

# 21st Century Life and Careers: Science, Technology, Engineering & Mathematics Career Cluster

**CAREER CLUSTER® :**  
**AGRICULTURE, FOOD & NATURAL RESOURCES (AG)**

- 1 Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster.** [9.3.12.AG.1](#)
- 2 Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career Cluster and the role of agriculture, food and natural resources (AFNR) in society and the economy.** [9.3.12.AG.2](#)
- 3 Examine and summarize the importance of health, safety and environmental management systems in AFNR businesses.** [9.3.12.AG.3](#)
- 4 Demonstrate stewardship of natural resources in AFNR activities.** [9.3.12.AG.4](#)
- 5 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.** [9.3.12.AG.5](#)
- 6 Analyze the interaction among AFNR systems in the production, processing and management of food, fiber and fuel and the sustainable use of natural resources.** [9.3.12.AG.6](#)

**PATHWAY:**  
**AGRIBUSINESS SYSTEMS (AG-BIZ)**

- 1 Apply management planning principles in AFNR businesses.** [9.3.12.AG-BIZ.1](#)
- 2 Use record keeping to accomplish AFNR business objectives, manage budgets and comply with laws and regulations.** [9.3.12.AG-BIZ.2](#)
- 3 Manage cash budgets, credit budgets and credit for an AFNR business using generally accepted accounting principles.** [9.3.12.AG-BIZ.3](#)
- 4 Develop a business plan for an AFNR business.** [9.3.12.AG-BIZ.4](#)
- 5 Use sales and marketing principles to accomplish AFNR business objectives.** [9.3.12.AG-BIZ.5](#)

**PATHWAY: ANIMAL  
SYSTEMS (AG-ANI)**

- 1 Analyze historic and current trends impacting the animal systems industry.** 9.3.12.AG-ANI.1
- 2 Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.** 9.3.12.AG-ANI.2
- 3 Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production.** 9.3.12.AG-ANI.3
- 4 Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.** 9.3.12.AG-ANI.4
- 5 Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.** 9.3.12.AG-ANI.5
- 6 Classify, evaluate and select animals based on anatomical and physiological characteristics.** 9.3.12.AG-ANI.6
- 7 Apply principles of effective animal health care.** 9.3.12.AG-ANI.7

**PATHWAY:  
ENVIRONMENTAL  
SERVICE SYSTEMS (AG-  
ENV)**

- 1 Use analytical procedures and instruments to manage environmental service systems.** 9.3.12.AG-ENV.1
- 2 Evaluate the impact of public policies and regulations on environmental service system operations.** 9.3.12.AG-ENV.2
- 3 Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology.** 9.3.12.AG-ENV.3
- 4 Demonstrate the operation of environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management and energy conservation).** 9.3.12.AG-ENV.4
- 5 Use tools, equipment, machinery and technology common to tasks in environmental service systems.** 9.3.12.AG-ENV.5

**PATHWAY: FOOD  
PRODUCTS &  
PROCESSING SYSTEMS  
(AG-FD)**

- 1 Develop and implement procedures to ensure safety, sanitation and quality in food product and processing facilities.** 9.3.12.AG-FD.1
- 2 Apply principles of nutrition, biology, microbiology, chemistry and human behavior to the development of food products.** 9.3.12.AG-FD.2
- 3 Select and process food products for storage, distribution and consumption.** 9.3.12.AG-FD.3
- 4 Explain the scope of the food industry and the historical and current developments of food products and processing.** 9.3.12.AG-FD.

**PATHWAY: NATURAL  
RESOURCES SYSTEMS  
(AG-NR)**

**1 Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.** 9.3.12.AG-NR.1

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**2 Analyze the interrelationships between natural resources and humans.** 9.3.12.AG-NR.2

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**3 Develop plans to ensure sustainable production and processing of natural resources.** 9.3.12.AG-NR.3

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**4 Demonstrate responsible management procedures and techniques to protect or maintain natural resources.** 9.3.12.AG-NR.4

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**PATHWAY: PLANT  
SYSTEMS (AG-PL)**

**1 Develop and implement a crop management plan for a given production goal that accounts for environmental factors.** 9.3.12.AG-PL.1

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**2 Apply the principles of classification, plant anatomy and plant physiology to plant production and management.** 9.3.12.AG-PL.2

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**3 Propagate, culture and harvest plants and plant products based on current industry standards.** 9.3.12.AG-PL.3

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**4 Apply principles of design in plant systems to enhance an environment (e.g., floral, forest, landscape and farm).** 9.3.12.AG-PL.4

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**PATHWAY: POWER,  
STRUCTURAL &  
TECHNICAL SYSTEMS  
(AG-PST)**

**1 Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.** 9.3.12.AG-PST.1

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**2 Operate and maintain AFNR mechanical equipment and power systems.** 9.3.12.AG-PST.2

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**3 Service and repair AFNR mechanical equipment and power systems.** 9.3.12.AG-PST.3

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**4 Plan, build and maintain AFNR structures.** 9.3.12.AG-PST.4