

Student Name: _____

Date: _____

PROGRAM COMPETENCY PROFILE FOR CAREER TECHNICAL EDUCATION
Career Cluster: Manufacturing

Program Name: Welding Technology/Welder CIP: 480508

Effective 08/11

National Standard: American Welding Society

Competencies (statement that provides the overview and defines the instructional area) Student will:	Knowledge, Content and Skills (what a student needs to know and be able to do and upon which they will be assessed) Student will:	<u>NH Common Core State Standards</u> – Aligned • English/Language Arts/Literacy: E • Mathematics: M • Science: S • Art: A	Rating Scale -Sample Performance Assessments (Performance tasks the student needs to demonstrate in order to be rated proficient in meeting the competency) Student will:				
Understand proper use of tools and equipment, and preventative maintenance practices to provide a safe work environment.	1. Identify safety policies and demonstrate the proper use of personal safety equipment and emergency equipment. AAI 8. Health, Safety, and Environment: Explain the health and safety laws and practices affecting the employee, the surrounding community, and the environment in this industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example: <ol style="list-style-type: none"> As an entry level welder you have to participate in a training session that encompasses all the safety protocol and though a written exam. As a new employee maybe required to complete the OSHA 10 certification .Report on strength and weaknesses of your performance on the assessments to your immediate supervisor. 	1	2	3	4
1	2	3	4				
	2. Interpret and comply with Material Safety Data Sheets and explain and interpret information on labels and signs. AAI 8. Health, Safety, and Environment: Explain the health and safety laws and practices affecting the employee, the surrounding community, and the environment in this industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example: Given the MSDS for proper material handling and PPE, as a new employee at General Electric, you are asked to clean your production components prior to welding. It is your responsibility to choose the best chemical cleaner for the application and report out why you choose that cleaner.	1	2	3	4
1	2	3	4				

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	3. Demonstrate the proper use of tools and power equipment and proper setup and operation of portable and fixed power tools/equipment. AAI 4. Technical and Production Skills: Identify specific production and technical skills required for this industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For Example: As a foreman you are now overseeing a new employee set up and operate all tools and equipment required for the job that is being done. A formal report assessing their performance will be reviewed with them..	1	2	3	4
1	2	3	4				
	4. Demonstrate proper service and repair techniques for equipment systems and implement preventive maintenance practices. AAI 4. Technical and Production Skills: Identify specific production and technical skills required for this industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example: A piece of equipment needs to be repaired/serviced. You need to send it to a qualified repair facility. Generate the work order to identify needed repairs.	1	2	3	4
1	2	3	4				
Understand Basic Metal identification to comprehend how it affects the welds.	5. Identify metals by use of basic shop testing.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example: You are hired by Carl Edwards to build a race car for Dale Earnheart and you need to determine which materials are currently being used on the roll cage. You will create a list and your findings will be put into a report.	1	2	3	4
1	2	3	4				

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Understand the use of oxy fuel equipment in order to comprehend how it effects the safety of the equipment.	6. Demonstrate the installation of regulators, lines and torch; check for gas leaks using approved methods; and shut down oxy/fuel system.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td></tr> </table> <p>For example: As a welder working for Pike Industries, there is a large piece of equipment that is broken. You arrive with your portable welding truck. You need to analyze the situation which requires the use of oxy fuel cutting equipment and cut off the obstruction. (cont. to #7)</p>	1	2	3	4
	1	2	3	4			
7. Select proper torch and tip size for the task and demonstrate igniting and adjustment for the proper flame for the task. AAI 4. Technical and Production Skills: Identify specific production and technical skills required for this industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td></tr> </table>	1	2	3	4	
1	2	3	4				
Understand the use of Shielded Metal Arc Welding (SMAW) equipment and their performance to illustrate how they are critical to the integrity of the weld.	8. Demonstrate proper equipment safety and identify the major components of the machine		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td></tr> </table> <p>For example: As a welder working for PSNH at a steam turbine plant. A high pressure steam line ruptures and damages the pipe support system. You have analyzed the situation and know what action to take. You must properly set up SMAW welding cables, and choose polarity and electrode. Perform proper base metal cleaning and joint design to complete necessary repairs. (cont. to #9&10)</p>	1	2	3	4
1	2	3	4				

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	9. Demonstrate proper base metal cleaning techniques , joint fit up, setup procedures , correct polarity and proper electrode selection for the task . AAI 4. Technical and Production Skills: Identify specific production and technical skills required for this industry.		<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4
1	2	3	4				
	10. Demonstrate a groove and fillet weld in the 1G (flat) and 2F (horizontal-fillet) in accordance with the AWS standards.		<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4
1	2	3	4				
Understand the use of Gas Metal Arc Welding (GMAW) and Flux Core Arc Welding (FCAW) equipment and performance to illustrate how they are critical to the integrity of the weld.	11. Demonstrate proper equipment safety and identify the major components of the machine and accessory equipment applicable to the process.		<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> For example: As a welder for Isaac’s Structural Steel working on the production line, a very large steel column needs to be fabricated using both GMAW and FCAW processes. It is your job to set up the equipment and area for safety; select the proper wire, polarity, and shielding gas. Clean and prepare the 2F fillet joint for solid wire welding and the 1G joint for flux core wire welding. (cont. #12, 13)	1	2	3	4
1	2	3	4				

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	12. Demonstrate proper base metal cleaning techniques, joint fit up, polarity, wire selection (e.g., solid or flux core), and shielding gas. AAI 4. Technical and Production Skills: Identify specific production and technical skills required for this industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table>	1	2	3	4
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Understand the use of Gas Tungsten Arc Welding (GTAW) equipment and performance to illustrate how they are critical to the integrity of the weld.	14. Demonstrate proper equipment safety and identify the major components of the machine and accessory equipment applicable to the process.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> <p>For example: As a pipe welder working at the Seabrook Power Plant, a high grade stainless steel container needs repair. It is your job to set up the equipment and area for safety; select the proper wire, polarity, and shielding gas. Clean and prepare the 2F and 1G joint for welding. (cont. #15, 16)</p>	1	2	3	4
1	2	3	4				
	15. Demonstrate proper base metal cleaning techniques, joint fit up, setup procedures, correct polarity, tungsten electrode, filler wire, and shielding gas.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table>	1	2	3	4
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	16. Demonstrate a groove and fillet weld in the 1G (flat) and 2F (horizontal-fillet) in accordance with the AWS standards.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4
1	2	3	4				
Understand the use of thermal cutting equipment and its performance in order to have a quality cut.	17. Describe and demonstrate safety procedures for thermal cutting, including but not limited to plasma arc and air carbon arc.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> For an example: As an inspector for Mr. Gadgets Inspections, there have been some discrepancies in a major weldment. You have decided that a thermal cutting process has to be used in order to remove the faulty weld material. After process has been completed, inspection is required prior to welding. (cont. #18)	1	2	3	4
	1	2	3	4			
18. Demonstrate and set up straight line cuts and weld gouging.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4	
1	2	3	4				
Understand terminology, resources, and standards of the trade that are necessary to have an efficient welding shop/facility.	19. Demonstrate Basic Blue Print Reading including field sketches, weld symbols, and bill of materials. AAI 5. Underlying Principles of Technology: Explain through discussion the technological systems used within this industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> For example: As a weld shop owner, a customer has stopped in asking for repairs on equipment. You now need to sketch a design, complete a formal Blue Print, include welding symbols, and present a Bill of Materials in order to charge the customer.	1	2	3	4
1	2	3	4				

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	20. Recognize and discuss written and verbally the skills in quality assurance and quality control as it pertains to Performance Quality Review, welding procedure sheets and destructive and non-destructive testing.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td></tr> </table> For example: As a Code Welding Inspector, an individual inquires on the process of becoming a certified welder. Your responsibility will be to deliver all the necessary information regarding the procedure.	1	2	3	4
1	2	3	4				
Understand the importance of leadership skills in order to better manage a welding shop/facility.	21. Demonstrate effective welding shop management skills. AAI 1. Planning: Explain the key elements of a long-term plan for a successful company. AAI 2. Management: Discuss the different forms of management and ownership within this industry. AAI 3. Finance: Explain the key components of financial management of a company.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td></tr> </table> For example: As the shop foreman, your supervisor has asked you to put in place a policy and procedure of the steps necessary for managing your department, staff, and product line.	1	2	3	4
1	2	3	4				
Understand the fundamental concepts of entrepreneurship and how entrepreneurship influences the economy.	22. Identify the economic, sustainability and cost awareness of the welding industry.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td></tr> </table> For example: Your company is faced with new competition. It is your responsibility to research the best methods of staying competitive in the industry. You will present your findings through a business plan to the Board of Trustees. (cont. #23)	1	2	3	4
1	2	3	4				

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	23. Discuss the options in planning the venture’s future (growth, development, demise). AAI 6. Labor Issues: Explain the employees’ and employers’ rights and responsibilities in this industry. AAI 7. Community Issues: Discuss the ways a company can impact its community and the ways a community can impact a company.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table>	1	2	3	4
1	2	3	4				
Understand the importance of personal growth and leadership to enhance career success.	24. Discuss personal growth, community leadership, democratic principles, and social responsibility in activities/events offered through student organizations.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For example: You have gone to your supervisor requesting a performance review do to the completion of additional trainings attended. The fact that you now have additional knowledge and skills, justifies why you should be promoted.	1	2	3	4
1	2	3	4				
Understand the necessary employability skills in order to achieve success in today’s workplace.	25. Decision-Making & Problem-Solving: Demonstrate and apply good decision-making and problem-solving skills by outlining issues in situations/problems and determining, collecting, and organizing information needed in order to formulate a solution.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For Example: You are in charge of three employees. Only one of the said employee is able operate the machine. This individual has come to you due to his/her frustration that he/she is overworked. You call a team meeting to communicate a clear and concise plan of action. (cont. #26-28)	1	2	3	4
1	2	3	4				

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	<p>26. Self-Management: Demonstrate and apply self-management skills by adhering to regulations, being responsible and following through on commitments.</p> <p>AAI 9. Personal Work Habits: Explain the work habits an employer looks for in an employee in this industry.</p>		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> <p>For Example:</p> <ul style="list-style-type: none"> - have a written test on applicable policies and procedures - assess student orientation knowledge through instructor observations and written unit test - review student handbook - adhere to regulations in school, classroom, and everyday settings - build trust by being consistent, dependable, and verbally positive with others - ask questions and listen to others - keep track of assignments and/or responsibilities - have work done on time - respond positively to constructive feedback - show respect for others and their points of view - set individual goals and document progress toward achieving those goals - take initiative to pursue learning - adapt as necessary to create a positive outcome for self and others - advocate appropriately for himself/herself 	1	2	3	4
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	27. Communication Skills: Demonstrate and apply effective communication skills: verbal, written, visual and listening.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;">2</td> <td style="width: 25%;">3</td> <td style="width: 25%;">4</td> </tr> </table> For Example: - be given a work order that contains written instructions of a specific job and complete the work order - create a power point presentation - participate in a debate - perform mock interviews - develop a topic - include details to support a main point - use appropriate grammar and sentence structure - organize writing and/or presentation materials - use constructive feedback to improve skill - participate in discussion and conversation by listening, entering in, taking turns, responding to others’ remarks, asking questions, summarizing and closing, as appropriate to the given context - use varied vocabulary for clarity and effectiveness - support his/her ideas in a public forum using the appropriate visual/audio aides - select and use the appropriate media and method(s) to communicate the subject effectively - adapt writing, speaking, and/or visual presentations effectively to a particular audience - act on or respond appropriately to verbal and non-verbal cues from the audience	1	2	3	4
1	2	3	4				

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	28. Ability to Work with Others: Demonstrate and apply the necessary skills in order to work effectively with others.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> For Example: - role play a situation in which there is a conflict which must be resolved - compose a list of what she/he believes to be the most common problems within that profession after reviewing appropriate work ethics standards - conduct an interview with a manager and share report with classmates - demonstrate knowledge of individual strengths he/she brings to a group - demonstrate knowledge of and respect for cultural and individual differences - demonstrate beginning skills in conflict management by outlining the issues involved and others’ points of view - demonstrate knowledge of the possible roles and responsibilities that individuals assume while working with others - demonstrate knowledge of group skills: listening, brainstorming, clarifying information, showing initiative, acknowledging contributions, defining group tasks, and responding positively to constructive feedback - demonstrate increasing skills in conflict management by brainstorming a variety of solutions and their possible outcomes - apply his/her individual strengths to enhance a group’s performance - assume responsibilities within a group - demonstrate the use of group skills in a way that enhances a group’s performance - demonstrate skills in conflict management by describing, justifying, and applying a resolution process, and reflecting on the outcome	1	2	3	4
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	29. Information Use - Research, Analysis, Technology: Demonstrate and apply the use of information through research, analysis, and technology.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> For Example: You are working in a foundry as a lab technician. The supervisor needs information pertaining to the proper chemical makeup of kryptonite. Create a report and send to Lex Luther. - do a research project and develop a presentation for the class - keep a daily notebook - show use of a plan for gathering information - gather information from a variety of sources, using a variety of technologies - use sources that are current and appropriate to the topic - evaluate sources for correct and trustworthy information - document sources of information appropriately - demonstrate and apply the skills in using software applications (MS Office) - use a filing/organization system for information, such as notebook, disk, etc. - justify the use of a particular organizational system for a particular product - demonstrate effective communication skills (written, oral, listening) - effectively present a thesis, supporting evidence, and a conclusion using a variety of media	1	2	3	4
1	2	3	4				

Key: Rating Scale: 1 NO EXPOSURE; 2 = NOVICE (Information was covered in class, but student cannot demonstrate skill or knowledge without significant supervision); 3 = PROFICIENT (Student regularly demonstrates the knowledge or skill); 4= MASTERY (Student demonstrates successful completion of this skill numerous times without supervision.)

PROGRAM COMPETENCY PROFILE FOR CAREER TECHNICAL EDUCATION
Career Cluster: Manufacturing

Program Name: Welding Technology/Welder CIP: 480508
 National Standard: American Welding Society

Effective 8/09

<p>Competencies (statement that provides the overview and defines the instructional area) Student will:</p>	<p>Knowledge, Content and Skills (what a student needs to know and be able to do and upon which they will be assessed) Student will:</p>	<p><u>NH Common Core State Standards</u> – Aligned</p> <ul style="list-style-type: none"> • English/Language Arts/Literacy: E • Mathematics: M • Science: S • Art: A 	<p>Rating Scale -Sample Performance Assessments (Performance tasks the student needs to demonstrate in order to be rated proficient in meeting the competency) Student will:</p>				
	<p>30. Mathematical Concepts: Demonstrate mathematical and computation skills as applied to real world situations: fabrication problems, whole numbers, fractions, decimals, rounding, geometry, and trigonometry (EG2.0-95).</p>		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> <p>For Example: You work for Multi-Weld services and you have to fabricate a set of stairs and railings. Given pre-determined height and following code requirements calculate the rise and run using basic geometric concepts.</p> <ul style="list-style-type: none"> - keep a log of all possible uses of mathematics noticed throughout the class/lab/worksite - compute accurately, applying addition, subtraction, multiplication, and division on real numbers, fractions, percents, and decimals - collect, interpret, organize and display relevant data for solving a mathematics problem - translate real world problems into mathematical representations - express and present mathematical ideas clearly in everyday written and oral language - express in written and oral language how mathematics connects to other contexts outside the mathematics classroom - use basic numerical concepts such as whole numbers and percentages in practical situations; make reasonable estimates of arithmetic results without a calculator; and use tables, graphs, diagrams, and charts to obtain or convey quantitative information - approach practical problems by choosing appropriately from a variety of mathematical techniques; use quantitative data to construct logical explanations for real world situations; express mathematical ideas and concepts orally and in writing; and understand the role of chance in the occurrence and prediction of events 	1	2	3	4
1	2	3	4				

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	<p>31. General Safety: Demonstrate and apply safe practices and procedures in the workplace.</p>		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; text-align: center;">1</td> <td style="width: 25%; text-align: center;">2</td> <td style="width: 25%; text-align: center;">3</td> <td style="width: 25%; text-align: center;">4</td> </tr> </table> <p>For Example: (refer to #1-3) - develop scenarios of hazards and accidents using publications and the internet - be observed by teacher - take written quizzes/written tests - demonstrate knowledge of safety and sanitation practices and procedures - identify and report hazardous conditions and safe working procedures - use personal protective equipment and clothing</p>	1	2	3	4
1	2	3	4				

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	<p>32. Career Development: Demonstrate personal/career development skills by completing a career plan.</p>		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; text-align: center;">1</td> <td style="width: 25%; text-align: center;">2</td> <td style="width: 25%; text-align: center;">3</td> <td style="width: 25%; text-align: center;">4</td> </tr> </table> <p>For Example:</p> <p>Covered under entrepreneurship.....</p> <ul style="list-style-type: none"> - complete a self-awareness inventory - develop a career portfolio - use a career software, such as Choices, to measure their aptitudes and abilities for particular careers - use available resources (college catalogs and websites) to research information about postsecondary educational opportunities - select a career in the field and outline educational and skill requirements, expected job growth, and salaries - review with teacher software printout to assess their aptitudes and abilities - make appropriate choices in pursuit of postsecondary education or training and/or direct entry into the world of work - plan a senior experiential project to review and evaluate a variety of career choices 	1	2	3	4
1	2	3	4				

Key: Rating Scale: 1 NO EXPOSURE; 2 = NOVICE (Information was covered in class, but student cannot demonstrate skill or knowledge without significant supervision); 3 = PROFICIENT (Student regularly demonstrates the knowledge or skill); 4= MASTERY (Student demonstrates successful completion of this skill numerous times without supervision.)