asphalt shingles, wood shingles and shakes, and masonry or baked-clay roofing tiles on sloped roofs of buildings.

Employment Requirements

Some secondary school education is required. For roofers, completion of a two-to-three year apprenticeship program or over three years of work experience in the trade, are usually required for trade certification.

This trade is **voluntary**.

Shinglers require one-to-two years of workplace training.



Roofers and Shinglers

Learning Activity 6

1. Complete the sentences.

Roofers and shinglers can install built-up roofing systems using materials such as

Roofers and shinglers can replace single-ply roofing systems using

Roofers and shinglers can repair shingles, shakes, and other roofing tiles on

Roofers and shinglers can install sheet metal _____

Roofers and shinglers can apply waterproof coatings to _____

Roofers and shinglers can install and repair metal roofs using _____

Roofers and shinglers can set up scaffolding to _____

Roofers and shinglers can install shingles and masonry or baked clay roofing tiles

to _____

Who employs roofers and shinglers? _____

Is trade certification mandatory? Yes, or no? _____

Terrazzo, Tile, and Marble Craftspeople

What does a terrazzo, tile, and marble craftsperson do?

This craftsperson cuts and installs terrazzo, tile, and marble.

This includes installation of materials for floors, walls, ceilings, and swimming pools.



If you work as a terrazzo, tile, and marble craftsperson, you must examine project blueprints and specifications as per the contractor's requirements before starting the work. You have to do the layout, measure, and mark the work area.

Once that is done, the terrazzo, tile, and marble craftsperson assemble the proper materials and mix the required compounds to begin the installation.

Main Duties of Terrazzo, Tile and Marble Craftspeople

- Mix, lay, and polish surfaces.
- Install tile strips.
- Remove and replace cracked or damaged tiles.
- Prepare, measure, and mark surfaces to be covered.
- Build underbeds and install anchor bolts, wires, and brackets.
- Mix, apply, and spread mortar, cement, mastic, glue, or other adhesives using a hand trowel.

- Set tiles in position and apply pressure to affix tiles to base.
- Align and straighten tile using levels, squares, and straight edges.
- Cut and fit tiles around obstacles and openings using hand and power cutting tools.
- Pack grout into joints between tiles and remove excess grout.
- Lay and set mosaic tiles to create decorative wall, mural, and floor designs.

Employment Requirements

Some secondary school education is required.

Completion of a three-year apprenticeship program or a combination of over three years of work experience in the trade and some high school, college, or industry courses in tile setting is usually required to be eligible for trade certification.



Trade certification is not compulsory in Ontario.

Working Conditions

Work performed by the journeyperson can be either inside and/or outside.

Some out-of-town work can be involved, therefore being flexible is considered an asset.

Most of the work is done at ground level or heights, which can be hard on the back and knees.

The average yearly income is \$55,000 and the hourly wage for this occupation

ranges from \$21 to \$30 per hour (union rate).

Job Search Methods

Union hiring halls and networking have proven to be the most successful methods. Tile setters are employed by special trade, building, and general contractors. Those who are self-employed usually contract their services for smaller renovation projects.

Terrazzo, Tile, and Marble Craftspeople

Learning Activity 7

1. Complete the sentences.

A terrazzo, tile, and marble craftsperson can prepare, measure, and mark

A terrazzo, tile, and marble craftsperson can build _____

A terrazzo, tile, and marble craftsperson can mix, apply, and spread

A terrazzo, tile, and marble craftsperson can set tiles

A terrazzo, tile, and marble craftsperson can align and straighten tile using

A terrazzo, tile, and marble craftsperson can cut and fit tiles around _____

A terrazzo, tile, and marble craftsperson can pack grout into

A terrazzo, tile, and marble craftsperson can install _____

A terrazzo, tile, and marble craftsperson can lay and set mosaic tiles to create

A terrazzo, tile, and marble craftsperson can mix, lay, and polish

A terrazzo, tile, and marble craftsperson can remove and replace

2. What are the three main things that a terrazzo, tile, and marble craftsperson does?

3. How can a person get training in this trade?

4. What parts of the body is this type of work hard on?

5. Who employs tile setters?



Skills for Success in this Section



Reading



Communication



Writing



Numeracy



Adaptability



Collaboration



Digital

What Employers Want in a Skilled Trades Helper

While preparing this training package, we talked to many employers in the construction field, contractors from both large and small companies.

While they agree that skills and knowledge are important, they also agree that a lot of that information can be learned on the job.



The skills they thought were most important:

- showing up on time
- following instructions
- asking questions when needed
- being willing to learn
- working hard
- never using alcohol or drugs on the job

Human Resources and Skills Development Canada (HRSDC) list the most important essential skills for trades helpers and labourers as:

- numeracy (math and number skills)
- significant use of memory (remembering information)
- working with others (teamwork and collaboration)

Show Up on Time (Be Punctual)

One of the biggest complaints employers have is that workers are not showing up on time, or not showing up at all. The best thing you can do for yourself as an employed person is to show up **15 minutes early** for work.



Bing late to work sends a message to your employer or supervisor that you are not committed to the job, that you are inconsiderate, and that you have poor time management skills. It shows you are not giving 100% (your best effort).

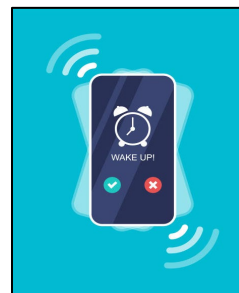
Employers look at all these things and think that if you cannot manage to get to work on time, then you cannot manage to work well.

It might not be true, but it will look that way. It may look like you do not really care about your work.

Remember, there are a lot of people standing in line behind you waiting for their chance to show your employer how dedicated they are, if they had the job.

If you have trouble getting to work on time, try these tricks to get you up and out the door:

- Set your alarm clock 20 minutes ahead. Do not allow yourself to say, “I know I have that extra 20 minutes, so I will just watch the news/sit and relax/walk the dog”.
- If you are a person that hits the snooze button on your alarm several times, set your alarm earlier, so you hit the button earlier.
- Buy an alarm clock that does not have a snooze button, so that you do not have that option.
- Set your phone or alarm clock on the other side of the room so that the only way to turn it off is to get out of bed. Do not allow yourself to get back into bed.
- Prepare for your day the night before: make your lunch, set your clothes out, have the coffee pot ready to turn on.
- Create a morning routine and stick to it. Do not allow yourself to get distracted. Focus on getting ready and getting out the door.
- Go to bed at a time that allows you to get 8 hours of sleep.
- Do not drink alcohol on weeknights. It disrupts sleep.
- Do not drink coffee in the evenings. It disrupts sleep.
- Find a friend who will give you a wakeup call for the first few weeks, until you get into a pattern.



Recognize that lateness is a bad habit.
With hard work and dedication, you can change this bad habit.
It takes focus and effort, but it can be done.
It is worth it!

Follow Written Instructions

Written Instructions

It is important to be able to read simple instructions or directions.

Your employer may leave you with a list of things to do. You will need to read and follow this list.



You may be required to read MSDS (Material Safety Data Sheets) on dangerous products and chemicals.

You may also be asked to read directions to assemble something.

Learning a basic vocabulary of words used in construction is a good idea.

That way you will be familiar with words that are used within the construction business.

Assembly Required

Reading directions in order to assemble something is a little more difficult. Often, they tell you what should be done and how you should do it.



Follow these helpful tips:

- **Read all of the directions before starting**, that way there are no surprises.
- The directions are usually written in a step-by-step format. Read step 1. Complete that step. Then move on to step 2, and so on.
- Do not be overwhelmed by the number of steps involved. Focus on what needs to be done first and then work your way through the list.
- Use a pencil to check off when you have completed a step. This will help you focus on what needs to be done next.
- Do not try to assemble something without reading the instructions. Remember the saying, *“If all else fails, read the instructions.”* It is usually said by someone who has failed to assemble something without reading the instructions. *“Time is money”* is another saying. Your employer is paying you to assemble the item. The best way is to **read the instructions**.
- **Look at the diagrams** that come with the instructions. Often this helps to “see” the process.
- Circle important words like cut, measure, snip, fold, and attach. These are words that tell you what to do. Pay close attention to them.



Always ask questions to find an answer when there is something you do not understand!

Follow Verbal Instructions

Verbal Instructions

Verbal instructions are different from written ones. You hear the information once and then it is gone.

It involves several skills: taking in the information, processing (what is he telling me to do?), understanding, and memorizing what is said.



Taking in the Information

Your hearing is something you will want to protect. You will only notice it is lost once the damage is done, and the damage is irreversible (cannot be changed). Always wear your hearing protection!

If you are working in an area where there is noise and your supervisor is giving you instructions and you cannot hear him, do not be afraid to say,

“Excuse me. I can’t quite hear you with the hammering going on. Can we go where it is less noisy? I want to be sure I hear what you are asking me to do.”

A tip for hearing people in a noisy environment is to watch their lips while they speak. You might not be able to read lips, but it helps to focus on them while they are talking.

Processing and Understanding

What exactly is the boss asking me to do? It helps to ask clarifying questions like,

“Do you want me to use the 2x4's over there or the ones that are piled out back?”



Mirror the information back to the person. This means to repeat the instructions.

Example: “You want me to build a sawhorse out of the 2x4's out back. I understand.”

You will process the information in your mind until you understand it.

Memorizing

When given verbal instructions, you only get one, maybe two, chances to hear the information. You have to process, understand, and memorize all of it quite quickly. That is why a lot of carpenters and workers carry small notebooks in their back pockets.



Make short notes for yourself. Draw simple sketches to help you remember. There is nothing wrong with making notes for yourself. It shows your boss that you want to get it right and know what you need in order to do it properly.



Some people have a lot of problems with processing and understanding verbal instructions. If you are one of those people, you can ask your boss to make a list for you.



Carry around a small notebook. When she/he starts to list off

things she/he wants you to do today, pull out your notebook and pencil and ask him to quickly jot them down.

If you are a valuable employee (hard working, show up on time, get the job done), your supervisor will make a few notes for you. Do not be embarrassed.

Understanding our differences and weaknesses and learning how to ask for help at work is one way to succeed at work.

“I have one guy on my crew who’s not so good at remembering stuff I tell him to do, but he is a good worker...one of the best on my crew. I don’t mind helping him out by writing down a list of things for him to do because I know that he’ll get them all done by the end of the day, and they will be done well too!”

- Ahmed, Supervisor

A Note on Note Taking

At work, you will often have important conversations with your boss or your co-workers. They might say things that you need to remember. Also, you might get an important phone call and need to take a message for someone else.

You need to be able to get the message, the caller’s name and phone number, and other important details.

When we listen, we often forget a lot of what is said. A good way to remember important things is to make some notes.

Here are a few tips for taking more detailed notes:

- Do not wait too long before you write down ideas. You might forget important details and have to scramble (hurry) to catch up. Have a pen and paper handy at all times.

- Write down only the most important ideas. Do not try to write down every single word.
- Develop a format for taking notes. You can put boxes or circles around important names or phone numbers. You can use letters or numbers to list important ideas. If you do it the same way all the time, it will help you remember the information.

From: Understanding Human Communication, 6th Edition, Ronald B. Adler and George Rodman, Harcourt Brace College Publishers, p. 126

Ask Questions When Needed



Asking questions is not a bad thing.

A lot of people do not ask questions when they need to or when they should.

They may be worried about looking bad.

They may be worried that others will think they do not know what they are doing.

They may be embarrassed to talk in groups, so they do not ask when they should.

Asking questions is a good way to learn!

Not asking a question when you do not understand something can be dangerous to you and the people you work with. It can also waste time when you have to repeat something and can end up costing your employer money.

Know When to Ask Questions

Asking questions is an important part of the working world. Knowing when to ask questions and how to phrase those questions is a good skill to work on.

One of the hardest things to learn about asking questions is when to interrupt someone to ask a question and when to wait.

Generally, it is best not to interrupt someone when they are talking. Sometimes you can, for example, if they are giving a detailed and lengthy description of something that you do not understand. You can let them know you are not able to follow what they are saying.

If you wait until they finish talking to ask the question, knowing that they will have to repeat a 5 minute talk, then it is best to interrupt them. Do not let them go on talking when you are lost. If you just need one thing explained, then wait until they are done talking.

If you are still able to follow the conversation but have questions, write them down in your notebook. That way you will not forget them and can ask when the the speaker has finished talking.

Sometimes we try so hard to remember our question that we do not listen to the speaker, and we miss important information.

Listen before asking. This means that the speaker may provide answers to your

questions later on in his talk. We have all heard someone ask a question only to be told

“I will get to that in a minute” or “I will be talking about that in a few minutes”.

Wait for the speaker to finish their talk, then ask your clarifying questions.

Know How to Ask Questions

“I know what I want to ask...I just do not know how to ask it.”

One of the most important things to think about when phrasing your question is...‘get to the point’.

Make your questions as direct as possible.

You do not want the speaker to begin his answer to you with “I am not really sure what you are asking.”

What to Say

Look at the question you want answered. Begin your sentence with phrases like:

- “Can you re-phrase...?” or “Can you repeat that?”
- “I do not understand what you meant by...?”
- “I have never... before. Can you show me how to ...?”
- “Could you write that down for me?”
- “What did you mean by...?”
- “How do I...?”

Paraphrasing and Clarifying

This means mirroring (repeating) the information back to the speaker in order to make sure you understand exactly what they want you to do.

- “So, what are you asking me...?”
- “So, what you’re saying is...?”
- “So, what I need to do is...?”

This will let you and the speaker know that you understand the instructions.

Be Willing to Learn

In an entry level (beginner’s) skilled trades helper position, employers do not expect you to come with all the skills of a master carpenter, but they do want you to come with a willingness to learn.

How do you show willingness to learn?

Volunteer to help with jobs that you’ve never done before so that you can watch and learn something new.

You can ask questions like:

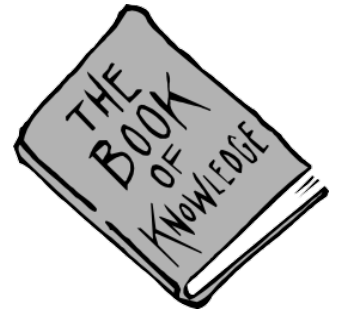
- “How do you know when to...?”
- “Why does the ...?”
- “How much do I ...?”



Being Resourceful

What Other Ways Can You Find Answers?

Do research. There are many books, magazines, websites, organizations, and associations dedicated to woodworking, construction, safety, tools, equipment, and anything else related to skilled trades. The information is at your fingertips.



Take courses or training. Keep upgrading your skills. If there is something you would like to learn about, ask someone to show you or ask where you could find the information.

Ask a co-worker. Your co-workers are a valuable resource in helping you learn more. Don't be afraid to ask them for help, advice, or information.



Volunteer for charitable organizations like Habitat for Humanity. A lot of trades people volunteer their time and energy to projects like these. You never know who you will meet, what you will learn, and what opportunities may arise.

Work Hard

Employers pay you to work. That is the bottom line. They do not pay you to stand around looking for something to do, but rather to dig in and do whatever it takes to get the job done.



There is a difference between hard work and working hard.

Working in the skilled trades field is hard work. In the summer, it is dirty, hot, and sweaty work. In the winter, it is cold, uncomfortable, and sweaty work. Your muscles may hurt. You will push, pull, carry, drag, dig, pound, and scrape. Your body is a tool used to get the job done.

Working hard means that you take your job seriously and you give 100% all the time. You will arrive on time and start work immediately. You will work until you are given a break. You will not extend your breaks longer than they are supposed to be. You will get back to work and give it your all.

You will work hard right up until the end of the day.

Anticipate What Needs to be Done Next



Employers want you to anticipate what needs to be done. If you finish the task you are given, look around for something to do. **This is called showing initiative.**

If you are unsure as to whether or not your boss wants you to do it, just quickly ask... "I see the boards over there need to be stacked. I'll move onto that if it's alright with you."

Offering suggestions like this will make your employer's job easier. They do not have to stop and think about what work to give you next.

Never Use Alcohol or Drugs on the Job

It goes without saying that drugs are illegal substances and will not be tolerated on the job. Drugs that are considered legal like alcohol and marijuana are not allowed in the workplace.



Substances that affect your abilities to do your job can lead to people getting hurt at work. It is dangerous.

Drinking or doing drugs at work can also get you fired!

Modified from: **Canadian Centre for Occupational Health & Safety (CCOHS)**

A typical trades contractor's policy may read like this:

1. No person under the influence of, or carrying alcoholic beverages is to enter, or knowingly be permitted to enter, the construction project.
2. No person under the influence of, or carrying drugs is to enter, or knowingly be permitted to enter the construction project.
3. The use of alcohol and other drugs (not prescribed by a physician) on a job or during work hours will result in disciplinary action.

To be effective, the policy must be forcefully applied every day.

For large sites, this may mean having an entry point at the site gate supervised by a site security person.

For smaller sites with no security, this will probably be carried out by the contractor's site supervisor or floor manager.

When a person is identified as having a problem, the employer and his/her representative should be contacted immediately.

What Employers Want in a Skilled Trades Helper

Learning Activity 1

1. What skills did the employers in the construction field find important?

Did the list above surprise you? Yes, or no? Explain.

2. What do you think? Are there skills you would add to the list?

3. According to HRSDC, what are the three most important essential skills for trades helpers and labourers?

4. When you show up late, what message are you sending to your employer?
What messages does arriving late send to your employer about you?

5. What 3 tricks do you think would be most helpful for getting out of bed in the morning?

1.

2.

3.

6. How is the skill of following written instructions used in the skilled trades helper occupation?

7. _____

In your opinion, what are (is) the most important tips to remember when reading directions? Explain why.

8. What skills are involved in following verbal instructions?

1. _____
2. _____
3. _____
4. _____

9. True or False?

T F Following verbal instructions is the same as following written ones.

T F Hearing loss is only noticeable once the damage is done, and then the damage is irreversible.

T F If your boss talks to you when there is a lot of noise around, they must not really expect you to follow their instructions because they know you can't really hear them.

T F Clarifying questions are asked to make sure you understand what is being said. They are asked to make things clearer.

T F Memorizing has nothing to do with following instructions.

T F It is okay to make notes for yourself when you are being given instructions.

10. Asking questions is a very important skill. What are some of the reasons why people might not ask questions?

11. Your boss asks you to “grab that load of wood over there and pile it out back”. You look around and see the wood they’re talking about but are not sure where they want it piled ‘out back’. How would you ask them? What would you say?

12. What does paraphrasing or mirroring mean?

Give examples below. The first one is completed for you.

Sentence	Paraphrasing or mirroring
You need to get 40 pieces from the pile, no better make that 50, and cut 20 of them to 3 feet. Then give them all to Mike.	<i>Take 50, cut 20 to 3 feet, and give them to Mike. Got it.</i>
Run into town and pick me up a gallon of red, two gallons of white, 2 lbs. of finishing nails, and charge it to the company. Better make that two gallons of red.	
Clean up around the table saw, take the scraps to the dumpster, and then I need you to move that pile of lumber so that the electricians can get in there.	

13. List five ways an employee shows people they are willing to learn.

1. _____
2. _____
3. _____
4. _____
5. _____

14. Explain, in your own words, the difference between hard work and working hard.

15. Why would employers want you to anticipate what needs to be done?

16. What three things are usually listed in a typical constructor policy on alcohol and drugs?

1.

2.

3.

17. You are working for a construction company. You are in the office when someone calls for your boss, Rita, who is not at work right now. You have to take a message. Write out the message you would give to your boss.

Here is the conversation:

You: Hello. Skyhigh Construction Company. Can I help you?

Caller: May I speak to Rita, please?

You: I am sorry. Rita is not here right now. Can I take a message?

Caller: This is Jack Smith from Wilson Brickyard. We have not been able to finish filling your order because one of our machines broke down. We should be able to get the stuff to you by next Thursday. Can you just let Rita know that? If she has any questions, she can call me at 548-8492 or on my cell at 878-8726.

You: Ok. I will give her the message. Thanks for calling.

18. Work with a partner or your instructor. Have your partner read this list of instructions to you. Follow the instructions as they are read to you.

* This activity is best done with a large group of people. Your instructor may choose to do this activity as a group exercise. Talk to your instructor before proceeding.

Instructions:

- Fold a piece of paper in half, like a greeting card.
- On the front of the card, write your birthday.
- Under that, write the numbers 1-19 from left to right.

- Open the card up.
- On the left side, draw a line from the top left corner to the bottom right corner.
- To the left of the line, draw a heart.
- To the right of the line, draw a diamond.
- On the back of the card, sign your name in the top left corner.
- Write today's date in the bottom right corner.

Discussion

When you have completed this activity, discuss with your partner or group the following:

Did you have problems following the instructions?

What was different between your card and everyone else's card (if you did this activity in a group setting)?

What does this activity show us about following verbal instructions?

Learning Activity 2

Credit: Developed by Angela Williams for CESBA. © 2023. CESBA (2023) Skills For Success Curriculum Resources, Starting a New Job Curriculum

1. Planning Tasks and Times

Jin is starting a new job as a construction labourer.

He starts work at **8:30am**.

He will walk to work. It is a **30-minute walk** to his new job.

He needs to set his alarm so that he will have enough time to do everything in the morning and get to work **20 minutes early**.

Morning Tasks

- Jin gets up and makes coffee.
- When the coffee is ready, he makes himself a cup of coffee and gets a bowl of cereal and an apple for breakfast.
- He puts on his coat and boots and takes his dog outside for a walk. This task usually takes **15 minutes**.
- He gets the clothes he put out the night before and has a shower. He puts on deodorant and gets dressed and brushes his teeth.
- His lunch, snacks, water bottle, apartment keys and cellphone has already been packed in a bag with his ID, and steel-toed shoes. He put out his work clothes and his orange construction vest the night before.
- He double checks to make sure he has packed everything that he needs.

Use the table to plan Jin's morning. **You will decide how long his morning tasks will take to finish (make an estimate).**

You can use a calculator when you are finished to add up the time for each task. Remember there are 60 minutes in an hour.

Tasks	Time for Task
Time to be there early	+20 minutes

A. How much time will Jin need in the morning to do his tasks?

B. What time will he need to set his alarm to be there for 830am?
(Use job start time and subtract time for tasks and being early to work).

2. Using Maps to Arrive on Time



Whether you are walking, driving yourself, bicycling, taking a bus or taxi or getting a ride from someone, be sure you know how much time it will take to get to work.

If you have the time, walk, or drive to the job before the day that you start working there. This will help when planning to arrive early to your job.

If you cannot do that then you can check an online map to see how long it will take to get there.

Activity Directions

STEP 1: Choose a place in your town or city that you would like to work.

STEP 2: Find out the address for this workplace.

STEP 3: Open an online map program like Google Maps (google.ca/maps) and type in your address in the  search bar.

STEP 4: Then click on Directions.

STEP 5: Look to see the distance and time you would travel to get there.

STEP 6: Look for the icons that tell the time for walking, driving and bicycling.

How long would it be...

A. to drive to this location? _____

B. to walk to the location? _____

C. to bike to the location? _____



Skills for Success in this Section



Reading



Communication



Writing



Digital



Adaptability



Collaboration

Communicating with Others

Your Speaking Voice



When people listen to you speak, they might make up their minds about what kind of person you are because of the way you talk.

It is important to think about how you say things.

Here are some things to think about:

- Speak clearly. Do not run your words together.
- Do not speak too fast or too slowly.
- Do not speak too loudly or softly.
- Try to pronounce words the right way as best you can.

Your voice tells people how you feel. If your voice sounds sad or angry, listeners will know this.

How you say something is just as important as what you say.

Using the Right Words

People notice how you use words. When you use words correctly, people respect what you say. When you talk with your friends, you can be more relaxed. However, on the job, you need to be careful what words that you use. Some things that you should avoid at work are:

- bad grammar
- slang
- swearing

Communicating with Others

Learning Activity #1



If English is your second language, you can use this site:
<https://idioms.thefreedictionary.com/> for online help with question 2.

1. Rewrite the following sentences using the correct words:

- He plays real good. _____.
- I ain't going. _____.
- You could of made it. _____.
- No way can I do that. _____.
- He goes, "" _____.
- I got to ... _____.
- Huh? _____.

2. Try to rewrite the following sentences as if you were talking to your boss:

- He decided to bag that idea. _____.
- You're a cool dude, Mr. Smith. _____.
- Run that by me again. _____.
- Cathy used to be a real jock, but now she's a couch potato.

_____.

Co-workers



Whenever you start a new job, you need to learn a new workplace “culture”. This is the way that people talk and act on the job. If you pay attention to your co-workers and your boss, you will figure out how to act.

Give yourself some time to do this and do not be upset if you do not understand it right away.

Do not be afraid to ask questions. This is how you will learn how to do your job better.

Try not to ask just “yes’ and “no’ questions.

Instead of just asking, “Is this right?” you could say, “Could you tell me or show

me how you want me to do this?”. When your co-worker or boss is giving you an answer or is talking to you about anything else, listen carefully.

If you are criticized for your job performance, do not take it personally. This is how you will learn your job. If someone criticizes you but does not give you any advice on how to do the job better, ask them how you could do better.

Say, “How could I do this better next time?”

Also, if you are giving criticism or feedback, make sure that you are positive and give good advice on how the person can improve their performance. Instead of just saying, “You did a bad job”, you can say, “Next time, you might try doing ... That way, you will avoid the same problem”.

Always remember that you are working as a part of a team. Be a team player by giving helpful ideas and suggestions to others.

There might be co-workers that you do not like. That is okay. However, you do need to respect them. Try to look at their strong points and ignore the things about them that bother you.

Look after the space where you are working and the tools that you use. This will also show that you are serious about your work and have respect for others.

Effective Listening

Everybody thinks that they know how to listen. It is easy, right?

However, are we really listening and understanding the meaning of what the other person is saying? OR are we only hearing the words someone says?

Listening is a learned skill, and it is the most important of all of our communication skills.

It takes practice to be a good listener.

Listening skills can be affected by:

- what is going on around us
- what is going on in our minds



If we are in a noisy place or if we are angry or hungry, we cannot listen as well.

Distractions can make it hard to be a good listener.

To be a good listener, we need to know some of the barriers that might get in the way of our understanding the message. We need to know when we are not really listening.

Here are some things that can tell us if we are not really listening:

- daydreaming
- slouching in the chair
- looking at our watch, the floor or the ceiling
- playing with an object such as a pencil or a ball
- staring into space
- drumming our fingers on the table
- crossing our legs or bouncing or tapping our foot
- turning slightly away from the other person or crossing your arms across your chest
- yawning, rolling your eyes or showing other signs of boredom
- not looking at the speaker
- texting, checking social media, or leaving a phone's volume on

Becoming aware of your ‘bad’ listening habits is the first step toward developing and improving your ‘good’ listening skills.

Here are some techniques you can use to overcome some of the barriers we covered earlier. To improve your listening habits, you **MUST** practice!

1. Be Prepared to Listen

a) **Learn everything you can about the speaker, the topic and the situation *before* you have the conversation:** This allows you to make predictions about what might be said. Keep in mind, though, that your predictions might not be right, so you need to be open-minded.

b) **Remove all possible distractions:** Try to remove internal distractions. Have something to eat so you are not thinking of food. Try to talk in a quiet place, if possible.

c) **Have a specific purpose in mind:** What do you want to get out of the conversation? You need a reason to listen.

2. Focusing Attention

Pay attention to non-verbal clues (facial expressions, gestures). These can be an important part of the speaker’s message, and it really shows that you are paying attention.

Some ways that you can focus your attention are:

a) **Paraphrasing:** This means that you repeat what the speaker’s message is, *in your own words*. You can check the ideas that you have heard and show the speaker that you are listening. Some phrases you can use are:

b) **Taking Notes:** Concentrate on the main ideas and evidence. Use key words and do not write down whole sentences. Put what they say in your own words.

“What I heard you say was...”

“You seem to be saying...”

“It sounds as if you...”

You can use the notes to check your understanding of what the speaker said.

- c) Repeating:** For example, if someone is introduced to you, focus on the name and repeat it right away.

“This is Carla”.

“Nice to meet you, *Carla*”.

Say their name several times during the conversation. The more you repeat the name and look at the person, the better your memory will be.

- d) Stay Alert Physically:** Sit or stand up straight with your eyes on the speaker if you really want to understand their message. Do this for as long as you need to understand the main idea, then relax. You can do it again each time a new idea comes up.

Facial Expressions in Communication

We depend on other people’s facial expressions more than any other nonverbal (not talking) clue to make sure our communication is successful.

By observing our conversation partner’s face, we might be able to figure out:

- Whether the other person is enjoying the interaction or not.
- How interested the other person is in what we are saying.
- How involved the other person is in the conversation.
- Whether the other person is understanding what we are saying.



Whenever you are communicating with another person, it is very important to pay attention to the other's facial expressions.

Paying attention will help guide the conversation and keep things working smoothly.

Communicating with Others

Learning Activity #2

1. How can our listening be negatively affected? What can happen to make listening more difficult?

2. What are some signs that we are not listening well?

3. What are some ways that we can remove barriers or distractions to listening?

4. Other than the speaker's words, what can help us to understand their message?

Tough Situations

Communicating with others may be difficult. Asking for help and saying 'no' are two examples. However, sometimes we have to ask for help or say no so that we can stay safe and do our job well.



Tips for Asking your Supervisor Questions (on Health and Safety Matters)

- Be polite and respectful.
- Try not to put your supervisor on the spot.
- Do not ask a personal question and do not blame others. For example, you can ask a question such as, "What would someone do in this situation...?"
- Try saying "I" instead of "you".
- Watch your body language. Don't cross your arms because it makes you look upset and do not point your finger because it can be seen as not polite.

- Make a positive suggestion to solve the problem if you can.
- State your issue clearly and briefly. Do not bring in other issues such as pay or time off.
- End on a positive note. Let the supervisor know that you want to do the best job that you can but that this task is new to you, and you want to do it safely.
- If you are given a task that you believe is unsafe, it is *your* right to refuse to do that work. You should express your concern to your supervisor if you think you don't have the proper health and safety training

Communicating with Others

Learning Activity #3

1. List three of the tips listed above that would work best for you and why?

2. Name three situations where you could apply some of these suggestions?



Skills for Success in this Section



Reading



Writing



Communication



Problem solving

Problem Solving



Life and work are often seen as a series of problems to be solved. How do we do this?

Let us look at a problem that might happen in the workplace and how we might solve it.

Situation

Your employer has asked you to work on a machine or drive a lift truck and you have not had any health and safety training to do this job.

If you are a new or inexperienced worker, you might panic.

What should you do?

Here is a formula you can use for working through problems and decisions.

At the end, there will be a suggested answer.



Step 1: Identify the problem. What is the problem?

Step 2: Clarify the goals and prioritize. Which goal is most important? What is at the top of the list?

Step 3: Create options: What are the different ways to solve the

problem?

Step 4: Evaluate the options. What are the good/bad points of each option? List the pros and cons.

Step 5: Look at the results of each option and compare with the goals. If we do this, what will happen? Is this what we want?

Step 6: Choose the option with the outcome most closely matching the goals. Which choice gets us closest to where we want to be?



Remember, any problem can be handled this way.

Take time and think carefully.

It will save you time and trouble in the end.

Let us look at how we would use these steps to solve the problem that we discussed above.

Step 1:

Problem: You do not feel safe, and you might feel uncomfortable asking the supervisor to help or admitting you cannot do the job.

Step 2:

You want to stay safe, and you want to do the job well.

Step 3:

- (a) You can go ahead and do the job without further information.
- (b) You can express your concerns to the employer and get further help.
- (c) You can speak to the workplace health and safety person about what you should do.

Step 4 and Step 5:

What is good and bad about each option?

Options	Good Points (Pros)	Bad Points (Cons)
Go ahead with job	You do not disturb the supervisor.	- You have a good chance of having an accident and getting hurt. - You are putting yourself and your co-workers in danger.
Express concerns to employer and request further information	- You will get the information you need to do the job safely. - You will become more confident. - Your employer will see you as someone who is serious about the job.	Employer might get upset and tell you to go and do the job anyway.
Ask workplace health and safety representative for information	- You will be able to do the job safely - You will gain support. - You will be speaking up for co-workers who have similar concerns but are too afraid to speak up.	- Employer might get upset. - You went over the boss' head (talked to someone other than the employer).

Step 6:

Our main goal is to stay safe and do the job as well as possible.

Therefore, the best choice would be to ask the employer for further information and, if that does not work, go to the workplace health and

safety person with your concerns.

Note: Remember, you cannot be fired for refusing to do work that you think is unsafe.



Problem Solving

Learning Activity #1

Using the steps listed above, try to solve the following problem.

The Scenario: A co-worker of yours used his right to refuse unsafe work when your boss asked him to move several skids of materials by hand.

Most of the materials weigh more than the safe lifting weight.

The materials have yet to be moved but you overheard your employer say that he was angry about the situation.

Therefore, the issue has NOT been resolved at this point.

Write down the steps that you could take to help your co-worker and your boss resolve this issue.



Skills for Success in this Section



Reading



Writing



Numeracy

Timesheets



One of the most important forms you may have to fill in will be your timesheet. This form could be a daily timesheet if you are working on different sites for the company.

If you work on one site for a long period of time, then the form will be a weekly timesheet.

The timesheet is very important as the payroll department will calculate your wages from your timesheet.

Depending on your job, you may have a system where you may have to use a pay card that you will clock in and out with.

At the entrance to the site will be a time clock device. You will punch the card into a slot beside the clock and your time will go on the card.

More modern ways involve “punching” (entering) your hours into a tablet or other digital device when you come to work.

You may have to clock out on your lunch break and then back in.

Make sure you keep track of your hours.

You want to be sure that you are paid the right amount.

Here is an example of a Timesheet:

Date	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
1			8 hrs.				
2				8 hrs.			
3					8 hrs.		
4							
5							
6	8 hrs.						
7		Sick Day					
8			7 hrs.				

Adding Hours in a Schedule

Some materials used or modified from: Retail Math by Angela Williams for CESBA. CESBA encourages the distribution of this information. **Credit:** CESBA (2023) Skills for Success Curriculum Resources from <https://cesba.com>

An hour is 60 minutes. When you add time on a calculator you can divide the minutes by 60 to get the right decimal amount to use for checking your pay stub.

This needs to be done because decimals and percentages are calculated out of 100 not out of 60.



You can use a calculator.

For example: Jin works **5 hours and 12 minutes** on Saturday.

12 divided by 60 is 0.2 or 20 percent of the hour.

Jin worked 5.2 hours on Saturday. He can multiply this by the \$16.00 he makes per hour to find out what he earned that day.

$$5.2 \times \$16.00 = \$83.20$$

Learning Activity 1

Practice Dividing Minutes by 60

Divide the following minutes by 60. Round each answer to the hundredths place (2 to the right of the decimal).

For example: 12 minutes $\div$ 60 (minutes in an hour) = 0.2

1. 15 minutes _____

2. 17 minutes _____

3. 35 minutes _____

4. 45 minutes _____

5. 50 minutes _____

Learning Activity 2

Adding Time in a Timesheet

Look at the 2-week schedule to calculate the number of hours worked by Carla.

Maintenance department	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
03/08/21 -03/14/21	8am-5pm	8am-5pm			12pm-8am	12pm-8am	12pm-8am
03/15/21 -03/21/21			8am-5pm	8am-5pm	8am-5pm		

Carla gets an unpaid half hour for lunch on each day that she works 6 hours or more.

1. Number of days worked per week _____ x 0.5 = _____

2. Number of hours worked from 03/08/21-03/21/21 subtracting unpaid lunch time.

Total = _____

3. How many hours will Carla be paid for on her pay cheque?

Understanding Pay Stubs and Hours Worked

Here is some information about time and vocabulary to help when calculating pay.

1. **Days in a Week:** There are 7 days in a week.
2. **Months in a Year:** There are 12 months in a year.
3. **Days in a Year:** There are usually 365 days in a year, but in a leap year, there are 366 days.
4. **Gross Pay:** This is the total amount of money you earn before any deductions (like taxes, insurance, and retirement contributions) are taken out.

It includes your salary or hourly wages, overtime pay, and bonuses.

5. **Net Pay:** This is the amount of money you take home after all deductions have been made from your gross pay. This is what you receive in your bank account.

Understanding Pay Calculations

To find out how much is earned in a month, you can take the yearly salary and divide it by 12.

Example: If you earn \$36,000 a year, you can calculate your monthly pay like this:

$$36,000 \div 12 = \$3000$$

This means you earn \$3,000 each month.

Calculating Hours Worked:

In Ontario, an ideal work week is 40 hours. This is usually spread out over 5 days, which means working 8 hours each day.

Example: Working 8 hours each day for 5 days, and making \$19.00 an hour the calculation would be:

Hour worked each day (8) x Hourly wage (\$19) x Number of day (5)

This means earnings of \$760.00

Learning Activity 3

Use the examples and information you have read for the following questions.

1. Monthly Pay Calculation

If you have a yearly salary of \$48,000, what is your monthly pay?

Salary $\div$ Number of months in a year = _____

Total hours worked calculation

If you work 7 hours a day for 6 days, how many total hours do you work in that week? _____

2. Hourly Wage Calculation

You received a pay stub showing that you earned \$800 for a week where you worked 32 hours. What is your hourly wage? _____

3. Days in a Year

How many days are in a non-leap year? _____

Calculating Pay and Hours Worked

At your job, your pay stub will have the number of hours worked and how much

your pay is per hour.

There will also be **deductions** (money that is subtracted from your pay for different reasons). You may have money deducted for taxes, union dues, or unemployment insurance, etc.

Keep track of the hours you work and always check your pay stubs to make sure they match your records.

To find your wage, the first step is to take the number of hours worked and then multiply it by your hourly wage.

Example: 30 hours x \$19.50 an hour = \$585.00

Then total all the deductions and subtract them from your pay.

Your pay before deductions is your **gross pay**. Your pay after deductions is your **net pay**. The net pay is the amount you will receive from your employer.

Here is an example of a pay cheque:

Hopetown Renos Hopetown, ON, K9L1G8 Name: Mario Cappelli			Pay Group: Labourer Pay Begin Date: 03/08/21 Pay End Date: 03/21/21 Employee #:123 Pay Rate: \$19.50 Hourly			Deductions	
						<u>Description</u>	
						CPP	5.65
						EI	4.60
						Income Tax	45.78
<u>Description</u>	<u>Rate</u>	<u>Hours</u>	<u>Earnings</u>	<u>YTD Hours</u>	<u>YTD Earnings</u>		
Regular Earnings	19.50	25	487.50	96	1,872		
Current: 487.50		Deductions: 56.03		Total Pay: _____			

Learning Activity 4

Reading a Pay Stub

Mario gets paid bi-weekly, which means he gets paid every two weeks.

Please answer the following questions, using the pay stub above.

1. Fill in the total pay on Mario's pay stub (remember to subtract the deductions from the current total)
2. What is the pay period for this pay stub?

3. How many hours did Mario work during this time? _____
4. What is Mario's hourly wage? _____
5. How much money has Mario made this year (YTD) with the company?

Why Calculate Salary and Check Pay Stubs?



Checking your pay stub is important because it helps you make sure you are getting paid the right amount for the hours you worked. It also lets you see if the money taken out for things like taxes and benefits is correct.

Plus, looking at your paystub can help you keep track of how much money you are earning, so you can plan your spending better.

If you do not check your pay stub, you might miss mistakes in your pay, like being underpaid for hours that you worked or having too many deductions taken off.

This can lead to problems, as you may not have enough money to cover your expenses.

Not finding these errors early could make it harder to get them fixed later, leading to longer waits to get the money you deserve.



Skills for Success in this Section



Reading



Writing



Numeracy



Digital

Ladder Safety

Step Ladders

For site workers, stepladder safety is essential to prevent accidents. Here is a straightforward guide to staying safe:



Check the Ladder: Inspect it before you start. Ensure there is no damage, like bent or cracked rungs. Lock all hinges in place. A damaged ladder should be taken out of service.

Stable Setup: Place the ladder on level ground. Open it fully and lock the spreaders to keep it stable. Avoid using it on uneven ground, slippery surfaces, or in front of doors unless they are blocked.

Climbing Safety: Maintain three points of contact (two hands and one foot or two feet and one hand) at all times. Face the ladder when climbing and avoid leaning too far to the side.

Stay Below the Top: Avoid standing on the top two steps. Select a ladder tall enough so you do not have to. Check the ladder's weight limit to make sure it can support you and any tools.

Electrical Hazards: Avoid using metal ladders around electricity; fiberglass ladders are safer for electrical work.

Following these basics helps make stepladder use safer on-site and reduces the risk of accidents.

Review the poster on the next page to learn more about step ladder safety.



STEP LADDERS

Workplace Safety



:STAY SAFE AND FOLLOW THESE STEPS:

- CHOOSE A LADDER ABOUT ONE METRE LESS THAN THE HEIGHT YOU WISH TO REACH
- FIBERGLASS LADDERS ARE REQUIRED FOR ANY *ELECTRICAL* WORK
- CHECK THE LADDER FOR DAMAGE BEFORE EACH USE
- ENSURE MINIMUM OF A CSA GRADE 1 LADDER
- CLEAN ALL CLIMBING AND GRIPPING SURFACES



QUICK TIPS

CAUTION

**ALWAYS PAY
ATTENTION**

**3-POINT CONTACT WHILE
CLIMBING IS TWO HANDS
AND ONE FOOT OR TWO
FEET AND ONE HAND
AT ALL TIMES.**

1. Make sure the ground is level and even
2. Do not place ladder on other object like tables or boxes
3. Maintain three points of contact
4. Always face the ladder when going up and down
5. Use only in the fully opened position with the spreader bars locked in place
6. Always face the ladder when going up and down
7. Climb up and down slowly
8. No work is to be done higher than the step indicated on the label
9. Keep belt buckle between the rails while maintaining a firm grip



Extension Ladders

When working with extension ladders, it is important to be safe. Here are some simple steps to keep you safe and follow Ontario's rules.

1. Check the Ladder First

- **Look for Damage:** Make sure there are no cracks, bends, or broken parts. If the ladder is damaged, do not use it.
- **Locked In:** Check that the ladder is set up properly, so it will not move when you climb it.

2. Setting Up the Ladder

- **Correct Angle:** Use the 4-to-1 rule. This means for every four feet high; the ladder base should be one foot away from the wall.
- **Stable Ground:** Place the ladder on solid, flat ground. Do not set it up on soft or sloped ground.
- **Secure the Ladder:** Tie the ladder at the top and bottom if you can, especially if it is windy.

3. Working from Heights and Fall Protection

- **Safety Training:** Ontario rules require training if you work three meters (10 feet) or higher. If possible, use a harness and secure it to an anchor.
- **Do Not Overreach:** Keep your body between the ladder's side rails. This will help you stay balanced.
- **Stay Low:** Do not climb higher than the fourth step from the top. If you need to reach higher, use a taller ladder.

4. Climbing the Ladder

- **Three Points of Contact:** Always keep three points of contact — either two hands and one foot or two feet and one hand.

- **Face the Ladder:** Always face the ladder when climbing, and do not carry heavy tools in your hands.
- **Go Slowly:** Climb up and down carefully to avoid losing your balance.

5. Electrical Safety

- **Keep Distance from Power Lines:** Ladders should be at least three meters (10 feet) away from power lines. Do not use metal ladders near electricity; use fiberglass ones instead.

6. Weather

- **No Ladders in High Winds:** Do not use ladders if it is very windy or rainy. Bad weather makes ladders unsafe.

7. Store and Transport Ladders Safely

- **Safe Storage:** Store ladders in a dry place to protect them from damage.
- **Safe Transport:** When moving ladders, secure them in vehicles so they do not fall.

These tips help you work safely with extension ladders.

Follow Ontario's rules for working at heights and use fall protection when needed.

Please review the poster on the next page for more information on extension ladders.



Fall protection training needed when working over 3 feet!



EXTENSION LADDER SAFETY



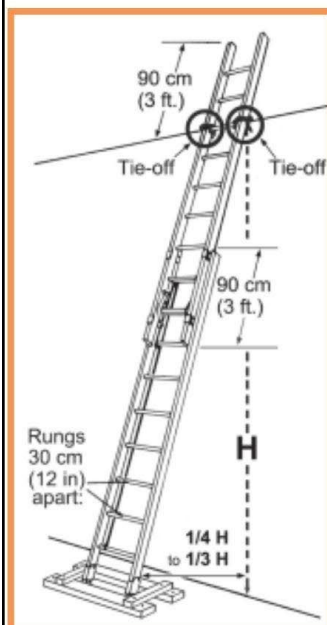
- Set the ladder one foot out for every 3 to 4 feet.
- Secure the top and bottom of the ladder.
- Clean your boot soles before climbing.
- Use two hands and one foot or two feet and one hand at all times.
- Face the ladder.
- Keep your body between the side rails.
- Do not lean out or back.



Keep them clean!



Keep ladders away from powerlines



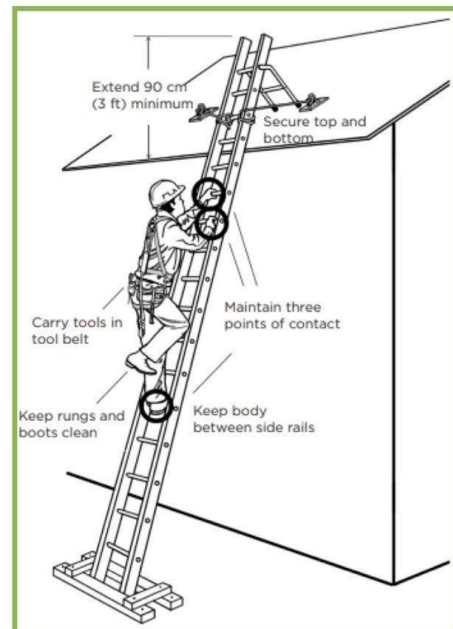
Set up at a proper angle and secure



Be cautious and follow safety rules



Always carry the tools in a tool belt



Transporting Ladders

When a ladder is being transported on a roof rack, it must be fastened securely. Use approved tie-downs that will hold it in place.

This will prevent damage from road shock and stop the ladder from falling off the vehicle and into traffic.



Note: Not tying the ladder down could cause an accident.

Ladder Safety Tips Activity

Numeracy

1. If the ladder needs to be 1 foot out for every 3 or 4 feet. How many feet out should it be if the ladder measures:

a) 12 feet _____ b) 8 feet _____ c) 15 feet _____

Multiple Choice

1. Before using a stepladder, you should:

- a) Check the weight limit only.
- b) Make sure the ladder is the correct color.
- c) Inspect for any damage, such as broken rungs or split side rails, and confirm that all locking mechanisms work.
- d) Only check the height of the ladder.

2. When setting up a stepladder, which of the following is NOT recommended?

- a) Fully opening the ladder and ensuring the spreaders are locked.
- b) Placing the ladder on a stable, level surface.
- c) Setting the ladder up on uneven ground or in front of an open doorway.
- d) Avoiding slippery surfaces.

3. Choose the best answer for the following question.

When transporting a ladder on a roof rack, you should:

- a) Only tie it down if driving on rough roads.
- b) Use approved tie-downs to secure it and prevent it from falling into traffic.
- c) Place it loosely on the roof rack to make it easier to remove.
- d) Check that the ladder is clean before transporting.

Fill-in-the-Blanks

1. To set up an extension ladder safely, use the _____ rule, which means the base of the ladder should be placed one foot away from the wall for every four feet of height.
2. When working on a ladder near power lines, make sure the ladder is at least _____ meters away to avoid the risk of electric shock.
3. When using a stepladder, it is essential to maintain three points of contact by keeping _____ and _____ on the ladder at all times.
- 4, When climbing, tools should be carried in a _____.

Finding Information Online



Fall protection training is essential on worksites when working on ladders higher than 3 feet.

Open a search engine like Google or Bing on your device.

Search for fall protection in your area or a nearby city.

Use the information that you find to answer the following questions:

1. Who is offering the training? _____
2. How much is the training? _____
3. List three topics that the training will cover:
1. _____ 2. _____ 3. _____



Electric Tools - Basic Safety

from: **Canadian Centre for Occupational Health & Safety (CCOHS)**

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When and how should you inspect powered hand tools?

- Inspect tools for any damage prior to each use.
- Check the handle and body casing of the tool for cracks or other damage.
- If the tool has second handles, check to see that they are installed properly.
- Inspect cords for defects. Check the power cord for cracking, fraying, and other signs of wear or faults in the cord insulation.
- Check for damaged switches.
- Inspect the plug for cracks and for missing, loose, or faulty prongs.



What should you do if you find a tool defective?

- Remove it from service and tag it with ***“Out of service for repair”***.
- Replace the tool immediately. Do not use defective tools “temporarily”.
- Have tools repaired by a qualified person - do not attempt your own repairs.



What should you do before using powered hand tools?

- Make sure that you have been properly trained to use the tool safely. Read the operator's manual. Operate the tool according to the instructions.
- Make sure that the power tool has the correct guard, shield, or other attachment that the manufacturer recommends.
- Prevent shocks. Make sure that the tools are properly grounded using a three-prong plug. They also need to be double insulated. This will protect users from an electrical shock.
- Use only the kind of battery that the tool manufacturer specifies for the battery-powered tool that you are using.
- Recharge a battery-powered tool only with a charger that is specifically intended for the battery in that tool.
- Remove the battery from the tool or ensure that it is switched off or locked off before changing accessories, adjusting, or storing the tool.
- Store a battery pack safely so that no metal parts, nails, screws, wrenches and so on can come in contact with the battery terminals; this could result in shorting the battery and possibly cause sparks, fires, or burns.



What should you do while using powered hand tools?

- Wear or use personal protective equipment (PPE) or clothing that is appropriate for the work you are doing.

This includes items such as safety glasses or goggles, hearing protection, dust mask, gloves, safety boots or shoes, or rubber boots.

- Switch off the tools before connecting them to a power supply.
- If a power cord feels more than comfortably warm or if a tool is sparking excessively, have it checked by an electrician or other qualified person.
- Disconnect the power supply before adjusting or changing accessories.
- Remove any wrenches and adjust tools before turning on a tool.
- Inspect the cord for fraying or damage before each use.
- During use, keep power cords clear of tools and the path that the tool will take.
- Use clamps, a vice, or other devices to hold and support the piece being worked on, when practical to do so.

This will allow you to use both hands for better control of the tool and will help prevent injuries if a tool jams or binds in a work piece.

- Use only approved extension cords that have the proper wire size for the length of cord and power requirements of the electric tool that you are using.

This will prevent the cord from overheating.

- For outdoor work, use outdoor extension cords marked “W-A” or “W”.
- Suspend power cords over aisles or work areas to eliminate stumbling or tripping hazards.
- Eliminate *octopus connections*. If more than one receptacle plug is needed,

use a power bar.

- Pull the plug, *not* the cord when unplugging a tool. Pulling the cord causes wear and may adversely affect the wiring to the plug - an electrical shock to the operator may result.
- Follow good housekeeping procedures - keep the work area free of clutter and debris that could be tripping or slipping hazards.
- Keep power cords away from heat, water, oil, sharp edges, and moving parts. They can damage the insulation and cause a shock.
- Store tools in a dry, secure location when they are not being used.



What should you avoid when using powered tools?

- Avoid accidental starting by making sure the tool is turned off before you plug it in.
- Do not walk around with a plugged-in tool with your finger touching the switch.
- Do not bypass the ON/OFF switch and operate the tools by connecting and disconnecting the power cord.
- Do not disconnect the power supply of the tool by pulling the cord from the outlet.
- Do not leave a running tool unattended. Do not leave it until it has been turned off, has stopped running completely, and has been unplugged.
- Do not use electric tools in wet conditions or damp locations unless the tool is connected to a ground fault circuit interrupter (GFCI).
- Do not expose electric power tools to rain or wet conditions; wet tools increase the likelihood of getting an electric shock.
- Do not use light duty power cords.
- Do not carry electrical tools by the power cord.
- Do not connect or splice extension cords together to make a longer connection. The extended extension cord may not be able to provide enough current or power safely.
- Do not tie power cords in knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.



- Never break off the third prong on a plug. Replace broken 3-prong plugs and make sure the third prong is properly grounded.
- Never use extension cords as permanent wiring. Use extension cords only as a temporary power supply to an area that does not have a power outlet.
- Do not walk on or allow vehicles or other moving equipment to pass over unprotected power cords. Cords should be put in conduits or protected by placing planks on each side of them.
- Do not brush away sawdust, shavings, or turnings while the tool is running. Never use compressed air for cleaning surfaces or removing sawdust, metal turnings, etc.
- Do not operate tools in an area containing explosive vapors or gases.
- Do not clean tools with flammable or toxic solvents.
- Do not surprise or touch anyone who is operating a tool. Startling a tool operator could end up causing an accident or injury.





Skills for Success in this Section



Reading



Writing



Numeracy

Wrenches

from: **Canadian Centre for Occupational Health & Safety (CCOHS)**

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What kinds of wrenches are there?

Wrenches are made in various shapes and sizes and are used for gripping, fastening, turning, tightening, and loosening things like pipes, pipe fittings, nuts, and bolts.

There are basically two major kinds of wrenches:

- pipe wrenches used in plumbing for gripping round (cylindrical) things
- general use wrenches used on nuts and bolts that have flat, parallel surfaces for example square or hexagonal (hex)



Note: Wrenches may be adjustable to fit different sized pipes, nuts, and bolts or they may be a fixed size.

What are some examples of adjustable wrenches?

Adjustable wrenches include:

- Pipe wrenches
- Crescent (TM) wrenches which have adjustable jaws set at a 30



degree angle from the handle. Although Crescent is a trade name, it is widely used to refer to any regular adjustable wrench with an angled jaw regardless of who manufactured it.

This is often referred to as just an 'adjustable wrench'.

What are some examples of fixed-size wrenches?

Fixed-sized wrenches include:

- **Open ended wrenches** that have “jaws” with parallel sides or tines that fit snugly on nuts and bolts 
- **Closed end or box wrenches** that have a loop at the end with notches on the inside that allow the wrench to fit either square or hex nuts or both (depending on the number of notches or points). 
- **Combination wrenches** that have both an open end and a closed end on either end of the wrench; usually they fit the same size nut or bolt. 
- **Socket wrenches** are like closed end wrenches except they are cylindrical in shape. They can fit over a nut in a recessed hole that would be inaccessible with open or closed ended wrenches. 

These have an offset handle at right angles to the nut being tightened or loosened.

Usually the handle is a ratchet-type handle that allows the user to turn the socket continuously in one direction by moving the handle back and forth without having to

take the socket off the nut.

- **Torque wrenches**, one type of socket wrench, have a built-in spring-loaded indicator that shows how much torque is being applied (i.e., shows how hard the nut is being tightened).
- **Nut drivers**, another type of socket wrench, are sockets that can be snapped on or permanently fixed to a screwdriver-type handle.
- **Allen wrenches or Allen keys** are hexagon-shaped (six-sided) metal shafts that are bent into an L-shape for leverage.

Hex drivers are “straight Allen wrenches” that have a screwdriver-type handle. These differ from the other wrenches since they fit inside a recessed hexagonal hole in screw heads instead of around a nut or bolt.



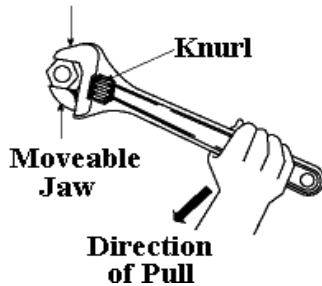
Metric wrench sizes are expressed as whole numbers (for example, 8, 10, 14, 32) that correspond to the sizes in millimetres.

Non-metric sizes used widely in the U.S. are also called S.A.E. (Society of Automotive Engineers) sizes and are expressed as fractions of an inch, for example $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $1 \frac{1}{4}$.

Since both metric and S.A.E. fasteners (nuts, bolts, etc.) are used in Canada, users must select the correct type and size of wrench to prevent injuries and damage to equipment in case of slippage when force is applied to the wrench.

What are general safety tips when using wrenches?

- Use the correct wrench for the job: pipe wrenches for pipes, plumbing fittings, and general use wrenches for nuts and bolts.
- Discard any damaged wrenches (for example, open ended wrenches with spread jaws or box wrenches with broken or damaged points).
- Select the correct jaw size to avoid slippage.
- Wear safety glasses or a face shield where there is a likely hazard of flying particles or falling debris.
- Position your body in a way that will prevent you from losing balance and hurting yourself if the wrench slips or something (for example, a bolt) suddenly breaks.
- Use a box or socket wrench with a straight handle, rather than an off-set handle, when possible.
- Ensure that the jaw of an open ended wrench is in full contact (fully seated, "flat", not tilted) with the nut or bolt before applying pressure.
- Face an adjustable wrench "forward", adjust tightly, and turn the wrench so pressure is against the permanent or fixed jaw.
- Ensure that the teeth of a pipe wrench are sharp and free of oil and debris and that the pipe or fitting is clean to prevent unexpected slippage and possible injuries.
- Apply a small amount of pressure to a ratchet wrench initially to ensure that the ratchet wheel (or gear) is engaged with the pawl (a catch fitting in the gear) for the direction you are applying pressure.

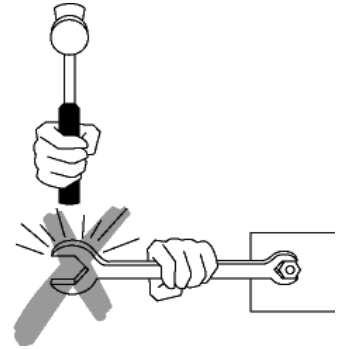
Permanent Jaw

- Pull on a wrench using a slow, steady pull; do not use fast, jerky movements.
- Stand aside when work is done with wrenches overhead.
- Make sure adjustable wrenches do not "slide" open during use.
- Keep tools well maintained (cleaned and oiled).
- Clean and place tools and wrenches in a toolbox, rack, or tool belt after use.

What should I avoid doing when using wrenches?

- Do not push on a wrench. Losing your balance is more likely if the wrench slips.
- Do not use a wrench that has a bent handle or is damaged.
- Do not use worn adjustable wrenches. Inspect the knurl, jaw, and pin for wear.
- Do not pull on an adjustable wrench that is loosely adjusted.
- Do not use pipe wrenches on nuts or bolts.
- Do not use pipe wrenches for lifting or bending pipes.

- Do not use a wrench on moving machinery.
- Do not use the wrong tools for the job. Never use pliers instead of a wrench or a wrench as a hammer.
- Do not use a make-shift wrench.
- Do not insert a shim in a wrench for better fit.
- Do not strike a wrench (except a “strike face” wrench) with a hammer, or similar object, to gain more force.
- Do not increase the leverage by adding sleeved additions (for example, a pipe) to increase tool handle length.
- Do not expose a wrench to excessive heat (like from a blow torch) that could affect the temper of the metal and ruin the tool.



Wrenches

Learning Activity

1. Pipe wrenches are used for _____.
2. General use wrenches are used on _____.
3. Wrenches are either adjustable or _____.
4. List 2 kinds of adjustable wrenches. _____.
5. Circle the correct size.

Metric wrench sizes are written as: whole numbers fractions of an inch

Non-metric sizes are written as: whole numbers fractions of an inch

6. Why is it important to position your body when using a wrench?

7. Fill in the following chart:

Name of fixed-size wrench	Description of wrench

8. Pick 2 of the tips listed in the 'what should I avoid doing when using wrenches' section. List them on the next page. Why are they important?

Tip # 1: _____

Reasons why it is important:

Tip # 2: _____

Reasons why it is important:



Skills for Success in this Section



Reading



Writing

Tin Snips

from: **Canadian Centre for Occupational Health & Safety (CCOHS)**

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What are some safety tips to know when using tin snips?

Tin snips are made in various shapes and sizes for various tasks. The handle can be like those on scissors with finger and thumb holes or like plier handles.

Models are available for cutting in straight lines, in curves to the left, or curves to the right.

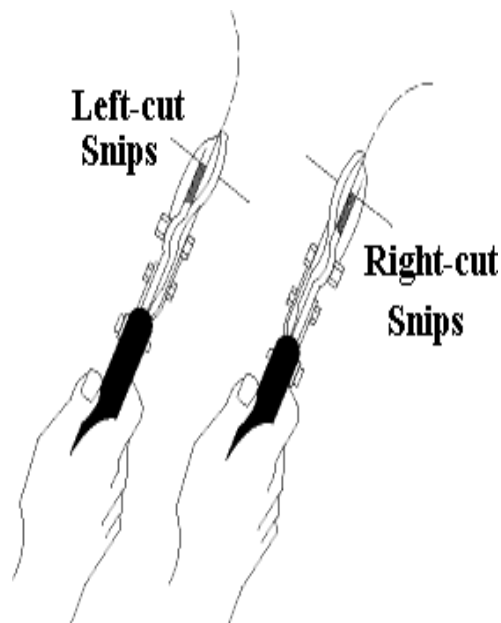
- **Universal** snips can cut in both straight and wide curves.
- **Straight** snips and duckbill snips (flat blade, "perpendicular" to the handle, with pointed tips) are designed to cut in straight lines; some duckbill snips are designed for cutting curved lines.
- **Hawk's bill** snips (with crescent-shaped jaws) are used for cutting tight circles.
- **Aviation** snips have compound leverage that reduces the effort required for cutting.
- **Offset** snips have jaws that are set at an angle from the handle.



DO

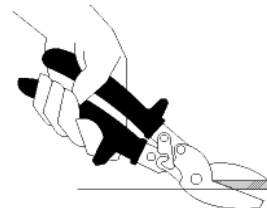
- Select the right size and type of snips for the job.
- Check the manufacturer's specifications about the intended use of the snips (for example, type of cut - straight, wide curve, tight curve, right or left, and maximum thickness and kind of metal or other material that can be cut).
- Only use snips that are sharp and in good condition.
- Wear safety glasses or a face shield and protective gloves when working with snips. Small pieces of metal may go flying in the air and cut edges of metal are sharp.

Left cut snips are for making cuts to the left and straight cuts.



Right cut snips are for making cuts to the right and straight cuts.

Offset snips permit you to keep your hands safely above the cut while cutting directly through the centre of a large sheet.



- Use snips for cutting soft sheet metal only.



Note: Hard or hardened metal should be cut with cutting tools designed for that purpose. Tin snips are not designed to cut wire!

- Use ordinary hand pressure for cutting. If extra force is needed, use a larger tool.
- Cut so that the waste is on the right if you are right-handed or on the left if you are left-handed.
- Avoid springing the blades. This results from trying to cut metal that is too thick or heavy for the snips you are using.
- Keep the nut and the pivot bolt properly adjusted at all times.
- Oil the pivot bolt on the snips occasionally.

What should I avoid doing?

- Do not try to cut sharp curves with straight cut snips.
- Do not cut sheet metal thicker than the manufacturer's recommended upper limit (for example, cuts up to 16 gauge cold rolled steel or 18 gauge stainless steel).
- Do not extend the length of handles to gain greater leverage.
- Do not hammer or use your foot to exert pressure on the cutting edges.
- Do not use cushion grip handles for tasks requiring insulated handles. They are for comfort and not for protection against electric shock.
- Do not attempt to re-sharpen snips in a sharpening device designed for scissors, garden tools, or cutlery.

Tin Snips

Learning Activity

1. Tin snips are made in various _____ and _____ for various _____. The _____ can be like those of scissors with _____ and _____ holes or like _____ handles. Models are available for _____ in straight lines, in _____ to the left, or curves to the _____.
2. Fill in the following chart.

Name of snip	Something about this snip

3. Write 3 things that I should DO if I am going to use tin snips.

4. Left snips are for

5. Right snips are for

6. Offset snips are for

7. True or False?

- | | | |
|---|---|--|
| T | F | Use any snip to cut any metal. It does not matter. |
| T | F | If you need more leverage, you can extend the handles. |
| T | F | Use ordinary hand pressure for cutting. |

- | | | |
|---|---|--|
| T | F | If your snips become dull, sharpen them with scissor sharpeners. |
| T | F | Avoid springing the blades. |
| T | F | Cut so that the waste is on the right if you are right-handed. |
| T | F | All cushioned grip snips are insulated so that you can use them when working with electricity. |



Skills for Success in this Section



Reading



Writing



Numeracy

Screwdrivers

from: **Canadian Centre for Occupational Health & Safety (CCOHS)**

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What are some general safety tips to know when using screwdrivers?

Screwdrivers are made in various shapes and sizes and for many uses. Use the correct screwdriver for the job.

- Use a slot screwdriver with a blade tip width that is the same as the width of the slotted screw head.
- Use a vice or clamp to hold the stock in if the piece is small or moves easily.
- Wear safety glasses or a face shield that is appropriate for the hazards of the work you are doing.
- Keep the screwdriver handle clean. A greasy handle could cause an injury or damage from unexpected slippage.
- Shut off electricity before beginning work on electrical equipment (lock out, de-energize, and tag out).
- If work must be carried out on “live” equipment, use screwdrivers that

have insulated handles designed for electrical work and a non-conducting shaft. Remember, most plastic handles are designed for grip and comfort.

- Use non-magnetic tools when working near strong magnets (for example, in some laboratories).
- Use a screw-holding screwdriver (with screw- holding clips or magnetic blades) to get screws started in awkward, hard-to-reach areas. Square- tipped screwdrivers (for example, Robertson) that hold screws with recessed square holes are also useful in such situations.
- Use an offset screwdriver in close quarters where a conventional screwdriver cannot.



Store screwdrivers in a rack or partitioned pouch so that the proper screwdriver can be selected quickly.



What should I avoid doing?

- Do not run with a screwdriver in your hand.
- Do not lean or push on a screwdriver with any more force than necessary to keep contact with the screw. A screw properly piloted and fitted will draw itself into the right position when turned. Keep the shank directly over the screw being driven in.
- Do not hold the stock in one hand while using the screwdriver with the other. If the screwdriver slips out of the slot you may cut your hand.
- Do not hammer screws which cannot be turned.

- Do not grind the tip to fit all sizes of screw heads.
- Do not try to use the screw drivers on screw heads for which they are not designed (for example, straight blade screwdrivers on Phillips, clutch head, Torx or multi-fluted spline screw heads).
- Do not use defective screwdrivers (i.e., ones with rounded or damaged edges or tips; split or broken handle; or bent shaft).
- Do not use screwdrivers for prying, punching, chiselling, scoring, scraping, or stirring paint.
- Do not use pliers on the handle of a screwdriver for extra turning power. A wrench should only be used on the square screwdriver shank designed for that purpose.
- Do not expose a screwdriver blade to excessive heat. Heat can affect the temper of the metal and weaken the tool.
- Do not use a screwdriver to check if an electrical circuit is live. Use a suitable metre or other circuit testing device.
- Do not carry screwdrivers in your pockets.

Screwdriver Basics

(*not from CCOHS)

Pilot Holes

Pilot holes are holes that are drilled into your work before you put a screw in. It is a good idea to drill pilot holes before putting a screw in to avoid having your wood split.

There are drill bits that will drill pilot holes and make a counterbore hole.

That means that your screw will sink below the level of the wood and can be filled in with wood putty or a wood button.

Use a drill slightly narrower than the screw's thread.

Tips

Power screwdrivers and drills save wear and tear on your wrist. They are used with interchangeable bits.

If you choose the wrong one you may strip the screw head or damage the tip or blade of your screwdriver.

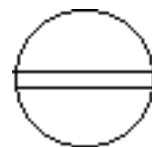
Three Kinds of Screwdrivers

Flat Slot



This is a basic screwdriver. It comes in varied sizes.

It is not used as much as it once was, but it is a good idea to have a few sizes in your toolbox.

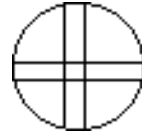


It is important to have the right size for the slot. If you do not, it will slip. You could injure yourself or strip the screw head.

Philips



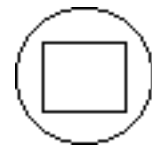
This screwdriver is good to use as it does not slip easily. It comes in various sizes.



Robertson



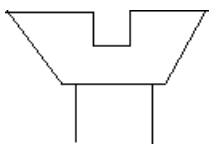
These come in various sizes. The different sizes come with different coloured handles: red, green, and black.



It is important to choose the right size, otherwise you might strip the corners on the screw, making it rounded, and harder to work with.

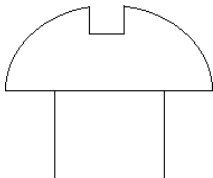
Screw Heads

The most common types of screw heads are flat, round, and pan.



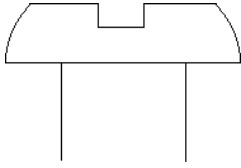
Flat

- most common
- can be countersunk



Round

- used when countersinking is not needed

**Pan**

- like the round but the top is flat

Screw Sizes - #6 x 1" - What does that mean?

#6 tells you the size of the shank.

The larger the number, the bigger the shank.

The most common sizes are #6, #8, and #10.

1" tells you the length of the screw.

Screwdrivers

Learning Activity

1. Pick one safety tip to remember when using a screwdriver. Explain the tip. Include why the tip is important and what could happen if the tip were ignored.

2. What is the purpose of storing screwdrivers in a rack or partitioned pouch?

3. Why is it important to not expose a screwdriver to excessive heat?

4. Circle the correct word in italics.

Pilot holes are drilled into your work *before* / *after* you put your screw in.

5. Fill in the following table.

Name of screwdriver	List 2 things about this screwdriver	Draw the blade tip	Draw the blade

6. What are the 3 kinds of screw heads?

1. _____

2. _____

3. _____

7. Explain what is meant by these screw measurements - #8, 2".



Skills for Success in this Section



Reading



Writing

Handsaws

What should I know about handsaws?

Saws are made in various shapes and sizes and for many uses.

Use the correct saw for the job.

- Wear safety glasses or a face shield.
- Select a saw of proper shape and size for the wood stock being used.
- Check the wood being cut for nails, knots, and other objects that may damage or buckle the saw.
- Start the cut by placing your hand beside the cut mark with your thumb upright and pressing against the blade.
- Start the cut carefully and slowly to prevent the blade from jumping.
- Pull upward until the blade bites the wood.
- Start with a partial cut, then set the saw at proper angle.
- Apply pressure on downstroke only.
- Hold stock being cut firmly in place.



- Use a helper, a supporting bench, or vise to support long stock if required.
- Protect teeth of saw when not in use.
- Keep saw blades clean.

What should I know about using a hacksaw?

- Select the correct blade for the material being cut.
- Secure blade with the teeth pointing forward.
- Keep the blade rigid, and the frame properly aligned.
- Cut using strong, steady strokes, directed away from yourself.
- Use the entire length of blade in each cutting stroke.
- Use light machine oil on the blade to keep it from overheating and breaking.
- Cut harder materials more slowly than soft materials.
- Clamp thin, flat pieces requiring edge cutting.
- Keep saw blades clean and lightly oiled.



Handsaw

Learning Activity

1. Put the following in order.

_____ Pull upwards until the blade bites the wood.

_____ Start cutting carefully to prevent the blade from jumping.

_____ Start with a partial cut, then set the saw at proper angle.

_____ Start the cut by placing your hand beside the cut mark with your thumb upright and pressing against the blade.

2. What does it mean when the blade “bites” the wood?

3. True or False?

T F Apply pressure on the upstroke only.

T F Use any saw for any job.

T F If you put enough pressure on the saw, you can just cut through the nails that are in the wood.

3. The following should be done with your instructor.

Explain and demonstrate the proper way to hold and cut a piece of wood.

The instructor will fill out the table below.

Skill	Demonstrated	Had some difficulty	Re-tested and demonstrated
Wore appropriate PPE			
Explained about using pressure on downstroke only			
Began the cut properly			
Able to cut the wood			



Skills for Success in this Section



Reading



Writing

Pliers

What are some safety tips to know when using?

Pliers are made in various shapes and sizes and for many uses. Some are used for gripping something round like a pipe or rod, some are used for twisting wires, and others are designed to be used for a combination of tasks including cutting wire.

There are also tools that are used just for cutting wires, called wire cutters. Use the correct pliers or cutters for the job.

DO:

- Wear safety glasses or a face shield where there is a hazard from flying particles, pieces of wire, etc.
- Cut at right angles. Never rock the cutting tool from side to side or bend



wire back and forth against the cutting edges.

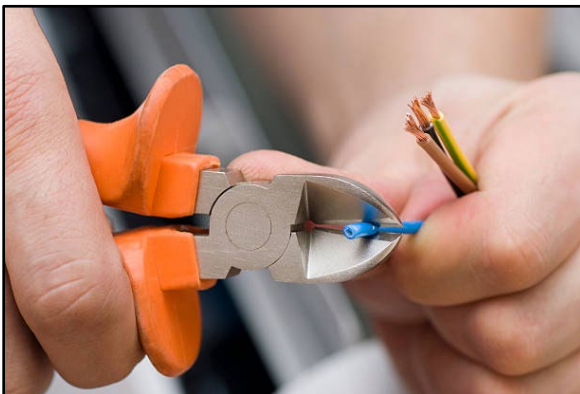
Choose pliers or wire cutters that have a grip span of 6 cm- 9 cm (2 ½- 3") to prevent your palm or fingers from being pinched when the tools are closed.

Use adjustable pliers that allow you to grip the workpiece firmly while maintaining a comfortable handgrip (i.e., hand grasp is not too wide).

- Use tools only if they are in good condition.
- Make sure that the cutting edges are sharp. Dull and worn down cutting edges require more force to cut.
- Oil pliers and wire cutters regularly. A drop of oil on the hinge will make the tools easier to use.
- Pull on the pliers; do not push away from you when applying pressure. If the tool slips unexpectedly, you may lose your balance or hit your hand against equipment or something else hard that could result in an injury.

DO NOT:

- Do not use pliers as a hammer.
- Do not hammer on pliers or wire cutters to cut wires or bolts.
- Do not use pliers on nuts and bolts; use a wrench.



Pliers

Learning Activity

1. Pliers are used for many things. List three things pliers are used for:

2. Why do you need to wear safety glasses or a face shield when using pliers?

3. Why is it important to make sure the cutting edges are sharp?

4. A drop of oil on the hinge will _____

.

5. Never _____ the cutting tool from side to side or _____ wire

back and forth against the cutting edge.



Skills for Success in this Section



Reading



Writing

Clamps

What are some general safety tips to know when using clamps?

Clamps are versatile tools that serve to temporarily hold work in place. They are used for many applications including carpentry, woodworking, furniture making, welding, construction, and metalworking.

Clamp styles include C-clamps, bar clamps, pipe clamps, and hand screws.

Bar clamps have adjustable arms that are easily widened or narrowed to fit the work piece and, therefore, require fewer turns of the screw spindle, compared to a C-clamp, to hold the piece tightly.

DO

- Wear safety glasses or a face shield.
- Select the proper clamp style and size by matching the work-holding requirements of the job with the following clamp features:
 - strength and weight (for example consider rail size and nominal clamping pressure)
 - opening (length of reach)
 - throat depth (depth of reach)
 - ease of adjustment
 - clamping surfaces (material used and size)
- Ensure that the swivel at the end of the screw turns freely before using.



- Dispose of clamps with bent frames; replace bent spindles, if possible.
- Ensure that the pressure plate and anvil parts of the clamp are in full contact with the workpiece before tightening.
- Use pads with C-clamps to avoid marking the work.
- Remove clamps as soon as the job is finished. Clamps serve only as temporary devices for holding work securely in place.
- Keep all moving parts of clamps lightly oiled and keep tools clean to prevent slippage.



Note: Make sure there is no dirt or oil on any part that will come into contact with the work.

- Store C-clamps by clamping them on a rack, not in a drawer.

What should I avoid doing?

- Do not use extra-large clamps just for the sake of their large throats. Instead, use deep-throat clamps.
- Do not use any clamps that have a bent frame or a bent spindle.
- Do not use wrenches, pipes, hammers, or pliers to tighten clamps.
- Use wrenches only on clamps especially designed for wrenches.
- Do not hoist or pull with C-clamps. Use special lifting clamps.
- Do not use C-clamps to construct scaffolds or platforms for workers.



Clamps

Learning Activity

1. What are clamps designed to do for a woodworker?

2. Clamps are used in what kinds of jobs?

3. What are the 4 different kinds of clamps?

4. What do you need to consider when choosing the right clamp for the job?

5. How can you avoid marking the wood when using a clamp?

6. True or False?

- | | | |
|---|---|--|
| T | F | Clamps are permanent holding devices. |
| T | F | Store clamps on a rack. |
| T | F | Do not hoist or pull with C-clamps. |
| T | F | Clamps are great for building scaffolding. |
| T | F | Dispose of clamps with bent frames. |



Skills for Success in this Section



Reading



Writing



Numeracy

Hammers

What are some safety tips to know when using a hammer?



Hammers and other striking tools are widely used and often abused.

Hammers are made for specific purposes in various types and sizes, and with striking surfaces of varying hardness.

For example, hammers are used for general carpentry, framing, nail pulling, cabinet making, assembling furniture, upholstering, finishing, riveting, bending or shaping metal, striking masonry drill and steel chisels, and so on.

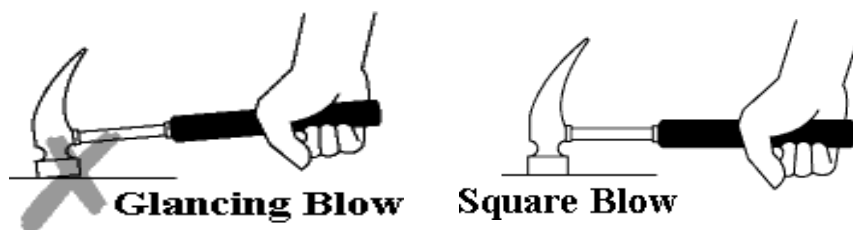
Hammers are designed according to their purpose (what they are being used for).

- Select a hammer that is comfortable for you and that is the proper size and weight for the job. Misuse can cause the striking face to chip, possibly causing a serious injury.
- Choose a hammer with a striking face diameter approximately 12 mm (0.5 inch) larger than the face of the tool being struck (e.g., chisels, punches, wedges, etc.).
- Ensure that the head of the hammer is firmly attached to the handle.
- Replace loose, cracked, or splintered handles.

- Discard any hammer with a mushroomed or chipped face or with cracks in the claw or eye sections.
- Wear safety glasses or a face shield.
- Strike a hammer blow squarely with the striking face parallel to the surface being struck.

Always avoid glancing blows and over and under strikes.

Hammers with beveled faces are less likely to chip or spall (splinter or chip).



- Look behind and above you before swinging the hammer.
- Watch the object you are hitting.
- Hold the hammer with your wrist straight and your hand firmly wrapped around the handle.

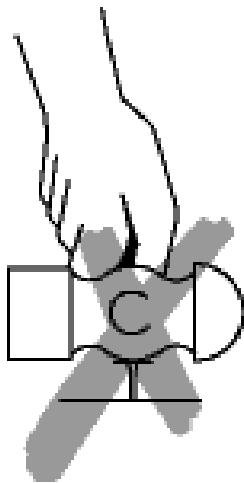


What should I avoid doing?

- Do not use a hammer with a loose or damaged handle.
- Do not use handles that are rough, cracked, broken, splintered, sharp-

edged, or loosely attached to the head.

- Do not use any hammer head with dents, cracks, chips, mushrooming (changes to hammer head because of repeated use), or excessive wear.
- Do not use a hammer for any purpose for which it was not designed or intended (that it should not be used for)
- Do not use one hammer to strike another hammer, other hard metal objects, stones, or concrete.
- Do not redress, grind, weld, or reheat-treat a hammer head.
- Do not strike with the side or cheek of the hammer.



Types of Hammers

(*not from CCOHS)

Claw Hammer

- heavy enough to drive large nails with ease
- claw designed to take out large nails



If you think you'll be removing a lot of nails, choose a hammer with a steel shaft.

Pulling nails puts a lot of strain on the shaft.

Ball-peen Hammer

- “engineer’s hammer” or “machinist’s hammer”
- best hammer to use for metal
- steelhead is harder than a claw hammer which means it is less likely to chip



Pin Hammer (Continental pattern)

- lightweight
- used to drive small nails, tacks, staples



Most carpenters use 16 oz. hammers but will often have a 20 oz. and a 22 oz. as well.

How to Hammer a Nail

- make sure the nail is aimed in the right direction
- hold the nail between your thumb and forefinger

- keep your eye on the nail
- lightly tap the nail until it is set in the wood
- let go of the nail once it is set in the wood
- lightly tap a few more times to make sure it is set
- hammer until the nail is in



How to fix a dent

If you miss the nail and put a dent or a 'bruise' in the wood, you can fix it by soaking the dent with water. This will make the wood swell.

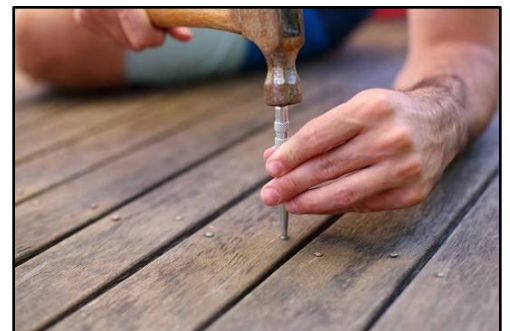
Wait for the area to dry.

Then, lightly sand the area.

Using a nail punch

A nail punch is a square tipped punch used to drive nails below the surface of the wood.

You can also use it to finish hammering a nail in, if you are worried about denting the wood.



Hammers

Learning Activity

1. What kinds of things are hammers used for?

2. What two things should you remember when picking out a hammer?

3. What is the difference between a glancing blow and a square blow?

4. Why should you look behind and above you before swinging a hammer?

5. List 3 types of hammers.

6. Fill in the following chart.

Name of hammer	Quick sketch of hammer	Description or qualities

7. Number the following into the proper sequence or order.

- _____ hammer until the nail is in
- _____ lightly tap a few more times to make sure it is set
- _____ make sure the nail is aimed in the right direction
- _____ lightly tap the nail until it is set in the wood
- _____ hold the nail between your thumb and forefinger
- _____ keep your eye on the nail
- _____ let go of the nail once it is set in the wood

8. In your own words, explain how you might try to fix a hammer dent or bruise in the wood.

9. What is a nail punch? What is it used for?

**Skills for Success in this Section****Reading****Writing**

Level and Plumb

Level means true horizontal (or even with the horizon).

level



Plumb means true vertical.

plumb



The tools used to measure level and plumb are:

Level



A level has small vials inside of it that when turned, an air bubble moves from side to side or up and down. When the true level or plumb is found, the air bubble will be in the middle of the vial. There are electronic levels that have sensors to show the true level or plumb.

Plumb Bob

A plumb bob is an old and simple tool that works on the principle of gravity. It is made up of a string and a heavy weight that is pointed on the bottom.



Level and Plumb

Learning Activity

1. _____ means true horizontal.

2. _____ means true vertical.

3. When true level is found the bubble on a level will be in:

4. What is a plumb bob?



Skills for Success in this Section



Reading



Writing

Table Saw

What should you do before using a table saw?

A table saw can be dangerous if not used properly.

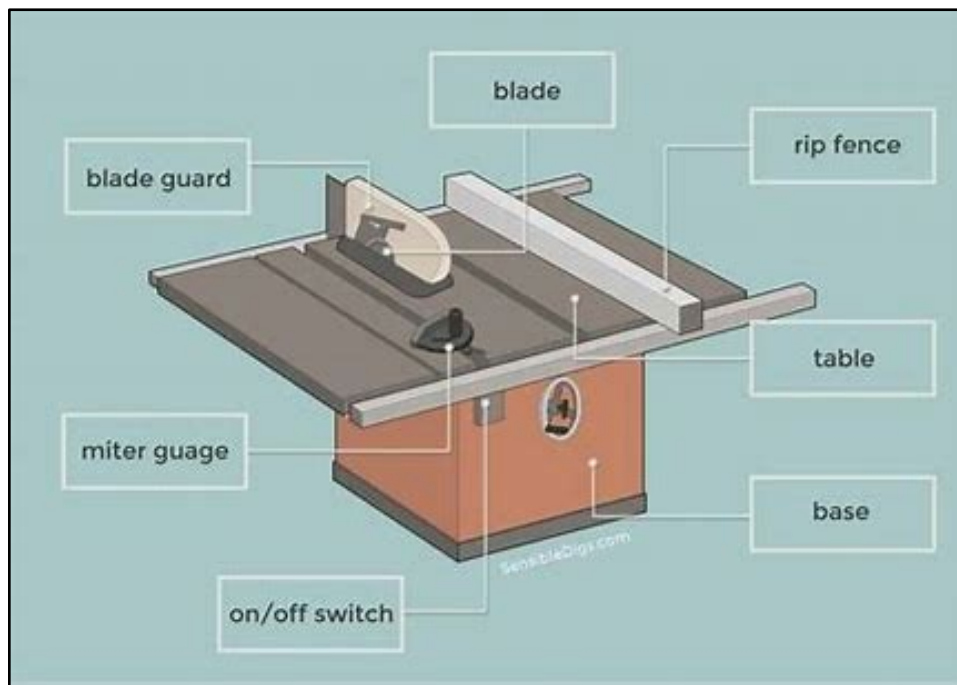
- Read the owner's manual carefully.
- Make sure you understand instructions before attempting to use any tool or machine.
- Learn the applications and limitations before use.



What safety procedures should you follow when using a table saw?

- Wear safety glasses or a face shield.
- Wear hearing protection that is suitable for the level and frequency of the noise you are exposed to in the wood working area.
- Read and understand the section on kickback. Kickback is when the wood can be violently thrown back toward the operator.
- Choose proper blades for the type of work being done.
- Keep blades clean, sharp, and properly set so that they will cut freely without having to force the work piece against the blade.
- Use the guards provided with the saw.

- Keep the guards in place and in working condition.
- Make sure that the fence is locked in position after the desired width has been set.



- Hold the workpiece firmly down on the table against the fence when pushing the wood through.
- Make sure that there is enough support to hold a work piece. Use extension tables or roller supports at the side or the back for larger pieces.

If an assistant is at the back (out feed) end of the saw, an extension table should be in place so the back edge is about 1.2 m (4 ft) from the saw blade.

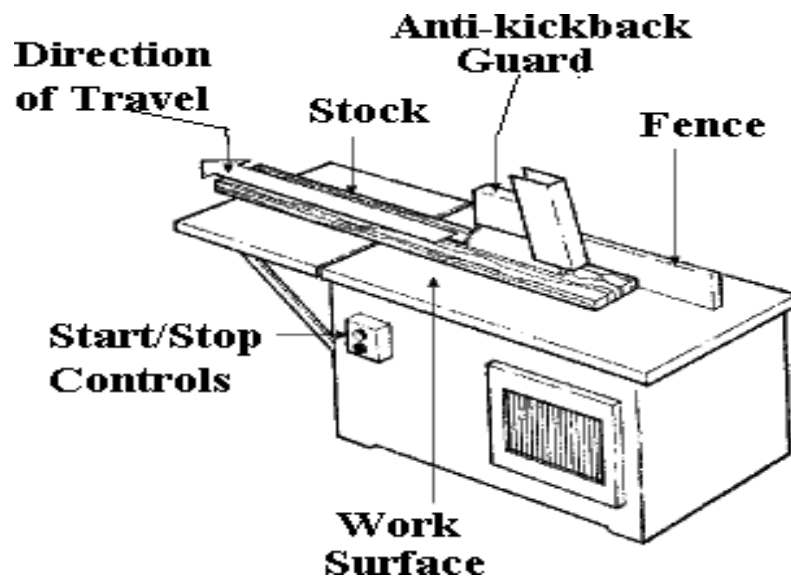
The assistant should wait for the work piece to reach the edge of the extension table and should not reach toward the saw blade.

- Feed stock into the blade against the direction of its rotation.

- Move the rip fence out of the way when cross cutting. Never use it as a cut off gauge.
- Use a push stick when ripping narrow or short stock (for example when the fence is set less than about 15 cm (6 in) from the blade; when the piece is less than 30 cm (12 in) long or when the last 30 cm (12 in) of a longer piece is being cut.).

Refer to ripping applications in the manufacturers instruction manual.

- Keep hands out of the line of a saw blade.



- Keep the body and face to one side of the saw blade out of the line of a possible kickback.
- Provide adequate support to the rear of a saw table for wide or long stock.
- Be careful when waxing, cleaning, or servicing the table.
- Shut off and unplug (or lock out) a saw before doing any work on the saw.

- Keep the area clean and clutter free.
- Operate machines in an area that is not crowded with a lot of light.
- Use the proper sawdust exhaust systems are required for operation.

What should you avoid when working with a table saw?

Do not saw freehand.

Always hold the stock firmly against the mitre gauge or a rip fence to position and guide the cut.

- Do not reach around and over moving blades.
- Do not feed the workpiece faster than the saw can accept.
- Do not leave a saw running unattended.

Turn off the power and make sure the machine has stopped running before leaving the area.



Always use a 'push stick' when feeding material through a table saw. This is the safest way to avoid contact with the spinning blade.

Push sticks can be purchased or easily made.

Making your own push stick is an excellent beginner-level woodworking project.

Table Saw

Learning Activity

1. What is kickback?

2. What is the purpose of an extension table or roller supports?

3. When should you use a push stick?

4. Re-read the following tips. Why are they important? What might happen?

- Do not reach around and over moving blades.
- Do not reach around and over moving blades.
- Do not feed the workpiece faster than the saw can accept.
- Do not leave a saw running unattended. Turn off the power and make sure the machine has stopped running before leaving the area.

5. Work with your instructor. Have your instructor test your knowledge and initial the following chart.

Parts of Table Saw	Able to identify	Had some difficulty	Re-tested and able to identify
direction of travel			
anti-kick guard			
fence			
start/stop controls			



Skills for Success in this Section



Reading



Writing

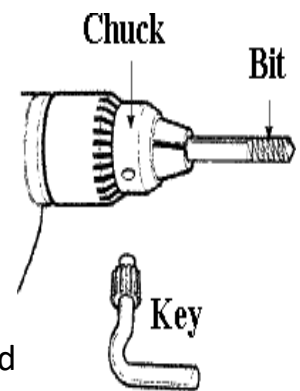


Digital

Drills

How do you select the proper bit or attachment?

- Follow manufacturer's instructions when selecting and using a bit or attachment, especially with unfamiliar drills or work.
- Select the bit or attachment suitable for the size of the drill and the work being done.
- Make sure that the bit or attachments are properly seated (positioned) and tightened in the chuck.
- Use only bits and attachments that turn true. Turning true means turning accurately, in the correct position, balanced, and level.
- Use the auxiliary (second) handle for larger work or continuous operation.



What should you do when working with powered hand drills?

- Wear safety glasses or a face shield.
- Keep drill air vents clear to maintain adequate ventilation.
- Keep drill bits sharp always.
- Keep all cords clear of the cutting area during use. Inspect for frays or damage before each use.



- Disconnect power supply before changing or adjusting bit or attachments.



- Tighten the chuck securely. Remove the chuck key before starting the drill.
- Secure workpiece being drilled to prevent movement.
- Slow the rate of feed just before breaking through the surface.
- Drill a small "pilot" hole before drilling large holes.

What should you do when working with small pieces?

- Clamp wood so work will not twist or spin.
- Do not drill with one hand while holding the material with the other.

What should you avoid when working with powered hand drills?

- Do not use a bent drill bit.
- Do not exceed the manufacturer's recommended maximum drilling capacities.
- Do not use a hole saw cutter without the pilot drill.
- Do not use high speed steel (HSS) bits without cooling or using lubrication.
- Do not attempt to free a jammed bit by starting and stopping the drill.

Unplug the drill and then remove the bit from the workpiece.

- Do not reach under or around stock being drilled.
- Do not overreach. Always keep proper footing and balance.
- Do not raise or lower the drill by its power cord.

The Power Drill

The power drill is probably the most widely used tool in construction. It is invaluable to the woodworker. Drills are either ***electric*** or ***cordless***.

The Chuck

Drill bits are held in place in the 'chuck'.

Most chucks have 3 jaws that tighten toward the centre.

Some drills use a chuck key to change the bits. It fits into grooves on the chuck, and when turned either tightens or loosens the 3 jaws around the drill bit. Other drills don't require a key.

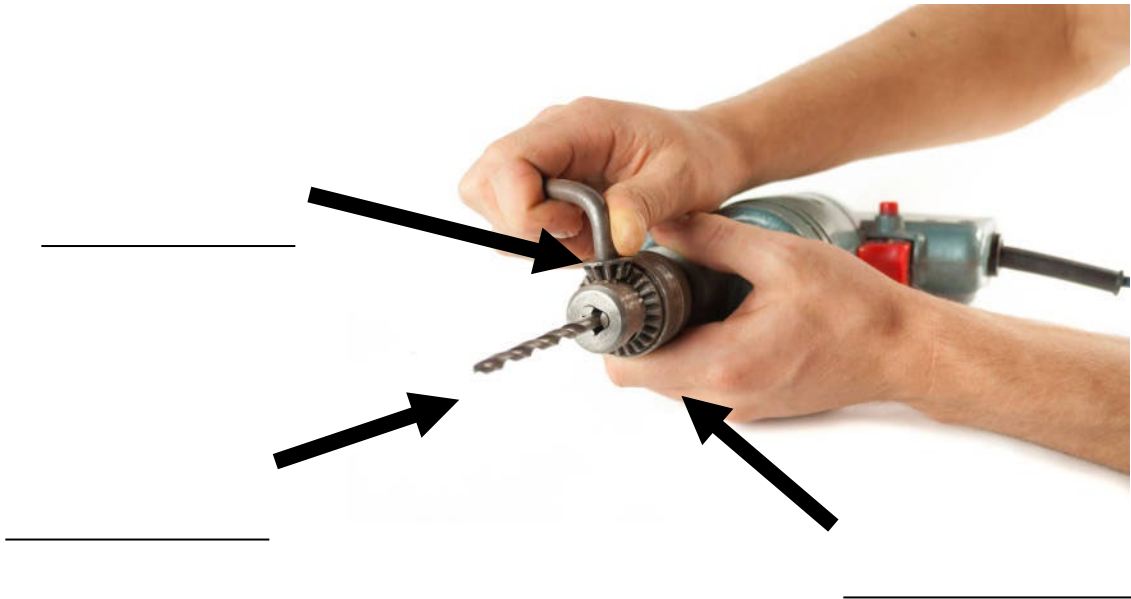
They are called 'chuckless keys'.

There is a collar on the drill that you turn to tighten or loosen the chuck. This is much handier, and there is no worry of losing the chuck key.

Drills

Learning Activity

1. Label the following picture.



2. Use a search engine on your device. Find a picture of a drill and a chuck. Print that picture. If you cannot print, show the picture to your instructor.
3. "Use only bits and attachments that turn true." Explain what this means.

4. Read the two tips for 'what you should do when working with small pieces'. Why are these tips important? What could happen? What are the risks?

5. Demonstrate to your instructor that you can use a drill safely.

Date	Able to use drill safely	Had some difficulty	Re-tested and able to use safely



Skills for Success in this Section



Reading



Writing



Problem solving

Sanders

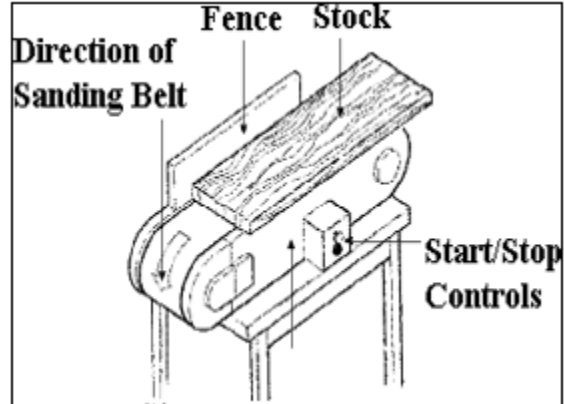
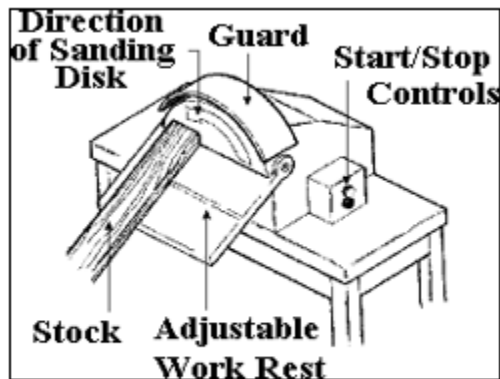
What should you do before using sanders?

Sanders can be very dangerous if not used properly.

- Read the owner's manual carefully.
- Make sure you understand instructions before attempting to use any tool or machine.
- Learn the applications and limitations before use.

Safety procedures should you follow when using sanders

- You should always keep your hands away from the abrasive surface.
- You should also hold small or thin pieces of stock in a jig or holding device to prevent injuries to your fingers or hands.
- Also it is important to inspect abrasive belts before using them and to replace belts that are worn or frayed in spots.
- Always remember to sand on the downward side of a disc sander so that the wood is driven onto the table by the machine's rotation.
- Install abrasive belts that are the same width as the pulley drum
- Adjust abrasive belt tension to keep the belt running the same speed as the pulley-drum.



What should you avoid when using a sander?

- Do not sand small or thin hand-held work pieces.
- Do not wear loose clothing, or jewelry while using revolving power tools. Tie back long hair or wear appropriate hair protection. These measures will prevent hair, clothing, or jewelry (like dangling neck chains) from being caught and pulled by the sander belts and pulleys that are in motion.
- Do not operate sanders without the exhaust system operating.
- Do not operate sanders unless adequately guarded.

Sanders

Learning Activity

1. In your opinion, why do you think that safety goggles are recommended rather than safety glasses?

2. What other kinds of safety equipment is required?

3. Why do you need to hold small pieces of wood in a jig or holding device?

4. Why should you not wear loose clothing, jewelry, or have long, loose hair around a sander?

5. Explain two things you can do to ensure you are using a power sanding tool safely.

**Skills for Success in this Section**

Reading



Writing

Belt Sanders

What should you do to work safely with belt sanders?

- Wear safety glasses or a face shield.
- Wear a dust respirator for dusty operations.
- Make sure the sander is switched "OFF" before connecting the power supply.
- Disconnect power supply before changing a sanding belt, adjusting, or emptying dust collector.
- Inspect sanding belts before using them. Replace belts that are excessively worn or frayed.
- Secure the sanding belt in the direction shown on the belt and the machine.
- Keep hands away from a sanding belt.
- Use two hands to operate sanders - one on a trigger switch and the other on a front handle knob.
- Keep all cords clear of the sanding area during use.
- Clean dust from a motor and vents at regular intervals.



What should you avoid while working with belt sanders?

- Do not use a sander without an exhaust system or a dust collector present that is in good working order.



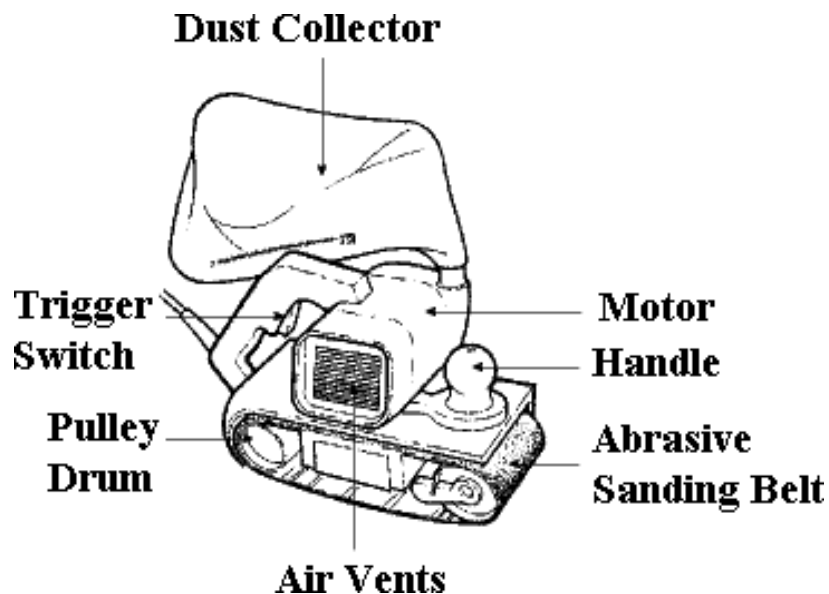
Note: Empty the collector when 1/4 full. The dust created when sanding can be a fire and explosion hazard. Proper ventilation is essential.

- Do not exert excessive pressure on a moving sander. The weight of the sander supplies adequate pressure for the job.
- Do not work on unsecured stock unless it is heavy enough to stay in place.



Note: Clamp the stock into place or use a “stop block” to prevent movement.

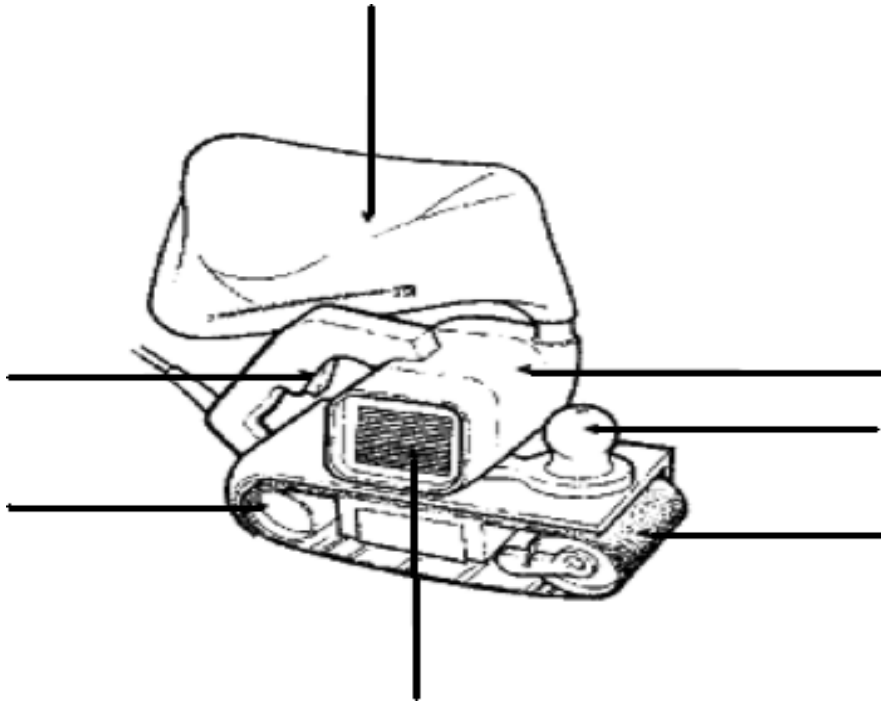
- Do not overreach. Always keep proper footing and balance.
- Do not cover the air vents of the sander.



Belt Sanders

Learning Activity

1. Label the following diagram of a belt sander.



2. In your opinion why is it important to wear dust masks and have a dust collector system?

3. Why should you not put excessive (a lot) of pressure on a moving sander?

**Skills for Success in this Section**

Reading



Writing



Digital

Routers

What should you do before you start cutting with a router?

- Wear eye protection or a face shield and appropriate hearing protection when required.
- Disconnect the power supply before making any adjustments or changing bits.
- Ensure that the bit is securely mounted in the chuck and the base is tight.
- Put the base of the router on the work, template, or guide. Make sure that the bit can rotate freely before switching on the motor.
- Never rely on yourself or a second person to support or hold the material.



Note: Sudden torque or kickback from the router can cause damage and injury.

- Before using a router, check stock thoroughly for staples, nails, screws, or other foreign objects.
- Keep all cords clear of the cutting area.

What should you do to work with a router safely?

- Hold both hands on router handles always, until a motor has stopped.

Routers

Learning Activity

1. Use the internet to find and print pictures of various router bits.

List the names of 6 different kinds you find on the lines below.

_____	_____
_____	_____
_____	_____

2. Make sure the router bit can turn _____ before turning it on.

3. Why should you disconnect the power supply before changing the bit?

4. Is it ok to have someone else hold your piece of wood for you while you router it? Why or why not?

5. Fill in the following chart:

Kind of wood	Speed of cutting
Softwood	
Hardwood, knotty, or twisted pine	

6. When the wood is fed into the router too slowly, the motor _____

7. When the router is pushed too hard, the motor _____



Note: Do not set the router down until the exposed router bit has stopped turning.

- Do not overreach. Keep proper footing and balance.
- When inside routing, start the motor with the bit above the stock.

When the router reaches full power, lower the bit to required depth.

- When routing outside edges, guide the router counterclockwise around the work.
- When routing bevels, moldings, and other edge work, make sure the router bit is in contact with the stock to the left of a starting point and is pointed in the correct cutting direction.
- Feed the router bit into the material at a firm, controlled speed.
- With softwood, you can sometimes move the router as fast as it can go.
- With hardwood, knotty, and twisted wood, cutting may be very slow.
- The sound of the motor can indicate safe cutting speeds.



Note: When the router is fed into the material too slowly, the motor makes a high-pitched whine. When the router is pushed too hard, the motor makes a low growling noise.

- When the type of wood or size of the bit requires going slow, make two or more passes to prevent the router from burning out or kicking back.
- To decide the depth of cut and how many passes to make, test the router on scrap lumber similar to the work.



Skills for Success in this Section



Reading



Writing



Numeracy

Band Saws

What should you do before using a band saw?

A band saw can be dangerous if not used properly.

- Read the owner's manual carefully.
- Make sure you understand the instructions before attempting to use any tool or machine.
- Securely anchor the band saw to the floor (or a workbench of appropriate height) to reduce vibration.

What safety procedures should you follow when using a band saw?

- Wear safety glasses or a face shield.
- Wear hearing protection that is suitable for the level and frequency of the noise you are exposed to in the woodworking area.
- Make sure all guards are in place and properly adjusted. Ensure all band wheels are enclosed.
- Adjust blade guard height to about 3 mm or 1/8 inch above the top of the material being cut.
- Ensure the blade is under proper tension. A band saw equipped with automatic tension control is desirable.

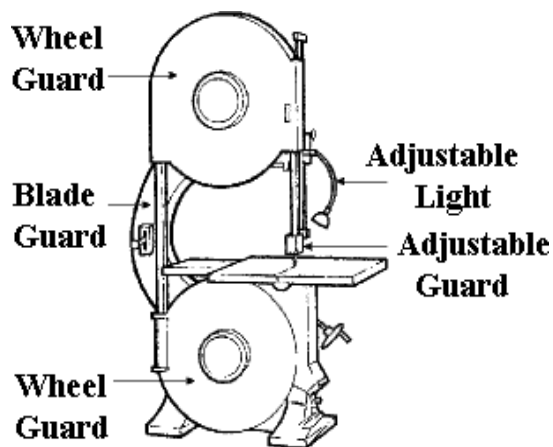


- Use band saw blades that are sharp, properly set, and otherwise suitable for the job (e.g. the right tooth pitch, tooth form, blade width).
- Hold the stock firmly and flat on the table to prevent the stock from turning and drawing your fingers against the blade. Keep hands braced against the table.
- Use a push stick when you remove cut pieces from between the fence and saw blade or when your hands are close to the blade.



Note: Keep your hands on either side of the blade - not in line with the cutting line and the blade.

- Make release (relief) cuts before tight curves when doing intricate scroll-type work.
- Keep the floor around a band saw clean and free of obstructions or clutter.
- Keep the machine properly oiled and serviced.
- Provide adequate lighting at the machine table. A light fixture with a flexible connection can provide essential lighting.



What should you avoid when working with a band saw?

- Do not use excessive force when pushing the wood past the blade.
- Do not back the stock away from the blade while the saw is in motion if the work piece binds or pinches on the blade.
- Do not stop a band saw by thrusting stock against the cutting edge or the side of the blade immediately after the power has been shut off.
- Do not remove sawdust or cutting from the table by hand or with compressed air. Use a stick or brush.
- **Do not leave a saw running unattended.**



Note: Turn off the power and make sure the machine has stopped running before leaving the area.

Band Saws

Learning Activity

1. Why should you secure a saw to the floor?

2. How much space should there be between the piece of wood you are cutting and the blade guard?

3. How and why would you use a push stick when operating a band saw?



Skills for Success in this Section



Reading



Writing



Numeracy

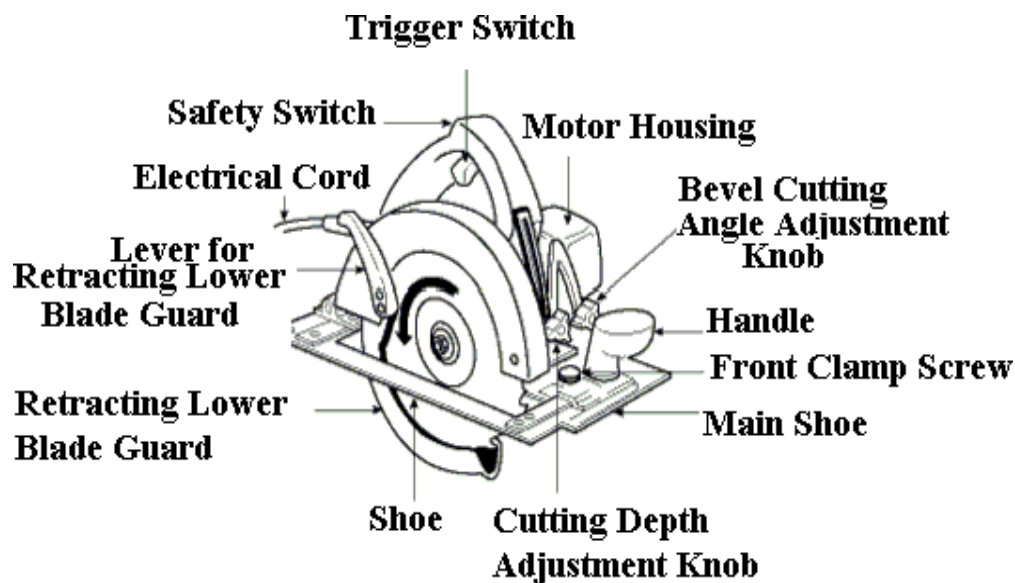
Circular Saws

What should you do before you start cutting with a circular saw?

- Wear safety glasses or a face shield. Wear an approved respirator or dust mask when exposed to harmful or nuisance dusts.
- Use appropriate hearing protection equipment in noisy areas.
- Check the retracting lower blade guard to make certain it works freely.
- Ensure that the blade that you have selected is sharp enough to do the job. Sharp blades work better and are safer.
- Check the saw for proper blade rotation.
- Set the depth of the blade, while the saw is unplugged, and lock it at a depth so that the lowest tooth does not extend more than about 0.3 cm or 1/8" beneath the wood.
- Keep all cords clear of the cutting area.
- Circular saws are designed for right-hand operation; left-handed operation will demand more care to operate safely.

What should you do to work safely with a circular saw?

- Check the retracting lower blade guard frequently to make certain it works freely. It should enclose the teeth as completely as possible and cover the unused portion of the blade when cutting.



- Check that the retracting lower blade guard has returned to its starting position before laying down the saw.
- Keep the upper and retracting lower blade guard clean and free of sawdust.
- Disconnect power supply before adjusting or changing the blade.
- Allow the saw to reach full power before starting to cut.
- Use two hands to operate saws - one on a trigger switch and the other on a front knob handle.

- Keep a motor free from accumulation of dust and chips.
- Select the correct blade for stock being cut and allow it to cut steadily.
- Do not force it.
- Secure work being cut to avoid movement.

What should you avoid when cutting with a circular saw?

- Do not hold or force the retracting lower guard in the open position.
- Do not place your hand under the shoe or guard of the saw.
- Do not over tighten the blade-locking nut.
- Do not twist the saw to change, cut, or check alignment.
- Do not use a saw that vibrates or appears unsafe in any way.
- Do not force the saw during cutting.
- Do not cut materials without first checking for obstructions or other objects such as nails and screws.
- Do not carry the saw with a finger on the trigger switch
- Do not overreach. Keep proper footing and balance.
- Do not rip stock without using a wedge or guide clamped or nailed to the stock.



Circular Saws

Learning Activity

1. Explain why you need to check if the blade is sharp.

2. Circular saws are designed for _____ handed operation. _____
handed people should be extra careful when using the saw.

3. Setting the depth of the blade: The saw should be _____.
Lock it at a depth so that the lowest tooth does not extend more than about
_____ cm or _____ inches below the wood.

4. List the safety equipment you need to use to safely operate a circular saw.

5. True or False?

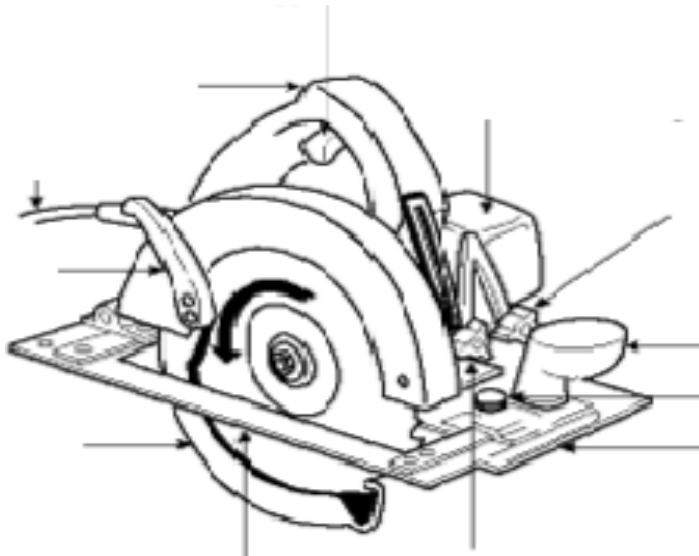
- | | | |
|---|---|---|
| T | F | Keep the motor free of dust. |
| T | F | It is ok to force the saw to make the cut. |
| T | F | Hold onto wood with one hand and cut the wood with the other. |

T	F	Do not carry the saw with a finger on the trigger switch.
---	---	---

T F Do not over tighten the blade-locking nut.

T F Do not place your hand under the shoe or guard.

6. Label the following diagram using the terms below.



* graphic adapted from Canadian Centre for Occupational Health & Safety (CCOHS), www.ccohs.ca

lever for retracting lower blade guard
main shoe
motor housing
front clamp screw
retracting lower blade guard
switch bevel cutting angle adjustment knob

shoe
electrical cord
handle
trigger switch
safety

7. Work with your instructor.

Have your instructor test your knowledge and initial the following chart.

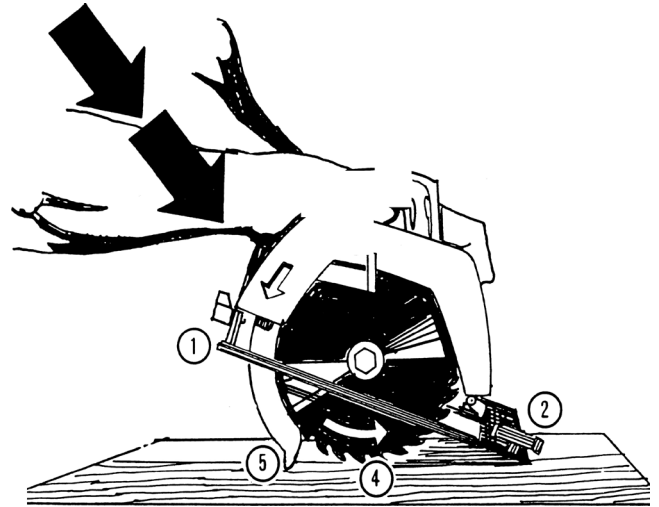
Parts of Circular Saw	Able to identify	Had some difficulty	Re-tested and able to identify
safety switch			
trigger			
motor			
knob for bevel cuts			
knob for cutting depth			
lever for retracting lower blade guard			
front clamp screw			
electrical cord			
handle			
lower blade guard			
main shoe			
shoe			

SAFETY TIPS

CIRCULAR SAWS- Pocket Cuts

Before switching on the saw:

- 1) Tilt saw forward.
- 2) Rest front of shoe on wood.
- 3) Retract lower guard.
- 4) Lower saw until front teeth **almost** touch wood.
- 5) Release guard to rest on wood.
- 6) **Then: Switch on the saw.**
- 7) Keep the saw tilted forward and push it down and forward with even pressure, gradually lowering it until the shoe rests flat on wood.



REMEMBER - hold the saw firmly to keep it from backing up.

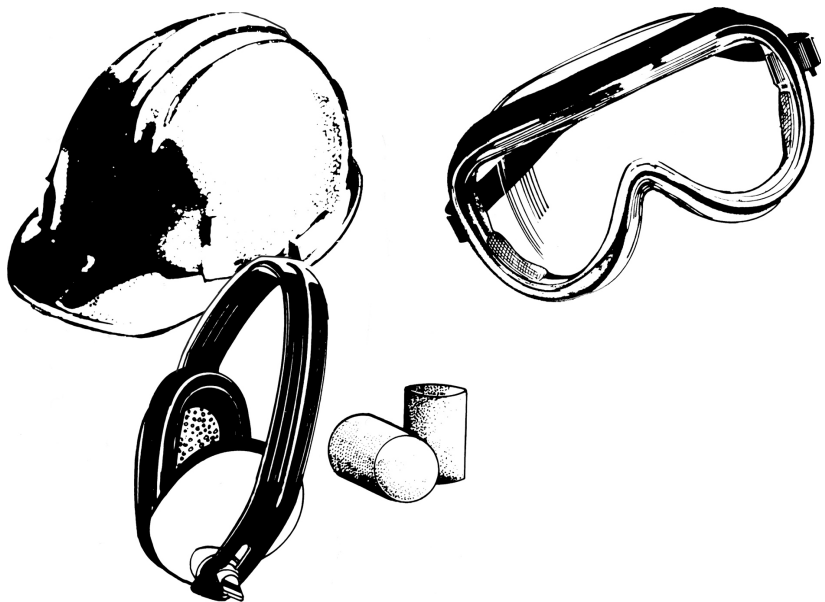
When making any cut with a circular saw, wear the right protective equipment.

Hard Hat and Safety Boots

Mandatory for everyone on a construction project.

Eye Protection

Should be always worn on a construction project. For cutting, the minimum protection is spectacles with side shields. Much more effective are eyecup or cover goggles.



Respiratory Protection

A disposable dust mask is adequate protection against dust from cutting most woods.

For exotic woods or specialized materials such as some floor and ceiling products, a half-face mask respirator may be required.

Hearing Protection

Should be worn by anyone operating circular saws or other power tools in confined spaces or for prolonged periods of time.



Credit: Construction Safety Association of Ontario

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Etobicoke, Ontario M9W 5M7

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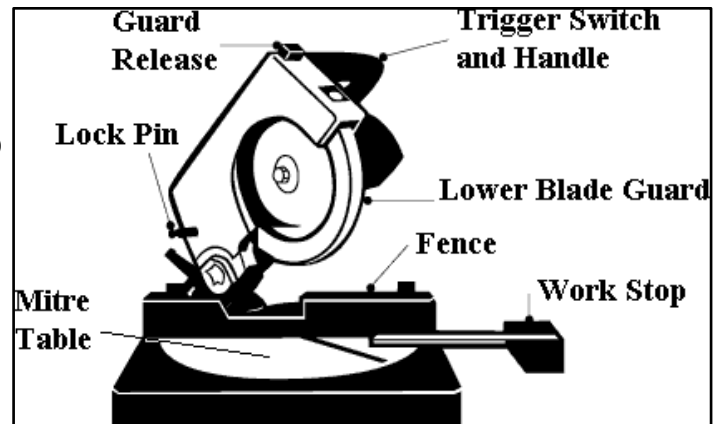


Mitre Saws

A mitre saw is like a circular saw on a stand. Its cutting edge is brought down to cut the wood. It chops the wood, so it is often called a chop saw.

The blade can be turned to cut angles or tilted to cut beveled edges.

It is a handy cutting tool.



Mitre saws can be dangerous if not used properly. Follow these steps for safety:

- Read the owner's manual carefully.
- Make sure you know and understand the instructions before attempting to use any tool or machine.
- Learn the applications and limitations before use.

What safety precautions should you follow when using a mitre saw?

- Wear safety glasses or a face shield. If work is dusty, use a respirator or dust mask.
- Wear appropriate hearing protection.
- Attach the saw firmly on a workbench or other rigid frame and operate the saw at waist height.
- The saw can also be taken to remote locations by mounting it on a piece of

plywood, 13 mm (½ inch) or thicker.

This must be clamped to a waist high work surface in the job site with large “C” clamps.

- Keep one hand on the trigger switch and handle and use the other hand to hold the stock against the fence.
- Keep hands out of the path of the blade.
- Keep guard in place and in working order.
- Remove adjusting keys and wrenches.
- Use a crosscut or combination blade.
- Ensure that the blade rotates in the correct direction.
- Keep the blade tight, clean, sharp, and properly set so that it cuts freely and easily.
- Allow the motor to reach full speed before cutting.
- Follow instructions for lubricating and changing accessories.
- Keep the work area clean. Cluttered areas and benches invite accidents.
- Keep the work area well lit.
- Reduce the risk of unintentional startup.



Note: Make sure the saw switch is in OFF position before plugging in.

- Unplug tools before servicing and when not in use.

- Check for damage. Repair or replace damaged parts.
- Keep motor air slots clean and free of wood chips.
- Use only the accessories designed for the specific saw and job.

What should you avoid when using a mitre saw?

- Do not operate the saw on the ground.
- Do not cut pieces smaller than 20 cm (8 inches) in length.
- Do not cut “free hand”. The stock should lie solidly on the table against the fence.
- Do not reach around or behind the saw blade.
- Do not take your hand away from the trigger switch and handle until the blade is fully covered by the lower blade guard.
- Do not overreach.



Note: Always keep proper footing and balance.

- Do not force the saw. The saw cuts better and more safely at the rate for which it was designed.
- Do not leave the saw until it has stopped completely. Turn the power off and unplug the saw.
- Do not use electric tools in damp or wet locations.
- Do not operate electric tools near flammable liquids or in gaseous or explosive atmospheres. Sparks may ignite fumes.

Mitre Saws

Learning Activity

1. Use one hand to hold the _____ and the other hand to hold the _____ against the fence.

2. How can you avoid unintentional start-up?

3. Why is it important to never operate electric tools near flammable liquids?

4. Explain the “free hand” rule.

**Skills for Success in this Section**

Reading



Writing

Push Blocks and Push Sticks

When should you use push sticks?

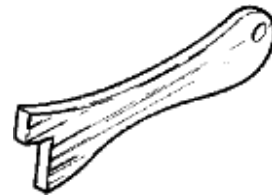
Push sticks or push blocks should be used when operating standard woodworking machinery, including table saws, radial arm saws, jointer/planers and shapers.

These sticks protect the hand while allowing good hand control of the stock as it is pushed through the cutting head or blade. Push blocks for jointer/planers and shapers should be either two blocks or ones with two-handed positioning.

What are some features of a push block?

Hold-down push blocks should:

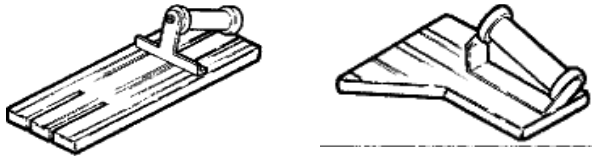
- Be rigid
- Enable the operator to protect both hands.
- Allow the operator to exert a firm and steady pressure on the workpiece.



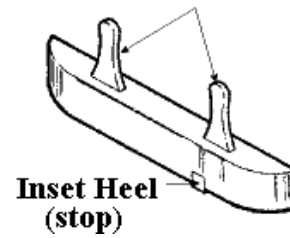
The following are samples of push blocks.

Simple push sticks are useful on a table saw when the distance between the blade and fence is narrow.

Double-handled hold-down push block



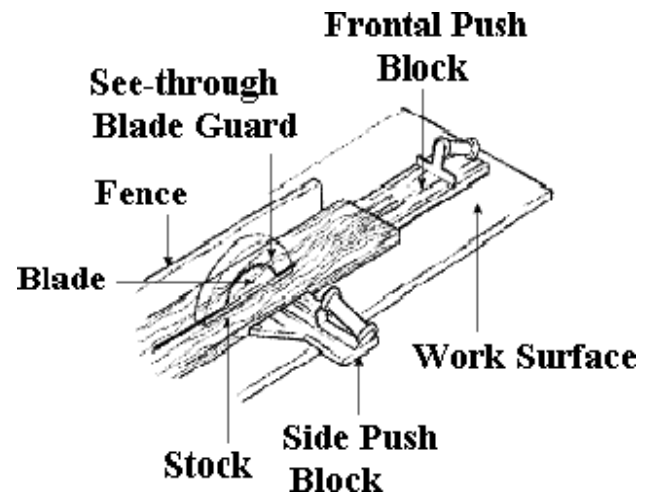
Old Paint Brush Handles



Frontal push block

Side push block

Use of two push blocks on a single application.



Push Blocks and Push Sticks

Learning Activity

1. What tools should you use a push stick with?

2. In your own words, describe what a push stick is and why it should be used.

3. What is the difference in a frontal push block and a side push block?

**Skills for Success in this Section**

Reading



Writing

Pneumatic Tools - Basic Safety

What are pneumatic tools?

Pneumatic tools are powered by compressed air.

Common types of these air-powered hand tools that are used in industry include buffers, nailing and stapling guns, grinders, drills, jack hammers, chipping hammers, riveting guns, sanders, and wrenches.

How do you use pneumatic tools safely?

- Review the manufacturer's instructions before using a tool.
- Wear safety glasses or a face shield and, where necessary, safety shoes or boots and hearing protection.
- Post warning signs where pneumatic tools are used. Set up screens or shields in areas where nearby workers may be exposed to flying fragments, chips, dust, and excessive noise.
- Ensure that the compressed air supplied to the tool is clean and dry. Dust, moisture, and corrosive fumes can damage a tool. An in-line regulator filter and lubricator increase tool life.
- Keep tools clean and lubricated and maintain them according to the manufacturer's instructions.
- Use only the attachments that the manufacturer recommends for the tools you are using.

- Be careful to prevent hands, feet, or body from injury in case the machine slips or the tool breaks.

How should you handle air hoses?

- Use the proper hose and fittings of the correct diameter.
- Check hoses regularly for cuts, bulges, and abrasions. Tag and replace, if defective.
- Blow out the air line before connecting a tool. Hold the hose firmly and blow away from yourself and others.
- Do not operate the tool at a pressure above the manufacturer's rating.
- Turn off the air pressure to hose when not in use or when changing power tools.
- Do not carry a pneumatic tool by its hose.
- Avoid creating trip hazards caused by hoses laid across walkways or curled underfoot.
- Do not use compressed air to blow debris or to clean dirt from clothes.

What should you avoid with compressed air?

- Cleaning with compressed air is dangerous.



Note: You should not use compressed air for cleaning.

Pneumatic Tools - Basic Safety

Learning Activity

1. Pneumatic tools are powered by

2. Common types of pneumatic tools are:
3. Why is it important to post warning signs if using pneumatic tools?
4. If you find a hose has a cut or abrasion in it, what should you do?
5. In your own opinion, why should you not use compressed air to blow debris or to clean dirt from your clothes? What could happen?



Skills for Success in this Section



Reading



Writing



Digital

Construction Machines on the Job Site

There are a lot of people on construction sites, doing lots of different kinds of jobs. Some of those jobs involve large pieces of machinery and equipment.

Without these pieces of machinery, these jobs would be a lot harder, take a lot more manpower, and take longer to complete.

These machines can be very dangerous. Extreme caution must be used when operating one.



The drivers of these machines need special training to operate them. It is not just the drivers who need to be careful. Everyone on the job site does.

Always be aware of what these machines are doing and where they are going.

The driver will keep the machine as safe as possible; you need to keep yourself safe.

It is important to know what these machines do so that you can anticipate their movements.

Knowing if a certain machine swings or swivels or has an arm that moves up and down, will help you to stay out of the way and stay safe.



It is important to know that trucks and machines make beeping noises when they are in reverse.



Note: If you hear this, you know that a machine is backing up and you need to get out of the way.

Stay safe! Know these machines, what they do, and always be aware of where they are on the job site.

Bulldozer

A bulldozer pushes rocks, earth, mud, etc.

They are also used to level the ground.
Bulldozers come in different styles and sizes.

They are made to do different types of jobs.



Loader

The loader is used to carry things like rocks and dirt.

It then dumps the load into dump trucks. There are different types of wheel loaders, designed to do work in different conditions.

The bucket can also be replaced with other equipment.



Excavator

The excavator can dig, level, and load materials.

Excavate means to dig out and leave a hole. A backhoe is an excavator.



Dump Truck

Dump trucks are used to carry things like dirt and rocks.

The back part of the truck lifts up and dumps the load.



Concrete Mixer

The concrete mixer carries concrete to the job site.

The tank on the back of the truck rolls continuously to keep the cement from hardening.



Cranes

Cranes are very useful for lifting things that are very heavy.

They can lift things up very high.



Construction Machines on the Job Site

Learning Activity

1. Use the internet to find pictures of various machines that you might find on a construction site.

Print out pictures of all the machines that you find. Find one or two that are not listed here.

List them below and write something about what kinds of jobs they do.

Machine: _____

What it does: _____

Machine: _____

What it does: _____

2. In your own words, why is it important to know what these machines do and where they are working on a job site? What could happen?

3. The reading told you about six different kinds of machines you might find on a construction site. Use that information to fill in the sections below.

Machine: _____

What it does: _____

Machine: _____

What it does: _____

Machine: _____

What it does: _____

Machine: _____

What it does: _____

Machine: _____

What it does: _____

Machine: _____

What it does: _____



Skills for Success in this Section



Reading



Writing



Numeracy

Blueprints and Drawings

Important Vocabulary

Incorporate:	include
Adjustments:	changes
Dimensions:	sizes
Fixtures:	toilets, sinks, tubs, etc.

Blueprints



Blueprints are drawings.

They are drawn by the architect.

Blueprints provide information and details about the construction.

People working in the trades use blueprints as a 'map' to guide them in their work.

They are called blueprints because, when they are printed, they are blue in colour.

Each blueprint will have a scale and measurements for the tradesperson to follow.

The scale is a **ratio**. The measurements are the actual length, width, etc. of the final construction.

For example, the plumber's blueprint will show all the pipe runs and connections for the plumbing system in the building. Each pipe run will be labelled and sized according to the needs of the system.

Depending on the size of the building, the blueprints could have all of the trades' details on one document. Sometimes there will be adjustments made to the blueprints during the construction.

It is important to follow the architect's drawings as closely as possible. When the architect draws the blueprints, he takes into consideration all the costs associated with the building. This ensures that the building is done according to budget.

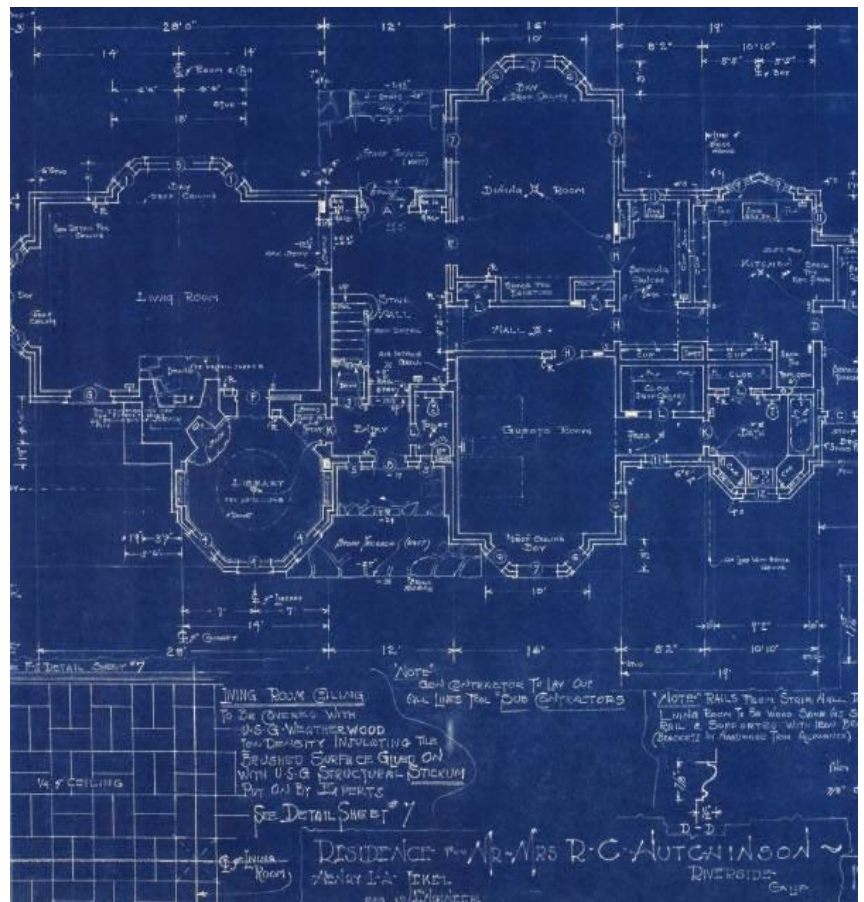
In the case of an apartment building, for example, a mistake in construction could cause thousands of dollars of extra costs.

Example: A blueprint has a scale of 1:12. This means that every 1" of the drawing represents 12" (or 1 foot) of the completed work.

The architect will provide this information on the blueprint.

It is important to convert the scale to the actual measurement so you know, for example, how long to cut the 2x4 lumber.

Sample blueprint:



Drawings and Floor Plans

On small construction jobs, the blueprint or drawing could be limited to one document with each floor plan.

The floor plan is drawn as if you are looking down on the plan. The dimensions of each room are given but it does not mean that the dimensions are to scale.

The scale of the plan is written in the bottom right hand corner of the drawing and could read for example $\frac{1}{4}$ " to 1 foot.

The floor plan will not give the layout of the pipe runs or electrical wiring, as they will be on the Master Blueprint. The dimensions of the rooms and the location of fixtures in the bathroom and kitchen will be on the floor plan.

Usually floor plans are designed for the purchaser or owner to follow for furnishings etc.

The floor plan will also allow the owner to make changes if necessary, usually at additional cost.

Blueprints and Drawings

Learning Activity

1. What is the purpose of the blueprint?

2. Why is it important to closely follow the blueprints?

3. What is the difference between a blueprint and floor plan?

4. What is the purpose of the floor plan?



Skills for Success in this Section



Reading



Writing

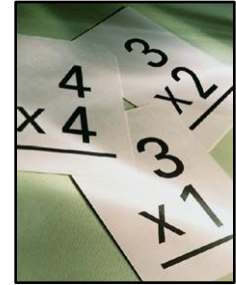


Numeracy

Multiplication

The Multiplication Table

If you do not have a calculator, cut this out and put it in your toolbox for a quick multiplication reference.



	1	2	3	4	5	6	7	8	9	10	11	12	16
1	1	2	3	4	5	6	7	8	9	10	11	12	16
2	2	4	6	8	10	12	14	16	18	20	22	24	32
3	3	6	9	12	15	18	21	24	27	30	33	36	48
4	4	8	12	16	20	24	28	32	36	40	44	48	64
5	5	10	15	20	25	30	35	40	45	50	55	60	80
6	6	12	18	24	30	36	42	48	54	60	66	72	96
7	7	14	21	28	35	42	49	56	63	70	77	84	112
8	8	16	24	32	40	48	56	64	72	80	88	96	128
9	9	18	27	36	45	54	63	72	81	90	99	108	144
10	10	20	30	40	50	60	70	80	90	100	110	120	160
11	11	22	33	44	55	66	77	88	99	110	121	132	176
12	12	24	36	48	60	72	84	96	108	120	132	144	192
16	16	32	48	64	80	96	112	128	144	160	176	192	256

12 Times Table (12x)

There are 12 inches in a foot. Feet are units of measurement that are often used.

It is a common unit of measurement in construction.

If you memorize the 12 x tables, it will save you having to do calculations on a piece of paper or on a calculator.

16 Times Table (16 x)

16 x tables are another common unit of measurement in construction. If you are building load-bearing walls, you will be using the 16 times table.

Why? Load-bearing wall studs are placed 16" apart.

Concrete blocks are 8"x16". If you are figuring out how many will fit into an area, knowing the 16 x table is helpful.



$$16 \times 1 = 16$$

$$16 \times 2 = 32$$

$$16 \times 3 = 48$$

$$16 \times 4 = 64$$

$$16 \times 5 = 80$$

$$16 \times 6 = 96$$

$$16 \times 7 = 112$$

$$16 \times 8 = 128$$

$$16 \times 9 = 144$$

$$16 \times 11 = 176$$

$$16 \times 12 = 192$$

$$16 \times 13 = 208$$

$$16 \times 14 = 224$$

$$16 \times 15 = 240$$

$$16 \times 16 = 256$$

$$16 \times 10 = 160$$



Skills for Success in this Section



Reading



Writing

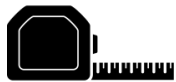


Numeracy



Digital

Using Tape Measures in Trades



Measurement is the way that numbers are used most often in the trades.

Three workplace examples of measurement and calculation in trades include the following:

- Construction electricians take measurements to make sure that electrical work meets electrical code regulations.
- Carpenters need precise measurements to make sure buildings are safe.
- Plumbers perform calculations to design, fabricate, and install pipes that need to go around obstacles.



Trades people who build things in their work use measuring tapes, survey equipment, scales, and other tools to measure each day.

They work with both imperial (feet, inches, yards) and metric measurements (millimetres, centimetres, metres) on the job.



Note: It is very important as a tradesperson to measure correctly.

Above materials, credit: Developed by Susan Boyd for CESBA. © 2023 Skills For Success Curriculum Resources, Trades Math Essentials from <https://cesba.com>

When measurements are incorrect materials such as lumber, carpet, wood flooring, and wires are wasted. Using a measuring tape accurately is an important skill in the trades.

Here is a simple way to understand how to read a tape measure:

1. **Look for Whole Numbers:** The largest numbers on the tape measure are whole numbers. Each of these numbers usually represents a full inch (or centimetre if it is metric).
2. **Identify the Smaller Lines:** Between each whole number, there are smaller lines. These lines represent fractions of the inch or smaller units, like half, quarters, or eighths.
3. **Practice Counting:** For example, if you are reading inches, the first small line after 1 inch is 1 and $\frac{1}{4}$ inches, then 1 and $\frac{1}{2}$, then 1 and $\frac{3}{4}$, and so on.
4. **Metric Tape:** In metric measurements, the larger numbers represent centimetres, and each centimetre is divided into 10 smaller lines. These are called millimetres.

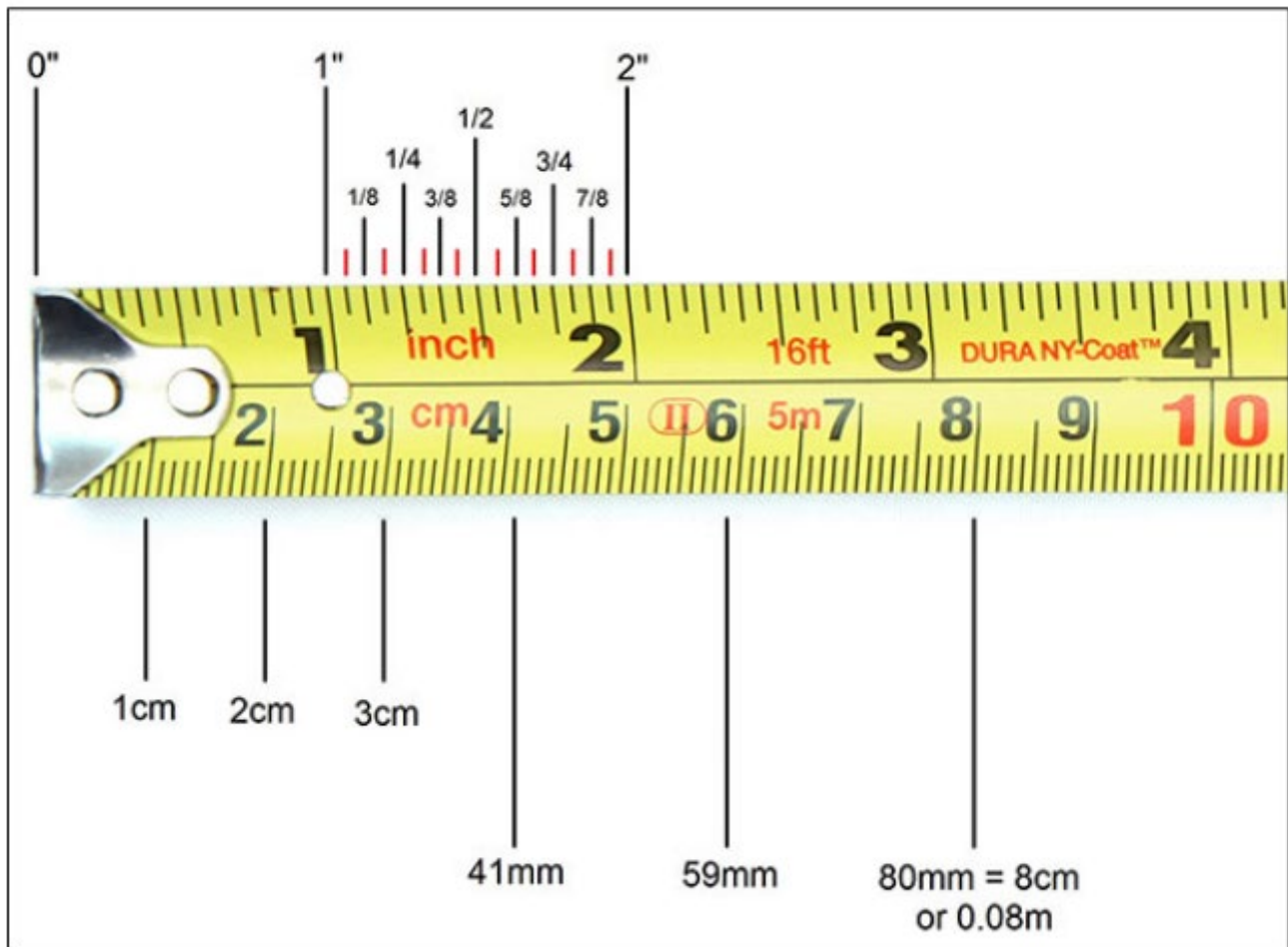


Note: If something lands halfway between whole numbers, it is usually at the “half” mark, such as 1 and $\frac{1}{2}$.

The picture on the next page shows how to correctly read a tape measure.

Imperial or Metric?

In Canada, there are two different units of measurement: imperial (inches) or metric (centimetres).



Americans use **the imperial system**. They measure in inches and feet.



Canadians use **the metric system**. Most industrialised countries in the world use the metric system. We measure in centimetres and metres. Canada used to use the imperial system.

Canada changed to the metric system in the 1970's.



Imperial Measurement

Because the skilled trades are steeped in tradition, a lot of carpenters and woodworkers in Canada still use the imperial system.

Wood is sold by the foot.

Screws are measured in inches.

Imperial measurement is still widely used.

For this reason, this unit will focus on imperial measurement.

Inches and Feet

The imperial system is based on inches, feet, yards, and miles.

The two symbols used in imperial measurement are the ' (apostrophe) and the " (quote).

5' 3/4" means five feet and three quarter inches. 5 3/4" means 5 and 3/4 inches.

Sometimes measurements are only written in inches. 5' 3/4" can be written as 60 - 3/4" or *60 and three quarter inches*.

To find the total number of inches, we multiply the number of feet by 12, because there are 12 inches in a foot.

$$1' = 12" (1 \times 12 = 12)$$

$$2' = 24" (2 \times 12 = 24)$$

$$3' = 36" (3 \times 12 = 36)$$

Learning Activity 1

Continue multiplying the whole numbers by 12 to find out the total number of inches.

$1' = \underline{12''}$

$7' = \underline{\quad}''$

$2' = \underline{24''}$

$8' = \underline{\quad}''$

$3' = \underline{36''}$

$9' = \underline{\quad}''$

$4' = \underline{\quad}''$

$10' = \underline{\quad}''$

$5' = \underline{\quad}''$

$11' = \underline{\quad}''$

$6' = \underline{\quad}''$

$12' = \underline{\quad}''$

Learning Activity 2

Get out your tape measure or multiply by 12. Use a calculator if you would like. How many inches would the following measurements be written as?

1. $5' 3/4'' = \underline{60 - 3/4''}$

2. $3' 5/8'' = \underline{\quad}$

3. $8' 2-1/4'' = \underline{\quad}$

4. $10' 2/3'' = \underline{\quad}$

5. $5' 7/8'' = \underline{\quad}$

6. $1' 5-1/8'' = \underline{\quad}$

7. $4' 5/8" =$ _____

8. $6' 9/16" =$ _____

9. $7' 1/2" =$ _____

10. $8' 6-5/16" =$ _____

11. $7' 7/8" =$ _____

12. $2' 1/16" =$ _____

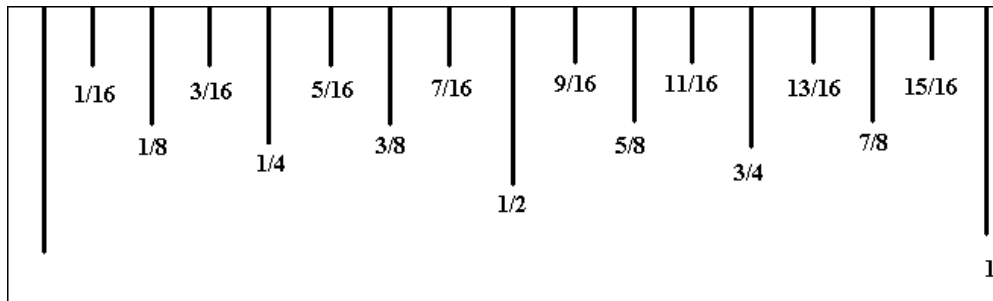
13. $4' 4-1/8" =$ _____

14. $6' 7/16" =$ _____

15. $8' 7/8" =$ _____

16. $2' 8-3/4" =$ _____

The Ruler



* enlarged inch measure

All those lines on a ruler have names. They mean something.

The marks represent a whole number (1, 2, 3, etc.) and a 'fraction of an inch', or a part of an inch. The foot is divided into 12 inches.

Each inch is then divided into equal parts.

These parts have different names.

The ruler has different length lines on it.

Each line represents a measurement ($\frac{1}{2}$ ", $\frac{5}{8}$ ", 1").

Fractions of an Inch

The longest line on the ruler represents the largest unit of measure: the inch.

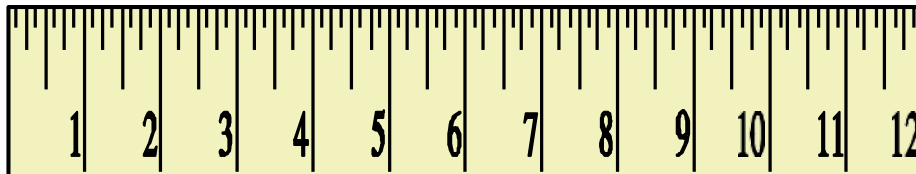
The second longest line on the ruler represents $\frac{1}{2}$ inch. The next longest lines show $\frac{1}{4}$ and $\frac{3}{4}$ inch.

The lines that show 8^{ths} are all the same length too.

The shortest lines show 16^{ths} of an inch.

The Inch

Inches are clearly marked on a measuring tape. They are shown as whole numbers (1, 2, 3, 4, etc.). They are marked on a tape as the longest lines.



* reduced inch measure

$\frac{1}{2}$ an Inch

The second longest line is the $\frac{1}{2}$ (one-half) inch mark. It is one-half of the way between two whole numbers.

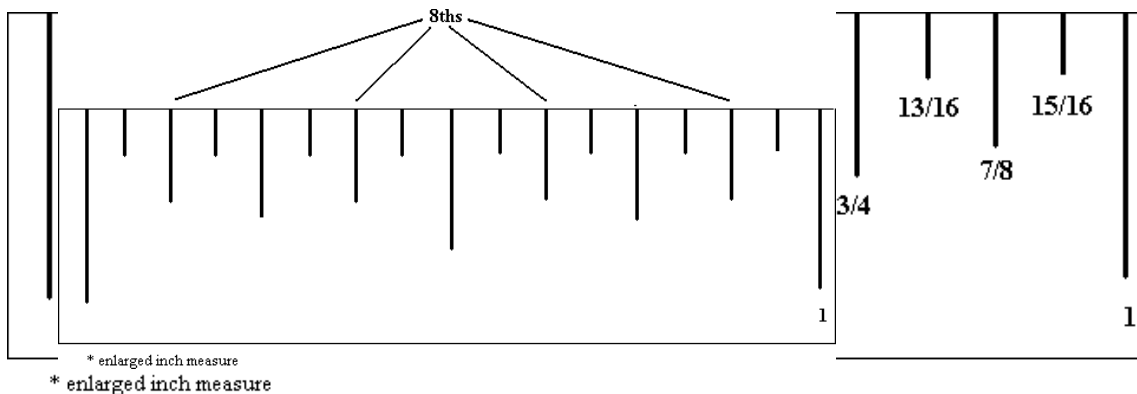
One-half of the way between 1 inch and 2 inches is 1 and $\frac{1}{2}$ inches (one and one-half inches or 1 $\frac{1}{2}$ ").

4^{ths} of an Inch - $\frac{1}{4}$

Within an inch, there are two lines that are 'fourths'.

There are only two of these: $\frac{1}{4}$ and $\frac{3}{4}$. The $\frac{1}{4}$ falls between the whole number and the $\frac{1}{2}$ inch mark.

The $\frac{3}{4}$ falls between the $\frac{1}{2}$ and the whole number.



8^{ths} of an Inch - 1/8

Look at the ruler again. The lines that are a little shorter than $\frac{1}{4}$ are called 8^{ths}. $\frac{1}{8}$, $\frac{3}{8}$, etc. There are four of these: $\frac{1}{8}$, $\frac{3}{8}$, $\frac{5}{8}$, and $\frac{7}{8}$.

16^{ths} of an Inch

The shortest lines are called 16^{ths}. $\frac{1}{16}$, $\frac{3}{16}$, etc. Count over the total number of lines.

This is the top number.

For example, you use a tape measure to measure a small item. The tape measure has lines on it but does not have the lines named.

You hold the tape measure next to the item you are measuring.

You look at the tape measure. You can find the line that marks the measurement, but you don't know how to 'read' it. It is one of the smallest lines, so you know it is a '16th'.

How many 16ths? Count over the total number of lines. Start at the whole number and count over to the left.

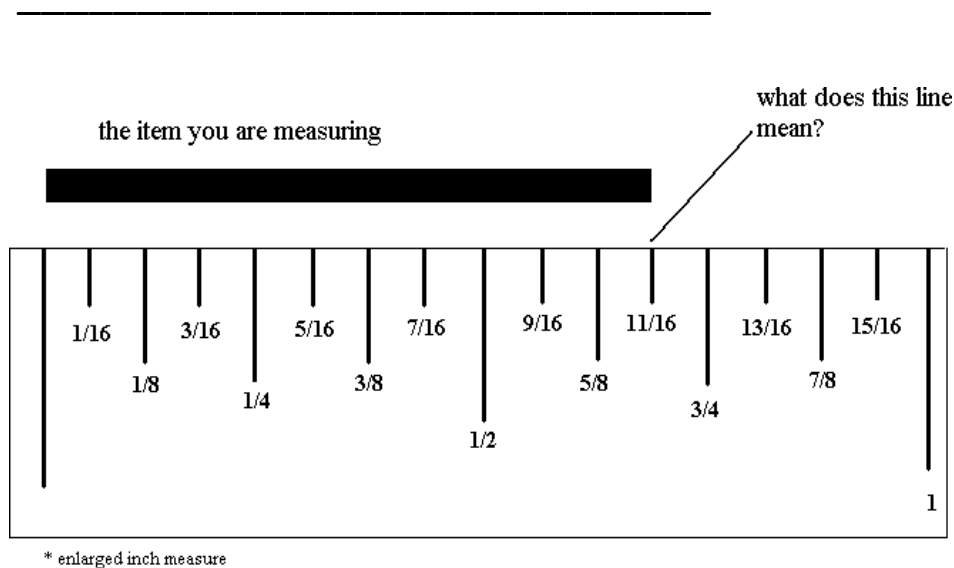
The total number of lines is 9. So, the answer is $9/16$, or nine sixteenths.

Note on 32nds of an Inch

Some common rulers measure 32nds of an inch. These lines would then be the smallest. Not all rulers measure this small of an inch unit.

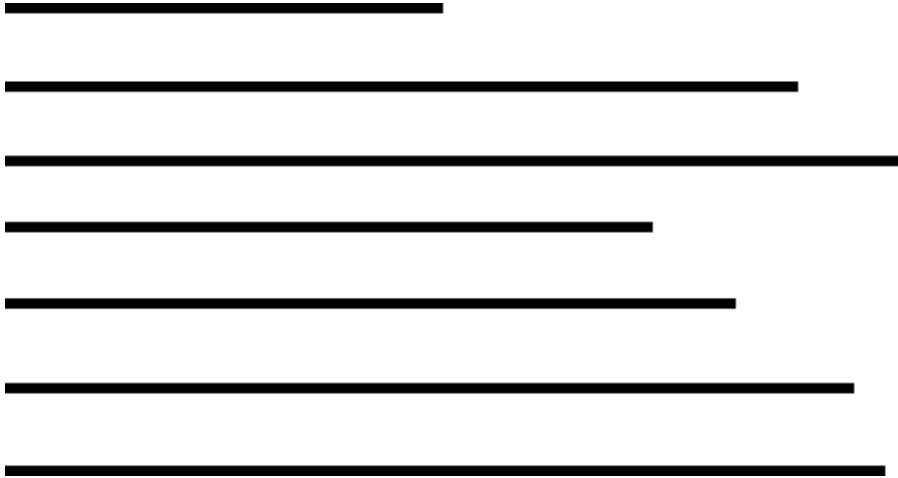
Learning Activity 3

On the ruler below, circle all the lines that represent 16^{th} s. Look at the solid black line above the ruler. According to the ruler, how long is this item?



Learning Activity 4

Use your tape measure to measure the following:



What else is on a tape measure?

Every foot and every 16" increments are marked on a tape measure. The kind of marking varies from tape measure to tape measure.

It may be a coloured box, triangle, or coloured number. Why? The markings are there because construction workers use these marks when they are spacing studs in a wall or when they are putting in floor or roof joists.

For walls that are load bearing, studs and joists are placed every 16 inches. For walls that are not load-bearing, they are placed every 24". Having every 16" and 24" clearly marked on a tape measure helps builders to measure correctly and quickly.

Still having problems reading a tape measure?

If you find that you are having problems reading a tape measure, look for one that clearly marks the fractions of an inch.

They are not as common, but they are available.

Learning the names of these markings comes with time and practice.

Use your tape measure every day. Carry it with you. Measure random items for practice.

There are also online videos on sites like YouTube which teach how to use a measuring tape, if you want more information.

Fractions of an Inch

One whole: Each inch is divided into 16 parts. One whole inch is $16/16^{\text{ths}}$ or *everything over everything* or 16 out of 16...which is why we call it 'one whole'.



One half ($1/2$ "): One half of an inch is $8/16$ ". When we talk about fractions, we talk in *lowest terms*. So, $8/16$ " can be reduced to $1/2$ ".

Look at the diagram below.

You can see that $8/16$ " and $1/2$ " are the same thing. 8 out of 16 are coloured.

That is half. 1 out of 2 is also half. $8/16$ " and $1/2$ " mean the same thing.



One quarter ($1/4$ "): One quarter ($1/4$ ") is a fourth ($1/4$ ") of the whole.

Look at the diagram below.

There are 16 total squares. One fourth of 16 is 4. Four squares are coloured in showing $1/4$ ". Four groupings of four would make a whole.



One eighth ($1/8"$): One eighth. This could also be called $2/16"$ or two sixteenths.

There are two out of sixteen coloured in.

$2/16"$ is not in its lowest terms. $2/16"$ is the same as saying $1/8"$.



One sixteenth ($1/16"$): One sixteenth. $1/16"$.

There is one out of a possible 16 squares coloured in.

$1/16"$ is the smallest fraction of an inch on most rulers.



A great website: Measure It! @ FunBrain

There are a lot of great websites out there for learning about measurement. This is one that allows you to practice what you have learned.

<http://www.funbrain.com/measure/>

This site also allows you to practice your metric measurement.

Start with Easy Inches. When you feel comfortable, move on to Medium Inches, Hard Inches, and then finally Super Brain Inches!

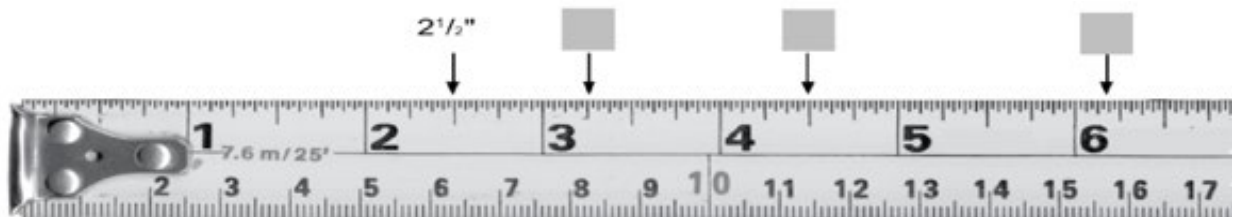
Learning Activity 5

Date	Level	Score
	Easy Inches	
Date	Increment Level	Score
	Medium Inches	
Date	Increment Level	Score
	Hard Inches	
Date	Increment Level	Score
	Super Brain Inches	

Learning Activity 6

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1. Enter the length beside each arrow on the measuring tape.



2. Draw an arrow to these measurements on the tape.



- a) $1\frac{1}{4}$ in b) 12 cm c) $6\frac{1}{8}$ in d) 6.5 cm e) 2 in f) 4.75 cm ($4\frac{3}{4}$)



Skills for Success in this Section



Reading



Writing



Numeracy

Metric Measurement: The Basics

Since the 1970's, Canada has been using the metric system of measurement. However, when you go into a lumber yard or hardware store, you will see a mixture of imperial and metric.

If you listen to a carpenter while he's working, you will hear words like feet and inches. These are units of measurement in the imperial system, not the metric system.

So, while Canada is metric, most of the measuring you will do in the Skilled Trades field is imperial. You will most likely measure in feet and inches.

We have included this basic unit on metric, so that you are familiar with it.

Units of measurement

Metric is based on **units of 10**. This means that all calculations within metric are based on the number 10.

This makes calculations simple. If you know how to multiply and divide by 10, you can convert from one metric unit to another quite easily.

There are 3 base units of measurement in metric:

- **metre:** for measuring length
- **litre:** for measuring capacity (liquids)
- **gram:** for measuring weight

These units are called base units because they can stand alone or be used to make up other units of measurement in the metric system.

Metre is the base word for measuring length.

A metre is a **basic unit of measure**, from which all other metric length units are measured.

Each length unit of measurement in metric has the base word metre and a **prefix**.

For example: cycle + prefix “bi” = bicycle

By adding the prefix bi to the word cycle, you change the meaning to cycle with 2 wheels. The prefix “bi” means two. Bi-annual = twice a year, bi-monthly = twice a month.



What is a prefix?

A prefix is a group of letters that comes before a word that changes its meaning. In metric, the prefixes that you add to the base word metre, changes the length of the measurement.

Metric Prefixes

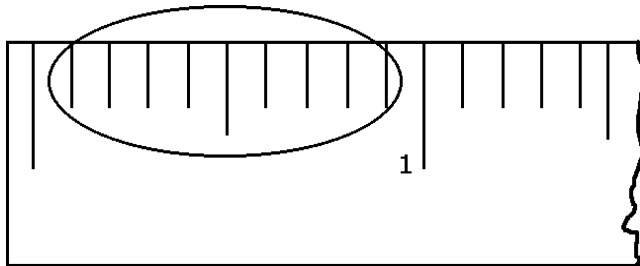
metr = 1	metre	m
deci = 10	decimetre	dm
centi = 100	centimetre	cm
milli = 1000	millimetre	mm



Note: This list is not complete, however it is the basics of what you need to know how to use when working in the Skilled Trades field. If you find you enjoy learning about metric, ask your instructor for more information.

What do those lines mean?

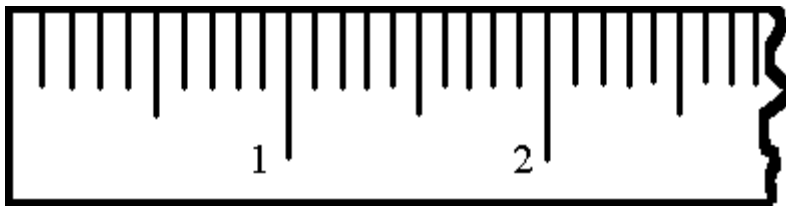
Look at the ruler again. There are many lines, but only one of them is named. It shows 1 cm. What do the other lines mean? They are called millimetres (mm).



* enlarged metric measure

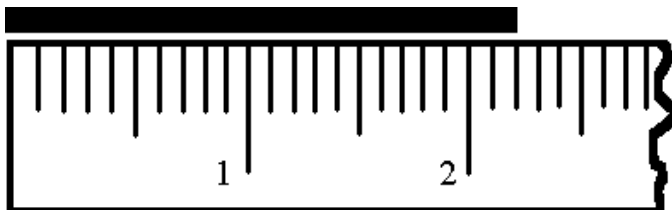
The lines between the cm marks show mm (millimetres). There are ten mm in a cm. The longer line in the middle shows 5 mm.

Reading a metric ruler



* enlarged metric measure

To read a metric ruler, you first read the cm mark. How many whole cm are there in the measurement?



* enlarged metric measure

Say you are measuring this black line.

Place your ruler so that the beginning of the tape and the beginning of the item to be measured. Line up the ruler and the item

Once you have them lined up, read the whole numbers first. In this case the whole number would be 2 cm.

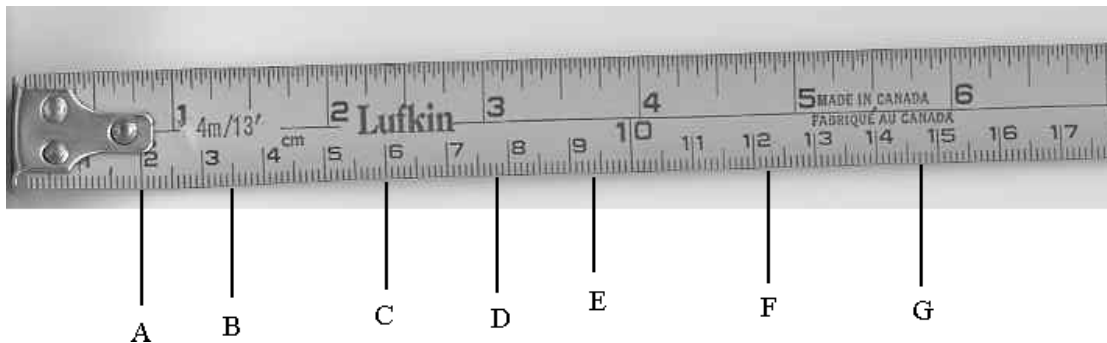
The item measures 2 cm and then 2 more lines.

We already know that these 2 lines represent mm (millimetres).

How many mm? Two. So, the measurement is 2 cm 2 mm.

Instead of saying both units of measurement, we often say: 2.2 cm. We know that the .2 is 2 mm.

Learning Activity 2



Look at the ruler above. What is the measurement of these points?

A = _____

E = _____

B = _____

F = _____

C = _____

G = _____

D = _____

Learning Activity 3

Use the ruler above to figure out what the measurement is between these two points.

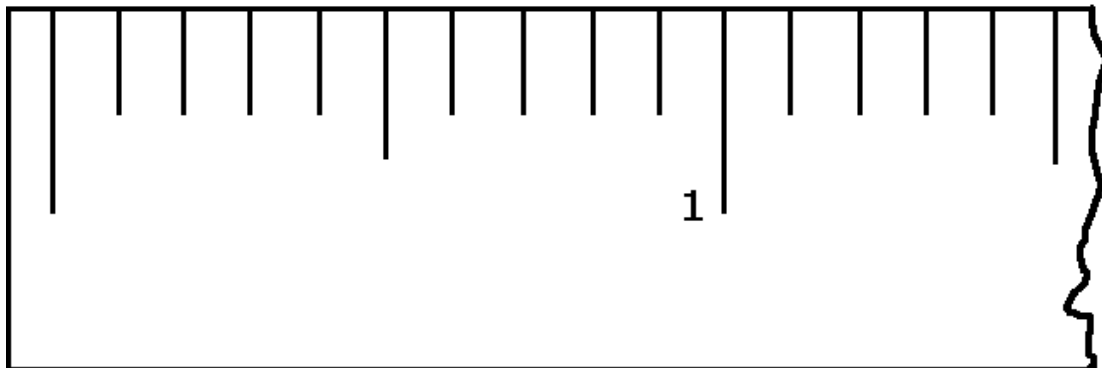
1. A & C = _____
2. B & G = _____
3. E & G = _____
4. D & F = _____

10 mm = 1 cm

10 mm is the same length as 1 cm.

There are 10 mm in 1 cm.

1 cm = 10 mm



* enlarged metric measure

Learning Activity 4

Remember: 10 mm = 1 cm

- | | |
|----------------------|----------------------|
| 1. 20 mm = _____ cm | 6. 124 mm = _____ cm |
| 2. 100 mm = _____ cm | 7. 40 mm = _____ cm |
| 3. 76 mm = _____ cm | 8. 110 mm = _____ cm |
| 4. 50 mm = _____ cm | 9. 57 mm = _____ cm |
| 5. 185 mm = _____ cm | 10. 30 mm = _____ cm |

Learning Activity 5

Remember: 100 cm = 1 m

100 cm = 1 metre.

- | | |
|---------------------|---------------------|
| 1. 100 cm = _____ m | 8. 400 cm = _____ m |
| 2. 200 cm = _____ m | 9. 900 cm = _____ m |
| 3. 500 cm = _____ m | |
| 4. 800 cm = _____ m | |
| 5. 700 cm = _____ m | |
| 6. 300 cm = _____ m | |
| 7. 600 cm = _____ m | |

A great website: Measure It! @ FunBrain

There are a lot of great websites out there for learning about measurement. This is one that allows you to practice what you've learned.

<http://www.funbrain.com/measure/>

This site also allows you to practice your imperial measurement.

Start with Easy Centimetres. When you feel comfortable, move on to Medium Centimetres, and finally Hard Centimetres.

Learning Activity 6

Date	Level	Score
	Easy Centimetres	

Date	Increment Level	Score
	Medium Centimetres	

Date	Increment Level	Score
	Hard Centimetres	



Skills for Success in this Section



Reading



Writing

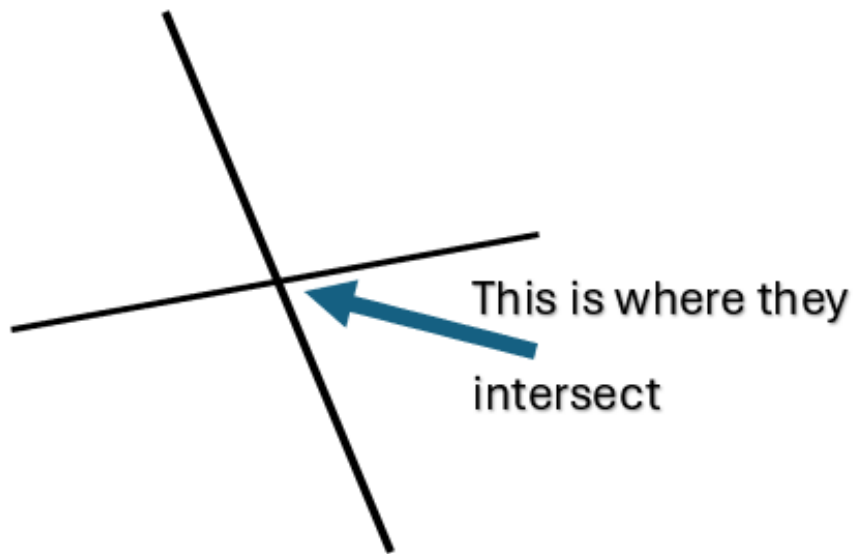


Numeracy

Basic Geometry

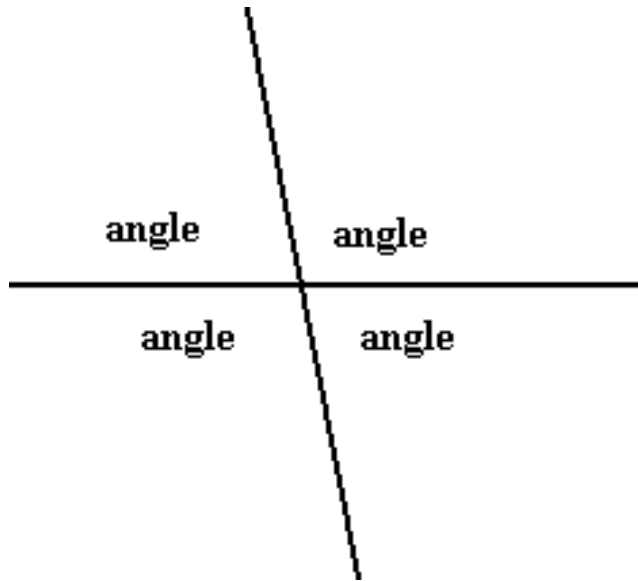
Geometry is the study of lines, points, shapes, and angles.

These are lines:

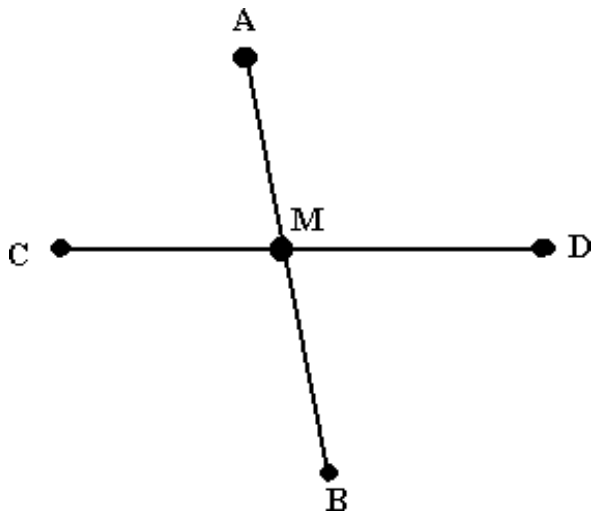


When these two lines cross over one another, they *intersect*.

When lines intersect, they form *angles*. An angle is the space between two lines that meet.



To name these angles, we must first name the lines and the intersection point.



The angle names then become AMD, AMC, BMC, BMD.

Look at the angles. Notice that the angles that are opposite of one another look the same.

AMD and BMC are the same measurement.

AMC and BMD are the same measurement.

They are called *vertical angles*.

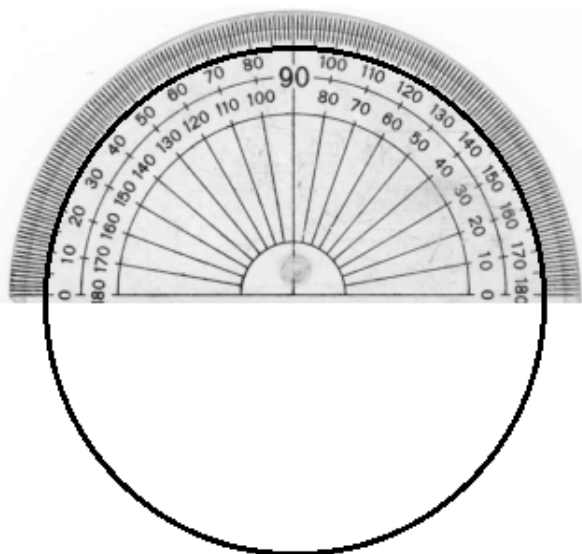
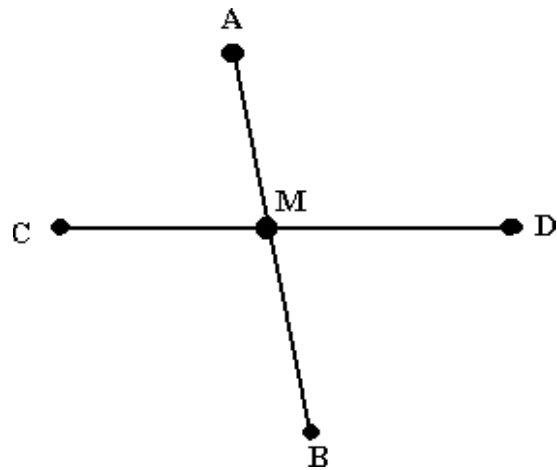
There are different types of angles.

Angles are measured in degrees. The symbol for degrees is $^{\circ}$.

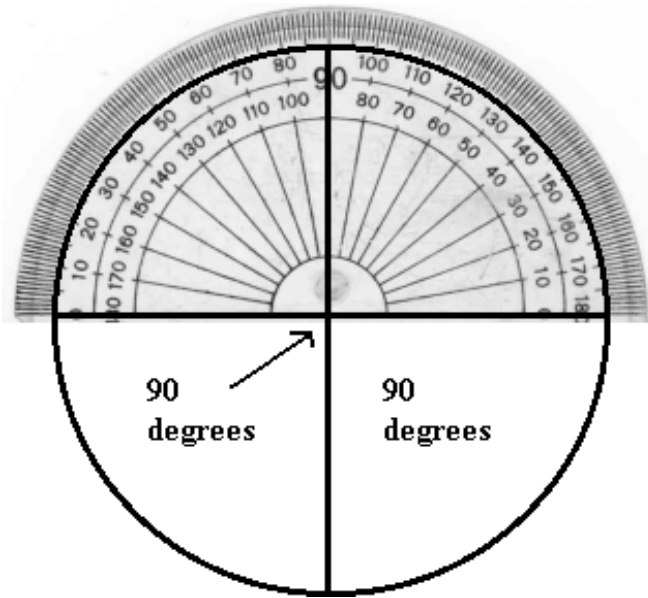
A circle is 360° .

A straight line is 180° .

A protractor measures half of a circle, or 180° .

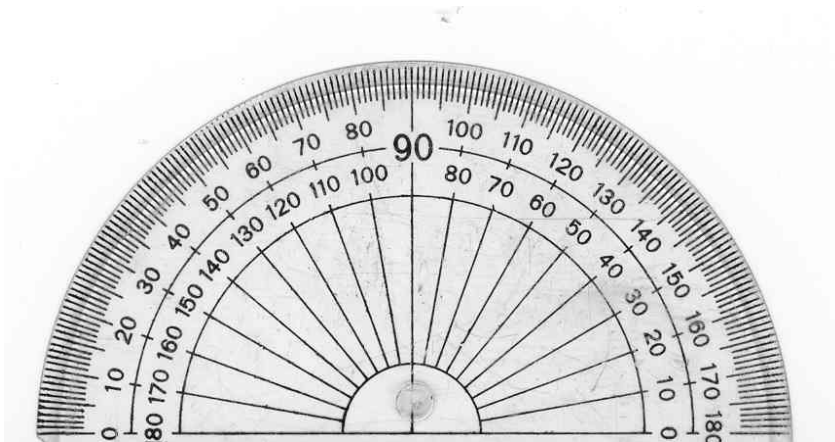


Think of a pie. Cut the pie into 4. Each piece of the pie is $\frac{1}{4}$ of the pie. Each quarter of the pie has a 90° angle.



How do you measure these angles? The Protractor!

A protractor is a tool that is used to measure angles.

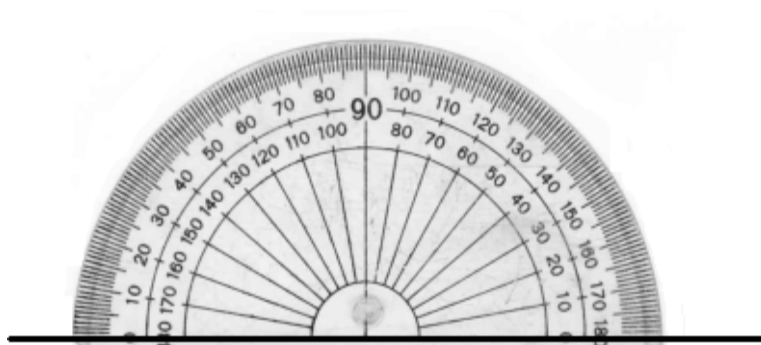


Ask your instructor for a protractor. Look at it.

Notice that it is half a circle. The bottom line is marked with 0° and 180° .

A straight line measures 180° .

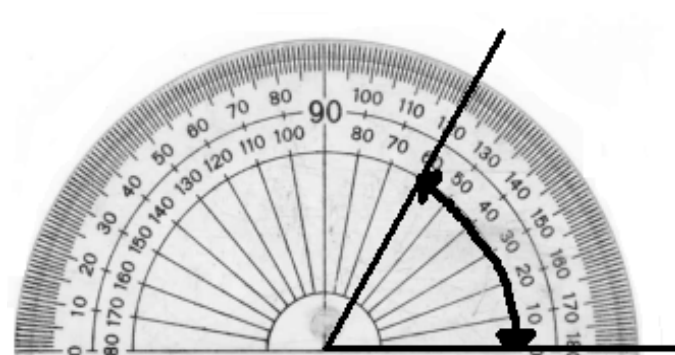
To measure with a protractor, set the protractor on the solid line.



When you are measuring an angle, set the protractor on the bottom solid line of the angle.

Line up the point of the angle with the 90° mark on the bottom line of the protractor.

Notice the protractor has two sets of numbers. You always want to start at 0° and read the inside of the angle.



This angle measures 60° .

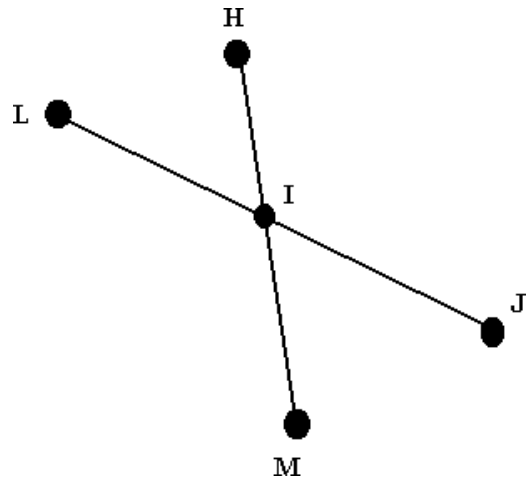
Learning Activity 1

1. Geometry is the study of _____, _____, _____, and _____.

2. When two lines cross over one another, they _____.
Draw a diagram of this.

3. When lines cross over one another, they form _____.

4. What are the names of the four angles formed below?



5. What are angles measured in? _____
6. What is the symbol? _____
7. How many degrees are there in a straight line? _____
8. How many degrees in a circle? _____

9. Read the following paragraph.

John was driving in his truck. He noticed a deer on the highway. He slammed on his brakes and turned the wheel. He did a 180 and came to a sudden stop.

What does it mean he did a "180"? How is this geometry?

If John had done a "360", what would that have meant?

10. What tool is used to measure angles? _____

11. Measure these angles.

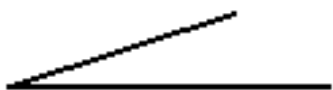
A



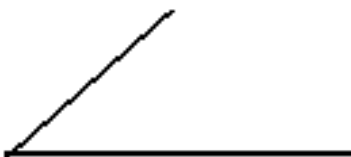
B



C



D



E



F



A = _____

B = _____

C = _____

D = _____

E = _____

F = _____

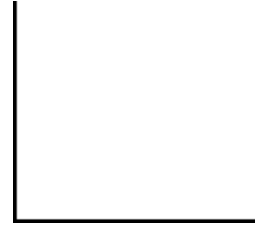
12. On a blank sheet of paper, draw 8 angles. Measure them using a protractor.

Angle	Measurement in °	Angle	Measurement in °

Types of Angles

Right Angle

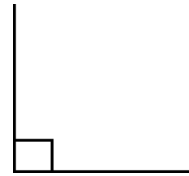
This is a *right angle*. It is perfectly square. The measurement is 90° . (90 degrees)



To show that an angle is a right angle, we mark the angle like this:



or



Acute Angle

An acute angle is an angle where the measurement is less than 90° .



Obtuse Angle

An obtuse angle is an angle where the measurement is more than 90° .



Straight Angle

A straight angle is an angle that measures exactly _____
180°. It is also called a straight line.

How do I use angles in construction?

If you were building a house or even a picture frame, you will want to be sure that your angles are 90°!

Can you imagine a house where the corners are not 90°?



90° is a right angle.

45° is $\frac{1}{2}$ of 90°.

22.5 is $\frac{1}{2}$ of 45° and also $\frac{1}{4}$ of 90°.

Can you imagine trying to drywall this house? Or hang wallpaper inside it?

Mitre saws are used to cut angles in construction and woodworking.

Mitre saws have a built-in protractor so that you can set your blade to cut specific angles.

The most common mitre saw angles are 90° , 45° , and 22.5°

Learning Activity 2

1. Fill in the following chart using the information about the four kinds of angles.

Name of angle	Number of degrees	Drawing of angle

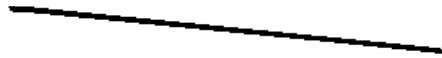
2. What are the three most commonly cut mitre saw angles?

Parallel Lines

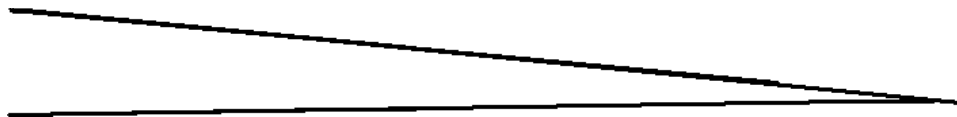
Parallel lines are lines that will never cross or intersect. They are opposite of each other. These two lines could run on forever and they would never, ever

cross one another or intersect.

These two lines below would eventually intersect if you were to keep drawing



them. They are not parallel.



Learning Activity 3

1. Parallel lines are lines that _____
2. Draw two parallel lines.

3. Draw two lines that are not parallel. If you kept drawing these lines, they would eventually _____.

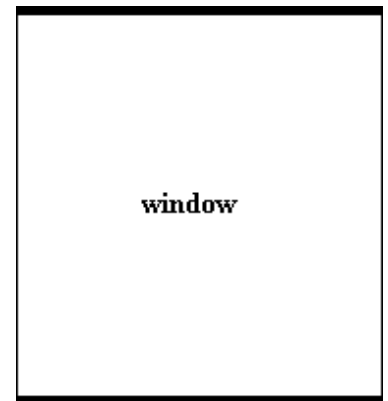
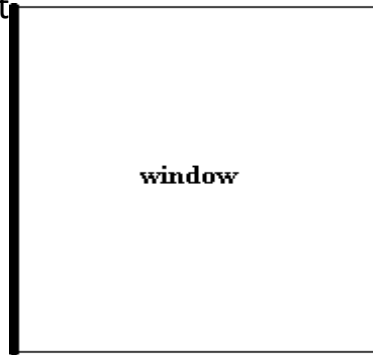
4. Look around the room you are in right now.

There are parallel lines everywhere.

Look at the floor tiles. Are there parallel lines there?

What about the window?

It contains two sets of parallel lines. The top and bottom are parallel and the left and right are parallel.



List 6 other objects in the room with parallel lines.

1. _____ 2. _____ 3. _____

4. _____ 5. _____ 6. _____

Shapes

Square

All four sides are of equal length.

All angles are 90° .



Rectangle

Opposite sides are of equal length. All angles are 90° .



Triangle

A three-sided enclosed shape.



Parallelogram

Opposite sides are parallel and are equal lengths. Opposite angles are the same. Neither set of opposite lines would ever intersect.



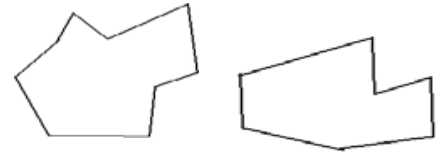
Trapezoid

One pair of the lines are parallel, the other set are not. One set would intersect.



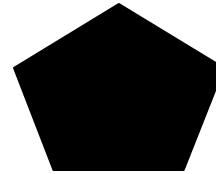
Polygon

A polygon is a many sided shape made up of line segments. The shapes on these pages are all polygons.



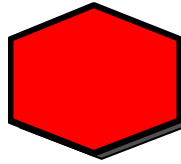
Pentagon

A 5-sided polygon. The prefix pent means 5.



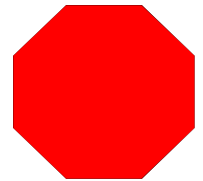
Hexagon

A 6-sided polygon.



Octagon

An 8-sided polygon. A stop sign is an octagon. Think of an *octopus*, which has 8 legs.



Learning Activity 4

1. Fill in the following table using the information about shapes.

Name of shape	Drawing of shape	Information about shape

Name of shape	Drawing of shape	Information about shape

**Skills for Success in this Section**

Reading



Writing



Numeracy

Fractions in the Skilled Trades

Fractions are used quite often in the Skilled Trades field.

Every day, carpenters and construction people measure things.

Often the measurements are not whole numbers (2 inches, 3 inches, etc.).

A carpenter might measure a piece of wood that is $3\frac{3}{8}$ "

3 feet (whole) and $\frac{3}{8}$ (part of a whole).

Example:

Two pieces of wood.

One measures $4\frac{3}{4}$ " long.

The other is $3\frac{3}{8}$ " long

If the carpenter wants you to find the total measurement of the two pieces of wood, you need to be able to add them together.

This is called **ADDING FRACTIONS**.

You might also need to know how to **SUBTRACT, MULTIPLY, and DIVIDE FRACTIONS**.



Tape measures have markings on them that represent fractions of an inch.

Some tape measures come with the fractions written on the tape.

This is helpful if you don't know how to read a tape measure.

There are also some **calculators** that can work with fractions. They cost a bit more than a regular calculator, take some time to learn how to use them, but could save you time in the end.

Fractions can be written in several ways, like so:

$$7 \frac{3}{8} \quad 7 \frac{3}{8} \quad 7\frac{3}{8}$$

Using $\frac{1}{2}$ as an example, the top number (1) is called the **numerator**.

$$\frac{1}{2} \quad \begin{array}{l} \text{Numerator} \\ \text{Denominator} \end{array}$$

The bottom number (2) is called the **denominator**.

Understanding Factoring and Common Denominators for Fractions

Factoring

Credit: TR Leger School, STEP Program, Secondary School Preparation: Numeracy Curriculum, 2024

Factoring helps us break down numbers into smaller parts that multiply to make the original number.

Imagine you have a group of building blocks, and you want to see what different

“sets” you can make with them.

For example:

- **12** can be split into sets of **2 and 6** (because $2 \times 6 = 12$) or **3 and 4** (because $3 \times 4 = 12$).
- The factors of 12 are **1, 2, 3, 4, 6, and 12**.

$1 \times 12 = 12$; $2 \times 6 = 12$; and $3 \times 4 = 12$

Finding a Common Denominator

When adding or subtracting fractions, we need to make sure the fractions we are comparing are divided the same way.

This is called finding a **common denominator**.

*Remember the denominator is the bottom number.

Imagine you and a friend are sharing two pizzas, but your pizza is cut into **4 slices** and your friend’s pizza is cut into **8 slices**.

To compare or share your pieces fairly, you would want both pizzas to be cut the same way—either into 4 slices or 8 slices.

This is why we need common denominators so we make the fractions use the same size “slices” and then can add or subtract them easily.

Example:

Say we want to add **$1/2$ an inch** and **$1/4$ an inch**:

Notice that **$1/2$** can be changed to have the denominator **4** (since 2 can be multiplied to make 4 – for example: $2 \times 2 = 4$). The fraction is multiplied by 2.

$1/2$ becomes **$2/4$** (because 2 slices out of 4 are the same as 1 out of 2).

Now we have $\frac{2}{4} + \frac{1}{4}$, which is easier to add because the “slices” are the same size.

Our answer is $\frac{3}{4}$.

In the example earlier, the two boards measured $4\frac{3}{4}$ " and $3\frac{3}{8}$ ". The two denominators are not the same.

If your boss asked to add the two measurements together, you would have to do the following:

1. Look at the two denominators (4 and 8). Do they have something in common? Do they have a common factor? In this case, $4 \times 2 = 8$.
2. Multiply the numerator and denominator by 2. This will allow the two fractions to be added because they have the same denominator.

$$\frac{3}{4} \times \frac{2}{2} = \frac{6}{8}$$

3. The one board measures $4\frac{6}{8}$ " and the other board measures $3\frac{3}{8}$ ".
4. Add the measurements of the two boards.

$$4\frac{6}{8} + 3\frac{3}{8} \text{ (Add the whole numbers first.) } 4 + 3 = 7$$

$$\frac{6}{8} + \frac{3}{8} = \frac{9}{8} \text{ (Add the numerators. **You do not add the denominators.**)}$$

5. The two boards measure $7\frac{9}{8}$ " in total.

$\frac{9}{8}$ can be reduced because 9 is larger than 8.

When you divide 9 by 8, you get 1 and some left over.

The leftover, in this case, is 1. This leftover is the new numerator and is put over

the denominator. $\frac{9}{8} = 1 \frac{1}{8}$

The two boards measure $7" + 1 \frac{1}{8}" = 8 \frac{1}{8}"$.

Fractions and Decimals

Learning Activity #1

1. Add the following measurements.

a. $3 \frac{1}{2} + 6 \frac{1}{2} =$

b. $2 \frac{3}{4} + 7 \frac{1}{8} =$

c. $4 \frac{3}{8} + 1 \frac{5}{16} =$

d. $2 \frac{3}{4} + 5 \frac{9}{16} =$

Decimals in the Skilled Trades

Decimals are also important in the Skilled Trades.

Sometimes you will use decimals to make calculations.

Decimals, like fractions, are parts of a whole. Decimals are a different way of writing fractions and vice versa.

Here are some examples:

- 3.5 litres are the same as $3 \frac{1}{2}$ litres

- 1.5 feet is the same as $1\frac{1}{2}$ feet
- 7.25 inches is the same as $7\frac{1}{4}$ inches

You can add, subtract, multiply and divide decimals.

Suppose you had to add the length of two boards measuring 4.5 feet and 2.25 feet.

$$\begin{array}{r} 4.50 \\ +2.25 \\ \hline 6.75 \end{array}$$

The two boards would measure 6.75 feet.

Suppose the boards measured 4.82 and 2.67.

$$\begin{array}{r} 4.82 \\ + 2.67 \\ \hline 7.49 \end{array}$$

The two boards would measure 7.49 feet.

Adding decimals is very similar to adding whole numbers but you must remember the decimal point.

Fractions and Decimals

Learning Activity #2

1. Add the following.
 - a. $12.75 + 3 =$
 - b. $4.15 + 5.84 =$
 - c. $17.36 + 6.75 =$
 - d. $35.1 + 29.99 =$

Converting Fractions and Decimals

Sometimes you will have to convert (or change) decimals to fractions or fractions to decimals.

Sometimes measurements will mix fractions and decimals.

You can decide if it is easier to add fractions or decimals.

Use this table to make conversions. These fractions are common in the Skilled Trades.

Fraction	Decimal
$1/16$	0.0625
$1/8$	0.125
$1/4$	0.25
$1/2$	0.5

Suppose you were asked to convert $3/8$ " to a decimal.

You know $1/8$ is the same as .125. In this case, there are 3 $1/8$ s.

So you multiply .125 by 3.

$$.125 \times 3 = .375$$

$3/8$ " is the same as .375".



Note: You can also find any decimal from a fraction by dividing the top number (numerator) of the fraction by the bottom number (denominator).

The decimal for $1/4$ can be found by dividing 1 by 4. For example: $1 \div 4 = .25$

Fractions and Decimals

Learning Activity #3

1. Using the table on to convert the following.
 - a. $11/16$ to a decimal
 - b. $7/8$ to a decimal
 - c. $3/4$ to a decimal

2. Suppose you had two boards measuring $7 \frac{5}{8}$ " and 3.25". What is the total measurement of the two boards?
 - a. As a fraction: _____
 - b. As a decimal: _____

**Skills for Success in this Section**

Reading



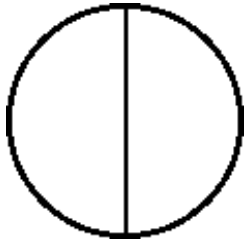
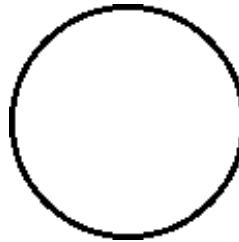
Writing



Numeracy

Circles - The Basics

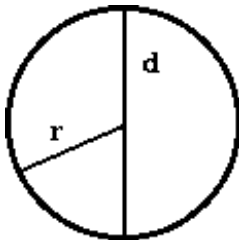
The circle is a shape with curved edges.



A line across the middle of the circle is called a diameter.

The diameter is the distance from one side of the circle through the exact middle to the opposite side.

The radius of a circle is a line from the exact centre of a circle to any point on the edge. A radius is $\frac{1}{2}$ the length of the diameter.



$$\text{radius} = \frac{1}{2} \text{ diameter}$$

r = radius

d = diameter

Circumference of a Circle

The perimeter of a circle is called the circumference. It is the measurement of the outside edge of a circle.

Imagine trying to use a tape measure to measure the outside edge. It would not be easy.

There is a formula to find out the circumference.

$$C = d \times \pi$$

$$\pi = \text{pi (3.14)}$$

What does that mean?

C means circumference.

Whatever follows the = (equal sign) is the formula to find C.

d = diameter

We learned that the diameter is the distance from one side of the circle through the exact middle to the opposite side.

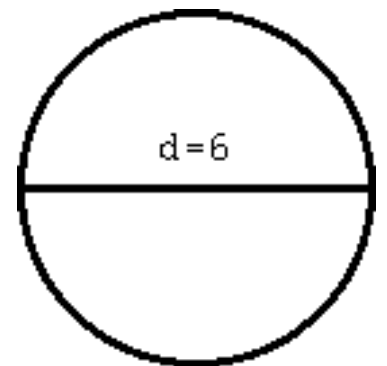
x means to multiply

π a symbol for Pi. Pi is always 3.14.

There is a deeper mathematical explanation of what this number means and where it comes from, it has to do with the curve in the circle

For our purposes here, we will just memorize pi as 3.14.

$C = d \times \pi$. means **circumference equals diameter X 3.14**

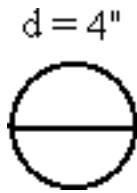


The diameter of this circle is 6. ($d=6$) $C = d \times \pi$
 $C = 6 \times 3.14 = 18.84$ **The circumference is 18.84.**

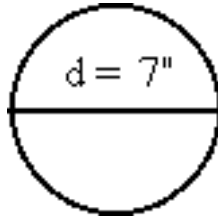
Learning Activity 1

1. Find the circumference for the following circles.

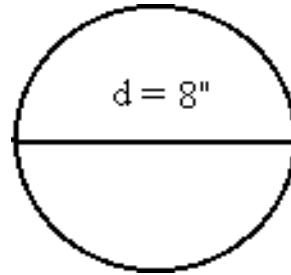
A)



B)



C)

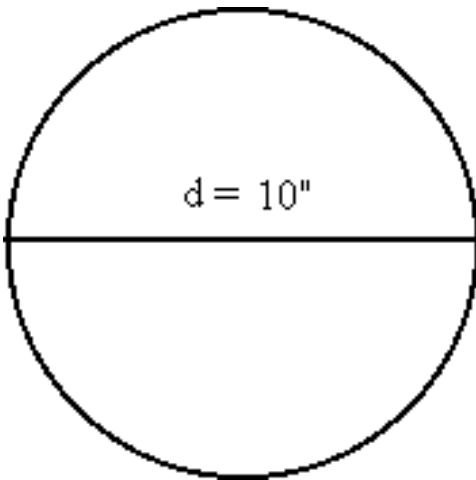


A) _____

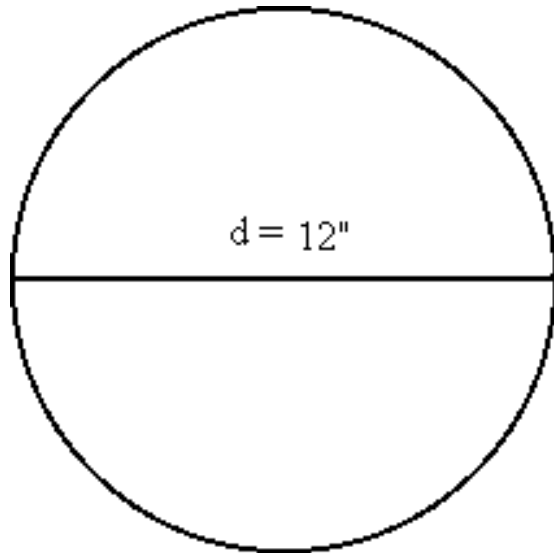
B) _____

C) _____

D)



E)



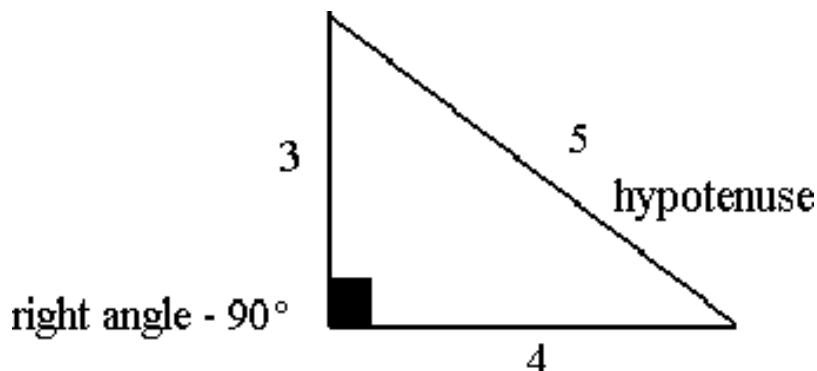
D) _____

E) _____



3 / 4 / 5 Rule for Making Square Corners or Pythagorean Theorem

How does it work?



A square corner is also called a **right angle**. It is exactly 90° .

To square off a corner, stake the spot where you want the 90° angle.

Attach two strings to the stake. Attach one of the lines to another stake where you want the first side of the angle. Mark 4 feet on the string. Mark 3 feet on the second string.

Place the tape measure on the 4 foot mark of the first string. Move the second string until it measures exactly 5 feet on the mark.

Stake the strings in place once the angle has been made.

For larger projects simply use a larger number combination making all three numbers multiplied by a common number.

For example: If you are trying to square off a large area, 3/4/5 is not big enough. Multiply 3 and 4 and 5 by the same number.

Say you have an area 20' x 35', and you want to square it up.

3/4/5 is not going to be big enough.

We need to find a number to multiply 3, 4, and 5 by.

It can be any number as long as the proportion is the same.

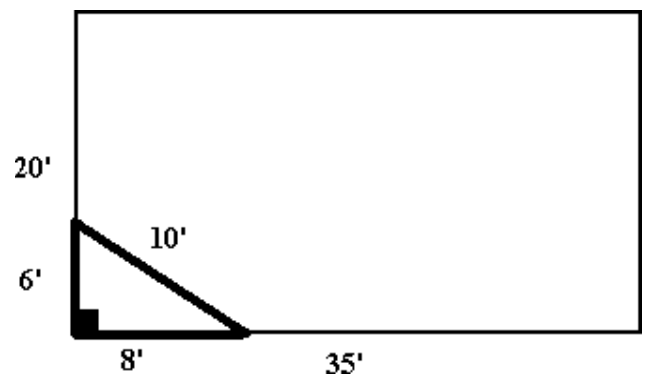
Start with 2.

$3 \times 2 = 6$, $4 \times 2 = 8$, $5 \times 2 = 10$.

This means that the 3/4/5 rule becomes the 6/8/10 rule.

If we use those numbers instead of 3, 4, and 5, will it be big enough?

The rule works, but is it big enough?
We still have to go out another 14' on one side and another 17' on the other.



With that much left to measure, we run the risk of coming out of true square.

Let's pick a bigger number to multiply by: 5

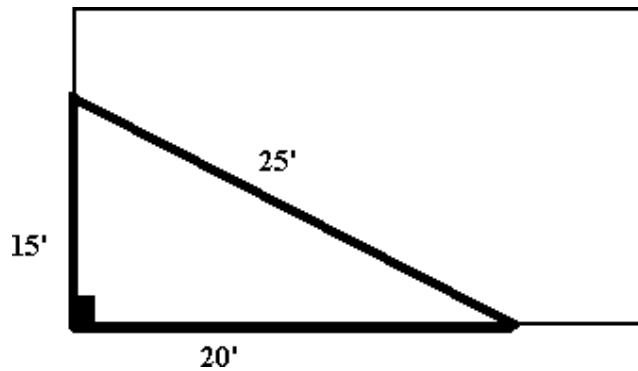
$3 \times 5 = 15$, $4 \times 5 = 20$, $5 \times 5 = 25$

The rule becomes 15/20/25. These numbers work better because they are closer to the total number of feet we are measuring.

How do I use this in construction?

The 3/4/5 rule is used to make things square: a foundation, deck, garden, or anything else that you want to make square.

You can use it to test that things are square or to create a square corner.



3 / 4 / 5 Rule for Making Square Corners

or Pythagorean Theorem

Learning Activity

1. Work with a partner or your instructor and test this theory.

	Date	Theory worked	Had some difficulty	Re-tested and theory worked
Work with a partner				
Work by yourself				

2. In your own words, how would this be helpful to someone working in construction?

3. The 3/4/5 rule is also called the _____ theorem.

4. Using the 3/4/5 rule, change 3/4/5 into proportions using the following numbers on the next page. Show your work. The first one is done for you.

- | | | |
|------|-----------------------|-------------------|
| A) 3 | 3x3=9, 3x4=12, 3x5=15 | New Rule: 9/12/15 |
| B) 6 | | New Rule: |
| C) 5 | | New Rule: |
| D) 9 | | New Rule: |
| E) 2 | | New Rule: |
| F) 4 | | New Rule: |
| G) 7 | | New Rule: |

5. Using this diagram to mark off the measurement in inches, show how the 3/4/5 rule works.





Skills for Success in this Section



Reading



Writing



Numeracy

Area

Area is the amount of surface of something flat. For example, you calculate area of a floor to find the amount of carpet needed to cover it.

To calculate area, use the formula:

$$A = LW \quad \text{or} \quad A = L \times W$$

A is the area.

L is the length.

W is the width.

The formula tells you to multiply the length by the width.

When there are two letters right beside each other, just like LW , that is asking you to multiply them.

Area is always measured in square units like square feet (feet^2) or square yards (yards^2).

When you start the question (equation), the first step is to write down the formula.

After that, you write it again and fill in the blanks.

See the following example.

Find the area of a room that is 9 feet long and 5 feet wide. $A = LW$

$$A = 9 \times 5$$

$$A = 45 \text{ ft}^2$$

So what did we just do? We replaced L (length) with 9 and W (width) with 5. Using those numbers we can find out the size (or area) of the whole space.

Area Practice

There is a rectangle with a length of 3 feet and a width of 4 feet.

How big is the area? Draw your own picture to help.

$$A = LW$$

$$A = \underline{\quad} \times \underline{\quad}$$

$$A = \underline{\quad}$$

Another example: A backyard measures 15 feet long by 20 feet wide. What is the area of the yard?

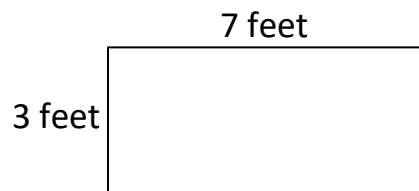
$$A = LW$$

$$A = \underline{\quad} \times \underline{\quad}$$

$$A = \underline{\quad}$$

Length usually means the longer side, but you can switch them around and still get the same answer.

Here is a scenario: Ahmed wants to carpet his floor. He has a floor that is 7 feet long and 3 feet wide. How much carpet will he need?



$$A = LW$$

$$A = 7 \times 3$$

$$A = 21 \text{ feet}^2.$$

Now we know how big an area he has to carpet.

Let us say that Ahmed buys a piece of carpet.

The carpet is 5 feet long and 8 feet wide. What is the area of the carpet?

$$A = LW \quad A = 5 \times 8$$

$$A = 40 \text{ feet}^2.$$

How much more carpet does Ahmed have than the floor?

$$40 - 21 = 19 \text{ square feet}$$

So, what did we just do?

We subtracted the smaller number (area) from the bigger one, so Ahmed would have 19 square feet of carpet left over.

Let us pretend the numbers were switched, to make the area of floor 40 feet², and the area of the carpet 21 feet². Would we have enough carpet to fit the area of the floor?

NO. We would be missing 19 ft².

Area

Learning Activity #1

Calculate the area for the following measurements.

A) Length = 13 feet x width = 10 feet Area =

B) Length = 42 feet x width = 4 feet Area =

C) Width = 2 inches x length = 4 inches Area =

Cost per Square Foot

Ahmed did not like the carpet, so he returned it.

Now he wants to buy a new one.

$$A = LW$$

$$A = 3 \times 7$$

$$A = 21$$

If the area Ahmed has to cover is 21 feet², and it costs him \$5 per foot², how much money does he have to spend to cover his floor?

We need 21 feet² of carpet at 5 dollars per 1 foot².

We could add 5 to itself twenty-one times.

But what is a quicker way to figure it out?

Multiply the area (21 feet²) by the cost per square foot (\$5.00) to calculate the cost of the carpet.

$$21 \times \$5.00 = \$105.00$$

Therefore, it will cost Ahmed \$105 to cover 21 feet² of floor with carpet.

Ahmed decides to carpet his living room too. Ahmed's living room is 10 feet long and 10 feet wide. Ahmed calculates the area of carpet he needs using the formula for area.

$$A = LW$$

$$A = 10 \times 10$$

$$A = 100 \text{ feet}^2$$

The areas of the two rooms are: $A = 21 \text{ feet}^2$

$A = 100 \text{ feet}^2$

Now add both areas together. $100 + 21 = 121 \text{ feet}^2$.

How much will the carpeting cost at \$5 per foot²? $121 \times \$5.00 = \605.00

Therefore, it will cost Ahmed \$605.00 to carpet his two rooms.

Cost per Square Foot

Learning Activity #2

1. Ahmed was so happy with the new carpet he decided to carpet his bedroom.

Ahmed's bedroom is 8 feet long and 6 feet wide.

The carpet is \$7.00 per square foot.

Calculate the area of Ahmed's bedroom.

Calculate how much Ahmed will have to pay to carpet his bedroom.

How do I build a cube?

A cube is three-dimensional, such as a box or an ice cube.

A cube (or box) has three measurements.

L= Length, **H** = height and **W** = width



Note: Sometimes width is called depth (D).

My boss has asked me to build a box (cube).

How do I calculate the measurements?

Suppose your boss asked you to build a box (cube) that is 3 feet long, 1 foot high and 2 feet wide (deep).



Your boss has given you this diagram. A box is made up of six pieces:

- 1 top
- 1 bottom
- 4 sides

Let us break this down.

Remember the Geometry Module you have completed. The front and the back sides will be the same size.

The top and bottom sides will be the same size.

The left and right sides will be the same size.

The front piece will be 3 feet long and 1 foot high. The back will be the same.

The top piece will be 3 feet long and 2 feet wide (deep). The bottom will be the same.

The left side will be 1 foot high and 2 feet wide (deep). The right will be the same.

Why are there so many sides the same?

The sides that are the same are parallel. To have a perfect box (cube), all parallel (or opposite) sides must be the same.

Remember: measure twice and cut once!



Liquids

Often you will work with liquids, such as paint. Some common measurements of liquids are:

- Pint
- Quart
- Gallon
- Millilitre
- Litre

The first three are Imperial and the last two are Metric. In this trade, both measurement systems are used.

Why would you have to know about liquid measurement?

Most of the supplies for the trade are measured using the Imperial system.

- Drywall may come in 4 feet by 8 feet sheets.
- Lumber may be 2 inches by 4 inches by 12 feet

Some supplies, especially liquids, are measured using the Metric system.

- Paint may come in 3.67 litre cans.
- Carpenters' glue may come in 125 millilitre tubes.

Let us take a look at an example.

One rule is that you will need about 1 litre of paint to cover 110 square feet of surface.

After Ahmed bought the new carpet, he decided to paint the living room. The living room is 10 feet wide and 10 feet long. The walls are 8 feet high.

How much paint will Ahmed need to paint the four walls? In this case, each wall is 10 feet long and 8 feet high.

Using the Area formula $A = L \times W$, we will adapt it for a wall.

This time W (width) is replaced with H (height).

$$A = L \times H$$

$$A = 10 \times 8$$

$$A = 80 \text{ square feet}$$

There are four walls in the living room. Each wall covers the same square footage.

You will multiply the area of one wall by four to calculate the total area of the living room walls.

$$A = 80 \text{ (square feet)} \times$$

$$4 \quad A = 320 \text{ square feet}$$

Ahmed needs enough paint to cover 320 square feet.

Ahmed buys a 3.67 litre can of paint. Does he have enough to cover the living room walls? Let's see.

Use the rule, 1 litre of paint will cover 110 square feet.

2 litres will cover 2×110 square feet or 220 square feet.

3 litres will cover 3×100 square feet or 330 square feet.

With 3.67 litres of paint, Ahmed has more than enough to paint the four living room walls.

Liquids

Learning Activity #3

Ahmed wants to paint a room in his house.

The room is 12 feet long and 11 feet wide. The walls are 10 feet high.

(Note: two walls will measure 12 feet long by 10 feet high. The other two walls will measure 11 feet by 10 feet.)

Ahmed has bought one 3.67 litre can of paint.

1. Calculate the square footage of each wall.

2. Calculate the total square footage of the four walls.

3. Calculate how much paint Ahmed will need. The rule is 1 litre of paint will cover 110 square feet.

4. Will Ahmed have enough paint?

Calculator



If you find doing calculations in your head difficult, use a calculator. It will do the calculations for you.

On this calculator, you see the “on” button in the top left corner.

On the right-hand side are the operations (add, subtract, multiply and divide). The **C** means clear. This will erase what you are doing.

All the numbers are in the centre. You will probably not need most of the other keys.

Addition: Key in the number then the + sign then the next number.

Most calculators add cumulatively (as they go along), but on some you have to push the = sign between numbers to get it to do addition.

Subtraction: Put in the number you are subtracting from, then the – sign, then the number to be subtracted, then the = sign.

Multiplication: You can key in either number first in multiplication.

Then press the x key.

After that, you enter the second number and then push the = key.

Division: First enter the dividend (number to be divided), then the division sign then the number that you are dividing by.

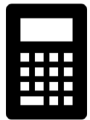
If you put the numbers in the wrong order, you will get the wrong answer. Any remainder will show as a decimal.

Finding Errors If you realize that you have keyed in the wrong number, clear the calculator and start over.

It is a good idea to do each calculation two times.

If you have the right answer both times, you likely have the right answer.

If you have different answers, try the question again, paying close attention to each number you key in.



Go back over some of Ahmed's calculations in this section.

Try them with a calculator.



Skills for Success in this Section



Reading



Writing

Electrical Safety

Why is it so important to work safely with or near electricity?



Even changing a light bulb without unplugging the lamp can be hazardous because coming in contact with the “hot” or live part of the socket could kill a person.



Note: The electrical current in regular businesses and homes has enough power to cause death by electrocution.



What kinds of injuries result from electrical currents?

There are four main types of injuries:

1. electrocution (fatal),
2. electric shock,
3. burns, and
4. falls.



These injuries can happen in various ways:

- direct contact with the electrical energy.
- when the electricity arcs (jumps) through a gas (such as air) to a person who is grounded (that would provide an alternative route to the ground for the electricity).
- muscle contractions, or a startle reaction, can cause a person to fall from a ladder, scaffold, or aerial bucket.

The fall can cause serious injuries.

What are some general safety tips for working with or near electricity?

- Inspect tools, power cords, and electrical fittings for damage or wear prior to each use.

Repair or replace damaged equipment immediately.

- Always tape cords to walls or floors when necessary.

Nails and staples can damage cords causing fire and shock hazards.

- Use cords or equipment that are rated for the level of amperage or wattage that you are using.
- Always use the correct size fuse. Replacing a fuse with one of a larger size can cause excessive currents in the wiring and possibly start a fire.
- Be aware that unusually warm or hot outlets may be a sign that unsafe wiring conditions exist.

Unplug any cords to these outlets and do not use them until a qualified electrician has checked the wiring.

- Always use ladders made of wood or other non-conductive materials when working with or near electricity or power lines.

Wood does not allow electricity to flow through it very easily.



- Place halogen lights away from combustible materials such as cloths or curtains.

Halogen lamps can become very hot and may be a fire hazard.

- Risk of electric shock is greater in areas that are wet or damp.
- Know where the breakers and boxes are located in case of emergency.
- Label all circuit breakers and fuse boxes clearly.

Each switch should be positively identified as to which outlet or appliance it is for.

- Do not use outlets or cords that have exposed wiring.
- Do not use power tools with the guards removed.
- Do not block access to circuit breakers or fuse boxes.
- Do not touch a person or electrical apparatus in the event of an electrical accident.

Always disconnect the current first.

What are some tips for working with power cords?

- Keep power cords clear of tools during use.
- Suspend power cords over aisles or work areas to eliminate stumbling or tripping hazards.
- Replace open front plugs with dead front plugs. Dead front plugs are sealed and present less danger of shock or short circuit.
- Do not use light duty power cords.
- Do not carry electrical tools by the power cord.
- Do not tie power cords in tight knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.

What is a sample checklist for basic electrical safety? Inspect Cords and Plugs

- Check power cords and plugs daily. Discard if worn or damaged.

Have any cord that feels more than comfortably warm checked by an electrician.

Eliminate an Octopus Connection

- Do not plug several power cords into one outlet.
- Pull the plug, not the cord.
- Do not disconnect the power supply by pulling or jerking the cord from the outlet. Pulling the cord causes wear and may cause a shock.

Never Break OFF the Third Prong on a Plug

- Replace broken 3-prong plugs and make sure the third prong is properly grounded.

Never Use Extension Cords as Permanent Wiring

- Use extension cords only to temporarily supply power to an area that does not have a power outlet.
- Keep power cords away from heat, water, and oil. They can damage the insulation and cause a shock.

Electrical Safety

Learning Activity

1. Electrical current in regular businesses and homes has enough power to

2. Explain why it is dangerous to even change a lightbulb without unplugging the lamp.

3. List the 4 kinds of injuries that can result from electrical currents.

4. Explain why it is dangerous to even get a small shock if you are up a ladder or on a roof.

5. Always tape cords to _____ and _____ when necessary.
Nails and _____ can damage cords causing _____ and _____ hazards.

6. Unusually warm or hot outlets may be a sign that

7. Why should you use a ladder made of wood or non-conductive material when working around power lines?

8. True or False

T F You do not need to label all circuit breakers.

T F Halogen lights become very hot.

T F It is ok to use light duty power cords.

T F Wood allows electricity to flow through it very easily.

T F Know where the breakers are located in case of emergency.

9. Write one thing about each subject.

Inspect Cords and Plugs

Eliminate Octopus Connection

Never Break OFF the Third Prong on a Plug

Never Use Extension Cords as Permanent Wiring

**Skills for Success in this Section**

Reading



Writing

Fire Extinguishers

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The IHSA was established in 2010 as a result of a merger between the Construction Safety Association of Ontario (CSAO) and the Electrical & Utilities Safety Association of Ontario (E&USA).

The law says that every worker who may be required to use a fire extinguisher must be trained to use it.

On a construction site, fire extinguishers must be:

- accessible
- inspected regularly
- refilled right away after use



Extinguishers should be located:

- where flammable materials are stored, handled, or used
- where temporary oil or gas fired equipment is being used
- where welding or open flame cutting is being done
- on each storey of an enclosed building being constructed or renovated
- in shops for at least every 325 square metres (2,400 square feet) of floor area

Fire extinguishers are classified according to their capacity to fight specific kinds of fire.

- Class A - wood, paper
- Class B - oil, gas, paint, grease
- Class C - electrical wiring
- Class D - combustible metals (combustible means 'able to burn')

How to Use a Fire Extinguisher

Fire extinguishers usually only go off for less than one minute, so it is important to aim right away.

Do not **waste** it.

Pull the pin.

Aim the nozzle at the base, or bottom, of the fire.

Squeeze the trigger.

Sweep from side to side until the fire is out.



Note: The idea is to put out the flames at their source.

Once you have used a fire extinguisher, tell your supervisor. They need to know that there has been a fire, and they need to have the fire extinguisher refilled right away.

Know where the fire extinguishers are located.

Do not wait until a fire breaks out to know where there is an extinguisher!



Fire Extinguishers

Learning Activity

1. Explain, in your own words, why fire extinguishers need to be accessible, inspected regularly, and refilled right away after use.

Use examples.

2. According to the reading, what are 5 places where you should have a fire extinguisher? List them below.

1.

2.

3.

4.

5.

3. What class of fire extinguishers are needed for each?

wood or paper Class _____

electrical wiring Class _____

oil, paint, gas Class _____

combustible metal Class _____

4. Explain, step by step, how to use a fire extinguisher.

5. Explain to your instructor how to use a fire extinguisher. Have your instructor fill in the following table.

Date	Able to demonstrate	Had some difficulty	Re-tested and able to demonstrate



Skills for Success in this Section



Reading



Writing

General Safety Tips

What should you do before using woodworking machines?



Note: Woodworking tools can be dangerous if not used properly.

- Only use woodworking machines that you have been trained to use properly and safely.
- Read the owner's manual carefully.
- Make sure you understand instructions before attempting to use any tool or machine. Ask questions if you have any doubts about doing the work safely.

What safety procedures should you follow when using woodworking machines?

- Always wear safety glasses or goggles.
- Wear dust masks when required.
- Wear hearing protection that is suitable for the level and frequency of the noise you are exposed to in the woodworking area.

If you have trouble hearing someone speak from 3' (1m) away, the noise level from the machine is too high. Damage to hearing may occur.

- Use gloves to protect hands from splinters when handling wood but do not wear them near rotating blades and other machinery parts where the gloves can catch.
- Make sure the guard is in position, is in good working condition, and guards the machine adequately before operating any equipment or machine.

Check and adjust all other safety devices.

- Make sure the equipment is properly grounded before use.
- Check that keys and adjusting wrenches are removed from the machine before turning on the power.
- Inspect stock for nails or other materials before cutting, planing, routing, or carrying out similar activities.
- Make sure that all machines have start and stop buttons within easy and convenient reach of an operator. Start buttons should be protected so that accidental contact will not start the machine.
- Ensure that all cutting tools and blades are clean, sharp, and in good working order so that they will cut freely.

Do not force the object you are cutting.

- Turn the power off and unplug the power cord (or lock out the power source) before inspecting, changing, cleaning, adjusting, or repairing a blade or a machine. Also turn the power off when discussing the work.
- Use a "push stick" to push material into the cutting area. Jigs are also useful in keeping hands safe during cutting procedures.

Keep hands out of the line of the cutting blade.

- Clamp down and secure all work pieces when drilling or milling.

- Use good lighting so that the work piece, cutting blades, and machine controls can be seen clearly.

Position or shade lighting sources so they do not shine in the operator's eyes or cause any glare and reflections.

- Ensure that the floor space around the equipment is big enough to allow you to move the size of work being processed safely without bumping into other workers or equipment.
- Woodworking machines should be fitted with efficient and well-maintained local exhaust ventilation systems to remove sawdust or chips that are produced.
- Electric power cords should be above head level or on the floor in such a way that they are not tripping hazards.
- Keep the work area free of clutter, clean, well swept, and well lit. Spills should be cleaned up immediately. Floor areas should be level and non-slip.

Good housekeeping practices and workplace design will reduce the number of injuries and accidents from slips, trips, and falls.

What should you avoid when working with woodworking machines?

- Do not wear loose clothing, work gloves, neckties, rings, bracelets, or other jewelry that can become entangled with moving parts.

Tie long hair into a ponytail or up in a bun.

- Avoid awkward operations and hand positions where a sudden slip could cause your hand to move into the cutting tool or blade.
- Do not remove sawdust or cuttings from the cutting head by hand while

a machine is running.

Use a stick or brush when the machine has stopped moving.

- Do not use compressed air to remove sawdust, turnings, etc. from machines or clothing.
- Do not leave machines running unattended (unless they are designed and intended to be operated while unattended).

Do not leave a machine until the power is turned off and the machine comes to a complete stop.

- Do not try to free a stalled blade before unplugging the power cord.
- Do not distract or startle an operator while he or she is using woodworking equipment.
- Horse play is not allowed. It can lead to injuries.

General Safety Tips

Learning Activity

1. How do you know when the noise level is too high?

2. Why should you not wear gloves when working near saw blades? What could happen?

3. Pick one safety tip. Discuss it below, giving reasons why that tip is important.

Safety Tip: _____

Reasons why it is important:

General Safety Tips

Learning Activity

1. How do you know when the noise level is too high?

2. Why should you not wear gloves when working near saw blades? What could happen?

3. Pick one safety tip. Discuss it below, giving reasons why that tip is important.

Safety Tip: _____

Reasons why it is important:

4. “Ensure that the floor space around the equipment is big enough to allow you to move the size of work being processed safely without bumping into other workers or equipment.”

Discuss this tip. What does it mean? Why is it important? What could happen if you did bump into another worker?

5. List ways to reduce injuries and accidents **from slips, trips, and falls**.

6. Why should you not wear loose clothing, work gloves, neckties, rings, or bracelets, or long hair? What could happen?

7. In your opinion, what is the most important safety tip to remember and why?

8. Do you have other safety tips to share, or stories relating to safety?

Write them below and share them with an instructor or your classmates.

4. “Ensure that the floor space around the equipment is big enough to allow you to move the size of work being processed safely without bumping into other workers or equipment.”

Discuss this tip. What does it mean? Why is it important? What could happen if you did bump into another worker?

5. List ways to reduce injuries and accidents **from slips, trips, and falls**.

6. Why should you not wear loose clothing, work gloves, neckties, rings, or bracelets, or long hair? What could happen?

7. In your opinion, what is the most important safety tip to remember and why?

8. Do you have other safety tips to share, or stories relating to safety?

Write them below and share them with an instructor or your classmates.



Skills for Success in this Section



Reading



Writing



Digital

Personal Protection Equipment (PPE)

Hazards exist in every workplace. Often, to make sure their employees are safe, it is necessary for employers to provide Personal Protection Equipment (PPE).

PPE is equipment worn to reduce your exposure to potential hazards.

The Hazard Assessment

Hazard assessment is the first step in figuring out what possible physical or health-related hazards a workplace has and then what precautions and PPE may be necessary.

The employee should be able to identify potential risks, tell their supervisor, and act if necessary.

A basic hazard assessment should begin with a walk through the work site to develop a list of potential hazards in the following categories:

- impact (something that could hit you)
- penetration (sharp objects that could enter your body)
- chemical
- heat/cold
- harmful dust

Some other things to be aware of while doing the basic assessment are:

- sources of electricity
- sources of motion, such as machines which could result in injury to

employees

- sources of high temperature
- types of chemicals used in the workplace
- potential for falling objects
- sharp objects

Types of PPE

There are many types of PPE available for a wide variety of potential risks.

When choosing PPE, there are a few things to think about.

It is important that the equipment selected is appropriate for the workplace and the possible risks.

All PPE should be designed and constructed well and should be regularly checked and maintained.

Finally, all PPE worn should fit each individual properly.

Eye and Face Protection

Most eye injuries in the workplace could be prevented if employees wore the right eye protection. It should fit properly.

Carpenters, electricians, plumbers, pipe fitters, and their helpers routinely use eye protection on the work site. Some examples of potential eye injuries include:

- dust, dirt, metal, or wood chips enter the eye as a result of activities such as chipping, grinding, sawing, hammering, the use of power tools, and even from strong wind forces.
- chemical splashes.
- objects swinging into the eye or face.

Some types of eye protection include:

- safety spectacles with safety frames and impact- resistant lenses.
- goggles that completely cover the eyes and provide protection from impact, dust, and splashes.
- welding shields that protect the eyes from the harmful light created when welding.

They protect both the eyes and face from flying sparks and metal.

When selecting suitable eye and face protection employees should ask themselves the following questions:

- What hazards will this protect me from?
- Does it fit properly and reasonably comfortably?
- Does it restrict my movement or vision?
- Is it clean and durable?
- Is it compatible with all other PPE that I am required to wear?

Head Protection



Head injuries can kill you.

They can also permanently change your personality, your ability to walk properly, your memory and your speech.

The easiest means of prevention is simply wearing a hard hat.

Hard hats can protect an individual from impact and penetration hazards, as well as from electrical shock and burns.

Some occupations in which employees should be required to wear head protection include construction workers, carpenters, electricians, plumbers, and pipefitters.

Hard hats should do the following:

- resist penetration by objects
- absorb the shock of a blow
- be water resistant, and slow burning
- have clear instructions explaining the proper way to wear, adjust and care for it



Like any other form of PPE, it is important that head protection fit properly, be in good condition, and be well cared for.

Foot and Leg Protection



When facing possible foot or leg injuries from falling or rolling objects or from crushing or penetrating materials, employees should wear protective footwear.

This is especially important when working with heavy objects which might fall or roll onto an employee's feet, with sharp objects which could penetrate ordinary shoes, or where electrical hazards are present.

Safety shoes and boots are the most common type of foot protection.

They typically have impact- resistant toes, metal insoles, and heat- resistant soles.

When buying safety footwear, look for the Canadian Safety Association label.

Hand and Arm Protection



Gloves are the most common and effective type of hand and arm protection available when the hazard cannot be eliminated through other precautions.

The wide variety of potential hand injuries makes choosing the appropriate pair of gloves challenging.

The following are some factors that might influence the selection of protective gloves:

- types of chemicals being handled
- the nature of contact (total immersion, splashing, etc.)
- length of contact
- what area of the hands and arms require protection
- temperature protection
- size and comfort

It is important to know that, when using some machinery, it is better not to wear gloves.



Note: When using any machine where the glove could get caught or stuck, it is better not to wear them.

As well, it is a good idea not to wear rings, watches, earrings and necklaces when operating certain types of machinery. Your company may have rules about what you are allowed to wear, in order to make sure you are safe.

Types of Gloves

There are various types of gloves that can be chosen with consideration of the factors previously mentioned. In the occupation of skilled trades labourer or helper the most common gloves you would encounter are:

- leather gloves that protect against sparks, moderate heat, blows, and rough objects
- aluminized gloves provide insulating protection against heat and cold
- fiber gloves also provide protection against heat and cold as well against cuts
- synthetic gloves of various materials can protect against heat and cold, cuts, and some chemicals.

Hearing Protection



The need for hearing protection depends on a number of factors such as the loudness of noise (decibels), the length of the employee's exposure to the noise, and whether the noise level changes between employee's various work areas.

Some of the more common types of hearing protection include:

- single-use earplugs which are self-forming when properly inserted.
- pre-formed or molded earplugs are professionally fitted for the individual. They can be disposable or reusable (in which case they need to properly be cleaned after each use).
- earmuffs which create a seal around the ear.

Personal Protective Equipment (PPE) for Women



Having PPE made specifically for women is very important for several reasons.

A woman's body can be shaped differently than a man's, so PPE designed for female workers can fit better and be more comfortable.

When safety gear fits properly it reduces the risk of accidents.

These accidents can be caused by loose equipment or clothing. Clothing that does not fit well can prevent safe movement on the job.

When women can access the right PPE, it can also boost their confidence because it shows that their safety matters at their workplace.

This sense of inclusion encourages more women to pursue careers in trades and construction. Jobs that were in the past mostly considered to be more for male workers.

Having female PPE options means that employers can provide the right PPE for all their workers. By offering female PPE options, companies can follow safety laws and show their commitment to a safe workplace.

While there are still limited options, more companies are beginning to offer better choices to keep up with these positive changes and the opportunities for inclusion in trades jobs.

Personal Protective Equipment

Learning Activity #1

Match the word or expression on the left with the correct definition on the right. Use a dictionary if you need one.

Hazard	possible
Potential	causes death
Precaution	danger
Harmful	long-lasting
Maintained	something you can do to reduce risk
Restrict	a danger
Fatal	kept in good condition
Durable	to reduce; make more difficult

Learning Activity #2

1. _____ is the first step in figuring out what possible physical and health and related hazards a workplace has.
2. A hazard assessment should begin with _____.



Skills for Success in this Section



Reading



Writing

Risk Management

The fact is that Skilled Trades Helpers work in dangerous situations.

There is a risk of injury every day because of the type of work being done.

You cannot make your work environment 100% safe, but you can do a lot to lessen the risk.

It takes effort, but **the gain far outweighs the cost** when you have a worksite where no one gets hurt.

Risk management is something you can do every day, all day.

Always be on the lookout for situations that could be dangerous.

This is an opportunity to put all of the safety information you have learned into practice. **Prevention is the key.**

Safety doesn't just happen. It takes workers who are committed to making their sites as safe as possible.

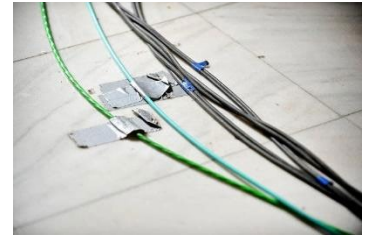
Situation —>Accident —> Consequences

Your job is to look at every situation. Think 'what could go wrong?' Ask yourself what accidents might happen and what the consequences of that accident would be, and to change an unsafe situation to make it as safe as possible.

Tips

1. Anticipate or look out for what could go wrong.

Example: If I set my saw on the edge of this table, someone could walk by and knock it off. It could injure one or both of us.



Solution: Put your saw in a safer place.

Example: The extension cord stretches across the middle of the room, is twisted up, and clumped in the middle.

Solution: Tape the cord down, stretch it to the other side of the room by lying it next to the wall, or at the very least, make sure it is lying flat with no twists, turns, or clumps.

When someone is coming into the room, make them aware of the hazard by saying “Watch out for the cord. Do not trip.”

2. Communicate with your co-workers and your supervisor. Ask questions if you are unsure.
3. Use common sense. If something looks dangerous, it probably is. Proceed with extreme caution or change the situation until it is safer.
4. Listen to co-workers if they tell you that your work behaviour is unsafe.
5. Do not take shortcuts! They can cost you a lot more in the long run.

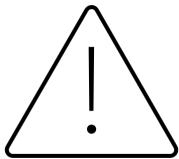
Example: Make sure the blades of the power saws you are using come to a full stop before you set them down, otherwise they could make the saw jump or cut the cord or any number of dangerous situations.

6. Safety equipment and practices are there to protect you. Equipment is designed because accidents have happened in the past. Equipment has to be used properly.
7. Learning and using proper safety procedures is as important, if not more so, than knowing your trade.

Your career as a trades helper will quickly come to a stop if you lose your arm, hands, sight, or life!

8. Always keep the safety of your co-workers in mind as well.

It is your responsibility to make your environment safe.



**Equipment, tools, and machines can all be replaced.
Your eyes, arms, fingers, toes, hands, and life cannot be replaced.**

3. Name 3 things to be aware of while doing the assessment.

4. Which kinds of workers regularly use eye protection?

5. Why is head protection so important?

6. Safety shoes should have _____.

7. Go on your device. Open a web browser (like Safari or Google Chrome).
Type in one or both of the following web sites:

<https://womensworkwear.ca/>

<https://dovetailworkwear.ca/>

Name 5 different types of PPE that are offered specifically for women workers on these sites.

Risk Management

Learning Activity

1. True or False?

- | | | |
|---|---|--|
| T | F | Skilled Trades Helper work is dangerous. |
| T | F | The only way to be safe is to ask someone to do the work for you. |
| T | F | Risk management is something that the boss does. |
| T | F | You need to ask yourself 'What could go wrong?' |
| T | F | You should keep yourself safe and not worry about your co-workers. |
| T | F | Ask questions if you are unsure. |

2. In your own words, explain what risk management is and why it is so important.



Skills for Success in this Section



Reading

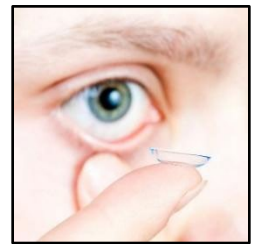


Writing

Contact Lenses at Work

What are contact lenses?

Contact lenses are small, thin discs made of a transparent (see through) material. Contact lenses can be a safe way to correct vision for most people.



Many people wear contact lenses because they prefer them to eyeglasses. For example contact lenses do not slip down your nose or fog up in the wintertime.

What is the problem with wearing contact lenses at work?

Put as simply as possible, the problem is that, according to some people, contact lenses may complicate eye safety.

Contact lenses may make it harder to keep your eyes safe.

The arguments against wearing contact lenses in the work environment are based on the following:

- Dusts or chemicals can be trapped behind the lens and cause irritation or damage to the eye.
- Gases and vapours can cause irritation and a lot of eye watering; and a chemical splash may cause more injury when contact lenses are worn.

This increased risk is related to the removal of the lenses. If removing the

lens takes some time. First aid treatment may not be as helpful and, in turn, the eye's exposure time to the chemical may be increased.

However, the opposite may be true as well.

Contact lenses may prevent some substances from reaching the eye.

The injury may not be as bad, or it might prevent the injury. Both situations have been documented.

The critical point to remember is that contact lenses are not made to be used as protective devices.

**Contact lenses are not a substitute
for personal protective equipment (PPE).**

If eye and face protection is needed for certain work then all workers, including contact lens wearers, should wear the proper protective devices.

Are there situations where it may be hazardous to wear contact lenses?

Conditions may be hazardous to both contact lens wearers and to people who do not wear them. Sometimes it is safer if you don't wear your contact lenses. Each situation should be looked at carefully.

These situations may include:

- exposure to chemical fumes and vapours
- chemical splash
- tiny matter or dust is in the air
- infrared rays



- intense heat
- dry atmosphere
- flying particles
- areas where caustic substances are handled, especially those used or stored under pressure (caustic substances are those that burn or corrode)

Contact Lenses at Work

Learning Activity

1. Describe in your own words, the problem with wearing contact lenses at work.

2. List the pros and cons to wearing contact lenses. Use point form.

PRO (for)	CON (against)

3. Contact lenses are not to be used as protective devices. They are not a substitute for _____.

4. List situations where it may be hazardous to wear contact lenses.



Skills for Success in this Section



Reading



Writing



Numeracy

Slips, Trips and Falls

Walking usually comes naturally but sometimes we forget to focus on where we are going.

On the job site, we need to pay attention to where we are walking and what is happening around us.

In the construction business, there are several safety hazards, three of which are: slipping, tripping and falling.



Slips

Lower Your Risk - Play it Safe

Slips can happen when there isn't enough friction or traction between your feet and the surface of the floor.

You can lower the risk of slipping on wet indoor surfaces by using some of these tips.

- Use smaller steps to help keep your balance and walk with your toes pointed slightly outwards.
- Be sure to turn more slowly at corners when the surface is wet. It is more dangerous than you think.
- Wear appropriate footwear. Shoes or boots with soles built for slippery surfaces are better.
- Know what personal protective equipment (PPE) is required to keep you safe on the job.

- If necessary, use 'abrasive strips' or other grips to prevent you from slipping.
- Make sure there are signs telling others about wet areas.
- Clean up spills when you see them!

If you are in doubt of your safety, ask your supervisor for help.

Outside weather conditions such as snow, ice, rain, and wind can cause you to slip as well.

You can lower the risk of slipping outside by using some of these tips.

- Take the time to look around and be prepared for weather changes.
- Slow down. Take time to test your balance and grip to the surface of the ground.
- Wear 'slip-resistant' shoes or 'overshoes'.
- Wear sunglasses or goggles when it is very sunny or bright, or when you are in ice and snow.

Cutting the glare will help you assess hazards.

- Be careful of wet shoes on a dry floor. They can be just as slippery as dry shoes on a wet surface.
- Try to avoid small, loose rugs on hard surfaces. They can bunch up or move, causing you to trip or fall.
- Be careful of changing surfaces. Moving from carpet to vinyl to wood flooring can cause slips because of a difference in level.

Trips

Walking into an object or being thrown off balance can cause you to trip.

If you cannot see past something that is in your way or that you are carrying, you could be setting yourself up for a collision!

- Clear all pathways and hallways of junk or anything that might inhibit your ability to walk or move safely.
- All carpeted areas should be tacked down so that it can't wrinkle or bunch up.
- Cables or wires that cross on walkways or stairs should be covered with tape to prevent tripping.
- Don't forget! The doorway of an elevator isn't always level with the floor. Sometimes there is a gap between the elevator and the floor. That's a big trip hazard!

Lighting can also be a hazard.

Trying not to do too much walking or working in the dark is extremely dangerous!

Always remember:

- If light is available, use it.
- Don't forget to replace dead light bulbs as soon as you notice them blow.
- Fix any switches that are broken.
- Use a flashlight if you have to go into a dark room where there is no light.

Falls

Falling most commonly happens because of one of two reasons:

- The ladder is not used properly or safely.
- Other objects have been used as a 'makeshift' ladder.

When you are choosing the tool for the job, be sure to choose the right equipment!

Make sure your ladder is locked into position and held stable.

Make sure the steps or rungs are not damaged or broken.

Due to the height of extension ladders, they can cause a serious fall when not used correctly.

To prevent a very dangerous fall, follow these tips:

- Follow the 1:4 rule. For every four feet you want to climb, position your ladder one foot out from the wall.

For example, if you are climbing 12 feet up, your ladder should be 3 feet out from the wall.

- Make sure the ladder is tall enough for the job.
- If possible, have someone stay at the bottom of the ladder, holding it secure.
- When working very high up or on a roof, the ladder should always be 3 feet higher than the building.
- Never use the top three rungs. The lower on the ladder you are, the safer you are.

Climb only as high as necessary.

- Doors can be extremely dangerous to your health if you are on a ladder in front of one.

Always be sure that any doors are securely locked, so no one pushes you off the ladder when opening a door.

Stairs

Stairs can be very useful, but if not maintained or used improperly, they can be hazardous.

Here are some safety tips for stairs:

- Take each step carefully. Take one step at a time. There is no rush.
- Walk on every stair. Do not skip steps or jump down them.
- Unless you are carrying something that requires both hands, use the handrail.
- Never use the stairs as a temporary closet or storage. Keep clutter away from the stairs.

A person working close to the ground might think they do not have to pay as close attention as if they were working ten feet above the ground. The truth is, when you do not pay attention, everyday clutter or mishaps can sneak up on you.

Be aware, pay attention and be cautious.



Slips, Trips and Falls

Learning Activity #1

1. On the job site, we need to pay _____ to where we are _____ and what is happening around us.
2. _____ can happen when there isn't enough _____ or _____ between your feet and the _____ on the floor.
3. PPE stands for _____.
4. Name four weather conditions that can affect your safety while working outdoors.

5. Try to avoid _____, loose _____ on hard surfaces.
6. _____ shoes on a dry floor are just as _____ as _____ shoes on a wet surface.
7. When working on a roof, the _____ should always be _____ feet higher than the top of the building.
8. Always use the _____ when walking up or down the stairs.



Skills for Success in this Section



Reading



Writing

WHMIS Overview

Introduction

WHMIS (pronounced whim-iss) stands for the Workplace Hazardous Material Information System.

WHMIS is a Canada-wide system designed to protect the health and safety of working Canadians by providing information about hazardous materials on the job.

In 1988, WHMIS (Workplace Hazardous Materials Information System) legislation came into effect across Canada.

It was designed to protect the health and safety of **workers** through the provision of information about hazardous materials on the job.

Right to Know

WHMIS gives everyone the right to know about the hazards of materials they work with and provides the means to find out that information. It does this through labels, safety data sheets (SDSs), and worker training and education.

WHMIS addresses the worker's "right to know".



There are 3 main areas to WHMIS:

- labels
- material safety data sheets (SDSs)
- worker education and training

WHMIS deals with the preservation of life and health against hazardous substances encountered at work.

The industry, labour, and government representatives who worked together to create WHMIS were working to protect Canadians from injury or illness on the job.

WHMIS is the Law

The WHMIS legislations are laws in every province and territory in Canada.

Federal and provincial legislation make WHMIS a Canada- wide program.

Hazardous Material

The Hazardous Products Act says that any product, material, or substance which falls into any of the six hazard classes described below is a **hazardous product**.

KNOW THESE SYMBOLS...THEY COULD SAVE YOUR LIFE!

WHMIS - Hazards

WHMIS (Workplace Hazardous Materials Information System) helps keep workers safe by showing them the different kinds of hazards that can be found in materials they might work with.

Here are the main types of hazards:

	Exploding bomb (for explosion or reactivity hazards)		Flame (for fire hazards)		Flame over circle (for oxidizing hazards)
	Gas cylinder (for gases under pressure)		Corrosion (for corrosive damage to metals, as well as skin, eyes)		Skull and Crossbones (can cause death or toxicity with short exposure to small amounts)
	Health hazard (may cause or suspected of causing serious health effects)		Exclamation mark (may cause less serious health effects or damage the ozone layer*)		Environment* (may cause damage to the aquatic environment)
	Biohazardous Infectious Materials (for organisms or toxins that can cause diseases in people or animals)				

* The GHS system also defines an Environmental hazards group. This group (and its classes) was not adopted in WHMIS 2015. However, you may see the environmental classes listed on labels and Safety Data Sheets (SDSs). Including information about environmental hazards is allowed by WHMIS 2015.

1. Physical Hazards

These hazards are related to how materials can behave in dangerous ways. For example:

- Explosives: Things that can blow up.
- Flammable Gases: Gases that can catch fire easily.
- Flammable Liquids: Liquids that can catch fire quickly.
- Flammable Solids: Solid materials that can burn easily.
- Oxidizers: These are materials that can make fires burn hotter or spread faster.

- **Corrosive Materials:** Things that can damage or eat away at metal or skin.
- **Reactivity:** Some materials can react with water or other things and cause fires or explosions.

2. Health Hazards

These hazards can make people sick or hurt them. For example:

- **Toxicity:** Some materials can make you sick if you breathe them in, touch them, or swallow them.
- **Skin and Eye Damage:** Some substances can cause rashes, burns, or serious damage to skin and eyes.
- **Allergic Reactions:** Some things can cause allergic reactions, like sneezing or skin rashes.
- **Cancer:** Some materials can cause cancer if you are around them a lot.

3. Environmental Hazards

These hazards are about how materials can harm the environment. For example:

- **Harmful to Water:** Some materials can hurt fish and other animals in water.
- **Long-Lasting Harm:** Some substances can stay in the environment for a long time and keep hurting plants and animals.

WHMIS 2015 introduced new classes and categories for hazardous materials. Some key additions included:

1. **Physical Hazards:** Such as combustible dust and pyrophoric materials.
2. **Health Hazards:** New categories for substances that are toxic to specific organs

or that can cause respiratory or skin sensitization.

3. Environmental Hazards: New classifications for materials harmful to aquatic life.

Examples of Hazards

WHMIS Hazard	Example	Products/Places
Physical Hazards	Flammable Liquids	Gasoline, paint thinners, and alcohol-based cleaning products (workshops, garages)
Health Hazards	Toxicity	Pesticides and certain cleaning agents (agricultural settings, janitorial supply closets)
Environmental Hazards	Harmful to Aquatic Life	Industrial wastewater, oil spills, and certain agricultural fertilizers (near water bodies, industrial facilities)
Corrosive Materials	Acids	Sulfuric acid (battery maintenance areas) and hydrochloric acid (chemical processing plants)
Explosives	Dynamite	Used in construction sites for demolition or mining operations
Oxidizers	Hydrogen Peroxide	Found in laboratories or healthcare settings as a disinfectant or bleach

You can find hazardous substances in the workplace in the following forms:

Solid, Liquid and Dust

SOLID: Dust, fumes, smoke

Dusts are made by grinding, crushing, or handling. Fine particles of dust can remain suspended in the air.

Fumes are formed when a volatilized solid such as metal, condenses in cool air. This occurs in welding operations.



Smoke is formed when a material containing carbon is burned.

LIQUID: Mist, vapours

Mists are suspended liquid droplets formed when gases move into a liquid state, or when a liquid is broken by splashing or foaming. Examples: paint mist from spraying.

Vapours are gaseous forms of substances which are normally a solid or liquid. You may find vapours in cleaning agents and paint thinners.



GAS

Gases are substances that do not exist as a solid or liquid at room temperature and pressure.

Gases tend to spread out and occupy the entire space you are in.

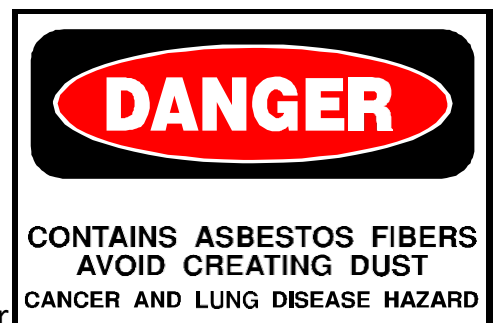
Examples: carbon monoxide, methane, and oxygen.



Note: All of these different forms of substances can contaminate workplace air.

Chemicals can enter your body through:

- **your lungs** if you breathe fumes, mist, or dust
- **your skin** if liquid or dust touches, spills on you, or splashes
- **your mouth** if you eat after handling chemicals or if you accidentally swallow chemicals



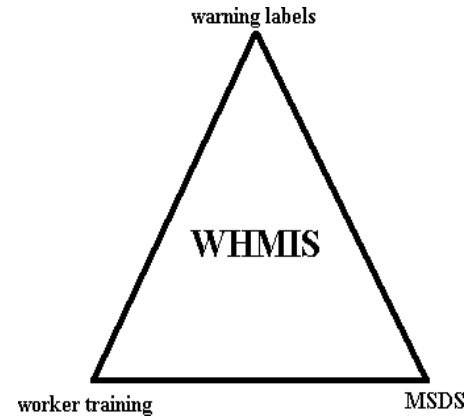
- **your eyes** if chemicals splash on you or are in the air

Getting Information Out

Everyone has a right to know about hazardous materials in their workplace. WHMIS gives people the means to find out that information.

It does this through a three-pronged approach:

- **warning labels** on containers of hazardous materials
- **material safety data sheets** (SDSs) providing further, detailed information
- **worker training** on how to use the information contained on the labels and SDSs.



All three of these requirements are of equal importance for the success of WHMIS.

Labeling containers and providing material safety data sheets would accomplish little if workers were not trained about the significance of the information contained on the labels and SDSs.

Similarly, training would be of little use if containers and SDSs were not available to provide detailed information about the products.

Labels

The label is the first and most basic form of WHMIS hazard warning to employers and workers.

It is easily recognized, appears on the container of a hazardous product, and provides basic information about the risks associated with the use of the material inside the container.

WHMIS requires two kinds of labels: supplier and workplace labels.

Look at the example on the next page and read the information about the important parts of both labels.



Note: The information on labels must be in French and English.

WHMIS Labels

1 Product Identifier

The product name exactly as it appears on the container and on the Safety Data Sheet (SDS).

2 Hazard Pictograms

Hazard pictograms, determined by the hazard classification of the product. In some cases, no pictogram is required.

3 Signal Words

"Danger" or "Warning" are used to emphasize hazards and indicate the severity of the hazard.

4 Hazard Statements

Brief standardized statements of all hazards based on the hazard classification of the product.

5 Precautionary Statements

These statements describe recommended measures to minimize or prevent adverse effects from exposure to the product, including protective equipment and emergency measures.

6 Supplemental information (if required)

May be required based on classification. This information must not contradict or detract from the standardized information.

7 Supplier Identifier

The company which made, packaged, sold or imported the product, and is responsible for the label and SDS.

8 Safe Handling Precautions

May include pictograms or other supplier label information.

9 Reference to SDS

If available.

Supplier Label

1 Product K1 / Produit K1



3 Danger

Danger

4 Fatal if swallowed.
Causes skin irritation.

Mortel en cas d'ingestion.
Provoque une irritation cutanée.

5 Precautions:

Wear protective gloves. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.

Store locked up. Dispose of contents/containers in accordance with local regulations.

IF ON SKIN: Wash with plenty of water. If skin irritation occurs, get medical advice or attention. Take off contaminated clothing and wash it before reuse.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor. Please consult.

Conseils :

Porter des gants de protection. Se laver les mains soigneusement après manipulation. Ne pas manger, boire ou fumer en manipulant ce produit.

Garder sous clé. Éliminer le contenu/réceptacle conformément aux règlements locaux en vigueur.

EN CAS DE CONTACT AVEC LA PEAU: Laver abondamment à l'eau. En cas d'irritation cutanée: Demander un avis médical/consulter un médecin. Enlever les vêtements contaminés et les laver avant réutilisation.

EN CAS D'INGESTION: Appeler immédiatement un CENTRE ANTIPISON ou un médecin. Rincer la bouche.

6 1% of the mixture consists of an ingredient or ingredients of unknown acute toxicity.

1% du mélange consiste en ingrédients de toxicité aiguë inconnus.

7 Company XYZ, 123 Main St, Mytown, ON N0N 0N0 (123) 456-7890

Workplace Label*

1 Product K1 / Produit K1

3 Danger

Danger

Fatal if swallowed. Causes skin irritation. Wear protective gloves (optional). Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.

Mortel en cas d'ingestion. Provoque une irritation cutanée. Porter des gants de protection (optionnels). Se laver les mains soigneusement après manipulation. Ne pas manger, boire ou fumer en manipulant ce produit.

9 See SDS for more information.

Pour de plus amples renseignements, consulter la FDS.

*Requirements may vary - consult your local jurisdiction for their requirements.

Workplace Identifiers

This is a substitute for the workplace label. It is used when a workplace label might not be practical. Look at the picture below.

The two identifiers (tags) are used because there really is nowhere to put the labels.

In this case, it makes more sense to use tags. That way there is no confusion as to which label goes with which pipe.



Labeling of Chemicals

If chemicals are placed in another container, this new container must have a label on it. All containers must have labels. If two or more chemicals are mixed together, it could cause a serious reaction.

If there is not a label:

Stop! - do not use chemicals.

Tell your supervisor.



Material Data Sheets (SDS)

The SDS is the second level of the WHMIS information-delivery system.

While the label provides vital warning information to those on the spot, the SDS contains additional details important for handling emergencies or clean-ups.



Much of the information provided on the SDS is of a technical nature. It is addressed primarily to engineers, occupational hygienists, fire fighters, emergency coordinators, and others.

Nevertheless it is useful for everyone in the workplace to understand how the information on the SDS can be used to protect health and safety.

For each hazardous product likely to be encountered on the job, Ontario employers must have an SDS available at their site for workers.

Summary of Safety Data Sheet (SDS) Sections

1. Identification

Includes the product name, synonyms, recommended use, restrictions, and the supplier's contact information.

2. Hazard Identification

Describes the product's hazards, including classification, label symbols, signal words, and precautionary statements.

3. Composition/Information on Ingredients

Lists ingredients, including chemical names, common names, CAS numbers, and concentrations of hazardous substances.

4. First-Aid Measures

Provides first-aid instructions for exposure through inhalation, skin contact, eye contact, and ingestion, along with symptoms and the need for medical attention.

5. Fire-Fighting Measures

Outlines suitable extinguishing media, specific fire hazards, and protective equipment for firefighters.

6. Accidental Release Measures

Details precautions, protective equipment, and cleanup methods for spills or leaks.

7. Handling and Storage

Gives safe handling practices and storage conditions, including incompatible materials.

8. Exposure Controls/Personal Protection

Recommends exposure limits, engineering controls, and personal protective equipment (PPE).

9. Physical and Chemical Properties

Lists key physical and chemical properties such as state, color, odor, melting and boiling points, and flammability.

10. Stability and Reactivity

Describes the product's stability, potential hazards, conditions to avoid, and incompatible materials.

11. Toxicological Information

Details health effects, routes of exposure, symptoms, and toxicity measures.

12. Ecological Information

Covers environmental effects, including toxicity, persistence, and bioaccumulation.

13. Disposal Considerations

Provides safe disposal methods and handling for contaminated materials.

14. Transport Information

Includes shipping details such as UN number, transport class, and precautions.

15. Regulatory Information

Lists relevant safety, health, and environmental regulations.

16. Other Information

Contains the date of the latest SDS revision.

Please look over an SDS example on the next page. See how the important safety information is sorted by category.

Years Go By Wood Stain

MATERIAL SAFETY DATA SHEET

SECTION 1: Identification

Company: Pretty Woods, LLC
 Reactive stains: Reclamation, Staining, Restoration,
 Cedar, Light Oak, Pining
 Size: 32 oz, 128 oz, 640 oz
 Classification: 6-4-19-7, 11121 13-7
 Formula: $2(C_2H_5O_2)Fe cMn PSS$
 Distributor: Pretty Woods, 1299 Elm Street,
 Anywhere, ON, K9D 1H4
 Chemical Information: 800-622-2699

SECTION 2: Hazard Identification

Emergency Overview: No hazardous components present as confirmed by WHMIS, OHSA, DOT or EPA

Potential Health Effects:

Eyes: may cause irritation

Skin: May cause irritation

Ingestion: May cause abdominal discomfort, diarrhea, and nausea if ingested

Inhalation: May cause irritation with prolonged exposure

SECTION 3: Ingredient Information

Principal Hazardous Components: No hazardous components present as confirmed by WHMIS, OHSA, DOT or EPA

Other ingredients: Potable water, Carbohydrate, Spices

Hazard symbols: None listed.

Risk phases: None listed.

SECTION 4: First Aid Measures

Emergency and First Aid Procedures

Eyes: In case of contact with eyes, rinse immediately with plenty of water. If irritation continues, seek medical advice.

Skin: Rinse with plenty of water. If irritation continues, seek medical advice.

Ingestion: If swallowed do not induce vomiting, drink plenty of milk or water. See medical advice immediately.

Inhalation: Move casualty to fresh air. If irritation continues, seek medical advice.

SECTION 5: Fire-Fighting Measures

Flammable Limits: None

Flash Point: Not flammable

Extinguishing Media: Use dry chemical, CO_2 , or appropriate foam.

Rating: Fire: 0, Reactivity: 0

Auto-ignition Temperature: N/A

Special Firefighting Procedures: For safety firefighter should wear NIOSH approved breathing apparatus.

Unusual fire or explosion hazard: 0

SECTION 6: Accidental Release Measures

Steps in Case Material is Released or Spilled: Use caution during clean-up, personnel should wear appropriate equipment and clothing, absorb material with suitable absorbent and containerize for removal, dispose in accordance with local and federal regulations.

SECTION 7: Handling and Storage

Precautions: Keep Container tightly closed in a cool, dry, well-ventilated place.

Avoid freezing. Suitable for any general chemical storage.

SECTION 8: Exposure Controls/ Personal Protection

Emergency Protection: None needed under normal condition of use with adequate ventilation, A NIOSH/MSHA chemical respirator should be worn if PEL or TLV is exceeded.

Other Protective Clothing or Equipment: La coat, apron, eye wash, safety shower

Protective Gloves: Wear natural rubber, neoprene, PVC, or equivalent gloves to prevent possible skin irritation.

Eye Protection: Splash proof chemical safety goggles.

Ventilation: N/A

Special: No

Other: No

SDS label credit: Developed by Angela Williams for CESBA © 2024 CESBA encourages the distribution of this information. CESBA (2024) Home Renovations and Carpentry Basic, Skills For Success Curriculum Resources, sfs.cesba.com

Worker Training and Education

The third part of the WHMIS information delivery system is the worker education program. Its purpose is to teach workers how to use the information on labels and SDSs so that they can protect themselves.

In fact, increasing workers' knowledge of the hazards of the materials they work with is the main aim of WHMIS.

Hazardous Products

A worker who works with a “hazardous product” is: Any person who stores, handles, uses, or disposes of a **Hazardous** product or a person who supervises another worker performing these activities.



Workers need to:

- have access to hazard information
- be able to understand it
- follow required procedures and precautions.
- not be shy when it comes to asking a question or pointing something out

The employer has the general duty under the *Occupational Health & Safety Act* to provide workers with the information, instruction, and supervision necessary to protect their health and safety.

Worker Responsibilities Regarding Training

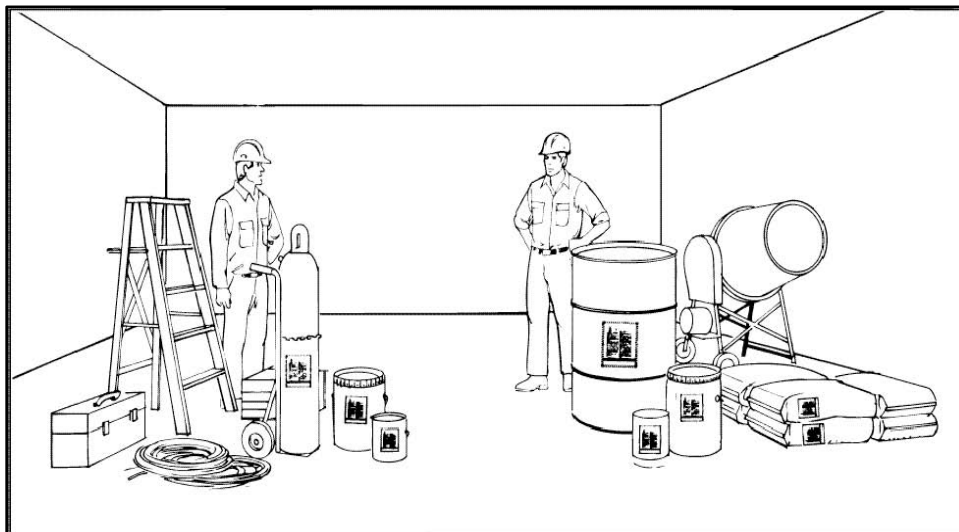
The worker:

- 1) must take and learn the information on hazardous products which the employer must give you
- 2) must tell the employer when information about a hazardous product is not good enough to keep the workers healthy and safe
- 3) should work with the employer through the health and safety representatives to make the training program as good as possible
- 4) should understand something completely and if not, should ask for it to be explained until it is understood

WHMIS in Construction

On typical construction projects there are several different employers, all of whom may be using or working with hazardous substances.

Those who need to know about the hazards are not only the crew using it, but other trades working in the area.



Example: If an electrician goes into an area where tile setters are applying a special adhesive and grout, the electrician should know what hazards these materials pose.

The general contractor can play an important role in coordinating the flow of information.

Sub-contractors should provide a copy of their SDSs to the general contractor.

Types of Health Hazards

Definitions

- **carcinogen** - may cause cancer
- **corrosive** - destroys or changes your tissues on contact, e.g. acid
- **highly toxic** - can kill you quickly, even if exposure is short
- **toxic** - similar to highly toxic, but takes larger exposure
- **irritant** - harms your skin but causes no permanent damage
- **sensitizer** - causes an allergic reaction that can get worse with more exposure
- **target organ effects** - damages a specific organ or system in your body, e.g. kidneys, central nervous system



Note: The important thing to remember is that you can protect yourself by preventing or controlling your exposure.

Chemical Tips

- Some chemicals may be safe by themselves but become dangerous when they come in contact with other chemicals.
- Store chemicals properly.
- Assume that all chemicals are hazardous.
- Wear your PPE! (Personal Protection Equipment)
- Know the location of emergency showers, eyewash stations, fire extinguishers, and exits.
- Wash your hands and face frequently during the day and be careful not to carry chemicals home on your clothing, hands, or hair.
- Avoid practical jokes or other behavior that might confuse, startle, or distract another worker.



Learning Activity #2

Use a dictionary to find the following words that you saw in this unit. On a piece of paper, write out the definition of each word.

If there is more than one definition, choose the definition of the word as it is used in this section.

Then, choose **5 words** and write a sentence using each one.

1. Abrasive
2. Appropriate
3. Balance
4. Clutter (noun)
5. Friction
6. Obstacle
7. Resistant
8. Rungs
9. Surroundings
10. Traction

WHMIS Overview

Learning Activity

Multiple Choice

1. What does WHMIS stand for?
 - a. Workplace Hazardous Material Information System
 - b. Workplace Health Management Information System
 - c. Worker Hazardous Material Identification System
 - d. Worker Health Material Information System
2. Which of the following is NOT one of the three main areas of WHMIS?
 - a. Labels
 - b. Chemical Safety Training
 - c. Material Safety Data Sheets (SDSs)
 - d. Worker Education and Training
3. What is a Material Safety Data Sheet (SDS)?
 - a. A document that labels hazardous materials
 - b. A detailed guide providing information about handling hazardous materials
 - c. A brief overview of workplace safety
 - d. A report of workplace incidents
4. What does "Right to Know" refer to in the context of WHMIS?
 - a. Workers can only know about hazards after they have experienced them.
 - b. Employers are required to share all information about workplace materials.
 - c. Workers have the right to access information about hazardous materials they may encounter.
 - d. Information about hazards is optional for workers.

True/False Questions

4. WHMIS was introduced in Canada in 1988 to protect workers from hazardous materials.
 - a. True
 - b. False
5. WHMIS only applies to certain industries in Canada, not all workplaces.
 - a. True
 - b. False
6. Labels, SDSs, and worker training are all crucial components of the WHMIS information delivery system.
 - a. True
 - b. False
7. Environmental hazards under WHMIS include substances harmful to aquatic life.
 - a. True
 - b. False

Reading Comprehension Questions

8. Describe the purpose of WHMIS and how it aims to protect workers.

9. What are the three main areas of WHMIS, and why is each important?

10. List the six hazard classes described by the Hazardous Products Act and provide one example for each.

Hazard	Example

11. Explain the significance of having labels and SDSs available in the workplace.

Matching Questions Table for SDS Sections

Draw a line matching the section with what it describes.

A) Identification	1) Provides first-aid instructions for exposure through inhalation, skin contact, eye contact, and ingestion.
B) Hazard Identification	2) Lists ingredients, including chemical names, common names, CAS numbers, and hazardous substances.
C) Composition/ Information on Ingredients	3) Describes the product's hazards, including classification, label symbols, signal words, and precautionary statements.
D) First-Aid Measures	4) Includes the product name, synonyms, recommended use, restrictions, and the supplier's contact information.
E) Fire-Fighting Measures	5) Outlines suitable extinguishing media, specific fire hazards, and protective equipment for firefighters.
F) Accidental Release Measures	6) Details precautions, protective equipment, and cleanup methods for spills or leaks.
G) Handling and Storage	7) Gives safe handling practices and storage conditions, including incompatible materials.
H) Exposure Controls/Personal Protection	8) Recommends exposure limits, engineering controls, and personal protective equipment (PPE).
I) Physical and Chemical Properties	9) Lists key physical and chemical properties such as state, color, odor, melting and boiling points, and flammability.
J) Stability and Reactivity	10) Describes the product's stability, potential hazards, conditions to avoid, and incompatible materials.



Skills for Success in this Section



Reading



Writing



Digital



Communication



Adaptability

Ergonomics

Repetitive Motion

“Everyday” jobs using your shoulder, neck, back, arms, wrists, and hands can cause pain and strain. Whether you are at home or at work, what you are doing needs to be done safely.



Note: Repetition means - Performing the same action many times.

When joints are used too much in the same way for long periods of time, muscle and joint strain and pain occur.

There are ways to prevent muscle and joint strain if you pay attention to your body. You can stop the pain before it starts if you are careful and act safely.

How to remain injury free



To remain safe and injury free, you will need to practice some of the following tips.

- Perform stretching exercises regularly
- Practice good posture
- Use smooth movements as often as you can
- Lift objects using your knees, which will relieve the pressure from your back and joints

When you are working, be sure to pay close attention to any 'bad' habits you may have.



Please check any points below that you feel might apply to you.

- ☐ Slouching your shoulders
- ☐ Lifting to the side
- ☐ Lifting above your shoulders
- ☐ Lifting behind your back
- ☐ Bending at the hip instead of the knee

Many back pain sufferers have hurt themselves by improperly lifting something too heavy for them.

Tips for Keeping Healthy

- Use a cart, pulley, portable floor crane, lift tables, a conveyor or a combination of these things to keep safe and eliminate heavy manual lifting.
- When standing for long periods of time, take breaks. Be sure to take a few minutes to stretch, relax and breathe.

Sore feet, stiffness, varicose veins, lower back pain and muscular fatigue can all be a result of standing for long periods of time without stretching.

- Buy quality footwear. Pay attention to arch support, padding, cushioned soles, the heels, and flatness of the shoe and if it is Canadian Safety Association approved.
- Avoid reaching beyond the point of comfort.

- Shift your feet to face the object instead of reaching behind your shoulders to get it.



Pushing and Pulling

You may do a lot of pushing and pulling, such as:

- Using manual carts and trucks or wheelbarrows
- Sliding objects like heavy boxes across the floor
- Operating tools or machines or their controls

The most common use you will likely see as a skilled- trades labourer will be using the wheelbarrow.

Ergonomics

Learning Activity #1

Match the word or expression on the left with the correct definition on the right.
Use a dictionary if you need one.

Posture	Tiredness
Slouching	A belt along which objects move
Conveyor	Dark blue veins that stick out, caused by poor circulation
Varicose veins	Places where your body bends (knees, elbows etc.)
Fatigue	Not standing up straight
Joint(s)	The way you stand (straight, hunched over etc.)

Learning Activity #2

1. What happens when joints are used too much in the same way?

2. Give one example of how you can help to prevent these kinds of problems?

3. What should you look for when you buy work footwear?

4. Protecting your back is very important when you are at a job where you are lifting and moving objects throughout the day.

If you have access to a device, please visit this site:

<https://myhealth.alberta.ca/Health/pages/conditions.aspx?hwid=hw206944>

Or, use a search engine and search, “*My Health Alberta Proper Lifting*” to find this page.

Read the information on proper lifting techniques on the My Health Alberta web page.

Discuss this information with your instructor, a classmate or a friend.

During your talk, address these questions:

1. Is this how you **currently** lift items? Are you doing this now?
2. Is there anything you need to start doing differently?
3. How can you change how you lift to protect yourself better?



Employee Rights

In Ontario, there are three important laws that have to do with workplace safety. They are:

- The Occupational Health and Safety Act
- The Workplace Safety and Insurance Act
- The Employment Standards Act

Occupational Health and Safety Act

The OHSA exists to prevent accidents and deaths in the workplace. It is more important than all other laws about the workplace. It must be followed, no matter what.

In the Act, we can see the health and safety responsibilities of workers, employers, and supervisors.

The Occupational Health and Safety Act states that health and safety is everyone's responsibility.

Employers and owners are responsible for making sure that the workplace follows the OHSA and its regulations.

They must make sure that supervisors know their responsibilities.

The employers must make sure that the workers are able to do their jobs properly.

They must let the workers know about all dangers in the workplace. Also, the employer must provide protective equipment if necessary. There must be a written health and safety policy, and it must be kept in a place where workers can read it.

Supervisors must make sure that employees are following safety regulations and wearing safety equipment.

Workers have three main rights under the act.

1. **Right to Know:** The employer must give you information about your job and any dangers.

If you are not sure of something, it is your responsibility to ask: How do I do this job safely?

2. **Right to Participate:** If the workplace has more than five employees, it has to have either a health and safety representative or a health and safety committee.

Anyone can be a member of the committee. You have a right to participate in training sessions and safety talks.

3. **Right to Refuse Unsafe Work:** You are allowed to say no to any work you believe is unsafe.

You must inform your supervisor, and he/she must deal with it. If your supervisor does not correct the situation, you may refuse to do the work.

You cannot be punished for refusing unsafe work.

If you refuse unsafe work, there is a procedure that must be followed by the employer (see section on refusing work).

In any case, your health and safety are more important than any job.

Joint Health and Safety Committees (JHSC)

- If twenty or more workers regularly work in a workplace, there must be a Joint Health and Safety Committee.
- At least 50% of the members must be workers.
- Employee members are appointed or chosen by their co-workers.
- One management member and one employee member must have special training in health and safety.

These are the “certified members.”

- If the workplace has 6-19 workers, there must be one Health and Safety Representative.

Minimum Ages for Working

Construction: You are not allowed to be on a construction site if you are *under* 16.

Factories: You are not allowed to work in a factory, warehouse, or kitchen under 15 years of age.

Reporting Critical Injuries and Death in the Workplace

If someone breaks a bone (an arm or a leg, for example), loses blood or becomes unconscious, these injuries must be reported to the *Ministry of Labour*.

If a worker is killed in the workplace, the *Ministry of Labour* must be contacted right away. The site must be left as is until the Ministry is contacted and gives permission to proceed.

Regulations under the OHSA

The employer *must* know which regulations apply to their industry. It is up to the employer and the employees to know what regulations apply to them.

Fines and Penalties

A person can be fined up to \$25,000 and/or be jailed for up to 12 months for every charge laid under the Act.

Construction workers and other industries can be ticketed if they are not wearing the regulation safety equipment.

The worker *might* have to appear in court.

Workplace Safety and Insurance Act

This law is designed to help sick and injured workers return to work safely and quickly. It also gives compensation to workers who are off work because of an illness or injury they get at work.

If a person is injured at work, the employer and worker must provide certain information to the Workplace Safety and Insurance Board (WSIB).

If you are hurt, you must report this injury to the employer right away.

You can claim WSIB benefits as soon as possible if you lose time from work, earn less than usual, or get medical treatment.

To get compensation, there are three forms you need to fill out. You can get these from the WSIB. In Ontario, you can contact them, toll-free, at 1-800-387-0750.

Employment Standards Act

This law contains information about minimum wage, number of hours you are allowed to work, overtime pay, vacation pay, and termination pay.

Minimum Wage: This is different in each province. Check with the Ministry of Labour or search online.

Number of Hours: Most employees in Ontario can refuse to work more than 48 hours in a week. You can work 8 hours a day or the number of hours in a regular workday established by the employer. You must get eleven straight hours off in a 24- hour period.

Overtime Pay: This starts for most workers after working 44 hours in 7 days. You should get time-and-a-half for any hours worked above 44.

Vacation Pay: For every dollar you earn, your employer must pay you an extra 4%. For most employees who have worked more than a year at the same place, the employer must give you at least 2 weeks' vacation with pay.

Rights if you lose your job: If a person is fired or permanently laid off and has worked more than 3 months, the employer must give the worker a Notice of Termination.

If the worker does not get this notice, they can get termination pay instead of notice.

- From 3-12 months: 1 week notice
- From 12-36 months: 2 weeks' notice
- More than 3 years: 3 weeks' notice plus one week for each additional year of service up to a maximum of 8 weeks.

The same formula applies to termination pay.

Human rights

One other law that is important in the workplace in Ontario is the Ontario Human

Rights Code. Other provinces have similar legislation.

The Ontario Human Rights code protects workers in Ontario from discrimination and harassment by their employers or co-workers. It also reminds all workers to treat each other with respect.

Discrimination

Discrimination is what happens when you are treated differently from other people. It is against the law to discriminate against people because of:

- Where they were born (place of origin)
- Where their ancestors were born (ancestry)
- Ethnic group (ethnicity)
- Religion
- Sex (male or female)
- Sexual orientation (preference of partner)
- Age
- Marital status (married, single, divorced or separated)
- Children (whether someone has children or not)
- Receiving social assistance or family benefits.

There are situations in which the employer is allowed to choose based on citizenship, age, or handicap.

For example, certain government jobs require that any person hired be a Canadian citizen or between certain ages.

Harassment

Harassment is a situation in which someone threatens, bothers, or insults you. Discrimination and harassment can occur in:

- Job ads
- Job applications
- Job interviews
- The way your employer or co-workers treat you.

Discrimination or Harassment in the workplace

Racial harassment or discrimination includes racial jokes and comments.

Sexual harassment or discrimination includes unwanted touching, comments, sexual jokes, and suggestions.

- If you feel that someone is discriminating against you or harassing you, get help.
- If a co-worker harasses you, report it to your employer.
- If an employer harasses you, tell them that the behaviour is not welcome.
- If the harassment continues, talk to a lawyer or a community legal clinic.

Exploring Types of Harassment with Examples

It is sometimes difficult to deal with situations where you are being harassed. No one likes to complain or be seen as a person who complains, but you have the right to feel comfortable, safe, and respected in your workplace.

It is also your employer's job to make sure that their employees are not mistreated or harassed.

Speaking up is not easy, but it is important. Look at the examples below and read the problem-solving options for various kinds of harassment scenarios. Look at the table to learn about several types of workplace issues and suggestions on how to address types of harassment on the job.

Type of Harassment	Example	Acknowledge the Problem	Speaking Up	Ways to Manage the Problem
Physical or Sexual Abuse	A worker grabs and pushes another worker, making them feel scared.	The worker feels scared. This is not safe or appropriate workplace conduct.	Take the situation directly to a supervisor or the site manager; avoid direct confrontation with the abusive employee.	- Report to the owner, site manager, or supervisor; the company may investigate and take disciplinary action. - Document incidents in detail to provide evidence. - Seek support from Employee Assistance Programs (EAP) or, if an option, Human Resources.
Culturally Insensitive Comments	A worker tells an offensive joke about someone's background or gender.	The person feels uncomfortable and unfairly targeted.	Explain that the joke is inappropriate and educate them on why the joke is offensive.	- If repeated, report to a supervisor, site manager, or owner. - If comfortable, have a private conversation to discuss the impact. - Request diversity or sensitivity training if appropriate. - Consider discussing your feelings with a trusted team member who may help support your concern with management.
Unwanted Physical Actions	A worker keeps patting another worker on the back.	The person feels uneasy about the physical contact.	Tell the person that touching is not okay.	- If it persists, report it to the site manager or owner. - Document incidents and details of unwanted contact. - Consider suggesting training on workplace boundaries and respect for personal space for all team members.

Type of Harassment	Example	Acknowledge the Problem	Speaking Up	Ways to Manage the Problem
Bullying or Intimidation	A supervisor constantly puts down a worker, making them feel humiliated. They call them names and mock them during the day.	The worker feels humiliated and stressed.	Tell the supervisor that this behavior is unacceptable and upsetting.	- Report ongoing issues to the site manager, owner, or HR if available. - Keep detailed records of incidents and emotional impact. - Suggest conflict resolution with a mediator if available, - Seek support from coworkers or a peer to address the issue collectively if formal action is not an option.
Ignoring Boundaries/ Harassment	A team lead repeatedly asks a worker on dates and assigns undesirable tasks when refused. It is suggested the assigned tasks will get better if the date is accepted.	The worker feels uncomfortable and unfairly treated.	Identify this as sexual harassment and report to a supervisor or the owner immediately.	- Report to the site manager, owner, or HR if available. - Document any incidents for evidence. - If a small site, request to be reassigned to a different area or team, if possible. - If unresolved, seek help through external (outside) agencies for job support.
Cruel Remarks or Verbal Abuse	A worker makes fun of another's accent or abilities.	The person feels embarrassed and hurt.	Inform the person that their comments are cruel and disrespectful. Ask them to stop.	- Report to a supervisor, manager, or owner if it continues. - Document incidents of verbal abuse for future reference. - Discuss options for conflict resolution or mediation with

Type of Harassment	Example	Acknowledge the Problem	Speaking Up	Ways to Manage the Problem
				the employee. - Encourage team-wide awareness on respectful communication practices in the workplace.
Negative Stereotypes	A worker says, "You are too old for this job."	The person feels insulted.	Tell the person their comment is based on a harmful stereotype.	- If this continues, report the behavior to the owner or site manager. - Request a meeting with leadership to discuss respect in the workplace. - Suggest ageism or diversity training for the team.
Refusal to Accommodate Disabilities	A worker with a disability requests an accessible restroom, but the employer refuses.	The worker feels their rights are ignored.	Formally request the accommodation again with a detailed written explanation.	- If no HR exists, report directly to the site manager or owner. - Keep a written record of requests and responses. - If accommodations are not provided, contact Accessibility Ontario (AODA) or a disability advocacy group. - Encourage discussion about workplace accessibility as part of team awareness.

In Ontario, you can find out more about your rights and the "Human Rights Complaint Form" from the Ontario Human Rights Commission.

They can be contacted at the following phone numbers and e-mail address:

Local: (416) 326-9511

Toll Free (outside Toronto Area): 1-800-387-9080

TTY (Local) (416) 314-6526

TTY (Toll Free) 1-800-308-5561

info@ohrc.on.ca



Employee Rights

Learning Activity #1

Discuss the following situation with your group or instructor about the right to refuse unsafe work.



Situation: Alex is covering for the regular supervisor, Julie.

Alex tells Roberto to restock the shelves with heavy items.

He wants all the stock up on the shelves, including each of the new fifty-pound items.

Roberto tells Alex that he and Julie discussed the danger of stacking items too high, especially heavy items.

Roberto also tells Alex that he now only has a footstool because another department is borrowing his ladder.

Without the ladder, he would have to climb on the shelves to reach the top.

Alex dismisses this and tells Roberto to get the merchandise off the floor because

the customers will be coming in soon. The problem will be examined later.

Roberto refuses to do the work under the OHSA.

Alex goes to the Health and Safety committee member to discuss the situation, and they decide that the shelves cannot be stacked with any more items.

They tell Roberto their decision. Alex promises the committee member that he will write a memo to management asking for more shelving.

Things to keep in mind for the discussion:

1. What is not safe about this situation? What is the hazard that exists or could exist?

2. What can be done to prevent the hazard from happening?

Learning Activity #2

1. Have you ever had a job where your employee rights were violated?

What did you do about it?

If you did not do anything at the time, what could you do now if a similar situation happened again?

2. Have you ever been injured on the job or become sick as a result of your job? Describe your experience.

Learning Activity #3

1. Which one of the following is **not** an important workplace safety law in Ontario?
- a) Occupational Health and Safety Act
 - b) British North America Act
 - c) Employment Standards Act
 - d) Workplace Safety and Insurance Act

2. Under the Occupational Health and Safety Act, you have the (circle all answers that apply):
- a) right to strike
 - b) right to know
 - c) right to refuse unsafe work
3. On a Joint Health and Safety committee, a minimum of _____ percent of the members must be workers:
- a) 25%
 - b) 75%
 - c) 50%
 - d) 40%
4. Who must be contacted if someone dies on the job site?
- _____
- _____
5. The Employment Standards Act tells us about (circle all answers that apply):
- a) minimum wage
 - b) overtime pays
 - c) right to be promoted
 - d) rights if you lose your job

6. If you are younger than _____ years old, you are not allowed to work on a construction site.

a) 18

b) 20

c) 16

d) 19

7. What is the purpose of the Workplace Safety and Insurance Act?

Learning Activity #4

Part 1: Match each situation below with the type of discrimination or harassment that it is:

a) place of origin
b) religion
c) ethnicity
d) race
e) sex
f) disability
g) age

- 1) ____ Andy answered an advertisement for an office assistant at a construction office.

The duties of the job involved typing, filing and sorting. When he asked for an interview, he was told that the job was meant for “girls” only.

- 2) ____ Nathan works in a machine shop.

Most of his co-workers are white. Last week his co-workers were telling racist jokes. Nathan was brave and asked them to stop, but they just laughed and went on with the jokes.

- 3) ____ Ameena applied for a job as a receptionist.

Ameena is an immigrant. She speaks English very well, but she has an accent. At the job interview the employer told her that she was not right for the job. He said that the company needed someone who spoke English with no accent.

- 4) ____ Andrea stutters when she speaks.

One of her co-workers makes fun of her when she stutters. He knows that this makes it harder for her to speak, because it makes her nervous and hurts her confidence, but he does it anyway.

- 5) ____ Ute has been looking for a job for almost two years.

She cannot understand why it is so difficult. Her friends say that it will be impossible for her to get a job because she is 56 years old.

6) ____ Olivia has worked in a small factory for three years.

She has never had a raise. Olivia is from the Philippines.

When Olivia asked her boss for a raise, he said that she should feel lucky that she has a job since he usually only hires Canadians and says, “you are all so greedy”.

7) ____ Ahmed has a special prayer time every Friday.

Every Friday one of his co-workers teases him: “There goes Ahmed to the mosque again!”

Part 2: Look at the table for Types of Harassment with Examples in the reading.

Choose two of the examples given and look over the suggested ways to manage each of these problems.

Which way to manage these problems do you think would work the best for these situations?

Is there one not mentioned that you think would work better as a solution?

Give reasons for your answers.

1. Example: _____

Best way to manage this issue:

2. Example: _____

Best way to manage this issue:

**Skills for Success in this Section****Reading****Writing****Collaboration****Communication****Adaptability****Problem solving****Digital**

Teamwork: Workplace Collaboration and Communications

Most jobs require working with other people.

This means you often have to work as a team to reach goals and finish tasks.

You will need to support others and be a good team member.



This module will discuss being a reliable, adaptable, and supportive team member.

Adaptability

Changes can happen in a workplace without much notice. Schedules can change, staff may come and go, and tasks can be different from day-to-day.

Adaptable and flexible employees are highly valued by their employers.

Therefore, an employee must be able to adjust quickly to changes or new circumstances.

Being open to new experiences can be helpful for adaptability.

Sometimes, it is easy to get wrapped up in the stress that comes along with workplace changes, and work against them instead of with them.

Deciding to try new things at work and keeping that mindset will help you be a great employee and team member.

What If?

Learning how to be adaptable starts with considering ‘what if’ scenarios.

Considering the ‘what ifs’ at work is thinking about how you would react or what you might do in certain situations.

For example: You are working as part of a team on a large construction site.

Your team is assisting with various tasks, and the project is on a tight schedule.

Today, the electrician was supposed to finish installing the wiring for the building’s lighting, but they ran into an issue and cannot finish their part of the work on time.

The team needs to stay on schedule, and without the electrician’s part finished you must adapt and keep things moving forward.

The day is not going how you thought it would, so options will now be needed to move forward with a new plan.

What If: You are asked to assist the plumber by helping to carry pipes, prep the area for installation, and do some basic cleanup.

You have no experience working with plumbing, but you know how to follow instructions and help where and when needed.

How would you adapt to help the team?

- Would you jump in and help the plumber, even though it is not your job?
- Would you get the materials needed for the next step ready for when the electrician is able to finish?
- How could you make sure the work gets done without slowing down the project too much?

Adjusting to daily changes and considering the 'what ifs' is a big part of being adaptable.

Being able to answer questions like those on the next page, whether the answers are considered right or wrong shows that you are open to change and willing to think about new options.



Learning Activity 1

Consider the following 'what if' questions and try to answer them with what you might do (as best you can).

1. What if you started a job and did not get along well with the person training you?

2. What if your boss gives you a work evaluation with feedback that you disagree with?

3. What if you were given free concert tickets to see your favourite band/singer two days before a shift that you are scheduled to work? What would you do?

4. What if you discovered a quicker and better way to finish a task but it was different from how all the other workers on your team do it?

5. If you were given permission to create your own job and job title at a company, what would that job and job title be?

Accepting Differences

While working in trades, workers are often around co-workers, or others on the same job site, like carpenters, electricians, and plumbers. These people can come from many different backgrounds.

What Does Accepting Differences Mean?

"Accepting differences" means understanding and respecting that people are all unique (that each person has their own story and experiences).

This includes:

- Different **backgrounds** (where people come from)
- Different **languages** (the way people speak)
- Different **beliefs** (what people believe in)
- Diverse **ways of doing things** (how people work or act)
- Different **abilities** (how they do what they do)
- Different **genders or identity** (how they see themselves)

On a job site, you may meet people from all over the world or those who have opinions that do not match your own.

Accepting and respecting each member of the team makes a workplace more comfortable for everyone.

Why is It Important to Accept Differences?

- **Creating a Positive Workplace:** When we respect people who are different from us, the worksite becomes a friendlier and more welcoming place.
 - This helps everyone feel at ease and enjoy their work more.
- **Respecting Everyone:** Everyone deserves to feel valued, no matter their background. Respect shows that you see them as one of the team.
 - When people feel respected, they are likely to be more polite and friendly in return.
- **Learning New Things:** People from other cultures may have interesting ways to do certain tasks or have special methods they use.
 - By being open to learning from others, you might discover new skills that help you in your own work.
- **Building a Better Community:** When people accept and respect each other, it creates a better community.
 - It also helps to prevent misunderstandings and makes sure everyone feels accepted at work.

How Can You Show an Acceptance of Others?

These are things you can do to show respect for other people on the job site:

- **Be Friendly and Polite:** A smile, wave, or friendly greeting can make someone's day better. If you see someone, say hello or nod. This small gesture can help others feel included.
- **Respect Personal Space:** Different cultures have different views on personal space. Giving others the space they need shows that you respect their comfort.

- **Keep Noise and Mess to a Minimum:** Keeping your area clean and noise levels down as much as possible are other ways of showing respect for others, even if you are not working together directly.
- **Be Open to Learning:** If someone from a different background shares tips or suggestions, listen and be open. You might pick up useful ideas that improve your own work!
- **Respect Different Beliefs:** People may have different holidays, foods, or customs. If you notice someone does things differently, show respect by not making assumptions or jokes about it.



Accepting differences helps create a positive work environment for everyone.

By being friendly, respectful, and open to learning new things, you can make your co-workers feel valued.

This respect helps everyone focus on doing their best work and makes the job site a better place to be.

It makes the workday easier and helps everyone do their best on the job.

Example: Understanding Differences – Learning Accommodations

Imagine there is a person on your construction site named Alex. Alex has dyslexia.

Dyslexia is a learning difference that can make it harder for people to read and understand written information right away. It is estimated that between 15 and 20 percent of people in Canada have dyslexia.

Alex is good at their job; they just use their own strategies to finish tasks successfully.

What Alex Might Find Challenging:

- **Reading Instructions or Blueprints:** Alex might require more time reading detailed written instructions or understanding blueprints.
- **Remembering Job Codes or Part Numbers:** If Alex needs to read long codes, part numbers, or measurements, they may need extra time or use a checklist or voice recorder, to help them keep track of these details.
- **Reading Labels or Safety Policies Quickly:** Alex may need time to read policies or labels so they might need to take a bit more time to double-check information for safety.
- **Measurements:** Alex may need to record measurements and double check calculations for a job.

How People Can Show Respect and Acceptance:

1. **Offering Help Respectfully:** If you see that a co-worker needs assistance no matter what the reason, you could politely offer to help without drawing attention to it.

For example, “Hey Alex, would you like to go over that policy together?”
This shows support without making Alex feel singled out.

2. **Respecting Their Tools or Methods:** Alex might use special tools to help them stay organized, like color-coded notes or a phone app that reads instructions aloud. Respecting their tools and learning methods helps to create an inclusive environment.
3. **Following Workplace Accommodations:** If Alex has specific accommodations (things at work that are set up just to help fit a worker’s needs) then all employees should be supporting these changes and/or methods.

Understanding Alex’s approach to teamwork is just part of accepting differences.

It shows that everyone may have their own needs and ways of working.

Example: Understanding Differences – Equal Treatment

Marta gets a new job on a construction team. Marta has previous experience and is great at using tools, reading blueprints, and doing the expected day-to-day tasks.

However, some people at the new job might not see this about her just because of her gender.

Challenges Marta Might Face:

- **People Underestimate Her Skills:** Some workers might think Marta cannot lift heavy things or handle certain tools, even though she can.
- **Feeling Left Out:** Sometimes, Marta might feel left out of group conversations because she is the only woman there.
- **Extra Explanations:** Sometimes, people might over-explain tasks to her, or go over information she already knows, thinking she needs extra help or more details.
- **Setting a High Bar:** Employees may think that Marta needs to prove herself more and work harder than others on the job to be part of the team because of her gender.

How Employees Can Show Respect to All Workers on the Job:

Marta's supervisor expects their employees to be respectful and supportive of everyone on the team and expects the team to include everyone.

Here are the ways that Marta, should be treated with that respect and inclusion:

1. **Recognizing Skills and Abilities:** Marta is on the team because she is skilled. Treating her fairly and respecting her abilities shows professionalism and trust.
2. **Being a Part of Group Conversations and Decisions:** Her company encourages everyone to make sure Marta, and all team members, feel part of the group. This means including everyone in discussions, especially about tasks and plans on the site.

- 3. No Tolerance for Bullying Behavior:** It is important that everyone treats each other with kindness and respect. Any bullying, words, or actions that hurt others, such as making negative jokes or stereotyping people should not be tolerated.

Everyone deserves to work in a safe and supportive environment.

How Can Teams Be More Culturally Sensitive?

Being open to different cultures means you are more likely to get along with your co-workers.

When everyone is included, it is easier to work together as a team.

This helps projects go more smoothly and can even make work more enjoyable.

In trades, safety is a big deal. When everyone understands each other and communicates well, it is easier to follow safety rules and keep each other safe.

Here are some simple ways to be more culturally sensitive when working with a diverse team:

- **Learn About Other Cultures:** Take time to find out about how people at your job from different backgrounds do things.
- **Be Respectful:** Treat everyone with respect and do not assume everyone will have the same experiences as you.
- **Be Open:** Be open to learning from people who are different from you.
- **Ask Questions:** If you are not sure about something, ask the person politely to explain it to you.
- **Be Flexible:** Be flexible in how you talk and act to make people from different cultures feel comfortable.

- **Offer Different Foods:** If you are choosing a place for lunch, offer a variety of foods to cater to different tastes.
- **Help in Different Languages:** Be prepared with a translation program or Google Translate, to help someone struggling with the language or to get a point across quickly.
- **Remember Ideas and Opinions are Mostly Formed by Experience:** People tend to develop their opinions and ideas based on how they grew up and based their background. This can be cultural, financial or from other influences.

Keep an open mind and even if you do not agree. Give everyone a chance to explain their perspective.

Learning Activity 2

Respect and Acceptance Practice

Imagine you are at a job site working alone, and you see someone new from another country setting up in the same area.

Think about how you would greet them politely and what questions you might ask them on their first day.

Write down two things you could say to them to show them acceptance at work.

Learning Activity 3

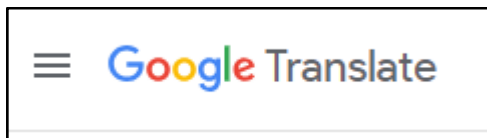
1. Why is it important to respect and accept people with unique needs, like someone with dyslexia, on a construction site?
 - a. So that everyone feels valued and comfortable while doing their work
 - b. Because it makes other people work harder.
 - c. To make sure everyone works at the same speed.
 - d. So, you can avoid talking to them.
2. True or False? It is respectful to greet someone from another culture by asking questions about their customs if you are genuinely curious. _____
3. True or False? Making assumptions (guesses) based on someone's gender, age, or background will make things much better at work. _____

Learning Activity 4



If you need to know what something you hear or see means in your own language or need to know how to say something in another language to someone else, you can use the Internet.

One of the sites you can use is Google Translate.



On your device, type the following address into the address bar or search bar.

translate.google.com

You can pick the language of the word or phrase in the first box.

You can then select the language to which you would like to see it translated.

You can click on the speaker icon to hear how that word or phrase should be said.

You can also ask the voice assistant on your phone (like Google Assistant or Siri) to translate a word into another language for you.

1. Using a Google translate or a voice assistant, translate these words into another language.

Word	Language chosen	Translation
Hammer		
Screwdriver		
Wrench		

Learning Activity 4

1. Find an AI program like ChatGPT, Meta AI (on Facebook) or Gemini. You can use one of the websites below or do your own search online for a program.



Note: Do not use a site that requests payment for use.

STEP 1: Choose a website, like:

<https://chatgpt.com/>

<https://gemini.google.com/app>

STEP 2: Type into the prompt box, and ask the program this question:

What are some differences in greetings, customs, and holidays in countries other than Canada?



What are some differences in greetings, customs, and holidays in countries other than Canada?



STEP 3: Click the arrow to see an answer to this question.

This is a great way to learn about other cultures.



Share 5 of the new and interesting things that you have learned about different cultures on the lines below.

Reliability and Teamwork



Being a reliable employee means that you are someone that can be counted on.

Reliable people are punctual, which means they come in to work on time and when they are scheduled.

It is much better to collaborate with a reliable co-worker.

Reliable workers can be counted on by the people that they work with each day.

Reliable people have plans in place for how they will get to work on time for each scheduled shift.

Here are some other ways to be a reliable employee:

- ✓ Complete tasks on time.
- ✓ Finish work when it needs to be finished.
- ✓ Avoid being late or leaving early.
- ✓ Do not exceed the lengths of your breaks.
- ✓ Be honest.
- ✓ Be trustworthy.
- ✓ Respect others.
- ✓ Use appropriate language.
- ✓ Dress appropriately for work.
- ✓ Wear the required PPE.
- ✓ Respect workplace privacy.
- ✓ Avoid workplace gossip.
- ✓ Focus on work and not on personal matters.
- ✓ Be there for your co-workers when they need you.
- ✓ Say yes to extra tasks or work, when possible, but know your **limits** and feel comfortable saying no if it is something you know you cannot manage.

Learning Activity 5

Based on what you have read about being reliable, which of the following employees would you choose to be on your team?

Please choose the **three workers** from the next page that you think would be the best choices. Give reasons for your answers.

Alex

Scenario: While working on a construction site, Alex is tasked with installing drywall. They consistently wear safety glasses to protect their eyes from dust and flying debris. During their shift, they make a point to take regular breaks to hydrate and rest, ensuring they stay focused on their work. Their attention to safety not only keeps them injury-free but also sets a positive example for their teammates, showing that they value the well-being of everyone on the site.

Benito

Scenario: On a busy carpentry job, Benito is responsible for cutting the wood. However, instead of focusing on his task, he often finds himself gossiping with his co-workers about weekend plans and the latest news. He makes everyone laugh and tells fun stories about his time outside of work. This talking sometimes leads to missed measurements and mistakes in his cuts, causing delays in the project timeline.

Carla

Scenario: Chloe is operating a table saw for a cabinetry project. Before starting, she checks the saw blade to make sure it is sharp and securely fastened, understanding that a dull or loose blade can lead to dangerous kickbacks or bad cuts. She also takes the time to adjust the settings for the specific type of wood she is working with. This is good for her own safety but also good for the project, as her cuts are precise and clean.

David

Scenario: During a busy renovation project, David is often seen rushing around the site, running with power tools in his hands. He does not wear all his safety gear sometimes. He likes to clean up at the end of the day instead of as he goes along. As a result, he leaves tools scattered across the floor of the work area.

Emily

Scenario: Emily is assigned to maintain a clean and organized job site during a roofing project. She takes her role seriously, routinely picking up debris and ensuring that any waste is properly disposed of in the right bins. She believes that a clean environment is a safe one.

Frank

Scenario: Frank is part of a construction team. He spends long stretches on his phone, scrolling through social media and commenting on posts, while others are working. He frequently complains about the amount of the workload, the heat and the tasks at hand. His interest in his cellphone often means others have to work harder and do more.

Jin

Scenario: Jin has a large family and finds it difficult to manage his home responsibilities and get to work on time. Most days he is at least a half an hour late. He knows his job quite well and does a fantastic, efficient job... when he is not taking extra breaks to deal with his home-related issues.

Part 1: Based on reliability, please choose 3 employees to be your co-workers.
Explain why you have chosen each one to join the team.

1. _____

2. _____

3. _____

Part 2: Who from the list would you most like to **not** have as part of your team. Why did you choose them?

Skills for Communicating with Feedback

What is Feedback?

Feedback is when you give or receive advice on how to do a job better.

It often happens in groups at work or comes directly from someone in charge of the work.

Being able to give and accept feedback can help you succeed better in your job.

Feedback helps everyone see what they can improve, which is important for doing your best work.

Accepting Feedback from Supervisors

Here are some tips for accepting feedback from supervisors:

- **Stay Calm:** Do not take feedback personally. It is about the work, not you. For example: If a supervisor points out a mistake in your installation, remember it is about the project, not about you as a person.
- **Listen Carefully:** Try not to get defensive. Be open to what your supervisor is saying. For example, if they suggest that you could improve your technique while using a power saw, listen to their advice and apply it to the work.

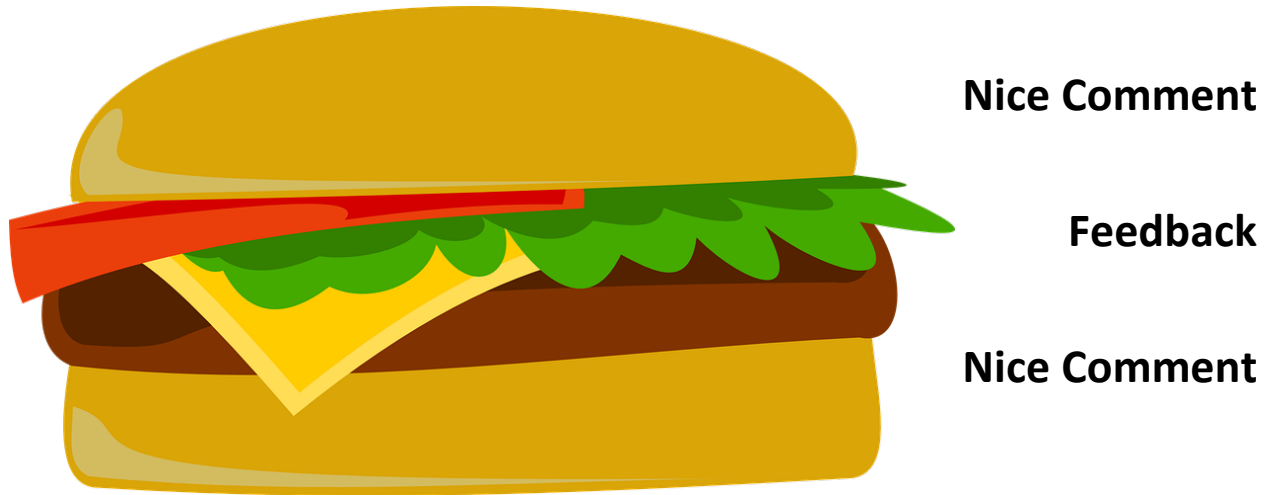
- **See it as a Chance to Improve:** Use feedback to learn and start a conversation about how things can get better. If your supervisor offers tips on how to safely lift heavy materials, consider it as valuable advice not as a reflection of your abilities.
- **Stay Positive:** Take a deep breath and focus on what is being said. Try not to feel too stressed.
- **Remember, it is Normal:** Getting feedback is a normal part of any job. Use it to help yourself improve your skills, whether you are learning how to operate a new piece of equipment or mastering a new skill.

Giving Feedback

Here are some tips for giving feedback to others:

- **Be Kind:** Do not make your suggestions personal. Use “I” statements to talk about the work, not the person.
 - For example, say, “I think we could double-check the measurements on the frame to make sure it fits perfectly” instead of, “You always measure wrong.”
- **Talk to the Group:** Instead of pointing out one person, talk to the whole team.
 - For example, you might say, “I think we should all review the safety procedures before we start working on the roof.” This approach makes everyone feel more relaxed about the feedback.
- **Say What is Good:** Before giving suggestions, mention what your teammates did well.
 - For instance, “You did a great job building today, and I appreciate how quickly you finished the project. I think we can improve our time by laying out and checking our tools before starting the next job.”
- **Be Selective:** Only give feedback when you think it is necessary.

The Nice Sandwich



The **Nice Sandwich** is a way to give feedback in a friendly way.

Here is how it works: you start with a compliment, then give your suggestion, and finish with another nice comment.

Example:

Ahmed is working on a construction project with his teammates. He needs to talk about a deadline because one person has not finished the work yet. Ahmed uses the nice sandwich approach.

Ahmed says: “I am happy to be working with you both because we all work hard. I think we should set a deadline for the safety inspection so we can make sure everything is done by then. I know we can get this finished together.”

This way, Ahmed gives feedback without making anyone feel stressed or singled out. It helps the team set a deadline and gives the team a clear idea of when they need to finish everything.

Learning Activity 6

1. Read the situation below and talk about how you would give feedback in this situation. Write what you would say on the lines below.

Situation:

You are part of a landscaping team preparing for a big job. You need to make sure all the equipment is ready, that the work is done right, and that everyone understands their tasks.

Your two teammates have worked hard and planted the flower beds and prepared the shrubs. They are going quickly, but you notice they are not following the company's planting guidelines for spacing.

Feedback:

On the lines below, offer feedback about the planting in a way that will not stress or upset your team.

True or False Questions**2. True or False?**

It is important to stay calm and not take feedback personally when receiving it from supervisors.

Answer: _____

3. True or False?

The Nice Sandwich approach to giving feedback starts with a suggestion, followed by a compliment, and ends with another suggestion.

Answer: _____

4. True or False?

Giving feedback should always include what was done well before suggesting improvements.

Answer: _____

5. True or False?

When receiving feedback, it is important to listen carefully and be open to your supervisor's suggestions.

Answer: _____

6. True or False?

It is uncommon to receive feedback at work, so it should always be taken as a personal criticism.

Answer: _____

Handling Stress on the Job Site



Sometimes, days at work do not go as planned.

You may face challenges that make your workday harder.

These tough times can be affected by others, like clients, co-workers, or your supervisor.

Balancing a busy workday with everything going on in your life can be tough.

You will have good days and some not-so-good days at the job site. Learning to handle these stressful days in a healthy way can make you a better teammate.

What is a Stressor?

Things that make us feel worried or upset are called stressors.

For example, if a client is unhappy with the renovations or if a co-worker makes a mistake, these can be stressors.

You can have stress and stressors outside of work as well. It is important to try to leave stress from home at home and stress from work at work.

This means you should not take your problems from home to the job site, and you should not take your work problems back home.

When you manage stress well, you help be a positive member of your team.

Finding Ways to Deal with Stress

There are many ways to handle stress, especially when you have responsibilities on the job. There are good ways and not as good ways to deal with stress.



Doing exercises, like lifting weights or playing sports, can help you feel better and stay strong for the job.



If you're feeling stressed, talk to someone you trust. This can be a co-worker, supervisor, or a friend who understands the demands of your work.



Spending time outside, especially on a sunny day at the job site, can help you relax. Take a break and enjoy the fresh air.



If you can, listen to music before or after work. It can help keep your spirits up and make the day feel lighter, which benefits everyone around you.



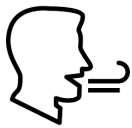
Make sure you get the best sleep that you can. Being well-rested can make the difference in how you react to stressful situations.

Some ways to deal with stress are not very healthy, like drinking too much coffee, eating lots of junk food, or drinking too much alcohol. It is better to try to find healthy ways to manage your daily pressures. It will make dealing with stress much easier.

Staying Calm During Conflicts

Sometimes, you may have conflicts or disagreements with clients or coworkers on the job site. These types of situations can be very stressful and can lead to unhealthy responses or overreactions if not dealt with the right way.

There are some ways that might help when dealing with these times.



If you feel upset, take a moment to breathe deeply. Inhale through your nose and exhale through your mouth. This can help you feel more relaxed and ready to work with others.



If you start to feel angry, count slowly to ten before you respond. This gives you time to think about how to express your feelings calmly. If you are still angry, try to count to ten again!



Try to listen to what the other person is saying instead of just thinking about your response. This can help you understand their point of view. Listening makes you a better collaborator.

Even if you disagree with a client's ideas or a co-worker's approach, use polite words. Being respectful can help solve the problem faster and keeps the team working together smoothly.



If you just feel too upset, it is okay, if you can take a short break. Walk around the job site or step outside for a moment to clear your head. A calm teammate helps everyone stay focused.

Remember, it is okay to have stressful days, but learning how to handle stress can make your work life on the job site much better.



Being a good teammate means supporting each other and working together, even when things get tough.

Learning Activity 7

1. How do you usually handle stress in the workplace or at home? Do any of the tips work for you? Discuss how you manage stress on the lines provided.

2. Why do you think it is important to not face a conflict too angry? What could happen if you do not take a moment to calm down before responding to an issue at work?



Congratulations, you have completed this course.

Great work!

Ask your instructor about completing milestones or a culminating task.

Skilled Trades Helper Skills for Success Course

This curriculum explores a wide variety of skills, tasks, and tools relevant to skilled trades related employment. The modules in this course may be selected individually or used in entirety to prepare learners for the practical skills and employer expectations related to employment in the skilled trades. Learners who complete this curriculum will have a solid foundational understanding of essential tools, and the importance of safety in building and construction work.

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Do not assume, therefore, that all necessary warnings, precautionary measures, and legal standards are contained in this document and that other or additional measures may not be required.