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