

Agricultural Welding, Power, and Structure Technology Standards



This document was prepared by:

Office of Career Readiness, Adult Learning, and Education Options
Nevada Department of Education
755 N. Roop Street, Suite 201
Carson City, NV 89701

www.doe.nv.gov

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Vision

All Nevada students are equipped and feel empowered to attain their vision of success

Mission

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



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Acknowledgements

The development of Nevada career and technical education (CTE) standards and assessments is a collaborative effort sponsored by the Nevada Department of Education (NDE) Office of Career Readiness, Adult Learning, and Education Options. The Nevada Department of Education relies on educators and industry representatives who have the technical expertise and teaching experience to develop standards and performance indicators that truly measure student skill attainment. More importantly, the NDE would like to recognize the time and commitment by the writing team members in developing the career and technical standards for Agricultural Welding, Power, and Structure Technology.

Standards Development Members

Name	Occupation/Title	Stakeholder Affiliation	School/Organization
Aaron Albisu	Instructor	Secondary Educator	Spring Creek High School, Elko County School District
TJ deBraga	Sales Manager	Business and Industry Representative	Renner Equipment, Yerington
Ryan Kindall	Instructor	Secondary Educator	Wells Combined School, Elko County School District
Gilbert Lenz	Instructor	Secondary Educator	North Valleys High School, Washoe County School District
Bryan Linford	Instructor	Secondary Educator	Moapa Valley High School, Clark County School District
Charles Mann	Instructor	Secondary Educator	Carson High School, Carson City School District
Jacob Oros	Technical Training Supervisor	Business and Industry Representative	Cashman Equipment, Elko

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 is coordinated with industry experts to ensure the standards include the proper content, or (3) nationally recognized standards currently endorsed by business and industry.

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

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 Agricultural Welding, Power, and Structure 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 crosswalks and alignment sections of the document show where the performance indicators support the Nevada Academic Content Standards. Where correlation with an academic content standard exists, students in the Agricultural Welding, Power, and Structure Technology program perform learning activities that connect with and support the academic content standards that are listed. The crosswalks and alignments are not intended to teach academic standards.

All students are encouraged to participate in the career and technical student organization (CTSO) that relates to the Agricultural Welding, Power, and Structure 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 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, AGWPS is the Standards Reference Code for Agricultural Welding, Power, and Structure Technology. For Content Standard 2, Performance Standard 3 and Performance Indicator 4 the Standards Reference Code would be AGWPS.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).

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CONTENT STANDARD 2.0: IDENTIFY LAB ORGANIZATION AND SAFETY

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 protective equipment – PPE)
- 2.1.4 Describe group safety precautions in an agricultural mechanics environment, including lock out/tag out procedures
- 2.1.5 Use safe procedures for handling of tools and equipment
- 2.1.6 Operate lab equipment according to safety guidelines
- 2.1.7 Identify and use proper lifting procedures and proper use of support equipment
- 2.1.8 Use proper ventilation procedures for working within the lab/shop area
- 2.1.9 Identify marked safety areas
- 2.1.10 Distinguish between the different types of fires
- 2.1.11 Classify the three components of the fire triangle
- 2.1.12 Identify the location and the types of fire extinguishers and other fire safety equipment
- 2.1.13 Demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment
- 2.1.14 Identify the location and use of eye wash stations
- 2.1.15 Identify the location of the posted evacuation routes
- 2.1.16 Identify and wear appropriate clothing for lab/shop activities
- 2.1.17 Secure hair and jewelry for lab/shop activities
- 2.1.18 Demonstrate knowledge of the safety aspects of high voltage circuits
- 2.1.19 Locate and interpret safety data sheets (SDS)
- 2.1.20 Perform housekeeping duties
- 2.1.21 Follow verbal instructions to complete work assignments
- 2.1.22 Follow written instructions to complete work assignments

CONTENT STANDARD 3.0: IDENTIFY AND DEMONSTRATE THE PROPER USE OF AGRICULTURAL HAND AND POWER TOOLS

Performance Standard 3.1: Identify General Shop Hand and Power Tools

- 3.1.1 Identify and explain the safe and proper use of shop hand and power tools (refer to Career Development Event [CDE] tool list)
- 3.1.2 Identify standard and metric designation
- 3.1.3 Identify power tools and their appropriate usage

Performance Standard 3.2: Demonstrate Appropriate Usage of Shop Hand and Power Tools

- 3.2.1 Demonstrate the proper techniques when using hand tools
- 3.2.2 Demonstrate proper cleaning, storage, and maintenance of hand tools
- 3.2.3 Demonstrate safe handling and use of appropriate tools
- 3.2.4 Demonstrate the proper techniques when using power tools
- 3.2.5 Demonstrate safe handling and use of appropriate power tools
- 3.2.6 Demonstrate proper cleaning, storage, and maintenance of power tools

Performance Standard 3.3: Demonstrate Appropriate Procedures for the Maintenance and Repair of Hand Tools

- 3.3.1 Determine if the tool can be safely used in its present condition or, if damaged, reconditioned/replaced
- 3.3.2 Repair a damaged tool to a safe working condition

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CONTENT STANDARD 4.0: DEMONSTRATE SAFE AND PROPER WELDING PROCEDURES

Performance Standard 4.1: Identify Different Welding Processes and Applications (Oxyfuel [OXY], Shielded Metal Arc Welding [SMAW], Gas Metal Arc Welding [GMAW], Plasma Cutting [PAC])

- 4.1.1 Differentiate between the different welding and cutting processes
- 4.1.2 Differentiate between different types of cutting
- 4.1.3 Differentiate between the different types of welding

Performance Standard 4.2: Demonstrate Safe and Proper Techniques in Oxyfuel Cutting (OFC)

- 4.2.1 Demonstrate proper safety practices while operating all cutting equipment
- 4.2.2 Select appropriate cutting tips for specific applications
- 4.2.3 Properly assemble oxy-fuel apparatus
- 4.2.4 Properly diagnose equipment failure
- 4.2.5 Properly cut mild steel to specification

Performance Standard 4.3: Demonstrate Safe and Proper Techniques in Shielded Metal Arc Welding

- 4.3.1 Demonstrate proper safety practices while operating SMAW equipment
- 4.3.2 Properly adjust SMAW apparatus
- 4.3.3 Properly diagnose equipment failure
- 4.3.4 Identify welding electrodes using accepted standard electrode classification system (e.g., American Welding Society [AWS])
- 4.3.5 Produce three accepted standard welds in the flat and horizontal position (e.g., American Welding Society [AWS])
- 4.3.6 Determine the correct shade of lens used for a given application and type of welding process
- 4.3.7 Produce in position (flat) or out of position (horizontal, overhead, vertical) the various weld joints
- 4.3.8 Use accepted standard welding terms and definitions for SMAW proficiently (e.g., American Welding Society [AWS])

Performance Standard 4.4: Demonstrate Safe and Proper Techniques in Gas Metal Arc Welding

- 4.4.1 Demonstrate proper safety practices while operating GMAW equipment
- 4.4.2 Select appropriate electrodes, contact tips, gas nozzles and diffusers, and shielding gas for specific applications
- 4.4.3 Properly adjust GMAW apparatus for specific application
- 4.4.4 Properly diagnose equipment failure
- 4.4.5 Produce three standard welds in the flat and horizontal position
- 4.4.6 Produce in position (flat) or out of position (horizontal, overhead, vertical) the various weld joints
- 4.4.7 Use accepted standard welding terms and definitions for GMAW proficiently (e.g., American Welding Society [AWS])
- 4.4.8 Differentiate between short circuit, globular, spray, and pulse transfer modes

Performance Standard 4.5: Demonstrate Safe and Proper Techniques in Plasma Cutting Procedures

- 4.5.1 Demonstrate proper safety practices while operating plasma cutting equipment
- 4.5.2 Select appropriate consumables for specific applications
- 4.5.3 Properly assemble plasma cutting apparatus
- 4.5.4 Properly diagnose equipment failure
- 4.5.5 Properly cut metals
- 4.5.6 Use accepted standard welding terms and definitions for PAC proficiently (e.g., American Welding Society [AWS])

CONTENT STANDARD 5.0: UNDERSTAND THE PRINCIPLES OF ELECTRICITY IN AGRICULTURE

Performance Standard 5.1: Understand Principles and Theories of Electricity

- 5.1.1 Describe proper safety practices applicable to agricultural electrification
- 5.1.2 Describe the principles of generation, transmission, and distribution of electricity
- 5.1.3 Describe voltage, current, and resistance
- 5.1.4 Differentiate between direct and alternating current

Performance Standard 5.2: Apply the Principles and Theories of Electrical Circuits

- 5.2.1 Determine the proper conductor for specific applications
- 5.2.2 Explain the function of circuit breakers and overcurrent protection devices
- 5.2.3 Explain the function and importance of grounding in electrical circuits
- 5.2.4 Use the multimeter to measure voltage, current, and resistance
- 5.2.5 Demonstrate proper wiring of electrical circuits
- 5.2.6 Demonstrate proper wiring of a service entrance panel

CONTENT STANDARD 6.0: UNDERSTAND WATER AND WASTEWATER MANAGEMENT IN AGRICULTURAL AND INDUSTRIAL SETTINGS

Performance Standard 6.1: Demonstrate Safe Practices and Procedures in Agricultural and Industrial Water Management

- 6.1.1 Explain the role of water use, management, and conservation in the agricultural industry
- 6.1.2 Discuss the fundamentals of agricultural water systems and irrigation
- 6.1.3 Select and use safety equipment appropriate to working conditions

Performance Standard 6.2: Demonstrate Basic Pipe Fitting Skills

- 6.2.1 Describe how to select and identify fittings and pipe
- 6.2.2 Describe how to measure, mark, cut, ream, thread, and join pipe

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CONTENT STANDARD 7.0: UNDERSTAND PRINCIPLES AND APPLICATIONS IN AGRICULTURAL CONSTRUCTION

Performance Standard 7.1: Demonstrate Practices, Applications, and Procedures of Drafting in Agricultural Projects

- 7.1.1 Differentiate between the various plans used in projects (blueprints, shop plans, and wiring schematics)
- 7.1.2 Develop a bill of materials from a selected set of plans
- 7.1.3 Draw basic plans using proper drafting techniques

Performance Standard 7.2: Demonstrate Practices and Procedures in Construction of Agricultural Projects

- 7.2.1 Explain safety procedures required while working on a project site, including personal safety, hand and power tools, and equipment
- 7.2.2 Select appropriate design type and materials to meet the building needs while considering use, environment, and budget
- 7.2.3 Demonstrate common surveying techniques utilizing both traditional and electronic survey equipment

CONTENT STANDARD 8.0: UNDERSTAND PRINCIPLES AND APPLICATIONS OF SINGLE AND MULTIPLE CYLINDER ENGINES

Performance Standard 8.1: Demonstrate Safe Practices and Procedures of the Operation, Maintenance, and Repair of Small Gas Engines and Equipment

- 8.1.1 Describe personal and environmental safety practices associated with the operation, maintenance, and repair of small gas engines and equipment
- 8.1.2 Describe personal and environmental safety practices associated with the operation, maintenance, and repair of gas and diesel power as applied to agricultural equipment
- 8.1.3 Identify small gas engine parts and tools required

Performance Standard 8.2: Demonstrate a Working Knowledge of the Essential Engine Operating Systems

- 8.2.1 Classify small gas engines according to ignition, fuel, cooling, lubrication, and compression systems
- 8.2.2 Explain functions of ignition, fuel, cooling, lubrication, and compression systems and their interrelationships

Performance Standard 8.3: Recognize Appropriate Power Attachments and Their Applications

- 8.3.1 List and describe appropriate uses and applications of small engine attachments
- 8.3.2 Explain the various methods of connecting attachments to small engines

Performance Standard 8.4: Demonstrate Maintenance and Repair Procedures on Single and Multiple Cylinder Engines and Attachments

- 8.4.1 Identify common failures relating to ignition, fuel, cooling, lubrication, and compression systems and attachments
- 8.4.2 Interpret service manual information for small engine and equipment maintenance and repair
- 8.4.3 Troubleshoot common failures relating to ignition, fuel, cooling, lubrication, electrical, and compression systems

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CONTENT STANDARD 9.0: DEMONSTRATE BASIC SKILLS IN OPERATION, MAINTENANCE, AND REPAIR OF AGRICULTURAL MACHINERY

Performance Standard 9.1: Demonstrate Safe Practices and Procedures of Operation, Maintenance, and Repair of Agricultural Machinery and Equipment

- 9.1.1 Demonstrate the safety practices and procedures that must be practiced when working with agricultural machinery and hydraulics
- 9.1.2 Classify agricultural machinery according to function, type, and style
- 9.1.3 Explain the importance of preventive maintenance programs and keeping accurate maintenance records
- 9.1.4 Prepare an applicable piece of equipment for storage
- 9.1.5 Determine the cost of routine equipment maintenance
- 9.1.6 Repair common failures relating to agricultural machinery by utilizing repair and parts manuals
- 9.1.7 Perform manufacturers recommended pre-operation safety inspection

CONTENT STANDARD 10.0: DEMONSTRATE THE OPERATION, MAINTENANCE, AND USE OF ELECTRICAL POWER, MOTORS, AND CONTROLS IN AGRICULTURAL APPLICATIONS

Performance Standard 10.1: Demonstrate Procedures Associated with the Operation, Maintenance, and Repair of Electrical Power

- 10.1.1 Recognize possible safety hazards while working with electrical motors and controls
- 10.1.2 Select and properly use safety equipment appropriate to working conditions
- 10.1.3 Explain the function of various controls used in electrical applications

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CONTENT STANDARD 11.0: UNDERSTAND AGRICULTURAL HYDRAULIC SYSTEMS

Performance Standard 11.1: Demonstrate Knowledge of the Basic Principles, Operation, and Maintenance of Hydraulic Systems in the Agricultural Industry

- 11.1.1 Identify essential safety practices relating to the operation of agricultural equipment using hydraulics
- 11.1.2 Explain the four basic principles of hydraulics
- 11.1.3 Interpret hydraulic symbols/schematics
- 11.1.4 Describe the functions and relationships of the basic components of a hydraulic system

CONTENT STANDARD 12.0: DESCRIBE THE RELATIONSHIP BETWEEN A SUPERVISED AGRICULTURAL EXPERIENCE (SAE) AND PREPARATION OF STUDENTS FOR A CAREER IN AGRICULTURE

Performance Standard 12.1: Actively Develop and Participate in Supervised Agricultural Experience (SAE) which Enables Students to Obtain Work-based Skills

- 12.1.1 Identify and describe a career interest in agriculture or agriculture related occupation
- 12.1.2 Participate in and manage their individual Supervised Agricultural Experience
- 12.1.3 Keep accurate records as prescribed by the Nevada State FFA policies and procedures

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CONTENT STANDARD 13.0: PARTICIPATE IN LEADERSHIP TRAINING THROUGH MEMBERSHIP IN FFA

Performance Standard 13.1: Recognize the Traits of Effective Leaders and Participate in Leadership Training Through Involvement in FFA

- 13.1.1 Summarize how, when, and why the National FFA Organization was founded
- 13.1.2 Describe the mission and strategies, colors, motto, parts of the emblem, and organizational structure of the National FFA Organization
- 13.1.3 Recite and explain the meaning of the FFA Creed
- 13.1.4 Explain the purpose of FFA's Program of Activities and describe its committee structure
- 13.1.5 Recognize opportunities in high-wage, high-skill, in-demand careers in leadership and communications

Performance Standard 13.2: Understand the Opportunities in FFA

- 13.2.1 Describe how FFA develops leadership skills, personal growth, and career success
- 13.2.2 Identify major state and national activities and awards available to FFA members
- 13.2.3 Identify components of career development event opportunities

Performance Standard 13.3: Understand the Importance of School and Community Awareness

- 13.3.1 Discuss the meaning and importance of community service
- 13.3.2 Identify and describe community service opportunities for partnerships
- 13.3.3 Explain how FFA members can become involved in community improvement and development

Crosswalks and Alignments

Crosswalks and alignments are intended to assist the teacher make connections for students between the technical skills within the program and academic standards. The crosswalks and alignments are not intended to teach the academic standards but to assist students in making meaningful connections between their CTE program of study and academic courses.

Crosswalks (Academic Standards)

The crosswalks of the Agricultural Welding, Power, and Structure Technology Standards show connections with the Nevada Academic Content Standards. The crosswalk identifies the performance indicators in which the learning objectives in the Agricultural Welding, Power, and Structure Technology program connect with and 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 connections with the Nevada Academic Content Standards for Mathematics, many performance indicators support the Mathematical Practices. The following table illustrates the alignment of the Agricultural Welding, Power, and Structure Technology Standards Performance Indicators and the Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Agricultural Welding, Power, and Structure Technology program connect with and support academic learning.

Alignments (Science and Engineering Practices)

In addition to connections 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 Agricultural Welding, Power, and Structure Technology Standards Performance Indicators and the Science and Engineering Practices. This alignment identifies the performance indicators in which the learning objectives in the Agricultural Welding, Power, and Structure Technology program connect with and support academic learning.

Crosswalks (Common Career Technical Core)

The crosswalks of the Agricultural Welding, Power, and Structure Technology Standards show connections with the Common Career Technical Core. The crosswalk identifies the performance indicators in which the learning objectives in the Agricultural Welding, Power, and Structure Technology program connect with and 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 Agricultural Welding, Power, and Structure Technology Standards are crosswalked to the Agriculture, Food, and Natural Resources Career Cluster™ and the Power, Structural, and Technical Systems Career Pathway.

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Crosswalk of Agricultural Welding, Power, and Structure 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>
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>

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Performance Indicators	Nevada Academic Content Standards
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>

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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>

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Performance Indicators	Nevada Academic Content Standards
1.5.2	<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: 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. 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 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>

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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</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> <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>
2.1.2	<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: 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>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>
2.1.12	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</p> <p>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>
2.1.18	<p>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</p> <p>RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p> <p>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.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</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> <p>WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.</p>

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Performance Indicators	Nevada Academic Content Standards
2.1.20	<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>
2.1.21	<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>

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Content Standard 4.0: Demonstrate Safe and Proper Welding Procedures

Performance Indicators	Nevada Academic Content Standards
4.2.4	English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
4.4.2	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.

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Content Standard 5.0: Understand the Principles of Electricity in Agriculture

Performance Indicators	Nevada Academic Content Standards
5.2.1	<p>Math: Algebra – Creating Equations ACED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.</p> <p>Math: Number & Quantity – Quantities NQ.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.</p>
5.2.2	<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> <p>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>
5.2.3	<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>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>

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Content Standard 7.0: Understand Principles and Applications in Agricultural Construction

Performance Indicators	Nevada Academic Content Standards
7.2.1	<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>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>

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Content Standard 8.0: Understand Principles and Applications of Single and Multiple Cylinder Engines

Performance Indicators	Nevada Academic Content Standards
8.1.1	<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> <p>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>
8.1.2	<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> <p>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>
8.2.2	<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> <p>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>

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Performance Indicators	Nevada Academic Content Standards
8.3.2	<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>
8.4.2	<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>
8.4.3	<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>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>

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Content Standard 9.0: Demonstrate Basic Skills in Operation, Maintenance, and Repair of Agricultural Machinery

Performance Indicators	Nevada Academic Content Standards
9.1.3	<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>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>
9.1.6	<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>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>

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Content Standard 10.0: Demonstrate the Operation, Maintenance, and Use of Electrical Power, Motors, and Controls in Agricultural Applications

Performance Indicators	Nevada Academic Content Standards
10.1.3	<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>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>

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Content Standard 11.0: Understand Agricultural Hydraulic Systems

Performance Indicators	Nevada Academic Content Standards
11.1.2	<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> <p>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p> <p>Math: Algebra – Creating Equations ACED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.</p>
11.1.4	<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>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>

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Content Standard 12.0: Describe the Relationship Between a Supervised Agricultural Experience (SAE) and Preparation of Students for a Career in Agriculture

Performance Indicators	Nevada Academic Content Standards
12.1.1	<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> <p>English Language Arts: Speaking and Listening Standards 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 WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>
12.1.3	<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>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>

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Content Standard 13.0: Participate in Leadership Training Through Membership In FFA

Performance Indicators	Nevada Academic Content Standards
13.1.2	English Language Arts: Speaking and Listening Standards 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.
13.1.4	English Language Arts: Speaking and Listening Standards 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.
13.2.1	English Language Arts: Speaking and Listening Standards 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.
13.3.3	English Language Arts: Writing Standards for Literacy in Science and Technical Subjects WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.

Agricultural Welding, Power, and Structure Technology Standards 2022

Alignment of Agricultural Welding, Power, and Structure Technology Standards and the Mathematical Practices

Mathematical Practices	Agricultural Welding, Power, and Structure Technology Performance Indicators
1. Make sense of problems and persevere in solving them.	4.2.2-4.2.5; 4.3.3-4.3.7; 4.4.1-4.4.5; 4.5.2-4.5.5 5.2.5-5.2.6; 6.1.2; 6.2.2; 7.1.2; 7.2.2
2. Reason abstractly and quantitatively.	4.2.4; 4.3.3; 4.4.4; 4.5.4; 6.1.2; 7.1.2,7.1.3; 7.2.2 8.2.2; 8.4.1, 8.4.3; 9.1.5; 11.1.3; 12.1.3
3. Construct viable arguments and critique the reasoning of others.	4.2.4; 4.3.3; 4.4.4; 4.5.4; 6.1.2; 7.1.2; 7.1.3; 7.2.2 8.2.2; 8.4.1-8.4.3
4. Model with mathematics.	4.2.5; 4.3.2; 4.3.4; 4.3.6
5. Use appropriate tools strategically.	4.3.2-4.3.7; 4.4.2-4.4.6; 4.5.2-4.5.5; 5.2.4-5.2.6; 7.1.3, 7.2.3 8.4.3; 9.1.6; 10.1.2; 11.1.3
6. Attend to precision.	3.1.1-3.1.8, 3.2.1-3.2.6, 3.3.1-3.3.2 4.2.2-4.2.5; 4.3.2-4.3.7, 4.4.2-4.4.6; 4.5.3-4.5.5 5.2.4-5.2.6; 7.1.2-7.1.3; 8.4.1-8.4.3; 9.1.4-9.1.7; 10.1.2; 11.1.3
7. Look for and make use of structure.	3.1.1-3.1.8, 3.2.1-3.2.6, 3.3.1-3.3.2; 4.2.1; 4.3.1, 4.3.2 4.4.1-4.4.3; 4.5.1-4.5.3; 5.2.1; 5.2.5, 5.2.6; 6.1.3 7.1.2-7.1.3; 7.2.3; 8.2.1; 8.3.2; 8.4.3; 9.1.1-9.1.7; 10.1.1-10.1.3 11.1.1-11.1.4
8. Look for and express regularity in repeated reasoning.	4.2.4; 4.3.3; 4.4.4; 4.5.4; 6.1.2; 7.1.2, 7.1.3; 7.2.2 8.2.2; 8.4.1; 8.4.3; 9.1.5; 11.1.3; 12.1.3

2022 Agricultural Welding, Power, and Structure Technology Standards

Alignment of Agricultural Welding, Power, and Structure Technology Standards and the Science and Engineering Practices

Science and Engineering Practices	Agricultural Welding, Power, and Structure Technology Performance Indicators
1. Asking questions (for science) and defining problems (for engineering).	4.2.4; 4.3.3; 4.4.4, 4.4.8; 4.5.4 6.1.1; 7.2.2; 8.4.3; 9.1.3
2. Developing and using models.	3.1.1; 3.1.3-3.1.4; 3.1.6-3.1.8; 3.2.1-3.2.6; 3.3.1-3.3.2 4.2.1; 4.3.1, 4.3.2; 4.4.1-4.4.3; 4.5.1-4.5.3; 5.2.1; 5.2.5, 5.2.6 6.1.3; 7.1.2, 7.1.3; 7.2.3; 8.2.1; 8.3.2; 8.4.3; 9.1.1-9.1.7 10.1.1-10.1.3; 11.1.1-11.1.4
3. Planning and carrying out investigations.	4.2.4; 4.3.3; 4.4.4, 4.4.8; 4.5.4 6.1.1; 7.2.2; 8.4.3; 9.1.3
4. Analyzing and interpreting data.	4.2.4; 4.3.3; 4.4.4, 4.4.8; 4.5.4 6.1.1; 7.2.2; 8.4.3; 9.1.3
5. Using mathematics and computational thinking.	6.2.2; 7.1.2, 7.1.3; 7.2.3; 9.1.5; 12.1.3
6. Constructing explanations (for science) and designing solutions (for engineering).	4.2.4; 4.3.3; 4.4.4, 4.4.8; 4.5.4 6.1.1; 7.2.2; 8.4.3; 9.1.3
7. Engaging in argument from evidence.	4.2.4; 4.3.3; 4.4.4, 4.4.8; 4.5.4 6.1.1; 7.2.2; 8.4.3; 9.1.3
8. Obtaining, evaluating, and communicating information.	4.2.4; 4.3.3; 4.4.4, 4.4.8; 4.5.4 6.1.1; 7.2.2; 8.4.3; 9.1.3

Agricultural Welding, Power, and Structure Technology Standards 2022

Crosswalks of Agricultural Welding, Power, and Structure Technology Standards and the Common Career Technical Core

Agriculture, Food, and Natural Resources Career Cluster	Performance Indicators
1. Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster™.	6.1.1
2. Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career Cluster™ and the role of agriculture, food and natural resources (AFNR) in society and the economy.	13.3.1-13.3.3
3. Examine and summarize the importance of health, safety and environmental management systems in AFNR businesses.	4.3.1, 4.4.1 4.5.1; 5.1.1; 6.1.1-6.1.3; 7.2.1; 8.1.1; 9.1.1; 10.1.1, 10.1.2; 11.1.1
4. Demonstrate stewardship of natural resources in AFNR activities.	6.1.1-6.1.3
5. Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.	1.4.1-1.4.5; 1.5.1-1.5.3 12.1.1-12.1.3; 13.1.1
6. Analyze the interaction among AFNR systems in the production, processing and management of food, fiber and fuel and the sustainable use of natural resources.	6.1.1-6.1.3

Power, Structural, and Technical Systems Career Pathway	Performance Indicators
1. Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.	4.2.4; 4.3.3, 4.4.4; 4.5.4 6.1.2; 7.1.2, 7.1.3; 7.2.2 8.2.2; 8.4.1; 8.4.3; 9.1.5 11.1.3
2. Operate and maintain AFNR mechanical equipment and power systems.	4.2.1-4.2.5; 4.3.1-4.3.7 4.4.1-4.4.6; 4.5.1-4.5.5 5.2.4-5.2.6; 6.1.3; 7.2.3 8.4.3; 9.1.1, 9.1.4 10.1.1-10.1.3
3. Service and repair AFNR mechanical equipment and power systems.	3.3.1, 3.3.2; 4.2.4; 4.3.3 4.4.4; 4.5.4; 8.1.1, 8.1.2 8.3.1, 8.3.2 8.4.1-8.4.3 9.1.6, 9.1.7
4. Plan, build and maintain AFNR structures.	7.1.1-7.1.3; 7.2.1, 7.2.3
5. Use control, monitoring, geospatial and other technologies in AFNR power, structural and technical systems.	4.3.2, 4.3.3; 4.4.3, .4.4 4.5.4; 5.2.4-5.2.6; 6.1.3 7.2.3; 8.4.3; 9.1.1, 9.1.6 10.1.3