



Statewide Framework Document for: 120503

Culinary Arts and Food Science

Standards may be added to this document prior to submission but may not be removed from the framework to meet state credit equivalency requirements. Performance assessments may be developed at the local level. In order to earn state approval, performance assessments must be submitted within this framework. **This course is eligible for 1 credit of laboratory science.** The Washington State Science Standards performance expectations for high school blend core ideas (Disciplinary Core Ideas, or DCIs) with scientific and engineering practices (SEPs) and crosscutting concepts (CCCs) to support students in developing usable knowledge that can be applied across the science disciplines. These courses are to be taught in a [three-dimensional manner](#). The details about each performance expectation can be found at [Next Generation Science Standards](#), and the supporting evidence statements can be found under [Resources](#).

School District Name		
Course Title: Culinary Arts and Food Science		Total Framework Hours: 540
CIP Code: 120503	<input type="checkbox"/> Exploratory <input checked="" type="checkbox"/> Preparatory	Date Last Modified: December 21, 2020
Career Cluster: Hospitality and Tourism		Cluster Pathway: Restaurant and Food/Beverage Services
<p>Course Summary:</p> <p>Culinary Arts prepares individuals to provide professional chef and related cooking services in restaurants and other commercial food establishments. The course includes instruction in recipe and menu planning, preparing and cooking foods, supervising and training kitchen assistants, the management of food supplies and kitchen resources, aesthetics of food presentation, and familiarity or mastery of a wide variety of cuisines and culinary techniques.</p> <p>The 8–10 individuals work within the hospitality industry at some point in their careers. It is one of the largest industries in the United States with many job opportunities from the farm to the table. In Culinary Arts, students learn the knowledge, skills, and practices required for careers in the hospitality industry from the food service side of the business. The course focuses on the relationship between food preparation, consumption, health, and service. Instruction includes risk management procedures, food preparation and technology in food production, diet and nutritional analysis and planning. Science is integrated throughout the course in such experiments as the caramelization of sugars and starches, the production and growth of yeast, or the effects of temperature on chocolate. Students may study such topics as the effects of antioxidants on humans, the shelf life of food products, and the positive and negative effects of bacteria on food.</p>		

During this course, students will work in teams to prepare and serve food. They will predict, interpret, and evaluate food service product and presentation for results. Throughout the course, students will discover exciting careers in the food industry. This framework is based on the American Culinary Foundations (ACF), National Family & Consumer Sciences (FCS) industry standards and is aligned with the Washington State Science Standards.

This course is designed for teachers coming from the culinary industry. Please ensure teacher has (Plan 2 V-code: V200493) to teach this course.

Eligible for Equivalent Credit in: Science

Total Number of Units: 8

Unit 1: The Hospitality Industry

Total Learning Hours for Unit: 40

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

- Students analyze their work experiences and skill level by creating a career portfolio that includes but is not limited to the following: a personal biography, resume, thank you letter, job application and cover letter.
- Students research and then compare and contrast three food service jobs in relationship to their own skills development, their plans for a food service career and the lifestyle they want to enjoy.
- Students conduct a real or mock interview elaborating on skills, goals, and decisions made concluding with a summary of their work to date and prediction for the future.
- Students who are CTSO members (or other approved leadership) may expand this assessment to include regional and state event competitions.
- Using a variety of resources, students research one aspect of the hospitality industry, comparing and contrasting it to others, and evaluating and analyzing the opportunities within that career path. Student elaborate on their research by giving an original presentation (display, video production, PowerPoint presentation, etc.).

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

- Students go through an application process for student leadership, they lead other students in each station applying the 21st century skills.
- Students who are CTSO members (or other approved leadership) may expand this assessment to include Regional and State event competitions.
- Students perform job skill demonstrations and final culinary projects to the class; they will also partake in Mock interviews

Industry Standards and/or Competencies:

National Standards for Family and Consumer Sciences Education (FCS)

- 1.2 Demonstrate transferable knowledge, attitudes, and technical and employability skills in school, community and workplace settings.
- 1.2.2 Demonstrate job seeking and job keeping skills.
- 2.1.3 Analyze decisions about providing safe and nutritious food for individuals and families.
- 8.1.2 Analyze opportunities for employment and entrepreneurial endeavors.
- 8.1.3 Summarize education and training requirements and opportunities for career paths in food production and services.
- 8.6.4 Examine the areas of risk management and legal liability within the food service industry.

American Culinary Foundations (ACF)

A1 Develop an understanding of the hospitality industry/career opportunities in the field.

A1.1 Define hospitality and tourism with examples of current industry philosophies.

A1.2 Trace the growth and development of the hospitality and tourism industry.

A1.3 Describe the various cuisines and the relationship to history and cultural development.

A1.4 Identify professional hospitality organizations and explain purposes and benefits to the industry. A1.5 Outline the organization, structure and functional areas in various hospitality organizations.

A1.6 Evaluate career opportunities utilizing industry resources.

A1.7 Discuss/evaluate industry trends as they relate to career opportunities and the future of the industry.

A1.8 Discuss and evaluate industry trade periodicals.

Aligned Washington State Academic Standards

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 2: Safety and Sanitation**Total Learning Hours for Unit: 70****Performance Assessments:** (Districts to complete for each unit)

Example assessments for this unit include:

- Students acquire a state-sanctioned food handler's card (and ServSafe where taught).
- Students demonstrate basic food safety first aid using role play situations that require assessment of the injury and appropriate treatment.
- Students demonstrate proper food safety and sanitation practice in all food labs.
- Students develop and use, within the day-to-day operation of the culinary kitchen, an HACCP flow chart (sanitation) that demonstrates the cause/effect relationship between food handling and serving, and understand its role to reduce/eliminate foodborne illness outbreaks.
- Students participate in safety talks and lectures, and document safety practices in a log or journal. (HACCP, OSHA, L&I etc.)
- Students take corrective action based on evidence gathered by instructors for continuous improvement of safety and sanitation practices. (HACCP, etc.)
- Students pass a state-sanctioned food handler test, and demonstrate knowledge and understanding of food service safety, related vocabulary comprehension, and cause/effect relationships relative to food borne illness.
- Students pass at 100 percent a proctored safety test, and demonstrate knowledge and understanding of safety practices in the food service facility, related vocabulary comprehension, and cause/effect relationships relative to proper use of utensils and equipment.
- All sanitation and safety procedures will be continuously applied and assessed in learning activities.
- Acting as a team leader, students apply safety and sanitation procedures while managing purchasing and inventory systems.
- Students construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity by comparing /contrast farming methods that impact food safety, including commercial vs. local farming, chemical pesticides vs. other methods, GMO benefits and risks.

- Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts as they develop awareness of the inspection models (random destination inspections, risk-based inspections...) used by USDA, FDA, NIH, & state agencies throughout our food chain; including the risks to public safety due to workforce/budget shortfalls.
- Students list the effects of common Bacteria, Viruses, and Parasites. Students will demonstrate proper practices in food handling and preparation to ensure public safety. Evaluating and or refining a technological solution that reduces the impacts of human activities on natural systems.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

- Student leaders organize and delegate core safety concepts in weekly safety talks, the skills applied through are the 21st century skills.
- The student demonstrates skills that assist in understanding and accepting responsibility to family, community, and business and industry.
- Lead Station Worker or Sanitation Supervisor Leadership Activity.
- The student develops a safety/sanitation handbook that could be used in a food service establishment. Student develops a safety section in Culinary portfolio and documents all Sodexo Safety Talks.

Industry Standards and/or Competencies:

National Standards for Family and Consumer Sciences Education (FCS)

- 1.2 Demonstrate transferable knowledge, attitudes, and technical and employability skills in school, community and workplace settings.
- 1.2.7 Analyze factors that contribute to maintaining safe and healthy school, work and community environments.
- 5.4.4 Record presence of hazardous materials and occurrence of hazardous situations accurately and communicate to appropriate authorities.
- 5.4.5 Describe procedures for safely handling and storing hazardous materials and waste products.
- 5.5.2 Apply security procedures.
- 5.5.3 Demonstrate safe procedures in the use, care, and storage of equipment.
- 5.5.4 Apply safety and security procedures as required by Hazard Analysis and Critical Control Point (HACCP), Occupational Safety and Health Administrations (OSHA), and other agencies.
- 5.5.5 Apply procedures for control of infection and infectious materials.
- 8.2.1 Identify characteristics of major foodborne pathogens, their role in causing illness, foods involved in outbreaks, and methods of prevention.
- 8.2.2 Employ food service management safety/sanitation program procedures, including CPR and first aid.
- 8.2.3 Use knowledge of systems for documenting, investigating, reporting, and preventing foodborne illness.
- 8.2.4 Use the Hazard Analysis Critical Control Point (HACCP) and crisis management principles and procedures during food handling processes to minimize the risks of foodborne illness.
- 8.2.5 Practice standard personal hygiene and wellness procedures.
- 8.2.6 Demonstrate proper purchasing, receiving, storage, and handling of both raw and prepared foods.
- 8.2.7 Demonstrate safe food handling and preparation techniques that prevent cross contamination from potentially hazardous foods and food groups.
- 8.2.8 Analyze current types of cleaning and sanitizing materials for proper use.

- 8.2.9 Use the Occupational Safety and Health Administration (OSHA) Right to Know Law and Materials Safety Data Sheets (MSDS) and explain their requirements in safe handling and storage of hazardous materials.
- 8.2.10 Demonstrate safe and environmentally responsible waste disposal and recycling methods.
- 8.2.11 Demonstrate ability to maintain necessary records to document time and temperature control, HACCP, employee health, maintenance of equipment, and other elements of food preparation, storage, and presentation.
- 8.5.1 Demonstrate professional skills in safe handling of knives, tools, and equipment.
- 8.6.9 Design internal/external crisis management and disaster plans and response procedures.
- 9.2.1 Analyze factors that contribute to food borne illness.
- 9.2.6 Demonstrate standard procedures for receiving, storage, and preparation of raw and prepared foods.
- 9.2.7 Classify cleaning and sanitizing materials and their correct use.
- 14.4.5 Analyze foodborne illness factors, including causes, potentially hazardous foods, and methods of prevention.
- 14.4.6 Analyze current consumer information about food safety and sanitation.

American Culinary Foundations (ACF)

- B1 Use/follow recognized safety and sanitation practices
 - B1.1 Value and demonstrate good sanitation habits.
 - B1.2 Identify harmful bacteria and demonstrate the proper storage of potentially hazardous foods.
 - B1.3 identify the hazardous areas in the kitchen and take corrective measures to ensure safe operation.
 - B1.4 Demonstrate proper safety method used for typical/standard culinary equipment.
 - B1.5 Demonstrate how to correctly wash dishes.
 - B1.6 Demonstrate proper equipment cleaning procedures.
 - B1.7 Identify and use MSDS (material safety data sheets).
 - B1.8 Recognize sanitary and safety design and construction features of food production equipment and facilities (i.e. NSF, UL, OSHA, ADA, etc.)
 - B1.9 Identify proper waste disposal methods and recycling.
- B2 Demonstrate proper food quality - receiving and storage
 - B2.1 Arrange food product using "first in/first out" rotation system.
 - B2.2 Understand and identify the different food groups.
 - B2.3 Explain the basic nutritional values of foods.
 - B2.4 Identify the different pack sizes of food service products.
 - B2.5 Demonstrate proper storage.
 - B2.6 Demonstrate and use all of the principles of fresh and frozen food storage.
 - B2.7 Discuss the market cycle of goods into a food service operation.
 - B2.8 Analyze market fluctuation and the effect on product cost.
 - B2.9 Discuss legal and ethical considerations of purchasing.
 - B2.10 Describe the current computerized systems for purchasing and inventory control.
 - B2.11 Describe the HACCP critical control points managed by the purchasing and receiving functions.

ACF Safety & Sanitation

- 1.2. Describe good personal hygiene and health habits
- 1.3. List the steps to proper hand washing
- 1.5 Identify microorganisms which are related to food spoilage and food-borne illnesses; describe the requirements and methods for growth (FAT-TOM)
- 1.6 Describe symptoms common to food-borne illnesses and how these illnesses can be prevented
- 1.7 Describe cross contamination and use of acceptable procedures when preparing and storing PHFs
- 1.8 List the major reasons for, and recognize signs of food spoilage and contamination
- 1.12 Uses and Calibrates a Stem Thermometer, Infrared Thermometer or Thermocouple Thermometer
- 1.13 Identify the Critical Control Points during all food handling processes as a method for minimizing the risk of food-borne illnesses (HACCP System)
- 1.14 Outline the requirements for proper receiving and storage of both raw and prepared foods
- 1.15 Compare different types of storage areas found in a foodservice operation (refrigerated, frozen, dry goods, etc.)
- 1.16 Develop cleaning & sanitizing schedule, procedures for equipment & facilities, when the restaurant must close down, and the PIC
- 1.17 Describe use, storage and disposal of types of cleaners and sanitizers (incl. proper bleach solution)
- 1.18 Identify proper methods of waste disposal, composting, and recycling
- 1.19 Identify proper methods for safely disposing of grease and fryer oil
- 1.21 Uses Proper Dishwashing Process (soaking, racking, scraping, washing, checking, air drying)
- 1.22 Uses Proper Pots & Pans Cleaning Process (Pre-rinse, washing, rinsing, sanitizing, air dry)
- 1.27 Describe appropriate measures for insect, rodent and pest control
- 2.2 Recognize sanitary and safety design and construction features of food production equipment and facilities (i.e. NSF, US, OSHA, ADA, etc.) ACF/ NRA Safety and Sanitation
- 2.3 Review Material Safety Data Sheets (MSDS) and explain the requirements in handling hazardous materials
- 2.5 Describe appropriate types and use of fire extinguishers used in the foodservice area
- 2.7 Conduct a sanitation self-inspection and identify modifications necessary for compliance with standards
- 2.7 List common causes of typical accidents and injuries in the food service industry and outline a safety management program (spills, horseplay, improper lifting & carrying, ladder use, cuts, etc.)
- 2.9 Demonstrates knowledge of safety with gas appliances (pilot lights, emergency shut-offs, ventilation, etc.)
- 2.13 Discuss appropriate emergency policies for kitchen and dining room injuries
- 2.14 Describe the role of the regulatory agencies governing sanitation and safety in protecting food safety (OSHA, FDA, USDA, etc.).

Aligned Washington State Academic Standards

Science	Washington Science Standards (Next Generation Science Standards): HS-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. HS-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
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	<p>HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.</p> <p>HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</p> <p>HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.</p> <p>HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.</p>	
Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 3: Kitchen Basics	Total Learning Hours for Unit: 60
<p>Performance Assessments: (Districts to complete for each unit)</p> <p><i>Example assessments for this unit include:</i></p> <p>(Please note that there is significant overlap in the competencies and science concepts in Unit 3 and Unit 5. Both are taught simultaneously)</p> <ul style="list-style-type: none"> • Having determined the recipe yield needed, the student converts (increase or decrease) a recipe, analyze and make recipe ingredient adjustments, and determine modifications in preparation. The student tests the recipe for conversion success. • Students develop and use a competency performance rubric (which includes all framework columns) for assessing the proper and efficient use of recognized standard preparation methods. • As students work through this unit they construct and revise an explanation for the outcome of a simple chemical reaction based on the knowledge of the patterns of chemical properties, absorption of energy from a chemical reaction through the following assessments: • Students understand and demonstrate emulsifications in dressings and sauces (Students will evaluate various forms of liquid and develop a strategy to suspend multiple viscosity liquids to form an emulsion. From this evaluation students prepare the emulsion for analysis.) • Students understand and demonstrate different mixing methods, especially with doughs and batters, and their impact on final product. • (Students apply the proper mixing method based on the dough being made. Students will prepare the product and develop a final evaluation on the overall product and if the product was mixed correctly.) • Students understand and demonstrate the proper use of multiple leavening agents, their reactive agents, and the properties of the final product. • Students explain the 4 common leavening agents Chemical, Biological, Physical, and Mechanical. Students will explain what each leavening agent is used for and what reaction each one does and what needs to be present for reactions to happen. • Students understand and demonstrate the proper use of mechanical & chemical tenderizing. Students will explain the effects of acids used on proteins for marinades. • Students understand and demonstrate the proper use of thickening and gelling agents and discuss what products are able to be used in the gelling process. Students compare various types of gelling agents and select the proper agent for the product being made. 	

- Students apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs and demonstrate the various means of heat transfer in different cooking appliances (ovens, pans, etc.) and cooking methods.
- Students evaluate dry heat, moist heat cooking methods, and combination methods and explain if the heat transfer is convection, conduction, microwave or radiation. Advanced students are able to discuss what percentage of a specific method is Conduction or Convection and explain their answers.
- Students understand and demonstrate the importance of accuracy in measurement and temperature control.
- Students understand the science of sensory perception, how we taste, etc. and how that is applied to food preparation.
- Students understand and demonstrate the structure and development of gluten in doughs and batters.
- Students label and explain the protein (Gluten) percentage difference in common flours found in the kitchen/bakery.
- Students understand and demonstrate the roles of sugars, fats/oils, eggs, etc. in food preparation, especially baking.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

- Students apply to be student leaders in each station then assist in instruction of the 21st century skills through skill assessments and competency work packets.
- Student demonstrates a safety, culinary, or employability skill in front of panel.
- Mock interview will take place with industry professionals.
- The student will demonstrate self-advocacy skills by achieving planned, individual goals.

Industry Standards and/or Competencies:

National Standards for Family and Consumer Sciences Education (FCS)

- 8.5.2 Demonstrate professional skill for a variety of cooking methods including roasting, broiling, smoking, grilling, sautéing, pan frying, deep frying, braising, stewing, poaching, steaming, and baking using professional equipment and current technologies.
- 8.5.3 Demonstrate knowledge of portion control and proper scaling and measurement techniques
- 8.5.4 Apply the fundamentals of time, temperature, and cooking methods to cooking, cooling, reheating, and holding of a variety of foods.
- 8.5.5 Prepare various meats, seafood, and poultry using safe handling and professional preparation techniques.
- 8.5.6 Prepare various stocks, soups, and sauces using safe handling and professional preparation techniques.
- 8.5.7 Prepare various fruits, vegetables, starches, legumes, dairy products, fats, and oils using safe handling and professional preparation techniques.
- 8.5.8 Prepare various salads, dressings, marinades, and spices using safe handling and professional preparation techniques.
- 8.5.9 Prepare sandwiches, canapes and appetizers using safe handling and professional preparation techniques.
- 8.5.10 Prepare breads, baked goods and desserts using safe handling and professional preparation techniques.
- 8.5.11 Prepare breakfast meats, eggs, cereals, and batter products using safe handling and professional preparation techniques.
- 8.5.12 Demonstrate professional plating, garnishing, and food presentation techniques.
- 8.5.13 Integrate sustainability in food production and services including menu planning; acquisition, preparation, and serving of food; storage; and recycling and waste management.
- 9.6.4 Create standardized recipes.

- 9.6.5 Manage food production to meet needs and preferences of diverse customer populations.
- 14.3.3 Demonstrate ability to select, store, prepare, and serve nutritious, aesthetically pleasing food and food product.

American Culinary Foundations (ACF)

C1 Demonstrate standard recipe use

C1.1 Convert weights of measurement.

C1.2 Reduce a recipe.

C1.3 Increase a recipe.

C2 Apply recognized/standard preparation methods

C2.1 Understand and properly demonstrate the following cooking methods: roast; bake; broil; griddle, grill; sauté; braise; pan fry, deep fry; poach; simmer; boil; sear; grill- charbroil.

C2.2 Discuss the differences between dry heat and moist heat cooking methods.

C2.3 Identify the differences between convection, conduction, radiant heat, and microwave.

C2.4 Discuss the applicability of convenience, value added, further processed or par-cooked food items.

Aligned Washington State Academic Standards

Science

Washington Science Standards (Next Generation Science Standards):

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

HS-PS1-5 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

HS-PS1-6 Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

HS-PS2-6 Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

HS-LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Science and Engineering Practice

Disciplinary Core Idea

Crosscutting Concept

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Unit 4: Food Service Equipment	Total Learning Hours for Unit: 20
<p>Performance Assessments: (Districts to complete for each unit)</p> <p><i>Example assessments for this unit include:</i></p> <ul style="list-style-type: none"> Students use applied thinking skills to demonstrate and teach classmates the proper use of a selected piece of equipment. Students apply decision-making and planning skills to demonstrate proper use of equipment, this must include demonstration and explanation, variety of uses, all safety issues, including the heat transfer with different types of pans (stainless steel, copper, aluminum...) and different cooking methods (such as use of a double boiler). Related math and science principles must be clear to the targeted audience. Students communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials by explaining what a BTU is and how it relates to the heat transfer process. Students apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs in an induction burner and how magnets play a key role. Students will demonstrate cooking on an induction burner. Students explain the scientific manner how immersion circulation works and explain why the absences of oxygen is so important. Students perform regular inspections of hot and cold holding equipment, comparing gauge temperatures to actual food temperatures, looking for signs of equipment malfunction or failure. Students develop and use a competency performance rubric for assessing the proper and efficient use of equipment, hand tools, and utensils. Students will perform at a level 3 or better when assessed using the rubric, demonstrating persistence to reach these goals. Given a food service situation, students demonstrate correct use of appropriate equipment. Applying scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. 	
<p>Leadership Alignment: (Districts to complete for each unit)</p> <p><i>Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.</i></p> <p><i>Example:</i></p> <ul style="list-style-type: none"> Students review and train each other on food service equipment. 	
<p>Industry Standards and/or Competencies:</p> <p>National Standards for Family and Consumer Sciences Education (FCS)</p> <p>8.2.2 Employ food service management safety/sanitation program procedures, including CPR and first aid.</p> <p>8.2.8 Analyze current types of cleaning and sanitizing materials for proper use.</p> <p>8.3.3 Demonstrate procedures for cleaning and sanitizing equipment, serving dishes, glassware, and utensils to meet industry standards and OSHA requirements.</p> <p>8.3.5 Demonstrate procedures for safe and secure storage of equipment and tools.</p>	

American Culinary Foundations (ACF)

D1 Practice correct use and care of hand tools, utensils, and measurement

D1.1 Identify and use the following equipment: pots and pans, processing equipment, cooking equipment, measuring equipment, hand tools, and refrigeration equipment.

D1.2 Use proper measurement.

D1.3 Out a recipe and a menu; appreciate the cost of food and the profit made.

D1.4 Understand apply and value the purpose of portion control.

D1.5 Convert units of measure by increasing and decreasing recipes.

D2 Practice correct use and care of equipment D2.1 Operate all kitchen equipment safely.

D2.2 Understand the need and method of properly cleaning all kitchen equipment.

Aligned Washington State Academic Standards

Science	Washington Science Standards (Next Generation Science Standards): Many of the standards taught in unit 3 are reinforced here through further application.	
	HS-PS1-5 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. HS-PS2-6 Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts	
Science and Engineering Practice		Disciplinary Core Idea
		Crosscutting Concept

Unit 5: Food Production Techniques**Total Learning Hours for Unit: 200****Performance Assessments:** (Districts to complete for each unit)

Example assessments for this unit include:

- Students perform food preparation techniques at a level 3 or better in each food preparation category listed below according to a recognized competency standard.
- The 3-D application of science learning will be practiced and assessed throughout each unit applying the applicable scientific cross cutting concepts, standards and engineering practices in the appropriate units as they are required in food preparation techniques to achieve the best results.

- Students set goals to carry out and incorporate into their final portfolio, a meal planning and preparation extended learning project. The project shall include such steps/elements as planning, purchasing, preparation, documentation, cost analysis, and evaluation. A minimum of three courses is required, e.g., appetizer, entrée, starch, cooked vegetable, dessert. Alternately, students will compete in a culinary competition or ACF-style practical certification to demonstrate a culmination of learning.
- Students develop and use a competency performance rubric (in each food preparation category) for assessing the application of recognized standard preparation procedures.
- Students perform at a level 3 or better when assessed using the rubric, demonstrating persistence to reach these goals

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

- Students apply for leadership positions in the kitchen stations and apply the learning.

Industry Standards and/or Competencies:

National Standards for Family and Consumer Sciences Education (FCS)

- 8.5.7 Prepare various fruits, vegetables, starches, legumes, dairy products, fats, and oils using safe handling and professional preparation techniques.
- 8.5.8 Prepare various salads, dressings, marinades, and spices using safe handling and professional preparation techniques.
- 8.5.9 Prepare sandwiches, canapes and appetizers using safe handling and professional preparation techniques.
- 8.5.10 Prepare breads, baked goods and desserts using safe handling and professional preparation techniques.
- 8.5.11 Prepare breakfast meats, eggs, cereals, and batter products using safe handling and professional preparation techniques.
- 8.5.12 Demonstrate professional plating, garnishing, and food presentation techniques.
- 9.6.3 Apply standards for food quality and sustainability.
- 9.6.7 Implement procedures that provide cost effective products.

American Culinary Foundations (ACF)

- E1 Apply recognized/standard procedures for breakfast cookery
 - E1.1 Define the features unique to the breakfast meal.
 - E1.2 Know and demonstrate the various methods for cooking eggs.
 - E1.3 Identify and prepare the various breakfast meats.
 - E1.4 Prepare and evaluate pancakes and potato dishes.
- E2 Apply recognized/standard procedures for sandwich, hors d'oeuvres, and garnish preparation
 - E2.1 Describe hot and cold sandwiches.
 - E2.2 Describe the types of hors d'oeuvres, canapés, appetizers and fancy sandwiches.
 - E2.3 Demonstrate the various design and form for garnishes.
- E3 Apply recognized/standard procedures for salad, fruit and salad dressing preparation
 - E3.1 Identify, describe and prepare various types of salads.
 - E3.2 Prepare and store salad greens.
 - E3.3 Properly handle and store fruits.

E3.4 Demonstrate methods for serving salads.
E3.5 Make the basic salad dressings.
E4 Apply recognized/standard procedures for vegetable, pasta and rice preparation E4.1 Identify varieties of vegetables, pasta and rice.
E4.2 Know and demonstrate various cuts for vegetables.
E4.3 Understand and demonstrate the methods for cooking vegetables.
E4.4 Understand and demonstrate the methods for cooking rice.
E4.5 Understand and demonstrate the methods used for cooking pasta.
E5 Apply/integrate seasoning use in food preparation
E5.1 Recognize and use most common herbs and spices.
E6 Apply recognized/standard procedures for stock, soup and sauce preparation
E6.1 Name the different classifications of soups.
E6.2 Prepare and analyze different types of stock.
E6.3 Analyze and identify the classification of a sauce.
E6.4 Prepare and evaluate various cream soups and sauces.
E6.5 Prepare and evaluate gravies.
E6.6 Prepare and evaluate clear soups. E6.7 Prepare and evaluate cream soup. E6.8 Prepare and evaluate chowder.
E7 Apply recognized/standard procedures for meat cookery
E7.1 Know and apply terms used for meat identification and production.
E7.2 Understand and use the following methods for preparing meats: roast, broil, grill, sauté, braise, poach, boil, sear.
E7.3 Understand the factors that affect meat-cooking time.
E7.4 Describe the procedures for meat cookery.
E7.5 Know how to check for degree of doneness.
E7.6 Know and demonstrate carving techniques.
E8 Apply recognized/standard procedures for poultry and fish cookery
E8.1 Identify types of poultry.
E8.2 Understand and employ proper storing methods for poultry and fish.
E8.3 Know the classification of fish.
E8.4 Understand and use the common methods for cooking fish.
E8.5 Know how to cut up whole chicken.
E8.6 Understand and use the common methods of cooking chicken.
E8.7 Know how to check for degree of doneness.
E8.8 Know how to check for freshness.
E9 Apply fundamentals of baking science
E9.1 Define baking terms.
E9.2 Identify ingredients used in baking; describe properties and list function of various ingredients.
E10 Apply recognized/standard procedures for quick bread preparation

- E10.1 Name the common types of quick breads.
- E10.2 Prepare and evaluate breads and rolls.
- E11 Apply recognized/standard procedures for yeast products preparation
- E11.1 Name the common types of yeast breads.
- E11.2 Participate in the production of crusty, soft, and specialty yeast products.
- E11.3 Understand and employ the steps for using yeast.
- E12 Apply recognized/standard procedures for dessert preparation
- E12.1 Describe the types of cakes.
- E12.2 Prepare and evaluate cakes.
- E12.3 Know and demonstrate the common types of icings.
- E12.4 Know the common types of cookies.
- E12.5 Prepare and evaluate cookies.
- E12.6 Know how to prepare pie shells.
- E12.7 Name the common types of pie fillings.
- E12.8 Prepare and evaluate pie shells, fillings, and toppings.
- E12.9 Prepare and evaluate puff pastry, turnovers and choux past products.
- E12.10 Prepare creams, custards, puddings and related sauces.
- E13 Apply recognized/standard procedures for beverage preparation
- E13.1 Prepare and evaluate coffee, tea, and cocoa beverages.

Aligned Washington State Academic Standards

Science

Washington Science Standards (Next Generation Science Standards): These science concepts were taught in Unit 3 and will be applied and assessed during the food preparation experiences as applicable.

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

HS-PS1-5 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

HS-PS1-6 Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

HS-PS2-6 Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

	<p>HS-LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.</p> <p>HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.</p>	
Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 6: Resource Management	Total Learning Hours for Unit: 30
<p>Performance Assessments: (Districts to complete for each unit)</p> <p><i>Example assessments for this unit include:</i></p> <ul style="list-style-type: none"> Students make an industry connection and conduct an informational interview and/or job shadow. Using a variety of resources, and application of the science principles related to farming and sustainable foods, students analyze, design, and develop an “aspects of industry” project which shows an understanding of using and managing resource, e.g., the student will create a “mock” restaurant, catered event, community service project, “chef special of the day,” etc., with supporting documentation to summarize their work and an evaluation of the process. Using a variety of presentation skills, the student presents what they learned to classmates. Students analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants understanding the importance of natural resources (sufficient clean potable water, mineral-rich soil, etc.), sustainable practices, the slow foods movement, etc. 	
<p>Leadership Alignment: (Districts to complete for each unit)</p> <p><i>Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.</i></p> <p><i>Example:</i></p> <ul style="list-style-type: none"> All students have a final project where they lead the kitchen or a station to create a project, concept, menu, catering event, or daily special through the 21st century skills. 	
<p>Industry Standards and/or Competencies:</p> <p>National Standards for Family and Consumer Sciences Education (FCS)</p> <p>5.7.3 Design staff schedules that meet industry needs and consider individual diversity.</p> <p>5.7.5 Demonstrate techniques and strategies to evaluate employee effectiveness.</p> <p>8.6.1 Apply principles of purchasing, receiving, and storing in food service operations.</p> <p>8.6.2 Practice inventory procedures including first in/first out concept, date marking, and specific record keeping.</p> <p>8.6.3 Apply accounting procedures in planning and forecasting profit and loss.</p> <p>8.6.8 Implement marketing plans for food service operations.</p> <p>9.5.2 Analyze data in statistical analysis when making development and marketing decisions.</p>	
American Culinary Foundations (ACF)	

- F1 Recognize and use resources
- F1.1 Collect, record, organize, and analyze sales data/information.
- F1.2 Base decisions on data/statistical analysis
- F1.3 Write requisition for production requirements
- F1.4 Use recognized/standard purchasing and receiving principles.
- F1.5 Collect/analyze inventory
- F1.6 Practice recognized/standard inventory procedures including first in/first out concept and date markings.
- F1.7 Use specific, recognized record keeping practices.
- F1.8 Use recognized/standard accounting principles in planning and forecasting profit and loss.
- F1.9 Record and analyze temperature logs.
- F1.10 Collect, record, and implement banquet event orders.
- F1.11 Develop staff schedules.
- F1.12 Apply time management techniques.
- F1.13 Implement marketing plan for culinary arts retail operations.
- F1.14 Understand the importance of natural resources for a sustainable population.

Aligned Washington State Academic Standards

Science	Washington Science Standards (Next Generation Science Standards):		
	HSESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.		
	HS-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.		
	HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.		
	HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.		
	HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.		
Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept	

Unit 7: Customer Service Relations/People Skills and Teamwork

Total Learning Hours for Unit: 60

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

- In a real or role-play situation, students demonstrate service procedures and operations of the culinary arts field and gather evidence of customer satisfaction. Students may use FCCLA Leaders at Work in food Services program for this assessment.

- Students are assessed on use of reading, writing, and communication essential learning as they develop, implement and present their project.

Level 2:

- The student applies/uses recognized service procedures and operations in the culinary arts retail operation, contrasting opinion of fact.
- A competency performance rubric will be used to assess the student's proper and efficient use of dining room service procedures and operations. Students perform at a level 3 or better when assessed using the rubric, demonstrating persistence to reach these goals.
- Teams of students develop a menu for a specific customer group "case study" and analyze its nutritional value, using available resources such as nutritional analysis software, USDA guidelines. The menu will address learning standards as appropriate to their case study. Each team will be given a different customer group "case study." Teams present their menus to a panel that includes industry representatives.
- As part of the culinary arts retail operation, the student uses nutritional/dietary guidelines and menu planning principles to develop menu items that provide guests and customers with food choices that meet a range of dietary needs. Proper, efficient and appropriate food handling techniques will be used in the preparation of these menu items that will show evidence of menu analysis.
- The student applies marketing and advertising methods to develop a menu that could be used in the culinary arts retail operation.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

- Students train and lead new students in Deli/Catering operations. They also have leadership's roles in every station where they plan and produce events that apply 21st century skills.

Industry Standards and/or Competencies:

National Standards for Family and Consumer Sciences Education (FCS)

- 1.2 Demonstrate transferable knowledge, attitudes, and technical and employability skills in school, community and workplace settings.
- 1.2.1 Analyze potential career choices to determine the knowledge, skills, attitudes, and opportunities associated with each career.
- 1.2.3 Apply communication skills in school, community and workplace settings and with diverse populations.
- 1.2.4 Demonstrate teamwork skills in school, community and workplace settings and with diverse populations.
- 1.2.5 Analyze future-ready strategies to shape, manage, and utilize change, including changing technologies, in workplace settings.
- 1.2.6 Demonstrate leadership skills and abilities in school, workplace and community settings.
- 1.2.8 Demonstrate employability skills, work ethics, and professionalism.
- 5.7.1 Demonstrate quality customer service which exceeds customer expectations in diverse settings.
- 5.7.4 Conduct orientation, regular training and education, and on the job training/retraining, considering employee diversity.
- 8.6.5 Apply human resource policies including rules, regulations, laws, hiring, compensation, overtime, discrimination, and harassment.
- 8.6.6 Apply the procedures involved in staff planning, recruiting, interviewing, selecting, scheduling, performance reviewing, and terminating of employees.
- 8.6.7 Conduct staff orientation, initial training and education, consistent reinforcement of training principles, and on the job training/retraining.
- 8.6.8 Implement marketing plans for food service operations.
- 8.7.5 Demonstrate sensitivity to diversity and special needs.
- 10.6.1 Coordinate client inquiries and requests.
- 10.6.2 Design themes, timelines, budgets, agendas, and itineraries for specific programs and events.

- 10.6.3 Organize resources and information about locations, facilities, suppliers, and vendors for specific services.
- 10.6.4 Prepare event materials for distribution.
- 10.6.5 Demonstrate skills related to promoting and publicizing events.
- 10.6.6 Manage programs and events for specific age groups or diverse populations.
- 10.6.7 Promote wellness initiatives through recreation and leisure programs and events.
- 13.5.1 Create an environment that encourages and respects the ideas, perspectives, and contributions of all group members.
- 13.5.2 Demonstrate strategies to motivate, encourage, and build trust in group members.
- 13.5.3 Demonstrate strategies that utilize the strengths and minimize the limitations of team members.
- 13.5.4 Demonstrate techniques that develop team and community spirit.
- 13.5.5 Demonstrate ways to organize and delegate responsibilities.
- 13.5.6 Create strategies to integrate new members into the team.
- 13.5.7 Demonstrate processes for cooperating, compromising, and collaborating.

American Culinary Foundations (ACF)

H1 Practice recognized dining room service procedures and operation

H1.1 Know and demonstrate responsibilities of dining room team: server, bus person/drawer cashier, host/hostess, dining room manager

H1.3 Using American service set a complete restaurant cover.

H1.4 Understand and demonstrate proper sanitation of the dining room.

H1.5 Identify and perform a side work duty list.

H1.6 Evaluate and demonstrate effective suggestive selling techniques.

H1.7 Demonstrate proper seating procedures.

H1.8 Demonstrate proper American food and beverage service.

H1.9 Demonstrate proper guest check writing.

H2 Practice recognized banquet procedures and set-up

H2.1 Set up meeting room.

H2.2 Set a buffet line.

H2.3 Set up various seating plans per customer: block, theater, classroom, carousel.

I1 Prepare for the transition to employee and from employee to supervisor

I1.1 Demonstrate effective communication and interpersonal skills: a) interact with others using tact and courtesy in both verbal and non-verbal communication; b) set and utilize appropriate rules when interacting with others; c) use effective structure and presentation style when speaking; d) use effective listening skills; e) adapt communication skills to appropriate environment and medium.

I1.2 Demonstrate the ability to work as a group member in the production of quality work: a) knowledge of own and others' interactive styles; b) ability to relate and interact effectively in teams consisting of individuals with differing interests, genders, backgrounds and professions.

I1.3 Logically and effectively solve personal and professional problems: a) adapt to change; b) deal constructively with stress; c) conflict resolution.

I1.4 Demonstrate ability to set and work towards goals within a set time line: a) set priorities, plan time lines, take action, evaluate and adjust accordingly; b) identify professional goals; c) reflect on short-term goals to measure personal effectiveness.

- I1.5 Carry out steps in job search and obtain employment: a) job interview; b) correct professional appearance and conduct; c) commit to industry work ethics.
- I1.6 Identify and value quality: a) able to identify standards of quality; b) assess a service/product and determine if meets defined quality standard; c) able to define quality process; d) willing to adjust to meet quality standards.
- I1.7 Describe procedure to progressive discipline.
- I1.8 Discuss technique for motivating employees.
- I1.9 Outline current federal and state employment laws.
- I1.10 Use proper evaluative techniques.

Aligned Washington State Academic Standards		
Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 8: Nutrition and Meal Planning	Total Learning Hours for Unit: 60
<p>Performance Assessments: (Districts to complete for each unit)</p> <p><i>Example assessments for this unit include:</i></p> <ul style="list-style-type: none"> Teams of students develop a menu for a specific customer group "case study" and analyze its nutritional value, using available resources such as nutritional analysis software, USDA guidelines. Teams construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. Understanding how this process may affect a client's health. The menu will address learning standards as appropriate to their case study. Each team will be given a different customer group "case study." Teams will present their menus to a panel that includes industry representatives. As part of the culinary arts retail operation, students evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. The student uses nutritional/dietary guidelines and menu planning principles to develop menu items that provide guests and customers with food choices that meet a range of dietary needs. Proper, efficient and appropriate food handling techniques will be used in the preparation of these menu items that will show evidence of menu analysis. The student researches and reviews a number of marketing/advertising styles and examples to develop a menu that could be used in the culinary arts retail operation. 	
<p>Leadership Alignment: (Districts to complete for each unit)</p> <p><i>Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.</i></p> <p><i>Example:</i></p> <ul style="list-style-type: none"> The student understands the organizational skills necessary to be a successful leader and citizen and practices those skills in real-life. As part of the instruction, students partake in scientific nutritional experiments with station leaders to exemplify core culinary concepts and utilize 21st Century skills. As part of the culinary arts retail operation, the student produces nutritional items daily and will plan meals or events. 	

Industry Standards and/or Competencies:**National Standards for Family and Consumer Sciences Education (FCS)**

- 8.4.1 Use computer-based menu systems to develop and modify menus.
- 8.4.2 Apply menu-planning principles to develop and modify menus.
- 8.4.3 Analyze food, equipment, and supplies needed for production.
- 8.4.4 Develop a variety of menu layouts, themes, and design styles.
- 8.4.6 Record performance of menu items to analyze sales and determine menu revisions.
- 9.3.2 Analyze nutritional data.
- 9.3.3 Apply principles of food production to maximize nutrient retention in menus.
- 9.3.4 Assess the influence of cultural, socioeconomic and psychological factors on food and nutrition and behavior.
- 9.3.5 Analyze recipe/formula proportions and modifications for food production.
- 9.3.6 Critique the selection of foods to promote a healthy lifestyle.
- 9.4.3 Determine when to provide a selective menu approach in nutrition therapy settings.
- 9.4.4 Construct a modified diet based on nutritional needs and health conditions.
- 9.4.5 Design instruction on nutrition to promote wellness and disease prevention.
- 14.2.1 Evaluate the effect of nutrition on health, wellness and performance.
- 14.2.4 Analyze sources of food and nutrition information, including food labels, related to health and wellness.

American Culinary Foundations (ACF)

- G1 Apply principles of nutrition to menu planning and food preparation
 - G1.1 List the six food groups in the current USDA My Pyramid and the recommended daily servings from each; list the major nutrients contributed by each of the food groups.
 - G1.2 Discuss the new dietary guidelines and adapt recipes.
 - G1.3 Describe the characteristics, functions and sources of the major nutrients.
 - G1.4 List the primary functions and best sources of each of the major vitamins and minerals.
 - G1.5 Discuss and demonstrate cooking techniques and storage principles for maximum retention of nutrients.
 - G1.6 Identify common food allergies and determine appropriate substitutions.
 - G1.7 Discuss contemporary nutritional concerns such as vegetarianism, heart health menus and religious dietary laws.
- G2 Apply principles of menu planning and layout to the development of menus for a variety of types of facilities and service
 - G2.1 List basic menu planning principles.
 - G2.2 Identify principles of menu layout and design.
 - G2.3 Create menu item descriptions following established truth-in-menu guidelines.
 - G2.4 Determine menu prices utilizing proper cost controls.
 - G2.5 Discuss importance of product mix, check average and their impact on profit contribution.

Aligned Washington State Academic Standards**Science****Washington Science Standards (Next Generation Science Standards):**

	<p>HS-PS3-1 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.</p> <p>HS-LS1-1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.</p> <p>HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</p> <p>HS-LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.</p> <p>HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.</p> <p>HS-LS2-8 Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.</p> <p>HS-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.</p> <p>HS-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.</p> <p>HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</p> <p>HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.</p> <p>HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts</p>		
Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept	