Lehighton Area School District
Curriculum Framework

Course Title:	Manufacturing Technology 1
Content Area:	Technology Education
Grade Level(s):	9-12
Course Overview:	Manufacturing Technology I is a half-credit course designed to give students insight to the field of metal working. Major emphasis of the course includes safely operating metalworking hand tools and machinery. Students will complete projects in various metalworking areas. Problem solving skills will be enhanced by hands-on learning throughout the course.
PA Core Standards:	K-12 STEELS Standards PA Core Mathematics Standards
Key Course Text and Materials:	Modern Machining Textbook
Key Assessments/Projects:	Measurement, machine/lab safety, powered tool safety, required projects

Big Idea/Unit: Introduction to the Metals Lab
Pacing: 4 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.5.9-12.N	Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems.	Micrometer reading Fraction / decimal conversion Shapes of metals Layout and measurement General metals lab safety Hand tool safety Blueprint reading / drawing	Modern Metalworking Textbook Micrometer reading Fraction / decimal conversion Shapes of metals Layout and measurement General metals lab safety Hand tool safety	Homework – when applicable Writing Prompt – once per week Quizzes – t/f, m/c Tests – t/f, m/c, short answer, matching, essay
3.5.9-12.U	Evaluate and define the purpose of a design.			
3.5.9-12.V	Apply principles of human-centered design.			
3.5.9-12.P	Apply a broad range of design skills to a design thinking process.			
CC.2.4.4.A.6	Measure angles and use properties of adjacent angles to solve problems.			
CC.2.1.7.D.1	Analyze proportional relationships and use them to model and solve real-world and mathematical problems.			
CC.2.1.HS.F.3	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.			
CC.3.5.9-10.D	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.			

Big Idea/Unit: Metal Lab Machinery
Pacing: 5 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.5.9-12.N	Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems.	Modern Metalworking Textbook Handouts Machinery Lab Materials	Modern Metalworking Textbook Handouts Machinery Lab Materials	Participation- graded daily Homework – when applicable Writing Prompt – once per week Quizzes – t/f, m/c Tests – t/f, m/c, short answer, matching, essay
3.5.9-12.U	Evaluate and define the purpose of a design.			
3.5.9-12.P	Apply a broad range of design skills to a design thinking process.			
3.5.9-12.A	Use various approaches to communicate processes and procedures for using, maintaining, and assessing technological products and systems.			
CC.2.4.4.A.6	Measure angles and use properties of adjacent angles to solve problems.			
CC.2.1.7.D.1	Analyze proportional relationships and use them to model and solve real-world and mathematical problems.			
CC.2.1.HS.F.3	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.			
CC.3.5.9-10.D	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.			

Big Idea/Unit: Product Design
Pacing: 1 week

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.5.9-12.N	Analyze and use relevant and appropriate design thinking processes to solve technological and engineering problems.			
3.5.9-12.U	Evaluate and define the purpose of a design.			
3.5.9-12.P	Apply a broad range of design skills to a design thinking process.			
3.5.9-12.O	Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality.			
3.5.9-12.I	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.		Modern Metalworking Textbook Handouts Machinery Lab Materials	Participation- graded daily Homework – when applicable Writing Prompt – once per week Quizzes – t/f, m/c Tests – t/f, m/c, short
CC.2.4.4.A.6	Measure angles and use properties of adjacent angles to solve problems.			

CC.2.1.7.D.1	Analyze proportional relationships and use them to model and solve real-world and mathematical problems.			Tests – t/f, m/c, short answer, matching, essay
CC.2.1.HS.F.3	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.			
CC.3.5.11-12.G	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.			

Big Idea/Unit: Steel Prodcution/Heat treating
Pacing: 4 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.5.9-12.**B**	Critically assess and evaluate a technology that minimizes resource use and resulting waste to achieve a goal.	Steel Production Cast Iron Wrought Iron Steel Pig Iron Smelting Blast Furnace Open Hearth Furnace Basic Oxygen Furnace Electric Arc Furnace Hardening Annealing Tempering Case Hardening Malleability Machinability Ductility Elasticity Tensile Strength Compression Strength Rockwell Hardness Tester	Handouts Modern Metalworking Textbook Tool Steel Samples Rockwell Hardness Tester Kasenit	Homework Tests – t/f, m/c, short answer, matching, essay Lab write up / findings
3.5.9-12.D	Critique whether existing or proposed technologies use resources sustainably.			
3.5.9-12.F	Evaluate a technological innovation that arose from a specific society' s unique need or want.			
3.5.9-12.H	Evaluate ways that technology and engineering can impact individuals, society, and the environment.			

Big Idea/Unit: Metal Finishing Techniques
Pacing: 1 week

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.5.9-12.**B**	Critically assess and evaluate a technology that minimizes resource use and resulting waste to achieve a goal.	Lacquer Spray Paint Powder Coating Anodizing Electroplating Buffing	Modern Materials Textbook Buffing Wheel Buffing Compound Paint Handouts	Participation – graded daily Homework Test – t/f, m/c, short answer, matching, essay Lab write up / findings
3.5.9-12.F	Evaluate a technological innovation that arose from a specific society' s unique need or want.			

Big Idea/Unit: Mechanical Fasteners
Pacing: 1 week

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project

3.5.9-12.**B**	Critically assess and evaluate a technology that minimizes resource use and resulting waste to achieve a goal.	Bolt Nut Screw Pop Rivet Tinners Rivet Screw Threads Major Diameter Minor Diameter Pitch Crest Root Tap Taper Tap Gun Tap Bottom Tap Spiral Tap Thread forming Tap Die Adjustable Die Fixed Die Tapwrench Diestock	Modern Metalworking textbook General mechanical fasteners tools and equipment Handouts	Participation – graded daily Homework Test – t/f, m/c, short answer, matching, essay Lab write up / findings
3.5.9-12.D	Critique whether existing or proposed technologies use resources sustainably.			
CC.2.1.7.D.1	Analyze proportional relationships and use them to model and solve real-world and mathematical problems.			
CC.2.1.HS.F.3	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.			

Big Idea/Unit: Sheet Metal Manufacture, Usage, and Soft Soldering
Pacing: 3 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.5.9-12.**B**	Critically assess and evaluate a technology that minimizes resource use and resulting waste to achieve a goal.	Parallel Line Development Radial Line Development Stretchout Hem Tab Bar Folder Box and Pan Brake Foot Squaring Shears Notching Machine Aviation Snips Solder Propane Torch Soldering Copper Capillary Action Surface Tension Flux	Modern Metalworking Textbook Handouts Sheet metal machines Solder Flux Propane Torch	Participation – graded daily Homework Test – t/f, m/c, short answer, matching, essay Lab write up / findings
3.5.9-12.D	Critique whether existing or proposed technologies use resources sustainably.			
3.4.10.C1	Apply the components of the technological design process.			
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.			

Big Idea/Unit: Modern Machining Practices
Pacing: 3 weeks

Standards	Objective/Skill	Vocabulary	Additional Resources	Assessment/Project
3.5.9-12.O	Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality.	CNC CAM Rapid Prototyping Wire EDM Automation CAD/CAM Software	Modern Machining Textbook Modern Marvels Machine Tools DVD Elmo / Presentation materials	Participation – graded daily Homework Test – t/f, m/c, short answer, matching, essay Lab write up / findings
3.5.9-12.V	Apply principles of human-centered design.			
3.5.9-12.P	Apply a broad range of design skills to a design thinking process.			
3.5.9-12.O	Apply appropriate design thinking processes to diagnose, adjust, and repair systems to ensure precise, safe, and proper functionality.			

		CAD/CAM Software	materials	Lab write up / findings
3.5.9-12.H	Evaluate ways that technology and engineering can impact individuals, society, and the environment.			