Metals Fabrication -- CURRICULUM MAP

Unit- Measurement

Enduring Understanding/ Big Ideas	Learning Objectives (SWBAT)	Essential Knowledge (Questions)	Suggested Strategies	Resources & Materials	Suggested Assessments
Appropriate tools are used to measure to the desired degree of accuracy.	• Select and use appropriate units and tools to measure to a degree of accuracy required in a particular measurement situation. • Fractional and decimal conversion • Add, subtract, multiply, and divide fractions. • Measure out symmetrically from a center point.	Why are certain measuring tools appropriate for a certain task? How does accuracy effect the end product? Why is it important to be able to convert and manipulate numbers? Why is mathematical accuracy and correctness important to the product? When is it important to layout from center?	Lecture Demonstration Handouts Student Practice Worksheets	Metalwork Technology and Practice textbook	Measuring and Fractional Quiz

Metals Fabrication -- CURRICULUM MAP

Unit- Safety

Enduring Understanding/Big Ideas	Learning Objectives	Essential Knowledge	Suggested Strategies	Resources & Materials	Suggested Assessments
Safety is the number one priority. Safety requires forethought, intention, and patience. Unsafe behaviors and actions are never tolerated.	• Explain and apply safe work practices while performing tasks. • Identify safety equipment • Recognize immediate, potential, and hidden hazards. • Perform housekeeping tasks related to maintaining a safe work environment. • Pass a safety test with a perfect score prior to operating equipment. • Demonstrate the proper safe use of tools and equipment.	Why are safe work practices essential? How does identifying safety equipment ensure safe working practices. How does knowing your environment and machine allow a person to avoid safety hazards? How is cleaning related to a safe lab? Why is it important to always use the proper tool for the job.	Lecture Demonstration Safety Video Student Practice	Metalwork Technology and Practice textbook Handouts Individual Machine Safety Worksheets Safety Equipment	Individual Machine Safety Tests Student Safety Demonstration to teacher

Individual Machine Safety Test will be given during the corresponding unit.

Unit-Layout and Assembly

Metals Fabrication -- CURRICULUM MAP

Enduring Understanding/Big Ideas	Learning Objectives	Essential Knowledge	Suggested Strategies	Resources & Materials	Suggested Assessments
An orthographic drawing is a scaled interpretation of the product. Manipulation of materials Method and procedure of joining and fastening.	• Translate information from an orthographic drawing to a desired material. • Manipulate materials to create joinery and safety. • Develop and follow a sequence to develop and produce a desired final outcome.	Why is it important to understand orthographic drawings when transferring information to materials? How can correct sequence affect the outcome? How can stock be processed to develop a product?	Lecture Demonstration Student Practice	Metalwork Technology and Practice textbook Handouts Worksheets Sheet Metal Fastening Hardware Layout Supplies Spot Welder	Toolbox Project Bill of Materials Quiz Pop Rivet and Fastener Quiz Toolbox Self Evaluation

		Why is order of operation necessary?		Box and Pan Break Squaring Sheer Safety Equipment	

Unit- Casting, Forming and Molding

Enduring Understanding/Big Ideas	Learning Objectives	Essential Knowledge	Suggested Strategies	Resources & Materials	Suggested Assessments
Material Properties Materials can be melted in order to be shaped into a desired form.	• Use property characteristics to identify the material. • Prepare molds following given procedures. • Understand the inherent dangers of molten materials. • Evaluate the quality of the cast and determine any flaws in the molding process.	What characteristics are most important in determining material selection? What problems could arise if proper procedures are not followed? Why might it be inappropriate for teenagers to work with molten material? What could lead to flaws in a casting and what can you do to avoid them?	Lecture Demonstration Student Practice	Metalwork Technology and Practice textbook Handouts Worksheets Foundry Materials Aluminum Ingots Furnace Safety Equipment	Anvil Project Foundry Quiz

Unit- Machining

Metals Fabrication -- CURRICULUM MAP

Enduring Understanding/Big Ideas	Learning Objectives	Essential Knowledge	Suggested Strategies	Resources & Materials	Suggested Assessments
Through the machining process rough materials can be refined into a product Each machine has a specific role in the refinement process The machining process moves from rough stock to finished product. Machining is a multi-step process moving toward	• Evaluate the rough product to determine necessary refinements • Choose machine/process according to product need. • Use machines, tools and processes safely to refine the product to meet desired size and specifications. • Evaluate the product to determine correct specifications.	How to you determine which machine to use in the process? Why are some machines better suited than others to perform certain operations? How does one know that the level of refinement has been reached?	Lecture Demonstration Student Practice	Metalwork Technology and Practice textbook Handouts Worksheets Vertical Mill Lathe Band Saw Sander Drill Press Sand Blaster Ferrous and Non-Ferrous metals Safety Equipment	Metal Lathe Operations Quiz Milling Machine Operations Quiz Band Saw Operations Quiz Lathe Operations Beginners Project Center Punch Project Plumb Bob Project C Clamp Project

Unit-Computer Numerical Controlled (CNC) Programming

Enduring Understanding/Big Ideas	Learning Objectives	Essential Knowledge	Suggested Strategies	Resources & Materials	Suggested Assessments
CNC applications allow exact	• Input commands and data to create a program	What are the advantages of using CNC machines?	Lecture Demonstration	Metalwork Technology and Practice textbook Handouts	Plasma Name Sign Project CNC Mill Project

drawings to be fabricated The physical product is a direct result of your digital input.	• Correctly orientate the stock on the cutting platform and sync the CNC interface with the written program. • Safely run the program and identify any actual flaws within their written program.	Why is stock setup so important moving from the digital program to the physical? What common errors in CNC machining? What are some ways to prevent errors before running the CNC program?	Student Practice	Worksheets CNC Plasma CNC Mill Ferrous and Non-Ferrous metals Safety Equipment	CNC Code printout

Unit- Welding and Joining

Enduring Understanding/Big Ideas	Learning Objectives	Essential Knowledge	Suggested Strategies	Resources & Materials	Suggested Assessments
Materials can be joined through the welding process Types of Welds	• Safely perform setup, startup, and shutdown on equipment. • Join material together by safely creating a weld • Choose the correct welding application for different situations	Why is heat important when welding? What needs to be checked before any welding begins? How can a weld be classified as a good weld? What are the different welding applications used for?	Lecture Demonstration Student Practice	Metalwork Technology and Practice textbook Handouts Worksheets Brazing rods Oxyacetylene Welding Equipment Arc Welder w/ Rods Mig Welder Safety Equipment	Brazing Quiz Brazing Strength Test Arc and MIG welding Activity Sweat Soldering Quiz

Metals Fabrication -- CURRICULUM MAP

Unit- Forging

Enduring Understanding/Big Ideas	Learning Objectives	Essential Knowledge	Suggested Strategies	Resources & Materials	Suggested Assessments
Temperature change allows for physical manipulation. Heating, cooling and stress changes the molecular structure of the material.	• Heat metal to a desired temperature/color for forging. • Safely use hand tools to form to a desired shape. • Explain what happens molecularly when a material is heated and cooled? • Use a quenching process to temper the desired area of the material.	How does one know when the material is ready for forging? What are the safety measure needed to forge safely? what happens molecularly when a material is heated and cooled? Why does quenching a material harden or soften it?	Lecture Demonstration Student Practice	Metalwork Technology and Practice textbook Handouts Worksheets Forge Ferrous and Non-Ferrous metals Forging Tools Safety Equipment	Chisel Project