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CTE Standards Unpacking
Food Technology

Course: Food Technology
Course Description: Food Technology offers opportunities to study the composition, structure, and properties of foods. Students examine changes that occur during the processing, storage, preparation, and consumption of food. Students explore effects of various materials, microorganisms, and processes on food products through laboratory experiments.
Career Cluster: Hospitality and Tourism
Prerequisites: N/A
Program of Study Application: Food Technology is a pathway course in the Hospitality and Tourism career cluster; Restaurant and Food Service Pathway.

INDICATOR #FT 1: **Students will integrate knowledge, skills, and practices required for careers in food science, food processing and food production from production to consumption.**		
SUB-INDICATOR 1.1 (Webb Level: 2 Skill/Concept): Determine the contributions of food science to society		
SUB-INDICATOR 1.2 (Webb Level: 2 Skill/Concept): Summarize food science in relation to social change and technological advances		
SUB-INDICATOR 1.3 (Webb Level: 2 Skill/Concept): Explain contributions of food science to changing food quality and availability		
SUB-INDICATOR 1.4 (Webb Level: 2 Skill/Concept): Investigate careers in food science, food processing, and food production industries		
Knowledge (Factual): -Food science, food technology, food processing, food production -Farm-to-table	**Understand (Conceptual):** -Historical happenings have influenced the evolution of food science. -Many career opportunities exist in the food science, food processing and food production industries. -The food supply has been and continues to be impacted by food science.	**Do (Application):** -Brainstorming food science(FS)contributions (fire, canning, dehydration) -Matching events of historical events with food discoveries. -Explore careers in FS, food processing (FP), and food production industries (Agriculture and Natural Resources cluster-Food Products and Food Processing Systems

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Benchmarks:
Students will be assessed on their ability to:

- Collect and display information about careers in food science.
- Create a timeline on historical events that influenced food production, processing and preparation.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
ELA -LITERACY.RI.1 - Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. Mathematics -HSS.IC.B.6 - Evaluate reports based on data. Social Studies -9-12.G.6.3 - Explain the way technology expands the human capacity to use and modify the physical environment	ELA -Using SDMyLife, research and write a short career report citing details and evidence gathered. Mathematics -Students will view data related to job growth within the food science, food processing, and food production industries and evaluate the need for workers in the chosen career. Social Studies -Select a major food technology advancement and create two lists, one with positive effects on the environment and one with negative effects.

INDICATOR #FT 2: **Students will explore scientific practices as they relate to the food industry.**

SUB-INDICATOR 2.1 (Webb Level: 2 Skill/Concept): Demonstrate safe laboratory practices

SUB-INDICATOR 2.2 (Webb Level: 3 Strategic Thinking): Apply skills needed for valid and reliable scientific experiments

Knowledge (Factual):	**Understand (Conceptual):**	**Do (Application):**
-Scientific method -Safe laboratory practices	-Using scientific method is critical for valid and reliable scientific experiments.	-Practice using scientific process in groups or directed by teacher

	-Following safe lab practices prevents accidents. -The scientific method has specific steps.	-Review lab safety rules

Benchmarks:
Students will be assessed on their ability to:

- The student will demonstrate use of basic food science equipment.
- The student will gather data using the scientific method of experiment.
- The students will complete a lab plan including hypothesis

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
ELA -LITERACY.RST.3 - Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.	ELA -Read a description of a lab scenario, following the process of a fictional student in the given lab. Find and list mistakes made by the student that would either make the lab environment unsafe or make the results of your lab invalid.

INDICATOR #FT 3: **Students will investigate physical and chemical changes of food composition.**

SUB-INDICATOR 3.2 (Webb Level: 2 Skill/Concept): Differentiate roles of the three phases of water in food preparation, food processing and food safety, e.g. steaming, freezing, boiling, shocking (ice bath), dehydration

SUB-INDICATOR 3.3 (Webb Level: 3 Strategic Thinking): Investigate changes of macro nutrients in food processing and preparation, e.g. heat application, varied ingredients

SUB-INDICATOR 3.4 (Webb Level: 3 Strategic Thinking): Investigate changes of micro nutrients in food processing and preparation, e.g. heat applications, solubility

Knowledge (Factual):	**Understand (Conceptual):**	**Do (Application):**
-Phases of water: gas, solid, liquid -Liquid cooking methods	-Food preservation techniques use the three phases of water.	-Categorize food preparation methods in each of the phases of water -e.g. gas = steam

-Food science terms - e.g. fermentation, -Macro nutrients -Micro nutrients -Cooking methods	-Micro nutrients are impacted by food processing and preparation. -Macro nutrients are impacted by food processing and preparation.	-Experiment with changes in pigmentation with the additions of acid and base. -Identify cooking techniques which preserve the nutrients or promote the loss of nutrients.

Benchmarks:
Students will be assessed on their ability to:

- Demonstrate the three phases of water through preservation of a food.
- Test, using the scientific method, the changes that take place in macro nutrients during food processing and preparation.
- Compare and contrast, using the scientific method, the changes that take place in micro nutrients during food processing and preparation.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
Mathematics -HSS.IC.B.5 - Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. Science -HS-PS1-5 - Construct an explanation based on evidence about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.	Mathematics -Gather data related to shocking a food substance versus not shocking. Compare and contrast the two preparations to determine the effect of shocking. Science -Build a scientific model that demonstrates how changes in temperature affects a food substance.

INDICATOR #FT 4: **Students will demonstrate food safety and sanitation procedures.**

SUB-INDICATOR 4.1 (Webb Level: 2 Skill/Concept): Practice procedures that minimize the risks of food borne illness

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SUB-INDICATOR 4.2 (Webb Level: 3 Strategic Thinking): Differentiate how microorganisms act in food and their effect on food products, e.g. fermentation, molds, probiotics and yeast		
SUB-INDICATOR 4.3 (Webb Level: 2 Skill/Concept): Classify sources of contamination: chemical, physical, and biological		
Knowledge (Factual): -Food safety and sanitation terms: included by not limited to: time and temperature control, cross contamination -Safe food handling practices: personal hygiene, washing hands	**Understand (Conceptual):** Proper food handling procedures reduce the risk of food-borne illnesses. -Microorganisms impact food both positively and negatively. -Microorganisms are used to create food products such as bread, yogurt, sauerkraut. -There are three types of food contamination- chemical, physical and biological .	**Do (Application):** -Name and describe the properties of microorganisms that cause food-borne illnesses. -Identify sanitary and unsanitary food handling practices. -Illustrate the impact of microorganisms in food production using foods such as: yogurt, yeast breads, cheese, sauerkraut -Compare and contrast conditions that promote bacterial growth using FATTOM (Food, acidity, time, temperature, oxygen, and moisture) conditions with yeast. -Identify type of contamination using situation cards

Benchmarks:

Students will be assessed on their ability to:

- Solve the mystery of the hidden culprit-microorganism in the Food Borne Illness Mystery (USDA-see resources)
- Sort examples of food contamination into the three forms – physical, chemical and biological.

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Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): ELA -LITERACY.SL.1 - Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.	**Sample Performance Task Aligned to the Academic Standard(s):** ELA -Role-play scenarios that would result in sanitary and unsanitary environments for food preparation. Discuss how each person involved can contribute to a safe and sanitary environment.

INDICATOR #FT 5: **Students will use the role of sensory evaluation in the food industry.**

SUB-INDICATOR 5.1 (Webb Level: 3 Strategic Thinking): Differentiate sensory characteristics that affect food preferences

SUB-INDICATOR 5.2 (Webb Level: 2 Skill/Concept): Implement procedures for evaluation of sensory characteristics

Knowledge (Factual):	**Understand (Conceptual):**	**Do (Application):**
-Five sense- taste, texture, smell, sight, sound -Taste- sweet, salty, sour, bitter, umami Blind test -Sensory evaluation	-Senses impact the perception of taste. -Industry uses sensory evaluation panels to evaluate food. -Blind tests are used for sensory panels.	-Conduct sensory test - add orange coloring to Sprite. Taste when blindfolded. - Compare and contrast salsa recipe changing the type of pepper used in each recipe. - Match jelly beans to the flavor using a blind tasting.

Benchmarks:

Students will be assessed on their ability to:

- Describe characteristics of a successful sensory testing.
- Define sensory evaluation.

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Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): Mathematics -HSS.IC.A.1 - Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	**Sample Performance Task Aligned to the Academic Standard(s):** Mathematics -Design a small survey related to how different members of the class might have different preferences based on their sensory characteristics. Apply the results from your survey to give insight into the larger population.

INDICATOR #FT 6: **Students will investigate technological advances in food science, food processing, and food production.**		
SUB-INDICATOR 6.1 (Webb Level: 2 Skill/Concept): Distinguish scientific advances that have changed the food supply and preparation, e.g. genetically modified organisms (GMOs), molecular gastronomy		
SUB-INDICATOR 6.2 (Webb Level: 3 Strategic Thinking): Investigate use of technology in new food product development		
Knowledge (Factual): -Genetically modified organisms -Molecular gastronomy -Crossbreeding -Aseptic packaging	**Understand (Conceptual):** -Scientific advances have changed food supply and preparation methods. -Advancements in technology have led to the creation of new food products. -Food production is evolving as new scientific methods of production and preservation are discovered.	**Do (Application):** -Create a new flavor by melting candy such as Jolly Rancher or sucker and then recombining. -Create a poster to show examples of foods that have been impacted by technology or scientific advances. -Research foods that have been created through the use of new technology. -Taste-test foods such as Tang, microwave popcorn

		-Follow the process of creating chocolate products.

Benchmarks:
Students will be assessed on their ability to:

- Create a food product using molecular gastronomy
- Present results of research on foods created using technological advances.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
ELA -LITERACY.RI.2 - Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text. Social Studies -9-12.G.6.3 - Explain the way technology expands the human capacity to use and modify the physical environment	ELA -Read an informational text about technology as it relates to developing new food product. Summarize the effect that technology has in this development process. Social Studies -Research food supply changes since the introduction of GMOs. Write a short explanation of how GMOs have changed the food industry.

Additional Resources
Please list any resources (e.g., websites, teaching guides, etc.) that would help teachers as they plan to teach these new standards.

Netflix documentary *Cooked* - Water, Fire, Earth and Air - An enlightening and compelling look at the evolution of what food means to us through the history of food preparation and its universal ability to connect us.

In addition to the Hospitality and Tourism- Restaurant & Food/Beverage Service pathway, the Agriculture and Natural Resources cluster has a pathway of Food Products and Food Processing Systems.
Alton Brown - What is Food Science?
FATTOM-
History of Chocolate video