Introduction to Tools and Equipment

Description
The goal of this activity plan is to highlight most of the wide variety of tools and equipment used in metal shops. The plan includes a lesson/demonstration with a PowerPoint presentation on all of the tools, and the student will complete tool and machine identification activities. The focus of the activity is broad, and it will be applicable in the majority of school sites.

Lesson Objectives
The student will be able to:

• Identify the tools and equipment in their own school metal shop
• Explain the function of the tools and equipment
• Discuss safety implications of each tool/machine
• Identify one or more operation that is possible with each machine/tool
• Recognize that tools/machines should always be used only for their intended purpose

Assumptions
• Students may not have had prior metal shop procedural and safety training
• Students have not seen all of the machines/tools in the shop under operation

Terminology
Hand/manual tool: a tool that is operated completely by human power using hands or feet.

Portable power tool: a handheld, portable tool operated through the use of electricity, air, or hydraulics.

Stationary machine: a large machine that is operated with electricity, air, or hydraulics, generally secured to the floor or a workbench.

Any other terminology related to the tools being introduced will be taught to the students as it is required during the lesson.

Estimated Time
1.5–2 hours

Recommended Number of Students
20, based on the BC Technology Educators’ Best Practices Guide

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Facilities
Secondary school metal shop, or equivalently equipped technology education shop

Students are generally unaware of the dangers in handling some tools for the first time, especially air- or electrically-operated tools. Therefore adequate space is a primary concern for safety.

Equipment/Machinery
All shop equipment/tools should be demonstrated in operation.
A data projector will be required for the PowerPoint presentations.

Tools
A wide variety of tools will be introduced that are used in the metal/machine shop. The names and functions of these tools will be identified through the activities in the plan.

Materials
Handouts of tool descriptions and images with most common names are attached.

Teacher-led Activity
Part 1: Hand Tools / Manually Operated Machines
1. Referring to the provided PowerPoint, outline all of the hand tools listed and if possible describe their potential uses or functions.

2. Have the students complete the provided tool identification activity throughout the presentation.

Part 2: Power/Air Tools & Machines/Equipment
1. Referring to the provided PowerPoint, outline all of the power/air tools and machines/equipment listed and if possible describe their potential uses or functions.

2. Have the students complete the provided tool identification activity throughout the presentation.

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

Students:
• accurately name the picture of the tool based on the presentation.
• accurately record the function/use of that tool based on instructor’s presented information.

Optional Extension Activity
Students can be taken throughout the shop and into various tool storage facilities/cabinets and asked to identify individual tools and machines.
**Student Activity: Hand Tools**

**Name:**

**Instructions**

Based on the PowerPoint presentation that your teacher has just shown you, name the following tools and briefly describe their functions.

<table>
<thead>
<tr>
<th>Figure</th>
<th>Tool Picture</th>
<th>Proper Name &amp; Function/Use</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><img src="image1" alt="Tool Picture" /></td>
<td>Hacksaw, used for cutting metal or wood.</td>
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<tr>
<td>2.</td>
<td><img src="image2" alt="Tool Picture" /></td>
<td>Shears, used for cutting metal.</td>
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<td>3.</td>
<td><img src="image3" alt="Tool Picture" /></td>
<td>Vernier calipers, used for precise measurement.</td>
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<td><strong>Cutter</strong></td>
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## Student Activity: Power Tools and Machines

**Name:**

### Instructions

Based on the PowerPoint presentation that your teacher has just shown you, name the following power tools and machines and briefly describe their functions.

<table>
<thead>
<tr>
<th>Figure</th>
<th>Power Tool/Machine Picture</th>
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## Answer Key

### Student Activity—Hand Tools

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<tr>
<td>Figure 1</td>
<td>HACKSAW</td>
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<td>Figure 2</td>
<td>SQUARING FOOT SHEAR</td>
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<td>Figure 3</td>
<td>DIVIDERS</td>
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<td>Figure 4</td>
<td>BEVERLY SHEAR</td>
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<td>Figure 5</td>
<td>ENGLISH WHEEL</td>
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<td>Figure 6</td>
<td>COMBINATION SQUARE</td>
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<td>Figure 7</td>
<td>JEWELLER’S SAW</td>
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<td>Figure 8</td>
<td>AVIATION SNIPS</td>
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<td>Figure 9</td>
<td>HAMMERS</td>
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<td>HOLE SAW</td>
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<td>Figure 14</td>
<td>SCRIBER</td>
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<td>Figure 15</td>
<td>CENTRE PUNCH</td>
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<td>STEP DRILL</td>
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<td>RIVETS &amp; RIVET GUN</td>
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<td>VERNIER CALIPERS</td>
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<td>CHISELS</td>
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<td>RULER</td>
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### Introduction to Tools and Equipment

#### Metal Work – Introduction to Metal Work

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<td>SCREWDRIVERS</td>
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<td>Figure 37</td>
<td>SIDE CUTTERS</td>
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<td>Figure 38</td>
<td>ROPER WHITNEY PUNCH</td>
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<td>DI-ACRO BENDER</td>
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<td>Figure 40</td>
<td>BOX &amp; PAN BRAKE</td>
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<td>NUMBER STAMPS</td>
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#### Student Activity—Power Tools and Machines

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<td>Figure 1</td>
<td>BUFFER</td>
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<td>Figure 2</td>
<td>AIR RIVETER</td>
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<td>Figure 3</td>
<td>OXYACETYLENE TORCH</td>
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<td>Figure 4</td>
<td>ANGLE GRINDER</td>
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<td>Figure 5</td>
<td>ARC WELDER</td>
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<td>Figure 6</td>
<td>COLD SAW</td>
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<td>HAND DRILL</td>
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