

## Food Science

### Pacing Guide 2023 - 2024

Days	Unit	Georgia Standards of Excellence
<p style="text-align: center;">5</p> <p>Covered throughout course content.</p>	<p>Unit 1: Employability Skills</p> <p>Demonstrate employability skills required by business and industry.</p>	<p>1.1 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.</p> <p>1.2 Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.</p> <p>1.3 Exhibit critical thinking and problem-solving skills to locate, analyze and apply information in career planning and employment situations.</p> <p>1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.</p> <p>1.5 Apply the appropriate skill sets to be productive in a changing, technological, diverse workplace to be able to work independently and apply teamwork skills.</p> <p>1.6 Present a professional image through appearance, behavior and language.</p>
<p style="text-align: center;">10</p>	<p>Unit 2: Food Science and Careers</p> <p>Define food science and explore careers in food science.</p>	<p>2.1 Define the study of food science and summarize how food products and processing methods have changed in modern history due to contributions of food scientists.</p> <p>2.2 Describe the history of the development of food and food systems emphasizing the transition from hunting and gathering to farming and then to market-based societies.</p> <p>2.3 Analyze how studying food science can benefit one in the future.</p> <p>2.4 Evaluate and list careers in food science and list the educational requirements.</p>
<p style="text-align: center;">5</p>	<p>Unit 3: Lab Safety</p>	<p>3.5 Identify equipment found in the food science laboratory and how to properly and safely use it.</p>
<p style="text-align: center;">10</p>	<p>Unit 4: Sensory Evaluation</p> <p>Investigate how and why scientific evaluation of foods is conducted.</p>	<p>3.1 Identify physical, physicochemical, and chemical techniques used for assessing food quality.</p> <p>3.2 Define sensory evaluation, identify the qualities that make-up the sensory characteristics of food, and explain how taste, aroma and the mouth feel sensations combined to give food their flavor.</p> <p>3.3 Explain what sensory evaluation panels do and conduct a sensory panel using appropriate controls and quantify and analyze the data.</p>

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		3.4 Describe the role of science in the development of new food products and the use of the scientific method.
6	Unit 5: Chemistry Concepts  Explore the basic chemistry concepts of food science.	4.1 Define and describe the parts of an atom. 4.2 Define matter and compare and contrast substances (elements and compounds) and mixtures (homogeneous and heterogeneous). 4.3 Recognize chemical symbols on the periodic table for common elements found in food and their role as the building blocks for compounds in food. 4.7 Define and differentiate between chemical and physical changes during food preparation and preservation.
5	Unit 5: Heat Transfer  Observe how energy works in food preparation and preservation.	5.1 Explain and demonstrate how heat is transferred via conduction, convection and radiation.
5	Unit 6: Water  Examine why water and acidity are important factors in food preparation and preservation.	6.1 Explain the importance of water as a food constituent and explain the relationship between the molecular structure of water and the functional properties of water (melting point, boiling point, role as a solvent and disperser, heat transfer medium). 6.2 Describe and demonstrate the functions and identify factors that alter the functional properties of water (addition of solutes such as salt and sugar; atmospheric pressure). 6.3 Describe the three states of water and the transition between states, (i.e. phase changes). 6.4 Define and differentiate between water content and water activity and relate their importance to food preparation/preservation and storage using representative examples. 6.5 List the common sources of water and the common contaminants. 6.6 Define acid, base and salt, and identify sensory properties and roles in determining the quality characteristics (color, flavor, texture) and safety of food. 6.7 Discuss ionization, using water as an example, and the relationship to the formation of acids and bases. 6.8 Describe the pH scale and demonstrate how to measure pH.

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5	<p>Unit 7: Carbohydrates</p> <p>Summarize why carbohydrates are important in food preparation, preservation, and the nutritional impact on diets.</p>	<p>7.1 Identify the functions of carbohydrates.</p> <p>7.2 Define and identify the functions of simple and complex carbohydrates, define monosaccharides and disaccharides, and identify the role and function of sugars in food products.</p> <p>7.3 Compare and contrast starches and non-starch-based polysaccharides and the role as food ingredients.</p>
5	<p>Unit 8: Fats/Lipids</p> <p>Summarize why lipids are important in food preparation and preservation and the nutritional impact they have on diet.</p>	<p>8.1 Identify fats present in food and differentiate between triglycerides, phospholipids, and sterols and stanols.</p> <p>8.2 Describe the structure of saturated, monounsaturated and polyunsaturated fatty acids.</p> <p>8.3 Identify and compare the functional properties of triglycerides classified as monounsaturated, polyunsaturated, saturated and trans and list the advantages and disadvantages of their use in food preparation.</p> <p>8.4 Examine the functions of lipids in food preparation and analyze the nutritional impact of lipids in the diet.</p> <p>8.5 Describe mono and diglycerides and phospholipids and their function as emulsifiers in food products.</p>
5	<p>Unit 9: Proteins</p> <p>Summarize why proteins are important in food preparation and preservation and the nutritional impact they have on diet.</p>	<p>9.1 Describe the chemical structure and organization of proteins.</p> <p>9.2 Describe the functional roles of protein in food products.</p> <p>9.3 Explain what happens during the denaturation of protein and illustrate how the process occurs using acids, enzymes and salts and mechanical action.</p> <p>9.4 Explain coagulation and apply basic principles of the chemistry to prepare high-protein foods such as eggs, milk and meat products.</p> <p>9.5 Define enzyme, including the nomenclature and mechanism of action, identify factors that control enzymatic activity and discuss examples of positive and negative enzymatic effects in food products.</p>
15	<p>Unit 10: Servsafe</p> <p>Investigate measures used to produce safe and wholesome food under sanitary conditions.</p>	<p>13.1 Discuss the three major types of food contaminants: physical, chemical, and biological.</p> <p>13.2 Differentiate among food borne illness, food spoilage and food sanitation.</p> <p>13.3 List specific microbial organisms that can cause food-borne illness.</p>

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		<p>13.4 Define toxin, pathogen and parasite and differentiate between food intoxication and food infection.</p> <p>13.5 Discuss sanitation and food handling and processing practices used to produce wholesome foods during the processing, preparation, consumption and storage of food.</p> <p>13.6 Describe the common causes of food spoilage and steps to reduce/prevent spoilage.</p> <p>13.7 Identify government agencies in the United States that regulate the food supply.</p>
2	<p>Unit 11: Phytochemicals</p> <p>Investigate the sources, and impact of food formulations, preparation and preservation on food constituents important to health.</p>	<p>10.1 Differentiate between nutrient and phytochemical and indicate the role of each in promoting health.</p> <p>10.2 List the key vitamins, minerals, and phytochemicals present in food and identify foods that are major sources of each food constituent and their role in promoting health.</p> <p>10.3 Define enrichment/fortification, list ideal characteristics of the food fortified or enriched and discuss the role in meeting nutrient needs of the population.</p> <p>10.4 Differentiate between availability and bioavailability.</p> <p>10.5 Explain the impact of food preparation, food processing and preservation methods on nutrient value and bioavailability of phytochemicals.</p> <p>10.6 Define functional foods and explore types of functional foods currently in the marketplace and the potential to impact health.</p>
2	<p>Unit 12: Food Additives/Analog</p> <p>Investigate the reasons for the use of food additives and food analogs in food preparation and in processed products.</p>	<p>11.1 Define food additives, discuss the various purposes of food additives in food products and identify advantages and disadvantages of their use.</p> <p>11.2 Identify regulations governing the approval and use of food additives and the agencies involved.</p> <p>11.3 Explain the difference between natural and artificial additives.</p> <p>11.4 Define food analog and list the main reasons for their use.</p> <p>11.5 Explore the impact of the use of substitutes for fat, sugar, and salt on product quality characteristics and nutrient content.</p> <p>11.6 Conduct a sensory evaluation of foods with and without food additives/analog and compile the data and examine the results.</p>

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<p style="text-align: center;">5</p>	<p>Unit 13: Fermentation</p> <p>Analyze the principles of fermentation.</p>	<p>12.1 List the reasons that food is fermented and identify common food products that result from fermentation.</p> <p>12.2 Define probiotics and the relationship to fermented foods and the benefits for gut health.</p> <p>12.3 Differentiate among yeast, bacterial and mold fermentation and identify food products produced for each type of fermentation.</p> <p>12.4 List the factors that impact the growth of single-celled organisms.</p> <p>12.5 Describe the process of pickling and compare and contrast the use of fermentation versus the addition of vinegar to produce cucumber pickles.</p> <p>12.6 Describe the making of a fermented food product, such as vinegar, cheese, yogurt or chocolate.</p>
<p style="text-align: center;">5</p>	<p>Unit 14: Canning/Dehydration</p> <p>Compare and contrast different food preservation methods and the resultant quality of preserved food.</p>	<p>14.1 Describe and provide examples of the continuum of processed foods.</p> <p>14.2 Identify the major functions of packaging used for food products, differentiating between the functions of primary, secondary and tertiary packaging.</p> <p>14.3 Identify common types of packaging materials, and compare and contrast the properties of containers made from different packaging materials and selection criteria.</p> <p>14.4 Discuss reduced oxygen packaging and the effects on product quality and availability of products in the marketplace.</p> <p>14.5 Explain the importance of product pH and final water activity of the processed product to preservation of foods.</p> <p>14.6 Examine the factors to be considered in the selection and use of successful thermal processing techniques (canning, freezing and pasteurization) and describe commercial thermal-processing methods.</p> <p>14.7 Examine the processes of curing, dehydration, freeze-drying, and extended shelf life of fresh products (refrigeration, modified atmosphere packaging and irradiation).</p> <p>14.8 Compare and contrast processes used for home and commercial preservation and evaluate the resulting quality of the products preserved using different commercial and/or home methods.</p>