



## Materials Processing Unit 2: Metalworking

### Unit Focus

In this unit, students will learn how to safely use a variety of hand and power tools in a metal shop-based environment. Students will learn how to use these tools in conjunction with several sheet metal processes such as layout, cutting, filing, bending, drilling, fastening and finishing. The goal of each student is to learn how to read and interpret working drawings when building a practical project. A PBA will have students design and safely use a variety of hand and power tools in constructing a sheet metal tray to go along with their toolbox.

### Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
<b>Connecticut Goals and Standards</b> <i>Manufacturing: 12</i> <ul style="list-style-type: none"><li>Demonstrate the safe and accurate secondary process to create a finished product; forming; separating; combining; assembly; finishing <i>MAN.03.02</i></li><li>Apply a variety of manufacturing techniques and processes to create a usable product <i>MAN.03.03</i></li></ul> <i>Technology Essential Knowledge and Skills: 12</i> <ul style="list-style-type: none"><li>Implement personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments. <i>EKS.06</i></li><li>Identify safety hazards common to workplaces. <i>EKS.06.03</i></li><li>Identify safety precautions to maintain a safe worksite. <i>EKS.06.04</i></li><li>Select appropriate personal protective equipment as needed for a safe workplace/jobsite. <i>EKS.06.05</i></li><li>Inspect personal protective equipment commonly used for selected career choice. <i>EKS.06.06</i></li><li>Use personal protective equipment according to manufacturer rules and regulations. <i>EKS.06.07</i></li><li>Implement safety precautions to maintain a safe worksite. <i>EKS.06.09</i></li></ul> <b>ITEEA - Standards for Technological Literacy</b> <i>Technological Literacy: K-12</i> <ul style="list-style-type: none"><li>Students will develop an understanding of the attributes of design. <i>8</i></li><li>Students will develop the abilities to use and maintain technological products and systems. <i>12</i></li></ul>	<i>Students will be able to independently use their learning to...</i> <b>T1</b> Explore and hone techniques, skills, methods, and processes to create and innovate <b>T2</b> Develop a product/solution that adheres to key parameters (e.g., cost, timeline, restrictions, available resources and audience).	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> <b>U1</b> Both the tools I am using and the way I am using them impact the quality of the result, the safety of the shop environment, and the longevity of the equipment. <b>U2</b> A project needs to be visualized prior to fabrication with a working drawing and pattern to help find problems prior to using any materials. <b>U3</b> Attention to detail during the layout process is a key component that determines the quality and accuracy of your work. <b>U4</b> Well-crafted work is done with care and precision. Attributes such as detail-mindedness, craftsmanship and accuracy helps students be their own evaluator so they can visualize what needs to be adjusted.	<i>Students will keep considering...</i> <b>Q1</b> How do my behaviors and actions affect the safety of myself and others? <b>Q2</b> How do I go about planning and fabricating my project?

## Stage 1: Desired Results - Key Understandings

Madison Public Schools Profile of a Graduate	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
<ul style="list-style-type: none"> <li>Idea Generation: Studying a problem, need or model (mentor text, political piece, documents, art work, etc.) to consider limitations and imagine new solutions/transformations. (POG.2.1)</li> <li>Design: Engaging in a process to refine a product for an intended audience and purpose. (POG.2.2)</li> <li>Product Creation: Effectively use a medium to communicate important information. (POG.3.2)</li> </ul>	<p><i>Students will know...</i></p> <p><b>K1</b> Operation and purpose of various hand and power tools in the metal shop: Squaring Shear, Box and Pan Brake, Hand Shears, Hand Punch, Spot welder, Rivet tool &amp; Hand drill.</p> <p><b>K2</b> Vocabulary: Pattern, layout, development, hem, seam, square, finish, plating, powdercoating, anodizing, buff polishing, welding and rivets.</p>	<p><i>Students will be skilled at...</i></p> <p><b>S1</b> Demonstrate safe operation of various tools and processes in the metal shop.</p> <p><b>S2</b> Execute precise work using a working drawing to create a product.</p> <p><b>S3</b> Create a sheet metal pattern to help visualize the project prior to fabrication.</p> <p><b>S4</b> Transfer a pattern onto sheet metal to minimize waste and streamline work.</p>