

**Agriculture, Food & Natural Resources Career Cluster**  
**Basic Agriculture Science**  
**Course Number 02.47100**

**Course Description:**

This course is designed as the foundational course for all Agriculture, Food & Natural Resources Pathways. The course introduces the major areas of scientific agricultural production and research; presents problem solving lessons and introductory skills and knowledge in agricultural science and agri-related technologies. Classroom and laboratory activities are supplemented through supervised agricultural experiences and leadership programs and activities. This course is the prerequisite for all AFNR pathways and is intended for students in grades 8-10.

**Course Standard 1**

**AFNR-BAS-1**

The following standard is included in all CTAE courses adopted for the Career Cluster/Pathways. Teachers should incorporate the elements of this standard into lesson plans during the course. The topics listed for each element of the standard may be addressed in differentiated instruction matching the content of each course. These elements may also be addressed with specific lessons from a variety of resources. This content is not to be treated as a unit or separate body of knowledge but rather integrated into class activities as applications of the concept.

**Standard: Demonstrate employability skills required by business and industry.**

The following elements should be integrated throughout the content of this course.

**1.1 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.**

Person-to-Person Etiquette	Telephone and Email Etiquette	Cell Phone and Internet Etiquette	Communicating At Work	Listening
Interacting with Your Boss	Telephone Conversations	Using Blogs	Improving Communication Skills	Reasons, Benefits, and Barriers
Interacting with Subordinates	Barriers to Phone conversations	Using Social Media	Effective Oral Communication	Listening Strategies
Interacting with Co-workers	Making and Returning Calls		Effective Written Communication	Ways We Filter What We Hear
Interacting with Suppliers	Making Cold Calls		Effective Nonverbal Skills	Developing a Listening Attitude
	Handling Conference Calls		Effective Word Use	Show You Are Listening
	Handling Unsolicited Calls		Giving and Receiving Feedback	Asking Questions
				Obtaining Feedback
				Getting Others to Listen

Nonverbal Communication	Written Communication	Speaking	Applications and Effective Résumés
Communicating Nonverbally	Writing Documents	Using Language Carefully	Completing a Job Application
Reading Body Language and mixed Messages	Constructive Criticism in Writing	One-on-One Conversations	Writing a Cover Letter

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Matching Verbal and Nonverbal communication		Small Group Communication	Things to Include in a Résumé
Improving Nonverbal Indicators		Large Group Communication	Selling Yourself in a Résumé
Nonverbal Feedback		Making Speeches	Terms to Use in a Résumé
Showing Confidence Nonverbally		Involving the Audience	Describing Your Job Strengths
Showing Assertiveness		Answering Questions	Organizing Your Résumé
		Visual and Media Aids	Writing an Electronic Résumé
		Errors in Presentation	Dressing Up Your Résumé

### 1.2 Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.

Teamwork and Problem Solving	Meeting Etiquette
Thinking Creatively	Preparation and Participation in Meetings
Taking Risks	Conducting Two-Person or Large Group Meetings
Building Team Communication	Inviting and Introducing Speakers
	Facilitating Discussions and Closing
	Preparing Visual Aids
	Virtual Meetings

### 1.3 Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

Problem Solving	Customer Service	The Application Process	Interviewing Skills	Finding the Right Job
Transferable Job Skills	Gaining Trust and Interacting with Customers	Providing Information, Accuracy and Double Checking	Preparing for an Interview	Locating Jobs and Networking
Becoming a Problem Solver	Learning and Giving Customers What They Want	Online Application Process	Questions to Ask in an Interview	Job Shopping Online
Identifying a Problem	Keeping Customers Coming Back	Following Up After Submitting an Application	Things to Include in a Career Portfolio	Job Search Websites
Becoming a Critical Thinker	Seeing the Customer's Point	Effective Résumés:	Traits Employers are Seeking	Participation in Job Fairs
Managing	Selling Yourself and the Company	Matching Your Talents to a Job	Considerations Before Taking a Job	Searching the Classified Ads
	Handling Customer Complaints	When a Résumé Should be Used		Using Employment Agencies
	Strategies for Customer Service			Landing an Internship
				Staying Motivated to Search

### 1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.

Workplace Ethics	Personal Characteristics	Employer Expectations	Business Etiquette	Communicating at Work
Demonstrating Good Work Ethic	Demonstrating a Good Attitude	Behaviors Employers Expect	Language and Behavior	Handling Anger
Behaving Appropriately	Gaining and Showing Respect	Objectionable Behaviors	Keeping Information Confidential	Dealing with Difficult Coworkers

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Maintaining Honesty	Demonstrating Responsibility	Establishing Credibility	Avoiding Gossip	Dealing with a Difficult Boss
Playing Fair	Showing Dependability	Demonstrating Your Skills	Appropriate Work Email	Dealing with Difficult Customers
Using Ethical Language	Being Courteous	Building Work Relationships	Cell Phone Etiquette	Dealing with Conflict
Showing Responsibility	Gaining Coworkers' Trust		Appropriate Work Texting	
Reducing Harassment	Persevering		Understanding Copyright	
Respecting Diversity	Handling Criticism		Social Networking	
Making Truthfulness a Habit	Showing Professionalism			
Leaving a Job Ethically				

### 1.5 Apply the appropriate skill sets to be productive in a changing, technological, diverse workplace to be able to work independently and apply team work skills.

Expected Work Traits	Teamwork	Time Management
Demonstrating Responsibility	Teamwork Skills	Managing Time
Dealing with Information Overload	Reasons Companies Use Teams	Putting First Things First
Transferable Job Skills	Decisions Teams Make	Juggling Many Priorities
Managing Change	Team Responsibilities	Overcoming Procrastination
Adopting a New Technology	Problems That Affect Teams	Organizing Workspace and Tasks
	Expressing Yourself on a Team	Staying Organized
	Giving and Receiving Constructive Criticism	Finding More Time
		Managing Projects
		Prioritizing Personal and Work Life

### 1.6 Present a professional image through appearance, behavior and language.

On-the-Job Etiquette	Person-to-Person Etiquette	Communication Etiquette	Presenting Yourself
Using Professional Manners	Meeting Business Acquaintances	Creating a Good Impression	Looking Professional
Introducing People	Meeting People for the First Time	Keeping Phone Calls Professional	Dressing for Success
Appropriate Dress	Showing Politeness	Proper Use of Work Email	Showing a Professional Attitude
Business Meal Functions		Proper Use of Cell Phone	Using Good Posture
Behavior at Work Parties		Proper Use in Texting	Presenting Yourself to Associates
Behavior at Conventions			Accepting Criticism
International Etiquette			Demonstrating Leadership
Cross-Cultural Etiquette			
Working in a Cubicle			

### Support of CTAE Foundation Course Standards and Georgia Standards of Excellence L9-10RST 1-10 and L9-10WHST 1-10:

Georgia Standards of Excellence ELA/Literacy standards have been written specifically for technical subjects and have been adopted as part of the official standards for all CTAE courses. Additional Common Core ELA/Literacy standards for Speaking and Listening are listed in the foundational course standards below.

## Course Standard 2

### AFNR-BAS-2

**Relate the role of the FFA student organization in the students' personal development.**

- 2.1 Summarize the FFA history including a basic timeline of events, key people, and major historical occurrences of the organization.
- 2.2 Illustrate the relationship of the FFA within the Agricultural Education model and describe the role and function of the organizational structure from the chapter to national level.
- 2.3 Interpret basic FFA information such as the emblem, colors, motto, mission, salute, behavior, and official dress.
- 2.4 Demonstrate communication skills individually and within group situations by using public speaking skills and parliamentary procedure abilities.
- 2.5 Design personal leadership plan that includes opportunities for personal development through student, chapter, and community related activities.

**Support of CTAE Foundation Course Standards and Georgia Standards of Excellence**

**ELACC9-10SL1:** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

**ELACC9-10SL4:** 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.

## Course Standard 3

### AFNR-BAS-3

**Explore, develop, and implement the Supervised Agricultural Experience (SAE) program by researching careers in agriculture and agribusiness.**

- 3.1 Design, implement, and document SAE by recording steps, skills acquired, and financial information.
- 3.2 Demonstrate employability skills such as work ethic, timeliness, communication, and self-direction.
- 3.3 Explain the role of the different types of agribusiness in society and identify agribusinesses in the local community.
- 3.4 Define agribusiness terminology and discuss the role of marketing in agricultural production.
- 3.5 Analyze skills, education requirements, income, and advantages and disadvantages of careers in the agriculture industry.

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## Course Standard 4

### AFNR-BAS-4

**Recognize how agriculture meets human needs today, in the past, and for the future.**

- 4.1 Explain the three basic human needs and sources for food, clothing, and shelter.
- 4.2 Define agriculture.
- 4.3 Identify major agricultural milestones or inventions and analyzes their impact on modern life and agriculture.
- 4.4 Describe the eight major branches of the agriculture industry.
- 4.5 Determine Georgia's top 10 agricultural commodities.
- 4.6 Differentiate between agricultural imports and exports and list examples of each.
- 4.7 Compare and contrast between agricultural products and byproducts and lists examples of each.
- 4.8 Identify the top three agricultural commodities within each region of the United States and the world.

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## Course Standard 5

### AFNR-BAS-5

**Determine and illustrate safety in the agriculture lab and agriculture worksites.**

- 5.1 Identify hazards in agricultural education labs and work sites.
- 5.2 Select safety equipment and procedures for various agriculture related activities.
- 5.3 Discuss the importance of safety in agricultural occupations.
- 5.4 Demonstrate safety procedures and appropriate behavior while working in the agriculture classroom, labs, and/or work sites.

## Course Standard 6

### AFNR-BAS-6

**Describe soil formation and management and assess its relevance to plant/animal production and natural resources management.**

- 6.1 Describe soil formation and soil composition.
- 6.2 Differentiate between soil components.
- 6.3 Explain the importance of soil ecosystems.
- 6.4 Analyze the importance of slope, soil texture, erosion, and water movement in determining land capability and land use.
- 6.5 Determine land class on a given site and select appropriate soil management practices.
- 6.6 Analyze skills, education requirements, income, and advantages and disadvantages of careers in agronomy.

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**SES3:** Students will explore the actions of water, wind, ice, and gravity that create landforms and systems of landforms (landscapes).

b. Explain how soil results from weathering and biological processes acting on parent rock.

**SEC1:** Students will analyze how biotic and abiotic factors interact to affect the distribution of species and the diversity of life on Earth.

c. Investigate factors that lead to the species richness of an ecosystem and describe the importance of biodiversity.

## Course Standard 7

### AFNR-BAS-7

**Demonstrate knowledge of physics used in agriculture as it relates to work, power, simple machines, and both past and present machinery used in the agricultural industry.**

- 7.1 Explain the areas of physics used in agriscience as it relates to work, power, simple machines and mechanical advantage.
- 7.2 Analyze the use of thermal energy, electrical energy and compression in agriculture and describe basic principles of each.
- 7.3 Trace the development of agricultural machinery.
- 7.4 Interpret service manuals to develop tractor or lawn mower maintenance calendars and perform basic service and maintenance recommendations on a tractor or lawn mower.
- 7.5 Demonstrate safe operating instructions and procedures for a tractor or lawn equipment as recommended by the manufacturer.
- 7.6 Analyze skills, education requirements, income, and advantages and disadvantages of careers in the agricultural mechanics industry.
- 7.7 Plan and construct basic Agricultural Mechanics project.

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## Course Standard 8

### AFNR-BAS-8

**Identify the different areas of agriscience and relate the scientific classification system to organize and research the agriscience field.**

- 8.1 Define biotechnology and create a timeline of biotechnology milestones.
- 8.2 Explain the importance of the scientific method in agriculture and list examples of current agriculture research.
- 8.3 Design, implement, collect data, and determine conclusions by conducting scientific experiments in any field of agriculture.
- 8.4 Research and report current agricultural biotechnology events or products.

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- 8.5 Analyze skills, education requirements, income, and advantages and disadvantages of careers in agriscience/biotechnology fields.

### **Support of CTAE Foundation Course Standards and Georgia Standards of Excellence**

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**ELACC9-10SL2:** Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

**ELACC9-10SL4:** 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.

**SCSh3:** Students will identify and investigate problems scientifically.

- a. Suggest reasonable hypotheses for identified problems.
- b. Develop procedures for solving scientific problems.
- c. Collect, organize and record appropriate data.
- d. Graphically compare and analyze data points and/or summary statistics.
- e. Develop reasonable conclusions based on data collected.
- f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

## Course Standard 9

### **AFNR-BAS-9**

**Define major components of the animal industry and outline the development of the resulting products, services, and careers.**

- 9.1 Analyze the role, importance, and scope of the dairy, beef, pork, poultry, equine, and small ruminant animal industries in modern agriculture.
- 9.2 Identify and describe major breeds within each livestock segment.
- 9.3 Explore the importance of alternative livestock in animal agriculture.
- 9.4 Define key terminology related to animal science and production practices (fact vs. fiction).
- 9.5 Distinguish between animal welfare and animal rights.
- 9.6 Explain the basic anatomy and label basic external parts of production animals.
- 9.7 Differentiate between major wholesale/retail meat cuts of beef, pork, lamb, and poultry and compare the value of various meat cuts.
- 9.8 Analyze skills, education requirements, income, and advantages and disadvantages of careers in the animal industry and explain how they differ from traditional on-farm animal husbandry.
- 9.9 Provide for the care and welfare of animals.

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## Course Standard 10

### AFNR-BAS-10

#### Demonstrate basic skills in natural resource management.

- 10.1 Describe the importance of the forestry and natural resource industry to Georgia's economy.
- 10.2 Label various parts of trees and explain their functions.
- 10.3 Demonstrate the ability to measure forest products and forest related items.
- 10.4 Identify basic equipment used in forestry.
- 10.5 Identify important species of trees and wildlife in Georgia.
- 10.6 Explain the relationship between wildlife and the environment.
- 10.7 Compare and contrast approved practices in managing wildlife.
- 10.8 Analyze skills, education requirements, income, and advantages and disadvantages of careers in the forest and natural resources industry.

#### Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

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**ELACC9-10SL2:** Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

**ELACC9-10SL4:** 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.

## Course Standard 11

### AFNR-BAS-11

#### Apply principles of science to food processing to provide a safe, wholesome and nutritious food supply.

- 11.1 Assess the importance of developing and maintaining sanitation standards.
- 11.2 Explore government requirements and government agencies associated with food quality and food safety.
- 11.3 Describe methods of food processing, preserving, and packaging.
- 11.4 Explain the importance of food processing, preserving, and packaging.
- 11.5 Demonstrate the processing, preserving, and packaging of foods using various methods and techniques.
- 11.6 Analyzes skills, education requirements, income, and advantages and disadvantages of careers in the food processing industry.

#### Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

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**ELACC9-10SL2:** Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

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## Course Standard 12

### AFNR-BAS-12

#### Apply principles of environmental science as it relates to agricultural production and sustainability.

- 12.1 Identifies agricultural commodities that can be converted to alternative energy sources.
- 12.2 Analyzes the efficiency of renewable energy sources such as wind, solar, and biofuels.
- 12.3 Compares and contrasts current production practices such as organic, naturally raised systems, and conventional agricultural production with regard to their sustainability.
- 12.4 Demonstrates how intensive production systems such as aquaculture and vertical farming can maximize production while minimizing space requirements.
- 12.5 Debates how environmental legislation effects agricultural production.
- 12.6 Analyzes skills, education requirements, income, and advantages and disadvantages of careers in the agricultural environmental science industry.

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**ELACC9-10SL2:** Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

**SEV4:** Students will understand and describe availability, allocation and conservation of energy and other resources.

- a. Differentiate between renewable and nonrenewable resources including how different resources are produced, rates of use, renewal rates, and limitations of sources. Distinguish between natural and produced resources.
- b. Describe how technology is increasing the efficiency of utilization and accessibility of resources.
- c. Describe how energy and other resource utilization impact the environment and recognize that individuals as well as larger entities (businesses, governments, etc.) have impact on energy efficiency.
- d. Describe the relationship of energy consumption and the living standards of societies.
- e. Describe the commonly used fuels (e.g. fossil fuels, nuclear fuels, etc.) and some alternative fuels (e.g. wind, solar, ethanol, etc.) including the required technology, availability, pollution problems and implementation problems. Recognize the origin of fossil fuels and the problems associated with our dependence on this energy source.
- f. Describe the need for informed decision making of resource utilization (i.e. energy and water usage allocation, conservation, food and land, and long-term depletion).

## Course Standard 13

### AFNR-BAS-13

#### Explain and demonstrate basic plant science principles including plant health, growth and reproduction.

- 13.1 Describe basic factors in plant growth.
- 13.2 Identify plant life cycles and list examples.
- 13.3 Label the major parts of the plant and explain functions of each plant part.
- 13.4 Compare and contrast photosynthesis, respiration, and transpiration and state their importance.
- 13.5 Identify important floriculture and nursery/landscape plants utilized in Georgia.
- 13.6 Explain the roles of essential plant nutrients for plant growth and reproduction.
- 13.7 Debate the use of organic and inorganic fertilizers in plant production.

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- 13.8 Illustrate and demonstrate sexual and asexual methods of various plant propagation techniques.
- 13.9 Sequence the steps of pollination and fertilization.
- 13.10 Demonstrate scarification, stratification, and planting seeds.
- 13.11 Outline germination steps and list conditions under which germination occurs.
- 13.12 Analyze skills, education requirements, income, and advantages and disadvantages of careers in the plant science industry.

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**ELACC9-10SL2:** Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

**ELACC9-10SL4:** 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.

**SBO1:** Students will use current plant phylogenetic principles and describe the structural changes used to delineate the plant divisions.

- b. Identify and evaluate plant structures in relation to their functions.

**SBO3:** Students will explore the structures and processes necessary for the mutual survival of plants and animals.

- a. Describe and relate plant structures (organs, tissues, cells, organelles) to plant processes (photosynthesis, respiration, transport, growth, reproduction, dispersal).

**SBO5:** Students will analyze the diversity of plant adaptations and responses to environmental extremes.

- b. Examine plant growth and development in relation to plant hormones and responses to external signals such as light, gravity, and touch.