Agriculture, Food, and Natural Resources Frameworks

Introduction

Purpose

Local educators are encouraged to use the standards as a guide for the development of well-planned curriculum and assessments for AFNR-related CTE programs. These standards are intended to help shape the design of all components of an agricultural education program including:

- Classroom and laboratory instruction

- Career and Technical Student Organization (CTSO) experiences through organizations such as the National Future Farmers of America (FFA) Organization and the Postsecondary Agriculture Students Organization (PAS)

- Work-based learning experiences such as Supervised Agricultural Experience (SAE) Programs and internships.

Just as agriculture varies throughout our state, nation, and around the world, so will our agricultural education programs. Adoption and use of these standards is voluntary, local entities are encouraged to adapt the standards to meet their needs. School districts should use these standards in conjunction with local advisory committees to determine what is most relevant and appropriate for their students in providing that all-important link between the school and the business community.

Agriculture, Food and Natural Resources Career Cluster

The agriculture, food and natural resources (AFNR) industry is a highly technical and ever-changing sector of the global economy upon which everyone is dependent. We will continue to meet national and global demand for a safe and abundant food, fiber and fuel supply if we invest in the growth and development of the human capital for the AFNR industry. Strong, relevant AFNR Career and Technical Education (CTE) programs that are informed by industry and education stakeholders are one way we can meet workforce needs now and in the future.

The AFNR Career Cluster Content Standards provide agricultural educators with a high-quality, rigorous set of standards to guide what students should know and be able to do after completing a program of study in each of the following AFNR career pathways:

- Agribusiness Systems

- Animal Systems

- Biotechnology Systems

- Food Products and Processing Systems

- Natural Resource and Environmental Service Systems

- Plant Systems

- Power, Structural and Technical Systems

The AFNR Career Cluster Content Standards were originally developed as part of the 2003 United States Department of Education (USDE) Career Clusters Project. In 2009, The National Council for Agricultural Education reviewed and revised the content standards.

The Council (National Council for Agricultural Education) strives to stimulate positive growth in agricultural education. Since its beginning in December 1983, The Council has provided leadership for stakeholders in agriculture, food, fiber and natural resources systems education. In 2012, The Council identified the review and revision of the AFNR Career Cluster Content Standards as a goal in its 2012 – 2015 Strategic Plan.

Framework Design

During the summer of 2016, the Minnesota Department of Education Office of Career and College Success provided a grant to the Southern Center of Agriculture. The Southern Center of Agriculture directed the development of the AFNR curriculum frameworks. Select agricultural educators from Minnesota developed an AFNR Framework by aligning the *AFNR Career Cluster Content Standards* to Minnesota Academic Science (2009) and Economic Standards (2011), Experiential Based Learning, **National FFA Activities**, and Career and Technical Education Courses offered in local Minnesota districts.

Acknowledgments

The revision process relied upon input from more than 20 Agriculture Education teachers representing educators at the secondary and postsecondary level, and state leaders in CTE and agricultural education. Carl Aakre and Leah Bott worked as project directors to develop the frameworks. The input from these educators was fundamental to achieving the project goals. Individuals providing input include:

Carl Aakre, Curriculum for Agricultural Education

Paul Aarsvold, Plainview Elgin Millville Community School

Brian Boomgaarden, Pipestone Area Schools

TJ Brown, Springfield Public Schools

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Sue Gorman, Goodhue Public Schools

Angie James, St. James Public Schools

Kerry Lindgren, Staples Motley Public Schools

Jacob Oyster, Sebeka Public Schools

John Roberts, Holdingford Public Schools

Eric Swatzke, Dassel Cokato School District

Barry Schmidt, Tri City United Public Schools

Paul Skoglund, Tracy Area Public Schools

Tracy Tebben, New London-Spicer Schools

Mike Thofson, Lake Crystal Wellcome Memorial School District

Liz Tianglia, Owatonna Public Schools

The members that provided input and assistance to these revisions are to be commended for their leadership, thoughtful inputs, and dedication to achieving the goals of this project.

The National Association of State Directors of Career and Technical Education/National Career Technical Education Foundation (NASDCTEc/NCTEF) have provided permission to use the Common Career and Technical Core(CCTC) Standards in support of this project. Further, their insights and input regarding the revised standards has been very valuable in shaping the final product. NASDCTE/NCTEF are the owners and developers of the Common Career and Technical Core (CCTC) Standards © Copyright 2012 and reserve all rights to the original material that is used here with permission.

Structure

Within each pathway, the standards are organized as follows:

- **Common Career Technical Core (CCTC) Standards** — these are the standards set forth for each of the respective content areas outlined above in the 2012 version of the Common Career and Technical Core Standards. These statements are owned by the National Association of State Directors of Career and Technical Education/National Career Technical Education Foundation and are used here with permission. They define what students should know and be able to do after completing instruction in a program of study for this pathway.

- **Performance indicators** — these statements distill each performance element into more discrete indicators of the knowledge and skills students should attain through a program of study in this pathway. Attainment of the knowledge and skills outlined in the performance indicators is intended to demonstrate an acceptable level of proficiency with the related performance element at the conclusion of a program of study in this area.

- **Benchmarks** — these statements are sample measureable activities that students might carry out to indicate attainment of each performance indicator at three levels of proficiency – awareness (a), intermediate (b), and advanced (c). This is not intended to be an all-encompassing list; the sample measurements are provided as examples to demonstrate a logical progression of knowledge and skill development pertaining to one or more content areas related to the performance indicator. State and local entities may determine the most appropriate timing for attainment of each level of proficiency based upon local CTE program structures.

Frameworks Organization

This document outlines content standards for the Common Career Technical Core (CCTC) Career Ready Practices, the AFNR Cluster Skills and seven AFNR career pathways. Minnesota agricultural educators reviewed recommendations from The Council and adapted standards to fit the needs of students and employers in the Agricultural, Food, and Natural Resources Career Cluster. It is recommended for students to select and complete one or more program of study to prepare for a career in the AFNR field.

A complete program of study will include instruction on essential knowledge and skills required for success regardless of one's chosen career pathway in the AFNR industry. These essential concepts are outlined in the following content standards:

- **CCTC Career Ready Practices (CRP)** – encompasses fundamental skills and practices that all students should acquire to be career ready such as: responsibility, productivity, healthy choices, maintaining personal finances, communication, decision-making, creativity and innovation, critical-thinking, problem solving, integrity, ethical leadership, management, career planning, technology use and cultural/global competency. Career Ready Practices should be implemented into all AFNR pathways. Go to the CCTC Career Ready Practices page for a detailed description of each standard.

- **AFNR Cluster Skills (CS)** – encompasses the study of fundamental knowledge and skills related to all AFNR professions. Students completing a program of study in any AFNR career pathway will demonstrate fundamental knowledge of the nature, scope and relationships of AFNR systems and the skills necessary for analysis of current and historical issues and trends; application of technologies; safety, health and environmental practices; stewardship of natural resources; and exploration of career opportunities. Access National Council for Agricultural Education website for more information about AFNR Cluster Skills.

Beyond these foundational skills, the content standards are further organized into seven career pathways of study. The career pathway content standards cover technical content required for future success within each respective pathway.

- **Agribusiness Systems (ABS)**— encompasses the study of agribusinesses and their management including, but not limited to, record keeping, budget management (cash and credit), business planning, and sales and marketing. Students completing a program of study in this pathway will demonstrate competence in the application of principles and techniques for the planning, development, application and management of agribusiness systems in AFNR settings.

- **Animal Systems (AS)** — encompasses the study of animal systems, including content areas such as life processes, health, nutrition, genetics, management and processing, as applied to small animals, aquaculture, exotic animals, livestock, dairy, horses and/or poultry. Students completing a program of study in this pathway will demonstrate competence in the application of principles and techniques for the development, application and management of animal systems in AFNR settings.

- **Biotechnology Systems (BS)** — encompasses the study of using data and scientific techniques to solve problems concerning living organisms with an emphasis on applications to agriculture, food and natural resource systems. Students completing a program of study in this pathway will demonstrate competence in the application of principles and techniques for the development, application and management of biotechnology systems in AFNR settings.

- **Food Products and Processing Systems (FPP)** — encompasses the study of food safety and sanitation; nutrition, biology, microbiology, chemistry and human behavior in local and global food systems; food selection and processing for storage, distribution and consumption; and the historical and current development of the food industry. Students completing a program of study in this pathway will demonstrate competence in the application of principles and techniques for the development, application and management of food products and processing systems in AFNR settings.

- **Natural Resource and Environmental Service Systems (NRESS)** — encompasses the study of the management, protection, enhancement and improvement of soil, water, wildlife, forests and air as natural resources as well as the study of systems, instruments and technology used to monitor and minimize the impact of human activity on environmental systems. Students completing a program of study in this pathway will demonstrate competence in the application of principles and techniques for the development, application and management of natural resource and environmental service systems in AFNR settings.

- **Plant Systems (PS)** — encompasses the study of plant life cycles, classifications, functions, structures, reproduction, media and nutrients, as wells as growth and cultural practices through the study of crops, turf grass, trees, shrubs and/or ornamental plants. Students completing a program of study in this pathway will demonstrate competence in the application of principles and techniques for the development, application and management of plant systems in AFNR settings.

- **Power, Structural and Technical Systems (PST)** — encompasses the study of agricultural equipment, power systems, alternative fuel sources and precision technology, as well as woodworking, metalworking, welding and project planning for agricultural structures. Students completing a program of study in this pathway will demonstrate competence in the application of principles and techniques for the development, application, and management of power, structural and technical systems in AFNR settings.

Common Career Technical Core Career Ready Practices Content Standards

Purpose

The Common Career Technical Core (CCTC) Career Ready Practices (CRP) describe skills required for future success with all careers. The content standards outlined in this document are intended to provide state agricultural education leaders and educators with a guide for what students should know and be able to do related to each of the CCTC CRPs. State leaders and local educators are encouraged to use the standards as a basis for the development of opportunities to learn, practice and assess these skills through classroom instruction, Career and Technical Student Organization (CTSO) involvement (e.g., FFA, Post-secondary Agriculture Students Organization, etc.), and work-based/community learning experiences (e.g., Supervised Agriculture Experience Programs, internships, service, etc.). Adoption and use of these standards is voluntary, states and local entities are encouraged to adapt the standards to meet local needs.

Scope

The CCTC CRPs encompass fundamental skills and practices that all students should acquire to be career ready such as: responsibility, productivity, healthy choices, maintaining personal finances, communication, decision-making, creativity and innovation, critical-thinking, problem solving, integrity, ethical leadership, management, career planning, technology use and cultural/global competency. Students completing a program of study in any AFNR career pathway will demonstrate the knowledge, skills and behaviors that are important to career ready through experiences in a variety of settings (e.g., classroom, CTSO, work-based learning, community etc.).

Common Career Technical Core Career Ready Practices Content Standards

CRP.01. Act as a responsible and contributing citizen and employee.
CRP.02. Apply appropriate academic and technical skills.
CRP.03. Attend to personal health and financial well-being.
CRP.04. Communicate clearly, effectively and with reason
CRP.05. Consider the environmental, social and economic impacts of decisions.
CRP.06. Demonstrate creativity and innovation.
CRP.07. Employ valid and reliable research strategies.
CRP.08. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.09. Model integrity, ethical leadership and effective management.

Agriculture, Food and Natural Resources Cluster Skill Content Standards

Purpose

The Cluster Skill Content Standards outline foundational technical knowledge and skills required for future success with all careers in the Agriculture, Food and Natural Resources (AFNR) Career Cluster®. The content standards are intended to provide state agricultural education leaders and educators with a guide for what students should know and be able to do after completing a program of study in any AFNR career pathway. State leaders and local educators are encouraged to use the standards as a basis for the development of well-planned curriculum and assessments for AFNR-related Career and Technical Education (CTE) programs. Adoption and use of these standards is voluntary, states and local entities are encouraged to adapt the standards to meet local needs.

Scope

The AFNR Cluster Skills (CS) encompasses the study of fundamental knowledge and skills related to all AFNR professions. Students completing a program of study in any AFNR career pathway will demonstrate fundamental knowledge of the nature, scope and relationships of AFNR systems and the skills necessary for analysis of current and historical issues and trends; application of technologies; safety, health and environmental practices; stewardship of natural resources; and exploration of career opportunities.

AFNR Cluster Skill Content Standards

CS.01. Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster.

CS.02. 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.

CS.03. Examine and summarize the importance of health, safety and environmental management systems in AFNR workplaces.

CS.04. Demonstrate stewardship of natural resources in AFNR activities.

CS.05. Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.

CS.06. Analyze the interaction among AFNR systems in the production, processing and management of food, fiber and fuel and the sustainable use of natural resources.