

WELDING TECHNOLOGY STANDARDS



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All Nevadans ready for success in the 21st century

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To improve student achievement and educator effectiveness by ensuring opportunities, facilitating learning, and promoting excellence



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The development of Nevada career and technical standards and assessments is a collaborative effort sponsored by the Office of Career Readiness, Adult Learning, and Education Options at the Department of Education. The Department of Education relies on teachers and industry representatives who have the technical expertise and teaching experience to develop standards and performance indicators that truly measure student skill attainment. Most important, however, is recognition of the time, expertise and great diligence provided by the writing team members in developing the career and technical standards for Welding Technology.

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BUSINESS AND INDUSTRY VALIDATION

All CTE standards developed through the Nevada Department of Education are validated by business and industry through one or more of the following processes: (1) the standards are developed by a team consisting of business and industry representatives; or (2) a separate review panel was coordinated with industry experts to ensure the standards include the proper content; or (3) the adoption of nationally recognized standards endorsed by business and industry.

The Welding Technology standards were validated through active participation of business and industry representatives on the development team.

PROJECT COORDINATOR

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INTRODUCTION

The standards in this document are designed to clearly state what the student should know and be able to do upon completion of an advanced high school Welding Technology program. These standards are designed for a two-credit course sequence that prepares the student for a technical assessment directly aligned to the standards.

These exit-level standards are designed for the student to complete all standards through their completion of a program of study. These standards are intended to guide curriculum objectives for a program of study.

The standards are organized as follows:

- **Content Standards** are general statements that identify major areas of knowledge, understanding, and the skills students are expected to learn in key subject and career areas by the end of the program.
- **Performance Standards** follow each content standard. Performance standards identify the more specific components of each content standard and define the expected abilities of students within each content standard.
- **Performance Indicators** are very specific criteria statements for determining whether a student meets the performance standard. Performance indicators may also be used as learning outcomes, which teachers can identify as they plan their program learning objectives.

The crosswalk and alignment section of the document shows where the performance indicators support the Nevada Academic Content Standards. Where correlation with an academic content standard exists, students in the Welding Technology program perform learning activities that support, either directly or indirectly, achievement of the academic content standards that are listed.

All students are encouraged to participate in the career and technical student organization (CTSO) that relates to the Welding Technology program. CTSOs are co-curricular national organizations that directly reinforce learning in the CTE classroom through curriculum resources, competitive events, and leadership development. CTSOs provide students the ability to apply academic and technical knowledge, develop communication and teamwork skills, and cultivate leadership skills to ensure college and career readiness.

The Employability Skills for Career Readiness identify the “soft skills” needed to be successful in all careers and must be taught as an integrated component of all CTE course sequences. These standards are available in a separate document.

The **Standards Reference Code** is only used to identify or align performance indicators listed in the standards to daily lesson plans, curriculum documents, or national standards. The Standards Reference Code is an abbreviated name for the program, and the content standard, performance standard and performance indicator are referenced in the program standards. This abbreviated code for identifying standards uses each of these items. For example, WELD is the Standards Reference Code for Welding Technology. For Content Standard 2, Performance Standard 3 and Performance Indicator 4 the Standards Reference Code would be WELD.2.3.4.

CONTENT STANDARD 1.0: INTEGRATE CAREER AND TECHNICAL STUDENT ORGANIZATIONS (CTSOs)***PERFORMANCE STANDARD 1.1: EXPLORE THE HISTORY AND ORGANIZATION OF CTSOs**

- 1.1.1 Discuss the requirements of CTSO participation/involvement as described in Carl D. Perkins Law
- 1.1.2 Research nationally recognized CTSOs
- 1.1.3 Investigate the impact of federal and state government regarding the progression and operation of CTSOs (e.g., Federal Statutes and Regulations, Nevada Administrative Code [NAC], Nevada Revised Statutes [NRS])

PERFORMANCE STANDARD 1.2: DEVELOP LEADERSHIP SKILLS

- 1.2.1 Discuss the purpose of parliamentary procedure
- 1.2.2 Demonstrate the proper use of parliamentary procedure
- 1.2.3 Differentiate between an office and a committee
- 1.2.4 Discuss the importance of participation in local, regional, state, and national conferences, events, and competitions
- 1.2.5 Participate in local, regional, state, or national conferences, events, or competitions
- 1.2.6 Describe the importance of a constitution and bylaws to the operation of a CTSO chapter

PERFORMANCE STANDARD 1.3: PARTICIPATE IN COMMUNITY SERVICE

- 1.3.1 Explore opportunities in community service-related work-based learning (WBL)
- 1.3.2 Participate in a service learning (program related) and/or community service project or activity
- 1.3.3 Engage with business and industry partners for community service

PERFORMANCE STANDARD 1.4: DEVELOP PROFESSIONAL AND CAREER SKILLS

- 1.4.1 Demonstrate college and career readiness (e.g., applications, resumes, interview skills, presentation skills)
- 1.4.2 Describe the appropriate professional/workplace attire and its importance
- 1.4.3 Investigate industry-standard credentials/certifications available within this Career Cluster™
- 1.4.4 Participate in authentic contextualized instructional activities
- 1.4.5 Demonstrate technical skills in various student organization activities/events

PERFORMANCE STANDARD 1.5: UNDERSTAND THE RELEVANCE OF CAREER AND TECHNICAL EDUCATION (CTE)

- 1.5.1 Make a connection between program standards to career pathway(s)
- 1.5.2 Explain the importance of participation and completion of a program of study
- 1.5.3 Promote community awareness of local student organizations associated with CTE programs

*Refer to the program of study Curriculum Framework for appropriate CTSO(s).

CONTENT STANDARD 2.0: IDENTIFY LAB ORGANIZATION AND SAFETY PROCEDURES**PERFORMANCE STANDARD 2.1: DEMONSTRATE GENERAL LAB SAFETY RULES AND PROCEDURES**

- 2.1.1 Describe general shop safety rules and procedures (i.e., safety test)
- 2.1.2 Describe the roles of OSHA in workplace safety
- 2.1.3 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities (i.e., personal protection equipment – PPE)
- 2.1.4 Utilize safe procedures for handling of tools and equipment
- 2.1.5 Operate lab equipment according to safety guidelines
- 2.1.6 Identify and use proper lifting procedures and proper use of support equipment
- 2.1.7 Utilize proper ventilation procedures for working within the lab/shop area
- 2.1.8 Identify marked safety areas
- 2.1.9 Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment
- 2.1.10 Identify the location and use of eye wash stations
- 2.1.11 Identify the location of the posted evacuation routes
- 2.1.12 Identify and wear appropriate clothing for lab/shop activities
- 2.1.13 Secure hair and jewelry for lab/shop activities
- 2.1.14 Demonstrate knowledge of the safety aspects of high voltage circuits
- 2.1.15 Locate and interpret safety data sheets (SDS)
- 2.1.16 Perform housekeeping duties
- 2.1.17 Follow verbal instructions to complete work assignments
- 2.1.18 Follow written instructions to complete work assignments

PERFORMANCE STANDARD 2.2: IDENTIFY AND UTILIZE HAND TOOLS

- 2.2.1 Identify hand tools and their appropriate usage
- 2.2.2 Identify standard and metric designation
- 2.2.3 Demonstrate the proper techniques when using hand tools
- 2.2.4 Demonstrate safe handling and use of appropriate tools
- 2.2.5 Demonstrate proper cleaning, storage, and maintenance of tools

PERFORMANCE STANDARD 2.3: IDENTIFY AND UTILIZE POWER TOOLS AND EQUIPMENT

- 2.3.1 Identify power tools and their appropriate usage
- 2.3.2 Identify equipment and their appropriate usage
- 2.3.3 Demonstrate the proper techniques when using power tools and equipment
- 2.3.4 Demonstrate safe handling and use of appropriate power tools and equipment
- 2.3.5 Demonstrate proper cleaning, storage, and maintenance of power tools and equipment

CONTENT STANDARD 3.0: APPLY FUNDAMENTAL PRINT READING, MEASUREMENT, AND LAYOUT/FIT-UP TECHNIQUES**PERFORMANCE STANDARD 3.1: DEMONSTRATE PRINT READING AND SKETCHING PRACTICES**

- 3.1.1 Interpret basic elements of a technical drawing (i.e., title block information, dimensions, line types)
- 3.1.2 Identify and explain industry standard welding symbols
- 3.1.3 Prepare a materials list from a technical drawing (i.e., bill of material)
- 3.1.4 Describe various types of drawings (i.e., part, assembly, pictorial, orthographic, isometric, schematic)
- 3.1.5 Understand dimensioning, sectional drawings, fasteners, tables, charts, assembly drawings, and revisions
- 3.1.6 Sketch or draw a basic welding drawing

PERFORMANCE STANDARD 3.2: DEMONSTRATE MEASURING AND SCALING TECHNIQUES

- 3.2.1 Identify industry standard units of measure
- 3.2.2 Convert between customary (i.e., SAE, Imperial) and metric systems
- 3.2.3 Determine appropriate engineering and metric scales
- 3.2.4 Measure and calculate size, area, and volume
- 3.2.5 Determine and apply the equivalence between fractions and decimals
- 3.2.6 Demonstrate proper use of appropriate measuring tools

PERFORMANCE STANDARD 3.3: UTILIZE LAYOUT PRINCIPLES AND PRACTICES

- 3.3.1 Interpret drawing, sketch, or specification information
- 3.3.2 Select appropriate materials to complete work assignment
- 3.3.3 Use layout and marking tools as required
- 3.3.4 Layout parts using measurement practices

PERFORMANCE STANDARD 3.4: DEMONSTRATE PREPARATION AND FIT-UP PRACTICES

- 3.4.1 Identify and explain job specifications
- 3.4.2 Identify industry codes (i.e., American Welding Society, American Society of Mechanical Engineers, American Petroleum Institute)
- 3.4.3 Check joint misalignment and poor fit-up before and after welding

CONTENT STANDARD 4.0: IDENTIFY PROPERTIES OF METALS**PERFORMANCE STANDARD 4.1: IDENTIFY MATERIAL PROPERTIES**

- 4.1.1 Identify base metals (e.g., aluminum, carbon steel, exotic steels, stainless)
- 4.1.2 Identify and explain forms and shapes of structural metals
- 4.1.3 Explain and demonstrate field identification methods for base metals (i.e., mill certificate, stamp)
- 4.1.4 Explain metallurgical considerations for welding metals (i.e., base metal prep, heat treatment)

PERFORMANCE STANDARD 4.2: IDENTIFY FILLER METALS

- 4.2.1 Explain filler metal classifications systems (i.e., American Welding Society, American Society of Mechanical Engineers)
- 4.2.2 Identify different types of filler metals
- 4.2.3 Explain the storage and control of filler metals

CONTENT STANDARD 5.0: APPLY SHIELDED METAL ARC WELDING (SMAW) TECHNIQUES**PERFORMANCE STANDARD 5.1: SAFETY PROCEDURES**

- 5.1.1 Identify and explain different types of welding current and polarity
- 5.1.2 Perform safety inspections of SMAW equipment and accessories
- 5.1.3 Make minor external repairs to SMAW equipment and accessories

PERFORMANCE STANDARD 5.2: PRODUCE WELDS USING SMAW ON CARBON STEEL

- 5.2.1 Set up for SMAW operations
- 5.2.2 Operate SMAW equipment
- 5.2.3 Perform welds in the 1F position
- 5.2.4 Perform welds in the 2F position
- 5.2.5 Perform welds in the 3F position
- 5.2.6 Perform welds in the 1G position
- 5.2.7 Perform welds in the 2G position
- 5.2.8 Perform welds in the 3G position

CONTENT STANDARD 6.0: APPLY THERMAL CUTTING PROCESSES**PERFORMANCE STANDARD 6.1: DEMONSTRATE OXY-FUEL GAS CUTTING (OFC)**

- 6.1.1 Perform safety inspections of OFC equipment and accessories
- 6.1.2 Make minor external maintenance to OFC equipment and accessories
- 6.1.3 Demonstrate safe startup, shutdown, disassembly, and connect and bleed regulator procedures of OFC equipment
- 6.1.4 Set up for OFC operations
- 6.1.5 Operate OFC equipment
- 6.1.6 Perform straight, square edge cutting operations in the flat position
- 6.1.7 Perform shape, square edge cutting operations in the flat position
- 6.1.8 Perform straight, bevel edge cutting operations in the flat position
- 6.1.9 Explain scarfing and gouging operations to remove base and weld metal, in flat and horizontal positions

PERFORMANCE STANDARD 6.2: DEMONSTRATE PLASMA ARC CUTTING (PAC) ON CARBON STEEL AND/OR ALUMINUM

- 6.2.1 Explain the PAC process
- 6.2.2 Determine the appropriate PAC settings for the various types of metals
- 6.2.3 Perform safety inspections of PAC equipment and accessories
- 6.2.4 Make minor external repairs to PAC equipment and accessories
- 6.2.5 Set up for PAC operations (handheld and/or Computer Numerical Controller [CNC])
- 6.2.6 Operate PAC equipment (handheld and/or CNC)
- 6.2.7 Perform straight, square edge cutting operations in the flat position (handheld and/or CNC)
- 6.2.8 Perform shape, square edge cutting operations in the flat position (handheld and/or CNC)

CONTENT STANDARD 7.0: APPLY FABRICATION FUNDAMENTALS**PERFORMANCE STANDARD 7.1: UTILIZE BASE METAL PREPARATION FUNDAMENTALS**

- 7.1.1 Clean base metal for welding or cutting
- 7.1.2 Identify and explain joint design and considerations
- 7.1.3 Identify and explain distortion and how it is controlled
- 7.1.4 Mechanically bevel the edge of a mild steel plate (i.e., hand beveller, grinder)

PERFORMANCE STANDARD 7.2: DEMONSTRATE PART PREPARATION WITH CUTTING AND FORMING TECHNIQUES

- 7.2.1 Perform bending or forming operations
- 7.2.2 Perform drilling or boring operations
- 7.2.3 Perform shearing operations

PERFORMANCE STANDARD 7.3: DEMONSTRATE FABRICATION TECHNIQUES

- 7.3.1 Demonstrate proper setup of fabrication area, equipment, and materials
- 7.3.2 Construct projects in the proper sequence
- 7.3.3 Produce tack welds to specifications
- 7.3.4 Properly layout and fabricate projects from welding prints
- 7.3.5 Check work for accuracy

CONTENT STANDARD 8.0: APPLY GAS METAL ARC WELDING (GMAW-S, GMAW) TECHNIQUES**PERFORMANCE STANDARD 8.1: UTILIZE SAFETY PROCEDURES**

- 8.1.1 Identify and explain the use of GMAW equipment (i.e., spray transfer, globular, short circuit, pulse)
- 8.1.2 Perform safety inspections of GMAW equipment and accessories
- 8.1.3 Make minor external repairs to GMAW equipment and accessories
- 8.1.4 Demonstrate safe startup, shutdown, disassembly, and connect and bleed regulator procedures of GMAW equipment

PERFORMANCE STANDARD 8.2: PRODUCE WELDS USING GMAW-S ON CARBON STEEL

- 8.2.1 Set up for GMAW-S operations
- 8.2.2 Operate GMAW-S equipment
- 8.2.3 Perform welds in the 1F position
- 8.2.4 Perform welds in the 2F position
- 8.2.5 Perform welds in the 1G position
- 8.2.6 Perform welds in the 2G position

PERFORMANCE STANDARD 8.3: PRODUCE WELDS USING GMAW (SPRAY TRANSFER) ON CARBON STEEL

- 8.3.1 Set up for GMAW (spray) operations
- 8.3.2 Operate GMAW (spray) equipment
- 8.3.3 Perform welds in the 1F position
- 8.3.4 Perform welds in the 2F position
- 8.3.5 Perform welds in the 1G position

CONTENT STANDARD 9.0: APPLY FLUX CORED ARC WELDING (FCAW-G, FCAW-S) TECHNIQUES**PERFORMANCE STANDARD 9.1: UTILIZE SAFETY PROCEDURES**

- 9.1.1 Identify and explain the use of FCAW equipment (i.e., spray transfer, globular, pulse)
- 9.1.2 Perform safety inspections of FCAW equipment and accessories
- 9.1.3 Make minor external repairs to FCAW equipment and accessories
- 9.1.4 Demonstrate safe startup, shutdown, disassembly, and connect and bleed regulator procedures of FCAW equipment

PERFORMANCE STANDARD 9.2: PRODUCE WELDS USING FCAW-G ON CARBON STEEL

- 9.2.1 Set up for FCAW-G operations
- 9.2.2 Operate FCAW-G equipment
- 9.2.3 Perform welds in the 1F position
- 9.2.4 Perform welds in the 2F position
- 9.2.5 Perform welds in the 1G position
- 9.2.6 Perform welds in the 2G position

PERFORMANCE STANDARD 9.3: PRODUCE WELDS USING FCAW-S ON CARBON STEEL

- 9.3.1 Set up for FCAW-S operations
- 9.3.2 Operate FCAW-S equipment
- 9.3.3 Perform welds in the 1F position
- 9.3.4 Perform welds in the 2F position
- 9.3.5 Perform welds in the 1G position
- 9.3.6 Perform welds in the 2G position

CONTENT STANDARD 10.0: APPLY GAS TUNGSTEN ARC WELDING (GTAW) TECHNIQUES**PERFORMANCE STANDARD 10.1: UTILIZE SAFETY PROCEDURES**

- 10.1.1 Perform safety inspections of GTAW equipment and accessories
- 10.1.2 Make minor external repairs to GTAW equipment and accessories
- 10.1.3 Demonstrate safe startup, shutdown, disassembly, and connect and bleed regulator procedures of GTAW equipment

PERFORMANCE STANDARD 10.2: PRODUCE WELDS USING GTAW ON CARBON STEEL

- 10.2.1 Set up for GTAW operations
- 10.2.2 Operate GTAW equipment
- 10.2.3 Perform welds in the 1F position
- 10.2.4 Perform welds in the 2F position
- 10.2.5 Perform welds in the 1G position

PERFORMANCE STANDARD 10.3: PRODUCE WELDS USING GTAW ON ALUMINUM

- 10.3.1 Set up for GTAW operations
- 10.3.2 Operate GTAW equipment

CROSSWALKS AND ALIGNMENTS**CROSSWALKS (ACADEMIC STANDARDS)**

The crosswalk of the Welding Technology Standards shows links to the Nevada Academic Content Standards. The crosswalk identifies the performance indicators in which the learning objectives in the Welding Technology program support academic learning. The performance indicators are grouped according to their content standard and are crosswalked to the Nevada Academic Content Standards in English Language Arts, Mathematics, and Science.

ALIGNMENTS (MATHEMATICAL PRACTICES)

In addition to correlation with the Nevada Academic Content Standards for Mathematics, many performance indicators support the Mathematical Practices. The following table illustrates the alignment of the Welding Technology Standards Performance Indicators and the Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Welding Technology program support academic learning.

ALIGNMENTS (SCIENCE AND ENGINEERING PRACTICES)

In addition to correlation with the Nevada Academic Content Standards for Science, many performance indicators support the Science and Engineering Practices. The following table illustrates the alignment of the Welding Technology Standards Performance Indicators and the Science and Engineering Practices. This alignment identifies the performance indicators in which the learning objectives in the Welding Technology program support academic learning.

CROSSWALKS (COMMON CAREER TECHNICAL CORE)

The crosswalk of the Welding Technology Standards shows links to the Common Career Technical Core. The crosswalk identifies the performance indicators in which the learning objectives in the Welding Technology program support the Common Career Technical Core. The Common Career Technical Core defines what students should know and be able to do after completing instruction in a program of study. The Welding Technology Standards are crosswalked to the Manufacturing Career Cluster™ and the Production Career Pathway.

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**CROSSWALK OF WELDING TECHNOLOGY STANDARDS
AND THE NEVADA ACADEMIC CONTENT STANDARDS**

CONTENT STANDARD 1.0: INTEGRATE CAREER AND TECHNICAL STUDENT ORGANIZATIONS (CTSOs)

Performance Indicators	Nevada Academic Content Standards
1.1.1	<p>English Language Arts: Speaking and Listening Standards</p> <p>SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>SL.11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>
1.1.2	<p>English Language Arts: Speaking and Listening Standards</p> <p>SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>SL.11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>

Performance Indicators	Nevada Academic Content Standards
1.1.3	<p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>
1.2.1	<p>English Language Arts: Speaking and Listening Standards</p> <p>SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>SL.11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>
1.2.4	<p>English Language Arts: Speaking and Listening Standards</p> <p>SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>SL.11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>
1.2.5	<p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
1.4.1	<p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>

Performance Indicators	Nevada Academic Content Standards
1.4.2	<p>English Language Arts: Speaking and Listening Standards</p> <p>SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>SL.11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>
1.4.3	<p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>
1.4.4	<p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.</p>
1.4.5	<p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p>

Performance Indicators	Nevada Academic Content Standards
1.5.2	<p>English Language Arts: Language Standards</p> <p>L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Speaking and Listening Standards</p> <p>SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>

CONTENT STANDARD 2.0: IDENTIFY LAB ORGANIZATION AND SAFETY PROCEDURES

Performance Indicators	Nevada Academic Content Standards
2.1.1	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p> <p>RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
2.1.2	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Speaking and Listening Standards SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
2.1.15	<p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.</p>
2.1.17	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p> <p>English Language Arts: Speaking and Listening Standards SL.11-12.1d Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.</p>
2.1.18	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p> <p>RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>

**CONTENT STANDARD 3.0: APPLY FUNDAMENTAL PRINT READING, MEASUREMENT, AND LAYOUT/FIT-UP
TECHNIQUES**

Performance Indicators	Nevada Academic Content Standards
3.1.1	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>
3.1.2	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>
3.1.3	<p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>Math: Geometry – Modeling with Geometry GMG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).</p> <p>Math: Number & Quantity – Quantities NQ.A.2 Define appropriate quantities for the purpose of descriptive modeling.</p>
3.1.4	<p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
3.2.4	<p>Math: Geometry – Geometric Measurement and Dimension GGMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.</p>
3.3.1	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p>RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>
3.4.1	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>

CONTENT STANDARD 4.0: IDENTIFY PROPERTIES OF METALS

Performance Indicators	Nevada Academic Content Standards
4.1.1	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>
4.1.2	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
4.1.3	<p>English Language Arts: Language Standards L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
4.1.4	<p>English Language Arts: Language Standards L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>

Performance Indicators	Nevada Academic Content Standards
4.2.1	<p>English Language Arts: Language Standards</p> <p>L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</p> <p>RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
4.2.3	<p>English Language Arts: Language Standards</p> <p>L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</p> <p>RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>

CONTENT STANDARD 5.0: APPLY SHIELDED METAL ARC WELDING (SMAW) TECHNIQUES

Performance Indicators	Nevada Academic Content Standards
5.1.1	<p>English Language Arts: Language Standards L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
5.1.2	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
5.1.3	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>

CONTENT STANDARD 6.0: APPLY THERMAL CUTTING PROCESSES

Performance Indicators	Nevada Academic Content Standards
6.1.1	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
6.1.2	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
6.1.3	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
6.1.9	<p>English Language Arts: Language Standards L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
6.2.1	<p>English Language Arts: Language Standards L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
6.2.3	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>

Performance Indicators	Nevada Academic Content Standards
6.2.4	English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

CONTENT STANDARD 7.0: APPLY FABRICATION FUNDAMENTALS

Performance Indicators	Nevada Academic Content Standards
7.1.2	<p>English Language Arts: Language Standards L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.1.3	<p>English Language Arts: Language Standards L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.3.1	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>

CONTENT STANDARD 8.0: APPLY GAS METAL ARC WELDING (GMAW-S, GMAW) TECHNIQUES

Performance Indicators	Nevada Academic Content Standards
8.1.1	<p>English Language Arts: Language Standards L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
8.1.2	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
8.1.3	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
8.1.4	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>

CONTENT STANDARD 9.0: APPLY FLUX CORED ARC WELDING (FCAW-G, FCAW-S) TECHNIQUES

Performance Indicators	Nevada Academic Content Standards
9.1.1	<p>English Language Arts: Language Standards</p> <p>L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</p> <p>RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</p> <p>WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
9.1.2	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</p> <p>RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
9.1.3	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</p> <p>RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
9.1.4	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</p> <p>RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>

CONTENT STANDARD 10.0: APPLY GAS TUNGSTEN ARC WELDING (GTAW) TECHNIQUES

Performance Indicators	Nevada Academic Content Standards
10.1.1	English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
10.1.2	English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
10.1.3	English Language Arts: Reading Standards for Literacy in Science and Technical Subjects RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**ALIGNMENT OF WELDING TECHNOLOGY STANDARDS
AND THE MATHEMATICAL PRACTICES**

Mathematical Practices	Welding Technology Performance Indicators
1. Make sense of problems and persevere in solving them.	3.2.4; 3.2.5
2. Reason abstractly and quantitatively.	3.4.1
3. Construct viable arguments and critique the reasoning of others.	
4. Model with mathematics.	3.1.3, 3.1.4
5. Use appropriate tools strategically.	3.2.4; 3.2.6; 3.3.3
6. Attend to precision.	3.1.5 6.2.5 7.3.5
7. Look for and make use of structure.	7.3.4
8. Look for and express regularity in repeated reasoning.	

**ALIGNMENT OF WELDING TECHNOLOGY STANDARDS
AND THE SCIENCE AND ENGINEERING PRACTICES**

Science and Engineering Practices	Welding Technology Performance Indicators
1. Asking questions (for science) and defining problems (for engineering).	3.4.3 4.1.1, 4.1.4
2. Developing and using models.	3.1.6
3. Planning and carrying out investigations.	7.3.5
4. Analyzing and interpreting data.	3.1.3, 3.1.5
5. Using mathematics and computational thinking.	3.3.4
6. Constructing explanations (for science) and designing solutions (for engineering).	3.4.1
7. Engaging in argument from evidence.	
8. Obtaining, evaluating, and communicating information.	4.1.3, 4.1.4 8.1.1

**CROSSWALKS OF WELDING TECHNOLOGY STANDARDS
AND THE COMMON CAREER TECHNICAL CORE**

Manufacturing Career Cluster™	Performance Indicators
1. Evaluate the nature and scope of the Manufacturing Career Cluster™ and the role of manufacturing in society and in the economy.	
2. Analyze and summarize how manufacturing businesses improve performance.	
3. Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.	2.1.2 3.4.2
4. Describe career opportunities and means to achieve those opportunities in each of the Manufacturing Career Pathways.	
5. Describe government policies and industry standards that apply to manufacturing.	2.1.2 3.4.2
6. Demonstrate workplace knowledge and skills common to manufacturing.	3.1.1-3.1.5 7.3.1, 7.3.2; 7.3.4, 7.3.5

Production Career Pathway	Performance Indicators
1. Diagnose production process problems and take corrective action to meet production quality standards.	
2. Manage safe and healthy production working conditions and environmental risks.	2.1.1, 2.1.3-2.1.11
3. Make continuous improvement recommendations based on results of production process audits and inspections.	
4. Coordinate work teams when producing products to enhance production process and performance.	3.4.1
5. Demonstrate the safe use of manufacturing equipment.	