

Food Science
Alignment with NASAFACS Standards (NS)

Topic 1: Exploring Food Science

Unit 1: History of Food Science *(9 strategies)*

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.1** Analyze career paths within food science, food technology, dietetics, and nutrition industries.
- **9.1.1** Explain the roles and functions of individuals engaged in food science, food technology, dietetics, and nutrition careers.
- **9.1.4** Analyze the correlation between food science, dietetics, and nutrition occupations and local, state, national, and global economies.
- **9.1.5** Create an employment portfolio to communicate food science, food technology, dietetics, and nutrition careers knowledge and skills.
- **9.1.6** Analyze the role of professional organizations in food science, food technology, dietetics, and nutrition careers.

Unit 2: Career Opportunities *(17 strategies)*

(NS 1) Integrate multiple life roles and responsibilities in family, work, and community settings.

- **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.

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.1** Analyze career paths within food science, food technology, dietetics, and nutrition industries.
- **9.1.1** Explain the roles and functions of individuals engaged in food science, food technology, dietetics, and nutrition careers.
- **9.1.2** Analyze opportunities for employment and entrepreneurial endeavors.
- **9.1.3** Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition.
- **9.1.4** Analyze the correlation between food science, dietetics, and nutrition occupations and local, state, national, and global economies.
- **9.1.5** Create an employment portfolio to communicate food science, food technology, dietetics, and nutrition careers knowledge and skills.

Topic 2: The Food Science Laboratory

Unit 1: Leadership Skills and Teamwork *(18 strategies)*

(NS 13) Demonstrate respectful and caring relationships in the family, workplace and community.

Food Science
Alignment with NASAFACS Standards (NS)

- **13.4** Evaluate effective conflict prevention and management techniques.
- **13.4.3** Apply the roles of decision-making and problem solving in reducing and managing conflict.
- **13.4.4** Demonstrate nonviolent strategies that address conflict.
- **13.5** Demonstrate teamwork and leadership skills in the family, workplace, and community.
- **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.

Unit 2: Equipment, Measurement, and Safety (*7 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.4** Maintain test kitchen/ laboratory and related equipment and supplies.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.

Unit 3: Scientific Method (*8 strategies*)

(NS RA) Use reasoning processes, individually and collaboratively, to take responsible action in families, workplaces, and communities.

- **RA.5** Demonstrate scientific inquiry and reasoning to gain factual knowledge and test theories on which to base judgments for action.
- **RA.5.1** Delineate scope, concepts, and scientific terminology for a particular inquiry.
- **RA.5.2** Judge validity and reliability of information, sources, opinions, and evidence.
- **RA.5.3** Generate hypotheses based on scientific principles, observations, evidence.
- **RA.5.4** Test hypotheses and theories using scientific inquiry and reasoning.
- **RA.5.5** Draw conclusions based on data and information that are judged to be reliable.
- **RA.5.6** Evaluate scientific reasoning processes.

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

Food Science
Alignment with NASAFACS Standards (NS)

- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.3** Prepare food for presentation and assessment.
- **9.5.4** Maintain test kitchen/ laboratory and related equipment and supplies.
- **9.5.6** Conduct sensory evaluations of food products.

Unit 5: Food Safety Certification (*5 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.2** Apply risk management procedures to food safety, food testing, and sanitation.
- **9.2.2** Analyze food service management safety and sanitation programs.

Topic 3: Fundamentals of Chemistry

Unit 1: Elements, Compounds, and Mixtures (*12 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.7** Demonstrate principles of food biology and chemistry.
- **9.7.1** Explain the properties of elements, compounds, and mixtures in foods and food products.
- **9.7.4** Explain the impact of molecular structure of simple and complex carbohydrates on digestion, nutrition, and food preparation procedures.

Unit 2: Chemical Reactions and Physical Changes (*10 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.7** Demonstrate principles of food biology and chemistry.
- **9.7.1** Explain the properties of elements, compounds, and mixtures in foods and food products.
- **9.7.2** Analyze the effects of thermodynamics on chemical reactions in foods and food products.
- **9.7.3** Explain the process of ionization in the formation of acids and bases and effect on food and food products.
- **9.7.4** Explain the impact of molecular structure of simple and complex carbohydrates on digestion, nutrition, and food preparation procedures.
- **9.7.5** Relate the composition of lipids and proteins to their functions in foods and their impact on food preparation and nutrition.
- **9.7.6** Explain the value of molds and enzymes in food products.

(NS RA) Use reasoning processes, individually and collaboratively, to take responsible action in families, workplaces, and communities.

- **RA.5** Demonstrate scientific inquiry and reasoning to gain factual knowledge and test theories on which to base judgments for action.

Food Science
Alignment with NASAFACS Standards (NS)

- **RA.5.1** Delineate scope, concepts, and scientific terminology for a particular inquiry.

Unit 3: Acids and Bases (*6 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.
- **9.5.7** Conduct testing for safety of food products, utilizing available technology.

Unit 4: Energy (*9 strategies*)

(NS RA) Use reasoning processes, individually and collaboratively, to take responsible action in families, workplaces, and communities.

- **RA.5** Demonstrate scientific inquiry and reasoning to gain factual knowledge and test theories on which to base judgments for action.
- **RA.5.1** Delineate scope, concepts, and scientific terminology for a particular inquiry.

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.7** Demonstrate principles of food biology and chemistry.
- **9.7.1** Explain the properties of elements, compounds, and mixtures in foods and food products.
- **9.7.2** Analyze the effects of thermodynamics on chemical reactions in foods and food products.
- **9.7.3** Explain the process of ionization in the formation of acids and bases and effect on food and food products.

Topic 4: Nutrition Science

Unit 1: Properties of Carbohydrates (*16 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.1** Analyze various factors that affect food preferences in the marketing of food to a variety of populations.

Unit 2: Properties of Lipids and Fats (*14 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.3** Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.

Food Science
Alignment with NASAFACS Standards (NS)

- **9.3.3** Apply principles of food production to maximize nutrient retention in menus.
- **9.3.6** Critique the selection of foods to promote a healthy lifestyle.
- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.1** Analyze various factors that affect food preferences in the marketing of food to a variety of populations.
- **9.5.4** Maintain test kitchen/laboratory and related equipment and supplies.

Unit 3: Protein Properties (*14 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.3** Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
- **9.3.3** Apply principles of food production to maximize nutrient retention in menus.
- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.
- **9.5.7** Conduct testing for safety of food products, utilizing available technology.

Unit 4: Vitamins and Minerals (*7 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.3** Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
- **9.3.3** Apply principles of food production to maximize nutrient retention in menus.
- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.1** Analyze various factors that affect food preferences in the marketing of food to a variety of populations.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.
- **9.5.7** Conduct testing for safety of food products, utilizing available technology.

Unit 5: Water Properties (*8 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.3** Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
- **9.3.3** Apply principles of food production to maximize nutrient retention in menus.
- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.

Food Science
Alignment with NASAFACS Standards (NS)

- **9.5.7** Conduct testing for safety of food products, utilizing available technology.

Topic 5: Food Chemistry

Unit 1: Enzyme *(20 strategies)*

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.3** Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
- **9.3.3** Apply principles of food production to maximize nutrient retention in menus.

Unit 2: Solutions and Colloidal Dispersions *(11 strategies)*

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.
- **9.6** Demonstrate food science, dietetics, and nutrition management principles and practices.
- **9.6.2** Implement food preparation, production, and testing systems.

Unit 3: Sensory Evaluation *(18 strategies)*

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.3** Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
- **9.3.4** Assess the influence of cultural, socioeconomic and psychological factors on food and nutrition and behavior.
- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.4** Maintain test kitchen/ laboratory and related equipment and supplies.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.
- **9.5.6** Conduct sensory evaluations of food products.

Unit 4: Food Fermentation *(12 strategies)*

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.3** Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
- **9.3.4** Assess the influence of cultural, socioeconomic and psychological factors on food and nutrition and behavior.

Food Science
Alignment with NASAFACS Standards (NS)

- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.4** Maintain test kitchen/ laboratory and related equipment and supplies.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.
- **9.5.6** Conduct sensory evaluations of food products.

Unit 5: Leavening Agents (*13 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.
- **9.6** Demonstrate food science, dietetics, and nutrition management principles and practices.
- **9.6.2** Implement food preparation, production, and testing systems.

Unit 6: Food Additives (*14 strategies*)

(NS 14) Demonstrate nutrition and wellness practices that enhance individual and family well-being.

- **14.5** Evaluate the influence of science and technology on food, nutrition, and wellness.
- **14.5.1** Investigate how scientific and technical advances influence the nutrient content, availability, and safety of foods.
- **14.5.2** Analyze how the scientific and technical advances in food processing, storage, product development, and distribution influence nutrition and wellness.

Topic 6: Microbiology of Food

Unit 1: Food Safety (*27 strategies*)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.2** Apply risk management procedures to food safety, food testing, and sanitation.
- **9.2.1** Analyze factors that contribute to food borne illness.
- **9.2.2** Analyze food service management safety and sanitation programs.
- **9.2.4** 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.
- **9.2.5** Demonstrate practices and procedures that assure personal and workplace health and hygiene.

Food Science
Alignment with NASAFACS Standards (NS)

Unit 2: Food Preservation (15 strategies)

(NS 14) Demonstrate nutrition and wellness practices that enhance individual and family well-being.

- **14.5** Evaluate the influence of science and technology on food, nutrition, and wellness.
- **14.5.1** Investigate how scientific and technical advances influence the nutrient content, availability, and safety of foods.
- **14.5.3** Analyze the effects of technological advances on selection, preparation and home storage of food.

(NS 8) Integrate knowledge, skills, and practices required for careers in food production and services.

- **8.5** Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.
- **8.5.1** Demonstrate professional skills in safe handling of knives, tools, and equipment.

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.2** Apply risk management procedures to food safety, food testing, and sanitation.
- **9.2.6** Demonstrate standard procedures for receiving, storage, and preparation of raw and prepared foods.
- **9.3** Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
- **9.3.3** Apply principles of food production to maximize nutrient retention in menus.
- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.4** Maintain test kitchen/ laboratory and related equipment and supplies.
- **9.5.5** Implement procedures that affect quality product performance and sustainability.
- **9.5.6** Conduct sensory evaluations of food products
- **9.5.7** Conduct testing for safety of food products, utilizing available technology..
- **9.6** Demonstrate food science, dietetics, and nutrition management principles and practices.
- **9.6.3** Apply standards for food quality and sustainability.

Unit 3: Food Packaging (16 strategies)

(NS 9) Integrate knowledge, skills, practices required for careers in food science, food technology, dietetics, and nutrition.

- **9.5** Demonstrate use of science and technology advancements in food product development and marketing.
- **9.5.1** Analyze various factors that affect food preferences in the marketing of food to a variety of populations.
- **9.5.3** Prepare food for presentation and assessment.

Food Science

Alignment with NASAFACS Standards (NS)

- **9.5.5** Implement procedures that affect quality product performance and sustainability.
- **9.5.6** Conduct sensory evaluations of food products.
- **9.6** Demonstrate food science, dietetics, and nutrition management principles and practices.
- **9.6.6** Analyze new products utilizing most current guidelines and innovations in technology.

(NS 14) Demonstrate nutrition and wellness practices that enhance individual and family well-being.

- **14.2** Examine the nutritional needs of individuals and families in relation to health and wellness across the life span.
- **14.2.4** Analyze sources of food and nutrition information, including food labels, related to health and wellness.
- **14.4** Evaluate factors that affect food safety from production through consumption.
- **14.4.4** Investigate federal, state, and local inspection and labeling systems that protect the health of individuals and the public.