

Appendix A: AFNR Career Cluster Content Standards-**Food Science**

	Performance Measurement Levels	Event Activity Addressing Measurement	Related Academic Standards
ABS.04.01. Performance Indicator: Use accounting fundamentals to accomplish dependable bookkeeping and fiscal management.			Math: 1C, 5A, 5C Social Studies: 7h
	ABS.04.01.02.b. Use accounting information to estimate the cost of goods sold and margins on the goods.	team activity	
ABS.06.01. Performance Indicator: Conduct appropriate market and marketing research.			Social Studies: 7b, 7h
	ABS.06.01.01.b. Apply benefit/cost analysis to marketing in AFNR businesses.	team activity	
ABS.07.02. Performance Indicator: Develop a production and operational plan.			Language Arts: 4, 5, 6, 12
	ABS.07.02.02.b. Examine legal and industry requirements for a production facility.	team activity, exam	
BS.03.01. Performance Indicator: Evaluate the application of genetic engineering to improve products of AFNR systems.			Math: 2C Science: A2, C2, E2, F4 Language Arts: 7 and 8
	BS.03.01.02.a. Describe enzymes, the changes they cause in foods and the physical and chemical parameters that affect enzymatic reactions.	exam	
BS.03.02. Performance Indicator: Perform biotechnology processes used in AFNR systems.			Science: B3, C5, D1, E2 Language Arts: 4
	BS.03.02.02.a. Identify foods produced through fermentation.	exam	
FPP.01.01. Performance Indicator: Evaluate the significance and implications of changes and trends in the food products and processing industry.			Science: F1 Language Arts: 7 and 8 Social Studies: 1g and 8c
	FPP.01.01.02.c. Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.	consumer inquiry	
FPP.01.02. Performance Indicator: Work effectively with industry organizations, groups and regulatory agencies affecting the food products and processing industry.			Language Arts: 12 Social Studies: 6c and 8f
	FPP.01.02.01.a. Explain the purposes of organizations that are part of or regulate the food products and processing industry.	exam	

FPP.02.02. Performance Indicator: Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters.		Science: F5 Language Arts: 8
	FPP.02.02.01.a. Describe contamination hazards (physical, chemical and biological) associated with food products and processing.	consumer inquiry, exam
	FPP.02.02.02.a. Identify the seven principles of HACCP.	team activity, exam
FPP.02.03. Performance Indicator: Apply safety and sanitation procedures in the handling, processing and storing of food products.		Science: A2 and F5
	FPP.02.03.01.a. Explain techniques and procedures for the safe handling of food products.	team activity, exam, consumer inquiry, safety/sanitation
	FPP.02.03.02.b. Perform quality-assurance tests on food products.	sensory
FPP.03.01. Performance Indicator: Apply principles of science to food processing to provide a safe, wholesome and nutritious food supply.		Science: A2, B3 and F1
	FPP.03.01.02.b. Explain how the chemical and physical properties of foods influence nutritional value and eating quality.	team activity, exam
	FPP.03.01.05.b. Describe the purpose of common food additives.	exam
	FPP.03.01.06.c. Prepare and label foods according to the established standards of regulatory agencies.	team activity
	FPP.03.01.07.b. Plan and create a new food product.	team activity
FPP.04.03. Performance Indicator: Process, preserve, package and present food and food products for sale and distribution.		Math: 1C, 4A and 4B Science: F1
	FPP.04.03.01.c. Use weights and measures to formulate and package food products.	team activity, exam
	FPP.04.03.02.a. Explain methods and materials for processing foods for sale as fresh-food products.	team activity
	FPP.04.03.03.b. Explain the processes of food preservation methods.	team activity, exam
	FPP.04.03.04.a. Explain techniques for preparing ready-to-eat food products.	team activity
	FPP.04.03.05.b. Select and utilize packaging materials in storing processed foods and raw food products.	team activity
	FPP.04.03.06.a. Identify and explain storage conditions to preserve product quality.	team activity, exam

CS.01.01. Performance Indicator: Action: Exhibit the skills and competencies needed to achieve a desired result.		Social Studies: 4d and 4h
	CS.01.01.01.c. Work independently and in group settings to accomplish a task.	all event
	CS.01.01.04.b. Use appropriate and reliable resources to complete an action or project.	team activity
	CS.01.01.06.b. Assign project parts equitably amongst team members to achieve a given task.	team activity
CS.02.04. Performance Indicator: Mental Growth: Demonstrate the effective application of reasoning, thinking and coping skills.		Math: 6C Science: A4 Language Arts: 4 and 8
	CS.02.04.01.c. Demonstrate critical and creative thinking skills while completing a task.	team activity, safety & quality
	CS.02.04.02.c. Implement effective problem solving strategies.	team activity, safety & quality
CS.03.01. Performance Indicator: Communication: Demonstrate oral, written and verbal skills.		Language Arts: 4, 5 and 12
	CS.03.01.01.b. Select the appropriate form of technical and business writing or communication for a specific situation.	team activity
	CS.03.01.03.c. Make effective business presentations.	team activity
CS.03.02. Performance Indicator: Decision Making –Analyze situations and execute an appropriate course of action.		Science: A1 and A5 Social Studies: 1c and 4h
	CS.03.02.02.c. Use problem-solving skills.	team activity, sensory, safety & quality
CS.06.01. Performance Indicator: Observe required regulations to maintain/improve safety health and environmental management systems.		Science: F4 and F5 Social Studies: 3g
	CS.06.01.01.a. Examine major health, safety, and environmental management system components in AFNR organizations.	quality & safety, exam

Appendix B: Related Academic Standards- **Food Science**

National academic standards for mathematics, science, English language arts and social studies related to this event are reported below. The statements are based on information in reports of the respective associations/organizations in the academic areas. Some adjustment of numbering was done to facilitate the process of alignment with the standards that have been developed in the pathways of the Agriculture, Food and Natural Resources (AFNR) Career Cluster.

The approach was to determine the presence of alignment between the content standards, expectations or thematic strands of the four academic areas and the performance indicators of the AFNR Standards. Supporting statements have been included to clarify content of the respective content standards, expectations or thematic strands. The statements were initially developed independently by the respective organizations and, therefore, are not parallel in wording and presentation. Occasionally minor editing was done to adjust the background or stem of a statement but not the statement itself.

Mathematics

1. Standard and Expectations: Number and Operations
 - 1C. Compute fluently and make reasonable estimates.
2. Standard and Expectations: Algebra
 - 2C. Use mathematical models to represent and understand quantitative relationships.
4. Standard and Expectations: Measurement
 - 4A. Understand measurable attributes of objects and the units, systems and processes of measurement.
 - 4B. Apply appropriate techniques, tools and formulas to determine measurements.
5. Standard and Expectations: Data Analysis and Probability
 - 5A. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them.
 - 5C. Develop and evaluate inferences and predictions that are based on data.
6. Standard and Expectations: Problem Solving
 - 6C. Apply and adapt a variety of appropriate strategies to solve problems.

Science

- A. Content Standard: Science as an Inquiry
 - A1. Identify questions and concepts that guide scientific investigation.
 - A2. Design and conduct scientific investigations.
 - A4. Formulate and revise scientific explanations and models using logic and evidence.
 - A5. Recognize and analyze alternative explanations and models.
- B. Content Standard: Physical Science
 - B3. Chemical reactions.
- C. Content Standard: Life Science
 - C2. Molecular basis of heredity.
 - C5. Matter, energy and organization in living systems.
- D. Content Standard: Earth and Space Science
 - D1. Energy in the earth system.
- E. Content Standard: Science and Technology
 - E2. Understanding about science and technology.

F. Content Standard: Science in Personal and Social Perspectives

F1. Personal and community health.

F4. Environmental quality.

F5. Natural and human-induced ha:

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English Language Arts

4. Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.
5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.
6. Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language and genre to create, critique and discuss print and non-print texts.
7. Students conduct research on issues and interests by generating ideas and questions and by posing problems. They gather, evaluate and synthesize data from a variety of sources (e.g., print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.
8. Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.
12. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information).

Social Studies

1. Thematic Strand: Culture

1c. apply an understanding of culture and an integrated whole that explains the functions and interactions of language, literature, the arts, traditions, beliefs and values and behavior patterns;

1g. construct reasoned judgments about specific cultural responses to persistent human issues;

3. Thematic Strand: People, Places and Environments

3g. describe and compare how people create places that reflect culture, human needs, government policy and current values and ideals as they design and build specialized buildings, neighborhoods, shopping centers, urban centers, industrial parks and the like;

4. Thematic Strand: Individual Development and Identity

4d. apply concepts, methods and theories about the study of human growth and development, such as physical endowment, learning, motivation, behavior, perception and personality;

4h. work independently and cooperatively within groups and institutions to accomplish goals;

6. Thematic Strand: Power, Authority and Governance

6c. analyze and explain ideas and mechanisms to meet needs and wants of citizens, regulate territory, manage conflict, establish order and security and balance competing conceptions of a just society;

7. Thematic Strand: Production, Distribution and Consumption

7b. analyze the role that supply and demand, prices, incentives and profits play in determining what is produced and distributed in a competitive market system;

- 7h. apply economic concepts and reasoning when evaluating historical and contemporary social developments and issues;
- 8. Thematic Strand: Science, Technology and Society
 - 8c. analyze how science and technology influence the core values, beliefs and attitudes of society, and how the core values, beliefs and attitudes of society shape scientific and technological change;
 - 8f. formulate strategies and develop policies for influencing public discussions associated with technology-society issues, such as the greenhouse effect.