

CAPS Future of Food

UNIT 1: Food Science

ESSENTIAL QUESTION

How does an understanding of food science inform the production, preservation, and consumption of food?

BIG IDEAS

- Exploring the Chemistry and Biology of Food and Human Nutrition
- Understanding Food Processing and Preservation Techniques
- Investigating the Impact of Food Science and Nutrition on Hunger at the Local and Global Scale

GUIDING QUESTIONS

Content

- What are the chemical and biological principles underlying food composition, structure, and transformation?
- How do food processing methods such as heating, cooling, fermentation, and preservation affect the safety, quality, and shelf life of food?
- What are the nutritional implications of food ingredients on human health and well-being?

Process

- How can scientific inquiry and experimentation be used to explore and understand food science concepts?
- What methods and technologies are employed in food processing and preservation, and how do they impact food properties and characteristics?
- How does the science of human nutrition inform the activities of the food industry.

Reflective

- How has your understanding of food science and nutrition concepts evolved throughout this unit, and how do you plan to apply this knowledge in your future food-related endeavors?
- What ethical considerations and implications arise from advancements in food science and technology, and how do they influence your perspective on food production and consumption?

FOCUS STANDARDS

Food Science Course No. 19254

BENCHMARK 1: UNDERSTAND (OR APPLY) BASIC CONCEPTS OF NUTRITION AND FOOD SCIENCE PRINCIPLES.

Competencies

- | # | DESCRIPTION |
|-----|---|
| 1.1 | Define the term food science and describe the main goal of food scientists. |
| 1.2 | Discuss the interrelationship of food science and nutrition to promote wellness and disease prevention. |
| 1.3 | Define the term sensory evaluation and the qualities that make the sensory characteristics of food. |
| 1.4 | Describe the characteristics of sensory tasting and the impact on people's food preferences. |

BENCHMARK 4: UNDERSTAND PRINCIPLES OF FOOD BIOLOGY AND MICROBIOLOGY.

Competencies

- | # | DESCRIPTION |
|-----|--|
| 4.1 | Explain the food dehydration process and how it relates to food preparation. |
| 4.2 | Discuss the food canning process. |
| 4.3 | Discuss freeze-drying and/or air-drying processes. |
| 4.4 | Discuss the food irradiation process. |

BENCHMARK 5: UNDERSTAND AND APPLY PRINCIPLES OF FOOD CHEMISTRY.

Competencies

- | # | DESCRIPTION |
|------|---|
| 5.1 | Explain the properties of elements, compounds, and mixtures in foods and food products. |
| 5.2 | Observe and explain why specific chemical reactions occur and the chemical and physical changes in food. |
| 5.3 | Investigate the processes of heat and temperature including: molecular motion & temperature, heat transfer, latent heat in phase changes, and temperature on rates of reaction. |
| 5.4 | Investigate the role of acids and bases in foods and food products (e.g. Why baking soda is used with an acid in baked goods). |
| 5.5 | Explain the coagulation and coalescence processes associated with milk protein and cheese. |
| 5.6 | Discuss the functions of enzymes in food. |
| 5.7 | Analyze the functions of molds and fermentation in food products. |
| 5.8 | Analyze leavening agents and baked goods. |
| 5.9 | Explain the impact of molecular structure of simple and complex carbohydrates on digestion, nutrition, and food preparation procedures. |
| 5.10 | Relate the composition of lipids and proteins to their functions in foods and their impact on food preparation and nutrition. |
| 5.11 | Compare the heat of fusion and the heat of vaporization. |
| 5.12 | Explain the functions of water in food preparation. |
| 5.13 | Explain the three parts of an emulsion and their relationship to each other. |

- 5.14 Demonstrate various food emulsions and tell the types of each emulsion.
- 5.15 Discuss fermentation and food including reasons why.
- 5.16 Identify bacteria used to ferment food (e.g. Lactic acid to create sauerkraut, process of making vinegar, fresh-pack vs brine pickling).
- 5.17 List the four major leavening agents.
- 5.18 Identify the types of doughs and batters used in making quick breads.
- 5.19 Demonstrate how air and steam act as leavening agents.
- 5.20 Analyze the purposes of the ingredients used in making yeast breads.

BENCHMARK 6: ANALYZE CAREER PATHS WITHIN FOOD SCIENCE AND FOOD TECHNOLOGY.

Competencies

- | # | DESCRIPTION |
|-----|--|
| 6.1 | Explain the roles and functions of individuals engaged in food science and food technology. |
| 6.2 | Analyze opportunities for employment and entrepreneurial endeavors. |
| 6.3 | Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition. |
| 6.4 | Review and enhance an electronic career portfolio to document knowledge, skills and experiences, and individual plan of study. |

KEY LEARNING EXPERIENCES

- Laboratory experiments exploring food chemistry, texture, and sensory properties.
- Case studies and discussions on food processing techniques and their impact on food safety and quality.
- Guest lectures from food scientists and industry professionals on current trends and innovations in food science.
- Hands-on demonstrations of food preservation methods such as canning, drying, and fermentation.
- Research projects investigating the nutritional content and health effects of processed foods.
- Field trips to food processing facilities or research labs to observe real-world applications of food science and nutrition principles.

CAPS Future of Food

UNIT 2: Basic Culinary Skills

ESSENTIAL QUESTION

BIG IDEAS

How do foundational culinary skills contribute to successful food preparation and presentation?

- **Mastering Fundamental Cooking Techniques and Methods**
- **Exploring Flavor Profiles and Culinary Creativity**
- **Embracing Principles of Food Safety and Sanitation**

GUIDING QUESTIONS

Content

- What are the essential cooking techniques and methods used in culinary arts, and how do they vary across cuisines and cultures?
- How do ingredients, seasonings, and cooking methods combine to create diverse flavor profiles and culinary experiences?
- What are the best practices for maintaining safety and sanitation in kitchen environments?

Process

- How can hands-on practice and repetition help develop proficiency in culinary techniques and skills?
- What strategies can chefs employ to experiment with flavors, textures, and presentations to create innovative dishes?
- How do culinary professionals prioritize and implement food safety protocols to prevent foodborne illnesses and ensure consumer health?

Reflective

- How have your culinary skills and confidence grown throughout this unit, and how do you envision applying them in future culinary endeavors?

- What insights have you gained about the importance of creativity, experimentation, and attention to detail in culinary arts, and how do you plan to incorporate these elements into your cooking practice?

FOCUS STANDARDS

Food Science Course No. 19254

BENCHMARK 2: DEMONSTRATE THE USE OF SCIENCE AND TECHNOLOGY IN FOOD PRODUCT TESTING AND DEVELOPMENT.

Competencies

- | # | DESCRIPTION |
|-----|---|
| 2.1 | Use leadership and teamwork skills in collaborating with others to accomplish lab goals and objectives. |
| 2.2 | Identify scientific equipment and the proper methods for use. |
| 2.3 | Maintain test kitchen/ laboratory and related equipment and supplies. |
| 2.4 | Implement safety procedures when conducting experiments. |
| 2.5 | Apply scientific principles when conducting research and/or sensory evaluations of food products. |
| 2.6 | Use the metric system of measurement. |
| 2.7 | Conduct testing of food products, utilizing available technology. |
| 2.8 | Analyze data in statistical analysis when making development decisions. |
| 2.9 | Write reports using scientific terminology. |

BENCHMARK 3: APPLY RISK MANAGEMENT PROCEDURES TO FOOD SAFETY, FOOD TESTING, AND SANITATION.

Competencies

- | # | DESCRIPTION |
|-----|---|
| 3.1 | Use Occupational Safety and Health Administration's (OSHA) Right to Know Law and Safety Data Sheets (SDS) and explain their requirements in handling hazardous materials. |
| 3.2 | Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes (the flow of food) to minimize the risks of food borne illness. |
| 3.3 | Demonstrate practices and procedures that assure personal and workplace health and hygiene (e.g. sanitary food-handling practices, cleaning and sanitizing materials). |
| 3.4 | Identify properties of microorganisms that cause food spoilage and contribute to food-borne illness. e.g. time, temperature, date markings, cross contamination, etc.). |
| 3.5 | Explain the difference between food intoxication and food infection. |

KEY LEARNING EXPERIENCES

- Hands-on cooking labs and demonstrations covering knife skills, cooking methods, and recipe execution.
- Culinary challenges and competitions encouraging students to apply culinary techniques and creativity to create signature dishes.
- Tastings and sensory evaluations to explore and analyze flavor profiles, textures, and culinary compositions.
- Workshops on food presentation and plating techniques to enhance visual appeal and aesthetics.
- Industry guided training in food and safety sanitation principles.
- Guest chef demonstrations and industry field trips to restaurants or culinary institutions to observe professional culinary practices in action.

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UNIT 3: Food Innovation Project

ESSENTIAL QUESTION

BIG IDEAS

How can innovation and creativity drive the development of new food products and solutions?

- **Identifying Opportunities for Innovation in the Food Industry**
- **Conceptualizing, Designing, and Prototyping New Food Products**
- **Developing a Business Plan for Testing, Iterating, and Marketing Innovative Food Solutions**

GUIDING QUESTIONS

Content

- What are the current trends and challenges in the food industry that present opportunities for innovation and disruption?
- How do food entrepreneurs and innovators conceptualize, develop, and prototype new food products and solutions?
- What strategies and techniques are effective for testing, refining, and commercializing innovative food concepts?
- How do food entrepreneurs develop a business strategy from an innovative idea?

Process

- How can design thinking and brainstorming methods be used to identify and explore innovative food ideas and concepts?
- What steps are involved in the product development process, from ideation and prototyping to testing and scaling including business plan writing and financial projections.
- How do food innovators navigate regulatory, market, and consumer considerations to bring new food products to market successfully?

Reflective

- How has your experience working on the food innovation project impacted your understanding of the innovation process and your ability to generate and develop business concepts?
- What lessons have you learned from the challenges and successes of the food innovation

project, and how do you plan to apply them in future innovation endeavors?

FOCUS STANDARDS

Food Science Course No. 19254

BENCHMARK 6: ANALYZE CAREER PATHS WITHIN FOOD SCIENCE AND FOOD TECHNOLOGY.

Competencies

#	DESCRIPTION	RATING
6.1	Explain the roles and functions of individuals engaged in food science and food technology.	<input type="text"/>
6.2	Analyze opportunities for employment and entrepreneurial endeavors.	<input type="text"/>
6.3	Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition.	<input type="text"/>
6.4	Review and enhance an electronic career portfolio to document knowledge, skills and experiences, and individual plan of study.	<input type="text"/>

KEY LEARNING EXPERIENCES

- Ideation workshops and design sprints to generate and refine innovative food concepts.
- Prototyping sessions to create physical or digital prototypes of new food products or solutions.
- Consumer testing and feedback sessions to gather insights and iterate on product concepts.
- Business model canvas workshops to explore market opportunities, competition, and revenue models.
- Pitch presentations and marketing campaigns to showcase and promote innovative food concepts to stakeholders.
- Culminating food innovation expo or showcase event where students present their final projects to peers, faculty, and professionals.
- Development of a written business plan for bringing the student's concept to market, including financial analysis and projections.

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UNIT 4: Professional Skills Development through Career Exploration

ESSENTIAL QUESTION

What are key professional skills needed to prepare future professionals in a career they are exploring?

BIG IDEAS

- **Holistic Skill Development:** Prioritize a diverse set of skills beyond technical expertise and including an entrepreneurial mindset.
- **Experiential Learning:** Hands-on experiences, internships, apprenticeships, and project-based learning opportunities provide career exploration opportunities.
- **Mentorship and Networking:** Facilitate mentorship programs and networking events to connect young professionals with experienced individuals in their field.

GUIDING QUESTIONS

Content

- What are effective communication strategies and tools used in specific professions?
- Why are critical thinking, problem-solving and adaptability important?
- How can professional skill development bridge the gap between theoretical knowledge and practical application and enhance understanding of future career opportunities?
- How can mentors offer guidance, advice, and valuable insight most effectively?

Process

- How can students learn about their current strengths and opportunities for development?
- How can experiential learning opportunities holistically create opportunities to practice professional skills?

Reflective

- How does professional skill development foster lifelong learning and development?
- How can I take these skills and transfer them to post secondary and future career

opportunities?

FOCUS STANDARDS

CTE Professionalism Standards

- 1.1 Act as a responsible and contributing citizen and employee.
- 1.2 Apply appropriate academic and technical skills.
- 1.4 Communicate clearly, effectively and with reason.
- 1.5 Consider the environmental, social and economic impacts of decisions.
- 1.6 Demonstrate creativity and innovation.
- 1.7 Employ valid and reliable research strategies.
- 1.8 Utilize critical thinking to make sense of problems and persevere in solving them.
- 1.9 Model integrity, ethical leadership and effective management.
- 1.10 Plan education and career path aligned to personal goals.
- 1.11 Use technology to enhance productivity.
- 1.12 Work productively in teams while using cultural/global competence.

CAPS Professional Profile

Skills: Communication, Collaboration, Time Management, Conflict Resolution, Critical Thinking, Interpersonal Relationship, Creativity, Leadership

Attributes: Adaptability, Curiosity, Self-awareness, Drive, Confidence, Enthusiasm, Resourcefulness, Integrity, Empathy

Actions: Networking, Interviewing, Goal Setting, Professional Manner

KEY LEARNING EXPERIENCES

- Experiential learning opportunities such as project presentations, apprenticeships, client projects and internships.
- Interview opportunities with community members.
- Mentorship events where students are connected to professionals in their chosen careers.
- Development of digital portfolios and resume building that are industry standard and can grow with students.