

6 – 12

Industrial Technology Framework

Spring 2010

Addendum added June 2018



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District Mission and Beliefs
6-12 Industrial Technology Philosophy

District Mission:

The mission of the Millard Public Schools is to guarantee that each student develops the character traits and masters the knowledge and skills necessary for personal excellence and responsible citizenship by developing a world-class educational system with diverse programs and effective practices designed to engage and challenge all students.

District Beliefs:

We believe:

- Each individual has worth.
- Individuals are responsible for their actions.
- Our greatest resource is people.
- Diversity enriches life.
- All people can learn.
- High expectations promote higher achievement.
- Achievement builds self-esteem; self-esteem promotes achievement.
- All people are entitled to a safe, caring, and respectful environment.
- Responsible risk-taking is essential for growth.
- Excellence is worth the investment.
- Educated and involved citizens are necessary to sustain our democratic society.
- Public education benefits the entire community and is the shared responsibility of all.
- All schools are accountable to the community.
- Shaping and developing character is the shared responsibility of the individual, family, school and community.

6-12 Industrial Technology Philosophy Statement:

The philosophy of Industrial Technology is to provide all students with a performance-based education that incorporates technical knowledge, skills, and literacy along with career exploration. This will lead a student to enter, maintain, and advance in a career or post-secondary program. Industrial Technology promotes the synthesis and application of academic knowledge and life skills.

Industrial Technology Curriculum Planning Committee Members 2009-10

Under the facilitation of Heather Daubert, MEP Facilitator Industrial Technology

Secondary

Gene Adams	SHS Industrial Technology
Rick Baker	WHS Industrial Technology
Jeff Banker	SHS Industrial Technology
Eric Daigle	NMS Industrial Technology
Judy Elledge	NHS Special Education Resource
Nick Friedrichsen	WHS Industrial Technology
Denny Hanley	District MEP Technology Facilitator
Mike Hansen	CMS Industrial Technology
Spencer Hawkins	BMS Industrial Technology
Casey Hurner	WHS Special Education Resource
Pat Meeker	KMS Assistant Principal
Mitch Mentzer	WHS Industrial Technology
Dave Patten	NHS Industrial Technology
Joe Philippi	SHS Industrial Technology
Andy Pinkall	SHS Assistant Principal
Jaisa Poppleton	SHS Industrial Technology
Jennifer Reid	District English Language Learners Department Head
Matt Shrader	NHS Industrial Technology
Barb Waller	District Career and Technical Education Coordinator

Millard Public Schools 2009 Industrial Technology Community Focus Group

Under the facilitation of Heather Daubert, MEP Facilitator Industrial Technology

Gene Adams	Millard Public Schools
Rick Baker	Millard Public Schools
Katie Beach	NMC (Caterpillar)
Heather Daubert	Millard Public Schools
Rosemary Edzie	UNL's Durham School/ Peter Kiewit Institute
Doug Fletcher	OSHA
Jay Hutfles	Werner Enterprises, Inc.
Nancy Johnston	Millard Public Schools
Andy Lange	Morrissey Engineering
Erika Volker	NDE Partnerships for Innovation
Jim Vyhlidal	Tri-V-Tool & Trade
John Vyhlidal	Tri-V-Tool & Trade
Barb Waller	Millard Public Schools
Christine Warren	UNL's Durham School/ Peter Kiewit Institute

Industrial Technology Framework Committee Members 2009-10

Under the facilitation of Heather Daubert, MEP Facilitator Industrial Technology

Middle Level

Eric Daigle	NMS Industrial Technology
Mike Hansen	CMS Industrial Technology
Spencer Hawkins	BMS Industrial Technology

Construction

Grant Brassette	SHS Industrial Technology
Mitch Mentzer	WHS Industrial Technology
Matt Shrader	NHS Industrial Technology

Engineering

Rick Baker	WHS Industrial Technology
Nick Friedrichsen	WHS Industrial Technology
Jaisa Poppleton	SHS Industrial Technology
Bob Trauernicht	NHS Industrial Technology

Manufacturing Systems

Gene Adams	SHS Industrial Technology
Jeff Banker	SHS Industrial Technology
Steve Besch	WHS Industrial Technology
John Kirke	NHS Industrial Technology
Dave Patten	NHS Industrial Technology

Power and Mechanized Systems

Scott Bohlken	WHS Industrial Technology
Gary Holst	NHS Industrial Technology
Joe Philippi	SHS Industrial Technology

**Phase I Timeline for the 6-12 Industrial Technology
Millard Education Program**

November, 2009	<ul style="list-style-type: none"> • Convened Curriculum Planning Committee. • Reviewed Data Book and determined research topics.
December, 2009 - March, 2010	<ul style="list-style-type: none"> • Research teams conducted research.
December, 2009	<ul style="list-style-type: none"> • Community Focus Group convened.
January, 2010	<ul style="list-style-type: none"> • Research shared with the Curriculum Planning Committee. • Course pathways were identified and additional research conducted.
January, 2010	<ul style="list-style-type: none"> • Representatives from the University of Nebraska Lincoln's Durham School of Architecture and Construction Management and Metropolitan Community College met with the Millard Public Schools Construction and Power and Mechanized Systems teams.
February, 2010	<ul style="list-style-type: none"> • 6-12 Industrial Technology Department toured and visited with representatives of the University of Nebraska Lincoln's Durham School of Architecture and Construction Management, Omaha Campus, and Metropolitan Community College, South Omaha Campus.
February-April, 2010	<ul style="list-style-type: none"> • Course pathways further defined. • Framework Committee began writing the MPS 6-12 Industrial Technology Matrix.
April, 2010	<ul style="list-style-type: none"> • Curriculum Planning Committee made final course and pathway recommendations to Educational Services and the Industrial Technology Framework Committee.
April, 2010	<ul style="list-style-type: none"> • Educational Services made recommendations. • Framework Committee finalized the 6-12 Industrial Technology Framework.
July, 2010	<ul style="list-style-type: none"> • Millard Public Schools Board of Education approved the 6-12 Industrial Technology Framework.

Introduction to 6-12 Industrial Technology Matrix

Introduction

The 6-12 Industrial Technology Standards and Indicators are sequenced in the following Matrix.

Nomenclature

The nomenclature for the standards and indicators is as follows:

IT Industrial Technology

M Millard Standard

6-8; 12 Grade Level

Comprehensive Pathway Standards

C Construction Pathway

E Engineering Pathway

M Manufacturing Pathway

PS Power and Mechanized Systems Pathway

Course Level Standards

Construction Pathway

IC Introduction to Carpentry

C Carpentry

AFC Advanced Finish Carpentry

CMGT Construction and Management

CM Consumer Maintenance

SYN Synergistics (middle school program)

Engineering Pathway

IED Introduction to Engineering and Design

POE Principles of Engineering

DE Digital Electronics

CEA Civil Engineering and Architecture

EDD Engineering Design and Development

SYN Synergistics (middle school program)

Manufacturing Pathway

IM Introduction to Metalworking

MP Machining Processes

AMTI Automated Manufacturing Technology I

AMTII Automated Manufacturing Technology II

WI Welding I

WII Welding II
SYN Synergistics (middle school program)

Power and Mechanized Systems Pathway

IPEMS Introduction to Power, Energy, and Mechanized Systems
MSO Mechanical Systems and Operations
PSDFI Power System Design and Fabrication I
PSDFII Power System Design and Fabrication II
SYN Synergistics (middle school program)

1-7 Concepts of each Course Level Standard

1 Safety
2 Oral and Written Communication
3 Employability Skills
4 Career Exploration
5 Technical Knowledge and Skills
6 Technical Communication (CAD, Print Reading)
7 Technical Math

Examples

IT M M-IM 12.1.a

IT Industrial Technology
M Millard Public School Standard
M Comprehensive Pathway Standard: Manufacturing Pathway
IM Course Level Standard: Introduction to Metalworking
12 Grade Level: 12
1 Concept Number: 1 - Safety
a Curricular Indicator: a - Model general shop safety practices.

IT M C-IC 12.3 b

IT Industrial Technology
M Millard Public School Standard
C Comprehensive Pathway Standard: Construction Pathway
IC Course Level Standard: Introduction to Carpentry
12 Grade Level: 12
3 Concept Number: 3 - Employability Skills
b Curricular Indicator: b - Use job roles to work effectively as a team member.

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of the Construction Pathway.**

Concepts	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Safety	IT M C-SYN 6-8.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-IC 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-C 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-AFC 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-CMGT 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-CM 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)
Oral/Written Communication	IT M C-SYN 6-8.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-IC 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-C 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-AFC 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-CMGT 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-CM 12.2 Apply speaking and technical writing skills to communicate key ideas..
Employability Skills	IT M C-SYN 6-8.3 Demonstrate appropriate employability skills throughout the course	IT M C-IC 12.3 Demonstrate appropriate employability skills throughout the course.	IT M C-C 12.3 Demonstrate appropriate employability skills throughout the course	IT M C-AFC 12.3 Demonstrate appropriate employability skills throughout the course	IT M C-CMGT 12.3 Demonstrate appropriate employability skills throughout the course	IT M C-CM 12.3 Demonstrate appropriate employability skills throughout the course
Career Exploration	IT M C-SYN 6-8.4 Investigate educational opportunities.	IT M C-IC 12.4 Investigate educational opportunities and employment requirements related to construction careers.	IT M C-C 12.4 Investigate educational opportunities and employment requirements related to construction careers.	IT M C-AFC 12.4 Investigate educational opportunities and employment requirements related to construction careers.	IT M C-CMGT 12.4 Investigate educational opportunities and employment requirements related to construction careers.	IT M C-CM 12.4 Investigate educational opportunities and employment requirements related to construction careers.

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of the Construction Pathway.**

Concepts	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Technical Knowledge and Skills	IT M C-SYN 6-8.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-IC 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-C 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-AFC 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-CMGT 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-CM 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.
Technical Communication (CAD, print reading)	IT M C-SYN 6-8.6 Read, interpret, and create graphic representations.	IT M C-IC 12.6 Read, interpret, and create graphic representations.	IT M C-C 12.6 Read, interpret, and create graphic representations.	IT M C-AFC 12.6 Read, interpret, and create graphic representations.	IT M C-CMGT 12.6 Read, interpret, and create graphic representations.	IT M C-CM 12.6 Read, interpret, and create graphic representations.
Technical Math	IT M C-SYN 6-8.7 Apply computational and geometric skills to course-specific goals.	IT M C-IC 12.7 Apply computational and geometric skills to course-specific goals.	IT M C-C 12.7 Apply computational and geometric skills to course-specific goals.	IT M C-AFC 12.7 Apply computational and geometric skills to course-specific goals.	IT M C-CMGT 12.7 Apply computational and geometric skills to course-specific goals.	IT M C-CM 12.7 Apply computational and geometric skills to course-specific goals.

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of the Construction Pathway.**

Concepts	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Safety	IT M C-SYN 6-8.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-IC 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-C 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-AFC 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-CMGT 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)	IT M C-CM 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up)
Safety Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M C-IC 12.1.a Model general shop safety practices.	IT M C-C 12.1.a Model general shop safety practices.	IT M C-AFC 12.1.a Model general shop safety practices.	IT M C-CMGT 12.1.a Model general shop safety practices.	IT M C-CM 12.1.a Model general shop safety practices.
IT M C-IC 12.1.b Assess the need for safe working habits in today's construction industry.		IT M C-C 12.1.b Assess the need for safe working habits in today's construction industry.	IT M C-AFC 12.1.b Assess the need for safe working habits in today's construction industry.	IT M C-CMGT 12.1.b Assess the need for safe working habits in today's construction industry.	IT M C-CM 12.1.b Assess the need for safe working habits in today's construction industry.	
IT M C-IC 12.1.c Demonstrate safe practices of hand tools.		IT M C-C 12.1.c Identify and demonstrate safe practices of the tools and machines in the shop and home.	IT M C-AFC 12.1.c Discuss the health and safety aspects of working around power tools and hazardous liquids.	IT M C-CMGT 12.1.c Demonstrate safe practices of portable power tools.	IT M C-CM 12.1.c Discuss the health and safety aspects of working around power tools and hazardous liquids.	
IT M C-IC 12.1.d Demonstrate safe practices of portable power tools.		IT M C-C 12.1.d Demonstrate safe practices of portable power tools.	T M C-AFC 12.1.e Examine and model safe sawing with hand and portable power tools.	IT M C-CMGT 12.1.d Demonstrate safe practices of stationary power tools.	IT M C-CM 12.1.d Discuss and demonstrate the safe use of tools used in cabinet making.	

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
<p align="center">Safety Curricular Indicators</p> <p><i>Synergistics</i> has its own identified course curriculum. For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
	IT M C-IC 12.1.e Demonstrate safe practices of stationary power tools.	IT M C-C 12.1.e Demonstrate safe practices of stationary power tools.	I IT M C-AFC 12.1.d Discuss sawing with stationary power tools	IT M C-CMGT 12.1.e List reasons why safety is a growing concern to the employer as well as the craftsman (Liability Insurance; Work Comp).	IT M C-CM 12.1.e Explain concrete safety pertaining to chemicals and burns.	
	IT M C-IC 12.1.f Explain OSHA.	IT M C-C 12.1.f Examine and explain electrical safety.		IT M C-CMGT 12.1.f Discuss the need for safe use of tools, and general working habits.	IT M C-CM 12.1.f Demonstrate safe practices with circuits and shocks.	
	IT M C-IC 12.1.g List safety features and practices for each circular saw.	IT M C-C 12.1.f List safety features and practices for each circular saw.	.	IT M C-CMGT 12.g Demonstrate proper use of safety equipment (Table saw guard, height, harnesses, etc.).	IT M C-CM 12.1.g Discuss plumbing tool safety.	
		IT M C-C 12.1.g Practice safe use of power drills and fastener drivers.	IT M C-AFC 12.1.g Explain safe surfacing with planes and scrapers	IT M C-CMGT 12.h Assess the need for the Federal Occupational Safety and Health Act of 1971.	IT M C-CM 12.1.h Discuss roofing safety.	
		IT M C-C 12.1.h Demonstrate safe working practices when using pneumatic tools (brad and finish nailer).			IT M C-CM 12.1.i Discuss the safety of floor covering tools.	
		IT M C-C 12.1.i Practice the safe use of the plate jointer.	T M C-AFC 12.1.f Review safe surfacing with the jointer and planer.			

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Oral/Written Communication	IT M C-SYN 6-8.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-IC 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-C 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-AFC 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-CMGT 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M C-CM 12.2 Apply speaking and technical writing skills to communicate key ideas.
Oral/Written Communication Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M C-IC 12.2.a Use appropriate technical vocabulary. (ex. Reference points, hand tool ID, power tool ID, and sheet metal, framing components, cabinet components)	IT M C-C 12.2.a Use appropriate technical vocabulary. (ex. Reference points, hand tool ID, power tool ID, and sheet metal, framing components, cabinet components)	IT M C-AFC 12.2.a Use appropriate technical vocabulary. (ex. Reference points, hand tool ID, power tool ID, and sheet metal, framing components, cabinet components)	IT M C-CMGT 12.2.a Use appropriate technical vocabulary. (ex. Reference points, hand tool ID, power tool ID, Framing members, wall members, roof members, floor members, foundation members, mechanical/HVAC members)	IT M C-CM 12.2.a Use appropriate technical vocabulary. (ex. Reference points, hand tool ID, power tool ID, and sheet metal, framing components, cabinet components)
		IT M C-IC 12.2.b Use technical writing.	IT M C-C 12.2.b Use technical writing.	IT M C-AFC 12.2.b Use technical writing.	IT M C-CMGT 12.2.b Use technical writing.	IT M C-CM 12.2.b Use technical writing.
		IT M C-IC 12.2.c Use proper construction symbols.	IT M C-C 12.2.c Use proper construction symbols.	IT M C-AFC 12.2.c Use proper construction symbols.	IT M C-CMGT 12.2.c Use proper construction symbols.	IT M C-CM 12.2.c Use proper construction symbols.
				IT M C-AFC 12.2.d Given general plans, the learner will create a written plan of procedure, cut list, and bill of materials.	IT M C-CMGT 12.2.d Create and defend a project proposal	

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Oral/Written Communication Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum.				IT M C-CMGT 12.2.e Retrieve prices from vendors.	
	For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.				IT M C-CMGT 12.2.f Write a proposal to a client with a business name, expected income, expenses, logo, etc.	
					IT M C-CMGT 12.2.g Write a bid.	

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Employability Skills	IT M C-SYN 6-8.3 Demonstrate appropriate employability skills throughout the course.	IT M C-IC 12.3 Demonstrate appropriate employability skills throughout the course.	IT M C-C 12.3 Demonstrate appropriate employability skills throughout the course.	IT M C-AFC 12.3 Demonstrate appropriate employability skills throughout the course.	IT M C-CMGT 12.3 Demonstrate appropriate employability skills throughout the course.	IT M C-CM 12.3 Demonstrate appropriate employability skills throughout the course.
Employability Skills Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum. For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M C-IC 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M C-C 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M C-AFC 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M C-CMGT 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M C-CM 12.3.a Use appropriate collaboration to complete tasks and assigned work.
		IT M C-IC 12.3.b Use job roles to work effectively as a team member.	IT M C-C 12.3.b Use job roles to work effectively as a team member.	IT M C-AFC 12.3.b Use job roles to work effectively as a team member.	IT M C-CMGT 12.3.b Use job roles to work effectively as a team member.	IT M C-CM 12.3.b Use job roles to work effectively as a team member.
		IT M C-IC 12.3.c Be punctual to class and maintain regular attendance.	IT M C-C 12.3.c Be punctual to class and maintain regular attendance.	IT M C-AFC 12.3.c Be punctual to class and maintain regular attendance.	IT M C-CMGT 12.3.c Be punctual to class and maintain regular attendance.	IT M C-CM 12.3.c Be punctual to class and maintain regular attendance.

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concepts	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Career Exploration	IT M C-SYN 6-8.4 Investigate educational opportunities.	IT M C-IC 12.4 Investigate educational opportunities and employment requirements related to construction careers.	IT M C-C 12.4 Investigate educational opportunities and employment requirements related to construction careers.	IT M C-AFC 12.4 Investigate educational opportunities and employment requirements related to construction careers.	IT M C-CMGT 12.4 Investigate educational opportunities and employment requirements related to construction careers.	IT M C-CM 12.4 Investigate educational opportunities and employment requirements related to construction careers.
Career Exploration Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M C-IC 12.4.a Explore construction trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).	IT M C-C 12.4.a Explore construction trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).	IT M C-C 12.4.a Explore construction trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).	IT M C-CMGT 12.4.a Explore construction trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).	IT M C-CM 12.4.a Explore construction trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).
		IT M C-IC 12.4.b Select a journal article and summarize how it applies to the construction pathway.	IT M C-C 12.4.b Do a presentation on the career opportunities w/in this field.		IT M C-CMGT 12.4.b Create and defend a project proposal.	

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Technical Knowledge and Skills	IT M C-SYN 6-8.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-IC 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-C 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-AFC 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-CMGT 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M C-CM 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.
Technical Knowledge and Skills Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M C-IC 12.5.a Identify wall parts.	IT M C-C 12.5.a Demonstrate the application of various measuring tools. (steel rule, tape measure, squares)	IT M C-AFC 12.5.a Select marking, measuring and layout tools.	IT M C-CMGT 12.5.a Identify Residential construction styles. (ranch, tudor, bungalow, duplex, townhome, split, etc)	IT M C-CM 12.5.a Differentiate between the different types of foundations.
<p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>		IT M C-IC 12.5.b Build a wall and a door opening.	IT M C-C 12.5.b Compare and contrast sawing, edge cutting, fastening, drilling and boring tools for both metal and wood (nail vs. glue).	IT M C-AFC 12.5.b Identify and order supplies required to build a project.	IT M C-CMGT 12.5.b Identify types of foundations, including: poured concrete, CMU (block), ICF (insulated concrete forms).	IT M C-CM 12.5.b Compare and contrast building materials and explain the structural parts of a house.
		IT M C-IC 12.5.c Identify the parts of a board.	IT M C-C 12.5.c Examine and illustrate the need for proper maintenance of hand tools.	IT M C-AFC 12.5.c Layout lines and use geometric shapes.	IT M C-CMGT 12.5.c Identify types of floors, including: platform construction, joist, truss, engineered beams, post and beam.	IT M C-CM 12.5.c Compare and contrast roofing materials.

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
<p align="center">Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M C-IC 12.5.d Differentiate between cuts on a board.	IT M C-C 12.5.d Demonstrate the cognitive ability to select quality tools for the proper task.	IT M C-AFC 12.5.d Identify the differences between cabinet styles.	IT M C-CMGT 12.5.d Identify types of walls, including: load-bearing, partitioned, 2X4, 2X6, wall members.	IT M C-CM 12.5.d Explain the statement "What do you own?" in reference to fence guidelines, covenants, local codes, and dial before you dig.
		IT M C-IC 12.5.e Demonstrate basic joinery and fasteners.	IT M C-C 12.5.e Practice the proper use of required hand tools.	IT M C-AFC 12.5.e Identify the difference between function and form of a cabinet.	IT M C-CMGT 12.5.e Identify the types of roofs, including: gable, hip & ridge, mansard, etc.	IT M C-CM 12.5.e Build a set of concrete forms, do a slump test and pour concrete.
			IT M C-C 12.5.f Articulate the types of cuts made on circular saws, including rip, crosscut, miter, and compound miter.	IT M C-AFC 12.5.f Design cabinetry that is convenient and flexible and choose the appropriate material for production.	IT M C-CMGT 12.5.f Define members of rafters and trusses.	IT M C-CM 12.5.f Identify concrete materials and tools.
			IT M C-C 12.5.g Practice changing blades as well as proper saw adjustments for each type of circular saw.	IT M C-AFC 12.5.g Describe the human factors that affect finish carpentry.	IT M C-CMGT 12.5.g Identify types of exterior siding, including: sheet, vinyl, concrete, lap, etc.	IT M C-CM 12.5.g Differentiate between cement and concrete.

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
<p align="center">Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>		IT M C-C 12.5.h Perform various cutting tasks as required in completion of a project.	IT M C-AFC 12.5.h Identify the need for a plan.	IT M C-CMGT 12.5.h Explain the different types of windows, including: vinyl, wood, casement, double-hung, awning.	IT M C-CM 12.5.h Identify the tools and materials of interior finish.
		IT M C-C 12.5.i List the drills available and categorize the use for each (cordless, corded, 3/8 inch drill, 1/2 inch drill, hammer drill, right angle drill).	IT M C-AFC 12.5.i. List the steps in making production decisions.	IT M C-CMGT 12.5.i Identify roofing components, including: tar paper, shingles, ridge cap.	IT M C-CM 12.5.i Practice drywall layout and hanging.	
		IT M C-C 12.5.j List the types of bits available and categorize the use for each.	IT M C-AFC 12.5.j Describe the types of working drawings and sketches used by cabinetmakers.	IT M C-CMGT 12.5.j Identify trim styles.	IT M C-CM 12.5.j Demonstrate drywall techniques including hanging, mudding, finishing and patching.	
		IT M C-C 12.5.k Discuss the need to drill proper size holes for wood crews.	IT M C-AFC 12.5.k Apply the techniques of sketching to draw isometric, cabinet, and perspective sketches.	IT M C-CMGT 12.5.k Discuss the different types of painting and sealant (caulk).	IT M C-CM 12.5.k Identify tools and materials of an electrical system.	

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
<p align="center">Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484</p>		IT M C-C 12.5.1 Recognize the tasks performed and fasteners used by nail and staple pneumatic drivers.	IT M C-AFC 12.5.1 Explain the activities leading to a finished drawing.	IT M C-CMGT 12.5.1 Create Print take-offs.	IT M C-CM 12.5.1 Explain troubleshooting of circuit breakers.
		IT M C-C 12.5.m List the functions that take place within a pneumatic fastener and list parts associated with these functions.	IT M C-AFC 12.5.m Select proper adhesives for cabinet assembly.	IT M C-CMGT 12.5.m Apply Construction Management skills by assigning jobs to fellow workers (accountant, foreman, laborer, executor, etc.).	IT M C-CM 12.5.m Create an entire electrical circuit including: pull wire through a wall, hang the box, wire in a new switch and place it in receptacle; How to change/add lighting circuits. (NOT adding a new switch.)	
		IT M C-C 12.5.n Explain the need and proper maintenance of pneumatic tools.	IT M C-AFC 12.5.n Identify adhesive characteristics and proper application.	IT M C-CMGT 12.5.n Create a scale model demonstrating structural members and framing.	IT M C-CM 12.5.n Identify the terminology of plumbing.	
		IT M C-C 12.5.o Differentiate between various air supply systems and chose the proper system (compressor, fuel, electrical, CO2) for the job.	IT M C-AFC 12.5.o Describe the different types of clamps and how they are used for assembling a project.	IT M C-CMGT 12.5.o Manufacture a physical structure (ex. MOBA playhouse).	IT M C-CM 12.5.o Discuss the responsibility of City Connection.	

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
<p align="center">Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484</p>		IT M C-C 12.5.p List the functions performed by a router.	IT M C-AFC 12.5.p Explain how to protect work pieces from clamp and glue damage.		IT M C-CM 12.5.p Differentiate between inflow and outflow systems.
			IT M C-C 12.5.q List the differences between hand and table routers.	IT M C-AFC 12.5.q Discuss the components made by spindle and faceplate turning.		IT M C-CM 12.5.q Examine what plumbing is and how it works.
			IT M C-C 12.5.r List the types of cutters available, describe the function for each and safely change bits.	IT M C-AFC 12.5.r Identify accessories which increase the convenience of a machine.		IT M C-CM 12.5.r Explain the troubleshooting of plumbing.
			IT M C-C 12.5.s Assess the need for jigs/guides.	IT M C-AFC 12.5.s Select appropriate joints based on the product/material and select the proper tools to make them.		IT M C-CM 12.5.s Observe the water flow in a house by the demonstration of sweating pipe.

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
<p align="center">Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484</p>		IT M C-C 12.5.t Differentiate between the jigsaw, saber saw and saws all.	IT M C-AFC 12.5.t Discuss abrasives and how they are used in making cabinets.		IT M C-CM 12.5.t Identify roofing materials.
			IT M C-C 12.5.u Calculate proper blade selection.	IT M C-AFC 12.5.u Demonstrate proper procedures for drilling and boring.		IT M C-CM 12.5.u Explain the tear-off of a roof.
			IT M C-C 12.5.v List the two types of sanders and categorize the use of each (orbital disc and belt sanders).	IT M C-AFC 12.5.v Demonstrate how to wet up and operate a shaper.		IT M C-CM 12.5.v Differentiate between roof types.
			IT M C-C 12.5.w Differentiate between the three types of finish sanders and list applications for each.			IT M C-CM 12.5.w Demonstrate roofing by shingling a section of a roof.
			IT M C-C 12.5.x Identify the need for proper selection of sand paper.			IT M C-CM 12.5.x Discuss what HVAC is.
			IT M C-C 12.5.y Demonstrate the ability to sand with various sanders.			IT M C-CM 12.5.y Observe the maintenance of an A/C, heater, and water heater.

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
<p align="center">Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>		IT M C-C 12.5.z Identify and categorize by use, the type of planers and jointers.			IT M C-CM 12.5.z Explain the basic troubleshooting of HVAC.
			IT M C-C 12.5.aa Discuss how grain direction is determined.			IT M C-CM 12.5.aa Observe the maintenance of A/C, heater and water heater.
			IT M C-C 12.5.bb Identify practical uses for plate jointers. (edge joining)			IT M C-CM 12.5.bb Explain the basic troubleshooting of HVAC.
			IT M C-C 12.5.cc Discuss proper layout needed for successful plate jointing.			IT M C-CM 12.5.cc Discuss requirements for carbon monoxide detectors and fire alarms.
			IT M C-C 12.5.dd List the numbered plate sizes to their actual size.			IT M C-CM 12.5.dd Create a schedule for lawn care.
			IT M C-C 12.5.ee Practice the safe use of the plate jointer.			IT M C-CM 12.5.ee Discuss fence and retaining wall maintenance.

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
<p align="center">Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>		IT M C-C 12.5.ff Analyze the value of wood as a building material.			IT M C-CM 12.5.ff Demonstrate small motor maintenance such as oil change, blade sharpening, spark plug and choke/primer.
			IT M C-C 12.5.gg Explain the natural defects in wood and how they are used in lumber grading.			IT M C-CM 12.5.gg Differentiate the different types of flooring.
			IT M C-C 12.5.hh Assess the need and application of local building codes.			IT M C-CM 12.5.hh Define insulation, sealants, emissions, windows and CFLs.
			IT M C-C 12.5.ii Demonstrate the selection of materials.			IT M C-CM 12.5.ii Observe efficiency testing.
			IT M C-C 12.5.jj Create a material list and estimate cost for a project.			
			IT M C-C 12.5.kk Build a jig.			

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Technical Communication	IT M C-SYN 6-8.6 Read, interpret, and create graphic representations.	IT M C-IC 12.6 Read, interpret, and create graphic representations.	IT M C-C 12.6 Read, interpret, and create graphic representations.	IT M C-AFC 12.6 Read, interpret, and create graphic representations.	IT M C-CMGT 12.6 Read, interpret, and create graphic representations.	IT M C-CM 12.6 Read, interpret, and create graphic representations.
Technical Communication Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum. For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M C-IC 12.6.a Read CAD-created plans to manually sketch initial designs.	IT M C-C 12.6.a Use CAD to represent project designs.	IT M C-AFC 12.6.a Read, interpret and alter CAD-created designs.	IT M C-CMGT 12.6.a Read, interpret and alter CAD-created designs.	
		IT M C-IC 12.6.b Interpret blueprints.				
		IT M C-IC 12.6.c Interpret multi-view drawings.				

**6- 12 Comprehensive Construction Pathway Standards:
Students will demonstrate competency in the practices and skills of Construction.**

Concept	Course Level Standards					
	IT 6-8	Introduction to Carpentry	Carpentry	Advanced Finish Carpentry	Construction and Management	Consumer Maintenance
Technical Math	IT M C-SYN 6-8.7 Apply computational and geometric skills to course-specific goals.	IT M C-IC 12.7 Apply computational and geometric skills to course-specific goals.	IT M C-C 12.7 Apply computational and geometric skills to course-specific goals.	IT M C-AFC 12.7 Apply computational and geometric skills to course-specific goals.	IT M C-CMGT 12.7 Apply computational and geometric skills to course-specific goals.	IT M C-CM 12.7 Apply computational and geometric skills to course-specific goals.
Technical Math Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M C-IC 12.7.a Apply measurement techniques: Read ruler within 1/16" accuracy and compute fractions.	IT M C-C 12.7.a Apply measurement techniques: Read ruler within 1/16" accuracy and compute fractions.	IT M C-AFC 12.7.a Apply measurement techniques: Read ruler within 1/16" accuracy and compute fractions.	IT M C-CMGT 12.7.a Apply measurement techniques: Read ruler within 1/16" accuracy and compute fractions.	IT M C-CM 12.7.a Apply measurement techniques: Read ruler within 1/16" accuracy and compute fractions.
		IT M C-IC 12.7.b Apply computational and geometric skills to course-specific goals.	IT M C-C 12.7.b Apply computational and geometric skills to course-specific goals.	IT M C-AFC 12.7.b Apply computational and geometric skills to course-specific goals.	IT M C-CMGT 12.7.b Apply computational and geometric skills to course-specific goals.	
			IT M C-C 12.7.c Calculate lumber in board feet for estimating cost.			

**K- 12 Comprehensive Engineering Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concepts	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Safety	IT M E–SYN 6-8.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–IED 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–POE 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–DE 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–CEA 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–EDD 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–CAD 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)
Oral and Written Communication	IT M E–SYN 6-8.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–IED 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–POE 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–DE 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–CEA 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–EDD 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–CAD 12.2 Apply speaking and technical writing skills to communicate key ideas.
Employability Skills	IT M E–SYN 6-8.3 Demonstrate appropriate employability skills throughout the course.	IT M E–IED 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–POE 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–DE 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–CEA 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–EDD 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–CAD 12.3 Demonstrate appropriate employability skills throughout the course.

**K- 12 Comprehensive Engineering Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concepts	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Career Exploration	IT M E–SYN 6-8.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–IED 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–POE 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–DE 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–CEA 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–EDD 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–CAD 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.
Technical Knowledge and Skills	IT M E–SYN 6-8.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–IED 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–POE 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–DE 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–CEA 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–EDD 12.7 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–CAD 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.
Technical Communication (CAD, print reading)	IT M E–SYN 6-8.6 Read, interpret, and create graphic representations.	IT M E–IED 12.6 Read, interpret, and create graphic representations.	IT M E–POE 12.6 Read, interpret, and create graphic representations.	IT M E–DE 12.6 Read, interpret, and create graphic representations.	IT M E–CEA 12.6 Read, interpret, and create graphic representations.	IT M E–EDD 12.6 Read, interpret, and create graphic representations.	IT M E–CAD 12.6 Read, interpret, and create graphic representations.

**K- 12 Comprehensive Engineering Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concept	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Technical Math	IT M E-SYN 6-8.7 Apply computational and geometric skills to course-specific goals.	IT M E-IED 12.7 Apply computational and geometric skills to course-specific goals.	IT M E-POE 12.7 Apply computational and geometric skills to course-specific goals.	IT M E-DE 12.7 Apply computational and geometric skills to course-specific goals.	IT M E-CEA 12.7 Apply computational and geometric skills to course-specific goals.	IT M E-EDD 12.7 Apply computational and geometric skills to course-specific goals.	IT M E-CAD 12.7 Apply computational and geometric skills to course-specific goals.

**K- 12 Comprehensive Engineering Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concept	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Safety	IT M E–SYN 6-8.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–IED 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–POE 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–DE 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–CEA 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E–EDD 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)	IT M E-CAD 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, inspection, use, clean-up)
Safety Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p align="center">For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					<p>IT M E–CAD 12.1.a Model general shop safety practices.</p> <p>12.1.b Assess the need for safe working habits and practices in today's manufacturing industry. (ex. OSHA)</p> <p>IT M E–CAD 12.1.c Demonstrate safe practices when using hand, portable and stationary power tools, and equipment.</p>

**K- 12 Comprehensive Engineering Systems Pathway Standard:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concept	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Oral/Written Communication	IT M E–SYN 6-8.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–IED 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–POE 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–DE 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–CEA 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–EDD 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M E–CAD 12.2 Apply speaking and technical writing skills to communicate key ideas.
Oral/Written Communication Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p align="center">For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					<p>IT M E–CAD 12.2.a Use CAD-specific vocabulary in all written and oral communication.</p>

**K- 12 Comprehensive Engineering Systems Pathway Standard:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concept	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Employability Skills	IT M E–SYN 6-8.3 Demonstrate appropriate employability skills throughout the course.	IT M E–IED 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–POE 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–DE 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–CEA 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–EDD 12.3 Demonstrate appropriate employability skills throughout the course.	IT M E–CAD 12.3 Demonstrate appropriate employability skills throughout the course.
Employability Skills Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p align="center">For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					<p>IT M E–CAD 12.3.a Use appropriate collaboration to complete tasks and assigned work.</p> <p>IT M E–CAD 12.3.b Use job roles to work effectively as a team member.</p> <p>IT M E–CAD 12.3.c Be punctual to class and maintain regular attendance.</p> <p>IT M E–CAD 12.3.d Demonstrate time management skills by completing tasks by the assigned deadlines.</p>

**K- 12 Comprehensive Engineering Systems Pathway Standard:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concept	Course Level Standards							
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)	
Employability Skills Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum.	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p>					IT M E–CAD 12.3.e Set and reach appropriate personal and classroom goals as they pertain to the course expectations.	
	For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.						For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M E–CAD 12.3.f Maintain appropriate personal hygiene.
								IT M E–CAD 12.3.g Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment. (ex. eye, hearing, etc.)
								IT M E–CAD 12.3.h Self-reflect on personal conduct and expectations.

**K- 12 Comprehensive Engineering Systems Pathway Standard:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concept	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Career Exploration	IT M E–SYN 6-8.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–IED 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–POE 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–DE 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–CEA 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–EDD 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M E–CAD 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.
Career Exploration Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p align="center">For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					IT M E–CAD 12.4.a Explore CAD-related career opportunities.

**K- 12 Comprehensive Engineering Systems Pathway Standard:
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Concept	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Technical Knowledge and Skills	IT M E–SYN 6-8.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–IED 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–POE 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–DE 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–CEA 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–EDD 12.7 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.	IT M E–CAD 12.5 Use the appropriate software, hardware, and portable and stationary power tools to accomplish specific course goals.
Technical Knowledge and Skills Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p align="center">For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					<p>IT M E – CAD 12.5.a CAD Commands: Perform all drawing commands (lines, poly-line, sp-line, arc, circles to specific annotations) to create specifically sized objects.</p> <p>IT M E – CAD 12.5.b CAD Commands: Use plot commands.</p>

**K- 12 Comprehensive Engineering Systems Pathway Standard:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concept	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
<p align="center">Technical Knowledge and Skills Curricular Indicators</p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p align="center">For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484</p>					<p>IT M E – CAD 12.5.c CAD Commands: Design basic file mgmt(naming, storage, saving, retrieval from student server) for continuing drawings so work is not lost on a daily basis.</p>
							<p>IT M E – CAD 12.5.d CAD Commands: Use modify commands to alter existing drawings to meet standards and improve efficiency repetitive tasks.</p>

**K- 12 Comprehensive Engineering Systems Pathway Standard:
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Concepts	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Technical Communication	IT M E–SYN 6-8.6 Read, interpret, and create graphic representations.	IT M E–IED 12.6 Read, interpret, and create graphic representations.	IT M E–POE 12.6 Read, interpret, and create graphic representations.	IT M E–DE 12.6 Read, interpret, and create graphic representations.	IT M E–CEA 12.6 Read, interpret, and create graphic representations.	IT M E–EDD 12.6 Read, interpret, and create graphic representations.	IT M E–CAD 12.6 Read, interpret, and create graphic representations.
Technical Communication Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p align="center">For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					<p>IT M E – CAD 12.6.a In sketching, sketch object to rough size and shape for basic reference to a final product to be graded.</p> <p>IT M E – CAD 12.6.b In sketching, constrain an object (give it dimensions - geometrically , Length, Width, Height, distance, thicknesses).</p>

**K- 12 Comprehensive Engineering Systems Pathway Standard:
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Concepts	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
<p align="center">Technical Communication Curricular Indicators</p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p>For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					<p>IT M E – CAD 12.6.c In Orthographic Projection, project an object by a multiple viewing capacity (i.e. Front, Top, and Right Side Views in a single drawing space) to better see the object in a two dimensional plane.</p>
							<p>IT M E – CAD 12.6.d Use Parametric Modeling file management (part, drawing, assembly).</p>
							<p>IT M E – CAD 12.6.e Use Parametric Modeling commands.</p>
							<p>IT M E – CAD 12.6.f Use Parametric Modeling sketch commands (draw, constrain, pattern, modify).</p>

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Concepts	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
<p align="center">Technical Communication Curricular Indicators</p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p>For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					<p>IT M E – CAD 12.6.g Use Parametric Modeling model commands (create, modify, work feature, pattern, surface).</p>
							<p>IT M E – CAD 12.6.h Use Parametric Modeling tools. (measure, options)</p>
							<p>IT M E – CAD 12.6.i Use Parametric Modeling manage commands (parameters, styles, standards, insert, layout)</p>
							<p>IT M E – CAD 12.6.j Use Parametric Modeling annotations.</p>

**K- 12 Comprehensive Engineering Systems Pathway Standard:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concepts	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
<p align="center">Technical Communication Curricular Indicators</p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p>For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					<p>IT M E – CAD 12.6.k Use Parametric Modeling view commands (visibility, appearance, windows, navigation).</p>
							<p>IT M E – CAD 12.6.l Use Parametric Modeling plot commands.</p>
							<p>IT M E – CAD 12.6.m Complete a portfolio representing mastery of CAD Commands, Orthographic/Pictorial Projection, Dimensioning/Scaling, Model/Paper Space/Templates.</p>

**K- 12 Comprehensive Engineering Systems Pathway Standard:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concept	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
Technical Math	IT M E–SYN 6-8.7 Apply computational and geometric skills to course-specific goals.	IT M E-IED 12.7 Apply computational and geometric skills to course-specific goals.	IT M E–POE 12.7 Apply computational and geometric skills to course-specific goals.	IT M E–DE 12.7 Apply computational and geometric skills to course-specific goals.	IT M E–CEA 12.7 Apply computational and geometric skills to course-specific goals.	IT M E–EDD 12.7 Apply computational and geometric skills to course-specific goals.	IT M E–CAD 12.7 Apply computational and geometric skills to course-specific goals.
Technical Math Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p align="center">For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>					<p>IT M E–CAD 12.7.a Apply Basic measurement skills to the nearest 1/16th on an inch on a daily basis through exercise and evaluation of accuracy.</p> <p>IT M E–CAD 12.7.b Convert full size scale to designated scale and vice versa.</p>

**K- 12 Comprehensive Engineering Systems Pathway Standard:
Students will demonstrate competency in the practices and skills of Engineering Systems.**

Concept	Course Level Standards						
	IT 6-8	Introduction to Engineering Design (IED)	Principles of Engineering (POE)	Digital Electronics (DE)	Civil Engineering and Architecture (CEA)	Engineering Design and Development (EDD)	Computer-Aided Drafting (CAD)
<p>Technical Math Curricular Indicators</p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p align="center"><i>Project Lead the Way</i> has its own identified course curriculum.</p> <p align="center"><i>Project Lead the Way</i> is recognized as a Science, Technology, Engineering, and Mathematics (STEM) program by the United States Department of Education and Nebraska Department of Education.</p> <p align="center">For the most current course syllabi and associated resources, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484</p>					<p>IT M E-CAD 12.7.c Compare and contrast the difference between Engineering and Architectural scales (measuring devices) applied to board drawing techniques.</p> <hr/> <p>IT M E-CAD 12.7.d Model Paper/Space: Convert a specific drawing to be printed onto a specified size for official documentation, including title, scale, name of designer, and drawing number.</p>

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concepts	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
Safety	T M M-SYN 6-8.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, equipment set-up.)	IT M M-IM 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-MP 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-AMTI 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-AMTII 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-WI 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-WII 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)
Oral and Written Communication	IT M M-SYN 6-8.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-IM 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-MP 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-AMTI 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-AMTII 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-WI 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-WII 12.2 Apply speaking and technical writing skills to communicate key ideas.
Employability Skills	IT M M-SYN 6-8.3 Demonstrate appropriate employability skills throughout the course.	IT M M-IM 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-MP 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-AMTI 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-AMTII 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-WI 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-WII 12.3 Demonstrate appropriate employability skills throughout the course.

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concepts	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
Career Exploration	IT M M-SYN 6-8.4 Investigate educational opportunities.	IT M M-IM 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-MP 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-AMTI 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-AMTII 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-WI 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-WII 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.
Technical Knowledge and Skills	IT M M-SYN 6-8.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	T M M-IM 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals	IT M M-MP 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M M-AMTI 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M M-AMTII 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M M-WI 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M M-WII 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.
Technical Communication (CAD, print reading)	IT M M-SYN 6-8.6 Read, interpret, and create graphic representations.	IT M M-IM 12.6 Read, interpret, and create graphic representations.	IT M M-MP 12.6 Read, interpret, and create graphic representations.	IT M M-AMTI 12.6 Read, interpret, and create graphic representations.	IT M M-AMTII 12.6 Read, interpret, and create graphic representations.	IT M M-WI 12.6 Read, interpret, and create graphic representations.	IT M M-WII 12.6 Read, interpret, and create graphic representations.
Technical Math	IT M M-SYN 6-8.7 Apply computational skills to course-specific goals.	IT M M-IM 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-MP 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-AMTI 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-AMTII 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-WI 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-WII 12.7 Apply computational and geometric skills to course-specific goals.

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
Safety	T M M-SYN 6-8.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, equipment set-up.)	IT M M-IM 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-MP 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-AMTI 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-AMTII 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-WI 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)	IT M M-WII 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)
Safety Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M M-IM 12.1.a Model general shop safety practices.	IT M M-MP 12.1.a Model general shop safety practices.	IT M M-AMTI 12.1.a Model general shop safety practices.	IT M M-AMTII 12.1.a Model general shop safety practices.	I IT M M-WI 12.1.a Model general shop safety practices.	IT M M-WII 12.1.a Model general shop safety practices.
		IT M M-IM 12.1.b Demonstrate safe practices when using hand tools.	IT M M-MP 12.1.b Demonstrate safe practices when using hand tools.	IT M M-AMTI 12.1.b Demonstrate safe practices when using hand tools.	IT M M-AMTII 12.1.b Demonstrate safe practices when using hand tools.	IT M M-WI 12.1.b Demonstrate safe practices when using hand tools.	IT M M-WII 12.1.b Demonstrate safe practices when using hand tools.
		IT M M-IM 12.1.c Demonstrate safe practices when using portable and stationary power tools and equipment.	IT M M-MP 12.1.c Demonstrate safe practices when using portable and stationary power tools and equipment.	IT M M-AMTI 12.1.c Demonstrate safe practices when using portable and stationary power tools and equipment.	IT M M-AMTII 12.1.c Demonstrate safe practices when using portable and stationary power tools and equipment.	IT M M-WI 12.1.c Demonstrate safe practices when using portable and stationary equipment.	IT M M-WII 12.1.c Demonstrate safe practices when using portable and stationary equipment.

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
Safety Curricular Indicators		IT M M-IM 12.1.d Assess the need for safe working habits in today's manufacturing industry.	IT M M-MP 12.1.d Assess the need for safe working habits in today's manufacturing industry.	IT M M-AMTI 12.1.d Assess the need for safe working habits in today's manufacturing industry.	IT M M-AMTII 12.1.d Assess the need for safe working habits in today's manufacturing industry.	IT M M-WI 12.1.d Assess the need for safe working habits in today's manufacturing industry.	IT M M-WII 12.1.d Assess the need for safe working habits in today's manufacturing industry.

**K- 12 Comprehensive Manufacturing Pathway Standards:
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Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
Oral/Written Communication	IT M M-SYN 6-8.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-IM 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-MP 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-AMTI 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-AMTII 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-WI 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M M-WII 12.2 Apply speaking and technical writing skills to communicate key ideas.
Oral/Written Communication Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum. For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M M-IM 12.2.a Use appropriate technical vocabulary (ex. Reference points, hand tool ID, power tool ID, and sheet metal, foundry, welding, machining terminology).	IT M M-MP 12.2.a Use appropriate technical vocabulary (ex. Reference points, hand tool ID, power tool ID, and sheet metal, foundry, welding, machining terminology).	IT M M-AMTI 12.2.a Use appropriate technical vocabulary (ex. Reference points, hand tool ID, power tool ID, boring, drilling, foundry, welding, machining terminology).	IT M M-AMTII 12.2.a Use appropriate technical vocabulary (ex. Reference points, hand tool ID, power tool ID, boring, drilling, foundry, welding, machining terminology).	IT M M-WI 12.2.a Use appropriate technical vocabulary (ex. SMAW, GTAW, O/A, GMAW).	IT M M-WII 12.2.a Use appropriate technical vocabulary (ex. SMAW, GTAW, O/A, GMAW).
		IT M M-IM 12.2.b Use technical writing.	IT M M-MP 12.2.b Use technical writing.	IT M M-AMTI 12.2.b Use technical writing.	IT M M-AMTII 12.2.b Use technical writing.	IT M M-WI 12.2.b Use technical writing.	IT M M-WII 12.2.b Use technical writing.
		IT M M-IM 12.2.c Use proper manufacturing symbols.	IT M M-MP 12.2.c Use proper manufacturing symbols.	IT M M-AMTI 12.2.c Use proper manufacturing symbols.	IT M M-AMTII 12.2.c Use proper manufacturing symbols.	IT M M-WI 12.2.c Use proper manufacturing symbols.	IT M M-WII 12.2.c Use proper manufacturing symbols.

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
Employability Skills	IT M M-SYN 6-8.3 Demonstrate appropriate employability skills throughout the course.	IT M M-IM 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-MP 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-AMTI 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-AMTII 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-WI 12.3 Demonstrate appropriate employability skills throughout the course.	IT M M-WII 12.3 Demonstrate appropriate employability skills throughout the course.
Employability Skills Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M M-IM 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M M-MP 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M M-AMTI 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M M-AMTII 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M M-WI 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M M-WII 12.3.a Use appropriate collaboration to complete tasks and assigned work.
IT M M-IM 12.3.b Use job roles to work effectively as a team member.		IT M M-MP 12.3.b Use job roles to work effectively as a team member.	IT M M-AMTI 12.3.b Use job roles to work effectively as a team member.	IT M M-AMTII 12.3.b Use job roles to work effectively as a team member.	IT M M-WI 12.3.b Use job roles to work effectively as a team member.	IT M M-WII 12.3.b Use job roles to work effectively as a team member.	
IT M M-IM 12.3.c Be punctual to class and maintain regular attendance.		IT M M-MP 12.3.c Be punctual to class and maintain regular attendance.	IT M M-AMTI 12.3.c Be punctual to class and maintain regular attendance.	IT M M-AMTII 12.3.c Be punctual to class and maintain regular attendance.	IT M M-WI 12.3.c Be punctual to class and maintain regular attendance.	IT M M-WII 12.3.c Be punctual to class and maintain regular attendance.	

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p>Employability Skills Curricular Indicators</p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715.8484.</p>	<p>IT M M-IM 12.3.d Set and reach appropriate personal and classroom goals as they pertain to the course deadlines and expectations.</p>	<p>IT M M-MP 12.3.d Set and reach appropriate personal and classroom goals as they pertain to the course deadlines and expectations.</p>	<p>IT M M-AMTI 12.3.d Set and reach appropriate personal and classroom goals as they pertain to the course deadlines and expectations.</p>	<p>IT M M-AMTII 12.3.d Set and reach appropriate personal and classroom goals as they pertain to the course deadlines and expectations.</p>	<p>IT M M-WI 12.3.d Set and reach appropriate personal and classroom goals as they pertain to the course deadlines and expectations.</p>	<p>IT M M-WII 12.3.d Set and reach appropriate personal and classroom goals as they pertain to the course deadlines and expectations.</p>
		<p>IT M M-IM 12.3.e Maintain appropriate personal hygiene.</p>	<p>IT M M-MP 12.3.e Maintain appropriate personal hygiene.</p>	<p>IT M M-AMTI 12.3.e Maintain appropriate personal hygiene.</p>	<p>IT M M-AMTII 12.3.e Maintain appropriate personal hygiene.</p>	<p>IT M M-WI 12.3.e Maintain appropriate personal hygiene.</p>	<p>IT M M-WII 12.3.e Maintain appropriate personal hygiene.</p>
		<p>IT M M-IM 12.3.f Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment. (ex. Eye, hearing, etc.)</p>	<p>IT M M-MP 12.3.f Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment. (ex. Eye, hearing, etc.)</p>	<p>IT M M-AMTI 12.3.f Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment. (ex. Eye, hearing, etc.)</p>	<p>IT M M-AMTII 12.3.f Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment. (ex. Eye, hearing, etc.)</p>	<p>IT M M-WI 12.3.f Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment. (ex. Eye, hearing, etc.)</p>	<p>IT M M-WII 12.3.f Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment. (ex. Eye, hearing, etc.)</p>
		<p>IT M M-IM 12.3.g Self-reflect on personal conduct and expectations.</p>	<p>IT M M-MP 12.3.g Self-reflect on personal conduct and expectations.</p>	<p>IT M M-AMTI 12.3.g Self-reflect on personal conduct and expectations.</p>	<p>IT M M-AMTII 12.3.g Self-reflect on personal conduct and expectations.</p>	<p>IT M M-WI 12.3.g Self-reflect on personal conduct and expectations.</p>	<p>IT M M-WII 12.3.g Self-reflect on personal conduct and expectations.</p>

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
Career Exploration	IT M M-SYN 6-8.4 Investigate educational opportunities.	IT M M-IM 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-MP 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-AMTI 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-AMTII 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-WI 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M M-WII 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.
Career Exploration Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M M-IM 12.4.a Explore manufacturing trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).	IT M M-MP 12.4.a Explore manufacturing trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).	IT M M-AMTI 12.4.a Explore manufacturing trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).	IT M M-AMTII 12.4.a Explore manufacturing trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).	IT M M-WI 12.4.a Explore manufacturing trades and job opportunities (ex. news articles, text, career tech expo; Skill USA)	IT M M-WII 12.4.a Explore manufacturing trades and job opportunities (ex. news articles, text, career tech expo; Skill USA).
IT M M-IM 12.4.b Do a presentation on the career opportunities within this field.		IT M M-MP 12.4.b Do a presentation on the career opportunities within this field.	IT M M-AMTI 12.4.b Do a presentation on the career opportunities within this field.	IT M M-AMTII 12.4.b Differentiate between the various trade and career levels available today.	IT M M-WI 12.4.b Do a presentation on the career opportunities within this field.	IT M M-WII 12.4.b Differentiate between the various trade and career levels available today.	

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p align="center">Technical Knowledge and Skills</p>	<p>IT M M-SYN 6-8.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.</p>	<p>T M M-IM 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals</p>	<p>IT M M-MP 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.</p>	<p>IT M M-AMTI 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.</p>	<p>IT M M-AMTII 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.</p>	<p>IT M M-WI 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.</p>	<p>IT M M-WII 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.</p>
<p align="center">Technical Knowledge and Skills Curricular Indicators</p>	<p><i>Synergistics</i> has its own identified course curriculum. For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p>IT M M-IM 12.5.a Sheet Metal: Identify and produce the basic hems and seams using sheet metal including: single hem, double hem, groove locking seam, wire edge, standing seam, cap strip, Pittsburg seam.</p>	<p>IT M M-MP 12.5.a Precision Measurement: Use dial calipers, micrometers: depth-mic, outside mic, height gauge, telescoping and small-hole gauge, thread-pitch, screw-pitch gauge, sheet metal gauge, wire gauge, and Vernier Measuring Systems.</p>	<p>IT M M-AMTI 12.5.a View multiple design models and determine the most efficient and effective process to produce an end-goal: Design, project-plan, cost-benefit analysis, process plan, effective use of machinery, materials options, time management, machine timing, size/weight of project, engineering and design factors.</p>	<p>IT M M-AMTII 12.5.a Lathe/Milling Operations: Machine to specified tolerances within +/- .005.</p>	<p>IT M M-WI 12.5.a Use and understand the standard and non-standard welding terms and definitions commonly used by welding professionals.</p>	<p>IT M M-WII 12.5.a Use and understand the standard and non-standard welding terms and definitions commonly used by welding professionals.</p>

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards
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	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p>Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p>	<p>IT M M-IM 12.5.b Sheet Metal: Use and identify fastening methods: spot weld, rivets, soldering, mechanical fasteners.</p>	<p>IT M M-MP 12.5.b Machine Tool ID: Use metal lathe and know its parts and functions: lathe – dog, t-wrenches, gauging, taper attachment, etc.</p>	<p>IT M M-AMTI 12.5.b Given a scenario with required parameters, in groups, students will apply the processes-planning and produce a final instructor-selected product (Skills USA: technical team problem solving).</p>	<p>IT M M-AMTII 12.5.b Classification and Composition of Materials: Describe and give examples of ferrous and nonferrous metals and alloys.</p>	<p>IT M M-WI 12.5.b Welding: Demonstrate welding processes by producing a fusion weld (square-groove weld, butt weld).</p>	<p>IT M M-WII 12.5.b Use the Shielded Metal Arc Welding process (SMAW) to produce quality welds based on an understanding of its method of operation, equipment and application to the welding of steel.</p>
	<p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p>IT M M-IM 12.5.c Sheet Metal: Model application of hems, seams, and fastening methods.</p>	<p>IT M M-MP 12.5.c Machine Tool ID: Use a vertical mill and know its parts and functions.</p>	<p>IT M M-AMTI 12.5.c Precision Measurement: Use dial calipers, micrometers (depth-mic, outside mic), height gauge, telescoping and small-hole gauge, thread-pitch, screw-pitch gauge, sheet metal gauge, wire gauge, and Vernier Measuring Systems, sin bars, angle plates, surface plate, inspection/quality control).</p>	<p>IT M M-AMTII 12.5.c Classification and Composition of Materials: ID and describe the code classification system used to designate basic types of steel.</p>	<p>IT M M-WI 12.5.c Welding: Demonstrate welding processes by producing a weld pool (bead, puddle, with and without filler rod).</p>	<p>IT M M-WII 12.5.c Differentiate between SMAW electrodes from the F1,F2, F3, and F4 groups based on an understanding of their operating characteristics, usability and application to the welding of steel.</p>

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p>Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M M-IM 12.5.d Bench Metal: Use appropriate tools to produce internal and external threads.	IT M M-MP 12.5.d Machine Tool ID: Use a surface grinder and know its parts and functions.		IT M M-AMTII 12.5.d Classification and Composition of Materials: Describe the process of ID different types of steel through spark testing and color codes	IT M M-WI 12.5.d Welding: Demonstrate welding processes by producing an arc weld.	IT M M-WII 12.5.d Produce quality single-pass fillet welds in the flat and horizontal positions.
		IT M M-IM 12.5.e Bench Metal: Model application of basic hand tools and procedures with bench metal.	IT M M-MP 12.5.e Tool ID: Identify and use reamers, drill bits, counter bores, counter sinks, taps, end-mills, cutters, lathe cutting tools, knurling, toe-clamps, kant-twist clamps.		IT M M-AMTII 12.5.e Classification and Composition of Materials: Describe various industrial uses of selected nonferrous alloys.	IT M M-WI 12.5.e Welding: Demonstrate cutting process. (Ex. O/A, flame/torch cutting, plasma, straight-cut, bevel-cut, hole-cut)	IT M M-WII 12.5.e Produce quality multi-pass fillet welds in the horizontal position.
		IT M M-IM 12.5.f Casting: Identify appropriate tools used in the casting process. (Ex. Heat source, patterns, pattern-making tools)	IT M M-MP 12.5.f Lathe: Turn, face, center-drill, knurl, taper, thread-cutting, drill, and bore a piece of metal.		IT M M-AMTII 12.5.f Classification and Composition of Materials: Heat Treatment of Metals.	IT M M-WI 12.5.f O/A Welding: Identify and produce the three welding flames. (carburizing, neutral, and oxidizing).	IT M M-WII 12.5.f Produce quality single-pass groove welds in the flat position.

**K- 12 Comprehensive Manufacturing Pathway Standards:
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Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p>Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p>IT M M-IM 12.5.g Casting: Model application of casting techniques.</p>	<p>IT M M-MP 12.5.g Milling Machine: Use the Vertical Mill and know its parts and functions (square a block of metal, indicate a vice, tram a head, edge-find, climb and conventional milling).</p>			<p>IT M M-WI 12.5.g O/A: Produce welds in the flat position (bead, butt, lap, T, outside corner, edge).</p>	<p>IT M M-WII 12.5.g Produce quality multi-pass groove welds in the flat position.</p>
		<p>IT M M-IM 12.5.h Welding: Demonstrate welding processes by producing a fusion weld (square-groove weld, butt weld).</p>				<p>IT M M-WI 12.5.h O/A: Apply visual inspection methods to evaluate a quality weld. (consistency, ripple, evenness, crown, penetration, and fusion)</p>	<p>IT M M-WII 12.h Pass the Welder Performance Qualification Tests in the flat position. (Guided Bend Test).</p>
		<p>IT M M-IM 12.5.i Welding: Demonstrate welding processes by producing a weld pool (bead, puddle, with and without filler rod).</p>				<p>IT M M-WI 12.5.i Shielded Metal Arc Welding (SMAW): Identify and demonstrate proper use of SMAW-related tools. (chipping hammers, brushes, stationary and portable equipment, electrode selection and identification.)</p>	

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p>Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p>IT M M-IM 12.5.j Welding: Demonstrate welding processes by producing an arc weld.</p>				<p>IT M M-WI 12.5.j Shielded Metal Arc Welding (SMAW): Produce welds in the flat position. (bead, butt, lap, T, outside corner, edge).</p>	
		<p>IT M M-IM 12.5.k Welding: Demonstrate cutting process. (Ex. O/A, plasma, straight-cut, bevel-cut, hole-cut)</p>				<p>IT M M-WI 12.5.k Shielded Metal Arc Welding (SMAW): Identify characteristics and proper use of different electrodes. (6010,6011, 6013, 7018)</p>	
						<p>IT M M-WI 12.5.l Shielded Metal Arc Welding (SMAW): Apply visual inspection methods to evaluate a quality weld. (consistency, ripple, evenness, crown, penetration, and fusion)</p>	

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Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p>Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484</p>					IT M M-WI 12.5.m Gas Metal Arch Welding (GMAW): Identify and demonstrate proper use of GMAW-related tools (chipping hammers, brushes, stationary and portable equipment, electrode selection and identification).	
						IT M M-WI 12.5.n Gas Metal Arch Welding (GMAW): Demonstrate ability to manipulate the torch (backhand, forehand, perpendicular) to produce welds.	
						IT M M-WI 12.5.o Gas Metal Arch Welding (GMAW): Produce welds (bead, butt, lap, T, outside corner, edge).	

**K- 12 Comprehensive Manufacturing Pathway Standards:
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Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p>Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484</p>					<p>IT M M-WI 12.5.p Gas Metal Arc Welding (GMAW): Apply visual inspection methods to evaluate a quality weld. (consistency, ripple, evenness, crown, penetration, and fusion)</p>	
						<p>IT M M-WI 12.5.q Gas Tungsten Arch Welding (GTAW/Tig-Welding): Identify and demonstrate proper use of GTAW-related tools. (brushes, stationary and portable equipment, electrode selection and identification.)</p>	

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Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p>Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components.</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p>					IT M M-WI 12.5.r Gas Tungsten Arch Welding (GTAW/Tig-Welding): Demonstrate ability to manipulate the torch (backhand, forehand, perpendicular) to produce welds.	
	<p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484</p>					IT M M-WI 12.5.s Gas Tungsten Arch Welding (GTAW/Tig-Welding): Produce welds. (bead, butt).	
						IT M M-WI 12.5.t Gas Tungsten Arch Welding (GTAW/Tig-Welding): Apply visual inspection methods to evaluate a quality weld. (consistency, ripple, evenness, crown, penetration, and fusion).	

**K- 12 Comprehensive Manufacturing Pathway Standards:
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Concepts	Course Level Standards						
Technical Knowledge and Skills Curricular Indicators	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
							IT M M-WI 12.5.u Identify and use a variety of power sources to produce welds. (ex. inverter, pulse, transformer, square-wave)

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Concepts	Course Level Standards						
Technical Communication	IT M M-SYN 6-8.6 Read, interpret, and create graphic representations.	IT M M-IM 12.6 Read, interpret, and create graphic representations.	IT M M-MP 12.6 Read, interpret, and create graphic representations.	IT M M-AMTI 12.6 Read, interpret, and create graphic representations.	IT M M-AMTII 12.6 Read, interpret, and create graphic representations.	IT M M-WI 12.6 Read, interpret, and create graphic representations.	IT M M-WII 12.6 Read, interpret, and create graphic representations.
Technical Communication Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M M-IM 12.6.a Read and interpret a plan of procedure.	IT M M-MP 12.6.a Read and interpret a plan of procedure.	IT M M-AMTI 12.6.a Read and interpret a plan of procedure.	IT M M-AMTII 12.6.a Read and interpret a plan of procedure.	IT M M-WI 12.6.a Read and interpret a welding procedure sheet.	IT M M-WII 12.6.a Read and interpret a welding procedure sheet.
		IT M M-IM 12.6.b Explore the menus in drafting software (ex. CAD, Spectracad).	IT M M-MP 12.6.b Apply the menus in drafting software (ex. CAD, Spectracad).	IT M M-AMTI 12.6.b Use drafting software (ex. CAD, Spectracad, Mastercam, Surfcam) to generate a CNC cut path.	IT M M-AMTII 12.6.b Use drafting software (ex. CAD, Spectracad, Mastercam, Surfcam) to generate a CNC cut path.		
						IT M M-WI 12.d Use a welding calculator to properly set-up the parameters for a welding machine.	IT M M-WII 12.6.d Use a welding calculator to properly set-up the parameters for a welding machine.

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Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
Technical Math	IT M M-SYN 6-8.7 Apply computational skills to course-specific goals.	IT M M-IM 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-MP 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-AMTI 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-AMTII 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-WI 12.7 Apply computational and geometric skills to course-specific goals.	IT M M-WII 12.7 Apply computational and geometric skills to course-specific goals.
Technical Math Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum.	IT M M-IM 12.7.a Read a ruler.	IT M M-MP 12.7.a Read a ruler.	IT M M-AMTI 12.7.a Read a ruler.	IT M M-AMTII 12.7.a Read a ruler.	IT M M-WI 12.7.a Read a ruler.	IT M M-WII 12.7.a Read a ruler.
	For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M M-IM 12.7.b Convert between decimals and fractions.	IT M M-MP 12.7.b Convert between decimals and fractions.	IT M M-AMTI 12.7.b Convert between decimals and fractions.	IT M M-AMTII 12.7.b Convert between decimals and fractions.	IT M M-WI 12.7.b Convert between decimals and fractions.	IT M M-WII 12.7.b Convert between decimals and fractions.
		IT M M-IM 12.7.c Add and subtract dimensions on a print	IT M M-MP 12.7.c Add and subtract dimensions on a print.	IT M M-AMTI 12.7.c Add and subtract dimensions on a print.	IT M M-AMTII 12.7.c Add and subtract dimensions on a print.	IT M M-WI 12.7.c Add and subtract dimensions on a print.	IT M M-WII 12.7.c Add and subtract dimensions on a print
			IT M M-MP 12.7.d Measure within .001 of an inch using precision measurement instruments.	IT M M-MP 12.7.d Measure within .001 of an inch using precision measurement instruments.	IT M M-AMTII 12.7.d Measure within .001 of an inch using precision measurement instruments.		

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Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p align="center">Technical Math Curricular Indicators</p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>		IT M M-MP 12.7.e Determine plot points using the Cartesian Coordinate System.	IT M M-MP 12.7.e Determine plot points using the Cartesian Coordinate System.	IT M M-AMTII 12.7.e Determine plot points using the Cartesian Coordinate System		
			IT M M-MP 12.7.f Apply right-angle trigonometry principles (sin, cos, seq, co-seq, tan, co-tan, Pythagorean Theorem) to set machine angles and cut tapers.	IT M M-MP 12.7.f Apply right-angle trigonometry principles (sin, cos, seq, co-seq, tan, co-tan, Pythagorean Theorem) to set machine angles and cut tapers.	IT M M-AMTII 12.7.f Apply right-angle trigonometry principles (sin, cos, seq, co-seq, tan, co-tan, Pythagorean Theorem) to set machine angles and cut tapers.		
			IT M M-MP 12.7. Manipulate arcs, circles, and radius to degrees.	IT M M-MP 12.7. Manipulate arcs, circles, and radius to degrees.	IT M M-AMTII 12.7 Manipulate arcs, circles, and radius to degrees.		
			IT M M-MP 12.7.h Apply basic Algebraic calculations (cut speed * 4/pi * diameter) to determine proper cutting speed.	IT M M-MP 12.7.h Apply basic Algebraic calculations (cut speed * 4/pi * diameter) to determine proper cutting speed.	IT M M-AMTII 12.7.h Apply basic Algebraic calculations (cut speed * 4/pi * diameter) to determine proper cutting speed.		

**K- 12 Comprehensive Manufacturing Pathway Standards:
Students will demonstrate competency in the practices and skills of Manufacturing Technology.**

Concept	Course Level Standards						
	IT 6-8	Intro to Metalworking	Machining Processes	Automated Manufacturing Technology I	Automated Manufacturing Technology II	Welding I	Welding II
<p align="center">Technical Math Curricular Indicators</p>	<p><i>Synergistics</i> has its own identified course curriculum.</p>		IT M M-MP 12.7.i Read drawings and manipulate drawings to find proper dimensions and tolerances.	IT M M-MP 12.7.i Read drawings and manipulate drawings to find proper dimensions and tolerances.	IT M M-AMTII 12.7.i Read drawings and manipulate drawings to find proper dimensions and tolerances.		
	For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484				IT M M-AMTII 12.7.j Solve practical math problems involving measurements relating to the machine trades (measure bores, tapers, shoulders, depth of bores, grooves).		

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concepts	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operations	Power System Design and Fabrication I	Power System Design and Fabrication II
Safety	IT M PS- SYN 6-8.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, equipment set-up,)	IT M PS-IPEMS 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up, pressures)	IT M PS-MSO 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up, pressures)	IT M PS-PSDFI 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, welding, clean-up, pressures)	IT M PS-PSDFII 12.1 Demonstrate safe practices with lab equipment. (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures)
Oral and Written Communication	IT M PS- SYN 6-8.2 Apply speaking and technical writing skills to communicate key ideas.	IT M PS-IPEMS 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M PS-MSO 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M PS-PSDFI 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M PS-PSDFII 12.2 Apply speaking and technical writing skills to communicate key ideas.
Employability Skills	IT M PS- SYN 6-8.3 Demonstrate appropriate employability skills throughout the course.	IT M PS-IPEMS 12.3 Demonstrate appropriate employability skills throughout the course.	IT M PS-MSO 12.3 Demonstrate appropriate employability skills throughout the course.	IT M PS-PSDFI 12.3 Demonstrate appropriate employability skills throughout the course.	IT M PS-PSDFII 12.3 Demonstrate appropriate employability skills throughout the course.
Career Exploration	IT M PS- SYN 6-8.4 Investigate educational opportunities.	IT M PS-IPEMS 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M PS-MSO 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M PS-PSDFI 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M PS-PSDFII 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.
Technical Knowledge and Skills		IT M PS-IPEMS 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M PS-MSO 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M PS-PSDFI 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M PS-PSDFII 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.
Technical Communication (CAD, print reading)		IT M PS-IPEMS 12.6 Read, interpret, and create schematics and technical drawings.	IT M PS-MSO 12.6 Read, interpret, and create schematics and technical drawings.	IT M PS-PSDFI 12.6 Read, interpret, and create schematics and technical drawings.	IT M PS-PSDFII 12.6 Read, interpret, and create schematics and technical drawings.

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concept	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operations	Power System Design and Fabrication I	Power System Design and Fabrication II
Technical Math	IT M PS- SYN 6-8.7 Apply computational skills to course-specific goals.	IT M PS-IPEMS 12.7 Apply computational and geometric skills to course-specific goals.	IT M PS-MSO 12.7 Apply computational and geometric skills to course-specific goals.	IT M PS-PSDFI 12.7 Apply computational and geometric skills to course-specific goals.	IT M PS-PSDFII 12.7 Apply computational and geometric skills to course-specific goals.

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concept	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operations	Power System Design and Fabrication I	Power System Design and Fabrication II
Safety	IT M PS- SYN 6-8.1 Demonstrate safe practices with lab equipment (ex. Clothing, eye protection, equipment set-up).	IT M PS-IPEMS 12.1 Demonstrate safe practices with lab equipment (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up, pressures).	IT M PS-MSO 12.1 Demonstrate safe practices with lab equipment (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, clean-up, pressures).	IT M PS-PSDFI 12.1 Demonstrate safe practices with lab equipment (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils, welding, clean-up, pressures).	IT M PS-PSDFII 12.1 Demonstrate safe practices with lab equipment (ex. Clothing, eye protection, burn protection, equipment set-up, grounding, inspection, use, chemicals/oils and welding, clean-up, pressures).
Safety Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M PS-IPEMS 12.1.a Model general shop safety practices.	IT M PS-MSO 12.1.a Model general shop safety practices.	IT M PS-PSDFI 12.1.a Model general shop safety practices.	IT M PS-PSDFII 12.1.a Model general shop safety practices.
		IT M PS-IPEMS 12.1.b Demonstrate safe practices when using hand tools.	IT M PS-MSO 12.1.b Demonstrate safe practices when using hand tools.	IT M PS-PSDFI 12.1.b Demonstrate safe practices when using hand tools.	IT M PS-PSDFII 12.1.b Demonstrate safe practices when using hand tools.
		IT M PS-IPEMS 12.1.c Demonstrate safe practices when using portable and stationary power tools and equipment.	IT M PS-MSO 12.1.c Demonstrate safe practices when using portable and stationary power tools and equipment.	IT M PS-PSDFI 12.1.c Demonstrate safe practices when using portable and stationary power tools and equipment.	IT M PS-PSDFII 12.1.c Demonstrate safe practices when using portable and stationary power tools and equipment.
		IT M PS-IPEMS 12.1.d Assess the need for safe working habits and practices in today's manufacturing industry (ex. OSHA).	IT M PS-MSO 12.1.d Assess the need for safe working habits and practices in today's manufacturing industry (ex. OSHA).	IT M PS-PSDFI 12.1.d Assess the need for safe working habits and practices in today's manufacturing industry (ex. OSHA).	IT M PS-PSDFII 12.1.d Assess the need for safe working habits and practices in today's manufacturing industry (ex. OSHA).
			IT M PS-MSO 12.1.e Safely wire-up an electrical (24V) circuit.	IT M PS-PSDFI 12.1.e Safely wire-up an electrical (24V) circuit.	IT M PS-PSDFII 12.1.e Safely wire-up an electrical (24V) circuit.
			IT M PS-MSO 12.1.f Practice electrical isolation (lock-out, tag-out)	IT M PS-PSDFI 12.1.f Practice electrical isolation (lock-out, tag-out)	IT M PS-PSDFII 12.1.f Practice electrical isolation (lock-out, tag-out).

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concept	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operation	Power System Design and Fabrication I	Power System Design and Fabrication II
Oral/Written Communication	IT M PS- SYN 6-8.2 Apply speaking and technical writing skills to communicate key ideas.	IT M PS-IPEMS 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M PS-MSO 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M PS-PSDFI 12.2 Apply speaking and technical writing skills to communicate key ideas.	IT M PS-PSDFII 12.2 Apply speaking and technical writing skills to communicate key ideas.
Oral/Written Communication Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715.8484.</p>	IT M PS-IPEMS 12.2 Use appropriate technical vocabulary (ex. Torque, leverage, gear ratios, pneumatic, chemical power, photovoltaic (solar) power, wind power).	IT M PS-MSO 12.2 Use appropriate technical vocabulary (ex. coupling, bearings, sheaves, sprockets, gears).	IT M PS-PSDFI 12.2 Use appropriate technical vocabulary (ex. Programmable-logic controllers (PLCs), switches, standard C-Programming).	IT M PS-PSDFII 12.2 Use appropriate technical vocabulary (ex. Programmable-logic controllers (PLCs), switches, standard C-Programming).
		IT M PS-IPEMS 12.2 Use technical writing.	IT M PS-MSO 12.2 Use technical writing.	IT M PS-PSDFI 12.2 Use technical writing.	IT M PS-PSDFII 12.2 Use technical writing.
		IT M PS-IPEMS 12.2 Use proper symbols (ex. electrical, mechanical systems).	IT M PS-MSO 12.2 Use proper symbols (ex. electrical, mechanical systems).	IT M PS-PSDFI 12.2 Use proper symbols (ex. electrical, mechanical systems).	IT M PS-PSDFII 12.2 Use proper symbols (ex. electrical, mechanical systems).

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concept	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operations	Power System Design and Fabrication I	Power System Design and Fabrication II
Employability Skills	IT M PS- SYN 6-8.3 Demonstrate appropriate employability skills throughout the course.	IT M PS-IPEMS 12.3 Demonstrate appropriate employability skills throughout the course.	IT M PS-MSO 12.3 Demonstrate appropriate employability skills throughout the course.	IT M PS-PSDFI 12.3 Demonstrate appropriate employability skills throughout the course.	IT M PS-PSDFII 12.3 Demonstrate appropriate employability skills throughout the course.
Employability Skills Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M PS-IPEMS 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M PS-MSO 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M PS-PSDFI 12.3.a Use appropriate collaboration to complete tasks and assigned work.	IT M PS-PSDFII 12.3.a Use appropriate collaboration to complete tasks and assigned work.
		IT M PS-IPEMS 12.3.b Use job roles to work effectively as a team member.	IT M PS-MSO 12.3.b Use job roles to work effectively as a team member.	IT M PS-PSDFI 12.3.b Use job roles to work effectively as a team member.	IT M PS-PSDFII 12.3.b Use job roles to work effectively as a team member.
		IT M PS-IPEMS 12.3.c Be punctual to class and maintain regular attendance.	IT M PS-MSO 12.3.c Be punctual to class and maintain regular attendance.	IT M PS-PSDFI 12.3.c Be punctual to class and maintain regular attendance.	IT M PS-PSDFII 12.3.c Be punctual to class and maintain regular attendance.
		IT M PS-IPEMS 12.3.d Demonstrate time management skills by completing tasks by the assigned deadlines.	IT M PS-MSO 12.3.d Demonstrate time management skills by completing tasks by the assigned deadlines.	IT M PS-PSDFI 12.3.d Demonstrate time management skills by completing tasks by the assigned deadlines.	IT M PS-PSDFII 12.3.d Demonstrate time management skills by completing tasks by the assigned deadlines.
		IT M PS-IPEMS 12.3.e Set and reach appropriate personal and classroom goals as they pertain to the course expectations.	IT M PS-MSO 12.3.e Set and reach appropriate personal and classroom goals as they pertain to the course expectations.	IT M PS-PSDFI 12.3.e Set and reach appropriate personal and classroom goals as they pertain to the course expectations.	IT M PS-PSDFII 12.3.e Set and reach appropriate personal and classroom goals as they pertain to the course expectations.
		IT M PS-IPEMS 12.3.f Maintain appropriate personal hygiene.	IT M PS-MSO 12.3.f Maintain appropriate personal hygiene.	IT M PS-PSDFI 12.3.f Maintain appropriate personal hygiene.	IT M PS-PSDFII 12.3.f Maintain appropriate personal hygiene.

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concept	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operations	Power System Design and Fabrication I	Power System Design and Fabrication II
Employability Skills Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum. For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M PS-IPEMS 12.3.g Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment (ex. eye, hearing, etc.).	IT M PS-MSO 12.3.g Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment (ex. eye, hearing, etc.).	IT M PS-PSDFI 12.3.g Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment (ex. eye, hearing, etc.).	IT M PS-PSDFII 12.3.g Wear appropriate clothing and personal safety protection equipment to safely work in a lab environment (ex. eye, hearing, etc.).
		IT M PS-IPEMS 12.3.h Self-reflect on personal conduct and expectations.	IT M PS-MSO 12.3.h Self-reflect on personal conduct and expectations.	IT M PS-PSDFI 12.3.h Self-reflect on personal conduct and expectations.	IT M PS-PSDFII 12.3.h Self-reflect on personal conduct and expectations.
				IT M PS-PSDFI 12.3.i Problem-solve to identify potential problems and correct them.	IT M PS-PSDFII 12.3.i Problem-solve to identify potential problems and correct them.

**K- 12 K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concepts	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operations	Power System Design and Fabrication I	Power System Design and Fabrication II
Career Exploration	I IT M PS- SYN 6-8.4 Investigate educational opportunities.	IT M PS-IPEMS 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M PS-MSO 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M PS-PSDFI 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.	IT M PS-PSDFII 12.4 Investigate educational opportunities and employment requirements related to course-specific careers.
Career Exploration Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum. For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M PS-IPEMS 12.4.a Explore power, energy, and mechanized trades and job opportunities (ex. TDL academy, news articles, text, career tech expo; Skill USA).	IT M PS-MSO 12.4.a Explore power, energy, and mechanized trades and job opportunities (ex. TDL academy, news articles, text, career tech expo; Skill USA).	IT M PS-PSDFI 12.4.a Explore power, energy, and mechanized trades and job opportunities (ex. TDL academy, news articles, text, career tech expo; Skill USA).	IT M PS-PSDFII 12.4.a Explore power, energy, and mechanized trades and job opportunities (ex. TDL academy, news articles, text, career tech expo; Skill USA).
	<i>Synergistics</i> has its own identified course curriculum.	IT M PS-IPEMS 12.4.b Do a presentation on the career opportunities within this field.	IT M PS-MSO 12.4.b Do a presentation on the career opportunities within this field.	IT M PS-PSDFI 12.4.b Do a presentation on the career opportunities within this field.	IT M PS-PSDFII 12.4.b Differentiate between the various trade and career levels available today.
	For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M PS-IPEMS 12.4.c Explore the educational requirements for different career opportunities.	IT M PS-MSO 12.4.c Explore the educational requirements for different career opportunities.	IT M PS-PSDFI 12.4.c Explore the educational requirements for different career opportunities.	IT M PS-PSDFII 12.4.c Explore the educational requirements for different career opportunities.

**K- 12 K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concepts	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operations	Power System Design and Fabrication I	Power System Design and Fabrication II
Technical Knowledge and Skills	IT M PS- SYN 6-8.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M PS-IPEMS 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M PS-MSO 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M PS-PSDFI 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.	IT M PS-PSDFII 12.5 Use the appropriate portable and stationary power tools to accomplish specific course goals.
Technical Knowledge and Skills Curricular Indicators	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M PS-IPEMS 12.5.a Human Power: Identify the six simple machines: levers, pulleys, wheel, axel, incline plane, screw, wedge.	IT M PS-MSO 12.5.a Circuit Symbols: Identify symbols within wiring diagrams.	IT M PS-PSDFI 12.5.a Apply technical writing processes to build an electrical machine (solar, wind, mechanical, electricity).	IT M PS-PSDFII 12.5.a Given a problematic scenario, develop a concept statement and use ROBOTC Language to build a mechanical device to solve the problem.
		IT M PS-IPEMS 12.5.b Mechanical Power: Develop a gear train.	IT M PS-MSO 12.5.b Apply Ohms Law and Kirkoff's Law to control motors.	IT M PS-PSDFI 12.5.b Use a computer program to create a 3D design for an electrical machine.	IT M PS-PSDFII 12.5.b Apply technical writing processes to build an electrical machine (solar, wind, mechanical, electricity).

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concept	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operation	Power System Design and Fabrication I	Power System Design and Fabrication II
<p>Technical Knowledge and Skills Curricular Indicators</p> <p><i>Note: The Technical Knowledge and Skills indicators listed on this document are not written in horizontal alignment. Each course has its own independent knowledge and skills components.</i></p>	<p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	IT M PS-IPEMS 12.5.c Mechanical Power: Use springs to move static/potential energy to kinetic energy.	IT M PS-MSO 12.5.c Apply different types of switches to control motors (ex. Push-button, float, limit, pressure, photo sensor, and magnet-reed).	IT M PS-PSDFI 12.5.c Identify assembly materials to create the machine.	IT M PS-PSDFII 12.5.c Use a computer program to create a 3D design for an electrical machine.
		IT M PS-IPEMS 12.5.d Pneumatic (air) Power: Identify Pascals Law and explain how to use it to create power (laws of pressure).	IT M PS-MSO 12.5.d Demonstrate preventative maintenance (lubrication).	IT M PS-PSDFI 12.5.d Assemble the electrical machine.	IT M PS-PSDFII 12.5.d As a team, identify assembly materials to create the machine.
		IT M PS-IPEMS 12.5.e Electrical Power: Explain torque, an electrical circuit, Ohms Law, and how an electrical motor is constructed and works.	IT M PS-MSO 12.5.e Classify types of bearings, and bearing and roller parts (race, balls).	IT M PS-PSDFI 12.5.e Manipulate the electrical machine through simple controls (switches, remote control).	
		IT M PS-IPEMS 12.5.f Chemical Power: Explain how a mixture of chemicals create electrical charge (batteries).	IT M PS-MSO 12.5.f Distinguish between different types of belt (sizes, materials).		
		IT M PS-IPEMS 12.5.g Photovoltaic (Solar) Power: Explain how to convert sun's rays into electricity.	IT M PS-MSO 12.5.g Classify different types of sprockets and chains (pitch, alignment).		
		IT M PS-IPEMS 12.5.h Wind Power: Explain how natural wind creates electricity (turbine, weather vane).	IT M PS-MSO 12.5.h Distinguish the uses and different types of couplings (magnetic, pneumatic, hydraulic).		

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concept	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operation	Power System Design and Fabrication I	Power System Design and Fabrication II
Technical Knowledge and Skills Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum.	IT M PS-IPEMS 12.5.i Fossil Fuels: Understand how combustion in an engine creates kinetic energy.			
	For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	T M PS-IPEMS 12.5.j Future Power: Students will explore future energy possibilities (ex. geothermal, nuclear, fuel cell).			

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concept	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operation	Power System Design and Fabrication I	Power System Design and Fabrication II
Technical Communication	IT M PS- SYN 6-8.6 Read, interpret, and create graphic representations.	IT M PS-IPEMS 12.6 Read, interpret, and create schematics and technical drawings.	IT M PS-MSO 12.6 Read, interpret, and create schematics and technical drawings.	IT M PS-PSDFI 12.6 Read, interpret, and create schematics and technical drawings.	IT M PS-PSDFII 12.6 Read, interpret, and create schematics and technical drawings.
Technical Communication Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum.	IT M PS-IPEMS 12.6.a Read and interpret a plan of procedure.	IT M PS-MSO 12.6.a Read and interpret a plan of procedure.	IT M PS-PSDFI 12.6.a Read and interpret a plan of procedure.	IT M PS-PSDFII 12.6.a Read and interpret a plan of procedure.
	For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M PS-IPEMS 12.6.b Interpret graphic and symbolic views (ex. CircuitMaker).	IT M PS-MSO 12.6.b Interpret graphic and symbolic views (ex. CircuitMaker).	IT M PS-PSDFI 12.6.b Interpret graphic and symbolic views (ex. Inventor).	IT M PS-PSDFII 12.6.b Interpret graphic and symbolic views (ex. Inventor).
		IT M PS-IPEMS 12.6.c Read, interpret, and use a simple drawing.	IT M PS-MSO 12.6.c Read, interpret, and use a simple drawing.	IT M PS-PSDFI 12.6.c Read, interpret, and use a multi-view (3D, isometric) drawing (ex. 3D printer).	IT M PS-PSDFII 12.6.c Read, interpret, and use a multi-view (3D, isometric) drawing (ex. 3D printer).
				IT M PS-PSDFI 12.6.d Create a 3D sketch and develop a plan of procedure to fabricate the product (ex. Inventor).	IT M PS-PSDFII 12.6.d Create a 3D sketch and develop a plan of procedure to fabricate the product (ex. Inventor).
					IT M PS-PSDFII 12.6.e Program in ROBOTC Language.

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concepts	Course Level Standards				
	IT 6-8	Intro Power, Energy, and Mechanized Systems	Mechanical Systems Operations	Power System Design and Fabrication I	Power System Design and Fabrication II
Technical Math	IT M PS- SYN 6-8.7 Apply computational skills to course-specific goals.	IT M PS-IPEMS 12.7 Apply computational and geometric skills to course-specific goals.	IT M PS-MSO 12.7 Apply computational and geometric skills to course-specific goals.	IT M PS-PSDFI 12.7 Apply computational and geometric skills to course-specific goals.	IT M PS-PSDFII 12.7 Apply computational and geometric skills to course-specific goals.
Technical Math Curricular Indicators	<i>Synergistics</i> has its own identified course curriculum.	IT M PS-IPEMS 12.7.a Read a ruler.	IT M PS-MSO 12.7.a Read a ruler.	IT M PS-PSDFI 12.7.a Read a ruler.	IT M PS-PSDFII 12.7.a Read a ruler.
	For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.	IT M PS-IPEMS 12.7.b Convert between decimals and fractions.	IT M PS-MSO 12.7.b Convert between decimals and fractions.	IT M PS-PSDFI 12.7.b Convert between decimals and fractions.	IT M PS-PSDFII 12.7.b Convert between decimals and fractions.
		IT M PS-IPEMS 12.7.c Add and subtract dimensions on a print.	IT M PS-MSO 12.7.c Add and subtract dimensions on a print.	IT M PS-PSDFI 12.7.c Add and subtract dimensions on a print.	IT M PS-PSDFII 12.7.c Add and subtract dimensions on a print.
			IT M PS-MSO 12.7.e Comprehend right-angle trigonometry principles (sin, cos, seq, co-seq, tan, co-tan, Pythagorean Theorem) to set machine angles and cut tapers.	IT M PS-PSDFI 12.7.f Apply right-angle trigonometry principles (sin, cos, seq, co-seq, tan, co-tan, Pythagorean Theorem) to set machine angles and cut tapers (ex. Inventor).	IT M PS-PSDFII 12.7.f Apply right-angle trigonometry principles (sin, cos, seq, co-seq, tan, co-tan, Pythagorean Theorem) to set machine angles and cut tapers (ex. Inventor).

**K- 12 Comprehensive Power and Mechanized Systems Pathway Standards:
Students will demonstrate competency in the practices and skills of Power and Mechanized Systems.**

Concept	Course Level Standards				
<p>Technical Math Curricular Indicators</p>	<p align="center">IT 6-8</p> <p><i>Synergistics</i> has its own identified course curriculum.</p> <p>For more information, contact the Millard Education Program Curriculum Facilitator for Industrial Technology at (402) 715-8484.</p>	<p>Intro Power, Energy, and Mechanized Systems</p>	<p>Mechanical Systems Operations</p>	<p>Power System Design and Fabrication I</p>	<p>Power System Design and Fabrication II</p>
		<p>IT M PS-IPEMS 12.7.d Apply basic Algebraic calculations. (ex. Ohm's Law, angles, gear ratios)</p>	<p>IT M PS-MSO 12.7.g Apply basic Algebraic calculations. (ex. Ohm's Law, angles, gear ratios, torque, timing, speed, inertia)</p>	<p>IT M PS-PSDFI 12.7.h Apply basic Algebraic calculations (ex. Ohm's Law, angles, gear ratios, torque, timing, speed, inertia).</p>	<p>IT M PS-PSDFII 12.7.h Apply basic Algebraic calculations. (ex. Ohm's Law, angles, gear ratios, torque, timing, speed, inertia)</p>
			<p>IT M PS-MSO 12.7.h Read drawings and manipulate drawings to find proper dimensions and tolerances.</p>	<p>IT M PS-PSDFI 12.7.i Read drawings and manipulate drawings to find proper dimensions and tolerances (ex. Inventor).</p>	<p>IT M PS-PSDFII 12.7.i Read drawings and manipulate drawings to find proper dimensions and tolerances (ex. Inventor).</p>

APPENDIX

6-12 Industrial Technology Rationale for Identified Pathways

The 6-12 Industrial Technology Framework is based on industry standards and aligned with the Nebraska Career Education Model defined by the Nebraska Department of Education. Each pathway contains a sequence of courses which will allow a student to build expertise for success in post-secondary and career opportunities.

- The middle school industrial technology program is based upon hands-on modules which explore the high school career pathways.
- The high school industrial technology curriculum is based upon four career pathways: Construction, Engineering, Manufacturing, and Power and Mechanized Systems.
- The course sequence in the pathway of Construction and Manufacturing were revised to reflect current industry standards.
- The Engineering pathway has been revised to align to *Project Lead the Way* to ensure the curriculum meets a national standard recognized by post secondary institutions. *Project Lead the Way* is recognized as a Science, Technology, Engineering, and Mathematics (STEM) pathway by the United States Department of Education and the Nebraska Department of Education.
- The Power and Mechanized Systems pathway is a proposed addition to expand opportunities for Millard students in a future area of need defined by Workforce Development data through Nebraska Department of Labor.

In addition to a realignment of courses, the following parameters were considered:

- Proposed course changes must be accommodated in existing facilities.
- Proposed changes could not require hiring additional staff.
- Proposed changes must maximize course capacity.
- Students are encouraged to complete a single pathway expand their knowledge through exploration of additional pathways. Therefore, Independent Studies within Industrial Technology are no longer an option.
- All existing course updates reflect current workforce demands.

Comparison of Previous and Proposed Courses

PREVIOUS COURSE	PROPOSED COURSE	IMPACT
Industrial Technology 6	Industrial Technology 6	Continue current modular instructional format. Update modules to reflect proposed high school pathways.
Industrial Technology 7	Industrial Technology 7	
Industrial Technology 8	Industrial Technology 8	
Construction Pathway		
Introduction to Woodworking (5 credits)	Introduction to Carpentry (5 credits)	Use existing instructional space and equipment with minimal update.
Woods I (5 credits)	Carpentry (5 credits)	
Woods II (10 credits)	Advanced Finish Carpentry (5 credits)	
Introduction to Building Trades (5 credits)	Construction and Management (5 credits)	Use existing instructional space and equipment with minimal update. Need: Fenced concrete slab at MSHS (est. size 20' x 20')
Consumer Maintenance (5 credits)	Consumer Maintenance (5 credits)	Use existing instructional space and equipment with minimal update.
Trades and Industry (10 credits)	Discontinue current course	
Cooperative Related Instruction (10 credits)	Discontinue current course	
Manufacturing Pathway		
Manufacturing Technology (5 credits)	Introduction to Metalworking (5 credits)	Use existing instructional space and equipment with minimal update.
Metals (5 credits)	Machining Processes (5 credits)	
Comprehensive Metals (20 credits)	Automated Manufacturing Technology I (10 credits)	Use existing instructional space and equipment with minimal update. Course separated into two one-year courses instead of the current double-block for one year.
	Automated Manufacturing Technology II (10 credits)	
Welding (5 credits)	Welding I (5 credits)	Use existing instructional space and equipment with minimal update.
Advanced Welding (5 credits)	Welding II: Welding Applications (5 credits)	

Engineering Pathway		
PREVIOUS COURSE	PROPOSED COURSE	IMPACT
Introduction to Engineering and Architectural Design (5 credits)	Discontinue current course	Existing lab and equipment will be used for <i>Project Lead the Way</i> courses.
	<i>Project Lead the Way:</i> Introduction to Engineering and Design I (5 credits) This course will replace Foundations of Technology I to fulfill the Technology graduation requirement.	
Residential Architecture Drafting & Design (10 credits)	Discontinue current course	
	<i>Project Lead the Way:</i> Introduction to Engineering and Design II (5 credits)	
Advanced Architecture Concepts (5credits)	Discontinue current course	
	<i>Project Lead the Way:</i> Principles of Engineering I (5 credits)	
Advanced Architecture: Residential Design/Presentation (5 credits)	Discontinue current course	
	<i>Project Lead the Way:</i> Principles of Engineering II (5 credits)	
Advanced Architecture: Commercial Design/Presentation (5 credits)	Discontinue current course	
	<i>Project Lead the Way:</i> Digital Electronics I (5 credits)	
Advanced Architecture: Modeling & Presentation (5 credits)	Discontinue current course	
	<i>Project Lead the Way:</i> Digital Electronics II (5 credits)	

Engineering Pathway (continued)		
PREVIOUS COURSE	PROPOSED COURSE	IMPACT
Engineering Drafting & Design (10 credits)	Discontinue current course	Existing lab and equipment will be used for <i>Project Lead the Way</i> courses.
	<i>Project Lead the Way:</i> Civil Engineering and Architecture I (5 credits)	
Advanced Engineering Concepts (5 credits)	Discontinue current course	
	<i>Project Lead the Way:</i> Civil Engineering and Architecture II (5 credits)	
Advanced Engineering: Structural Design (5 credits)	Discontinue current course	
	<i>Project Lead the Way:</i> Engineering Design and Development I (5 credits)	
Advanced Engineering: Industrial/Mechanical Design (5 credits)	Discontinue current course	
	<i>Project Lead the Way:</i> Engineering Design and Development II (5 credits)	
Advanced Engineering: Civil/Surface Design (5 credits)	Discontinue current course	
Power and Mechanized Systems Pathway		
	Introduction to Power, Energy, and Mechanized Systems (5 credits)	Use existing Foundations Lab and Equipment. Adopt some non-consumable instructional materials.
	Mechanical Systems Operations (5 credits)	
	Power Systems Design and Fabrication I (5 credits)	
	Power Systems Design and Fabrication II (5 credits)	
No Current Pathway		
Foundations of Technology I (5 credits)	Discontinue current course	Instructional space and equipment will be used for Power and Mechanized Systems Pathway.
Foundations of Technology II (5 credits)	Discontinue current course	

Electricity (5 credits)	Discontinue current course	Instructional space and equipment will be used for Power and Mechanized Systems Pathway.
Industrial Plastics (5 credits)	Discontinue current course	

As with all adoptions, staff development will be provided with newly implemented course guides, materials, resources and equipment.

New or Revised Course Descriptions

CONSTRUCTION PATHWAY

INTRODUCTION TO CARPENTRY 9-12 5 Credits

Description: Introduction To Carpentry provides instruction in the use and care of hand tools and portable power equipment. Fundamental principles of construction design, fabrication, and career exploration are also addressed.

Prerequisites: None.

CARPENTRY 9-12 5 Credits

Description: Carpentry provides students with the introductory skills and knowledge needed to correctly perform construction/woodworking operations using hand tools and power equipment. Instructional emphasizes safe, proper operation and care of equipment, selection of construction materials, understanding processes, and the importance of design.

Prerequisites: Introduction to Carpentry

ADVANCED FINISH CARPENTRY 9-12 5 Credits

Description: Advanced Finish Carpentry provides students with advanced skills and knowledge needed to perform upper level construction/woodworking operations using power equipment. Students will obtain job-related, entry-level skills in cabinet design, material selection, and construction.

Prerequisites: Carpentry

CONSTRUCTION AND MANAGEMENT 9-12 5 Credits

Description: Construction and Management provides students with a hands-on career exploratory experience in the construction industry. Students will study surveying and site preparation, residential construction styles, foundations, framing, roofing, siding, and applying construction management skills to build a physical structure. Emphasis will be placed on basic entry-level skills, demonstration of desirable employability skills, and development of an awareness of the opportunities in the building trades.

Prerequisites: Carpentry.

CONSUMER MAINTENANCE 9-12 5 Credits

Description: An exploratory level course for all future homeowners! This course will introduce the learner to consumer knowledge and maintenance skills in the areas of masonry, carpentry, plumbing, electricity, insulation, drywall, interior wall finish, exterior wall finish and repair, appliance repair, furnace maintenance, small engines, and basic auto repair. The students will also explore career opportunities in these areas.

Prerequisites: None

ENGINEERING PATHWAY

COMPUTER-AIDED DRAFTING

9-12

5 Credits

Description: Computer-Aided Drafting introduces the students to the software tools and techniques used in the drafting industry. Activities prepare the students for design communication in all areas of industrial technology.

Prerequisites: None

The following engineering courses are part of *Project Lead the Way*, a nationally-recognized Science, Technology, Engineering, and Mathematics (STEM) pathway.

INTRODUCTION TO ENGINEERING DESIGN I

9-12

5 Credits

Description: Introduction to Engineering Design I encourages students to use a problem-solving model to improve existing products and invent new ones. They learn how to apply this model to solve any problems, even outside of the classroom. Students use sophisticated three-dimension modeling software to communicate the details of these products. Emphasis is placed on analyzing potential solutions and communicating ideas to others.

Prerequisites: None

INTRODUCTION TO ENGINEERING DESIGN II

9-12

5 Credits

Description: Introduction to Engineering Design II continues to encourage students to use a problem-solving model to improve existing products and invent new ones. They learn how to apply this model to solve any problems, even outside of the classroom. Students use sophisticated three-dimension modeling software to communicate the details of these products. Emphasis is placed on analyzing potential solutions and communicating ideas to others.

Prerequisites: Introduction to Engineering Design I

PRINCIPALS OF ENGINEERING I

9-12

5 Credits

Description: Principals of Engineering I helps students understand the field of engineering/engineering technology. Exploring various technology systems and manufacturing processes help students learn how engineers and technicians use math, science, and technology in an engineering problem solving process to benefit people.

Prerequisites: Introduction to Engineering Design II

PRINCIPALS OF ENGINEERING II

9-12

5 Credits

Description: Principals of Engineering II continues to help students understand the field of engineering/engineering technology. Exploring various technology systems and manufacturing processes help students learn how engineers and technicians use math, science, and technology in an engineering problem solving process to benefit people.

Prerequisites: Principals of Engineering I

DIGITAL ELECTRONICS I**10-12****5 Credits**

Description: Digital Electronics I explores the application of electronic circuits and devices. Students use their knowledge of both computer simulation and breadboards to design, build and test their own circuits. Students will use a mathematical logic approach to simplify complex circuits.

Prerequisites: Principals of Engineering II

DIGITAL ELECTRONICS II**10-12****5 Credits**

Description: Digital Electronics II continues to explore the application of electronic circuits and devices. Students use their knowledge of both computer simulation and breadboards to design, build and test their own circuits. Students will use a mathematical logic approach to simplify complex circuits.

Prerequisites: Digital Electronics I

CIVIL ENGINEERING AND ARCHITECTURE I**10-12****5 Credits**

Description: Civil Engineering and Architecture I utilizes teams of students to collaborate on the development of community-based projects and conceptual design for project presentations.

Prerequisites: Principals of Engineering II

CIVIL ENGINEERING AND ARCHITECTURE II**10-12****5 Credits**

Description: Civil Engineering and Architecture II continues to utilize teams of students to collaborate on the development of community-based projects and conceptual design for project presentations.

Prerequisites: Civil Engineering and Architecture I

ENGINEERING DESIGN AND DEVELOPMENT I**11-12****5 Credits**

Description: Engineering and Design and Development I is an engineering research course in which students work in teams to research, design, and construct a solution to an open-ended engineering problem.

Prerequisites: Civil Engineering and Architecture II

ENGINEERING DESIGN AND DEVELOPMENT II**11-12****5 Credits**

Description: Engineering and Design and Development is an engineering research course in which students work in teams to research, design, and construct a solution to an open-ended engineering problem.

Prerequisites: Engineering and Design and Development I

MANUFACTURING PATHWAY

INTRODUCTION TO METALWORKING **9-12** **5 Credits**

Description: Introduction to Metalworking introduces the student to tools, materials, and manufacturing techniques and processes in the areas of welding, sheet metal, foundry, plastics, and bench metals.

Prerequisites: None

MACHINING PROCESSES **9-12** **5 Credits**

Description: Machining Processes develops technical skills in the areas of machining, foundry, bench metal, and sheet metal. The student will create simple sketches and apply the menus in drafting software while learning lathing and milling operations and computerized machining.

Prerequisites: Introduction to Metalworking

AUTOMATED MANUFACTURING TECHNOLOGY I **9-12** **10 Credits**

Description: Automated Manufacturing Technology I provides advanced skill development in machining, foundry, and sheet metal. The student will also become familiar with C.N.C. (Computer Numerical Control) lathe and milling operations, programs writing, and C.A.M. (Computer Aided Manufacturing) which allows the student to design, program, and produce a product through computer use.

Prerequisites: Machining Processes

AUTOMATED MANUFACTURING TECHNOLOGY II **9-12** **10 Credits**

Description: Automated Manufacturing Technology II is a continuation of Automated Manufacturing Technology I. Introduction to machines, tools and processes associated with the machine trade is offered. Fundamentals in bench layout, basic machine tool operation and metal removal processes, measuring devices and classifications of materials in industry are covered.

Prerequisites: Automated Manufacturing Technology I

WELDING I **9-12** **5 Credits**

Description: Welding I develops welding skills in flat position arc, oxyacetylene welding, brazing, and gas and plasma cutting, gas metal arc and gas tungsten arc welding.

Prerequisites: Introduction to Metalworking

WELDING II: WELDING APPLICATIONS **9-12** **5 Credits**

Description: Welding II: Welding Applications covers fundamental understanding and skills in the safe use of arc welding equipment. Typical operations include striking the arc, making fillet welds in the flat and horizontal positions and groove welds in the flat position. A variety of methods are used to examine the weldments.

Prerequisites: Welding I

POWER, ENERGY, AND MECHANIZED SYSTEMS PATHWAY

INTRODUCTION TO POWER, ENERGY, AND MECHANIZED SYSTEMS

9-12

5 Credits

Description: Introduction to Power, Energy, and Mechanized Systems uses hands-on experiences to show how power is produced, altered, and transferred to meet power production needs. Mechanical power, pneumatic power, electrical power, chemical power, solar power, wind power, and fossil fuels will be discussed. Students will design and build two type of vehicles (MagLev/Wheel) to test each type of power individually and then altered for maximum efficiency. Students will also gain a better understanding of potential careers and additional courses available in the Power, Energy, and Mechanized Systems pathway.

Prerequisites: None

MECHANICAL SYSTEMS OPERATIONS

9-12

5 Credits

Description: Mechanical Systems Operations covers mechanical power system essentials. Students will apply motor control through Ohms law, Kickoffs Law, switches, bearings, lubrication, belts, sprockets, chains, and couplings. Upon completion of this course, the student will receive practical experience with each type of power transmission component.

Prerequisites: Introduction to Power, Energy, and Mechanized Systems

POWER SYSTEMS DESIGN AND FABRICATION I

10-12

5 Credits

Description: Power Systems Design and Fabrication I explores electrical-powered applications. Projects will apply math, science, electrical engineering design, electrical and mechanical skills, and team-based problem solving.

Prerequisites: Mechanical Systems Operations

POWER SYSTEMS DESIGN AND FABRICATION II

10-12

5 Credits

Description: Power Systems Design and Fabrication II continues to explore electrical-powered applications. Projects will apply math, science, electrical engineering design, electrical and mechanical skills, and team-based problem solving.

Prerequisites: Power Systems Design and Fabrication I

Revisions to Approved Frameworks to Support the Middle Level Schedule Change for 2018-2019 and Beyond

This an addendum to each of the related frameworks.

Previous	Revised
Art	
Art 6, 7; required	elective
Business and Information Technology	
Computer Applications 6, 7; required Computational Thinking	Elective Computational Thinking and Coding
Family and Consumer Science	
Childcare, Foods & Nutrition, 6 or 7; required	elective
Integrated Learning Lab 6 or 7; required	elective
Industrial Technology	
Industrial Technology 6, 7; required	elective
Music	
General Music 6, 7; required	elective
Language Arts	
Reading 6, 7, 8; required	Young Adult Literature 6, 7, 8; elective
New	Creative Writing 6, 7, 8; elective
Social Studies	
New	Law and Public Service 6, 7, 8; elective
World Language	
Spanish 6	Spanish A; elective
Spanish 7	Spanish B; elective
Language 8	Spanish C; elective
Spanish I	Spanish II-A; elective
	Spanish II-B; elective

New or revised course descriptions

2652/2752/2852 Young Adult Literature (6, 7, 8)

1 Year

This course is designed with the avid reader in mind! Students will read and familiarize themselves with a wide variety of genres from full novels to short stories, articles, poems, blogs, etc. Each hexter will focus on a new and engaging theme. Similar to a book club, students will share responsibility for facilitating discussion of whole class texts and within smaller literature circles. Emphasis will be placed on independent, active reading and responding to both fiction and nonfiction text.

2656/2756/2856 Creative Writing (6, 7, 8)

1 Hexter

This course is an introduction to creative writing for middle school students who enjoy writing and who want to improve their writing techniques. Students will read mentor texts and write daily. Within different units, writers will experiment with a variety of genre and will share their writing in small groups and potentially with the class.

4602/4702/4802 Law and Public Service (6, 7, 8)

1 Hexter

Students will learn about law and public service. This six week course explores the importance of Civic Responsibility, Legal Services, Law Enforcement Services, Correction Services, Security and Protective Services and Emergency and Fire Management Services within our government.

1618 Spanish A**1 Year**

Students will acquire the vocabulary and structures needed for listening, speaking, reading and writing at an introductory level. Students will learn about and experience cultural practices relating to the Spanish culture. Spanish A is the first year of a three year course to be completed in 8th grade. The course meets on alternate days. Spanish A, Spanish B and Spanish C make up a three year course sequence equivalent to the Spanish I course at the high school.

1718 Spanish B**1 Year**

Students will acquire the vocabulary and structures needed for listening, speaking, reading and writing at an introductory level. Students will learn about and experience cultural practices relating to the Spanish culture. Spanish B is the second year of a three year course to be completed in 8th grade. The course meets on alternate days. Spanish A, Spanish B and Spanish C make up a three year course sequence equivalent to the Spanish I course at the high school.

1818 Spanish C**1 Year**

Students will further develop the vocabulary and structures needed for listening, speaking, reading and writing at an introductory level. Students will learn about and experience cultural practices relating to the Spanish culture. Spanish C is the third year of a three year course sequence. The course meets on alternate days. Spanish A, Spanish B and Spanish C make up a three year course sequence equivalent to the Spanish I course at the high school.

1620 Spanish I-A (KMS/NMS for Aldrich students only)**1 Year**

This course is intended for students who have completed the Spanish sequence at Aldrich Elementary School or an equivalent elementary school Spanish program. The course is offered at KMS and NMS only. Students will acquire the vocabulary and structures needed for listening, speaking, reading and writing at an introductory level. Students will learn about and experience cultural practices relating to the target culture(s). This course begins in sixth grade, meets on alternate days, and will continue with Spanish II-A in seventh grade. Spanish I-A, Spanish II-A, and Spanish II-B constitute a three-year course sequence equivalent to Spanish I and Spanish II taught at the high school.

1722 Spanish II-A**1 Year**

This course is intended for students who have completed the Spanish sequence at Aldrich Elementary School or an equivalent elementary school Spanish program. The course is offered at KMS and NMS only. Students will continue learning vocabulary and developing skills to express themselves. Students will explore culture through a variety of topics. Using listening, speaking, reading and writing skills, students will communicate in the target language. This course meets on alternate days, and will continue with Spanish II-B in eighth grade. Spanish I-A, Spanish II-A, and Spanish II-B constitute a three-year course sequence equivalent to Spanish I and Spanish II taught at the high school.

1826 Spanish II-B**1 Year**

This course is intended for students who have completed the Spanish sequence at Aldrich Elementary School or an equivalent elementary school Spanish program. The course is offered at KMS and NMS only. Students will continue learning vocabulary and developing skills to express themselves. Students will explore culture through a variety of topics. Using listening, speaking, reading and writing skills, students will communicate in the target language. This course meets on alternate days. Spanish I-A, Spanish II-A, and Spanish II-B constitute a three-year course sequence equivalent to Spanish I and Spanish II taught at the high school.