GACE® Agricultural Education Assessment

Test at a Glance

Updated May 2017

See the GACE® Agricultural Education Assessment Study Companion for practice questions and preparation resources.

Assessment Name	Agricultural Education
Grade Level	6–12
Test Code	Test I: 040 Test II: 041 Combined Test I and Test II: 540
Testing Time	Test I: 2 hours Test II: 2 hours Combined Test I and Test II: 4 hours
Test Duration	Test I: 2.5 hours Test II: 2.5 hours Combined Test I and Test II: 5 hours
Test Format	Computer delivered
Number of Selected-response Questions	Test I: 80 Test II: 80 Combined Test I and Test II: 160
Question Format	The test consists of a variety of short-answer questions such as selected-response questions, where you select one answer choice or multiple answer choices (depending on what the question asks for), questions where you enter your answer in a text box, and other types of questions. You can review the possible question types in the ***Guide to Taking a GACE Computer-delivered Test***.
Number of Constructed-response Questions	Test I: 0 Test II: 0 Combined Test I and Test II: 0

About this Assessment

The GACE Agricultural Education assessment is designed to measure the professional knowledge of prospective teachers of secondary school Agricultural Education in the state of Georgia.

This assessment includes two tests. You may take either test individually or the full assessment in a single session. The testing time is the amount of time you will have to answer the questions on the test. Test duration includes time for tutorials and directional screens that may be included in the test.

The questions in this assessment assess both basic knowledge across content areas and the ability to apply principles.

The total number of questions that are scored is typically smaller than the total number of questions on the test. Most tests that contain selected-response questions also include embedded pretest questions, which are not used in calculating your score. By including pretest questions in the assessment, ETS is able to analyze actual test-taker performance on proposed new questions and determine whether they should be included in future versions of the test.

Content Specifications

Each test in this assessment is organized into content **subareas**. Each subarea is further defined by a set of **objectives** and their **knowledge statements**.

- The objectives broadly define what an entry-level educator in this field in Georgia public schools should know and be able to do.
- The knowledge statements describe in greater detail the knowledge and skills eligible for testing.
- Some tests also include content material at the evidence level. This content serves as descriptors of what each knowledge statement encompasses.

See a breakdown of the subareas and objectives for the tests in this assessment on the following pages.

Test I Subareas

Subarea	Approx. Percentage of Test
I. Foundations of Agricultural Education	60%
II. Food Science and Biotechnology	20%
III. Power, Structural, and Technical Systems	20%

Test I Objectives

Subarea I: Foundations of Agriculture and Agricultural Education

Objective 1: Understands the agriculture industry and agribusiness systems

The beginning Agricultural Education teacher:

A. Knows the historical development of agriculture
   - Describes the spread of agriculture
   - Describes the value of research in agriculture

B. Understands the value of agriculture
   - Defines agriculture
   - Identifies the areas or branches of agriculture
   - Is familiar with global impacts of agriculture
   - Identifies the major categories of food and fiber products

C. Knows the principles of capitalism and entrepreneurship in the agribusiness industry
   - Describes how supply and demand interact to determine the price of agricultural commodities
   - Describes the law of diminishing returns
   - Distinguishes between fixed and variable costs
   - Distinguishes between marginal cost and marginal return
   - Distinguishes between inputs and outputs, and makes decisions based on costs and availability
   - Distinguishes among current and noncurrent assets and liabilities
   - Identifies the opportunity costs within an agribusiness
   - Compares and contrasts the main characteristics of individual proprietorships, partnerships, cooperatives, and corporations

- Distinguishes among the sectors of agribusiness; e.g., producer, service, processing, and marketing
- Identifies methods of reducing risk in an agribusiness

D. Knows the management skills needed to organize an agribusiness
   - Identifies and describes key components of a contract and a lease
   - Describes diversification and specialization in agribusiness
   - Understands basic management skills; e.g., scheduling, hiring, and purchasing
   - Describes the components of an agribusiness plan
   - Understands steps in the management decision-making process

E. Knows the record-keeping practices needed to accomplish agribusiness objectives and to make informed decisions
   - Describes the purposes of enterprise records
   - Develops and completes an enterprise budget
   - Develops a balance sheet and analyzes its uses
   - Completes and interprets a cash-flow statement
   - Identifies the components of a completed inventory
   - Describes depreciation
   - Develops an income/expense statement and describes its purposes
   - Completes a break-even analysis for an enterprise
   - Analyzes the important financial ratios and calculations; e.g., net worth, debt to equity, solvency

F. Is familiar with the fundamentals of savings, investments, and credit in agribusiness
   - Identifies the importance of a savings and investment plan
   - Identifies the sources of credit
   - Describes ways to build and maintain credit
   - Describes a business proposal

G. Is familiar with the marketing principles needed to accomplish agribusiness objectives
   - Describes the components and purpose of a promotional campaign
   - Describes key factors involved in marketing; e.g., product knowledge, service knowledge, and customer knowledge
   - Describes how market prices and cycles affect agricultural commodities
   - Describes commodity futures and options trading

- Distinguishes between hedging and speculation

Objective 2: Understands leadership, career, and program development in agriculture and agricultural education

The beginning Agricultural Education teacher:

A. Knows the principles of individual and team leadership
    - Describes the importance of personal leadership development; e.g., personality, leadership style, and Maslow's hierarchy
    - Describes various forms of leadership; e.g., democratic, authoritarian, and situational
    - Understands basic parliamentary procedure motions described in the *Official FFA Manual*.
    - Describes proper presentation and disposal of a main motion
    - Describes the purpose of parliamentary procedure in Future Farmers of America (FFA) meetings
    - Describes team-building skills; e.g., motivation, communication, and influence
    - Differentiates between the positive and negative attributes of a leader
    - Identifies the importance of ethics in leadership
B. Knows the foundational areas of career development
    - Describes how to develop a career plan; e.g., strengths, values, and interests
    - Develops a career plan to meet career goals; e.g., education, employment, and lifestyle goals
    - Describes the various components related to job preparation; e.g., résumé development, interviewing, and overall business etiquette
C. Understands the purpose, structure, and function of the National FFA Organization
    - Identifies the FFA mission statement, creed, motto, ceremonies, and salute
    - Identifies different types of FFA membership
    - Describes major historical moments and figures of the FFA; e.g., founded in 1928, New Farmers of America, E. M. Tiffany, girls allowed in 1969, Henry C. Groseclose
    - Identifies the constitutional officer positions and their duties
    - Knows the FFA degrees
    - Understands the importance of the Program of Activities and FFA Committee structures

- Identifies and describes career development events (CDEs) and their purpose
- Identifies FFA award programs; e.g., degree programs and applications, proficiencies, leadership awards, scholarships

D. Knows communication skills

- Describes effective communication skills; e.g., written, verbal, and nonverbal
- Identifies techniques to improve listening, reading, writing, speaking, and nonverbal communication skills

E. Knows information research skills to make informed decisions

- Describes how to determine validity and reliability of a source; e.g., author, date, bibliography, type of source
- Understands the scientific method

F. Understands supervised agricultural experiences (SAEs)

- Describes the purpose of an SAE
- Describes the major types of SAEs; e.g., entrepreneurship, placement, agriscience, agribusiness, exploratory
- Describes how to develop an SAE program
- Identifies student advancement and awards related to the SAE program; e.g., degrees, proficiency awards
- Applies basic financial record-keeping skills for the establishment and maintenance of an SAE

G. Knows opportunities across the various career pathways of agriculture

- Describes the various career pathways within the Agriculture, Food, and Natural Resources Career Cluster
- Identifies the specific skills and education needed for the career pathways
- Describes agricultural careers available to students in an agricultural education program

H. Is familiar with local program planning and management

- Identifies and describes the three components of a comprehensive agricultural education program
- Defines the scope and sequence for a secondary agricultural education program, including the FFA Alumni Association, Georgia Young Farmers Association, and adult agricultural education programs
- Identifies the purpose and importance of an advisory committee

Subarea II: Food Science and Biotechnology

Objective 1: Understands trends, regulatory agencies, and processes related to food science

The beginning Agricultural Education teacher:

A. Is familiar with major issues and trends affecting the food products and processing industry
    - Identifies major trends and developments in the food products and processing industry; e.g., buying local, free-range animals, and irradiated beef
    - Describes dietary trends affecting the food industry; e.g., low fat, sugar free, gluten free

B. Is familiar with regulatory agencies that effect the food products and processing industry
    - Describes how the United States Department of Agriculture (USDA) and the United States Food and Drug Administration (FDA) regulate the food products and processing industry; e.g., country-of-origin labeling, nutrition labeling, and inspections

C. Is familiar with selecting, harvesting, processing, and classifying food products for storage, distribution, and consumption
    - Describes the purpose of grading to select food products for a specific use
    - Describes the methods that add value to agricultural commodities
    - Identifies basic processing techniques; e.g., preservation, homogenization, and meat fabrication
    - Describes the importance of controlled features in the processing of food; e.g., temperature, moisture, and sanitation

Objective 2: Understands biotechnology as it relates to the agriculture industry

The beginning Agricultural Education teacher:

A. Is familiar with major innovations, historical developments, and applications of biotechnology in agriculture
    - Identifies the major biotechnological innovations; e.g., increased yields, herbicide tolerance, and insect resistance
    - Describes the advantages that advances in biotechnology offer local producers

B. Is familiar with the ethical, legal, social, cultural, safety, and environmental issues related to biotechnology
    - Identifies the major legal and ethical issues surrounding the adoption of biotechnology

- Identifies the social and cultural issues related to agricultural biotechnology; e.g., resistance to the use of genetically modified organisms (GMOs), hormones
- Identifies the economic impact of biotechnology
- Describes the environmental issues related to agricultural biotechnology; e.g., herbicide resistance in weeds, beneficial-insect decline

C. Is familiar with basic, safe laboratory procedures

- Identifies the principles of aseptic technique
- Identifies potential hazards in a biotechnology lab
- Identifies the safety equipment needed to properly conduct a laboratory experiment
- Describes safe handling of laboratory materials, chemicals, and equipment

D. Is familiar with the various uses of genetic engineering in the agricultural industry

- Identifies the uses of genetic engineering, cloning, and stem-cell research in agriculture
- Identifies the purpose of genetically modifying organisms in agriculture

Subarea III: Power, Structural, and Technical Systems

Objective 1: Understands science principles and safety of power, structural, and technical systems

The beginning Agricultural Education teacher:

A. Is familiar with the physical science principles and engineering applications associated with power, structural, and technical systems

- Describes the basic principles of work and power; e.g., pneumatics, hydraulics, and simple machines
- Differentiates among basic metals as they pertain to a welding shop; e.g., mild steel, cast iron, brass, and copper
- Describes horsepower for engines, equipment, and electrical motors
- Differentiates among conduction, convection, and radiation
- Describes principles of oil viscosity and lubrication

B. Is familiar with various power and energy sources

- Describes proper safety procedures for dealing with power and energy sources
- Compares and contrasts the benefits and costs of various energy sources; e.g., wind, solar, hydro, coal, and nuclear

- Differentiates among energy sources; e.g., internal combustion, mechanical, and electrical

C. Is familiar with the principles of power, energy transfer, and conversion

- Describes the basic operating principles of an electric motor
- Describes the basic principles of gears and pulleys
- Describes gear reduction and multipliers
- Describes the transfer of power/energy from a motor to an implement

D. Knows the proper use, storage, and disposal of potentially hazardous materials

- Describes the importance of proper laboratory safety
- Interprets instructions and precautions
- Identifies Occupational Safety and Health Administration (OSHA) regulations regarding laboratory safety colors and uses
- Explains the proper storage of compressed-gas bottles according to OSHA regulations
- Describes the proper storage and disposal of hazardous materials; e.g., fuels, pesticides, and paints

E. Is familiar with the application of technology to the agriculture industry

- Defines the term “GIS (Geographic Information System)” and explains its relationship to GPS (Global Positioning System)
- Explains how GPS and GIS are used in precision agriculture
- Lists the common applications of GPS technology in agriculture
- Identifies potential applications for computer-controlled technology; e.g., greenhouse controls (GNC), computer numerical control machines, and automated equipment

Objective 2: Understands applications of power, structural, and technical systems

The beginning Agricultural Education teacher:

A. Is familiar with electricity and electrical wiring

- Identifies proper safety procedures for working with electricity and electrical wiring
- Defines common electrical terms; e.g., amp, volt, ohm, watt, kilowatt, kilowatt hour, conductor, resistance, and transformer
- Determines amperage, voltage, horsepower, wattage, and rpm from the nameplate on an electric motor
- Identifies the importance of grounding and ground fault circuit interrupters (GFCIs)
- Calculates electrical power usage and cost using Ohm’s law

- Interprets electrical diagrams of common 110–120 volt AC electrical circuits; e.g., single-pole switches, three-way switches, outlets, GFCI, and fixtures
- Distinguishes the differences between AC and DC circuits
- Identifies conductors and insulators

B. Knows the safe operation and maintenance of hand tools, power tools, and other equipment

- Identifies potential safety hazards in the agriculture mechanics laboratory
- Identifies hand tools and determines their uses
- Identifies power tools and determines their uses
- Identifies the proper use of electrical wiring tools and supplies
- Describes the basic use and maintenance of common pneumatic shop equipment; e.g., air compressor, impact wrench
- Describes hand-tool and power-tool maintenance

C. Is familiar with the principles of small-engine operation, maintenance, and repair

- Identifies basic maintenance procedures and adjustments of internal combustion engines
- Identifies the basic parts of a small gas engine
- Describes the four-stroke cycle and the two-stroke cycle
- Describes the principles of spark-ignition engine (gas) operation
- Describes the basic principles of compression engine (diesel) operation
- Identifies the different fuels used in internal combustion engines
- Describes engine displacement

D. Is familiar with metal fabrication and welding

- Describes and identifies metal shop safety procedures and equipment
- Describes different types of welding; e.g., shielded metal-arc welding (SMAW), gas metal-arc welding (GMAW), flux-cored arc welding (FCAW), tungsten-inert gas (TIG), oxy-fuel, and brazing
- Identifies common welding joints, including lap, butt, and fillet
- Describes basic arc welding procedures and terminology; e.g., positions, classifying rods, and polarity
- Describes proper metal-cutting practices; e.g., oxy-fuel, plasma, cutoff saws, and shears
- Describes basic oxy-fuel welding procedures and terminology; e.g., positions, equipment setup, and selection
- Describes the fundamentals of cold metal work

Test II Subareas

Subarea	Approx. Percentage of Test
I. Animal Systems	34%
II. Environmental and Natural Resource Systems	33%
III. Plant Systems	33%

Test II Objectives

Subarea I: Animal Systems

Objective 1: Understands the principles of animal science as related to the agriculture industry

The beginning Agricultural Education teacher:

A. Is familiar with the historical development and trends of the animal systems industry
   - Explains past, current, and emerging trends related to the animal agricultural industry
   - Describes the domestication of animals

B. Knows the classification, anatomical characteristics, and physiological characteristics of animals
   - Understands the taxonomical classification system of animals
   - Identifies the structure and function of the major body systems of animals; e.g., digestive, reproductive, and respiratory
   - Distinguishes animals by species, use, sex, age, and physical traits

C. Is familiar with proper health care of animals
   - Describes the use of vaccination and immunization in the animal science industry
   - Selects proper routes of administration of medications and vaccines on various animal species
   - Describes methods of controlling parasites of livestock
   - Describes noninfectious and infectious diseases and disorders
   - Differentiates between normal and abnormal behavior in common poultry and livestock
   - Identifies causes of abnormal behavior in common poultry and livestock

D. Knows basic principles of animal nutrition

- Describes the importance of proper nutrition for animal production
- Differentiates between ruminant and nonruminant digestion
- Identifies the major groups of nutrients; e.g., proteins, carbohydrates, and minerals
- Describes the general principles involved in balancing a ration
- Calculates a balanced ration, given animal requirements and feed composition, using the Pearson's square method

E. Is familiar with the principles and practices of basic animal reproduction

- Defines terminology related to reproductive management and breeding systems, including castration, estrus, gestation, lactation, and parturition
- Explains the role of the estrus cycle, ovulation, heat detection, and fertilization in animal reproduction management
- Identifies practices and principles related to animal reproduction; e.g., artificial insemination, embryo transfer, and selective breeding
- Describes processes involved in cell division, including how genes affect the transmission of characteristics
- Completes Punnett square crosses for one-factor and two-factor crosses
- Defines phenotype and genotype of animals

Objective 2: Understands animal production, management, and safety

The beginning Agricultural Education teacher:

A. Knows the basic principles of animal production and management

- Selects market and breeding livestock based on visual assessment
- Selects animals to cull based on performance data
- Describes grading systems of livestock; e.g., feeder, quality, and yield
- Interprets expected progeny differences (EPDs) to make production decisions
- Describes management procedures needed for effective livestock production; e.g., castration, docking, and dehorning
- Defines crossbreeding, grading up, inbreeding, linebreeding, and purebred breeding

B. Knows safety practices related to animal production

- Describes basic procedures for handling animal materials; e.g., vaccinations, supplements
- Describes safe animal-handling procedures

- Identifies the components of a safety and biosecurity plan for a specific class of animals

C. Is familiar with the proper design and use of animal facilities and the equipment for safe and efficient production

- Identifies common styles of facilities for common poultry and livestock production
- Identifies safe and effective facility designs based on animal species and environment
- Describes equipment needed for safe and effective handling of common poultry and livestock; e.g., squeeze chute, twitch, and grooming stand

D. Is familiar with the effects of environmental conditions on animal production

- Understands that various environmental conditions affect animal agriculture; e.g., air, water, and temperature
- Describes the effect of detrimental environmental conditions on common poultry and livestock; e.g., health, production, and reproduction

E. Is familiar with the impacts of animal production on the environment

- Describes environmental conditions affected by animal production
- Describes the importance of a waste-management and an animal-disposal plan for livestock operations

F. Is familiar with the issues related to animal rights, animal welfare, and producer responsibilities

- Differentiates between animal welfare and animal rights
- Describes the USDA inspection process for livestock processing and handling facilities

Subarea II: Environmental and Natural Resource Systems

Objective 1: Understands the principles of environmental science

The beginning Agricultural Education teacher:

A. Is familiar with natural cycles related to environmental and natural resource management

- Identifies and explains the carbon cycle, water cycle, and nitrogen cycle as they relate to the environment

B. Is familiar with chemical properties related to environmental and natural resources

- Differentiates between organic and inorganic compounds
- Describes preemergence and postemergence herbicides
- Describes selective and nonselective herbicides

- Describes the effects of chemicals on organisms at different levels of the food chain; e.g., biomagnification
- Differentiates between point (agricultural) and nonpoint (nonagricultural) source pollution

C. Is familiar with the various ecosystems of the environment
    - Identifies and describes the various types of ecosystems; e.g., biomes, aquatic versus terrestrial
    - Identifies biotic and abiotic factors that define an ecosystem

D. Is familiar with the ecological concepts and principles related to natural resource systems
    - Identifies common forestry harvest techniques; e.g., clear-cut, thinning
    - Explains the process of succession in a forest
    - Describes the purpose of reforestation; e.g., soil erosion, water quality, sustainability
    - Explains the difference between preservation and conservation
    - Describes the concepts of population growth and carrying capacity

Objective 2: Understands the principles of environmental management and land use

The beginning Agricultural Education teacher:

A. Is familiar with the issues and regulations in forestry, land use, and environmental and natural resource management
    - Identifies the federal agencies responsible for forestry, environmental regulation, and natural resource management; e.g., United States Environmental Protection Agency (EPA), Natural Resources Conservation Service (NRCS), and Bureau of Land Management (BLM)
    - Describes the impact of federal regulations on agriculture production; e.g., Endangered Species Act (ESA) of 1973, water rights
    - Describes the Georgia forestry industry

B. Knows the use of personal protective equipment (PPE) and safety procedures related to forestry, environmental, and natural resource management
    - Identifies PPE and safety procedures related to forestry, environmental, and natural resource management; e.g., fisheries, wildlife

C. Is familiar with the role of forestry, environmental, and natural resource management in the local, state, and national economies
    - Describes the importance of hunting, trapping, fishing, and outdoor recreation to the economy
    - Knows significant legislation milestones related to natural resources; e.g., Clean Air Act, Clean Water Act

- Explains the contributions of environmental and natural resource management to the national economy
- Describes the impact of forestry on the economy

D. Is familiar with the use, production, and processing of forestry and natural resources
   - Identifies products derived from forestry and natural resources; e.g., wood products, fuels, fish, and wildlife
   - Differentiates between renewable and nonrenewable resources

E. Is familiar with procedures used to develop a forestry, environmental, and natural resource management plan
   - Describes population sampling techniques; e.g., quadrant sampling, electrofishing in aquatic systems, radio tracking
   - Describes the relationship between a species and the habitat needed to support that species
   - Describes a food web
   - Explains the importance of an indicator species

F. Knows the general impact of land use on environmental and natural resources
   - Describes methods used to limit erosion and runoff; e.g., buffers, windbreaks
   - Describes best management practices and explains how they benefit the environment; e.g., stocking rate, protection of critical wildlife habitat
   - Describes the effects of urban sprawl on the environment

G. Describes methods used to limit erosion and runoff; e.g., buffers, windbreaks
   - Explains the role of wetlands in the environment and the need for wetland conservation; e.g., flood control, wildlife habitat

H. Is familiar with the impact of conventional and alternative energy sources on the environment
   - Identifies environmental impacts of energy production
   - Identifies and explains the use of conventional and alternative energy sources; e.g., fossil fuels, solar, and biomass

Subarea III: Plant Systems

Objective 1: Understands the principles of plant and soil science as related to the agriculture industry

The beginning Agricultural Education teacher:

A. Is familiar with the historical development of plant science and its relationship with society

- Knows the development of human use of plants; e.g., food, fiber, shelter
- Identifies the major milestones and advances of plant science; e.g., plant genetics, soil amendments
- Understands the importance of plants in the global food supply

B. Knows general safety issues related to plant systems
   - Identifies and describes safety hazards related to plant production systems; e.g., chemicals, equipment, and tools
   - Defines hazardous plant classifications (e.g., noxious, invasive)
   - Identifies and understands the use of personal protective equipment (PPE)
   - Interprets material safety data sheet (MSDS) information
   - Knows the guidelines for safe pesticide use

C. Knows the basic principles of identification, classification, anatomy, and physiology as related to plant production and management
   - Understands the taxonomical classification system of plants and the importance of binomial nomenclature
   - Differentiates between monocots and dicots
   - Describes reproductive and vegetative plant parts and their functions; e.g., roots absorption, stem support
   - Describes major plant processes; e.g., photosynthesis, transpiration, and respiration
   - Identifies and classifies plants according to use and growth habits; e.g., agronomic, horticultural, annual, perennial
   - Differentiates between herbaceous and woody plants

D. Is familiar with the influence of environmental factors on plant growth
   - Describes how temperature, light, moisture, and air affect plant growth
   - Interprets USDA Plant Hardiness Zone Maps

E. Knows the basic characteristics and uses of soils, growing media, and nutrients
   - Identifies the macronutrients and micronutrients needed for plant growth
   - Describes the role of nitrogen (N), phosphorus (P), and potassium (K) in plant growth
   - Explains the role soil pH plays in plant production
   - Understands the materials used in soilless media, such as vermiculite, perlite, sphagnum moss, and horticultural-grade sand
   - Explains soil structure and texture as related to plant growth

- Describes the types of water in soil; e.g., gravitational, capillary, and available
- Describes the horizons within a soil profile
- Understands the basics of soil conservation practices

F. Is familiar with the propagation, cultivation, and harvesting of plants

- Describes sexual reproduction in plants; e.g., fertilization, germination, and pollination
- Describes asexual propagation methods; e.g., cutting, layering, and grafting
- Identifies major types of cultivation for horticultural crops, including hydroponics
- Identifies major types of cultivation for agronomic crops
- Identifies harvesting techniques; e.g., hand, mechanical
- Describes the importance of growth regulators

Objective 2: Understands the principles of plant production and management

The beginning Agricultural Education teacher:

A. Is familiar with the use of integrated pest management (IPM) in plant production

- Describes IPM and its purposes
- Differentiates between cultural, biological, mechanical (physical), and chemical controls
- Describes the types and uses of pesticides; e.g., herbicides, fungicides, and insecticides

B. Is familiar with production and management practices associated with horticultural crops

- Identifies proper management and production techniques related to greenhouses, orchards, gardens, and nurseries
- Describes greenhouse structures and systems
- Describes the divisions of horticulture; e.g., pomology, floriculture, landscape, and olericulture

C. Is familiar with production and management practices associated with agronomic crops

- Identifies equipment used in cultivating and harvesting agronomic crops
- Identifies and describes the production and management practices of agronomic crops
- Explains the importance of weed and pest control in agronomic crop production

- Describes the divisions of agronomic crops; e.g., cereal grains, forage, oil, fiber
- Describes the purposes of crop rotation
- Describes the fundamentals of cold metal work

D. Is familiar with the principles and elements of landscape and floral design

- Identifies and describes the principles and elements of landscape and floral design