

**STATE OF WYOMING
AGRICULTURE & NATURAL RESOURCES
CLUSTER AND PATHWAY COMPETENCIES**

AGRICULTURE COMPETENCIES

Cluster Level Core Competencies & Objectives

COMPETENCY

AS1 Students will demonstrate knowledge of impacts of agriculture on society.

OBJECTIVES

- AS1-1 Students will identify careers in agriculture/ industries
- Identify occupations in agriculture
 - Identify individual agriculture career interests
- AS1-2 Students will recognize the role of agriculture in society
- Trace major changes and accomplishments in the history of agriculture
 - Analyze the importance of agriculture to society
 - Demonstrate understanding of the scope of world agricultural production
 - Describe the role of consumers in world agriculture systems
 - Describe the use of science and technology in world food and fiber production

COMPETENCY

AS2 Students will demonstrate written and verbal communication skills.

OBJECTIVES

- AS2-1 Students will demonstrate public speaking skills
- Demonstrate effective speaking techniques
 - Organize and present a persuasive message
- AS2-2 Students will read, comprehend, and interpret technical materials/publications
- AS2-3 Students will produce
- Technical report/research paper
 - Resume, letter of job application, cover letter application, cover letter and/or job application form

COMPETENCY

AS3 Students will demonstrate an understanding of agribusiness principles and skills.

OBJECTIVES

- AS3-1 Students will describe personal finance management
- Demonstrate the components of personal finances and goal making
 - Distinguish the pros and cons of borrowing money
 - Identify sources of credit.
- AS3-2 Students will maintain and complete a set of financial records based on a Supervised Agricultural Experience Project (SAE) or a simulated class activity
- AS3-3 Students will explain keeping and using records in agricultural occupations
- Explain the purpose of record keeping
 - Complete a balance sheet
 - Demonstrate understanding of cash flow, income statements, and computerized record keeping

COMPETENCY

AS4 Students will demonstrate understanding of applied sciences in agriculture.

OBJECTIVES

- AS4-1 Students will describe how the scientific method is used in agricultural research
- AS4-2 Students will explain the steps of the scientific method

COMPETENCY

AS5 Students will demonstrate understanding of the Future Farmers of America (FFA) organization.

OBJECTIVES

- AS5-1 History and membership of FFA
- AS5-2 Parliamentary procedure
- AS5-3 Identify opportunities through FFA
- AS5-4 Demonstrate leadership, citizenship, and cooperation skills

Agriculture & Natural Resources Cluster

AGRICULTURE BUSINESS PATHWAY

Pathway Core Competencies & Objectives

COMPETENCY

ASAB1 Students will understand basic agricultural business management procedures in agriculture and natural resources.

OBJECTIVES

- ASAB1-1 Students will understand agriculture credit
- Students will understand credit and its role in agribusiness
 - Students will analyze and compare credit sources and types
- ASAB1-2 Students will maintain agriculture records
- Demonstrate understanding of record-keeping procedures including accounting and bookkeeping systems, as well as inventory and depreciation procedures commonly used in production agriculture and agribusiness
 - Maintain and complete a set of financial records based on a Supervised Agricultural Experience Project (SAE) or a simulated class activity
- ASAB1-3 Students will understand cash flow planning and analysis
- Identify how to make management decisions based on financial and production records

COMPETENCY

ASAB2 Students will apply basic economic principles in agriculture and natural resource business and management.

OBJECTIVES

- ASAB2-1 Students will apply basic economic principles in natural resource business and management
- Demonstrate understanding of profit motive
- ASAB2-2 Students will monitor monthly financial statements

COMPETENCY

ASAB3 **Students will demonstrate understanding of agricultural finance management procedures**

OBJECTIVES

- ASAB3-1 Students will understand agriculture credit sources
- Students will analyze and compare credit sources and types, calculate repayment ability, and costs of credit
- ASAB3-2 Students will understand cash flow planning and analysis
- Students will understand agricultural budgeting, cash flow analysis, and the use of records for planning and analysis
 - Students will prepare an enterprise budget and a cash flow statement
- ASAB3-3 Students will understand sales, excise and property taxes
- Demonstrate understanding of the purpose of different types of taxes
 - Demonstrate understanding the importance of tax planning and record keeping
- ASAB3-4 Students will demonstrate understanding insurance and risk management as it relates to agriculture
- Demonstrate understanding of the insurance needs applicable to the agriculture and natural resources
 - Identify and describe insurance concerns of agriculture and natural resources

COMPETENCY

ASAB4 **Students will understand marketing, sales, and purchasing.**

OBJECTIVES

- ASAB4-1 Students will understand commodities and marketing
- Understand marketing functions and concepts in agribusiness management
 - Understand the components of a marketing plan for an agricultural product or service
- ASAB4-2 Students will analyze purchasing options
- Understand purchasing and leasing options involved in agriculture
 - Analyze land purchase vs. lease
 - Analyze and compare costs of options such as leasing versus purchasing, new versus used equipment, and volume buying
- ASAB4-3 Students will understand agriculture sales
- Understand the principles and techniques involved in marketing and selling agricultural products and services
 - Observe agriculture sales skills in a role-playing situation

COMPETENCY

ASAB5 Students will inventory private and public organizations that impact agriculture and natural resources.

OBJECTIVES

- ASAB5-1 Students will understand how private and public organizations and government agencies impact agriculture and agribusiness. (e.g. Farm Bureau, Nature Conservancy, mineral industry, USDA, BLM, Forest Service, WY DoAG, EPA)
- ASAB5-2 Students will analyze and compare the purposes, services, and effects of private and public organizations

Agriculture & Natural Resources Cluster

AGRICULTURAL MECHANICS PATHWAY

Pathway Core Competencies & Objectives

COMPETENCY

ASAM1 Students will demonstrate safe practices when working in laboratories and other enclosed facilities and when operating and working around laboratory equipment, materials, and chemicals.

OBJECTIVES

- ASAM1-1 Students will demonstrate understanding of information from MSDS manuals (material safety data sheets)
- ASAM1-2 Students will understand appropriate use of clothing protection and personal protection equipment
- ASAM1-3 Students will identify appropriate practices for use of electricity for safe practices
- ASAM1-4 Students will identify appropriate fire safety practices
- ASAM1-5 Students will explain how to create a safe place to work
- ASAM1-6 Students will describe what each safety color means and where it is used

COMPETENCY

ASAM2 Students will repair, recondition, and safely operate hand tools.

OBJECTIVES

- ASAM2-1 Students will sharpen, recondition, maintain, and properly store tools

COMPETENCY

ASAM3 Students will safely operate power tools.

OBJECTIVES

- ASAM3-1 Students will safely use portable and stationary power tools

COMPETENCY

ASAM4 Student will understand welding orientation.

OBJECTIVES

- ASAM4-1 Student will identify welding processes
- ASAM4-2 Student will understand and use welding safety and first aid
- ASAM4-3 Student will identify welding tools and equipment

COMPETENCY

ASAM5 Student will use shielded metal arc welding processes.

OBJECTIVES

- ASAM5-1 Student will perform safety inspections of equipment and accessories
- ASAM5-2 Student will set up for shielded metal arc welding operations on mild steel
- ASAM5-3 Student will start and restart an arc, crater, and backfill at the edge while running a bead on mild steel plate
- ASAM5-4 Student will build a pad on mild steel plate in the flat position on mild steel
- ASAM5-5 Student will weld to specifications a groove and fillet weld in the flat position on mild steel

COMPETENCY

ASAM6 Student will use gas metal arc welding processes.

OBJECTIVES

- ASAM6-1 Student will perform safety inspections of equipment and accessories
- ASAM6-2 Student will set up for gas metal arc welding operations on mild steel
- ASAM6-3 Student will operate gas metal arc welding equipment
- ASAM6-4 Student will use Short Circuit Transfer to make fillet & groove welds in flat position on mild steel

COMPETENCY

ASAM7 **Students will select, maintain, and safely operate oxyfuel welding and cutting equipment systems.**

OBJECTIVES

- ASAM7-1 Student will perform safety inspections of equipment and accessories
- ASAM7-2 Students will apply oxyfuel welding processes and techniques
- ASAM7-3 Students will weld mild steel with filler rod
- ASAM7-4 Students will cut and weld various thickness of mild steel with an oxy-acetylene unit
- ASAM7-5 Students will perform straight and shape cutting operations on mild steel

COMPETENCY

ASAM8 **Students will fabricate with metal.**

OBJECTIVES

- ASAM8-1 Students will identify types and shapes of metals
- ASAM8-2 Students will plan and design projects with a bill of materials included
- ASAM8-3 Students will fabricate shop projects using metal
- ASAM8-4 Student will use basic math and measuring skills (tape measures, adding, subtracting, fractions)
- ASAM8-5 Student will read welding project plans

COMPETENCY

ASAM9 **Students will demonstrate basic electrical wiring knowledge.**

OBJECTIVES

- ASAM9-1 Students will explain electricity and identify safety practices that should be observed in doing electrical work
- ASAM9-2 Students will compare single-phase and three-phase systems

COMPETENCY

ASAM10 **Students will paint and/or apply protective coatings.**

OBJECTIVES

- ASAM10-1 Students will prepare surfaces and select paints/preservatives
- ASAM10-2 Students will select applicators and apply finishes

Note: We would like to acknowledge that some schools within the state currently or will in the future offer the following. However, these topics are NOT OFFERED STATEWIDE due to size or time limitations and as such, competencies have not been identified at this time.

- Small engine
- Equipment and vehicle maintenance
- Trailer maintenance
- Plumbing
- Electrical wiring and motors
- Soldering
- Masonry
- Surveying

Agriculture & Natural Resources Cluster

NATURAL RESOURCE MANAGEMENT PATHWAY

Pathway Core Competencies & Objectives

COMPETENCY

ASNRM1 Students will demonstrate an understanding of natural resource management.

OBJECTIVES

- ASNRM1-1 Students will explore natural resources
- Identify types of natural resources
 - Distinguish between renewable and nonrenewable resources.
- ASNRM1-2 Students will examine the relationship between natural resources and society, including conflict management
- Define natural resource management
 - Identify and compare major natural resource management agencies and companies
 - Investigate applicable acts and laws pertaining to natural resources
 - Describe human demands on natural resources
- ASNRM1-3 Students will demonstrate an understanding of water resources, watersheds and management
- Explain the water cycle
 - Determine water usage and conservation
 - Identify water sources and quality standards
 - Conduct water quality tests
 - Explain water distribution and regulation
 - Identify the importance of wetlands
- ASNRM1-4 Students will demonstrate an understanding of fisheries/wildlife resources and management
- Describe the food chain and natural selection
 - Define, recognize the importance of, and understand management of fish and wildlife habitat
 - Identify game animals and their respective food webs
 - Analyze and interpret endangered species
- ASNRM1-5 Students will demonstrate an understanding of forest resources and management
- Describe forest ecology and the importance of forests
 - Explain the role of fire in forest management
 - Examine reforestation practices.

- ASNRM1-6 Students will demonstrate an understanding of recreation and resources management
- Identify and explore outdoor recreational enterprises
 - Compare various recreational uses of the region
 - Investigate the economic and environmental impact of the outdoor recreation industry
- ASNRM1-7 Students will assess soil resources and management
- Explain the importance of soil
 - Describe soil texture, structure, and profile
 - Describe soil erosion and management practices
- ASNRM1-8 Students will demonstrate understanding of land classification, planning inventory, and monitoring methods
- Students will describe the interrelationships between land use planning and natural resources
 - Students will demonstrate how GIS applies to land use planning
 - Students will develop a basic plan for monitoring a natural resource project

COMPETENCY

ASNRM2 Students will analyze waste generation, waste reduction, disposal and impacts.

OBJECTIVES

- ASNRM2-1 Students will compare and contrast waste disposal methods
- ASNRM2-2 Students will assess agriculture's impact on the environment through waste generation (i.e., animal waste, pesticide residue, fertilizer runoff, sedimentation/erosion, and odors/dust)

COMPETENCY

ASNRM3 Students will demonstrate an understanding of range resources and management.

OBJECTIVES

- ASNRM3-1 Students will evaluate range management systems, economics, and improvement techniques
- ASNRM3-2 Students will evaluate
- Livestock use of rangeland
 - Wildlife use of rangeland
 - Range plant succession

COMPETENCY

ASNRM4 **Students will understand ecology, ecosystems, and biomes.**

OBJECTIVES

- ASNRM4-1 Students will define concepts (i.e. communities, ecosystems, population ecology, food web, homeostasis, and succession)
- ASNRM4-2 Students will identify biomes and explain ecosystem diversity
- ASNRM4-3 Students will use research methodologies to investigate an ecological problem

COMPETENCY

ASNRM5 **Students will demonstrate an understanding of air resources and management.**

OBJECTIVES

- ASNRM5-1 Students will describe the effects of air pollution on people and their environment
- ASNRM5-2 Students will assess methods of controlling air pollution

Agriculture & Natural Resources Cluster

ANIMAL SCIENCE PATHWAY

Pathway Core Competencies & Objectives

COMPETENCY

ASAS1 Students will understand animal anatomy, physiology, and health of domesticated animals.

OBJECTIVES

- ASAS1-1 Students will understand the major internal body systems
- ASAS1-2 Students will identify the external anatomy of each species of livestock
- ASAS1-3 Students will describe the role of bacteria, fungi, viruses, genetics, and nutrition in disease
- ASAS1-4 Students will explain vital signs and normal behavior
- ASAS1-5 Students will identify management methods of control, treatment and prevention for disease and parasites.
- ASAS1-6 Students will identify appropriate tools and equipment

COMPETENCY

ASAS2 Students will explain animal genetics and reproduction.

OBJECTIVES

- ASAS2-1 Students will identify the anatomy and exhibit knowledge of physiology of the reproductive system
- ASAS2-2 Students will explain the uses of genetic selection in animal agriculture
- ASAS2-3 Students will list and describe systems of animal breeding
- ASAS2-4 Students will explain current technologies in animal reproduction

COMPETENCY

ASAS3 **Student will identify current topics and career opportunities and animal science.**

OBJECTIVES

- ASAS3-1 Students will identify current topics in animal science
- Identify the legal aspects of animal welfare and animal rights
 - Discuss ethical issues in modern biotechnology
- ASAS3-2 Students will appraise career opportunities in animal science
- Use available handbooks, career information, and computerized career information delivery systems to aid career exploration or to formulate tentative career choices
 - Match interests and aptitudes to an occupational area
 - Identify the skills, education and preparation needed for an occupational area

COMPETENCY

ASAS4 **Students will demonstrate management practices for specific species of animals.**

OBJECTIVES

- ASAS4-1 Students will analyze importance of the industry
- ASAS4-2 Students will demonstrate knowledge of management principles
- ASAS4-3 Students will evaluate and select depending on intended use
- ASAS4-4 Students will identify the nutritional requirements
- ASAS4-5 Students will demonstrate an understanding of fitting and showing techniques
- ASAS4-6 Students will demonstrate an understanding of safety around livestock

COMPETENCY

ASAS5 **Students will understand animal science and production.**

OBJECTIVES

- ASAS5-1 Students will explore the industry and related terminology
- List the common breeds and uses
 - Identify types of production enterprises and facility needs
 - Describe marketing options

COMPETENCY

ASAS6 Students will demonstrate an understanding of the meat industry.

OBJECTIVES

- ASAS6-1 Students will distinguish meat inspection from grading
- ASAS6-2 Students will identify wholesale and retail cuts of beef, lamb and pork
- ASAS6-3 Students will demonstrate knowledge of the meat industry from a consumer viewpoint
- ASAS6-4 Students will grade carcasses

Agriculture & Natural Resources Cluster

PLANT SCIENCE PATHWAY

Pathway Core Competencies & Objectives

COMPETENCY

ASPS1 Students will demonstrate an understanding of soil science.

OBJECTIVES

- ASPS1-1 Students will explain the importance of soil
- Explain the importance of soil as a medium for plant growth
 - Describe the agricultural and non-agricultural uses of soil
- ASPS1-2 Students will explain soil-forming factors
- Identify five factors involved in soil formation (parent material, topography, organisms, time, climate)
- ASPS1-3 Students will describe basic biological, physical, and chemical properties of soil
- Explain the components of soil (biological, chemical, mineral, and profile)
 - Describe soil texture, structure and profile
- ASPS1-4 Students will analyze soil fertility
- Describe the meaning and importance of soil fertility
 - Explain the role of organic matter, soil depth, surface slope, soil organisms, and nutrient balance in soil productivity

COMPETENCY

ASPS2 Students will demonstrate basic surveying and soil and water management skills.

OBJECTIVES

- ASPS2-1 Students will describe land measurement and legal descriptions
- Investigate surveying equipment
 - Interpret legal land descriptions

COMPETENCY

ASPS3 Students will demonstrate an understanding of agronomy.

OBJECTIVES

- ASPS3-1 Demonstrate an understanding of crop production and the resources necessary for producing domesticated plants
- Identify the environmental impacts of crop production
 - Describe the use of irrigation in crop production
- ASPS3-2 Students will describe the planting, growth, and development of economically important crops
- ASPS3-3 Students will identify the fertilization needs of crops
- ASPS3-4 Students will understand how to harvest and store forages and grain crops

COMPETENCY

ASPS4 Students will understand plant science careers.

OBJECTIVES

- ASPS4-1 Students will identify career opportunities and levels of education needed in the plant science area
- Identify and describe the major areas of plant and soil science occupations
 - Students will identify career and entrepreneurship opportunities and expectations in plant and soil science

COMPETENCY

ASPS5 Students will demonstrate an understanding of plant structure and function.

OBJECTIVES

- ASPS5-1 Students will demonstrate an understanding of plant cells and seeds
- Describe the cellular structure of plants
 - Explain the structure and kinds of seed
 - Describe the process of seed germination and conditions required
 - Explain the importance of seed quality
- ASPS5-2 Students will analyze the function of the stem, roots and leaves
- ASPS5-3 Students will understand plant adaptations used for protection
- Discuss plant responses to a shortage of water
 - Describe plant responses to temperature

- ASPS5-4 Students will explain the control of plant growth and development
- Understand the use and importance of plant growth regulators (PGR) and their functions
 - Explain plant tropisms
- ASPS5-5 Students will describe the uptake and use of water, minerals, and light
- Describe the functions of water in plant growth
 - Explain the absorption and transport systems of plants
 - Explain the role of light quality and quantity on plant growth
 - Describe the processes of photosynthesis
- ASPS5-6 Students will explain plant reproduction
- Identify the major parts of flowers and explain the functions of the parts
 - Describe the types of flowers
 - Explain the processes of pollination and fertilization
 - Describe the purposes and kinds of fruit
 - Explain the structure and kinds of seed
 - Explain sexual reproduction, pollination, and fertilization in plants
 - Explain asexual propagation in plants
 - Describe methods for asexually propagating plants

COMPETENCY

ASPS6 Students will investigate principles of biotechnology in plant science.

OBJECTIVES

- ASPS6-1 Students will discuss ethical issues in modern biotechnology
- ASPS6-2 Students will understand plant genetics and the role of technology in modern practices

COMPETENCY

ASPS7 Students will demonstrate understanding of weeds, diseases, and insects.

OBJECTIVES

- ASPS7-1 Students will identify plant pests, diseases and their causes
- Identify and describe types of pests
 - Explain the identification of weeds
 - Explain the classification of and identify economic importance of insects
- ASPS7-2 Students will identify and select an appropriate control for each major type of pest
- Describe types of pest control strategies
 - Explain the identification, diagnosis, and methods of controlling plant diseases
 - Describe methods of weed management and the selection of herbicides
 - Describe methods of insect management
- ASPS7-3 Students will describe the principles of pest management
- Explain Integrated Pest Management (IPM) and its benefits
 - Explain scouting of field crops for pests
 - Identify basic principles of crop monitoring
- ASPS7-4 Students will prepare plant and soil samples for analysis
- Describe why, how, and when to conduct soil samples
 - Interpret the results of soil analysis
 - Explain samples and sampling techniques used with monitoring field crops
- ASPS7-5 Students will understand the importance of pesticide safety
- Identify major classifications of pesticides and their use (herbicides, pesticides, fungicides, etc.)
 - Identify the safety practices that should be followed when applying pesticides
 - Properly interpret pesticide labels
 - Explain how to properly calibrate equipment used in applying pesticides
 - Identify the environmental concerns involved with pesticide use