AGRICULTURE SCIENCE I AND II STANDARDS

This document was prepared by:

Office of Career, Technical, and Adult Education
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Adopted by the State Board of Education /
State Board for Career and Technical Education on
October 5, 2012

NEVADA STATE BOARD OF EDUCATION
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CTE MISSION STATEMENT:

The Office of Career, Technical, and Adult Education is dedicated to developing innovative educational opportunities for students to acquire skills for productive employment and lifelong learning.

NEVADA DEPARTMENT OF EDUCATION

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ACKNOWLEDGEMENTS

The development of Nevada Career and Technical standards and assessments is a collaborative effort sponsored by the Office of Career, Technical, and Adult Education at the Department of Education and the Career and Technical Education Consortium of States. 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 Agriculture Science.

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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 Agriculture Science standards were validated through the active participation by business and industry on the development team.

PROJECT COORDINATOR

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AGRICULTURE AND NATURAL RESOURCES
Program Requirements

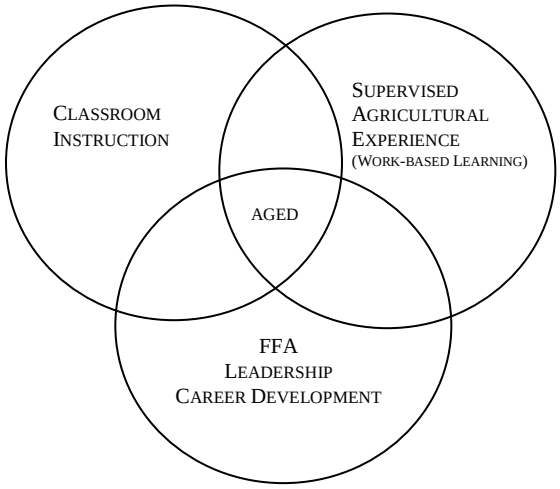
Occupations associated with agriculture production, natural resources, processing and distribution of food and fiber are important to the national interests and provide significant employment opportunities. Occupational education and training in agriculture and agri-business are essential to the continued economic health of Nevada and the nation, as it provides the needed competent and trained work force.

Agriculture education provides high school students with technical and specialized knowledge in production agriculture and natural resources as well as other specific agriculture occupations. The programs are designed to meet students' occupational objectives, interests, and abilities for entry into chosen occupations and can prepare them for advanced education and training. Agriculture education is a coordinated program of group and individual instructional activities consisting of classroom instruction, laboratory experiences, and leadership development. Integral to these activities are FFA (leadership development) and Supervised Agricultural Experience (work-based learning), Nevada Revised Statute 385.110. Federal/Public law#105-225 which was passed in August, 1998, states "Congress of the United States recognizes the importance of the FFA as an integral part of the program of Vocational Agriculture." All students enrolled in Agriculture Education will be recognized as members of the FFA organization. All secondary agriculture education programs and school districts will purchase a curriculum packet consisting of the New Horizons agriculture career and technical magazine, the FFA manual, and the Nevada Record Book on a yearly basis for every student enrolled in agriculture education in their program. Areas of study at the secondary level are divided into Agriculture Science and Specialized Advanced Agriculture Career and Technical Areas.

Agriculture and Society, Plant and Soil Science, Agriculture Mechanical Engineering and Technology, Animal Science, Leadership/FFA, Agriculture Business, Sales, Marketing and Supervised Agriculture Experience, Natural Resources, and Employability are included in the Agriculture Science introduction division.

Instruction in business/specialized agriculture provides training in specific occupational skills, duties, and tasks, as determined by the business and industry needs. Specialized career and technical agriculture programs will include, but are not limited to, the following: ornamental horticulture, floriculture design, turf and landscape management, equine science and technology, forestry technology, wildlife management and enforcement, food science and processing, feedlot management, animal science, veterinary science, agriculture power systems, natural resources and reclamation, mining science and operations, nursery and greenhouse management, landscape architecture, irrigation and chemical management, lawn care and maintenance, and agriculture construction.

NEVADA
SCHOOL BASED AGRICULTURAL
EDUCATION
Model of Instruction



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 Agriculture Science program. These standards are designed for a three-credit course sequence that prepares the student for a technical assessment directly aligned to these and the completer course program 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 in Science (based on the Next Generation Science Standards) and the English Language Arts and Mathematics (based on the Common Core State Standards). Where correlation with an academic content standard exists, students in the Agriculture Science 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 their program area. CTSOs are co-curricular national associations that directly enforce 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.

Program Name	Standards Reference Code
Agriculture Science	AGSCI

Example: AGSCI.2.3.4

Standards	Content Standard	Performance Standard	Performance Indicator
Agriculture Science I & II	2	3	4

CONTENT STANDARD 1.0 : EXAMINE THE ROLE OF AGRICULTURE IN SOCIETY	
PERFORMANCE STANDARD 1.1 : RECOGNIZE THE ROLE OF AGRICULTURE IN SOCIETY	
1.1.1	Assess how agriculture supports daily life
1.1.2	Explain that agriculture is a science
1.1.3	Describe how agricultural products are traded around the globe
1.1.4	Describe the various components of the agriculture industry
1.1.5	Discuss the role of modern agriculture in basic human nutrition
1.1.6	Identify agricultural products used to provide food, clothing, and human shelter
PERFORMANCE STANDARD 1.2 : UNDERSTAND THE HISTORY OF PRODUCTION AGRICULTURE	
1.2.1	Compare agriculture's role in developing civilizations
1.2.2	Organize the major technological developments that have occurred in agriculture
1.2.3	Interpret historical events and trends that have led to the development of today's agriculture industry
PERFORMANCE STANDARD 1.3 : EXPLORE THE WORLD FOOD SUPPLY	
1.3.1	Analyze the impact of agriculture on the local, state, national, and world economies
1.3.2	Explain the role of government in the world's food supply

CONTENT STANDARD 2.0 : DEVELOP LEADERSHIP AND COMMUNICATION SKILLS THROUGH PARTICIPATION IN FFA	
PERFORMANCE STANDARD 2.1 : UNDERSTAND THE HISTORY AND ORGANIZATION OF FFA	
2.1.1	Summarize how, when, and why the National FFA Organization was founded
2.1.2	Describe the mission and strategies, colors, motto, parts of the emblem, and organizational structure of the National FFA Organization
2.1.3	Recite and explain the meaning of the FFA Creed
2.1.4	Explain the purpose of FFA's Program of Activities and describe its committee structure
PERFORMANCE STANDARD 2.2 : UNDERSTAND THE OPPORTUNITIES IN FFA	
2.2.1	Describe how FFA develops leadership skills, personal growth, and career success
2.2.2	Identify major state and national activities and awards available to FFA members
2.2.3	Compete in at least one Career Development Event at the local level
PERFORMANCE STANDARD 2.3 : PROPERLY USE SKILLS IN PARLIAMENTARY PROCEDURE	
2.3.1	List three reasons why parliamentary procedure is used in meetings
2.3.2	List five classifications of motions
2.3.3	Properly perform ten procedures of parliamentary law
PERFORMANCE STANDARD 2.4 : UNDERSTAND THE IMPORTANCE OF SCHOOL AND COMMUNITY AWARENESS	
2.4.1	Discuss the meaning and importance of community service
2.4.2	Identify and describe some community service organizations
2.4.3	Explain how FFA members can become involved in community improvement and development, and plan an activity

CONTENT STANDARD 3.0 : DEVELOP A SUPERVISED AGRICULTURAL EXPERIENCE (SAE) PROGRAM	
PERFORMANCE STANDARD 3.1 : UNDERSTAND THE BENEFITS OF AN SAE PROGRAM	
3.1.1	Relate the importance of goals and career ladders
3.1.2	Explore and develop supervised agricultural experience plans
3.1.3	Prove the benefits of supervised agricultural experience programs
3.1.4	Compare the difference between entrepreneurship and placement SAEs
3.1.5	Connect exploratory SAEs and research and experimentation SAEs
PERFORMANCE STANDARD 3.2 : UNDERSTAND THE BENEFITS OF SAE RECORDS	
3.2.1	Analyze the importance of keeping records of an SAE program
3.2.2	Investigate the types of financial records needed to support a chosen SAE program
3.2.3	Show the procedures for making entries in SAE records
3.2.4	Explain how to summarize and analyze SAE records

CONTENT STANDARD 4.0 : EXPLORING SCIENTIFIC INVESTIGATION IN AGRICULTURE	
PERFORMANCE STANDARD 4.1 : DESIGN AND CONDUCT AGRICULTURAL RESEARCH	
4.1.1	List the steps of the scientific method
4.1.2	Explain the steps in conducting research in agriculture, and conduct an appropriate research project
PERFORMANCE STANDARD 4.2 : REPORT AGRICULTURAL RESEARCH	
4.2.1	Organize the major parts of a research report
4.2.2	Construct the general guidelines for preparing a research report
4.2.3	Explain how to include proper tables and figures in a research report
PERFORMANCE STANDARD 4.3 : UNDERSTAND SCIENTIFIC MEASUREMENT	
4.3.1	Describe the systems of measurement used in this country
4.3.2	Determine the metric prefixes and units used for measuring length, volume weight, temperature, and area
4.3.3	Convert from one system of units to another system of units
PERFORMANCE STANDARD 4.4 : USE LABORATORY TOOLS AND EQUIPMENT	
4.4.1	Identify and properly use personal protection equipment (PPE)
4.4.2	Describe safety in agriscience laboratories
4.4.3	Demonstrate proper use of common agriscience equipment
4.4.4	Identify the major parts of a microscope
4.4.5	Show the proper use and care of a microscope
PERFORMANCE STANDARD 4.5 : EXPLORE CAREERS IN AGRICULTURAL SCIENCE	
4.5.1	Identify basic career information related to agricultural science
4.5.2	Name several agricultural science careers

CONTENT STANDARD 5.0 : DEVELOP AN UNDERSTANDING OF THE ANIMAL SCIENCE INDUSTRY	
PERFORMANCE STANDARD 5.1 : EXPLORE AND EVALUATE THE LIVESTOCK INDUSTRY	
5.1.1	Define terms used to describe beef cattle, dairy, sheep, swine, and horses and identify their external parts
5.1.2	Compare and contrast the common breeds of livestock
5.1.3	Identify and describe methods used to select different species of livestock
5.1.4	Evaluate livestock in a systematic, organized manner according to industry standards
PERFORMANCE STANDARD 5.2 : UNDERSTAND ANIMAL CELLULAR BIOLOGY	
5.2.1	Explain a cell's role and compare and contrast the types of cells (prokaryotic and eukaryotic)
5.2.2	Analyze the components of an animal cell and explain their functions
5.2.3	Define cell theory and examine the importance of mitosis
5.2.4	Identify and describe the five stages of mitosis
5.2.5	Identify and describe the stages of meiosis I and II
5.2.6	Analyze the role of meiosis in spermatogenesis and oogenesis
5.2.7	Compare and contrast mitosis and meiosis
PERFORMANCE STANDARD 5.3 : EXPLORE REPRODUCTIVE PHYSIOLOGY AND BREEDING SYSTEMS	
5.3.1	Compare and explain common breeding systems used in livestock production
5.3.2	Compare gestation lengths in livestock species
5.3.3	Analyze the effects of DNA sequencing on crossbreeding
PERFORMANCE STANDARD 5.4 : UNDERSTAND ANIMAL NUTRITION	
5.4.1	Identify the major parts and describe the functions of the digestive systems in livestock
5.4.2	Analyze the major nutrients and their importance to animals

PERFORMANCE STANDARD 5.5 : UNDERSTAND ANIMAL HEALTH MANAGEMENT	
5.5.1	Measure animal health through visual and tangible observations
5.5.2	Identify the two categories of disease and determine the causes of each
5.5.3	Recognize the two categories of immunity and compare the types in each category
5.5.4	Identify good animal health management practices
PERFORMANCE STANDARD 5.6 : EXPLORE ANIMAL WELFARE ISSUES	
5.6.1	Compare and contrast animal rights and animal welfare
5.6.2	Analyze the ethics involved in animal production
5.6.3	Compare and contrast the role of companion animals and production livestock in society
PERFORMANCE STANDARD 5.7 : EXPLORE CAREERS IN ANIMAL SCIENCE	
5.7.1	Identify basic career information related to animal science
5.7.2	Name several animal science careers

CONTENT STANDARD 6.0 : UNDERSTANDING PLANT SCIENCE	
PERFORMANCE STANDARD 6.1 : IDENTIFY DIFFERENT PLANT CLASSIFICATION SYSTEMS	
6.1.1	State the classification and naming of plants
6.1.2	Distinguish the major groups of plants
6.1.3	Compare the classification of plants by life cycle
PERFORMANCE STANDARD 6.2 : IDENTIFY PARTS AND FUNCTIONS OF PLANT CELLS	
6.2.1	Label the parts of a plant cell
6.2.2	Differentiate between a plant and animal cell
6.2.3	State the function of plant cell organelles
PERFORMANCE STANDARD 6.3 : UNDERSTAND PLANT PHYSIOLOGY	
6.3.1	Analyze the process of photosynthesis
6.3.2	Formulate the process of cellular respiration
6.3.3	Describe plant growth processes
6.3.4	Summarize why photosynthesis and respiration are important to human beings
PERFORMANCE STANDARD 6.4 : UNDERSTAND FLOWER ANATOMY	
6.4.1	Identify and describe the parts of a flower
6.4.2	Explain the purpose of a flower
6.4.3	List different types of flowers
6.4.4	Describe the difference between monocot and dicot flowers
PERFORMANCE STANDARD 6.5 : UNDERSTAND PLANT PROPAGATION	
6.5.1	Explain the importance of plant propagation
6.5.2	Compare the difference between sexual and asexual propagation
6.5.3	Demonstrate asexual propagation

PERFORMANCE STANDARD 6.6 : UNDERSTAND PLANT NUTRITION AND HEALTH	
6.6.1	Differentiate between macronutrients and micronutrients
6.6.2	Describe pH and how it is modified
6.6.3	Describe the components of a fertilizer
6.6.4	Categorize the methods of safely applying agricultural chemicals to crops
6.6.5	Explain the role of agriculture chemicals in crop production
PERFORMANCE STANDARD 6.7 : EXPLORE CAREERS IN PLANT SCIENCE	
6.7.1	Identify basic career information related to plant science
6.7.2	Name several plant science careers

CONTENT STANDARD 7.0 : EXPLORING SOIL SCIENCE	
PERFORMANCE STANDARD 7.1 : UNDERSTAND SOIL TEXTURE AND STRUCTURE	
7.1.1	List the components of soil
7.1.2	Describe the concept of soil texture and its importance
7.1.3	Classify the texture of a soil sample
7.1.4	Identify various soil structures, their formation, and importance in agriculture production
PERFORMANCE STANDARD 7.2 : UNDERSTAND SOIL EROSION	
7.2.1	Define soil erosion and describe the two classes of erosion
7.2.2	Identify the causes of soil erosion and the steps in the erosion process
PERFORMANCE STANDARD 7.3 : EXPLORE CAREERS IN SOIL SCIENCE	
7.3.1	Identify basic career information related to soil science
7.3.2	Name several soil science careers

CONTENT STANDARD 8.0 : EXPLORING ORNAMENTAL HORTICULTURE	
PERFORMANCE STANDARD 8.1 : UNDERSTAND THE BASIC PRINCIPLES OF LANDSCAPE DESIGN	
8.1.1	Identify the major areas of a residential landscape
8.1.2	Evaluate the selection of plant materials for the landscape
8.1.3	Demonstrate how to draw plants on a landscape plan
8.1.4	Describe how to label a landscape plan
PERFORMANCE STANDARD 8.2 : UNDERSTAND THE BASIC PRINCIPLES OF GREENHOUSE	
8.2.1	Classify greenhouse designs
8.2.2	Review considerations for greenhouse frameworks
8.2.3	Identify and describe greenhouse glazing materials
8.2.4	Describe the functions of the headhouse
8.2.5	List greenhouse bench options
PERFORMANCE STANDARD 8.3 : UNDERSTAND THE BASIC PRINCIPLES OF FLORICULTURE	
8.3.1	Analyze the principles of floral design
8.3.2	Compare the major forms used in floral design
8.3.3	Demonstrate corsage design mechanics and techniques
8.3.4	Identify supplies and tools needed in floral work
PERFORMANCE STANDARD 8.4 : EXPLORE CAREERS IN ORNAMENTAL HORTICULTURE	
8.4.1	Identify basic career information related to ornamental horticulture science
8.4.2	Name several ornamental horticulture science careers

CONTENT STANDARD 9.0 : EXPLAIN BASIC SALES AND MARKETING CONCEPTS FOR AGRICULTURAL PRODUCTS	
PERFORMANCE STANDARD 9.1 : DEMONSTRATE AN UNDERSTANDING OF AGRICULTURAL MARKETING	
9.1.1	Distinguish between the four basic market structures
9.1.2	Define marketing and the marketing mix
9.1.3	Investigate the benefits of a brand, and explain how to establish and maintain a brand's reputation
9.1.4	Investigate the role of value-added products to an agricultural business
9.1.5	Define the purpose for developing a marketing plan
PERFORMANCE STANDARD 9.2 : UNDERSTAND THE PRINCIPLES OF AGRICULTURAL SALES	
9.2.1	Identify the characteristics of an effective salesperson, and define related terms
9.2.2	Compare and contrast the relationship between marketing and selling
9.2.3	Compare the customer buying process
9.2.4	Identify the six steps involved in the selling process
9.2.5	Identify the benefits of different types of sales to an agribusiness, including Website and E-commerce
9.2.6	Assess the basic components and content of a business Website
PERFORMANCE STANDARD 9.3 : EXPLORE CAREERS IN SALES AND MARKETING	
9.3.1	Identify basic career information related to sales and marketing
9.3.2	Name several sales and marketing careers

CONTENT STANDARD 10.0 : UNDERSTAND THE RELATIONSHIP BETWEEN AGRICULTURE AND NATURAL RESOURCE MANAGEMENT	
PERFORMANCE STANDARD 10.1 : EXPLORE TYPES OF NATURAL RESOURCES	
10.1.1	Define and identify types of natural resources
10.1.2	Distinguish between renewable and nonrenewable resources
10.1.3	Compare the difference between inexhaustible and exhaustible resources
PERFORMANCE STANDARD 10.2 : UNDERSTAND HUMAN DEMAND ON NATURAL RESOURCES	
10.2.1	Recognize how humans use natural resources
10.2.2	Identify the urban and rural impacts of natural resource use
10.2.3	Analyze the impact of recycling and reusing resources
PERFORMANCE STANDARD 10.3 : COMPREHEND NATURAL RESOURCE CONSERVATION	
10.3.1	Critique the importance of conservation and preservation
10.3.2	Identify the effects of humans on the environment, including the greenhouse effect
10.3.3	Identify types of natural resource damage
PERFORMANCE STANDARD 10.4 : UNDERSTAND ECOLOGY AND ECOSYSTEMS	
10.4.1	Define ecology and ecosystems
10.4.2	Explain natural selection and succession
10.4.3	Identify biomes and explain ecosystem diversity
10.4.4	Diagram and explain the nitrogen, phosphorus, carbon, and water cycle

PERFORMANCE STANDARD 10.5 : EXPLORE PRINCIPLES OF RANGELAND MANAGEMENT	
10.5.1	Define range
10.5.2	Define multiple use
10.5.3	Identify Nevada's bioregions
10.5.4	Explain effects of invasive species
10.5.5	Explain six rangeland management concepts
PERFORMANCE STANDARD 10.6 : EXPLORE CAREERS IN NATURAL RESOURCE MANAGEMENT	
10.6.1	Identify basic career information related to natural resource management
10.6.2	Name several natural resource management careers

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CROSSWALKS AND ALIGNMENTS OF AGRICULTURE SCIENCE I & II STANDARDS AND THE NEVADA ACADEMIC CONTENT STANDARDS AND THE COMMON CAREER TECHNICAL CORE STANDARDS

CROSSWALKS (ACADEMIC STANDARDS) *

The crosswalk of the Agriculture Science I & II Standards shows links to the Nevada Academic Content Standards in Science (based on the Next Generation Science Standards – Disciplinary Core Ideas Arrangement) and the English Language Arts and Mathematics (based on the Common Core State Standards). The crosswalk identifies the performance indicators in which the learning objectives in the Agriculture Science program support academic learning. The performance indicators are grouped according to their content standard and are crosswalked to the Nevada Academic Content Standards in Science, English Language Arts, and Mathematics.

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 Agriculture Science I & II Standards Performance Indicators and the Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Agriculture Science program support academic learning.

CROSSWALKS (COMMON CAREER TECHNICAL CORE)

The crosswalk of the Agriculture Science I & II Standards shows links to the Common Career Technical Core. The crosswalk identifies the performance indicators in which the learning objectives in the Agriculture Science 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 Agriculture Science I & II Standards are crosswalked to the Agriculture, Food & Natural Resources (AFNR) Career Cluster™ and multiple AFNR career pathways.

*Revised 06/04/2014 – Updated Crosswalks for the Nevada Academic Content Standards in Science

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CROSSWALK OF AGRICULTURE SCIENCE I AND II STANDARDS AND THE NEVADA ACADEMIC CONTENT STANDARDS

CONTENT STANDARD 1.0: EXAMINE THE ROLE OF AGRICULTURE AND SOCIETY

Performance Indicators	Nevada Academic Content Standards
1.2.1	**Science: HS-Earth and Human Activity** HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
1.2.3	**Science: HS-Engineering Design** HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. **Science: HS-Earth and Human Activity** HS-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

CONTENT STANDARD 2.0: DEVELOP LEADERSHIP AND COMMUNICATION SKILLS THROUGH PARTICIPATION IN FFA

Performance Indicators	Nevada Academic Content Standards
2.1.3	**English Language Arts: Reading Standards for Literacy in Science and Technical Subjects** RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
2.2.1	**English Language Arts: Speaking and Listening** SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience and task.

CONTENT STANDARD 3.0: DEVELOP A SUPERVISED AGRICULTURAL EXPERIENCE (SAE) PROGRAM

Performance Indicators	Nevada Academic Content Standards
3.1.4	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.2d Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
3.1.5	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9.10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
3.2.4	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. **English Language Arts: Speaking and Listening Standards** SL.9-10.4 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. SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CONTENT STANDARD 4.0: EXPLORING SCIENTIFIC INVESTIGATION IN AGRICULTURE

Performance Indicators	Nevada Academic Content Standards
4.2.1	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
4.2.2	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
4.2.3	**English Language Arts: Speaking and Listening Standards** 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. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
4.4.2	**English Language Arts: Speaking and Listening Standards** SL.9-10.4 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.

CONTENT STANDARD 5.0: DEVELOP AN UNDERSTANDING OF THE ANIMAL SCIENCE INDUSTRY

Performance Indicators	Nevada Academic Content Standards
5.2.1	**Science: HS-From Molecules to Organisms: Structures and Processes** HS-LS1-1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
5.2.4	**Science: HS-From Molecules to Organisms: Structures and Processes** HS-LS1-4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
5.2.5	**Science: HS-Heredity: Inheritance and Variation of Traits** HS-LS3-1 Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. HS-LS3-2 Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
5.2.6	**Science: HS-Heredity: Inheritance and Variation of Traits** HS-LS3-2 Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. HS-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
5.2.7	**Science: HS-Heredity: Inheritance and Variation of Traits** HS-LS3-2 Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. HS-LS1-4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
5.3.3	**Science: HS-Heredity: Inheritance and Variation of Traits** HS-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
5.4.2	**Science: HS-From Molecules to Organisms: Structures and Processes** HS-LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. **Science: HS-Ecosystems: Interactions, Energy, and Dynamics** HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

CONTENT STANDARD 6.0: UNDERSTANDING PLANT SCIENCE

Performance Indicators	Nevada Academic Content Standards
6.1.2	**Science: HS-Biological Evolution: Unity and Diversity** HS-LS4-2 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.
6.2.2	**Science: HS-From Molecules to Organisms: Structures and Processes** HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
6.3.1	**Science: HS-From Molecules to Organisms: Structures and Processes** HS-LS1-5 Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.
6.3.2	**Science: HS-From Molecules to Organisms: Structures and Processes** HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
6.3.4	**Science: HS-Ecosystems: Interactions, Energy, and Dynamics** HS-LS2-5 Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

CONTENT STANDARD 7.0: EXPLORING SOIL SCIENCE

Performance Indicators	Nevada Academic Content Standards
7.1.4	**Science: HS-Earth's Systems** HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
7.2.1	**Science: HS-Earth's Systems** HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
7.2.2	**Science: HS-Earth's Systems** HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

CONTENT STANDARD 9.0: EXPLAIN BASIC SALES AND MARKETING CONCEPTS FOR AGRICULTURAL PRODUCTS

Performance Indicators	Nevada Academic Content Standards
9.1.3	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.
9.1.4	**English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

CONTENT STANDARD 10.0: UNDERSTAND THE RELATIONSHIP BETWEEN AGRICULTURE AND NATURAL RESOURCE MANAGEMENT

Performance Indicators	Nevada Academic Content Standards
10.2.1	**Science: HS-Earth and Human Activity** HS-ESS3-3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
10.2.3	**Science: HS-Earth and Human Activity** HS-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. **English Language Arts: Writing Standards for Literacy in Science and Technical Subjects** WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.
10.3.1	**Science: HS-Earth and Human Activity** HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
10.3.2	**Science: HS-Earth and Human Activity** HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. **Science: HS-Biological Evolution: Unity and Diversity** HS-LS4-6 Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
10.3.3	**Science: HS-Earth and Human Activity** HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
10.4.2	**Science: HS-Ecosystems: Interactions, Energy, and Dynamics** HS-LS2-8 Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce. **Science: HS-Heredity: Inheritance and Variation of Traits** HS-LS3-2 Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. **Science: HS-Biological Evolution: Unity and Diversity** HS-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
10.4.3	**Science: HS-Ecosystems: Interactions, Energy, and Dynamics** HS-LS2-6 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
10.4.4	**Science: HS-Earth's Systems** HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. HS-ESS2-6 Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. **Science: HS-Ecosystems: Interactions, Energy, and Dynamics** HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. HS-LS2-5 Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
10.5.4	**Science: HS-Earth's Systems** HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.

10.5.5	**Science: HS-Earth's Systems** HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. **Science: HS-Earth and Human Activity** HS-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

ALIGNMENT OF AGRICULTURE SCIENCE I & II STANDARDS AND THE MATHEMATICAL PRACTICES

Mathematical Practices	Agriculture Science I and II Performance Indicators
1. Make sense of problems and persevere in solving them.	
2. Reason abstractly and quantitatively.	4.3.2, 4.3.3 13.2.3
3. Construct viable arguments and critique the reasoning of others.	2.3.3
4. Model with mathematics.	3.2.3, 3.2.4 4.3.3 6.3.1, 6.3.2
5. Use appropriate tools strategically.	3.2.2, 3.2.3 4.2.3 8.1.2, 8.1.3
6. Attend to precision.	3.2.3, 3.2.4 4.2.3; 4.3.3
7. Look for and make use of structure.	3.2.4 4.3.2 6.3.1, 6.3.2
8. Look for and express regularity in repeated reasoning.	

CROSSWALKS OF AGRICULTURE SCIENCE I AND II STANDARDS AND THE COMMON CAREER TECHNICAL CORE

Agriculture, Food & Natural Resources Career Cluster™ (AG)	Performance Indicators
1. Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster™.	1.1.3, 1.2.2, 1.2.3 1.3.1, 1.3.2; 4.1.2
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.	1.1.1-1.1.6 2.4.1-2.4.3
3. Examine and summarize the importance of health, safety and environmental management systems in AFNR businesses.	1.1.1, 1.1.5, 1.1.6, 1.3.2 4.4.1, 4.4.2
4. Demonstrate stewardship of natural resources in AFNR activities.	10.2.1-10.2.3, 10.5.4
5. Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.	2.2.3; 3.1.1, 3.1.3-3.1.5 4.5.1; 5.7.1; 6.7.1 7.3.1; 8.4.1; 9.3.1; 10.6.1
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.	3.2.4 10.3.1-10.3.3, 10.5.2
Agribusiness Systems Career Pathway (AG-BIZ)	**Performance Indicators**
1. Apply management planning principles in AFNR businesses.	
2. Use record keeping to accomplish AFNR business objectives, manage budgets, and comply with laws and regulations.	
3. Manage cash budgets, credit budgets and credit for an AFNR business using generally accepted accounting principles.	3.2.2-3.2.4
4. Develop a business plan for an AFNR business.	
5. Use sales and marketing principles to accomplish AFNR business objectives.	9.1.4, 9.2.1-9.2.6
Animal Systems Career Pathway (AG-ANI)	**Performance Indicators**
1. Analyze historic and current trends impacting the animal systems industry.	5.6.1-5.6.3
2. Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.	
3. Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production.	5.4.2
4. Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.	5.3.1-5.3.3
5. Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.	
6. Classify, evaluate and select animals based on anatomical and physiological characteristics.	5.1.3, 5.1.4, 5.5.1, 5.5.4
7. Apply principles of effective animal health care.	

Natural Resources Systems Career Pathway (AG-NR)	Performance Indicators
1. Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.	10.5.2
2. Analyze the interrelationships between natural resources and humans.	10.2.1-10.2.3 10.3.2, 10.3.3
3. Develop plans to ensure sustainable production and processing of natural resources.	
4. Demonstrate responsible management procedures and techniques to protect or maintain natural resources.	10.5.5
Plant Systems Career Pathway (AG-PL)	**Performance Indicators**
1. Develop and implement a crop management plan for a given production goal that accounts for environmental factors.	6.6.5
2. Apply the principles of classification, plant anatomy and plant physiology to plant production and management.	6.1.1-6.1.3, 6.2.1-6.2.3 6.3.1-6.3.4, 6.4.1-6.4.4
3. Propagate, culture and harvest plants and plant products based on current industry standards.	6.5.1-6.5.3, 6.6.1-6.6.5
4. Apply principles of design in plant systems to enhance an environment (e.g., floral, forest, landscape and farm).	8.1.1, 8.3.1, 8.3.2