Woodshop Safety and Introduction to Hand Tools

Description
A woodworking environment presents a variety of potential safety hazards and requires an ongoing awareness of the dangers involved in using both hand and power tools. Additionally, there are a number of hand tools specific to carpentry, and students need to be introduced to both their application and the specific safety steps that should be followed to maintain a safe working environment.

The purpose of this Activity Plan is to provide students with an introduction to the general safety requirements necessary within a woodworking environment. This will be followed by a presentation of basic hand tools used in carpentry and how to use those tools in a safe manner.

Lesson Outcomes
The student will be able to:

- Identify appropriate clothing requirements in a woodworking environment
- List safety equipment requirements for eye, hearing, and dust protection
- Explain the dangers of drug and alcohol usage in relation to job safety
- Be aware of job requirements for safety equipment, including eyewash stations, fire extinguishers, and first aid supplies
- List the common hand tools used in carpentry
- Demonstrate the specific usage of those common hand tools

Terminology
Carpenter’s level (spirit level): a rectangular tool used to check the level of a surface. It consists of two flat parallel surfaces with a small window containing a cylinder filled with liquid and a bubble of air.

Figure 1—Four-vial hand level

Carpenter’s pencil: a large, rectangular pencil with a strong graphite lead typically sharpened with a knife or chisel.

Figure 2—Carpenter’s pencil
Chalk line: a tool for marking long, straight lines. It consists of a casing holding a rolled string and ground chalk that coats the string.

![Chalk line](image)

Figure 3—Chalk line

Chemical cartridge respirator: a respirator mask that consists of a dust pre-filter and a chemical cartridge specifically designed to capture hazardous fumes and other contaminants, and prevent them from causing respiratory damage.

Chisel: a hand tool with a plain handle and a long blade and beveled cutting edge, designed to be struck by a hammer or mallet. Used to cut or shape hard materials such as wood, stone or metal.

Claw hammer: a tool generally used to hammer nails or remove nails from material. It consists of a handle attached to a solid steel head with a pounding end and a claw end to hook and remove fasteners with.

![Claw hammer](image)

Curved claw

Straight claw

Figure 4—Different claw hammers
**Combination square (square head):** a ruled blade with both 45° and 90° heads, used to lay out right angles and 45° angles. Figure 5 shows how the square head of a combination square is used to hold the blade at right angles to the edge of stock or flat bar.

![Diagram of a combination square showing square head, 45° mitre face, spirit level, and scriber.]

**Dry chemical fire extinguisher:** a portable cylinder filled with foam or a dry chemical material. Some types include:

- Class A (ordinary combustible materials—paper, wood, or plastics)
- Class B (flammable liquids—gasoline, grease, or oil)
- Class C (electrical equipment—appliances, wiring)
- Class D (combustible metals—sodium, magnesium)

Some dry chemical fire extinguishers can be used for a variety of fire sources (ABC).

**Earmuffs:** hearing protectors that consist of soft ear cushions with sound-attenuating materials fitted within rigid outer cups and attached to a headband

**Earplugs:** a type of hearing protection device in which preformed silicon (customized) or mouldable foam plugs (disposable) are inserted into the ear canal to reduce sound.

**Emergency eyewash station:** a safety device that contains saline (salt dissolved in sterile water) or warm water that can be used to flush particles or chemicals from the eye in an emergency.

**First aid kit:** a portable container that holds essential first aid supplies, including adhesive bandages, antiseptic solutions, scissors, and other supplies.
**Measuring tape**: a flexible ruler with linear measurement markings attached to a spring mechanism housed in a case. These may be in imperial or metric units or both.

![Measuring tape](image)

**Figure 6**—Measuring tape

**Nail puller**: a pry bar consisting of a handle and a hooked claw end used to pull fasteners.

![Nail puller](image)

**Figure 7**—Nail puller

**Particulate respirator dust mask**: a disposable paper-filter mask designed to fit over the nose and mouth to prevent sawdust and other materials from causing respiratory damage. This type is not generally effective against hazardous fumes.

**Personal protective equipment (PPE)**: protective equipment and clothing designed to shield the worker from injury. Types of PPE include eye, ear, and body protection to prevent injuries from workplace hazards such as projectiles, fumes, and excessive noise.

**Safety glasses**: plastic lens eyewear with a wraparound or side protection shape designed to stop foreign objects from damaging the eyes.

**Semi-insert earplugs**: a set of earplugs attached to a headband and placed over the outside of the ear canal to reduce sound.

![Semi-insert earplugs](image)

**Figure 8**—Semi-insert earplugs
**Speed square**: a triangular-shaped layout tool used for a variety of functions, including marking 90°, 45°, and specific angles, line-scribing, and as a saw guide for a portable circular saw.

![Speed square](image)

**Figure 9**—Speed square

**Tool pouch**: a leather or fabric belt holding a variety of pockets used to carry tools and fastening devices.

**Estimated Time**

1.5–2 hours

**Recommended Number of Students**

20, based on the *BC Technology Educators’ Best Practice Guide*; ideal is 16.

**Facilities**

Technology education shop facility required.

**Tools**

- Safety glasses
- Sample hearing protectors
- Sample dust masks and respirators
- Fire extinguisher
- Eyewash station
- First aid kit
- Tool pouch
- Tape measures
- Combination square
• Speed square
• Carpenter’s level
• Hammers and nail pullers
• Chalk line
• Carpenter’s pencil

**Materials**

2 × 4” samples used to show layout and measuring techniques

**Resources**

Deaf to the Danger—WorkSafeBC video on inappropriate use of earbuds
https://www.youtube.com/watch?v=EBzBX1OppkQ

Look at Me—WorkSafeBC video on importance of eye protection
https://www.youtube.com/watch?v=k7ITA6QQWGw
Activity

1. This activity should begin with a general discussion of safety in the workplace and introduce the overriding acknowledgement that safety is a consideration in every aspect of the carpentry trade. Students may not have any background knowledge of construction safety or within related trades. It needs to be emphasized that regular workplace behaviour requires a much greater degree of awareness of the dangers present both from tools and machinery and from environmental hazards such as noise and dust.

2. Workplace clothing plays an important role in safety. A brief discussion of what is considered appropriate is necessary and includes the following points to consider:
   - Proper footwear—no open-toed shoes, requirements for safety footwear on many job sites
   - Appropriate clothing—no shorts, muscle shirts, dangling sleeves, or cords such as those found on hoodies, etc.
   - Removal of jewellery and other hazards—watches, rings, etc.

3. A discussion of workplace distractions can be introduced by having students view the short WorksafeBC video “Deaf to the Danger.” Have students brainstorm on other potential distractions that could impact safety. Appropriate use of cellphones should be mentioned.

4. As many workplace injuries result from inappropriate use of drugs and alcohol, an overview of the relevance of taking responsibility for one’s own safety and other workers should be discussed.

5. Personal protective equipment (PPE) should be demonstrated to the class. The discussion should make clear to each student when they should be used and the consequences of non-use. This discussion should include the following:
   - Safety glasses
   - Hearing protection
   - Dust masks and respirators

6. The short WorkSafeBC video “Look at Me” can be used to supplement this discussion. It will provide students with a reminder that it only takes one instance of non-use of PPE to result in a serious injury.

7. Job site safety equipment is a legislated requirement, and students should be made aware of fire extinguishers, eyewash stations, and first aid kits. At this point, it would not be necessary to demonstrate each component in depth, but students should understand that all accidents should be reported immediately to the teacher and that equipment should be available at any worksite.
8. The final part of this activity is to provide an overview of the common hand tools used in carpentry. A brief demonstration/discussion should present the basic use and handling of each of the following:

- Tape measure (metric and imperial units)
- Combination square
- Speed square
- Carpenter's level
- Claw hammer
- Nail puller
- Chalk line
- Carpenter's pencil
- Chisel

**Evaluation Guidelines**

The student can:

- Identify the three main elements of PPE
- Demonstrate the basic use of the hand tools given
- Identify the names of each of the hand tools given

**Optional Extension Activity**

- If time is available, students could practise with the hand tools provided in the earlier demonstration.

- As both imperial and metric units are used in carpentry, the advantages/disadvantages of each system could be discussed briefly.