Trinity Area School District
Template for Curriculum Mapping

Course: Metalworking Technology **(Semester)** **Grade: 10-12** **Designer(s): John Husk**	**Overview of Course** (Briefly describe what students should understand and be able to do as a result of engaging in this course)**:** **This all year course will build upon pats courses and use a variety of specialized hand tools, power tools and computerized equipment in order to complete a wide range of individual and small group projects. Emphasis will be applied in areas of construction, welding and forging applications. Research and prototyping will be involved to design and engineer projects to meet specific criteria.**

Overarching Big Ideas, Enduring Understandings, and Essential Questions
(These "spiral" throughout the entire curriculum.)

Big Idea (A Big Idea is typically a noun and always transferable within and among content areas.)	**Standard(s) Addressed** (What Common Core Standard(s) and/or PA Standard(s) addresses this Big Idea?)	**Enduring Understanding(s)** (SAS refers to Enduring Understandings as "Big Ideas." EUs are the understandings we want students to carry with them after they graduate. EUs will link Big Ideas together. Consider having only one or two EUs per Big Idea.)	**Essential Question(s)** (Essential Questions are broad and open ended. Sometimes, EQs can be debated. A student's answer to an EQ will help teachers determine if he/she truly understands. Consider having only one or two EQs per Enduring Understanding.)
Manufacturing Standards Sub Unit			
DESIGN	3.4.10.C1 Apply the components of the technological design process.	Components of design to fill a specific need.	How can the specific needs of a project effect the design and function of the product?
ENGINEERING	3.4.10.C2 Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments.	Working models are used to test the design concept.	Give an example of how a working model might be used to test a design concept.
HANDS-ON LEARNING	3.4.10.C3 Illustrate the concept that not all problems are technological and not every problem can be solved using technology	Not all problems are technological and not every problem can be solved using technology.	How can kinesthetic learning be an advantage over a technological approach?
PROTOTYPES	3.4.10.D1 Refine a design by using prototypes and	Prototypes are used to ensure quality of a final product.	What is the role of prototypes when fabricating a product?

	modeling to ensure quality, efficiency, and productivity of a final product.		
MEASURING	2.3.11. A Select and use appropriate units and tools to measure to a degree of accuracy required in a particular measurement situation>	Appropriate tools are used to measure to the desired degree of accuracy.	Explain what measuring tools should be used for appropriate measuring situations?
ACCURACY	2.3.11.C Demonstrate the ability to produce measures with specified levels of precision	Precise measurements ensure quality control.	How does precision measurement effect quality control of a product?
SCALING	2.3.8.E Describe how a change in linear dimension of an object affects its perimeter, area, and volume.	A change in linear dimension of an object affects its perimeter, area and volume.	How are perimeter, area and volume effected by a change in linear dimensions?
DRAWINGS	2.3.8.F Use scale measurements to interpret maps or drawings	A drawing is a scaled interpretation of the original.	How can a scaled drawing be used to recreate the original?
RESEARCH	1.8.8.B Locate information using appropriate sources and strategies	Electronic search tools and traditional methods are used to locate information.	How can search tools be used to locate information about safety and products?
MANUFACTURING	3.4.10.E6. Illustrate how manufacturing systems may be classified into types such as customized production, batch production, and continuous production.	There are many forms of manufacturing.	What are the different forms of manufacturing?
STRUCTURE	3.4.10.E7. Evaluate structure design as related to function, considering such factors as style, convenience, safety, and efficiency.	Structural design considers style, safety, efficiency, and convenience.	How does structural design relate to function?
COMMUNICATIONS	3.4.10.E4. Evaluate the purpose and effectiveness of information and communication systems.	Communication systems are an effective way to transmit ideas.	How are communication systems used to relay an idea.
REPAIR	3.4.10.D2. Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.	A malfunctioning system must be diagnosed before repaired	How will diagnosing a malfunctioning system effect the repair process?
Principles of Technology Standards Sub Unit			

FORCE	3.2.10.B1 Analyze the relationships among the net forces acting on a body, the mass of the body.	Net forces acting on an object effect motion of that object.	How does mass and direction affect motion and acceleration?
TORQUE	3.2.P.B1. Relate torque and rotational inertia to explain rotational motion.	Torque is a rotation force.	How can a rotating force be expressed in terms of torque?
ANGLE	2.3.8.C Measure angles in degrees and radians>	Angles can be measured in degrees or radians.	How can angles be represented in degrees and radians.
ELECTRICITY	3.2.10.B4. Describe quantitatively the relationships between voltage, current, and resistance to electrical energy and power.	Voltage, current and resistance have an effect on power and energy.	How does power and energy effected by voltage, current and resistance?

Big Ideas, Enduring Understandings, and Essential Questions Per Unit of Study
(These do NOT "spiral" throughout the entire curriculum, but are specific to each unit.)

Month of Instruction (In what month(s) will you teach this unit?)	**Title of Unit**	**Big Idea(s)** (A Big Idea is typically a noun and always transferable within and among content areas.)	**Standard(s) Addressed** (What Common Core Standard(s) and/or PA Standard(s) addresses this Big Idea?)	**Enduring Understanding(s)** (SAS refers to Enduring Understandings as "Big Ideas." EUs are the understandings we want students to carry with them after they graduate. EUs will link Big Ideas together. Consider having only one or two EUs per Big Idea.)	**Essential Question(s)** (Essential Questions are broad and open ended. Sometimes, EQs can be debated. A student's answer to an EQ will help teachers determine if he/she truly understands. Consider having only one or two EQs per Enduring Understanding.)	**Common Assessment(s)*** (What assessments will all teachers of this unit use to determine if students have answered the Essential Questions?)	**Common Resource(s)* Used** (What resources will all teachers of this unit use to help students understand the Big Ideas?)
Week 1	**Measuring**	**MEASURING**	**2.3.11.**	**Appropriate tools are used to measure to the desired degree of accuracy.**	**Explain what measuring tools should be used for specific measuring situations?**	**Complete worksheets and test on material.**	**Teacher demonstrations and student participation in lab activities**

Week 2	**Layout**	**DRAWINGS**	**2.3.11.C 2.3.8.E 2.3.8.F**	**A drawing is a scaled interpretation of the original.**	**How can a scaled drawing be used to recreate the original?**	**Project based hands on assignment**	**Teacher demonstrations and student participation in lab activities**
Week 3-5	**Brazing Welding Process**	**HANDS-ON LEARNING**	**3.4.10.C3**	**Not all problems are technological and not every problem can be solved using technology.**	**How can kinesthetic learning be an advantage over a technological approach?**	**Project based hands on assignment**	**Teacher demonstrations and student participation in lab activities**
Week 6	**Work in a Mechanical system**	**FORCE**	**3.2.10.B1 3.2.P.B1. 2.3.8.C**	**Net forces acting on an object effect motion of that object**	**How does mass and direction affect motion and acceleration?**	**Complete worksheets and test on material.**	**Teacher demonstrations and student participation in lab activities**
Week 7-8	**Arc Welding Process**	**MANUFACTURING**	**3.4.10.E6. 3.4.10.C1 3.4.10.C2 3.4.10.D1**	**There are many forms of manufacturing.**	**What are the different forms of manufacturing?**	**Project based hands on assignment**	**Teacher demonstrations and student participation in lab activities**
Week 9	**Work in a fluid system**	**FORCE**	**3.2.10.B1 3.2.P.B1. 2.3.8.C**	**Net forces acting on an object effect motion of that object**	**How does pressure affect fluid movement?**	**Complete worksheets and test on material.**	**Teacher demonstrations and student participation in lab activities**
Week 10	**Mig Welding Process**	**HANDS-ON LEARNING**	**3.4.10.C3**	**Not all problems are technological and not every problem can be solved using technology.**	**How can kinesthetic learning be an advantage over a technological approach?**	**Project based hands on assignment**	**Teacher demonstrations and student participation in lab activities**
Week 11	**Work in an Electrical System**	**ELECTRICITY**	**3.2.10.B4.**	**Voltage, current and resistance have an effect on power and energy.**	**How does power and energy effected by voltage, current and resistance?**	**Complete worksheets and test on material.**	**Teacher demonstrations and student participation in lab activities**

Week 12-18	**Forging Metal**	**STRUCTURE**	**3.4.10.E7. 3.4.10.E4. 3.4.10.D2. 3.4.10.D1**	**Structural design considers style, safety, efficiency, and convenience.**	**How does structural design relate to function?**	**Complete worksheets and test on material.**	**Teacher demonstrations and student participation in lab activities**

***** Some teachers may need to think about the assessments and resources used in order to determine the Big Ideas, Enduring Understandings, and Essential Questions embedded in their courses. At this point in your curriculum mapping, you might want to ignore the "Common Assessments" and "Common Resources Used" columns. However, you may use them if you wish.