

Metal Fabrication Welding

Curriculum Content Frameworks

Please note: All assessment questions will be taken from the knowledge portion of these frameworks.

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Curriculum Content Frameworks

Metal Fabrication Welding

Grade Levels: 9-12
Course Code: 495570

Prerequisite: None

Course Description: This instructional program prepares individuals to apply technical knowledge and skills to unite or separate metal parts by heating, using a variant of techniques and equipment.

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Unit 1: Demonstrating Manual Oxyfuel Gas Cutting

Hours: 35

Terminology: Acetylene, Cutting head, Cutting tip, Cutting torch, Cylinder, Cylinder gauge, Flame cutting, Flashback, Gouging, HAZ (heat-affected zone), OAC (oxygen arc cutting), Preheating, Shield, Torch, Workpiece, Workpiece lead

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
1.1 Define terminology related to oxyfuel gas cutting	1.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to metal fabrication [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
1.2 Identify the theoretical principles behind oxyfuel gas cutting	1.2.1 Explain all applied principles of oxyfuel gas cutting	Foundation	Reading	Uses appropriate materials and techniques as specified [1.3.20]	
1.3 List steps to perform safety inspections of welding equipment and accessories	1.3.1 Perform inspection of oxyfuel gas cutting equipment and accessories (clothing, hand tools, and base metal) on a daily basis	Foundation	Reading	Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]	
1.4 Identify minor external repairs to equipment and accessories	1.4.1 Discover minor repairs required for safe operation of oxyfuel gas cutting equipment	Foundation	Reading	Reads and follows instructions to operate technical equipment [1.3.19]	
	1.4.2 Perform inspection of hoses to check for leaks			Uses standard occupational resource materials [1.3.22]	
	1.4.3 Adjust gauges to ensure proper working order				
	1.4.4 Inspect cutting tip to make sure it is free of any obstruction				

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
1.5 Describe setup for manual oxyfuel gas cutting operations and base metal preparation on carbon steel	1.5.1 Demonstrate proper use of protective clothing and accessories 1.5.2 Determine correct electrodes for various cutting thicknesses 1.5.3 Assemble components (gauges, hoses, torch, cutting tip), adjusting to proper polarity and current 1.5.4 Apply principles of oxyfuel gas cutting operation in accordance with instructor's guidelines	Foundation	Listening Reading	Listens to follow directions [1.2.6] Analyzes and applies what has been read to specific task [1.3.2] Reads and follows instructions to operate technical equipment [1.3.19]	
1.6 Outline operation manual of oxyfuel cutting equipment	1.6.1 Demonstrate proper operation of manual oxyfuel cutting equipment by adherence to welding assignment 1.6.2 Adjust equipment to obtain a neutral flame 1.6.3 Perform inspection of cut surfaces 1.6.4 Compare types of gases and flames 1.6.5 Practice proper shutdown of equipment 1.6.6 Use protective clothing accessories correctly	Foundation	Science	Applies knowledge to complete a practical task [1.4.3]	
1.7 Explain how to lay out a straight cut on carbon steel	1.7.1 Perform a straight production cut on carbon steel surface	Foundation	Science	Applies knowledge to complete a practical task [1.4.3]	
1.8 Describe how to make a shape cut on carbon steel	1.8.1 Perform a shape cut to specific specifications on carbon steel	Foundation	Science	Applies knowledge to complete a practical task [1.4.3]	
1.9 Identify a bevel cut on plain carbon steel	1.9.1 Perform a bevel cut on plain carbon steel	Foundation	Science	Applies knowledge to complete a practical task [1.4.3]	
1.10 Outline removal of weld metal from plain carbon steel, using weld washing techniques	1.10.1 Correctly remove weld metal from plain carbon steel	Foundation	Science	Applies knowledge to complete a practical task [1.4.3]	

Unit 2: Demonstrating Machine Oxyfuel Gas Cutting (OFC Track Burner)

Hours: 20

Terminology: Track burner

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
2.1 Define terminology related to oxyfuel gas cutting using a track burner	2.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to metal fabrication [1.3.6]
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]
2.2 Outline safety inspections of equipment and accessories	2.2.1 Perform inspection of OFC equipment and accessories (clothing, hand tools, base metal)	Foundation	Reading	Follows written directions [1.3.13]
	2.2.2 Perform inspection of hoses, checking for leaks or damage			
	2.2.3 Perform inspection of track to ensure it is free of any obstructions			
	2.2.4 Perform complete inspection of electrical cords and gauges on a daily basis			
2.3 Identify minor repairs to equipment and accessories	2.3.1 Fix minor repairs required to ensure safe operation of OFC track burner equipment	Thinking	Seeing	Organizes and processes images, symbols, pictures, graphs, objects, etc. [4.6.2]
	2.3.2 Ensure gauges are in proper working order			Visualizes a system's operation from schematics [4.6.3]
	2.3.3 Clean cutting tip to ensure it is free of any obstructions			

CAREER and TECHNICAL SKILLS			ACADEMIC and WORKPLACE SKILLS		
What the Student Should be Able to Do			What the Instruction Should Reinforce		
Knowledge	Application		Skill Group	Skill	Description
2.4 Describe setup for machine oxyfuel gas cutting (track burner) operations on carbon steel	2.4.1 Use protective clothing and accessories to ensure maximum protection from heat 2.4.2 Assemble components (e.g., gauges and hoses) 2.4.3 Apply standard OFC operations safely and correctly		Foundation	Listening Reading	Evaluates oral information/presentation [1.2.2] Receives and interprets verbal messages [1.2.8] Analyzes and applies what has been read to specific task [1.3.2] Comprehends written specifications, and applies them to a task [1.3.9] Reads and follows instructions to operate technical equipment [1.3.19]
2.5 Outline how oxyfuel gas cutting (track burner) equipment operates	2.5.1 Demonstrate proper operation of machine OFC (track burner) equipment by adherence to a welding assignment 2.5.2 Adjust equipment to obtain a neutral flame 2.5.3 Set adjustments to ensure gauges reflect correct travel speed for specified application 2.5.4 Perform standard types of cuts (e.g., bevel, straight) used in OFC 2.5.5 Demonstrate cutting metal to a designated thickness 2.5.6 Properly shut down equipment in accordance with manufacturer's guidelines		Foundation Personal Management	Reading Integrity/Honesty/ Work Ethic	Analyzes and applies what has been read to specific task [1.3.2] Comprehends written information, and applies it to a task [1.3.8] Complies with safety and health rules in a given work environment [3.2.2]
2.6 Identify a straight-cut operation on carbon steel	2.6.1 Perform a straight cut on carbon steel surface		Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2] Comprehends written information, and applies it to a task [1.3.8] Comprehends written specifications, and applies them to a task [1.3.9]
2.7 Describe how to set up a bevel-cut operation on carbon steel	2.7.1 Perform a bevel cut on carbon steel surface		Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2]

Unit 3: Demonstrating Carbon Arc Cutting (CAC)

Hours: 15

Terminology: Carbon arc cutting, Exothermic, Exothermic cutting process

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
3.1 Define terminology related to carbon arc cutting (CAC)	3.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to metal fabrication [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
3.2 Identify the theoretical principles of carbon arc cutting	3.2.1 Explain the applied principles of carbon arc cutting	Thinking	Knowing how to Learn	Uses available resources to apply new skills [4.3.6]	
3.3 Outline steps to perform safety inspection of equipment and accessories	3.3.1 Perform inspection of carbon arc cutting equipment and accessories (clothing, hand tools, base metal)	Foundation	Reading	Follows written directions [1.3.13]	
	3.3.2 Perform inspection of air compressor lines to check for moisture	Thinking	Seeing Things in the Mind's Eye	Visualizes a system's operation from schematics [4.6.3]	
	3.3.3 Perform inspection of electrical cords and gauges on a daily basis				
3.4 Identify minor external repairs to equipment and accessories	3.4.1 Demonstrate how to troubleshoot and make minor repairs required for safe operation of carbon arc cutting equipment	Thinking	Seeing Things in the Mind's Eye	Visualizes a system's operation from schematics [4.6.3]	
	3.4.2 Perform inspection of air compressor lines to check for moisture				
	3.4.3 Perform inspection of gauges to ensure proper working order				
	3.4.4 Perform inspection of equipment to check for any frayed, nicked, or loose connectors				

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
3.5 Describe how to set up equipment for manual carbon arc cutting	3.5.1 Demonstrate proper setup of manual CAC equipment, using basic CAC theory (e.g., setting the proper air pressure, amperage, and polarity for electrode size and correct grounding to work piece) 3.5.2 Install carbon electrode in the torch line using correct extension 3.5.3 Correctly position air holes on the cutting tip 3.5.4 Perform operations by first turning the air release button to "on"	Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2] Comprehends written information, and applies it to a task [1.3.8]
3.6 Identify operations of manual carbon arc cutting equipment	3.6.1 Demonstrate proper operation of manual CAC equipment by adhering to welding assignment; utilize protective clothing and accessories 3.6.2 Perform a carbon arc cut on steel	Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2] Comprehends written information, and applies it to a task [1.3.8]
3.7 Describe how to remove metal on carbon steel	3.7.1 Perform carbon arc cutting to remove weld metal and separate structural members for salvage	Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2] Comprehends written information, and applies it to a task [1.3.8]

Unit 4: Demonstrating Plasma Arc Cutting (PAC)

Hours: 35

Terminology: Constricting, Direct current electrode negative (DCEN), Nitriding, Pilot arc, Plasma arc cutting (PAC), Plasma spraying, Torch

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
4.1 Define terminology related to plasma arc cutting (PAC)	4.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to metal fabrication [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
4.2 Identify the theoretical principles of plasma arc cutting	4.2.1 Apply principles of plasma arc cutting to specific project	Thinking	Knowing how to Learn	Uses available resources to acquire new skills or improve skills [4.3.4]	
4.3 Outline safety inspections of plasma arc cutting equipment and accessories	4.3.1 Perform inspection of plasma arc cutting equipment (power source, air compressors, connections to the PAC process) and accessories (clothing, hand tools, base metal) on a daily basis	Foundation	Reading	Follows written directions [1.3.13]	
	4.3.2 Perform daily inspection of air compressor lines to check for moisture				
4.4 Identify minor external repairs to equipment and accessories	4.4.1 Perform inspection of wiring (check for frayed, nicked, or loose connections)	Thinking	Seeing Things in the Mind's Eye	Organizes and processes images – symbols, pictures, graphs, objects, etc. [4.6.2]	
	4.4.2 Show how to clear moisture out of air compressor lines			Visualizes a system's operation from schematics [4.6.3]	
	4.4.3 Perform inspection of plasma torch (check condition of nozzle and tip)				

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do			ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description	
4.5 Describe setup for manual plasma arc cutting operations	4.5.1 Demonstrate proper use of protective clothing and accessories	Foundation Personal Management	Listening Reading Integrity/Honesty/ Work Ethic	Evaluates oral information/presentation [1.2.2]	
	4.5.2 Show how to assemble components, including correct air compressor pressure selection and shielding as it pertains to metal thickness			Analyzes and applies what has been read to specific task [1.3.2]	
	4.5.3 Demonstrate how to determine amperage or machine setting			Follows written directions [1.3.13]	
	4.5.4 Show how to ground power source			Complies with safety and health rules in a given work environment [3.2.2]	
	4.5.5 Demonstrate how to install torch head parts			Follows established rules, regulations, and policies [3.2.5]	
	4.5.6 Apply principles of plasma arc cutting as assigned				
4.6 Outline standard operations of plasma arc cutting equipment	4.6.1 Demonstrate proper operation of manual plasma arc cutting equipment as assigned	Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2]	
	4.6.2 Utilize protective clothing and accessories			Comprehends written information, and applies it to a task [1.3.8]	
	4.6.3 Perform a plasma arc cut on carbon steel			Comprehends written specifications, and applies them to a task [1.3.9]	
4.7 Describe plasma arc shape-cutting operations	4.7.1 Perform straight and shape cuts	Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2]	

Unit 5: Demonstrating Visual Examination Principles and Practices

Hours: 3

Terminology: Defect, Discontinuity, Hardness, Liquid penetration inspection, Nondestructive evaluation, Nondestructive examination, Peel test, Scleroscope test, Tensile strength

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
5.1 Define terminology related to visual examination principles and practices	5.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to metal fabrication [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
5.2 Outline how to inspect cutting surfaces and edges of prepared base metal parts	5.2.1 Demonstrate visual examination of surfaces of material for serious notches, grooves, or gouges	Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2]	
5.3 List steps to inspect welding tacks, intermediate layers, and completed welds	5.3.1 Demonstrate visual inspection of tacks and welds for defects and discontinuities (e.g., undercut, slag inclusion, and overlap)	Foundation	Reading	Analyzes and applies what has been read to specific task [1.3.2]	

Unit 6: Career and Technical Student Organizations (SkillsUSA/HOSA)

Hours: 12

Terminology: Assess, Assessment, Behavior, Business meeting, Career, Competency, Critique, Cultural diversity, Customer, Equity issue, Expectation, Government, Image, Interview, Job application, Journal, Management, Mentor, Organizational chart, Parliamentary procedure, Portfolio, Presentation, Professional organization, Résumé, Self-motivation, Short-term goals, Stress, Task, Trade union

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do			ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description	
6.1 Define terminology related to student organizations	6.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to student organizations [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
6.2 Outline a self-assessment, and identify individual learning styles	6.2.1 Show individual strengths	Interpersonal	Leadership	Conveys attitudes and values of group to others [2.4.3]	
	6.2.2 Show areas in need of improvement	Thinking	Problem Solving	Identifies possible reasons for problem [4.4.6]	
6.3 Describe self-motivation techniques, and establish short-term goals	6.3.1 Prepare a list of short-term goals	Personal Management	Self-esteem	Develops/Initiates a plan for self-improvement [3.5.4]	
	6.3.2 Discuss ways to change or improve lifestyle, appearance, and behavior	Thinking	Creative Thinking	Identifies new goals and objectives [4.1.8]	
6.4 Give examples of individual time-management skills	6.4.1 Prepare and maintain a time journal	Foundation	Writing	Prepares a complex document in a concise manner [1.6.12]	
	6.4.2 Outline ways to improve time-management skills	Thinking	Problem Solving	Devises and implements a plan of action to resolve problem [4.4.3] Recognizes/Defines problem [4.4.8]	
6.5 Predict future occupations	6.5.1 Research the Internet to explore career opportunities within specified fields of study	Foundation	Reading	Draws conclusions from what is read [1.3.12]	
			Writing	Summarizes written information [1.6.17]	
	6.5.2 Prepare a presentation on a specified career area	Personal Management	Career Awareness, Development, and Mobility	Explores career opportunities [3.1.6]	
		Thinking	Creative Thinking	Prepares presentation based on subject research, interviews, surveys [4.1.10]	

CAREER and TECHNICAL SKILLS			ACADEMIC and WORKPLACE SKILLS		
What the Student Should be Able to Do			What the Instruction Should Reinforce		
Knowledge	Application		Skill Group	Skill	Description
6.6 Identify the customer	6.6.1 Differentiate between external and internal customers	Interpersonal	Thinking	Customer Service	Recognizes effects of positive/negative attitudes on customers [2.3.7]
	6.6.2 Identify factors that contribute to poor customer relationships			Decision Making	Shows initiative and courtesy in meeting and working with customers [2.3.8] Evaluates information/data to make best decision [4.2.5]
6.7 Identify the benefits of doing a community service project	6.7.1 Outline ways to become involved in the community	Foundation	Interpersonal	Speaking	Organizes ideas, and communicates oral messages to listeners [1.5.7]
	6.7.2 Develop a community service project	Interpersonal		Teamwork	Contributes to group with ideas, suggestions, and effort [2.6.2]
6.8 Describe effective communication with others	6.8.1 Note personal barriers to listening	Thinking	Problem Solving	Problem Solving	Recognizes/Defines problem [4.4.8]
	6.8.2 Relate a personal plan to overcome barriers to listening				Revises plan of action indicated by findings [4.4.9]
6.9 Give locations for a shadowing activity	6.9.1 Summarize and relate an experience of job shadowing activity	Interpersonal	Leadership	Leadership	Encourages/Motivates members of a group or team [2.4.6]
6.10 Identify the components of an employment portfolio	6.10.1 Present parts of a portfolio	Foundation	Writing	Writing	Completes form accurately [1.6.7]
	6.10.2 Compile a personal employment portfolio for an interview	Foundation			Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
6.11 List proficiency in program competencies	6.11.1 Construct an interpersonal competency assessment	Foundation	Writing	Writing	Analyzes data, summarizes results, and makes conclusions [1.6.2]
6.12 Describe how to measure/modify short-term goals	6.12.1 Discuss how to pursue short-term goals	Thinking	Creative Thinking	Creative Thinking	Identifies new goals and objectives [4.1.8]
6.13 Identify stress sources	6.13.1 Prepare a list of personal sources of stress	Foundation	Thinking	Writing	Communicates thoughts, ideas, or facts in written form in a clear, concise manner [1.6.6]
	6.13.2 Outline techniques to cope with individual sources of stress	Thinking		Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
6.14 Identify characteristics of a positive image	6.14.1 List behaviors and traits that lead to a positive image	Foundation	Reading	Determines what information is needed [1.3.10]	
	6.14.2 Note behaviors and traits that lead to a negative image	Personal Management	Self-esteem	Comprehends the importance of a positive self-concept [3.5.1] Develops/Initiates a plan for self-improvement [3.5.4]	
			Thinking	Decision Making Problem Solving	Identifies pros and cons to assist in decision-making process [4.2.7] Demonstrates logical reasoning in reaching a conclusion [4.4.2]
6.15 Describe how team skills can be applied to a group project	6.15.1 Form a team to develop a class project	Interpersonal	Teamwork	Works effectively with others to reach a common goal [2.6.6]	
6.16 Outline how to observe and critique a meeting	6.16.1 Attend a formal meeting held in the community	Foundation	Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]	
	6.16.2 Prepare a critique of the meeting attended	Interpersonal	Customer Service	Shows initiative and courtesy in meeting and working with customers [2.3.8]	
6.17 List business meeting skills	6.17.1 Relate the basic rules required to ensure an orderly and business-like meeting	Foundation	Speaking	Organizes ideas, and communicates oral messages to listeners [1.5.7]	
	6.17.2 Demonstrate with role-playing appropriate meeting skills	Interpersonal	Leadership	Conveys attitudes and values of group to others [2.4.3] Influences group behavior [2.4.8]	
6.18.2 Outline a survey for employment opportunities	6.18.1 Compile information on a particular employment opportunity of interest	Foundation	Writing	Presents own opinion in written form in a clear, concise manner [1.6.14]	
	6.18.2 Perform an Internet search of a specific career area	Personal Management	Career Awareness, Development, and Mobility	Develops skills to locate, evaluate, and interpret career information [3.1.4]	
6.19 Select a professional journal for review, and develop a three- to five-minute presentation	6.19.1 Prepare a presentation on the content, purpose, and distribution of a particular professional journal	Foundation	Writing	Prepares a complex document in a concise manner [1.6.12]	

CAREER and TECHNICAL SKILLS			ACADEMIC and WORKPLACE SKILLS		
What the Student Should be Able to Do			What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description	
6.20 Identify customer expectations	6.20.1 List customer expectations 6.20.2 Discover the consequences of unmet customer expectations	Interpersonal	Customer Service	Applies human relations skills in real-life situations [2.3.1] Recognizes effects of positive/negative attitudes on customers [2.3.7] Works with customers to satisfy their expectations [2.3.9]	
6.21 List parts of a job application	6.21.1 Prepare a job application from various businesses in the community 6.21.2 Demonstrate a mock job interview	Foundation	Reading Speaking Writing	Determines what information is needed [1.3.10] Communicates a thought, idea, or fact in spoken form [1.5.5] Uses verbal language and other cues, such as body language, appropriate in style, tone, and level of complexity to the audience and the occasion [1.5.14] Completes form accurately [1.6.7]	
6.22 Outline your employment portfolio	6.22.1 Construct a personal employment portfolio	Foundation	Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8] Produces neat, legible document from typewriter or computer [1.6.15] Summarizes written information [1.6.17] Uses language, style, organization, and format appropriate to subject matter, purpose, and audience [1.6.19]	
6.23 Identify supervisory and management roles in an organization	6.23.1 Prepare an organizational chart 6.23.2 Outline the responsibilities of managers and supervisors	Foundation Interpersonal Thinking	Writing Leadership Creative Thinking	Produces neat, legible document from typewriter or computer [1.6.15] Helps an individual or group challenge existing procedures, policies, or authority [2.4.7] Develops visual aids to create audience interest [4.1.4]	

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
6.24 Outline safety issues	6.24.1 Research safety issues within a given career area	Foundation	Reading	Identifies relevant details, facts, and specifications [1.3.16]
			Science	Follows safety guidelines [1.4.15]
		Personal Management	Integrity/Honesty/ Work Ethic	Follows established rules, regulations, and policies [3.2.5]

Glossary

Unit 1: Demonstrating Manual Oxyfuel Gas Cutting

1. Acetylene — gas composed of two parts of carbon and two parts hydrogen; when acetylene is burned in an atmosphere of oxygen, it produces one of the highest flame temperatures obtainable
2. Cutting head — the part of a cutting machine or cutting equipment to which a cutting torch or tip is attached
3. Cutting tip — the part of an oxygen cutting torch from which the gases are released
4. Cutting torch — nozzle or device that controls and directs the gases and oxygen needed for cutting and removing the metal in oxyfuel gas cutting
5. Cylinder — a container holding the supply of high-pressure gas used in welding
6. Cylinder gauge — a gauge attached to a gas cylinder that shows the pressure of the gas contained in the cylinder
7. Flame cutting — cutting performed by the flame of an oxyfuel gas torch that has a second oxygen jet
8. Flashback — a burning back of the gases into the oxyfuel gas torch, hoses, and possibly the regulator and cylinder; a very dangerous situation
9. Gouging — cutting a groove in the surface of a metal, using an oxyfuel gas or arc cutting process
10. HAZ (heat-affected zone) — the part of the base metal altered by heat from welding, brazing, or cutting operations
11. OAC (oxygen arc cutting) — a cutting process in which an electric arc is drawn between a hollow electrode and the base metal; a lever on the holder allows a jet of oxygen to flow through the electrode; this jet cuts the base metal by rapid oxidizations (combining the metal with oxygen)
12. Preheating — application of heat to a metal before a welding or cutting operation has been performed
13. Shield — an eye and face protector; enables a person to look directly at the electric arc through a special lens without being harmed
14. Torch — mechanical device that a welder holds during gas welding and cutting and from which issue the gases that are burned to produce heat; the device held during some arc welding processes
15. Workpiece — the part that is to be welded, brazed, cut, or surfaced
16. Workpiece lead — electrical conductor that carries the current between the welding machine and the workpiece

Unit 2: Demonstrating Machine Oxyfuel Gas Cutting (OFC Track Burner)

1. Track burner — a motor-driven carriage with a track used to make long straight cuts; the carriage may carry a cutting torch or a welding torch; this system can produce continuous or intermittent welds

Unit 3: Demonstrating Carbon Arc Cutting (CAC)

1. Carbon arc cutting – the original method used to cut or melt away metals; base metal is melted by the heat of the arc struck between the carbon electrode and the base metal; metal is removed from the kerf by the force of the arc and gravity
2. Exothermic – the ability to release heat
3. Exothermic cutting process – the use of rods that release a great deal of heat as they burn

Unit 4: Demonstrating Plasma Arc Cutting (PAC)

1. Constricting – reducing in size or diameter, as in a constricted arc, constricting orifice, or constricting nozzle
2. Direct current electrode negative (DCEN) – direct current that flows from the electrode to the work
3. Nitriding – a case-hardening process that involves adding nitrogen to a solid ferrous alloy by keeping the alloy at a suitable temperature while in touch with a material rich in nitrogen
4. Pilot arc – a nontransferred arc in plasma arc cutting used to initially ionize the plasma gas
5. Plasma arc cutting (PAC) – an electric arc between a tungsten electrode and the base metal ionizes some of the cutting gas; this ionized gas (plasma) leaves the torch and hits the base metal; the very high plasma temperature superheats the base metal and rapidly forms a kerf (cut) in the base metal
6. Plasma spraying – thermal spraying process that uses a nontransferred plasma arc to melt and propel the surfacing material onto the base
7. Torch – mechanical device that a welder holds during gas welding and cutting and from which issue the gases that are burned to produce heat; the device held during some arc welding processes

Unit 5: Demonstrating Visual Examination Principles and Practices

1. Defect – a flaw; anything about the weld that is imperfect
2. Discontinuity – any abrupt change or break (cracks, seams, laps, bumps, or changes in density) in the shape or structure of a part; the usefulness of the part may or may not be affected
3. Hardness – ability of metal to resist plastic deformation
4. Liquid penetration inspection – a method that uses colored liquid dyes and fluorescent liquid penetrants to check for surface flaws; can be used to show surface flaws in metals, plastics, ceramics, or glass; will not detect subsurface discontinuities or defects
5. Nondestructive evaluation – visual inspection of pipe
6. Nondestructive examination – the act of determining the suitability of materials or parts using techniques that do not affect the serviceability of the part or material
7. Peel test – a destructive test that mechanically separates a resistance-welded lap joint by peeling one piece away from the other
8. Scleroscope test – hardness test that uses the height of rebound of a falling piece of metal to determine how much energy is absorbed by the material being tested
9. Tensile strength – maximum pull stress in pounds per square inch or megapascals (newtons per square millimeter) that a specimen will withstand

Unit 6: Career and Technical Student Organizations (SkillsUSA/HOSA)

1. Assess – to determine the value, significance, or extent; to judge
2. Assessment – a tool used to determine value, significance, or extent
3. Behavior – the actions one takes; how one conducts oneself
4. Business meeting – planned gathering of individuals (occupational, work, trade, or organizational) that is methodical and systematic; a meeting for a common purpose
5. Career – a chosen pursuit; the general course of progression of one's working life
6. Competency – the knowledge that enables one to comprehend and complete a task
7. Critique – a critical review or commentary
8. Cultural diversity – integrated existence of ethnic groups based on their values, beliefs, and behavior patterns (social, educational, economic, religious, and artistic values)
9. Customer – one who buys goods or services
10. Equity issue – a point of matter affecting the justice and fairness for all concerned
11. Expectation – eager anticipation; to look forward to the probable occurrence or appearance of something
12. Government – the agency or apparatus through which a governing individual or body functions and exercises authority
13. Image – the public's opinion or concept of something
14. Interview – a formal, in-person meeting in which the assessment of the qualifications of an applicant are demonstrated/determined
15. Job application – a form or document used by an employer when hiring prospective employees
16. Journal – a personal record of occurrences, experiences, and reflections kept on a regular basis
17. Management – the person or people who control or direct a business or other enterprise
18. Mentor – a wise or trusted counselor or teacher
19. Organizational chart – a chart that reflects the structure through which individuals cooperate systematically to conduct business
20. Parliamentary procedure – a body of rules governing a meeting

21. Portfolio – a portable case for holding materials – such as photographs, drawings, or other materials – that represent a person's work
22. Presentation – a performance; a formal introduction; the process of offering for consideration or display
23. Professional organization – a service provider utilizing a business relationship that allows outsourcing of human resources tasks, mainly for small to mid-sized business that do not have the need or resources for a dedicated human resources department; the concept is virtually unknown outside of the United States
24. Résumé – a brief account of one's professional or work experience and qualifications; often submitted with a job application
25. Self-motivation – to take action, move forward of one's own volition
26. Short-term goals – goals or targets that are reachable within a short or brief period of time
27. Stress – an extreme pressure, strain, or difficulty
28. Task – a function to be performed
29. Trade union – a labor union, especially one limited in membership to people in the same trade