

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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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.

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.

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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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.

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.

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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.

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 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.

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.

ELACC9-10SL2: 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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ELACC9-10SL4: 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.