CTE Approval Self-Study Report

Welding

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Self-study

> *Self-study is the first step in the career and technical education approval process. The self-study review is required for all existing programs and new programs seeking approval. Its purpose is to bring together partners to review the CTE program, propose relevant modifications, and evaluate the degree to which the program meets the policy requirements approved by the Board of Regents on February 6, 2001.*

Self-study review will include:

Curriculum review

Benchmarks for student performance and student assessment

Teacher certification and highly-qualified status of instructional staff

Work-based learning opportunities

Teacher and student schedules

Resources, including staff, facilities, and equipment

Accessibility for all students

Work skills employability profile

Professional development plans

Projected number of students to be served

Source: http://www.p12.nysed.gov/cte/ctepolicy/guide.html

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Welders, Cutters, Solderers, and Brazers

Quick Facts: Welders, Cutters, Solderers, and Brazers	
2015 Median Pay	$38,150 per year $18.34 per hour
Typical Entry-Level Education	High school diploma or equivalent
Work Experience in a Related Occupation	None
On-the-job Training	Moderate-term on-the-job training
Number of Jobs, 2014	397,900
Job Outlook, 2014-24	4% (Slower than average)
Employment Change, 2014-24	14,400

What Welders, Cutters, Solderers, and Brazers Do

Welders, cutters, solderers, and brazers use hand-held or remotely controlled equipment to join or cut metal parts. They also fill holes, indentations, or seams of metal products.

Work Environment

Welders, cutters, solderers, and brazers may work outdoors, often in inclement weather, or indoors, sometimes in a confined area. They may work on a scaffold, high off the ground, and they occasionally must lift heavy objects and work in awkward positions. Although most work full time, overtime is common.

How to Become a Welder, Cutter, Solderer, or Brazer

A high school diploma or equivalent combined with technical and on-the-job training is typically required to become a welder, cutter, solderer, or brazer.

Pay

The median annual wage for welders, cutters, solderers, and brazers was $38,150 in May 2015.

Job Outlook

Employment of welders, cutters, solderers, and brazers is projected to grow 4 percent from 2014 to 2024, slower than the average for all occupations. Despite slower than average employment growth, skilled welders with up-to-date training should have good job opportunities.

Related Occupations

Occupational Title	SOC Code	Employment, 2014	Projected Employment, 2024	Change, 2014-24	
				Percent	Numeric
Assemblers and fabricators	**—**	**1,834,000**	**1,824,300**	**-1**	**-9,700**
Sheet metal workers	47-2211	141,000	150,500	7	9,400
Plumbers, pipefitters, and steamfitters	47-2152	425,000	474,100	12	49,100
Boilermakers	47-2011	17,400	19,000	9	1,500

Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2016-17 Edition, Welders, Cutters, Solderers, and Brazers, on the Internet at https://www.bls.gov/ooh/production/welders-cutters-solderers-and-brazers.htm (visited February 15, 2017).

New York Employment Demand Profile: **Welding**

Source: Labor Insight Jobs (Burning Glass Technologies), Summary Demand and Requirements Table by Occupation, New York state data, Mar. 01, 2016 - Feb. 28, 2017, Monday, March 6, 2017

Category:		**Demand and Employment**				**Salary**		**Education level based on posting requirements (*excluding NA)**					**Education level of employed individuals**		
Source:		**Burning Glass**	**BLS/OES, 2015**			**Burning Glass**	**BLS/OES, 2015**	**Burning Glass**					**ACS, 2014**		
SOC Code (ONET-6)	Occupation Title	Number of Job Postings	Number Employed	% Change in Employment, 2014-2015	Projected Statewide Change in Employment, 2016-2026	Mean Advertised Salary	Mean Salary	% Requiring high school*	% Requiring Post-Secondary or Associate's Degree*	% Requiring Bachelor's Degree*	% Requiring Graduate or Professional Degree*	% with Unspecified Education	% with a H.S. diploma or less	% with Some College or an Assoc.	% with a Bachelor's or higher
51-4121	**Welders, Cutters, Solderers, and Brazers**	766	8,510	0%	8.4%	$53,398	$43,310	89%	8%	5%	6%	77%	69%	29%	2%
47-2152	**Plumbers, Pipefitters, and Steamfitters**	337	27,550	10%	25.8%	$71,204	$72,480	100%	0%	0%	0%	84%	64%	32%	4%
47-2211	**Sheet Metal Workers**	208	8,300	22%	27.6%	$67,273	$69,910	98%	4%	0%	0%	77%	62%	34%	4%
51-2099	**Assemblers and Fabricators, All Other**	96	6,130	-5%	18.5%	$34,762	$30,410	87%	16%	10%	3%	68%	66%	29%	5%
47-2011	**Boilermakers**	25	570	18%	26%	$85,776	$71,500	N/A	N/A	N/A	N/A	4%	61%	35%	4%

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A. Curriculum Review

> *The curriculum review is a step in the self-study process. It is an opportunity for members of the self-study team to evaluate the proposed curriculum for completeness in terms of the knowledge, skills, and competencies required in the program field. The team reviews the curriculum to ensure that course content in the career and technical education program meets State Education Department regulations, contributes to achievement of state and industry standards, and prepares students for successful completion of a technical assessment. Approved curriculum content is nonduplicative, challenging, organized along a continuum of difficulty, and free of bias.*
>
> *CTE program approval does not constitute Department approval or endorsement of proprietary curriculum or related curriculum products. Program approval indicates only that a school district or BOCES has provided the Department with assurances that the curriculum review has been completed.*

Process

- The school district or BOCES identifies the faculty members and other individuals who will be involved in conducting the curriculum review
- The school district or BOCES determines the procedures used in completing the curriculum review
- Reviewers confirm that CTE program content aligns with state CDOS standards, relevant state academic standards, and related business and industry standards
- Reviewers confirm that CTE program content includes integrated or specialized units of credit
- Reviewers confirm that the CTE program meets unit of credit and other distributive requirements
-

Documentation

Documentation of the curriculum review is maintained by the school district or BOCES and is updated whenever modifications are made to the approved CTE program. Recommendations from curricular review should be included in the self-study report and reviewed by the external committee.

Resources

New York State graduation requirements

http://www.emsc.nysed.gov/part100/pages/1005.html

Source: http://www.p12.nysed.gov/cte/ctepolicy/guide.html

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Welding

The Welding Program delivers a combination of classroom theory and practical experience within the Weld Shop at the Johnson Center over a period of three years. The program is designed to prepare students for extended study in an apprenticeship, two-year college or employment.

The skills taught are based on the Standards of the American Welding Society (AWS). The society and its standards are recognized worldwide as a benchmark for skilled welders. Skills learned in this program give students a step up on their college training and will transfer anywhere in the United States.

The program will involve the following:
- Basic and advanced practices of metal inert gas (MIG), stick and tungsten inert gas (TIG) welding
- Plasma and torch cutting
- Metal art
- Safety (OSHA training)
- Introduction to fabrication and repair
- Aluminum and stainless steel TIG Welding

Career Opportunities:
Welding, Construction

Course of Study **Welding**

9th Grade	10th Grade	11th Grade	12th Grade
■ CTE Exploratory	■ Welding 100 WLD100 (1 Credit CTE)	■ Welding 200 WLD200 (1 Credit CTE) ■ Welding CTE Integrated Science CTE300 (1 Credit)	■ Welding 300 WLD300 (2 Credits CTE) ■ Welding CTE Integrated ELA CTE400 (1 Credit)

DISTRICT REQUIREMENTS

Students must pass CTE Welding 100, 200 and 300 to challenge the course approved technical assessment.

- All students in 9th grade will receive Career and Financial Management.
- Student will have earned the 12th grade integrated ELA credit upon successful completion of the CTE Welding 100, 200 and 300.
- Student will have earned the 11th grade integrated Science credit upon successful completion of the CTE Welding 100 and 200.
- Student will receive the CTE Endorsement upon successful completion of the CTE Weld 100, 200 300 and must pass the prescribed technical assessment and complete a commencement level project.

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Syracuse City School District
Career and Technical Education Program
Course Syllabus
WLD100: Welding 100

Program Overview

The Welding program is designed to give students a solid foundation in the knowledge and technical skills that will prepare them for positions as entry-level welders or for advanced placement in post-secondary education. The program provides students with the skills of arc welding, resistance welding, brazing and soldering, as well as cutting, heat-treating and metallurgy. Students will also gain knowledge of electrical systems, power sources and different welding technologies, welding systems, print interpretation and measurement, as well as the use and interpretation of visual symbols related to welding. Students will have the opportunity to intern at many local businesses as well as work on customer projects and design. Students who excel in this course will have the opportunity to work toward their Level 1–Entry Welder Certification through the American Welding Society (AWS).

Course Description

Students in the Welding 100 course will study the equipment and techniques used for the welding processes most often used in today's industry including plasma arc cutting, oxyfuel gas cutting and welding, Gas Metal Arc Welding (GMAW), Flux-Cored Arc Welding (FCAW), Shielded Metal Arc Welding (SMAW), and Gas Tungsten Arc Welding (GTAW). Flat welding positions and basic joints will be practiced. Pipe and tube welding will be introduced. Classroom instruction will also include career exploration in welding, safety, design, welding theory, math, communication and organizational skills, and introduction to welder certification. As students become proficient in all welding areas, they will have the opportunity to work on customer projects and design.

Pre-Requisites

N/A

Course Objectives

1. Students will learn and practice the fundamentals of different types of welding processes.
2. Students will understand and apply safe working practices in a safe work environment.
3. Students will practice safe equipment set up, adjustment and tear down, and machine and tool maintenance.
4. Students will work as part of a team to clean up and care for equipment.

Integrated Academics

N/A

Equipment and Supplies

- **School will provide:** Welding helmet, safety glasses and shields, gloves, flame retardant jacket, apron, ear protection and dust mask when needed, lockers for work clothes, materials and welding consumables, tools, and machines
- **Student will provide:** Leather work boots or shoes (steel/composite toe preferred), long work pants with no holes that cover the top of the shoe or boot, pencil, notebook with paper, and folder with pockets

Textbook

Bowditch, W., Bowditch, K., & Bowditch, M. (2016). *Welding Fundamentals, 5th Edition.* Tinley Park, IL: Goodheart-Willcox.

Grading

50% Projects, Lab and Shop Work, Participation
25% Assignments
25% Quizzes and Exams

Additional Course Policies

Attendance will be counted towards the final grade in each marking period. All work, assignments or quizzes can be made up the following class until the last day of each marking period.

Course Calendar

Quarter	Units of Study

1	• Overview
	  ○ Class Expectations and Policies
	  ○ Careers in Welding
	  ○ Safety in the Welding Shop
	• Foundations
	  ○ Welding and Cutting Processes
	  ○ Math for Welding
	  ○ Weld Joints and Positions
	• Plasma Arc Cutting

2	• GMAW (MIG Welding) and FCAW
	  ○ Equipment and Supplies
	  ○ Equipment Assembly and Adjustment
	  ○ Flat Welding Position
	• Oxyfuel Gas Processes
	  ○ Oxyfuel Gas Cutting and Welding Equipment and Supplies
	  ○ Oxyfuel Gas Cutting and Welding Equipment Assembly and Adjustment
	  ○ Oxyfuel Gas Cutting

3	• SMAW (Stick Welding)
	  ○ Equipment and Supplies
	  ○ Equipment Assembly and Adjustment
	  ○ Flat Welding Position

4	• GTAW (TIG Welding)
	  ○ Equipment and Supplies
	  ○ Equipment Assembly and Adjustment
	  ○ Flat Welding Position
	• Welding in Industry
	  ○ Pipe and Tube Welding
	• Review
	• Final Exam

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Syracuse City School District
Career and Technical Education Program
Scope and Sequence
WLD100: Welding 100

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Week 1 **Overview** • Class Expectations and Policies • Careers in Welding	• What are the expectations in the welding classroom and shop? • What factors should be considered when identifying personal career goals? • What jobs are available in the welding field? • What skills are needed for a successful welding career? • What are the steps to finding a welding-related job? • What behaviors does an employee need to keep and advance in a career? • What are the advantages and the disadvantages of becoming an entrepreneur?	• Discuss classroom expectations and policies. • List the factors to be considered when developing personal career goals. • List welding jobs available at various educational levels. • Describe different types of skills needed for a successful welding career. • Outline the steps and processes needed to find a welding-related job. • List actions needed to keep a job and advance in a career. • Find advantages and disadvantages of becoming an entrepreneur.	**Written** • Assignment on Careers in Welding Related Fields • Quiz on Class Expectations **Performance** • Teacher Observation of Class Expectations Checklist	**Career Ready Practices** CRP 2,4,7,10 **Cluster Standards** MN 1,4 **Pathway Standards** MN-PRO 4 **Industry Standards**	**ELA** RI.9-10.1,2,4,10 W.9-10.2,4,8 SL.9-10.1,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,4,9 WHST.9-10.2,4,8 **Math** **S-ID.2,3,5,6,9**
Week 2 **Overview** • Safety in the Welding Shop	• Why is safety a priority in the welding shop? • What hazards are found in the welding shop? • What safety precautions should be	• Describe clothing items that should be worn when welding or cutting. • List the various causes of fire hazards in the welding shop. • List the machinery and tool hazards present in a welding shop and the safety features that can be used in	**Written** • Assignment on Safety in the Workplace • Quiz on Safety • Research Project on Safety Hazards **Performance**	**Career Ready Practices** CRP 1,2,3,4,5,7,8,12 **Cluster Standards** MN 3,5,6	**ELA** RI.9-10.1,2,4 W.9-10.1,2,4,5,6,7,8,9 SL.9-10.1,2,4,5,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,4,9

	in place to minimize the risk of injury? • What sources of safety information are necessary?	an emergency. • Outline the danger of fumes and airborne contaminants to the welder and the safety precautions that provide respiratory protection. • Cite at least five general rules to follow when storing compressed gas. • List ways to prevent injury when lifting heavy objects. • Recall where to find information about welding on hazardous containers and disposing of hazardous waste legally and safely. • Tell the purpose of and where to find SDS documents.	• Safety Checklist • Teacher Observation Checklist		WHST.9-10.1,2,4,7,8,9
				Pathway Standards MN-PRO 2,5	**Math** S-ID.2,3,5,6,9 N-Q,1
				Industry Standards	
Weeks 3-4 **Foundations** • Welding and Cutting Processes	• What welding and cutting processes are currently used in industry? • How has technology changed welding and cutting processes?	• List the welding and cutting processes currently used in industry to create and repair products. • Outline advantages of welding over other joining processes. • Identify recent developments in welding and cutting processes.	**Written** • Research Project on Different Welding and Cutting Processes and Their Application • Quiz on Welding and Cutting Processes • Self-Assessment **Performance** • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,7,8	**ELA** RI.9-10.1,2,4,5 W.9-10.2,4,5,7,8,9 SL.9-10.1,2,4,5,6 L.9-10.1-6
				Cluster Standards MN 6	**Literacy** RST.9-10.1,2,4,5,7,9 WHST.9-10.2,4,5,6,7,8,9
				Pathway Standards MN-PRO 5	**Math** F-LE.1-4
				Industry Standards	
Weeks 5-6 **Foundations** • Math for Welding	• What mathematical operations are necessary for welders to know and use?	• Explain how the academic disciplines of science, technology, engineering, and mathematics (STEM) apply to welding. • Describe the application for math in welding and in personal life. • Add, subtract, multiply and divide whole numbers, fractions, and decimals. • Use a calculator for simple calculations.	**Written** • Assignment on Adding and Subtracting Fractions • Quiz on Adding and Subtracting Fractions • Self-Assessment **Performance** • Ruler Exercise – Measuring Using a Ruler/Tape • Teacher Observation	**Career Ready Practices** CRP 2,4,8,11	**ELA** RI.9-10.1,4 W.9-10.2,4 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 6	**Literacy** RST.9-10.1,3,4,7 WHST.9-10.2,4
				Pathway Standards MN-PRO 5	**Math** N-RN.1
				Industry Standards	

			Checklist		
Week 7-8 **Foundations** • Weld Joints and Positions	• How are the five basic weld joints used in the field? • How does a welder decide which type of weld to use?	• Identify the five basic weld joints. • Identify the types of welds that can be made on each joint. • Identify the parts of a fillet weld and a groove weld. • Recognize a stringer bead and a weave bead. • List the four welding positions. • State the conditions for welding in the four welding positions.	**Written** • Assignment on Weld Joints and Angles • Quiz on Weld Joints • Self-Assessment **Performance** • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,8 **Cluster Standards** MN 6 **Pathway Standards** MN-PRO 5 **Industry Standards**	**ELA** RI.9-10.1,4,7 W.9-10.2,4,6 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,5,7,8 WHST.9-10.2,4,9 **Math** G-SRT.8 F-TF.1-2
Weeks 9-10 **Plasma Arc Cutting**	• What is plasma arc cutting and what is it used for? • What are the main safety considerations when using PAC equipment?	• Describe the plasma arc cutting (PAC) process. • Identify and assemble the equipment and supplies used for PAC. • Label the parts of a PAC torch. • Describe the safety considerations for PAC. • Set up and use PAC equipment for cutting.	**Written** • Assignment on Cutting Equipment and Supplies • Quiz on PAC Process • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,8,9,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	**ELA** RI.9-10.1,2,4,7 W.9-10.2,4,6,8 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,5 WHST.9-10.2,4,8 **Math** G-SRT.8 F-TF.1-2 G-C.5
Week 11 **GMAW (MIG Welding) and FCAW** • Equipment and Supplies	• What is GMAW and what is it used for? • How are the differences between GMAW and FCAW? • What equipment and gases are used for GMAW? • What are the main safety considerations	• Identify the correct polarity to use for GMAW. • Identify similarities and differences between GMAW and FCAW. • Describe three methods of metal transfer. • Use the equipment that makes up a GMAW outfit. • Observe the operation of a wire feeder.	**Written** • Assignment on GMAW and FCAW Equipment and Supplies • Quiz on GMAW and FCAW Equipment and Supplies • Self-Assessment **Performance** • Safety Checklist	**Career Ready Practices** CRP 2,4,8,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 2,5	**ELA** RI.9-10.1,2,4 W.9-10.2,4,6,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9

	when using GMAW?	• List the parts of a welding gun and cables. • List four gases used for GMAW. • Explain the use of a flowmeter for GMAW. • Describe the protective clothing and safety equipment for GMAW.	• Procedure Checklist • Teacher Observation Checklist	**Industry Standards**	**Math**
Weeks 12-13 **GMAW (MIG Welding) and FCAW** • Equipment Assembly and Adjustment	• How is a GMAW welding outfit assembled and adjusted?	• Assemble a GMAW welding outfit. • Adjust the drive mechanism for the proper pressure and alignment. • List the proper sequence for removing a bird's nest. • Adjust the shielding gas flowmeter for the proper pressure and flow rate. • Identify the electrode wire designations for GMAW electrodes. • Identify the two adjustments that are made to the welding machine. • Identify safety precautions for GMAW.	**Written** • Assignment on GMAW and FCAW Equipment Assembly • Quiz on GMAW and FCAW Equipment Assembly • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,8,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 2,5 **Industry Standards**	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9 **Math** G-MG.1-3 G-GMD.4
Weeks 14-17 **GMAW (MIG Welding) and FCAW** • Flat Welding Position	• What are the advantages and disadvantages of GMAW and FCAW? • Which type of current is most commonly used for GMAW welding? • What factors must be considered before selecting the electrode and shielding gas?	• Describe GMAW processes. • Determine the appropriate electrode to use with GMAW in the flat welding position. • Identify the correct electrode extension to use with GMAW using different metal transfer methods. • Lay a weld bead on a plate using GMAW. • Make a fillet weld on a lap joint and on a T-joint in the flat welding position. • Weld a butt joint in the flat welding position. • Describe how to weld aluminum using GMAW. • Identify various weld defects.	**Written** • Assignment on GMAW vs. FCAW • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9 **Math** G-MG.1-3 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Week 18	• What are oxyfuel gas	• Identify the parts and the function of	**Written**	**Career Ready Practices** CRP 2,4,8	**ELA** RI.9-10.1,2,4

Oxyfuel Gas Processes • Oxyfuel Gas Cutting and Welding Equipment and Supplies	processes and what are they used for? • What equipment and gases are used for oxyfuel cutting and welding?	an oxyfuel gas cutting or welding outfit. • Describe the safety features of an oxyfuel cutting or welding outfit. • Describe the protective clothing and the safety precautions that must be taken when performing oxyfuel cutting or welding.	• Assignment on Welding Gases and Processes • Quiz on Different Gases Used in Welding • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist		W.9-10.2,4,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7 WHST.9-10.2,4,9
				Pathway Standards MN-PRO 2,5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Week 19 **Oxyfuel Gas Processes** • Oxyfuel Gas Cutting and Welding Equipment Assembly and Adjustment	• What are the main safety considerations when using oxyfuel gas processes? • How is an oxyfuel cutting or welding outfit assembled and adjusted?	• List the procedure to assemble and turn on an oxyfuel gas cutting and welding outfit. • Describe how to check for leaks in an oxyfuel cutting and welding system. • Identify three types of flames that can be produced when burning oxygen and acetylene. • Describe the steps to light and adjust the flame on an oxyfuel cutting torch and an oxyfuel welding torch. • Describe how to shut down an oxyfuel cutting or welding outfit.	**Written** • Assignment on Oxyfuel Gas Equipment Assembly • Quiz on Oxyfuel Gas Equipment Assembly • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,8	**ELA** RI.9-10.1,2,4 W.9-10.2,4,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 2,5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Week 20 **Oxyfuel Gas Processes** • Oxyfuel Gas	• How are cuts made using an oxyfuel gas cutting outfit?	• List the fuel gases that are used for oxyfuel gas cutting. • Perform cuts manually with a cutting torch or cutting torch attachment. • Practice cuts with an oxyfuel gas	**Written** • Assignment on Welding Gases • Self-Assessment **Performance**	**Career Ready Practices** CRP 2,4,6,8,11,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards	**Literacy**

Cutting		cutting machine. • Identify the basic types of cutting machines.	• Safety Checklist • Procedure Checklist • Teacher Observation Checklist	MN 3,6	RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Week 21 **SMAW (Stick Welding)** • Equipment and Supplies	• What equipment and supplies are found in a SMAW station?	• Explain the differences between direct current (DC) and alternating current (AC). • Identify American Welding Society (AWS) abbreviations regarding welding current polarity. • Name the equipment and accessories used in SMAW. • List the components of an arc welding outfit and arc welding station. • List factors to consider when selecting an arc welding machine.	**Written** • Assignment on SMAW Equipment and Supplies • Quiz on Parts of a SMAW Outfit • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation	**Career Ready Practices** CRP 2,4,8	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 2,5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Week 22 **SMAW (Stick Welding)** • Equipment Assembly and	• How is the SMAW station prepared for work? • What safety precautions should be considered when setting up a SMAW	• Describe the assembly of a welding machine, leads, and electrode holder. • Describe the procedure for inspecting a SMAW outfit. • Estimate the proper amperage and polarity on a welding machine.	**Written** • Assignment on Setting Up SMAW Outfit • Quiz on Assembly of a SMAW Outfit • Self-Assessment **Performance**	**Career Ready Practices** CRP 2,4,8	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,9

Adjustment	station?		• Safety Checklist • Procedure Checklist • Teacher Observation		WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 2,5 **Industry Standards**	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
Weeks 23-30 **SMAW (Stick Welding)** • Flat Welding Position	• How are welds made using a SMAW welding outfit? • What weld angles are used for welding in the flat position?	• Identify the safety rules required for arc welding. • Describe methods to prevent or reduce arc blow. • Run a weld bead using the correct electrode angles. • Use drag welding techniques. • Clean a weld. • Make a fillet weld on a lap joint, inside corner, and T-joint in the flat welding position. • Identify weld defects.	**Written** • Assignment on SMAW Flat Welding Position and When to Use It • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,7,8,9
				Pathway Standards MN-PRO 1-5 **Industry Standards**	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
Week 31 **GTAW (TIG Welding)** • Equipment and Supplies	• What is GTAW? • Why is a post flow of shielding gas used with GTAW? • What type of connection is used for	• Describe the principles of gas tungsten arc welding (GTAW). • Identify the equipment and supplies involved with GTAW. • List the parts of a GTAW torch. • Describe the functions of the cables	**Written** • Assignment on GTAW Equipment and Supplies • Quiz on GTAW Welding Equipment	**Career Ready Practices** CRP 2,3,4,8,11	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-

	shielding gas and water hoses? • What are the major types of electrodes used in GTAW?	and hoses. • Observe safety considerations when gas tungsten arc welding.	• Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist		10.1,2,3,4,7,8 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 2,5 **Industry Standards**	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
Week 32 **GTAW (TIG Welding)** • Equipment Assembly and Adjustment	• What type of current requires the high-frequency voltage to be used continuously? • What are the two ways to increase the current while welding?	• Assemble a GTAW welding outfit. • Assemble a GTAW torch. • Adjust the shielding gas flowmeter for the proper flow rate. • Select the proper current amount and type for the metal to be welded. • Identify electrode type designations for GTAW electrodes. • Prepare an electrode for GTAW. • Observe the metal cleaning processes used in GTAW.	**Written** • Assignment on Setting Up a GTAW Outfit • Quiz on Adjusting Equipment Used During GTAW Welding • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,8,11	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 2,5 **Industry Standards**	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
Weeks 33-36 **GTAW (TIG Welding)** • Flat Welding Position	• How are welds made in the flat welding position using a GTAW welding outfit? • What weld angles are used for welding in the flat position?	• Describe the GTAW process. • Locate the appropriate welding rod to use when gas tungsten arc welding. • Lay a bead on a plate using GTAW. • Reproduce a fillet weld on a lap joint in the flat welding position. • Reproduce a fillet weld on a T-joint in the flat welding position.	**Written** • Assignment on GTAW Flat Welding Position • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,8,9 WHST.9-

		• Weld a butt joint in the flat welding position. • Describe the use of a backing when welding aluminum using GTAW. • Identify various welding defects.	Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test		10.2,4,7,8,9
				Pathway Standards MN-PRO 1-5 **Industry Standards**	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
Weeks 37-39 **Welding in Industry** • Pipe and Tube Welding	• What procedures are used for welding pipes and tubes?	• Identify the differences between pipes and tubes. • List the names of the welding passes used in welding pipe with walls more than 3/16″ (5 mm) thick. • Demonstrate the procedures to weld pipes or tubes using SMAW, GTAW, SMAW and FCAW. • Observe the differences in technique for uphill and downhill welding.	**Written** • Assignment on Types of Pipes and Tubes • Quiz on Pipe and Tube Welding • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 2,4,6,8,11	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,8,9 WHST.9-10.2,4,7,8,9
				Pathway Standards MN-PRO 1-5 **Industry Standards**	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
Week 40 **Review** **Final Exam**	• What are the main learning goals for this past year in welding?	• Complete the written and performance assessments demonstrating a thorough knowledge of welding.	• Written and Performance Final Exam	**Career Ready Practices** CRP 2,4,6,8,11	**ELA** RI.9-10.1,2,4,7,8 W.9-10.2,4,6,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 1-6	**Literacy** RST.9-10.1,2,3,4,7,8,9 WHST.9-10.2,4,6,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1

				Industry Standards	A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12

Return to TOC

Syracuse City School District
Career and Technical Education Program
Course Syllabus
WLD200: Welding 200

Program Overview

The Welding program is designed to give students a solid foundation in the knowledge and technical skills that will prepare them for positions as entry-level welders or for advanced placement in post-secondary education. The program provides students with the skills of arc welding, resistance welding, brazing and soldering, as well as cutting, heat-treating and metallurgy. Students will also gain knowledge of electrical systems, power sources and different welding technologies, welding systems, print interpretation and measurement, as well as the use and interpretation of visual symbols related to welding. Students will have the opportunity to intern at many local businesses as well as work on customer projects and design. Students who excel in this course will have the opportunity to work toward their Level 1–Entry Welder Certification through the American Welding Society (AWS).

Course Description

Students in the Welding 200 course will continue to study the equipment and techniques used for the welding processes most often used in today's industry including plasma arc cutting, oxyfuel gas cutting and welding, Gas Metal Arc Welding (GMAW), Flux-Cored Arc Welding (FCAW), Shielded Metal Arc Welding (SMAW), and Gas Tungsten Arc Welding (GTAW), brazing and braze welding, soldering, resistance welding and robotic welding. Flat, horizontal, and vertical welding positions and basic joints, pipe, and tube welding will be practiced. Classroom instruction will also include career exploration in welding, safety, design, welding theory, math applications, physics of welding, communication and organizational skills, welding symbols and welder certification. As students become proficient in all welding areas, they will have the opportunity to work on customer projects and design.

Pre-Requisites

WLD100: Welding 100

Course Objectives

1. Students will learn and practice the fundamentals of different types of welding processes.
2. Students will understand and apply safe working practices in a safe work environment.
3. Students will practice safe equipment set up, adjustment and tear down, and machine and tool maintenance.
4. Students will work as part of a team to clean up and care for equipment.

Integrated Academics

N/A

Equipment and Supplies

- **School will provide:** Welding helmet, safety glasses and shields, gloves, flame retardant jacket, apron, ear protection and dust mask when needed, lockers for work clothes, materials and welding consumables, tools, and machines
- **Student will provide:** Leather work boots or shoes (steel/composite toe preferred), long work pants with no holes that cover the top of the shoe or boot, pencil, notebook with paper, and folder with pockets

Textbook

Bowditch, W., Bowditch, K., & Bowditch, M. (2016). *Welding Fundamentals, 5th Edition.* Tinley Park, IL: Goodheart-Willcox.

Grading

50% Projects, Lab and Shop Work, Participation
25% Assignments
25% Quizzes and Exams

Additional Course Policies

Attendance will be counted towards the final grade in each marking period. All work, assignments or quizzes can be made up the following class until the last day of each marking period.

Course Calendar

Quarter	Units of Study

1	• Overview
	  o Class Expectations and Policies
	  o Careers in Welding
	  o Safety in the Welding Shop
	• Foundations
	  o Welding and Cutting Processes
	  o Physics of Welding
	  o Math for Welding
	  o Math Applications for Welders
	  o Weld Joints and Positions
	  o Welding Symbols
	• Plasma Arc Cutting

2	• GMAW (MIG Welding) and FCAW
	  o Equipment and Supplies
	  o Equipment Assembly and Adjustment
	  o Flat Welding Position
	  o Horizontal and Vertical Welding Positions
	• Oxyfuel Gas Processes
	  o Oxyfuel Gas Cutting and Welding Equipment and Supplies
	  o Oxyfuel Gas Cutting and Welding Equipment Assembly and Adjustment
	  o Oxyfuel Gas Cutting
	  o Oxyfuel Gas Welding Flat Welding Position
	  o Brazing and Braze Welding
	  o Soldering

3	• SMAW (Stick Welding)
	  o Equipment and Supplies
	  o Equipment Assembly and Adjustment
	  o Electrodes
	  o Flat Welding Position
	  o Horizontal and Vertical Welding Positions
	• Resistance Welding (Spot Welding)
	  o Equipment and Supplies
	  o Procedures

4	• GTAW (TIG Welding)

	○ Equipment and Supplies ○ Equipment Assembly and Adjustment ○ Flat Welding Position ○ Horizontal and Vertical Welding Positions • Welding in Industry ○ Pipe and Tube Welding ○ Robotics and Welding ○ Welder Certification (introduction) • Review • Final Exam

Return to TOC

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
WLD 200: Welding 200

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Week 1 **Overview** • Class Expectations and Policies • Careers in Welding	• What are the expectations in the welding classroom and shop? • What factors should be considered when identifying personal career goals? • What jobs are available in the welding field? • What skills are needed for a successful welding career? • What are the steps to finding a welding-related job? • What behaviors does an employee need to keep and advance in a career? • What are the advantages and the disadvantages of becoming an entrepreneur?	• Discuss classroom expectations and policies. • Describe the factors to be considered when developing personal career goals. • Identify welding jobs available at various educational levels. • Summarize the different types of skills needed for a successful welding career. • Analyze the steps and processes needed to find a welding-related job. • Demonstrate actions needed to keep a job and advance in a career. • Compare the advantages and disadvantages of becoming an entrepreneur.	**Written** • Assignment on Careers in Welding Related Fields • Quiz on Class Expectations **Performance** • Teacher Observation of Class Expectations Checklist	**Career Ready Practices** CRP 2,4,7,10 **Cluster Standards** MN 1,4 **Pathway Standards** MN-PRO 4 **Industry Standards**	**ELA** RI.9-10.1,2,4,10 W.9-10.2,4,8 SL.9-10.1,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,4,9 WHST.9-10.2,4,8 **Math** S-ID.2 S-ID.3 S-ID.5 S.ID.6 S.ID.9
Week 2 **Overview** • Safety in the Welding Shop	• Why is safety a priority in the welding shop? • What hazards are found in the welding shop? • What safety	• Select which clothing items should be worn when welding or cutting. • Explain the various causes of fire hazards. • Identify the machinery and tool	**Written** • Assignment on Safety in the Workplace • Quiz on Safety • Research Project on Safety Hazards	**Career Ready Practices** CRP 1,2,3,4,5,7,8,11,12 **Cluster Standards** MN 3,5,6	**ELA** RI.9-10.1,2,4 W.9-10.1,2,4,5,6,7,8,9 SL.9-10.1,2,4,5,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,4,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
	precautions should be in place to minimize the risk of injury? • What sources of safety information are necessary?	hazards present in a welding shop and the safety features that can be used in an emergency. • Summarize the danger of fumes and airborne contaminants to the welder and the safety precautions that provide respiratory protection. • Cite at least five general rules to follow when storing compressed gas. • List ways to prevent injury when lifting heavy objects. • Explain where to find information about welding on hazardous containers and disposing of hazardous waste legally and safely. • Show the purpose of and where to find SDS documents.	**Performance** • Safety Checklist • Teacher Observation Checklist		WHST.9-10.1,2,4,7,8,9
				Pathway Standards MN-PRO 2,5	**Math** S-ID.2,3,5,6,9 N-Q,1
				Industry Standards	
Week 3 **Foundations** • Welding and Cutting Processes	• What welding and cutting processes are currently used in industry? • How has technology changed welding and cutting processes?	• Demonstrate the welding and cutting processes currently used in industry to create and repair products. • Explain the advantages of welding over other joining processes. • Compare the various welding and cutting processes currently used in industry.	**Written** • Research Project on Different Welding and Cutting Processes and Their Application • Quiz on Welding and Cutting Processes • Self-Assessment **Performance** • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,7,8	**ELA** RI.9-10.1,2,4,5 W.9-10.2,4,5,7,8,9 SL.9-10.1,2,4,5,6 L.9-10.1-6
				Cluster Standards MN 6	**Literacy** RST.9-10.1,2,4,5,7,9 WHST.9-10.2,4,5,6,7,8,9
				Pathway Standards MN-PRO 5	**Math** F-LE.1-4
				Industry Standards	
Week 4 **Foundations**	• Why is welding more efficient than riveting and machining?	• List the three general methods by which a weld is achieved. • Compare the difference	**Written** • Assignment on Heat Transfer and Physical	**Career Ready Practices** CRP 2,4,8	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
• Physics of Welding	• What three methods are used to achieve a weld? • What happens to the size of base metal when it is heated?	between chemical and mechanical properties and give examples of each. • Show the effects of welding on metal. • Recall the processes used to heat-treat metal. • Find the relationship between voltage and current. • Select examples of US customary and SI metric units of measurement.	Properties of Metal • Quiz on Physical Properties of Metal • Self-Assessment **Performance** • Teacher Observation Checklist		L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,5,7,9 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 2,5	**Math** S-ID.2 S-ID.3 S-ID.5 S-ID.6 S-ID.9
				Industry Standards	
Week 5-6 **Foundations** • Math for Welding • Math Applications for Welders	• What mathematical operations are necessary for welders to know and use? • What math applications are necessary for welders to know and use?	• Measure using both the US customary system and the SI metric system. • Convert lengths from US customary units to SI metric units and from SI metric units to US customary units. • Calculate the perimeter, area, and volume of common shapes. • Convert welding values from US customary unites to SI metric units and from SI metric units to US customary units. • Demonstrate knowledge and skills through application and projects.	**Written** • Assignment on Perimeter, Area, and Volume • Assignment on Converting Measurements • Quiz on Measurement Conversions • Self-Assessment **Performance** • Ruler Exercise – Measuring Using a Ruler/Tape • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,8,11	**ELA** RI.9-10.1,4 W.9-10.2,4 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 6	**Literacy** RST.9-10.1,3,4,7 WHST.9-10.2,4
				Pathway Standards MN-PRO 5	**Math** N-RN.1 G-GPE.7 G-GMD.1 G.GMD.3
				Industry Standards	
Week 7 **Foundations** • Weld Joints and Positions	• How are the five basic weld joints used in the field? • How does a welder decide which type of weld to use?	• Practice the five basic weld joints. • Describe the types of welds that can be made on each joint. • Explain the parts of a fillet weld and a groove weld. • Practice a stringer bead and a weave bead.	**Written** • Assignment on Weld Joints and Angles • Quiz on Weld Joints • Self-Assessment **Performance** • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,8	**ELA** RI.9-10.1,4,7 W.9-10.2,4,6 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 6	**Literacy** RST.9-10.1,2,3,4,5,7,8 WHST.9-10.2,4,9
				Pathway Standards MN-PRO 5	**Math** G-MG.1

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		• Practice the four welding positions. • Recognize the conditions for welding in the four welding positions.		**Industry Standards**	
Week 8-9 **Foundations** • Welding Symbols	• At what angle are the axes positioned to create an isometric drawing? • What does the welding symbol tell the welder?	• Memorize the method for making a mechanical drawing of a three-dimensional object, using the orthographic projection process. • List the names of the views used in an orthographic projection. • Describe the characteristics of an isometric drawing. • Identify the basic types of welds indicated on the ANSI/AWS welding symbol. • Locate information on the weld symbol to determine the size of the root opening, the groove angle, and the desired size, contour, and finish of the weld.	**Written** • Assignment on Welding Symbols • Quiz on Welding Symbols • Research Project on How Welding Symbols Are Used • Self-Assessment **Performance** • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,7,8,11 **Cluster Standards** MN 6 **Pathway Standards** MN-PRO 5 **Industry Standards**	**ELA** RI.9-10.1,4 W.9-10.2,4,8 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,3,4,7,9 WHST.9-10.2,4,7,8,9 **Math** G-CO.4 G-CO.5 G-CO.6 G-CO.9 G-CO.12 G-CO.13
Week 10 **Plasma Arc Cutting** • Review	• What is plasma arc cutting and what is it used for? • What are the main safety considerations when using PAC equipment?	• Practice the plasma arc cutting (PAC) process. • Choose and assemble the equipment and supplies used for PAC. • Inspect the parts of a PAC torch. • Apply safety considerations for PAC. • Demonstrate how to set up PAC equipment for cutting. • Evaluate cuts using PAC equipment.	**Written** • Assignment on Cutting Equipment and Supplies • Quiz on PAC Process • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,8,9,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	**ELA** RI.9-10.1,2,4,7 W.9-10.2,4,6,8 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,5 WHST.9-10.2,4,8 **Math** G-SRT.8 F-TF.1-2 G-C.5
Week 11 **GMAW (MIG**	• What is GMAW and what is it used for?	• Compare GMAW and FCAW. • Explain the correct polarity to	**Written** • Assignment on GMAW	**Career Ready Practices** CRP 2,4,8,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,6,8,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Welding) and FCAW • Equipment and Supplies • Equipment Assembly and Adjustment	• What are the differences between GMAW and FCAW? • What equipment and gases are used for GMAW? • What are the main safety considerations when using GMAW? • How is a GMAW welding outfit assembled and adjusted?	use for GMAW and FCAW. • Demonstrate three methods of metal transfer. • Use the equipment that makes up a GMAW and FCAW outfit. • Explain the operation of a wire feeder. • Breakdown the parts of a welding gun and cables. • Describe four gases used for GMAW and identify the most common shielding gas used for FCAW. • Explain the use of a flowmeter for GMAW and FCAW. • Use protective clothing and equipment for GMAW and FCAW. • Assemble a GMAW/FCAW welding outfit. • Adjust the drive mechanism for the proper pressure and alignment. • List the proper sequence for removing a bird's nest. • Adjust the shielding gas flowmeter for the proper pressure and flow rate. • Identify the electrode wire designations for GMAW and FCAW electrodes. • Identify the two adjustments that are made to the welding machine. • Identify safety precautions for GMAW and FCAW.	and FCAW Equipment Assembly • Quiz on GMAW and FCAW Equipment, Supplies and Assembly • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 2,5 **Industry Standards**	SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9 **Math** G-MG.1-3 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Weeks 12-13 **GMAW (MIG**	• What are the advantages and	• Identify the GMAW and FCAW processes.	**Written** • Assignment on GMAW	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Welding) and FCAW • Flat Welding Position	disadvantages of GMAW and FCAW? • Which type of current is most commonly used for GMAW welding? • What factors must be considered before selecting the electrode and shielding gas?	• Determine the appropriate electrode to use with GMAW and FCAW in the flat welding position. • Identify the correct electrode extension to use with GMAW and FCAW using different metal transfer methods. • Lay a weld bead on a plate using GMAW and FCAW. • Make a fillet weld on a lap joint in the flat welding position. • Make a fillet weld on a T-joint in the flat welding position. • Weld a butt joint in the flat welding position. • Describe how to weld aluminum using GMAW. • Identify various weld defects.	vs. FCAW • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test		SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math** G-MG.1-3 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Weeks 14-17 **GMAW (MIG Welding) and FCAW** • Horizontal and Vertical Welding Positions	• What are the advantages of backhand welding over forehand welding? • What weld pool shape is used when welding a fillet weld in the vertical welding position? • What two types of weld beads can be used to fill or build up a weld?	• Explain why flat position welding is preferred over out-of-position welding. • Identify the correct welding gun angle for out-of-position welding. • Weld in the horizontal welding position using GMAW and FCAW. • Weld in the vertical welding position using GMAW and FCAW.	**Written** • Assignment on GMAW vs. FCAW • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math** G-MG.1-3 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Week 18 **Oxyfuel Gas Processes**	• What are oxyfuel gas processes and what are they used for?	• Explain the parts and function of an oxyfuel gas cutting or welding outfit.	**Written** • Assignment on Welding Gases	**Career Ready Practices** CRP 2,4,6,8,11,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,9 SL.9-10.1,2,4,6

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
• Oxyfuel Gas Cutting and Welding Equipment and Supplies • Oxyfuel Gas Cutting and Welding Equipment Assembly and Adjustment • Oxyfuel Gas Cutting	• What equipment and gases are used for oxyfuel cutting and welding? • What are the main safety considerations when using oxyfuel processes? • How is an oxyfuel cutting or welding outfit assembled and adjusted? • How are cuts made using an oxyfuel gas cutting outfit?	• Explain the safety features of an oxyfuel cutting or welding outfit. • Demonstrate the protective clothing and the safety precautions that must be used for oxyfuel cutting or welding. • Demonstrate the steps required to assemble an oxyfuel gas cutting and welding outfit. • Safely turn on, check for leaks, and shut down an oxyfuel cutting and welding outfit. • Compare three types of flames that can be produced when burning oxygen and acetylene. • Demonstrate the steps to light and adjust the flame on an oxyfuel cutting torch and an oxyfuel welding torch. • Select the fuel gases to use for oxyfuel gas cutting. • Perform cuts manually with a cutting torch or cutting torch attachment. • Demonstrate cuts with an oxyfuel gas cutting machine.	• Quiz on Different Gases Used in Welding • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist		L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Week 19 **Oxyfuel Gas Processes** • Oxyfuel Gas Welding Flat Welding Position	• How are welds made using an oxyfuel gas welding outfit? • What weld angles are used for welding in the flat position?	• Identify the four positions used in welding and explain which is the most efficient. • Use the proper protective clothing for oxyfuel gas welding. • Explain how to hold a torch when forehand welding and when backhand welding. • Practice the torch angles used to weld in the flat position.	**Written** • Assignment on Welding Positions • Quiz on Oxyfuel Gas Welding Processes • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7
				Industry Standards	

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		• Carry a weld pool along a weld joint. • Weld edge, corner, and flanged butt joints without a welding rod. • Select a welding rod. • Lay a weld bead on a plate using a welding rod. • Lay a fillet weld on lap and T-joints using a welding rod. • Weld a butt joint using a welding rod. • Identify weld defects.	• Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test		G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Week 20 **Oxyfuel Gas Processes** • Brazing and Braze Welding • Soldering	• What is the difference between brazing and braze welding? • How are brazing filler metals chosen? • How is a joint prepared for brazing or braze welding? • How does a welder choose the correct equipment for brazing and braze welding? • What makes a good braze weld? • What safety precautions are necessary for brazing, braze welding and soldering? • What are the principles of soldering? • What are the advantages and disadvantages of soldering?	• Explain the major difference between the brazing and braze welding processes. • Describe the available brazing filler metals and the factors to be considered when choosing a filler metal. • Observe the procedure for properly cleaning a joint prior to brazing or braze welding. • Select the correct torch tip, rod diameter, and flux for brazing and braze welding. • List the safety precautions for brazing and braze welding. • Describe the procedures for brazing and braze welding. • Describe the principles of soldering. • Identify the advantages of soldering. • Select the appropriate filler metal and flux for soldering. • Explain the purposes and classifications of soldering fluxes.	**Written** • Assignment on Brazing, Soldering, and Heat Transfer • Quiz on Brazing, Soldering and Heat Transfer • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	**ELA** RI.9-10.1,2,4 W.9-10.2,4,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9 **Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
	• How does a welder choose the correct filler metals and fluxes for different types of soldering work?	• Observe common hazards associated with lead-containing solders and fluxes. • List acceptable solders for drinking water systems. • Discuss the soldering process, including the steps needed to clean metal surfaces prior to soldering. • Follow safety precautions and be aware of potential health hazards related to soldering. • Solder a lap joint and a pipe joint.			
Week 21 **SMAW (Stick Welding)** • Equipment and Supplies • Equipment Assembly and Adjustment	• What equipment and supplies are found in a SMAW station? • How is the SMAW station prepared for work? • What safety precautions should be considered when setting up a SMAW station?	• Explain the differences between direct current (DC) and alternating current (AC). • Interpret American Welding Society (AWS) abbreviations regarding welding current polarity. • Identify the equipment and accessories used in shielded metal arc welding (SMAW). • List the components of an arc welding outfit and arc welding station. • Identify factors to consider when selecting an arc welding machine. • Explain the assembly of a welding machine, leads, and electrode holder. • Demonstrate the procedure for inspecting a SMAW outfit. • Predict the proper amperage and polarity on a welding machine.	**Written** • Assignment on Setting Up SMAW Outfit • Quiz on Parts of a SMAW Outfit • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation	**Career Ready Practices** CRP 2,4,8 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 2,5 **Industry Standards**	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9 **Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Week 22	• What information does	• Identify carbon and low alloy	**Written**	**Career Ready Practices**	**ELA**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
SMAW (Stick Welding) • Electrodes	the AWS electrode identification system provide? • What are the purposes of an electrode covering? • Why should electrodes be kept in their shipping containers until they are used? • How does a welder decide what electrode to use in different conditions?	SMAW electrodes. • List six purposes of an electrode covering. • Interpret the AWS electrode identification system. • Predict the trial amperage of a welding machine using the rule-of-thumb method. • Select an electrode to meet the requirements of a weld. • Observe two means of storing electrodes.	• Assignment on SMAW Electrodes • Quiz on Electrodes • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	CRP 2,4,8,11 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 2,5 **Industry Standards**	RI.9-10.1,4 W.9-10.2,4,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,3,4,7,9 WHST.9-10.2,4,9 **Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Weeks 23-25 **SMAW (Stick Welding)** • Flat Welding Position	• How are welds made in the flat welding position using a SMAW welding outfit? • What weld angles are used for welding in the flat position?	• Discuss the safety rules required for arc welding. • Explain methods to prevent or reduce arc blow. • Practice a weld bead using the correct electrode angles. • Model drag welding techniques. • Clean a weld. • Apply a fillet weld on a lap joint, inside corner, and T-joint in the flat welding position using SMAW. • Evaluate weld defects.	**Written** • Assignment on SMAW Flat Welding Position and When to Use It • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,7,8,9 **Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Weeks 26-29 **SMAW (Stick Welding)** • Horizontal	• How are welds made in the horizontal and vertical positions using a SMAW welding outfit?	• Identify the proper protective clothing to be worn when welding out of position. • Weld in the horizontal and vertical welding positions.	**Written** • Assignment on SMAW Welds and Positions: When to Use Each • Quiz on SMAW Welding	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12 **Cluster Standards**	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
and Vertical Welding Positions	• What weld angles are used for welding in the horizontal and vertical positions?	• Practice the procedure for welding uphill and downhill.	Positions • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,7,8,9 **Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Week 30 **Resistance Welding (Spot Welding)** • Equipment and Supplies • Procedures	• What is electrical resistance and how is it applied in resistance welding? • What equipment is used for resistance welding and how is it set up and adjusted? • How are resistance welds made?	• Explain the principle of electrical resistance and how it is used in resistance welding. • List the three most common resistance welding machine designs. • Explain how a step-down transformer affects voltage and current. • Explain the three time intervals in resistance welding schedules. • Compare the properties of a material suitable for use as an electrode in resistance welding. • Describe the regular checks needed for safe operation of a resistance spot welding machine. • Select the proper spot welding machine for the welding to be done. • Explain how to select and prepare the electrodes for resistance spot welding. • Describe the methods used to determine the correct force for	**Written** • Assignment on Setting Up Resistance Welding Outfit • Quiz on Parts of a Resistance Welding Outfit and Procedures • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,8,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,9 WHST.9-10.2,4,8,9 **Math** S-ID.1 S-ID.5

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		spot welding. • Determine the weld time and current needed for resistance welding mild steel. • Make resistance spot welds on mild steel and aluminum. • Explain the method used to test for a good spot weld and the signs that indicate a weld is of the desired quality. • Discuss the process of projection welding. • Evaluate the process of resistance seam welding.			
Week 31 **GTAW (TIG Welding)** • Equipment and Supplies • Equipment Assembly and Adjustment	• What is GTAW? • Why is a post flow of shielding gas used with GTAW? • What type of connection is used for shielding gas and water hoses? • What are the major types of electrodes used in GTAW? • What type of current requires the high-frequency voltage to be used continuously? • What are the two ways to increase the current while welding?	• Describe the principles of gas tungsten arc welding (GTAW). • Identify the equipment and supplies involved with GTAW. • Describe the parts of a GTAW torch and how it is used. • Describe the functions of the cables and hoses. • Observe safety considerations when gas tungsten arc welding. • Assemble a GTAW welding outfit. • Demonstrate adjusting the shielding gas flowmeter for the proper flow rate. • Predict the proper current amount and type for the metal to be welded. • Explain electrode type designations for GTAW electrodes. • Use an electrode for GTAW • Apply the metal cleaning processes used in GTAW.	**Written** • Assignment on Setting Up a GTAW Outfit • Quiz on Equipment Used During GTAW Welding • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 2,3,4,8,11 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 2,5 **Industry Standards**	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,8,9 WHST.9-10.2,4,8,9 **Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Weeks 32-33 **GTAW (TIG Welding)** • Flat Welding Position	• How are welds made in the flat welding position using a GTAW welding outfit? • What weld angles are used for welding in the flat position?	• Discuss the GTAW process. • Determine the appropriate welding rod to use when gas tungsten arc welding. • Practice laying a bead on a plate using GTAW. • Make a fillet weld on a lap joint in the flat welding position. • Make a fillet weld on a T-joint in the flat welding position. • Weld a butt joint in the flat welding position. • Explain the use of a backing when welding aluminum using GTAW. • Analyze various welding defects.	**Written** • Assignment on GTAW Flat Welding Position • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,8,9 WHST.9-10.2,4,7,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
				Industry Standards	
Weeks 34-36 **GTAW (TIG Welding)** • Horizontal and Vertical Welding Positions	• How are welds made in the horizontal and vertical welding positions using a SMAW welding outfit? • What weld angles are used for welding in the horizontal and vertical positions?	• Remember why out-of-position welding is often an important part of welder qualification tests. • Observe the correct torch and welding rod angles for out-of-position welding. • Weld in the horizontal welding position with GTAW. • Weld in the vertical welding position with GTAW.	**Written** • Assignment on GTAW Welding Proper Techniques and Positions • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.9-10.1,2,4 W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 3,6	**Literacy** RST.9-10.1,2,3,4,7,8,9 WHST.9-10.2,4,7,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
				Industry Standards	
Week 37	• What procedures are	• Compare the differences	**Written**	**Career Ready Practices** CRP 2,4,6,8,11	**ELA** RI.9-10.1,2,4

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Welding in Industry • Pipe and Tube Welding	used for welding pipes and tubes?	between pipes and tubes. • Identify the names of the welding passes used in welding pipe with walls more than 3/16″ (5 mm) thick. • Demonstrate the procedures to weld pipes or tubes using SMAW, GTAW, SMAW and FCAW. • Discuss the differences in technique for uphill and downhill welding.	• Assignment on Types of Pipes and Tubes • Quiz on Pipe and Tube Welding • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,3,4,7,8,9 WHST.9-10.2,4,7,8,9 **Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
Week 38 **Welding in Industry** • Robotics and Welding	• How is robotic welding equipment used in manufacturing? • What are the advantages of using robotic welding equipment? • What are the components of a robotic welding station?	• Cite advantages of using robotic welding equipment in manufacturing. • Identify the main parts of a robot and the components of a robotic welding station. • Describe the use of a teach pendant in programming a robot to perform its designated tasks. • Discuss the safety precautions to be taken when working around robots.	**Written** • Research Project on Robotic Welding • Self-Assessment **Performance** • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,5,6,7,8,11 **Cluster Standards** MN 1,2,5,6 **Pathway Standards** MN-PRO 1,3 **Industry Standards**	**ELA** RI.9-10.1,2,4,8 W.9-10.1,2,4,6,7,8,9 SL.9-10.1,2,4,6 L.9-10.1-6 **Literacy** RST.9-10.1,2,4,7,8,9 WHST.9-10.1,2,4,6,7,8,9 **Math**
Week 39	• What codes and	• Describe the use of codes and	**Written**	**Career Ready Practices** CRP 2,4,8,10,11	**ELA** RI.9-10.1,2,4

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Welding in Industry • Welder Certification (introduction)	specifications are used to provide information on a required weld? • What is the difference between a procedure and a performance specification?	specifications to provide needed information on a required weld. • Discuss the difference between a welding procedure specification and a welding performance specification. • Explain why a welder often must pass a number welding performance qualifications. • List the steps that must be followed to conform to most codes. • List the things employers look for when hiring welders.	• Assignment on Welding Certification Process • Quiz on Different Welding Certifications • Self-Assessment **Performance** • Teacher Observation Checklist		W.9-10.2,4,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 1,4,6	**Literacy** RST.9-10.1,2,3,4,7,8,9 WHST.9-10.2,4,8,9
				Pathway Standards MN-PRO 1	**Math**
				Industry Standards	
Week 40 **Review** **Final Exam**	• What are the main learning goals for this past year in welding?	• Complete the written and performance assessments demonstrating a thorough knowledge of welding.	• Written and Performance Final Exam	**Career Ready Practices** CRP 2,4,6,8,11	**ELA** RI.9-10.1,2,4,7,8 W.9-10.2,4,6,8,9 SL.9-10.1,2,4,6 L.9-10.1-6
				Cluster Standards MN 1-6	**Literacy** RST.9-10.1,2,3,4,7,8,9 WHST.9-10.2,4,6,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
				Industry Standards	

Return to TOC

Syracuse City School District
Career and Technical Education Program
Course Syllabus
WLD300: Welding 300

Program Overview

The Welding program is designed to give students a solid foundation in the knowledge and technical skills that will prepare them for positions as entry-level welders or for advanced placement in post-secondary education. The program provides students with the skills of arc welding, resistance welding, brazing and soldering, as well as cutting, heat-treating and metallurgy. Students will also gain knowledge of electrical systems, power sources and different welding technologies, welding systems, print interpretation and measurement, as well as the use and interpretation of visual symbols related to welding. Students will have the opportunity to intern at many local businesses as well as work on customer projects and design. Students who excel in this course will have the opportunity to work toward their Level 1–Entry Welder Certification through the American Welding Society (AWS).

Course Description

Students in the Welding 300 course will continue to study and become proficient in the equipment and techniques used for the welding processes most often used in today's industry including oxyfuel gas cutting and welding, Gas Metal Arc Welding (GMAW), Flux-Cored Arc Welding (FCAW), Shielded Metal Arc Welding (SMAW), and Gas Tungsten Arc Welding (GTAW), brazing and braze welding, soldering, resistance welding and robotic welding. Flat, horizontal, vertical, and overhead welding positions and basic joints, pipe, and tube welding will be practiced. Classroom instruction will also include career exploration in welding, safety, design, welding theory, math applications, advanced physics of welding, communication and organizational skills, welding symbols, inspecting and testing welds, and welder certification. As students become proficient in all welding areas, they will have the opportunity to work on customer projects and design.

Pre-Requisites

WLD100: Welding 100 and WLD200: Welding 200

Course Objectives

1. Students will learn and practice the fundamentals of different types of welding processes.
2. Students will understand and apply safe working practices in a safe work environment.
3. Students will practice safe equipment set up, adjustment and tear down, and machine and tool maintenance.
4. Students will work as part of a team to clean up and care for equipment.

Integrated Academics

N/A

Equipment and Supplies

- **School will provide:** Welding helmet, safety glasses and shields, gloves, flame retardant jacket, apron, ear protection and dust mask when needed, lockers for work clothes, materials and welding consumables, tools, and machines

- **Student will provide:** Leather work boots or shoes (steel/composite toe preferred), long work pants with no holes that cover the top of the shoe or boot, pencil, notebook with paper, and folder with pockets

Textbook

Bowditch, W., Bowditch, K., & Bowditch, M. (2016). *Welding Fundamentals, 5th Edition.* Tinley Park, IL: Goodheart-Willcox.

Grading

50% Projects, Lab and Shop Work, Participation
25% Assignments
25% Quizzes and Exams

Additional Course Policies

Attendance will be counted towards the final grade in each marking period. All work, assignments or quizzes can be made up the following class until the last day of each marking period.

Course Calendar

Quarter	Units of Study

1	• Overview
	  o Class Expectations and Policies
	  o Careers in Welding
	  o Safety in the Welding Shop
	• Foundations
	  o Physics of Welding
	  o Math Applications for Welders
	  o Weld Joints and Positions
	  o Welding Symbols

2	• GMAW (MIG Welding) and FCAW
	  o Equipment and Supplies
	  o Equipment Assembly and Adjustment
	  o Flat Welding Position
	  o Horizontal, Vertical and Overhead Welding Positions
	• Oxyfuel Gas Processes
	  o Oxyfuel Gas Welding Flat Welding Position
	  o Oxyfuel Gas Welding Horizontal and Vertical Welding Positions
	  o Brazing and Braze Welding
	  o Soldering

3	• SMAW (Stick Welding)
	  o Equipment and Supplies
	  o Equipment Assembly and Adjustment
	  o Electrodes
	  o Horizontal, Vertical and Overhead Welding Positions
	  o Surfacing

4	• GTAW (TIG Welding)
	  o Equipment and Supplies
	  o Equipment Assembly and Adjustment
	  o Horizontal, Vertical and Overhead Welding Positions
	• Welding in Industry

	○ Special Welding and Cutting Processes ○ Inspecting and Testing Welds ○ Welder Certification • Review • Final Exam

Return to TOC

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
WLD 300: Welding 300

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Week 1 **Overview** • Class Expectations and Policies • Careers in Welding	• What are the expectations in the welding classroom and shop? • What factors should be considered when identifying personal career goals? • What jobs are available in the welding field? • What skills are needed for a successful welding career? • What are the steps to finding a welding-related job? • What behaviors does an employee need to keep and advance in a career? • What are the advantages and the disadvantages of becoming an entrepreneur?	• Discuss classroom expectations and policies. • Develop personal career goals. • Compile a list welding jobs available at various educational levels. • Discuss the different types of skills needed for a successful welding career. • Explain the steps and processes needed to find a welding-related job. • Elaborate on the actions needed to keep a job and advance in a career. • Compare the advantages and disadvantages of becoming an entrepreneur.	**Written** • Assignment on Careers in Welding Related Fields • Quiz on Class Expectations **Performance** • Teacher Observation of Class Expectations Checklist	**Career Ready Practices** CRP 2,4,7,10 **Cluster Standards** MN 1,4 **Pathway Standards** MN-PRO 4 **Industry Standards**	**ELA** RI.11-12.1,2,4,10 W.11-12.2,4,8, 10 SL.11-12.1,2,4,6 L.11-12.1-6 **Literacy** RST.11-12.1,2,4,9 WHST.11-12.2,4,8 **Math** S-ID.2 S-ID.3 S-ID.5 S.ID.6 S.ID.9
Week 2 **Overview** • Safety in the Welding	• Why is safety a priority in the welding shop? • What hazards are found in the welding shop?	• Analyze the hazards that exist in the welding shop including fire hazards, machinery and tool hazards, fumes, and airborne contaminants. • Describe the methods used to	**Written** • Assignment on Safety in the Workplace • Quiz on Safety • Research Project on Safety Hazards	**Career Ready Practices** CRP 1,2,3,4,5,7,8,11,12 **Cluster Standards**	**ELA** RI.11-12.1,2,4 W.11-12.1,2,4,5,6,7,8,9 SL.11-12.1,2,4,5,6 L.11-12.1-6 **Literacy**

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Shop	• What safety precautions should be in place to minimize the risk of injury? • What sources of safety information are necessary?	minimize the risk of injury including appropriate clothing, PPE, machinery, and tool safety features. • Describe at least five general rules to follow when storing compressed gas. • Explain ways to prevent injury when lifting heavy objects. • Explain where to find information about welding on hazardous containers and disposing of hazardous waste legally and safely. • Understand the purpose of and where to find SDS documents.	**Performance** • Safety Checklist • Teacher Observation Checklist	MN 3,5,6 **Pathway Standards** MN-PRO 2,5 **Industry Standards**	RST.11-12.1,2,4,9 WHST.11-12.1,2,4,7,8,9 **Math** S-ID.2 S-ID.3 S-ID.5 S.ID.6 S.ID.9 N-Q.1
Weeks 3-6 **Foundations** • Physics of Welding • Math Applications for Welders	• Why is welding more efficient than riveting and machining? • What three methods are used to achieve a weld? • What happens to the size of base metal when it is heated? • What math applications are necessary for welders to know and use?	• Identify the three general methods by which a weld is achieved. • Summarize the difference between chemical and mechanical properties and give examples of each. • Experiment with the effects of welding on metal. • Discuss the processes used to heat-treat metal. • Compare the relationship between voltage and current. • Give examples of US customary and SI metric units of measurement. • Demonstrate knowledge and skills through application and projects.	**Written** • Assignment on Heat Transfer and Physical Properties of Metal • Assignment on Converting Measurements • Quiz on Measurement Conversions **Performance** • Teacher Observation Checklist • Ruler Exercise: Finding Center Using a Ruler/Tape	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 2,5 **Industry Standards**	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6 **Literacy** RST.11-12.1,2,3,4,5,7,9 WHST.11-12.2,4,8,9 **Math** S-ID.2 S-ID.3 S-ID.5 S-ID.6 S-ID.9 N-RN.1 G-GPE.7 G-GMD.1 G.GMD.3
Weeks 7-8 **Foundations**	• How are the five basic weld joints used in the field?	• Identify the five basic weld joints. • Discuss the types of welds that can be made on each joint.	**Written** • Assignment on Weld Joints and Angles	**Career Ready Practices** CRP 2,4,8	**ELA** RI.11-12.1,4,7 W.11-12.2,4,6 SL.11-12.1,2,4,6

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• Weld Joints and Positions	• How does a welder decide which type of weld to use?	• Evaluate the parts of a fillet weld and a groove weld. • Model a stringer bead and a weave bead. • Model the four welding positions and evaluate the conditions needed for each.	• Quiz on Weld Joints • Self-Assessment **Performance** • Teacher Observation Checklist		L.11-12.1-6
				Cluster Standards MN 6	**Literacy** RST.11-12.1,2,3,4,5,7,8 WHST.11-12.2,4,9
				Pathway Standards MN-PRO 5	**Math** G-MG.1
				Industry Standards	
Weeks 9-10 **Foundations** • Welding Symbols	• At what angle are the axes positioned to create an isometric drawing? • What does the welding symbol tell the welder?	• Make a mechanical drawing of a three-dimensional object using the orthographic projection process. • Cite the names of the views used in an orthographic projection. • Explain the characteristics of an isometric drawing. • Practice the basic types of welds indicated on the ANSI/AWS welding symbol. • Explain information on the weld symbol to determine the size of the root opening, the groove angle, and the desired size, contour, and finish of the weld.	**Written** • Assignment on Welding Symbols • Quiz on Welding Symbols • Research Project on How Welding Symbols Are Used • Self-Assessment **Performance** • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,7,8,11	**ELA** RI.11-12.1,4 W.11-12.2,4,8 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 6	**Literacy** RST.11-12.1,3,4,7,9 WHST.11-12.2,4,9
				Pathway Standards MN-PRO 5	**Math** G-CO.4 G-CO.5 G-CO.6 G-CO.9 G-CO.12 G-CO.13
				Industry Standards	
Week 11 **GMAW (MIG Welding) and FCAW** • Equipment and Supplies • Equipment Assembly and Adjustment	• What is GMAW and what is it used for? • What are the advantages and disadvantages of GMAW and FCAW? • What equipment and gases are used for GMAW? • What are the main safety considerations when using GMAW?	• Discuss advantages and disadvantage of GMAW and FCAW. • Explain the correct polarity to use for GMAW and FCAW. • Demonstrate three methods of metal transfer. • Use the equipment that makes up a GMAW and FCAW outfit. • Explain the operation of a wire feeder. • Breakdown the parts of a welding	**Written** • Assignment on GMAW and FCAW • Quiz on GMAW and FCAW • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,8,12	**ELA** RI.11-12.1,2,4 W.11-12.2,4,6,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9
				Pathway Standards MN-PRO 2,5	**Math** G-MG.1-3 G-GMD.4
				Industry Standards	

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	• How is a GMAW welding outfit assembled and adjusted?	gun and cables. • Describe four gases used for GMAW and identify the most common shielding gas used for FCAW. • Explain the use of a flowmeter for GMAW and FCAW. • Assemble a GMAW/FCAW welding outfit. • Adjust the drive mechanism for the proper pressure and alignment. • List the proper sequence for removing a bird's nest. • Adjust the shielding gas flowmeter for the proper pressure and flow rate. • Identify the electrode wire designations for GMAW and FCAW electrodes. • Identify the two adjustments that are made to the welding machine. • Use safety precautions for GMAW and FCAW.			N-Q.1 N-RN.3 G-CO.5
Week 12-16 **GMAW (MIG Welding) and FCAW** • Flat Welding Position • Horizontal, Vertical	• What are the advantages and disadvantages of GMAW and FCAW? • Which type of current is most commonly used for GMAW welding? • What factors must be considered before	• Describe the advantages and disadvantages of GMAW and FCAW. • Determine the appropriate electrode to use with GMAW and FCAW. • Explain four factors that a welder must consider before selecting the electrode and shielding gas. • Identify the correct electrode	**Written** • Assignment on GMAW vs. FCAW • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6 **Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9 **Math** G-MG.1-3

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and Overhead Welding Positions	selecting the electrode and shielding gas? • What are the advantages of backhand welding over forehand welding? • What weld pool shape is used when welding a fillet weld in the vertical and overhead welding positions? • What two types of weld beads can be used to fill or build up a weld? • What type of protective clothing is recommended when welding in the overhead welding position?	extension to use with GMAW and FCAW using different metal transfer methods. • Explain the uses of DCEN or DCEP currents for GMAW welding. • Set the correct shielding gas flow rate on the flowmeter. • Explain the effect of increasing the contact tube-to-work distance. • Explain two advantages of backhand welding over forehand welding. • Describe the weld pool shape used when welding a fillet weld in the vertical and overhead welding positions. • Describe two types of weld beads that can be used to fill or build up a weld. • Analyze why flat position welding is preferred over out-of-position welding. • Demonstrate the correct welding gun angle for out-of-position welding. • Explain the type of protective clothing needed when welding in the overhead welding position. • Weld in the flat, horizontal, vertical, and overhead welding positions using GMAW and FCAW. • Identify various weld defects. • Demonstrate knowledge and skills through application and projects.	• Welding Coupon Preparation • Welding Joint Bend Test	**Industry Standards**	G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Week 17	• How are welds made	• Practice the four positions used	**Written**	**Career Ready Practices**	**ELA**

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Oxyfuel Gas Processes: • Oxyfuel Gas Welding Flat Welding Position	using an oxyfuel gas welding outfit? • What weld angles are used for welding in the flat position?	in welding and explain which is the most efficient. • Discuss the proper protective clothing that must be worn for oxyfuel gas cutting or welding. • Distinguish how to hold a torch for both forehand and backhand welding. • Determine the torch angles used to weld in the flat position. • Examine a weld pool along a weld joint. • Weld edge, corner, and flanged butt joints without a welding rod. • Select a welding rod. • Lay a weld bead on a plate using a welding rod. • Lay a fillet weld on lap and T-joints using a welding rod. • Weld a butt joint using a welding rod. • Evaluate welds and identify weld defects.	• Assignment on Welding Gases • Quiz on Different Gases Used in Welding • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	CRP 1,2,3,4,6,8,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	RI.11-12.1,2,4 W.11-12.2,4,9 SL.11-12.1,2,4,6 L.11-12.1-6 **Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9 **Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Week 18 **Oxyfuel Gas Processes:** • Oxyfuel Gas Welding Horizontal and Vertical Welding Positions	• Why is out-of-position welding sometimes necessary? • What safety measures need to be taken when welding out of position?	• Explain why out-of-position welding sometimes necessary. • Identify safety measures to be taken when welding out of position. • Describe methods used to perform welds in the horizontal and vertical welding positions. • Weld in the horizontal and vertical welding positions with oxyfuel gas welding (OFW). • Evaluate welds and identify weld defects.	**Written** • Assignment on Oxyfuel and Its Uses on the Job Site • Quiz on Oxyfuel Welding • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	**ELA** RI.11-12.1,2,4 W.11-12.2,4,9 SL.11-12.1,2,4,6 L.11-12.1-6 **Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9 **Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1

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					N-RN.3 G-CO.5
Week 19 **Oxyfuel Gas Processes** • Brazing and Braze Welding	• What is the difference between brazing and braze welding? • How are brazing filler metals chosen? • How is a joint prepared for brazing or braze welding? • How does a welder choose the correct equipment for brazing and braze welding? • What safety precautions are necessary for brazing and braze welding? • What makes a good braze weld?	• Explain the major difference between the brazing and braze welding processes. • Explain the available brazing filler metals and evaluate the factors to be considered when choosing a filler metal. • Demonstrate the proper procedure for cleaning a joint prior to brazing or braze welding. • Choose the correct torch tip, rod diameter, and flux for brazing and braze welding. • Model safety precautions for brazing and braze welding. • Demonstrate the procedures for brazing and braze welding. • Evaluate welds and identify weld defects in both the flat position and out of position.	**Written** • Assignment on Purpose and Conditions for Brazing • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.11-12.1,2,4 W.11-12.2,4,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Week 20 **Oxyfuel Gas Processes** • Soldering	• What are the principles of soldering? • What are the advantages and disadvantages of soldering? • How does a welder choose the correct filler metals and fluxes for different types of soldering work? • What are the proper steps and safety	• Explain the principles of soldering. • Debate the advantages and disadvantages of soldering. • Explain the purposes and classifications of soldering fluxes. • Choose the appropriate filler metal and flux for soldering. • Describe common hazards associated with lead-containing solders and fluxes. • Identify acceptable solders for drinking water systems. • Practice the soldering process, including the steps needed to	**Written** • Assignment on Soldering and Heat Transfer • Quiz on Soldering and Heat Transfer • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.11-12.1,2,4 W.11-12.2,4,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4
				Industry Standards	

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	precautions for soldering?	clean metal surfaces prior to soldering. • Explain safety precautions and be aware of potential health hazards related to soldering. • Model soldering lap and pipe joints.			N-Q.1 N-RN.3 G-CO.5
Week 21 **SMAW (Stick Welding)** • Equipment and Supplies • Equipment Assembly and Adjustment	• What equipment is found in a SMAW station? • How is the SMAW station prepared for work? • What safety precautions should be considered when setting up a SMAW station?	• Identify the components of an arc welding outfit and arc welding station. • Describe factors to consider when selecting an arc welding machine. • Demonstrate the differences between direct current (DC) and alternating current (AC). • Use American Welding Society (AWS) abbreviations regarding welding current polarity. • Explain the safety precautions that need to be considered when setting up a SMAW station. • Demonstrate safe and proper use of the SMAW equipment and accessories. • Demonstrate knowledge and skills through application and projects.	**Written** • Assignment on Setting Up SMAW Outfit • Quiz on Parts of a SMAW Outfit • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation	**Career Ready Practices** CRP 2,4,8	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9
				Pathway Standards MN-PRO 2,5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Week 22 **SMAW (Stick Welding)** • Electrodes	• What information does the AWS electrode identification system provide? • What are the purposes of an electrode covering? • Why should	• Explain six purposes of an electrode covering. • Use the AWS electrode identification system. • Model two means of storing electrodes. • Distinguish between carbon and low alloy SMAW electrodes. • Determine the trial amperage of a	**Written** • Assignment on SMAW Electrodes • Quiz on Electrodes • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation	**Career Ready Practices** CRP 2,4,8,11	**ELA** RI.11-12.1,4 W.11-12.2,4,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,3,4,7,9 WHST.11-12.2,4,9
				Pathway Standards MN-PRO 2,5	**Math** A.APR.1

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	electrodes be kept in their shipping containers until they are used? • How does a welder decide what electrode to use in different conditions?	welding machine using the rule-of-thumb method. • Choose an electrode to meet the requirements of a weld. • List three advantages of using smaller diameter electrodes for out-of-position welding.	Checklist	**Industry Standards**	A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Weeks 23-29 **SMAW (Stick Welding)** • Horizontal, Vertical and Overhead Welding Positions	• Why is it advisable to wear earplugs for out-of-position welding? • What protective clothing should be worn for out-of-position welding? • What methods are used to strike an SMAW arc?	• Use the proper protective clothing when welding out of position. • Weld in the horizontal and vertical welding positions. • Predict the procedure for welding uphill and downhill. • Weld in the overhead welding position. • Evaluate welds and identify weld defects. • Demonstrate knowledge and skills through application and projects.	**Written** • Assignment on SMAW Welds and Positions: When to Use Each • Quiz on SMAW Welding Positions • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,7,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Week 30 **SMAW (Stick Welding)** • Surfacing	• When does a part need surfacing? • What processes are used for surfacing a part? • How are materials tested for hardness? • How does a welder choose the correct electrode for	• List reasons for surfacing a part. • Identify the various surfacing processes. • List reasons for wear that occurs in parts. • Define characteristics of surfacing electrodes. • List two means of testing material hardness. • Describe abbreviations used	**Written** • Assignment on Surfacing Processes • Quiz on Surfacing and Surfacing Electrodes • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation	**Career Ready Practices** CRP 2,4,8,11,12	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1

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	surfacing a part?	when specifying surfacing electrodes. • Select the proper surfacing electrode and surface a part.	Checklist	**Industry Standards**	A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Week 31 **GTAW (TIG Welding)** • Equipment and Supplies • Equipment Assembly and Adjustment	• What is GTAW? • Why is a post flow of shielding gas used with GTAW? • What type of connection is used for shielding gas and water hoses? • What are the major types of electrodes used in GTAW? • What type of current requires the high-frequency voltage to be used continuously? • What are the two ways to increase the current while welding?	• Explain the principles of GTAW. • Describe and demonstrate the equipment and supplies involved with GTAW. • Break down the parts of a GTAW torch. • List three of the major types of electrodes used in GTAW. • Explain the functions of the cables and hoses in GTAW. • Describe the direction of the grind marks go when grinding an electrode. • List two ways to strike, or start, an arc. • Describe the ways to increase the current when welding. • Discuss safety considerations when gas tungsten arc welding. • Demonstrate knowledge and skills through application and projects.	**Written** • Assignment on Setting Up a GTAW Outfit • Quiz on Equipment Used During GTAW Welding • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 2,3,4,8,11	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,8,9 WHST.11-12.2,4,8,9
				Pathway Standards MN-PRO 2,5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
				Industry Standards	
Weeks 32-37 **GTAW (TIG Welding)** • Horizontal, Vertical and Overhead	• What safety precautions should a welder take to prevent being burned by falling molten metal? • What are three common defects that occur when welding	• Explain why out-of-position welding is often an important part of welder qualification tests. • Select the correct torch and welding rod angles for out-of-position welding. • Practice welding in the horizontal, vertical, and overhead welding positions with GTAW.	**Written** • Assignment on GTAW Welding Proper Techniques and Positions • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,8,9 WHST.11-12.2,4,7,8,9

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Welding Positions	in the horizontal position?	• Evaluate welds and identify weld defects. • Demonstrate knowledge and skills through application and projects.	Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Pathway Standards** MN-PRO 1-5 **Industry Standards**	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
Week 38 **Welding in Industry** • Special Welding and Cutting Processes	• What special welding and cutting processes are used in industry?	• Identify several special welding processes used in industry for unusual metals or unusual positions. • Describe several special cutting processes used in industry. • Evaluate the advantages of some special welding and cutting processes that are used in industry. • Demonstrate knowledge and skills through application and projects	**Written** • Assignment on Special Welding and Cutting Processes • Research Project on Special Welding and Cutting Processes • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,8,11	**ELA** RI.11-12.1,2,4,8 W.11-12.2,4,6,7,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 1	**Literacy** RST.11-12.1,2,3,4,7,8,9 WHST.11-12.1,2,4,6,7,8,9
				Pathway Standards MN-PRO 5 **Industry Standards**	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
Week 39 **Welding in Industry** • Inspecting and Testing	• What is the difference between a flaw and a defect? • What are the most common types of tests done on welds?	• Explain the difference between a welding flaw and a welding defect. • List the most common types of nondestructive and destructive testing done on welds. • Describe the methods used to	**Written** • Assignment on Identifying Flaws in a Weld • Quiz on Weld Flaw Identification • Self-Assessment **Performance**	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,4,5,6	**Literacy** RST.11-12.1,2,3,4,7,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Welds		prepare samples for tensile bend tests. • Perform several basic types of tests on welds to evaluate weld quality.	• Safety Checklist • Procedure Checklist • Teacher Observation Checklist		WHST.11-12.2,4,7,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
				Industry Standards	
Week 40 **Welding in Industry** • Welder Certification **Review** **Final Exam**	• What codes and specifications are used to provide information on a required weld? • What is the difference between a procedure and a performance specification? • What are the main learning goals for this past year in welding?	• Describe the codes and specifications that provide needed information on a required weld. • Compare the difference between a welding procedure specification and a welding performance specification. • Justify why a welder often must pass a number welding performance qualifications. • Utilize the steps that must be followed to conform to most codes. • Describe the things employers look for when hiring welders. • Complete the written and performance assessments demonstrating a thorough knowledge of welding.	**Written** • Assignment on Welding Certification Process • Quiz on Different Welding Certifications • Self-Assessment • Written Final Exam **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Performance Final Exam	**Career Ready Practices** CRP 2,4,6,8,10,11	**ELA** RI.11-12.1,2,4,7,8 W.11-12.2,4,6,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 1-6	**Literacy** RST.11-12.1,2,3,4,7,8,9 WHST.11-12.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math**
				Industry Standards	

Return to TOC

Syracuse City School District
Career and Technical Education Program
Course Syllabus
WLD400: Welding 400

Program Overview

The Welding program is designed to give students a solid foundation in the knowledge and technical skills that will prepare them for positions as entry-level welders or for advanced placement in post-secondary education. The program provides students with the skills of arc welding, resistance welding, brazing and soldering, as well as cutting, heat-treating and metallurgy. Students will also gain knowledge of electrical systems, power sources and different welding technologies, welding systems, print interpretation and measurement, as well as the use and interpretation of visual symbols related to welding. Students will have the opportunity to intern at many local businesses as well as work on customer projects and design. Students who excel in this course will have the opportunity to work toward their Level 1–Entry Welder Certification through the American Welding Society (AWS).

Course Description

Students in the Welding 400 course will continue to study and begin to master the equipment and techniques used for the welding processes most often used in today's industry including oxyfuel gas cutting and welding, Gas Metal Arc Welding (GMAW), Flux-Cored Arc Welding (FCAW), Shielded Metal Arc Welding (SMAW), and Gas Tungsten Arc Welding (GTAW), brazing and braze welding, soldering, resistance welding and robotic welding. Flat, horizontal, and vertical welding positions and basic joints, pipe, and tube welding will be practiced. Classroom instruction will also include career exploration in welding, safety, design, welding theory, math applications, advanced physics of welding, communication and organizational skills, welding symbols, inspecting and testing welds, preparation for welder certification, and local internships in welding. As students become proficient in all welding areas, they will have the opportunity to work on customer projects and design.

Pre-Requisites

WLD100: Welding 100, WLD200: Welding 200 and WLD300: Welding 300

Course Objectives

1. Students will learn and practice the fundamentals of different types of welding processes.
2. Students will understand and apply safe working practices in a safe work environment.
3. Students will practice safe equipment set up, adjustment and tear down, and machine and tool maintenance.
4. Students will work as part of a team to clean up and care for equipment.

Integrated Academics

N/A

Equipment and Supplies

- **School will provide:** Welding helmet, safety glasses and shields, gloves, flame retardant jacket, apron, ear protection and dust mask when needed, lockers for work clothes, materials and welding consumables, tools, and machines

- **Student will provide:** Leather work boots or shoes (steel/composite toe preferred), long work pants with no holes that cover the top of the shoe or boot, pencil, notebook with paper, and folder with pockets

Textbook

Bowditch, W., Bowditch, K., & Bowditch, M. (2016). *Welding Fundamentals, 5th Edition.* Tinley Park, IL: Goodheart-Willcox.

Grading

50% Projects, Lab and Shop Work, Participation
25% Assignments
25% Quizzes and Exams

Additional Course Policies

Attendance will be counted towards the final grade in each marking period. All work, assignments or quizzes can be made up the following class until the last day of each marking period.

Course Calendar

Quarter	Units of Study

1	• Overview
	  ○ Class Expectations and Policies
	  ○ Careers in Welding
	  ○ Safety in the Welding Shop
	• Foundations
	  ○ Physics of Welding
	  ○ Weld Joints and Positions
	  ○ Welding Symbols

2	• GMAW (MIG Welding) and FCAW
	  ○ Flat, Horizontal, Vertical and Overhead Welding Positions
	• Oxyfuel Gas Processes
	  ○ Oxyfuel Gas Welding Horizontal and Vertical Welding Positions
	  ○ Brazing and Braze Welding

3	• SMAW (Stick Welding) ○ Flat, Horizontal, Vertical and Overhead Welding Positions

4	• GTAW (TIG Welding)
	  ○ Horizontal, Vertical and Overhead Welding Positions
	• Welding in Industry
	  ○ Internships
	  ○ Welder Certification
	• Review
	• Final Exam

Return to TOC

Syracuse City School District
Career and Technical Education Program
Scope and Sequence
WLD 400: Welding 400

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Weeks 1-2 **Overview** • Class Expectations and Policies • Careers in Welding	• What are the expectations in the welding classroom and shop? • What factors should be considered when identifying personal career goals? • What jobs are available in the welding field? • What skills are needed for a successful welding career? • What are the steps to finding a welding-related job? • What behaviors does an employee need to keep and advance in a career? • What are the advantages and the disadvantages of becoming an entrepreneur?	• Discuss classroom expectations and policies. • Explain several factors to be considered when developing personal career goals. • Determine which welding jobs available at various educational levels. • Support an opinion on the different types of skills needed for a successful welding career. • Interpret the steps and processes needed to find a welding-related job. • Defend what actions are needed to keep a job and advance in a career. • Prioritize the advantages and disadvantages of becoming an entrepreneur. • Demonstrate knowledge and skills through application and projects.	**Written** • Assignment on Careers in Welding Related Fields • Quiz on Class Expectations **Performance** • Teacher Observation of Class Expectations Checklist	**Career Ready Practices** CRP 2,4,7,10 **Cluster Standards** MN 1,4 **Pathway Standards** MN-PRO 4 **Industry Standards**	**ELA** RI.11-12.1,2,4,10 W.11-12.2,4,8, 10 SL.11-12.1,2,4,6 L.11-12.1-6 **Literacy** RST.11-12.1,2,4,9 WHST.11-12.2,4,8 **Math** S-ID.2 S-ID.3 S-ID.5 S.ID.6 S.ID.9
Week 3 **Overview** • Safety in the Welding Shop	• Why is safety a priority in the welding shop? • What hazards are found in the welding shop?	• Discuss the hazards that exist in the welding shop. • Determine the clothing items that should be worn when welding or cutting. • Predict the various causes of fire	**Written** • Assignment on Safety in the Workplace • Quiz on Safety • Research Project on Safety Hazards	**Career Ready Practices** CRP 1,2,3,4,5,7,8,11,12 **Cluster Standards**	**ELA** RI.11-12.1,2,4 W.11-12.1,2,4,5,6,7,8,9 SL.11-12.1,2,4,5,6 L.11-12.1-6 **Literacy**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
	• What safety precautions should be in place to minimize the risk of injury? • What sources of safety information are necessary?	hazards. • Explain the machinery and tool hazards present in a welding shop and the safety features that can be used in an emergency. • Dispute the danger of fumes and airborne contaminants to the welder and the safety precautions that provide respiratory protection. • Cite at least five general rules to follow when storing compressed gas. • List ways to prevent injury when lifting heavy objects. • Describe hazards present in specific areas of the welding shop and the methods used to minimize the risk of injury. • Support where to find information about welding on hazardous containers and disposing of hazardous waste legally and safely. • Elaborate the purpose of and where to find SDS documents. • Demonstrate knowledge and skills through application and projects.	**Performance** • Safety Checklist • Teacher Observation Checklist	MN 3,5,6 **Pathway Standards** MN-PRO 2,5 **Industry Standards**	RST.11-12.1,2,4,9 WHST.11-12.1,2,4,7,8,9 **Math** S-ID.2 S-ID.3 S-ID.5 S.ID.6 S.ID.9 N-Q.1
Weeks 4-5 **Foundations** • Physics of Welding	• Why is welding more efficient than riveting and machining? • What three methods are used to achieve a weld? • What happens to the size of base metal when it is heated?	• Model the three general methods by which a weld is achieved. • Describe the difference between chemical and mechanical properties and give examples of each. • Predict the effects of welding on metal. • Demonstrate the processes used to heat-treat metal. • Discuss the relationship between voltage and current. • Make up examples of US customary and SI metric units of	**Written** • Assignment on Heat Transfer and Physical Properties of Metal • Assignment on Converting Measurements • Quiz on Measurement Conversions **Performance** • Teacher Observation Checklist • Ruler Exercise:	**Career Ready Practices** CRP 2,4,8,11 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 2,5 **Industry Standards**	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6 **Literacy** RST.11-12.1,2,3,4,5,7,9 WHST.11-12.2,4,8,9 **Math** S-ID.2 S-ID.3 S-ID.5

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
		measurement.	Calculating Center Using a Ruler/Tape		S-ID.6 S-ID.9 N-RN.1 G-GPE.7 G-GMD.1 G.GMD.3
Weeks 6-10 **Foundations** • Weld Joints and Positions • Welding Symbols	• How are the five basic weld joints used in the field? • How does a welder decide which type of weld to use? • At what angle are the axes positioned to create an isometric drawing? • What does the welding symbol tell the welder?	• Model the four welding positions and evaluate the conditions needed for each. • Use information on the weld symbol to determine the size of the root opening, the groove angle, and the desired size, contour, and finish of the weld. • Demonstrate knowledge and skills through application and projects.	**Written** • Assignment on Weld Joints, Angles, and Welding Symbols • Quiz on Welding Symbols • Self-Assessment **Performance** • Teacher Observation Checklist	**Career Ready Practices** CRP 2,4,8 **Cluster Standards** MN 6 **Pathway Standards** MN-PRO 5 **Industry Standards**	**ELA** RI.11-12.1,4,7 W.11-12.2,4,6,8 SL.11-12.1,2,4,6 L.11-12.1-6 **Literacy** RST.11-12.1,2,3,4,5,7,8 WHST.11-12.2,4,9 **Math** G-MG.1
Weeks 11-16 **GMAW (MIG Welding) and FCAW** • Flat, Horizontal, Vertical and Overhead Welding Positions	• What makes a good weld? • What type of protective clothing is strongly recommended when welding in the overhead welding position? • What is the difference between a flaw and a defect? • What are the most common types of tests done on welds?	• Weld in the flat, horizontal, vertical, and overhead welding positions using GMAW and FCAW. • Evaluate welds and identify weld defects. • Demonstrate knowledge and skills through application and projects.	**Written** • Assignment on GMAW vs. FCAW • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12 **Cluster Standards** MN 3,6 **Pathway Standards** MN-PRO 1-5 **Industry Standards**	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6 **Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9 **Math** G-MG.1-3 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
Weeks 17-20	• What safety	• Apply safety measures when	**Written**	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.11-12.1,2,4

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Oxyfuel Gas Processes: • Oxyfuel Gas Welding Horizontal and Vertical Welding Positions • Brazing and Braze Welding	measures need to be taken when welding out of position? • What safety precautions are necessary for brazing and braze welding? • What makes a good braze weld? • What is the difference between a flaw and a defect? • What are the most common types of tests done on welds?	welding out of position. • Weld in the horizontal and vertical welding positions with oxyfuel gas welding (OFW). • Model safety precautions for brazing and braze welding. • Demonstrate the procedures for brazing and braze welding. • Evaluate welds and identify weld defects. • Demonstrate knowledge and skills through application and projects.	• Assignment on Oxyfuel Welding and Brazing Applications • Quiz on Oxyfuel Welding and Brazing • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test		W.11-12.2,4,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Weeks 21-30 **SMAW (Stick Welding)** • Flat, Horizontal, Vertical and Overhead Welding Positions	• What protective clothing should be worn for out-of-position welding? • What makes a good weld? • What is the difference between a flaw and a defect? • What are the most common types of tests done on welds?	• Use the proper protective clothing when welding out of position. • Weld in the flat, horizontal, vertical, and overhead welding positions. • Evaluate welds and identify weld defects. • Demonstrate knowledge and skills through application and projects.	**Written** • Assignment on SMAW Welds and Positions: When to Use Each • Quiz on SMAW Welding Positions • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6	**Literacy** RST.11-12.1,2,3,4,7,9 WHST.11-12.2,4,7,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5
				Industry Standards	
Weeks 31-33 **GTAW (TIG**	• What safety precautions should a	• Investigate why out-of-position welding is often an important part of	**Written** • Assignment on GTAW	**Career Ready Practices** CRP 1,2,3,4,6,8,11,12	**ELA** RI.11-12.1,2,4 W.11-12.2,4,8,9

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
Welding) • Horizontal, Vertical, and Overhead Welding Positions	welder take to prevent being burned by falling molten metal? • What is the difference between a flaw and a defect? • What are the most common types of tests done on welds?	welder qualification tests. • Model the correct torch and welding rod angles for out-of-position welding. • Evaluate welds in the horizontal, vertical, and overhead welding positions with GTAW. • Demonstrate knowledge and skills through application and projects.	Welding Proper Techniques and Positions • Self-Assessment **Performance** • Safety Checklist • Procedure Checklist • Teacher Observation Checklist • Welding Rating Rubric • Welding Coupon Preparation • Welding Joint Bend Test		SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 3,6 A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12	**Literacy** RST.11-12.1,2,3,4,7,8,9 WHST.11-12.2,4,7,8,9
				Pathway Standards MN-PRO 1-5	**Math** A.APR.1 A-APR.7 G-MG.1-3 G-GMD.1 G-GMD.4 N-Q.1 N-RN.3 G-CO.5 G-CO.12
				Industry Standards	
Weeks 34-40 **Welding in Industry** • Internships • Welder Certification **Review** **Final Exam**	• How does an employee convey professionalism in the workplace? • How do professionals work together to solve problems? • What codes and specifications are used to provide information on a required weld? • What is the difference between a procedure and a performance specification?	• Apply the knowledge and skills learned in the classroom to working in a professional setting. • Explain how various professionals work together toward the common goal of solving problems. • Explain how the demands of a job can change according to the setting and the needs of the employer. • Explain and demonstrate professionalism and ethics in the workplace. • Complete internship requirements. • Prepare for Welding Certification performance tests. • Obtain AWS Certification.	**Written** • Internship Report • Self-Assessment • AWS Certification Test • Written Final Exam **Performance** • AWS Certification Test • Performance Final Exam	**Career Ready Practices** CRP 2,4,6,8,10,11	**ELA** RI.11-12.1,2,4,7,8 W.11-12.2,4,6,8,9 SL.11-12.1,2,4,6 L.11-12.1-6
				Cluster Standards MN 1-6	**Literacy** RST.11-12.1,2,3,4,7,8,9 WHST.11-12.2,4,8,9
				Pathway Standards MN-PRO 1-5	**Math**
				Industry Standards	**Science**

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS ELA, Literacy, Math, Science
	• What are the main learning goals for this past year in welding?	• Complete the written and performance assessments demonstrating a thorough knowledge of welding.			

Return to TOC

B. Teacher Certification

> *The self-study team reviews the teacher certification and training of the school or BOCES' instructional, paraprofessional, and support staff who deliver services within the CTE program seeking approval. New York State teacher certification review should include both CTE teachers and teachers of academic content within the proposed program.*

Process

- Reviewers confirm that all CTE teachers hold appropriate New York State teacher certification for the program in which they will teach.
- Reviewers confirm that all teachers of academic content hold appropriate New York State teacher certification for the program in which they will teach.
- Reviewers confirm the appropriate NCLB highly-qualified status for the CTE teachers in programs offering academic credit.
- Reviewers confirm that staff delivering instruction in programs where certification, licensure, or registration by an external entity have acquired the necessary credentials.
- Reviewers confirm that professional development opportunities exist within the school district or BOCES for instructional, paraprofessional, and support staff to acquire and improve skills and knowledge related to instructional enhancement of the CTE program.

Documentation

Recommendations from the review of teacher certification should be included in the self-study report and reviewed by the external committee. A list of all teachers for the program and the New York State teacher certification(s) held by each must be attached to the Application for Career and Technical Education Program Approval.

Resources

New York State Office of Teaching Initiatives
http://www.highered.nysed.gov/tcert/certificate/certprocess.htm

Source: http://www.p12.nysed.gov/cte/ctepolicy/guide.html

Teacher Certification Lookup

When searching for a New York State certificate holder you must enter at least a last name or a first name. In order to narrow your search results it is recommended that you provide both first and the last names. Please do not include prefixes or suffixes as part of the name. Please note, New York State certification records were computerized in 1983. Anyone certified by New York State prior to 1983 may not appear in this search.

Search Certificate Holder

First Name:

todd

Last Name:

schober

Middle Initial:

Submit

Search Results

Select	First Name	Last Name	MI	City	State	Registration Status
◉	TODD	SCHOBER	M	CLAY	NY	N/A

View Detail

Certificate Information for New York State Teaching Certificate Holder

Certificate Title	Issue / Effective Date	Expiration Date	Status
Technology Education Permanent Certificate	02/01/2006		Issued
Technology Education Provisional Certificate	09/01/2003	08/31/2008	Expired
Welding 7-12 Initial Certificate	07/14/2015	08/31/2020	Issued

Return to TOC

C. Technical Assessments Based on Industry Standards

> *The self-study team reviews the selection of a technical assessment for the program seeking approval. The selected technical assessment must be nationally-recognized and based on industry standards. It must be available to students enrolled in the approved program and must consist of three parts: written, student demonstration, and student project. Successful completion of the technical assessment is not a requirement for high school graduation, but is required for a student to earn a technical endorsement on the high school diploma*
>
> *The New York State Education Department does not approve, endorse, or certify any technical assessment.*

Process

- The school district or BOCES selects an appropriate industry standard technical assessment to measure student proficiency in the technical field for the program. The school district or BOCES may select a New York State licensing examination as the technical assessment.
- The school district or BOCES determines the scheduling and administration of technical assessments. It is not required that the technical assessment be administered at the conclusion of the program. Parts may be administered throughout a student's learning experience.
- The school district or BOCES determines the number of times a student may take a particular technical assessment.
- The school district or BOCES must comply with existing laws and regulations related to administration of technical assessments to students with disabling conditions and provide appropriate testing modifications. Restrictions on student eligibility for testing are the responsibility of the test producer.
- In the absence of an appropriate nationally-recognized industry standard based assessment, a consortium of local, regional, state, business and industry representatives may be formed to produce such an instrument.
    - Technical assessments must meet generally recognized psychometric criteria. Therefore, the consortium approach may be expensive because of the many steps required to insure assessment validity, reliability, and security.
    - An existing CTE advisory committee or craft committee is not a technical assessment consortium. The school district or BOCES must ensure that the assessment consortium adequately represents current business and industry standards for the specific career area for the program.
- Where an appropriate technical assessment exists, but consists of only one or two parts, a consortium must be formed to develop the missing part(s).
- The school district or BOCES must develop a system to collect student-level and program-level data on performance on the technical assessment.

Documentation

Recommendations on the technical assessment selection should be included in the self-study report and reviewed by the external committee.

Resources

New York State graduation requirements: http://www.emsc.nysed.gov/part100/pages/1005.html

Information on the Technical Endorsement: http://www.emsc.nysed.gov/cte/ctepolicy/endorsement.html

Source: http://www.p12.nysed.gov/cte/ctepolicy/guide.html

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Measuring What Matters in CTE®

Job Ready Assessment Blueprint

Welding

Test Code: 4172 / Version: 01

General Assessment Information

Blueprint Contents

Test Type: The Welding industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of Kansas, Michigan, North Carolina, Pennsylvania, and Virginia.

CIP Code

48.0508-
Welding Technology/Welder

Learning that works for America
CTE™

Career Cluster 13 -
Manufacturing

o*net™ in*it

51-4121.06- Welders, Cutters,
and Welder Fitters

NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE
University of the State of New York - Regents Research Fund

In the lower division baccalaureate/associate degree category, 3 semester hours in Welding Technology or Mechanical Technology.

(Continued on the following page)

General Assessment Information (continued)

Association for Career and Technical Education
ACTE
www.acteonline.org

The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!

ISA®
INTERNATIONAL SIGN ASSOCIATION
www.signs.org

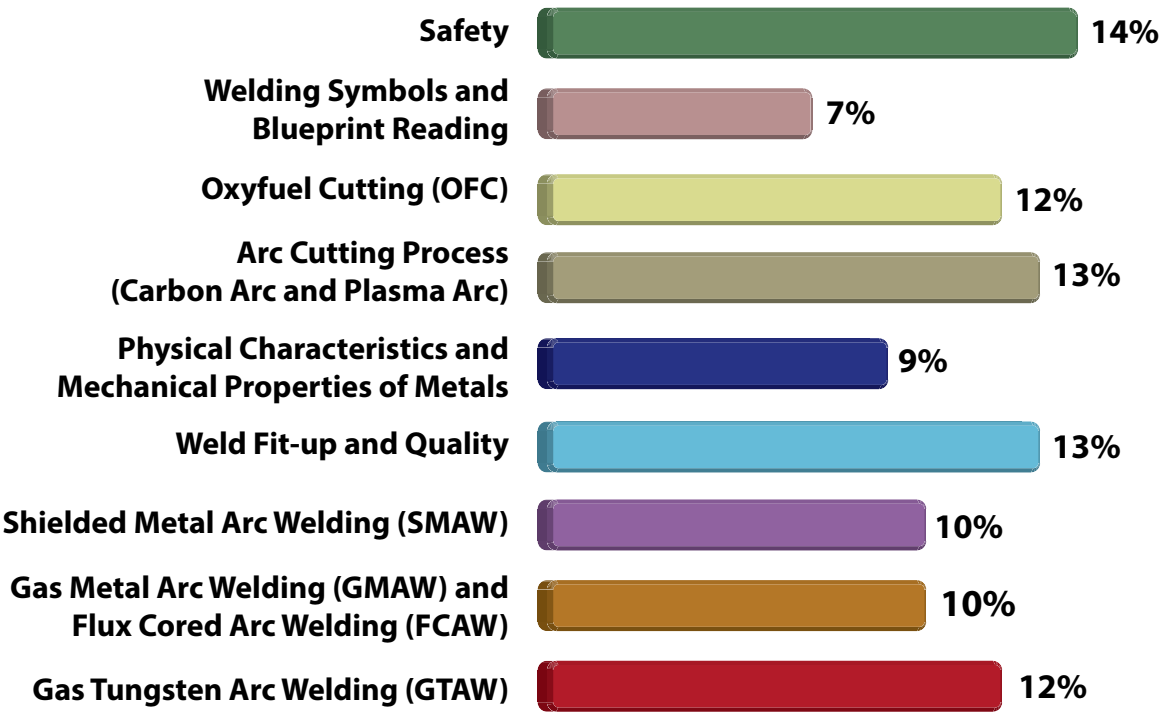
The International Sign Association (ISA) represents manufacturers, suppliers and users of on-premise signs and sign products from all 50 states and around the globe. The sign and visual communications industry is a $37.5 billion business that employs more than 200,000 individuals. One of ISA's long term goals is to showcase and promote the many exciting and diverse career opportunities that exist within the sign and visual communications industry and to apprise students of the abundant employment opportunities that are present to skilled and qualified candidates. ISA strongly encourages and supports students that work to enhance their educational achievements by completing NOCTI assessments.

Written Assessment

NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours
Number of Questions: 162
Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered



Specific Standards and Competencies Included in this Assessment

Safety

- Identify various welding hazards and safe practices
- Display familiarity with industrial and OSHA safety standards
- Demonstrate knowledge of oxyfuel safety procedures
- Demonstrate knowledge of arc welding and cutting safety procedures
- Demonstrate proper and safe use of PPE, hand tools, and power equipment

Welding Symbols and Blueprint Reading

- Interpret weld and welding symbols
- Read and interpret blueprints and sketches

Oxyfuel Cutting (OFC)

- Identify oxyfuel cutting principles
- Identify and maintain oxyfuel equipment
- Assemble and disassemble oxyfuel equipment
- Handle and store compressed gas cylinders
- Cut and form metal with oxyfuel equipment

Arc Cutting Process (Carbon Arc and Plasma Arc)

- Identify arc cutting process principles
- Assemble and disassemble arc cutting equipment
- Identify and maintain arc cutting equipment
- Exhibit an understanding of arc cutting consumables
- Demonstrate appropriate use of arc cutting equipment

Physical Characteristics and Mechanical Properties of Metals

- Identify metals by physical characteristics and shapes
- Explain the pre-heating and post-heating processes
- Exhibit understanding of distortion control methods
- Identify basic mechanical properties of metals

(Continued on the following page)

Please note, due to a shift in OSHA terminology, that any references to "Material Safety Data Sheets (MSDS)" will be changed to "Safety Data Sheets (SDS)" during the next scheduled revision.

Specific Standards and Competencies (continued)

Weld Fit-Up and Quality

- Identify various joint designs (joint geometry) and welding positions
- Clean and prepare materials for groove and fillet welds
- Identify welding defects and/or discontinuities
- Test welds using various techniques
- Use standard measuring and layout tools (metric and English)
- Describe welding industry codes, standards, and procedures

Shielded Metal Arc Welding (SMAW)

- Explain principles of SMAW
- Set up and maintain SMAW equipment
- Demonstrate selection and application of SMAW consumables
- Perform fillet and groove welds on plate in all positions

Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW)

- Explain principles of GMAW and FCAW
- Set up and maintain GMAW and FCAW equipment
- Demonstrate selection and application of GMAW and FCAW consumables
- Perform fillet and groove welds on plate in all positions

Gas Tungsten Arc Welding (GTAW)

- Explain principles of GTAW
- Set up and maintain GTAW equipment
- Demonstrate selection and application of GTAW consumables
- Perform fillet and groove welds on ferrous and nonferrous metals in all positions

Sample Questions

Before cutting or welding, a container should be

A. burned out
B. steam cleaned
C. filled with flux
D. filled with oxygen

When a cutting attachment is added to a welding torch body, the oxygen valve on the torch body is opened

A. one complete turn
B. half way
C. completely
D. two and one-half turns

What is the most common reason for post-weld heat treatment?

A. normalizing
B. tempering
C. stress relieving
D. annealing

The number 70 of an E-7018 electrode indicates the electrode's

A. tensile strength
B. position
C. type of coating
D. polarity

In GTAW of aluminum and magnesium, the current supply recommended for best results is

A. alternating current, low frequency
B. direct current, straight polarity, high frequency
C. alternating current, high frequency
D. direct current, reverse polarity, high frequency

(*Continued on the following page*)

Sample Questions (continued)

Information contained in the tail of a welding symbol might include

A. specifications
B. pitch
C. field weld
D. size of weld

Which current setup is used for plasma arc cutting?

A. AC
B. ACHF
C. DCEN
D. DCEP

The members of a fillet weld will join at approximately

A. 30 degrees
B. 45 degrees
C. 60 degrees
D. 90 degrees

The _____ electrode is commonly used with the FCAW process.

A. ER705-3
B. E7018
C. E70T-1
D. F7X-EM12K

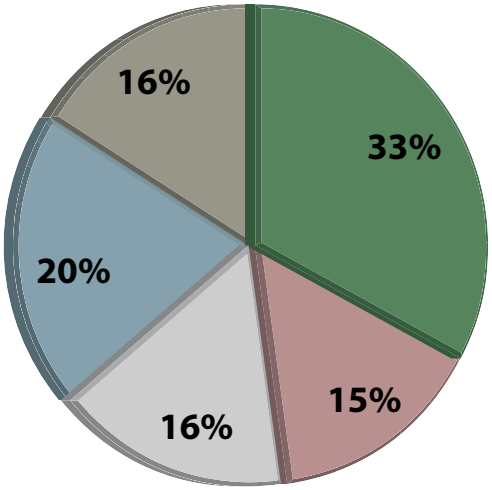
The major difference between FCAW and GMAW is the

A. polarity
B. power source
C. electrode
D. wire feeder

Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

Administration Time: 2 hours and 40 minutes
Number of Jobs: 5



Areas Covered:

33% Oxyfuel Cutting
Participants will select and set up equipment correctly and safely, lay out the project according to the provided diagram, and cut to specified dimensions.

15% SMAW V-Groove, 3G
Participants will select and set up equipment correctly and safely, fit and tack the assembly on a bench, weld material according to specifications, and perform a visual inspection.

16% GMAW Tee Joint, 2F
Participants will select and set up materials correctly and safely, weld material according to specifications, and perform a visual inspection.

20% Aluminum GTAW Tee Joint, 2F
Participants will select and set up equipment correctly and safely, clean material as necessary, determine appropriate shielding gas flow rate, weld according to specifications, and then perform a visual inspection.

16% Stainless Steel GTAW Lap Joint, 2F
Participants will set up equipment correctly and safely, select the correct type and diameter of tungsten, fit and tack material appropriately, weld according to specifications, and perform a visual inspection.

Sample Job

Aluminum GTAW Tee Joint, 2F

Maximum Time: 20 minutes

Participant Activity: The participant will use two pieces of sheet aluminum and filler rod to weld a Tee-joint in the horizontal position.

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SCSD CTE Student Portfolio

Definition: Student portfolios are a collection of personal documents, which showcase an individual's learning experiences, goals and achievements. Student portfolios are created and controlled by the student, facilitated by the instructor, and evaluated by outside entities.

Purpose: Students should be able to leave a program with as many tools in their toolbox as possible. Student portfolios are a way to assist students in marketing themselves in future interviews, by using the portfolio to illustrate his or her skills and/or talents.

SCSD CTE Student Portfolio Requirements

☐	**Table of Contents:**	This should list each section and piece of the portfolio in the order it appears
☐	**Cover letter**	A cover letter introducing the student to a potential employer about a specific job in his or her chosen pathway. Should focus on why the student is the best candidate for the job. It should compliment the resume, not repeat it.
☐	**Resume**	Should be professionally formatted. Usually a one-page document listing the student's name, personal information (address, phone, and email), an objective, work history or extracurricular/community involvement, education, certifications/credentials, personal skills/interests, and references.
☐	**Letters of Recommendation**	Students must include at least two (2) reference letters, provided by people outside the school who are familiar with his or her work or character. The reference letters can be employment-related, personal, or they can attest to the character of the student.
☐	**Certifications/Credentials**	Students should include copies of any credentials and/or certifications they have earned as a result of their program.
☐	**Transcript**	Student provides a copy of his or her full academic transcript.
☐	**Employability Profile**	Per NYSED: The work skills employability profile is intended to document student attainment of technical knowledge and work-related skills. Documents to validate skills reported on the profile could include, but are not limited to, an employer/teacher review of student work based on learning standards and expectations in the workplace, performance evaluations and observations. Students must have at least one employability profile completed within one year prior to school exit. If a student is involved in a number of work-based learning experiences and/or is employed part time, he/she may also have additional employability profiles as completed by others knowledgeable about his or her skills (e.g.,

	employer and/or job coach).
☐ **College Research**	A written research assignment focusing on three colleges offering programs in the student's chosen career pathway.
☐ **Career Plan**	Per NYSED: "Career Plans are an important mechanism to add relevance and meaning to learning experiences across subject areas. The career development model used to create the Career Plan aligns with the CDOS standards." A Career Plan document can be found here: http://www.p12.nysed.gov/cte/careerplan/docs/SecondaryCommencLvl.pdf
☐ **Student Awards**	This section is completely open ended. Students should use this section to illustrate any awards, projects, exemplars, service learning, or scholarships, they participated or earned during their high school years. They can show evidence through pictures, project documentation, news articles, program agendas, meeting minutes, videos, etc.
☐ **Work Samples**	Examples highlighting ***only the student's best work***, demonstrating the skills and competencies he or she has mastered. These should be presented professionally and be clearly captioned. ***Should not be thought as a scrapbook.*** Potential employers are only interested in the very best examples.

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Return to TOC

D. Postsecondary Articulation

> *The self-study team reviews the postsecondary articulation agreement for the program seeking approval. Postsecondary articulation agreements help students prepare for the transition from high school to advanced study in a particular career area. Articulation agreements provide direct benefits to students such as dual credits, college credits, advanced standing, or reduced tuition at a postsecondary institution. Articulation agreements may include several school districts and/or BOCES and multiple postsecondary institutions. The school district or BOCES may enter into multiple articulation agreements for a program seeking approval.*

Process

- Reviewers confirm that the postsecondary articulation agreement is designed to prepare students for the transition from high school study to postsecondary study in the career area of the program seeking approval.
- Reviewers confirm that a postsecondary articulation agreement has been obtained that offers direct benefits to students in the program seeking approval.
- Reviewers confirm that the postsecondary articulation agreement includes the
    - prerequisite skills, knowledge, or coursework required of students to participate in the agreement
    - roles and responsibilities of each institution
    - duration of the agreement
    - endorsement by officials of each institution
- Signed articulation agreements must be on file within the school district or BOCES.

Documentation

Documentation of the postsecondary articulation agreement is maintained by the school district or BOCES and updated whenever modifications are made. Recommendations on the technical assessment selection should be included in the self-study report and reviewed by the external committee. A copy of the signed postsecondary articulation agreement must be attached to the Application for Career and Technical Education Program Approval.

Source: http://www.p12.nysed.gov/cte/ctepolicy/guide.html

MOHAWK VALLEY COMMUNITY COLLEGE
UTICA-ROME, NY 13501
AND
SYRACUSE CITY SCHOOL DISTRICT
725 HARRISON STREET, SYRACUSE NY 13210

ARTICULATION AGREEMENT

The purpose of this articulation agreement is to develop an ongoing relationship between Mohawk Valley Community College (MVCC) and Syracuse City School District (SCSD) enabling each of these institutions to better serve their communal students. The relevant faculties of MVCC and SCSD subscribe to the following memorandum of understanding based on their mutual concern for providing programs in applied technologies that will build upon past student experiences and eliminate unnecessary duplication of instruction.

It is agreed, subject to the following conditions, that MVCC will grant 5-college credit hours satisfying the MT174: Electrical Arc Welding Procedures requirement of the Welding Technology Certificate or A.O.S. degree to each person who successfully completes SCSD's Welding CTE pathway and meets the criteria outlined below *(Note: This agreement is valid for up to 1-year post SCSD graduation).*

To receive college credit for MT174, SCSD Welding CTE graduates must meet the following criteria:

1. Achieved a minimum cumulative average of 85 during their SCSD secondary school experience.
2. Completed the SCSD Welding CTE pathway.
3. Hold the AWS 3G plate welding certification completed with vertical up process.
4. Students must demonstrate their ability to apply electric arc welding with ferrous and nonferrous metals in all positions through successfully passing a performance-based welding test administered by MVCC faculty.

It is further agreed upon, subject to the following conditions, that MVCC will grant 5-college credit hours satisfying the MT270: Welding Procedures of MIG & TIG requirement of the Welding Technology Certificate or A.O.S. degree to each person who successfully completes SCSD's Welding CTE pathway and meets the criteria outlined below *(Note: This agreement is valid for up to 1-year post SCSD graduation).*

To receive college credit for MT270, SCSD Welding CTE graduates must meet the following criteria:

1. Achieved a minimum cumulative average of 85 during their SCSD secondary school experience.
2. Completed the SCSD Welding CTE pathway.
3. Hold the following AWS welding certifications: 1G, 2G, 5G, & 6G pipe welding certifications
4. Students must demonstrate their ability to apply MIG & TIG welding with ferrous and nonferrous metals in all positions including pipe welding and welding t-joints, lap-joints, and butt-joints through successfully passing a performance-based welding test administered by MVCC faculty.

Process for granting credit owed:

1. Students will arrange a meeting with the Associate Dean of the Physical Sciences, Engineering & Applied Technologies (PSAT) department by calling 315-792-5446 upon entrance to MVCC's Welding Technology Certificate or A.O.S. program. At the meeting students will provide documentation supporting their attainment of the above criteria #1-3.
2. The Associate Dean of PSAT or designee will verify that the student meets criteria #1-3 identified above.
3. Upon verification of the student's fulfillment of criteria #1-3, the Associate Dean of PSAT will coordinate the administration of a performance-based welding test.
4. The Associate Dean of PSAT will communicate with MVCC's Registrar to authorize the granting of transfer credit for MT174 and/or upon successful completion of the performance-based welding test(s).

This agreement is effective for 5-years subsequent the completion of the signing process unless either party has significant changes in the program. The College reserves the right to make final determination concerning all college credit awarded.

Syracuse City School District

Welding Instructor	Date 5/18/17
Director of Career Technical Education	Date 5/18/17
Superintendent	Date 5/18/17

Mohawk Valley Community College

Associate Dean, PSAT Department	Date 4/26/17
V.P. for Learning & Academic Affairs	Date 5/1/17
President	Date 5/5/17

Mohawk Valley Community College does not discriminate on the basis of age, race, creed, color, sex, sexual orientation, national origin, disability, veteran status, gender identity, pregnancy, religion, predisposing genetic characteristics, marital status or domestic violence victim status in admissions, employment, and treatment of students and employees or in any aspect of the business of the College.

E. Work-based Learning

> *Work-based learning (WBL) is the "umbrella" term used to identify activities which collaboratively engage employers and schools in providing structured learning experiences for students. These experiences focus on assisting students to develop broad, transferable skills for postsecondary education and the workplace. A quality WBL experience can make school-based learning more relevant by providing students with the opportunity to apply knowledge and skills learned in the classroom to real world situations.*
>
> *Time requirements that students in an approved program may devote to work-based learning experiences are set by administrators of the approved program. This time should be an outcome of the self-study report and external review phases of the approval process. Work-based learning experiences must be sufficient in length and rigor to contribute to student achievement of the State learning standards as well as specific technical competencies.*

Process

- The school district/BOCES and the employer cooperatively plan all work experiences.
- The school district/BOCES set up a formal procedure for the supervision/coordination of all work-based learning experiences and must ensure that work-based learning coordinators are appropriately certified.
- The school district/BOCES provide work-based learning experiences for students with disabilities
- The school district/BOCES and employer must ensure compliance with federal and state labor laws, and the State Department of Labor regulations and guidelines.
- The school district/BOCES must explore and develop work-based learning experiences in settings that are relevant to the program.
- The school district/BOCES must comply with Commissioner's Regulations and Department policy where credit towards graduation is being awarded.

Documentation

Recommendations for work-based learning should be included in the self-study report and reviewed by the external committee.

Resources

New York State Education Department Work Experience Manual **http://www.emsc.nysed.gov/cte/wbl/**

Source: http://www.p12.nysed.gov/cte/ctepolicy/guide.html

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SYRACUSE CITY SCHOOL DISTRICT

Career and Technical Education

CTE

Internship Handbook

Preparing today's students for tomorrow's careers.

Table of Contents

Syracuse City School District

Career and Technical Education Internship

Forms are available on SCSD CTE website www.syracusecityschools.com/cte

Introduction

Syracuse City School District Career and Technical Education Work Based Learning

Learning in the workplace is not a new concept. Informal, on-the-job training is an integral part of all workforce development. Work based learning (WBL) provides structured learning experiences for students through exposure to a range of occupations. The Harvard University report, Pathways to Prosperity (February, 2011) suggested that "Work-linked learning should play an especially important role in the new American system of pathways to prosperity. There is mounting evidence that this would be an effective strategy for encouraging young adults to complete both high school and post-secondary degrees. Co-operative education is a tested model that provides students with extensive work experience that is monitored by the school."

Learning in the workplace is connected to and supports learning in the classroom. Work based learning also helps students achieve established academic standards. Properly developed and supported, work based learning provides a practical context for school subject matter and enhances the traditional classroom learning. Work based learning activities promote the development of broad, transferable skills and are a key element of a rigorous and relevant education for students. It enables students to acquire the attitudes, skills and knowledge needed to succeed in today's workplace.

Employer partners can develop and support work based learning experiences that promote the attainment of workplace knowledge and skills. In doing so, they can support academic achievement and personal growth by designing, structuring, supporting and connecting work based learning experiences. Work based learning also supports professional, technical, and work-readiness skills development. Quality work based learning should:

- Be designed to enhance the learning of skills and workplace knowledge in all aspects of the industry
- Be structured to be safe, legal and measurable
- Be developmentally appropriate
- Have identified learning objectives and assess student performance
- Develop career ready practices and provide opportunities for reflection
- Be supported and documented by appropriate planning and training; and
- Comply with State and Federal labor laws

Syracuse City School District Career and Technical Education Internship

A Career and Technical Education Internship provides an important link between the classroom and the workplace for students age 16 and older. It is a structured, time-limited, career preparation activity in which students are assigned to a workplace for a defined period of time to participate in and observe firsthand within a given industry. The internship enhances and adds relevance to classroom learning. The internship may provide the opportunity to work in teams, rotate through a number of departments and job functions, or work on a project of interest to the student. It is essentially a partnership that links school, community, and business/industry to provide a real-world environment in which students are given the opportunity to apply, and thereby enhance, the knowledge and skills obtained in the classroom. The internship is related to the student's CTE program of study, with the primary goals of promoting:

- The exploration of and experience in a field of interest
- Exposure to a wide range of careers and jobs within an industry
- Opportunities to develop, practice and demonstrate new skills
- The acquisition of occupational knowledge and awareness of the skills and education needed to be successful in the industry

Career & Technical Program/ Teacher Guidelines

Legal Requirements of SCSD CTE Internship Program

All Career and Technical Education Internship Programs have the common objective of providing opportunities for students to develop and demonstrate job skills at a supervised worksite. They are supported by training plans developed cooperatively by the employer, instructor, and student. There should be ongoing communication between the job mentors and the CTE teacher or work based learning coordinator concerning students' performance and needs.

Each internship program needs to have the following:

- New York State Education Department (NYSED) approval of the CTE program
- The employer understands that the student placement is governed by NYSED, New York State Workers' Compensation Board (NYSWCB), New York State Department of Labor (NYSDOL), and United States Department of Labor (USDOL) labor laws and regulations
- Employer is provided a Certificate of Insurance from school where school liability insurance protects the employer from any damage student may do in the workplace
- Students are given written notification that this program is unpaid and they are not due any wages per NYSDOL regulations
- Per NYS, students are required to receive coverage under the employer's Workers' Compensation Insurance if student is interning for a for-profit company. If student is interning at a non-profit entity, the student is required to be covered by the employer's visitors or volunteer insurance.
- Worksite must be in compliance with Occupational Safety and Health Administration (OSHA) regulations. Health and safety instruction/training appropriate for the job is provided by the SCSD and employer specific training is provided by the employer on the worksite.
- Memorandum of Agreement is in effect between the cooperating business and the education agency and outlines the responsibilities of the student, employer, parent/guardian, and school/coordinator, all of whom must sign to confirm their support of the agreement.
- Students complete an Internship Application indicating their understanding of, and agreement to, all rules and regulations of the program.
- Students receive instruction embedded within their CTE curriculum relating to the technical and career ready practices.
- An Internship Training Plan (ITP) is developed and used for each participating student. The plan identifies the general and specific job tasks the student will perform on the job, the desired learning outcomes of the experience, and the time frame the student will spend at each task. The training plan should be designed to ensure that the student will have a progressive learning experience.
- All participating students are meeting, or have met, academic requirements of their CTE programs and academic subjects. No students on academic probation will participate in the internship.
- Employment Certificate (Working Papers) for students provide verification that a student under age 18 is eligible for employment. The student, employer, and school must complete the form. Employment certificates are obtained at the high school – typically the main office, health office, or guidance office.
- Time Log/Record of Attendance provides an official record of the weekly and cumulative hours the student has worked during the experience. It must be maintained for each student.
- An intern evaluation will be done by the CTE teacher before the internship, at the midpoint of the internship and at the end of the internship. This same form will be completed by the on-site supervisor in the midpoint and at the end of the internship.

SCSD CTE Internship Program Checklist (To be completed by CTE teacher or WBL coordinator)

- ☐ NYSED has approved the CTE program
- ☐ The employer understands that the student placement is governed by NYSED, NYSWCB, NYSDOL, and USDOL labor laws and regulations
- ☐ NYSED Application for Employment certificate (working papers, usually available in school counseling office) has been verified (NYSED form attached)
- ☐ Employer is provided with a Certificate of Insurance from school to cover liability (sample attached)
- ☐ A written Memorandum of Agreement is in effect between the cooperating business and the education agency (**Form #1**)
- ☐ Students complete an Internship Application indicating their understanding of, and adherence to all rules and regulations set forth by the program. (**Form #2**)
- ☐ Students receive instruction embedded within their CTE curriculum relating to the technical and Career Ready Practices. The CTE teacher and the student have completed the SCSD CTE Internship Ready to Work Assessment (**Form #3**)
- ☐ An Internship Training Plan (ITP) is developed and used for each participating student (**Form #4**)
- ☐ Students are given written notification that this program will be unpaid and they are not due any wages per NYS DOL regulations (**Form #5**)
- ☐ All SCSD internship candidates have received appropriate safety certification for the industry provided by the school before internship and employer specific training and orientation is provided by the employer on the worksite (**Form #6 & Form #7**)
- ☐ All participating students are meeting, or have met, academic requirements of their CTE programs and academic subjects
- ☐ Review Time Log/Record of Attendance which serves as an official record of the hours the student has worked during the experience (**Form #8**)

REQUIRED FORMS

NYSED Application for Employment Certificate

Certificate of Insurance

SCSD Memorandum of Agreement
(Form #1)

SCSD Internship Program Application
(Form #2)

SCSD Internship Ready to Work Assessment
(Form #3)

SCSD Internship Training Plan
(Form #4)

SCSD Notification of unpaid internship
(Form #5)

SCSD Internship Safety Certification
(Form #6)

SCSD Worksite Orientation
(Form #7)

SCSD Weekly Time Log/Record of Attendance
(Form #8)

Forms are available online at the SCSD CTE website : www.syracusecityschools.com/cte

CTE Teacher/WBL Coordinator

Date

Employer Internship Partner Guidelines

SCSD CTE Internship Employer Requirements

Safety

At all times, both school personnel and the employment site personnel must take appropriate steps to ensure that safe practices are stressed and followed. However, it is impossible to guarantee that no injuries resulting in medical expenses and liability will occur. The following prudent steps are encouraged:

1. In-school course content must include training related to safety at the worksite. Appropriate safety certification should be offered if possible. SCSD internship candidates will have received appropriate safety training before beginning their internship.
2. Any sites used for SCSD CTE internships will be reviewed by school personnel prior to placing a student at the worksite.
3. Employers must provide safety training information to interns as they would a new employee. Safety training must be provided if the employer engaged in a particularly hazardous occupation for minors as defined by the USDOL.
4. Provisions for student safety must be included as part of the training agreement signed by the employer, student, parent, and school representative.

Types of Liability Insurance and Risk Management

Workers' Compensation and Employer Liability Insurance

All employers will have a policy that provides coverage for the Workers' Compensation statutory benefits as well as liability coverage for certain employment-related situations. Verification of employer's Workers Compensation insurance will be included in the Memorandum of Agreement. The SCSD will also have insurance that covers the student participating in a school-related internship experience.

SCSD CTE Internship Expectations & Responsibilities of Employer

Before

- Determine projects or activities that would be appropriate for your student intern
- Communicate with staff that an intern will be at the workplace and identify mentors
- Designate one employee, the on-site supervisor, to work with coordinator/teacher to develop and define successful student objectives and experiences and record on the student Internship Training Plan

During

- Provide student with a Work Site Orientation to organization and any required training
- Train student intern for your work site, including all work site safety training
- Maintain a quality, safe and legal learning experience; provide effective supervision
- Use the Internship Training Plan as a guide for the internship; hold intern to employee standards/ expectations; oversee, direct, and provide adequate tasking to maximize learning
- Meet with coordinator/teacher and student to decide on an ongoing communications strategy
- Evaluate intern work and provide constructive criticism
- Assist student in working toward learning outcomes
- Coordinate student schedule, approve weekly timesheets
- Communicate successes and opportunities at the workplace that the teacher can use to enhance the value of classroom connections
- Complete a student evaluation midway through internship and discuss with student

After

- Complete a final evaluation of the student
- Hold debriefing session and review performance with the student and teacher
- Complete a Program Evaluation

SCSD CTE Internship Employer Internship Partner Checklist (To be completed by On-Site Supervisor/Mentor)

- ☐ Meet with coordinator/teacher and student to agree on ongoing communication strategy (e-mail, text, telephone, etc.)
- ☐ A written Memorandum of Agreement is in effect between the cooperating business and the education agency (**Form #1**)
- ☐ Work with coordinator/teacher to develop and define successful student objectives and experiences and record on the student Internship Training Plan (**Form #4**)
- ☐ Coordinate student schedule, approve weekly time log/record of attendance (**Form #8**)
- ☐ Communicate with staff that an intern will be at the workplace and identify on-site supervisor and/or mentor

On-Site Supervisor _____

Mentor Name _____

- ☐ Provide student with Work Site Orientation to organization and any required training (Form #7)
- ☐ Create and maintain a quality, safe and legal learning experience
- ☐ Hold intern to employee standards/expectation; provide student support and candid feedback
- ☐ Communicate successes and opportunities at the workplace that the teacher can use to enhance the value of classroom connections
- ☐ Complete an interim SCSD CTE Internship Ready to Work Assessment of student performance and discuss with student (**Form #3**)
- ☐ Provide effective supervision
- ☐ Complete a final assessment of the student (**Ready to Work Assessment, Form #3 and Student Training Plan, Form #4**)
- ☐ Complete a program evaluation (**Form #10**)

REQUIRED FORMS

SCSD Memorandum of Agreement
(Form #1)

SCSD Internship Ready to Work Assessment
(Form #3)

SCSD Internship Training Plan
(Form #4)

SCSD Worksite Orientation
(Form #7)

SCSD Weekly Time Log/Record of Attendance
(Form #8)

SCSD Mentor Program Evaluation
(Form #10)

Forms are available online at the SCSD CTE website : www.syracusecityschools.com/cte

_____ _____

Employer/ Mentor Date

Student Intern Guidelines

Expectations and Responsibilities of Students

Before

- Obtain working papers (if under 18)
- Return Internship Application and all permission slips with appropriate signatures
- Meet with your teacher/coordinator and worksite supervisor to finalize an Internship Training Plan

During

- Attend Orientation at the worksite
- Observe all workplace rules and regulations particularly those applicable to safety and security concerns
- Perform all duties, jobs and assigned tasks; treat internship like a real job
- Maintain regular work schedule and notify supervisor in advance of any vacation/appointments
- Track you hours as instructed on Weekly Timesheet
- Develop skill specific learning outcomes with your worksite supervisor
- Participate in ongoing reflection journal activities and skill building classroom assignments
- Communicate with your teacher/coordinator and worksite supervisor if issues arise
- Keep copies of all necessary paperwork (work journal, training plan, Weekly Time Log/Record of Attendance, and evaluations)

After

- Participate in self-evaluation and reflection activities
- Update your resume based upon new skills and experiences gained
- Send thank you note to employer

SCSD CTE Internship Student Checklist (To be completed by student)

- ☐ Obtain NYSED Application for Employment Certificate (usually available in school counseling office, application attached)
- ☐ A written Memorandum of Agreement is in effect between the cooperating business, the education agency, and signed by student and parents (**Form #1**)
- ☐ Return Internship Application (**Form #2**) and all permission slips with appropriate signatures
- ☐ Develop skill specific learning outcomes with your worksite supervisor
- ☐ Meet with your teacher/coordinator and worksite supervisor to finalize an Internship Training Plan for the internship (**Form #4**)
- ☐ Attend orientation at the worksite (**Form #7**)
- ☐ Observe all workplace rules and regulations particularly those applicable to safety and security concerns
- ☐ Perform all duties, jobs and assigned tasks; treat internship like a real job
- ☐ Maintain regular work schedule and notify supervisor in advance of any vacation/appointments
- ☐ Track you hours as instructed on time log/record of attendance (**Form #8**)
- ☐ Participate in ongoing reflection activities and skill building classroom assignments
- ☐ Communicate with your teacher/coordinator and worksite supervisor, if issues arise and keep copies of all necessary paperwork (work journal, training plan, Weekly Time Log/Record of Attendance, and evaluations)
- ☐ Participate in self-evaluation and reflection activities (**Forms #3 & #9**)
- ☐ Update your resume based on new skills and experiences gained
- ☐ Send thank you note to employer

REQUIRED FORMS

SCSD Memorandum of Agreement
(Form #1)

SCSD Internship Program Application
(Form #2)

SCSD Internship Ready to Work Assessment
(Form #3)

SCSD Internship Training Plan
(Form #4)

SCSD Worksite Orientation
(Form #7)

SCSD Weekly Time Log/Record of Attendance
(Form #8)

SCSD Student Evaluation
(Form #9)

Forms are available online at the SCSD CTE website : www.syracusecityschools.com/cte

Student _____ Date _____

SCSD CTE Internship Forms

NYSED Application for Employment Certificate

SCSD Certificate of Insurance to Cover Student Liability (Sample)

Form #1	SCSD Memorandum of Agreement
Form #2	SCSD Internship Program Application
Form #3	SCSD Internship Ready to Work Assessment
Form #4	SCSD Internship Training Plan
Form #5	SCSD Notification of unpaid internship
Form #6	SCSD Internship Safety Certification
Form #7	SCSD Worksite Orientation
Form #8	SCSD Weekly Time Log/Record of Attendance
Form #9	SCSD Student Evaluation
Form #10	SCSD Mentor Program Evaluation

Forms are available on SCSD CTE website at www.syracusecityschools.com/cte

AT-17
Rev. 5/10

THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
ALBANY, NY 12234

APPLICATION FOR EMPLOYMENT CERTIFICATE

See reverse side of this form for information concerning employment of minors.

All signatures must be handwritten in ink, and applicant must appear in person before the certifying official.

THIS APPLICATION DOES NOT AUTHORIZE EMPLOYMENT

PART I – Parental Consent – (To be completed by applicant and parent or guardian)

Parent or guardian must appear at the school or issuing center to sign the application for the first certificate for full-time employment, unless the minor is a graduate of a four-year high school and presents evidence thereof. For all other certificates, the parent or guardian must sign the application, but need not appear in person to do so.

Date……

I, …… Age ……..…
[Applicant]

Home Address ……....., apply for a certificate as checked below
[Full Home Address including Zip Code]

- ☐ Nonfactory Employment Certificate – Valid for lawful employment of a minor 14 or 15 years of age enrolled in day school when attendance is not required.
- ☐ Student General Employment Certificate – Valid for lawful employment of a minor 16 or 17 years of age enrolled in day school when attendance is not required.
- ☐ Full-Time Employment Certificate – Valid for lawful employment of a minor 16 or 17 years of age who is not attending day school.

I hereby consent to the required examination and employment certification as indicated above.

……
[Signature of Parent or Guardian]

PART II – Evidence of Age – (To be completed by issuing official only)

……. – Check evidence of age accepted – Document # (if any) ……..
[Date of Birth]

Birth Certificate State Issued Photo I.D Driver's License Schooling Record Other……
[Specify]

PART III – Certificate of Physical Fitness

Applicant shall present documentation of physical exam from a school or private physician, physician's assistant or nurse practitioner licensed to practice within New York State. Said examination must have been given within 12 months prior to issuance of the employment certificate. Date of physical exam on file with school …… If physical exam is over 12 months, provide student with certificate of physical fitness to be completed by school medical director or private health care provider.

If the physical exam or Certificate of Physical Fitness is limited with regards to allowed work/activity, the issuing official shall issue a Limited Employment Certificate (valid for a period not to exceed 6 months unless the limitation noted by the physician is permanent, then the certificate will remain valid until the minor changes jobs. Enter the limitation on the employment certificate. THE PHYSICIAN'S CERTIFICATION SHOULD BE RETURNED TO THE APPLICANT.

PART IV – Pledge of Employment – (To be completed by prospective employer)

Part IV must be completed only for: (a) a minor with a medical limitation; and (b) for a minor 16 years of age or legally able to withdraw from school, according to Section 3205 of the Education Law, and must show proof of having a job.

The undersigned will employ …… residing at ……
[Applicant]

as …… at ……
[Description of Applicant's Work] **[Job Location]**

for …… days per week …….. hours per day, beginning …… a.m. ……..…… p.m.

…… Factory ending…… a.m. ……p.m.
[Name of Firm]

Nonfactory ……..
[Address of Firm]

…… Starting date …….. ……..
[Telephone Number] **[Signature of Employer]**

PART V – Schooling Record – (To be completed by school official)

Part V must be completed only for a minor 16 years of age who is leaving school and resides in a district (New York City and Buffalo) which require a minor 16 years of age to attend school, according to Section 3205 of the Education Law.

I certify that the records of …… ……
[Name of School] **[Address]**

Show that …….. whose date of birth is ……
[Name of Applicant]

Is in grade…… ……
[Signature of Principal or Designee]

PART VI – Employment Certification – (To be completed by issuing official only)

Certificate Number ……..... Date Issued ……

…… …….. ……
[School or Issuing Center] **[Address]** **[Signature of Issuing Officer]**

GENERAL INFORMATION

An employment Certificate (Student Nonfactory, Student General, or Full Time) may be used for an unlimited number of successive job placements in lawful employment permitted by the particular type of certificate.

A Nonfactory Employment Certificate is valid for 2 years from the date of issuance or until the student turns 16 years old, with the exception of a Limited Employment Certificate. A Limited Employment Certificate is valid for a maximum of 6 months unless the limitation noted by the physician is permanent, then the certificate will remain valid until the minor changes job. It may be accepted only by the employer indicated on the certificate.

A new Certificate of Physical Fitness is required when applying for a different type of employment certificate, if more than 12 months have elapsed since the previous physical for employment.

An employer shall retain the certificate on file for the duration of the minor's employment. Upon termination of employment, or expiration of the employment certificate's period of validity, the certificate shall be returned to the minor. A certificate may be revoked by school district authorities for cause.

A minor employed as a Newspaper Carrier, Street Trades Worker, Farmworker, or Child Model, must obtain the Special Occupational Permit required.

A minor 14 years of age and over may be employed as a caddy, babysitter, or in casual employment consisting of yard work and household chores when not required to attend school. Employment certification for such employment is not mandatory.

An employer of a minor in an occupation which does not require employment certification should request a Certificate of Age.

PROHIBITED EMPLOYMENT

Minors 14 and 15 years may not be employed in, or in connection with a factory (except in delivery and clerical employment in an enclosed office thereof), or in certain hazardous occupations such as: construction work; helper on a motor vehicle; operation of washing, grinding, cutting, slicing, pressing or mixing machinery in any establishment; painting or exterior cleaning in connection with the maintenance of a building or structure; and others listed in Section 133 of the New York State Labor Law.

Minors 16 and 17 years of age may not be employed in certain hazardous occupations such as: construction worker; helper on a motor vehicle, the operation of various kinds of power-driver machinery; and others listed in Section 133 of the New York State Labor Law.

HOURS OF EMPLOYMENT

Minors may not be employed during the hours they are required to attend school.

Minors 14 and 15 years of age may not be employed in any occupation (except farmwork and delivering, or selling and delivering newspapers):

When school is in session:

- more than 3 hours on any school day, more than 8 hours on a nonschool day, more than 6 days in any week, for a maximum of 18 hours per week, or a maximum of 23 hours per week if enrolled in a supervised work study program approved by the Commissioner.
- after 7 p.m. or before 7 a.m.

When school is not in session:

- more than 8 hours on any day, 6 days in any week, for a maximum of 40 hours per week.
- after 9 p.m. or before 7 a.m.

This certificate is not valid for work associated with newspaper carrier, agriculture or modeling.

Minors 16 and 17 years of age may not be employed: --

When school is in session:

- more than 4 hours on days preceding school days; more than 8 hours on days not preceding school days (Friday, Saturday, Sunday and holidays), 6 days in any week, for a maximum of 28 hours per week.
- between 10 p.m. and 12 midnight <u>on days followed by a school day</u> without written consent of parent of guardian <u>and</u> a certificate of satisfactory academic standing from the minor's school (to be validated at the end of each marking period).
- between 10 p.m. and 12 midnight <u>on days not followed by a school day</u> without written consent of parent or guardian.

When school is not in session:

- more than 8 hours on any day, 6 days in any week, for a maximum of 48 hours per week.

EDUCATION LAW, SECTION 3233

"Any person who knowingly makes a false statement in or in relation to any application made for an employment certificate or permit as to any matter by this chapter to appear in any affidavit, record, transcript, certificate or permit therein provided for, is guilty of a misdemeanor."

ACORD® CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A :	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	**GENERAL LIABILITY**						EACH OCCURRENCE	$
	☐ COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
	☐ CLAIMS-MADE ☐ OCCUR						MED EXP (Any one person)	$
	500,000 Retained						PERSONAL & ADV INJURY	$
							GENERAL AGGREGATE	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$
	☐ POLICY ☐ PRO-JECT ☐ LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	☐ **UMBRELLA LIAB** ☐ OCCUR						EACH OCCURRENCE	$
	☐ **EXCESS LIAB** ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N	N / A					☐ WC STATU-TORY LIMITS ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ **(Mandatory in NH)**						E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Teacher

Employer

Student

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

Memorandum of Agreement

(Form #1)

Type of Work Based Learning Experience: Non-Paid Internship

This Work Based Learning Experience Agreement is entered into by and between the Syracuse City School District (SCSD) _____ (Student), his/her Parents/Guardian, _____ (Parent/Guardian), and his/her Work Experience Employer, _____ (Employer), on the date indicated below, whereby the Student will participate in a CTE Internship (Program at the Employer's place of business located at _____ , on _____ , during the hours of _____ .

THE STUDENT UNDERSTANDS THAT HIS/HER CONDUCT IS A REFLECTION UPON THE SCHOOL NAME AND AGREES THAT HE/SHE WILL:

1. Provide his/her own transportation to and from the Employer's place of business (the SCHOOL, the Student's home school, the SCHOOL and the Employer are in no way responsible for providing the Student with transportation to and/or from the Employer's place of business at any time or for any incidents or accidents which may occur while the Student is on route to or from the Employer's place of business)
2. Demonstrate a conscientious attitude and be honest, punctual, cooperative, courteous and willing to learn while at the Employer's place of business.
3. Keep regular attendance as agreed upon with the Employer, excluding Employer-observed holidays, days on which the Employer's place of business is closed or other legal absences and understands that his/her attendance will be taken from his/her weekly attendance reports.
4. Keep regular attendance at his/her home school.
5. Give the Employer as much advance notice as possible if unable to report for work or to do so in a timely manner and contact the CTE teacher at (315) _____.
6. Report to SCHOOL if the Internship location is closed for any reason during at time in which the student is scheduled to be at the Internship location and SCHOOL is in session.
7. Complete weekly time log/record of attendance (Form # 8) reports as required by SCHOOL.
8. Engage in only those work based learning experiences approved by the supervisor at the work-site.

THE EMPLOYER AGREES THAT IT WILL:

1. Not permit the Student to replace any paid employee (in the case of an Internship).
2. Advise the Student of all company rules, regulations and policies which relate to the Student.
3. Explain to the Student the responsibilities and duties of his/her internship and shall correlate on-the-job training with safety instructions given by the SCHOOL.
4. The work of the Student in occupations declared particularly hazardous by the U.S. Department of Labor shall be (i) incidental to the Student's training; (ii) intermittent and for short periods of time; and (iii) under the direct and close supervision of a qualified and experienced person.
5. Provide direct supervision by an authorized employee to the Student as needed.
6. Complete an accident report form and return to SCHOOL in the event of an accident.
7. Review the Student's performance with him/her on a weekly basis and sign a weekly time sheet, complete an evaluation of the Student on forms provided by the SCHOOL.
8. Inform the SCHOOL Instructor/Coordinator when the Student is absent or not performing adequately by calling (315)_____ .

9. Observe any and all laws that may relate to the Student's work experience.

THE SCHOOL AGREES THAT IT WILL:

1. Carry the insurance listed for students during class activities including internships, job experiences and work placement.
2. Accident Insurance: SCHOOL carries tertiary accident insurance to cover medical expenses as a result of an accident. The parent's health insurance is primary and the home school district would be secondary. General Liability Insurance: SCHOOL carries general liability insurance to cover up to one million dollars for a single event. As added protection, a ten million dollar umbrella policy is also in effect.
3. Assist the Student in securing internship placement regardless of his/her sex, race, color, national origin or disability (all inquiries and/or complaints regarding discrimination should be directed to the compliance officer, Patty Clark, SCSD Central Office, 725 Harrison Street, Syracuse, New York 13210. Telephone: (315) 435-4131.
4. Provide the STUDENT with safety instructions correlated by the EMPLOYER with on-the-job training.
5. Review with the Student and the Employer their respective responsibilities and obligations while participating in the Program.

The parties/signatories hereby agree that good communication and understanding between them is vital if the objectives of this Program are to be met and that joint conferences between the Student, Employer, Parent/Guardian, Instructor, and others may be scheduled from time to time in order to discuss:

1. the student's progress
2. any misunderstandings
3. the reason for termination of the Agreement

This Agreement is not in effect until signed by all parties. This Agreement may be terminated at any time by any party upon written notice to the other parties.

We the undersigned, have reviewed and agreed to the terms and conditions set forth herein.

Date	/ /	Student
Date	/ /	Parent/ Guardian
Date	/ /	Daytime Phone
		Evening Phone
Date	/ /	Employer/ Supervisor
Date	/ /	CTE Teacher
Date	/ /	Home School Principal

The Syracuse City School District hereby advises students, parents, employees and the general public that it is committed to providing equal access to all categories of employment, programs and educational opportunities, including career and technical education opportunities, regardless of actual or perceived race, color, national origin, Native American ancestry/ethnicity, creed or religion, marital status, sex, sexual orientation, age, gender identity or expression, disability or any other legally protected category under federal, state or local law.
Inquiries regarding the District's non-discrimination policies should be directed to:
Executive Director of Student Support Services, Civil Rights Compliance Officer, Syracuse City School District, 725 Harrison Street • Syracuse, NY 13210
(315) 435-4131, Email: CivilRightsCompliance@scsd.us

Teacher

Student

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

CTE Internship Program Application Form

(Form #2)

Personal Information

Last Name	First Name	Age	Date of Birth
Street		Home Telephone Number	Cell Phone Number
City, State, Zip		Emergency Contact Name	Telephone Number
Email Address		Relationship to Emergency Contact	
Primary Parent/ Guardian Name		Parent/ Guardian's Telephone Number Home Cell	
Primary Parent/ Guardian Email			
Secondary Parent/ Guardian Name		Secondary Parent/ Guardian's Telephone Number Home Cell	
Secondary Parent/ Guardian Email			
Working Papers Certificate Number		SCSD Student schedule should be attached to this form School Counselor	

School Year Training/ Work Schedule Availability

Please list the hours you can work during a typical weekly schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Please check applicable box: ☐ Fixed Schedule ☐ Schedule will vary

Sports, Clubs, and Other Activities

Transportation

Please check the appropriate response

Do you have a license? ☐ Yes ☐ No	If YES, which license do you have? ☐ Full License ☐ Junior License
Do you drive to school? ☐ Yes ☐ No	License Number:

If you do not have a license, how do you plan on getting to and from your internship?

☐ Public Transportation ☐ Other

Teacher

Student

INSURANCE COVERAGE IN CASE OF INJURIES TO STUDENT AT INTERNSHIP:

EMPLOYER'S WORKER'S COMPENSATION MUST COVER THE STUDENT IN CASE OF INJURIES AT TRAINING SITE.

PROGRAM AWARENESS STATEMENT TO BE CHECKED BY STUDENTS:

☐ In order to receive credit for my work-based learning experience, I must be training at a legal site approved by the school's CTE Teacher or work-based learning coordinator.

☐ I must notify my CTE teacher or work-based learning coordinator immediately if there is a change of work schedule or duties at the training site.

☐ Failure to report any disciplinary action, termination, or proper documentation of hours may result in the student not earning school credit.

☐ Students must present all daily attendance records to CTE teacher or work-based learning coordinator weekly and complete all assignments related to the program.

☐ I must immediately notify my work-based learning coordinator if I have or develop any medical condition(s) which affects my ability to participate in training, such as allergies, lifting heavy items, movement, standing, sitting, migraine headaches, etc. If there are any current conditions, please state them below. The presence of such a condition will not necessarily preclude me from participating in the internship and accommodations may be provided.

PARENTAL/GUARDIAN PERMISSION AND PICTURE/NEWS STORY RELEASE:

I give my child,_____ permission to participate in the work-based learning internship at the Syracuse City School District. By signing the parental permission form, it is understood that:

- All the information is accurate.
- In order to receive credit, students must work a minimum of 150 hours during the school year.
- All students must report to CTE teacher or work-based learning coordinator in the case of any change in employment.
- Failure to report any disciplinary action, termination, or proper documentation may result in the student not earning school credit.
- Students must present all daily attendance records to CTE teacher or work-based learning coordinator weekly and complete all assignments related to the program.
- A student with a junior license must only drive to school if they go directly to work following the school day and they must carry with them the proper paperwork as directed by the work-based learning coordinator.

In addition to agreeing with the above statements, please check off one:

☐ I give permission for my child's photograph or name to be used to promote the Work Experience Program.

☐ I do not want my child's photograph or name to be used to promote the Work Experience Program.

_____	_____	___/___/___
Parent/ Guardian's Name	Parent/ Guardian's Signature	Date

_____
Relationship to Student

_____	_____	___/___/___
Student's Name	Student's Signature	Date

The Syracuse City School District hereby advises students, parents, employees and the general public that it is committed to providing equal access to all categories of employment, programs and educational opportunities, including career and technical education opportunities, regardless of actual or perceived race, color, national origin, Native American ancestry/ethnicity, creed or religion, marital status, sex, sexual orientation, age, gender identity or expression, disability or any other legally protected category under federal, state or local law. Inquiries regarding the District's non-discrimination policies should be directed to: Executive Director of Student Support Services, Civil Rights Compliance Officer, Syracuse City School District, 725 Harrison Street • Syracuse, NY 13210/ (315) 435-4131, Email: CivilRightsCompliance@scsd.us

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

CTE Internship Ready to Work Assessment

(Form #3)

Teacher | Employer | Student

Name _____ Program _____ Date ___/___/___

Scale

1 = Seldom. 2 = Occasionally. 3 = Usually. 4 = Always.

		Student	Teacher	Onsite Supervisor
ZEST				
1	Actively participates			
2	Shows enthusiasm			
3	Invigorates others			
GRIT				
4	Finishes whatever he or she begins			
5	Tries very hard even after experiencing failure			
6	Works independently with focus			
SELF CONTROL SCHOOL WORK				
7	Comes to class prepared			
8	Pays attention and resists distractions			
9	Remembers and follows directions			
10	Gets to work right away rather than procrastinating			
SELF-CONTROL INTERPERSONAL				
11	Remains calm even when criticized or otherwise provoked			
12	Allows others to speak without interruption			
13	Is polite to adults and peers			
14	Keeps his/her temper in check			

		Student	Teacher	Onsite Supervisor
OPTIMISM				
15	Gets over frustrations and setbacks quickly			
16	Believes that effort will improve his or her future			
GRATITUDE				
17	Recognizes and shows appreciation for others			
18	Recognizes and shows appreciation for his/her opportunities			
SOCIAL INTELLIGENCE				
19	Is able to find solutions during conflicts with others			
20	Demonstrates respect for feelings of others			
21	Knows when and how to include others			
CURIOSITY				
22	Is eager to explore new things			
23	Asks and answers questions to deepen understanding			
24	Actively listens to others.			
ACADEMIC PERFORMANCE				
25	Completes all assignments with quality and timeliness			
26	Uses tools appropriately and safely			
COMMITMENT				
27	Attends class with one or less absences per quarter			
28	Demonstrates loyalty and appreciation to the program and instructors			

Teacher

Employer

Student

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

CTE Internship Training Plan
(Form #4)

Student's Name	Email	
Student's Address	Telephone	Date of Birth
CTE Program Career Cluster	Working Papers Certificate #	
School Coordinator		
Phone Number		
Fax Number		
Email		
Employer		
Phone Number		
Fax Number		
Email		
Immediate Job Supervisor		
Phone Number		
Email		
Corporate Address		

Training Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Insurance Coverage

- ☐ Student is a non-paid intern – Worker's Compensation
- ☐ Student is a non-paid observer – Worker's Compensation

Transportation Provided by

- ☐ Student/parent will provide own transportation
- ☐ School district will provide transportation during school hours

Goals for this Work-Based Learning Student:

1. To explore, learn and develop the skills necessary for this career.
2. To develop the Career Ready Practices necessary for success in the global, competitive world.
3. To be trained in the safe operations of this job title.
4. To be able to demonstrate positive behavior and appropriate dress.

(Form #4 Continued)

JOB TASKS AND LEARNING OUTCOMES (Determined by the Employer and Coordinator)	ACHIEVEMENT LEVEL AND COMMENTS 1. Mastered skill 2. Needs more training at the work site. 3. Needs more training at school. 4. Has not reached this training area.
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

CAREER READY PRACTICES	Always	Frequently	Occasionally	Rarely
1. Student works cooperatively as a team member?	☐	☐	☐	☐
2. Student is able to read instructions for information and application.	☐	☐	☐	☐
3. Student can calculate and measure for information and application.	☐	☐	☐	☐
4. Student can behave in a responsible manner without supervision.	☐	☐	☐	☐
5. Student can communicate verbally and in writing to evoke clear understanding.	☐	☐	☐	☐
6. Student demonstrates good listening and follow through skills.	☐	☐	☐	☐
7. Student demonstrates critical thinking and problem solving skills.	☐	☐	☐	☐
8. Student can locate and manage resources for problem solving.	☐	☐	☐	☐
9. Student demonstrates a positive work ethic.	☐	☐	☐	☐
10. Student demonstrates computer literacy.	☐	☐	☐	☐

(Form #4 Continued)

SAFETY TRAINING	DATE OF SAFETY TRAINING	ACHIEVEMENT LEVEL AND COMMENTS 1. Mastered safety training instruction. 2. Needs more safety training at work site. 3. Needs more safety training at school. 4. Has not reached this training area.
1. Safety precautions related to stairs, floors, office equipment and furniture.		
2. Safety precaution related to proper dress apparel, shoes, gloves, head, eye and ear protection.		
3. Safety precaution related to use of tools, machines, and chemicals.		
4. Safety precautions related to fire, weather and other natural disasters.		
5. Safety precautions related to sexual harassment and workplace violence.		

DRESS AND BEHAVIOR CODE FOR POSITION	ACHIEVEMENT LEVEL AND COMMENTS 1. Dresses/behaves appropriately 2. Needs to modify dress/behavior. 3. Needs personal consultation.

Employer Name	Employer Signature	Date / /
Work-based Learning Coordinator Name	Work Based Learning Coordinator Signature	Date / /
Parent/ Guardian Name	Parent/Guardian Signature	Date / /
Student Name	Student Signature	Date / /

If you have any questions please do not hesitate to contact me at (315) 435-_____.

Thank you for your cooperation! _____ , CTE Teacher

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD CTE Internship
Notification of Unpaid Internship
(Form #5)

This form serves as notification that the Syracuse City School District CTE Internship is an unpaid internship and students are not due any wages per New York State Department of Labor.

_____	____/____/____
Student	Date
_____	____/____/____
CTE Teacher/ WBL Coordinator	Date
_____	____/____/____
Worksite Representative/ Mentor	Date

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD Internship Safety Certification
(Form #6)

Student _____ Date ____/____/____

Mentor or Supervisor _____ CTE/ WBL Teacher _____

Student CTE Program SCSD Career and Technical Program:

_____

SAFETY CERTIFICATIONS		Date
OSHA 10	☐	/ /
Safe Serv	☐	/ /
First Aid	☐	/ /
CPR	☐	/ /
Other	☐	/ /

Teacher

Employer

Student

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD Internship Worksite Orientation
(Form #7)

Student _____ Date ___/___/___

Mentor or Supervisor _____ CTE/ WBL Teacher _____

Company Orientation

Directions: Be sure that your student employee obtains information about the factors listed below. Check the information on each item as it is completed. Return the completed form to the CTE Teacher or Work Based Learning Coordinator.

Tour of Workplace

- ☐ A tour of the workplace
- ☐ An overview of the company safety plan
- ☐ Introductions to co-workers

Tour of Employee Facilities

- ☐ Rest rooms
- ☐ Lunch room
- ☐ Where to store personal belongings

Other _____

Safety Plan

- ☐ Safety plan
- ☐ Stairwell/fire exits
- ☐ Fire Extinguishers
- ☐ Special hazards
- ☐ Accident prevention
- ☐ Safety Training Log, updated as needed

About the Company

- ☐ Discuss company organizational structure
- ☐ Review type of business, products, services
- ☐ Overview of who the customers are

Other _____

Department/Position Specifics

- ☐ Explanation of work schedule
- ☐ Review of dress and conduct code
- ☐ Review of hours, breaks and lunch policies
- ☐ Location of time clock or sign-in
- ☐ Attendance requirements, including procedures for calling in when absent
- ☐ Relationship to working with other departments or co-workers

Job Specific

- ☐ How to use the phones and office equipment
- ☐ Supplies, paper, pens, etc.
- ☐ Job description, Work-Based Learning Plan and evaluation process

Supervisors Expectations

- ☐ Dress code including clothing, hair and jewelry
- ☐ Work performance including productivity and work habits
- ☐ Company culture

Materials provided to intern

- ☐ Copy of personnel handbook
- ☐ Organizational charts
- ☐ Telephone directory
- ☐ Security procedures

Employer/training sponsor _____ Date ___/___/___

Student _____ Date ___/___/___

CTE Teacher/WBL Coordinator _____ Date ___/___/___

Teacher

Employer

Student

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

Weekly Time Log/Record of Attendance
(Form #8)

Student _____ Training Title _____

Worksite Supervisor _____

Time Log for the Week of: ____/____/____

	Date	Start Time	End Time	Hours Worked
Sunday				
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				

Total Weekly Hours: _____

Student please list any new tasks performed this week: _____

By signing this timesheet, you are certifying that it is correct and truthful.

Student's Signature _____ Date ____/____/____

Supervisor Name _____ Phone _____ Date ____/____/____

Supervisor's Signature _____

Attention Worksite Supervisor:
If you have any questions or concerns, please contact: _____ CTE Teacher _____ Phone

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD CTE Internship Student Evaluation

(Form #9)

Name _____ CTE Program _____

Dates of Internship _____ / _____ / _____ — _____ / _____ / _____ Year to Graduate _____

Please complete this form upon completion of your internship.

	Strongly Agree	Agree	Indifferent	Disagree	Strongly Disagree
Overall, I had a great experience	☐	☐	☐	☐	☐
I was actively involved in the team meetings and felt free to express my thoughts and opinions	☐	☐	☐	☐	☐
My mentors encouraged and responded to my questions	☐	☐	☐	☐	☐
I have an increased appreciation for teamwork	☐	☐	☐	☐	☐
I have a greater ability to ask good questions and synthesize information	☐	☐	☐	☐	☐
I was presented with opportunities to learn by doing	☐	☐	☐	☐	☐
I gained factual knowledge about careers throughout the internship	☐	☐	☐	☐	☐
I would recommend this opportunity to others	☐	☐	☐	☐	☐
My time was well spent	☐	☐	☐	☐	☐
I would consider this employer as a future employer	☐	☐	☐	☐	☐
My co-workers are generally positive about work	☐	☐	☐	☐	☐

The best thing about my experience was… _____

_____

The worst thing about my experience was… _____

_____

Any suggestions on how we could improve the intern experience? _____

_____

Other comments… _____

Syracuse City School District

Syracuse City School District
725 Harrison Street, Syracuse, NY 13210

SCSD CTE Internship Mentor Program Evaluation

(Form #10)

Student Name _____ SCSD School _____

Interning Location _____

Supervisor/ Mentor Name _____ Date ____/____/____

Internship Preparation

- ☐ Exceptional
- ☐ Adequate
- ☐ Inadequate

Modes of Communication with SCSD Personnel

- ☐ In-Person
- ☐ Email
- ☐ Phone

Amount of Communication with SCSD Personnel

- ☐ Exceptionally good
- ☐ Appropriate
- ☐ Too much
- ☐ Too little

Suggestions for improvement: _____

Additional comments: _____

Return to CTE teacher: _____
CTE Teacher Email

BOARD OF EDUCATION

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NOTICE OF NON-DISCRIMINATION

The Syracuse City School District hereby advises students, parents, employees and the general public that it is committed to providing equal access to all categories of employment, programs and educational opportunities, including career and technical education opportunities, regardless of actual or perceived race, color, national origin, Native American ancestry/ethnicity, creed or religion, marital status, sex, sexual orientation, age, gender identity or expression, disability or any other legally protected category under federal, state or local law.

Inquiries regarding the District's non-discrimination policies should be directed to:

Assistant Superintendent for Student Support Services, Civil Rights Compliance Officer
Syracuse City School District
725 Harrison Street • Syracuse, NY 13210
(315) 435-4131

Email: CivilRightsCompliance@scsd.us

Return to TOC

F. Employability Profile

> *The employability profile is a record of student achievement. That may include documentation of the student's attainment of technical knowledge and work-related skills, endorsements, licenses, clinical experience, work experience, performance on core academic Regent's examinations, performance on industry based assessments, attendance, student leadership honors and achievements and other honors or accolades of student success.*

Process

- An employability profile model is developed for the program
- A profile of student achievement is developed for each student in the program and is maintained in accordance with records and retention policies of the school district/BOCES.
- The profile of student achievement is reviewed and updated on a continuous basis by the student and the appropriate program/guidance personnel.
- The work skills to be mastered by students with disabilities should be aligned with the student's Individualized Education Program (IEP).

Documentation

Recommendations for the employability profile model should be included in the self-study report and reviewed by the external committee.

Source: http://www.p12.nysed.gov/cte/ctepolicy/guide.html

EMPLOYABILITY PROFILE

Welding

Industry Based Skill Standards

Proficiency Definitions

NA = Not Applicable **1 = Developing** **2 = Basic** **3 = Proficient** **4 = Mastery**

	9th	10th	11th	12th
History of Welding				
Recognizes some of the significant developments in the history of welding.				
Personal and Professional Goal Setting and Success				
Defines principles that contribute to personal and professional success. Demonstrates different types of skills needed for a successful welder				
Effective Communication in welding				
Displays written and verbal communication effectively. Interprets instruction or directions for a specific welding job before, during, and/or after welding				
Shop / Jobsite Safety				
Understands machinery and tool hazards present in a welding shop/jobsite and the safety features that can be used in an emergency				
Tools and Equipment				
Demonstrates proper use of machinery, power tools, and hand tools after thorough training. Follows all maintenance recommendations and inspects the equipment before each use				
Welding and Cutting				
Identifies recent developments in welding and cutting processes. Uses various processes currently used in industry. Utilize and differentiate between Plasma arc cutting and Oxy-fuel cutting				
The Physics of Welding				
Understands and can differentiate the 3 properties of metal - Physical, Chemical, and Mechanical				
Math for Welding				
Describes and utilizes applications for math in welding and in personal life. Can add, subtract, multiply, and divide whole numbers, fractions, and decimals. Able to convert between fractions and decimals				
Math Applications for Welders				
Measure using both U.S. customary (standard) system and the S.I. metric system. Convert lengths from standard units to metric units and from Metric units to Standard units. Calculate the perimeter, area, and volume of common shapes. Convert welding values from and to standard and metric units				

	9th	10th	11th	12th
Weld Joints and Positions				
Identifies the five basic weld joints and the types of welds that can be made on each joint. Describe a stringer bead and a weave bead. List the four welding positions and state the conditions in the four welding				
Welding Symbols				
Identifies the basic types of welds indicated on the ANSI / AWS welding symbol. Locate information on the weld symbol to determine the size of the root opening, the groove angle, and the desired size, contour, and finish of the weld				
Shielded Metal Arc Welding (S				
Identify the equipment and accessories used in SMAW. List components of an arc welding outfit and welding station. Explain the assembly of a welding machine, leads, and electrode holder. Set the proper amperage and polarity on a welding machine				
Gas Metal Arc Welding (GMAW) & Flux-cored Arc Welding (FCAW)				
Identify the equipment and accessories used in GMAW and FCAW. List components of a GMAW and FCAW welding outfit and welding station. Explain the assembly of a welding machine, leads, and electrode holder.				
Gas Tungsten Arc Welding (GT				
Identify the equipment and accessories used in GTAW. List components of a GTAW welding outfit and welding station. Explain the assembly of a welding machine, leads, and electrode holder. Set the proper amperage and polarity on a welding machine				
Oxyfuel Welding and Cutting				
Identify and describe the parts of an Oxyfuel gas cutting/welding outfit. List and perform safety precautions when using oxyfuel systems. Handles and cares for oxygen and gas cylinders properly and safely				
Inspecting and Testing Welds				
Differentiate between a welding flaw and welding defect. List most common types of nondestructive and destructive testing done on welds. Perform several basic types of tests on welds to evaluate weld quality				
Welder Certification				
Describe the use of codes and specifications to provide needed information on a required weld. List the steps that must be followed to conform to most codes. Understands the different types of welder certifications and how to obtain them				

WELDING
EMPLOYABILITY PROFILE

Student Name: _____ School Year: _____ Absences: _____

ID Number: _____ Teacher: _____ Final Grade: _____

Career Ready Practices / Career Development Standards

STANDARDS DEFINITIONS

NA = Not Applicable 1 = Developing 2 = Basic 3 = Proficient 4 = Mastery

	9th	10th	11th	12th
Acts as a responsible citizen/employee				
Is on time and prepared, follows workplace policies, demonstrates reliability and dependability, is polite and courteous to adults and peers, demonstrates appreciation, and is reliable and consistent in their actions				
Applies appropriate academic and technical skills				
Demonstrates an understanding of the academic knowledge and skills associated with their trade. Technical skills are developed with academic competencies including English language arts and science that are integrated within the CTE program.				
Attends to personal health and financial well-being				
Recognizes the benefits of physical, mental, social, and financial well-being to the importance of that success in their career. Accepts criticism and works towards self-improvement targets on a consistent basis.				
Communicates clearly, effectively, and with reason.				
Is able to communicate both verbally and in writing to express ideas and obtain information. Uses appropriate vocabulary to share information both verbally and in writing as well. Demonstrates active listening skills and verbal communication.				
Makes appropriate decisions				
Considers the environmental, social, and economic impacts of their decisions. Understands that their actions and decisions will impact other people directly. Works independently and responds positively to new ideas and suggestions.				
Demonstrates creativity and innovative thought				
Demonstrates creativity and new thinking to solve workplace problems as encountered. Is creative, innovative, and is eager to explore new ways of addressing issues and challenges that are encountered.				
Employs valid and reliable research strategies				
Seeks information to develop a deeper understanding of issues encountered. Uses technology as a tool to research, organize, and evaluate information critically incompetently. Interprets information and draws conclusions based on best analysis.				
Uses critical thinking skills and demonstrates perseverance				
Demonstrates problem-solving skills through the use of creative thinking, decision-making, and adaptability. Effectively reasons through difficult situations, and makes decisions even when faced with complex or challenging problems.				

	9th	10th	11th	12th
Models integrity, ethical behavior, and leadership				
Is accountable and transparent in all of their work and assignments. Consistently exhibits ethical behavior, and commitment to completing tasks as assigned. Develops and demonstrates leadership skills, assuming responsibility readily.				
Develops and implements a Career Plan				
Develops a career plan based on understanding of their personal goals and the career pathways that aligns to them. Develops resumes, cover letters, and examples of best work to aid in the job seeking process and/or entrepreneurial goals.				
Uses technology to enhance productivity				
Demonstrates an understanding of the use of technology related to their career pathway. Continually develops their ability to adapt to changing work environments using technology, including new tools and their associated applications.				
Works as a productive and respectful team member				
Actively participates as a member of a team recognizing and appreciating others skills and abilities. Adds to the collective value of the team, and invigorates others to add to the collective efforts and goals.				
Demonstrates reliability and dependability				
Regardless of tasks given, demonstrates reliable and dependable behaviors to meet the expectations as defined. Attendance and levels of participation meet expectations consistently. Take on additional responsibilities without prompting.				
Arrives on time and is prepared to work				
Consistently demonstrates promptness, reliability, and commitment to reporting for classes, work site experiences, and other assignments as defined. Reports prepared for work or education as requirements dictate, meets attendance requirements.				
Demonstrates safe working habits				
When engaging in worksite situations or learning labs, uses tools and equipment safely, observes general safety guidelines for material handling, and meets the expectations of maintaining a safe work environment for others.				
Demonstrates problem solving skills				
Addresses problems encountered using effective problem-solving strategies. Works to define potential solutions to problems, identifies and implements the best solution based on the information gathered and their skill and knowledge.				

Earned Technical Endorsement on Diploma **YES** ☐ NO ☐

Industry Credential(s) Awarded _____

Special Recognitions or Scholarships _____

Student Leadership Organization _____

Return to TOC