Content Area: Food Science **Course/Grade Level:** 10-12

Unit 1: The World Of Food Science Suggested Length:

Essential Questions	*Program of Studies* and Core Content	Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
Chapters 1 & 2 What is the Food Science? Why Study Food Science?	Program of Studies: AC-9 Analyze the role of Science plays in everyday life and compare different careers in science. S1-1 Identify and refine questions and identify scientific concepts to guide the design of scientific investigations. S1-2 Design and conduct different kinds of scientific investigations for a wide variety of reasons. LS-13 Analyze the flow of water and matter energy through and between living systems and environments. Core Content: 3.6.3 As matter and energy flow through different organizational levels (e.g. cells, organs, organisms, communities) and between living systems and the physical environment, chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change. PL-HS-4.1.05 Students will identify and describe supporting documents that would be needed for the career portfolio/ Individual Graduation Plan.	• Biotechnology • Food Chain • Food Science • Biodiversity • Entrepreneurs • Entry Level Jobs • Integrated Pest Management(IPM) • Sustainable • Farming	• Complete terms on page 25. • Use your knowledge Questions on page 32. • Chapters 1& 2 Study Guide. • Extend Learning Activity: DNA and Biochemical Viewpoints on Food Biotechnology. • Experiments Food Labels & Nutrition. • Food Science Career. • Categorize careers in Nutrition and Food Service according to skills required and type of Job. • Unit Test Over Chapter 1& 2.

Unit 2: The Food Science Lab Suggested Length:

Essential Questions	*Program of Studies* and Core Content	Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
Chapter 3 Students will: Choose Laboratory equipment that is suited for specific tasks. Demonstrate proper use and maintance of laboratory equipment Demonstrate techniques for working safely in food science laboratory. **Chapter 4** Demonstrate how to make accurate and precise laboratory measurement. Distinguish between metric units of length, mass, and volume, and the prefixes used with them. Compare temperatures on the Celsius and Fahrenheit temperature scales. Demonstrate	Program of Studies Students willl:: ❑ AC-9analyze the role science plays in everyday life and compare different careers in science. ❑ SI- Identify and refine questions and identify scientific concepts to guide the design of scientific investigations. ❑ SI-2design and conduct different kinds of scientific investigations for a wide variety of reasons. ❑ LS-13analyze the flow of matter and energy through and between living systems and environments ❑ SI-3use equipment, techniques, technology and mathematics to improve scientific investigations and communications Core Content ❑ 3.6.3As matter and energy flow through different organizational levels and between living systems and the physical environment, chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change. ❑ SC-081.1.1 • interpret models/representations of atom of different elements • classify elements based upon patterns in their physical elements (density, boiling point, solubility) and chemical (flammability, reactivity) properties	**Chapter 3** • Balance • Beaker • Buret • Calibrate • Erlenmeyer flask • Graduated Cylinder • Insoluble • Meniscus **Chapter 4** • Accuracy • Decimal System • Metric System • Precision	**Chapter 3** • Complete terms on page 49. • Questions on page 58. • Thinking Lab Report on page 59. • Skills Building Activities 59 • Experiments 3-1 Using Electronic Balance • Experiment 3-2 Precision In Measurement. **Chapter 4** • Terms page 61. • Using Knowledge page 72 • Skills Building Activities page 73. • Thinking Lab • Study Guide

Unit 2: The Food Science Lab Suggested Length:

Essential Questions	*Program of Studies* and Core Content	Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
techniques for taking length, volume, mass, and temperature reading. **Chapter 5** Describe in order the steps in the scientific method. Explain the role of reasoning skills in forming a hypothesis. Identify variables in a food science experiment and explain how they may affect the result. Demonstrate completing a data table and report form for a food service experiment. Distinguish between a hypothesis and a scientific theory. Suggest guidelines for doing a food science research project. **Chapter 6**	❑ SC-HS-1.1.6 • Identify variables that affect reaction rates; • Predict effects of changes in variables.	**Chapter 5** • Data • Deductive reasoning • Dependent variable • Experiment • Hypothesis • Independent variable • Experiment • Hypothesis • Independent variable • Inductive reasoning • Theory • Variable	**Chapter 5** • Terms on page 75 • Page 84 Using Knowledge • Page 85 Skills Building • Study Guide • Experiment Popping Corn **Chapter 6** • Terms on Page 87 • Experiment 6-1 Odor Recognition.

Unit 2: The Food Science Lab Suggested Length:

Essential Questions	*Program of Studies* and Core Content	Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
Explain how various influences affect food choice. Describe sensory characteristics that affect food preferences. Plan a setting for successful sensory evaluation in the food industry. Explain the relationship between sensory characteristics and nutrition.		**Chapter 6** • Flavor • Garnish • Monosodium glutamate • Mouthful • Olfactory • Sensory characteristics • Sensory evaluation • Sensory evaluation panels • Taste blinds • Taste buds • Volatile	• Experiment 6-2 Flavor Comparison. • Experiment 6-3 Mouthful and Sensory Evaluation • Study Guide • Page 98 Using Knowledge • Real World Impact – Enhance Flavor. • Unit 2 Test over Chapters 3-6.

Unit 3: Chemistry Fundamentals Suggested Length:

Essential Questions	*Program of Studies* and Core Content	Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
Chapter 7 Explain the difference between physical and chemical properties. Compare the physical phase of matter. Distinguish between pure substances and mixtures.	Students will: ❑ SC-HS-1.1.5Explain the role of intermolecular or intramolecular interactions on the physical properties of compounds. ❑ SC-HS-1.1.6identify variables that affect reaction rates; predict effects of changes in variables (temperature, properties of reactants, surface area, and catalysts) based on evidence/data from chemical reactions. ❑ SC-HS1.1.1classify or make	• Atoms • Chemical Property • Compound • Element • Matter • Mixture • Molecule • Organic compounds • Phase • Physical	• Study Guide 7 • Experiment 7-1 Separating Mixtures. • Experiment 7-2 Heterogeneous and Homogeneous. Mixtures. • Experiment 7-3 Boiling Point • Terms page 103 • Questions Using Your knowledge page 112 Questions Skills Building Activities page 113.

Unit 3: Chemistry Fundamentals Suggested Length:

Essential Questions	*Program of Studies* and Core Content	Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
Explain the relationship between elements and compounds. Compare heterogeneous and homogeneous mixtures. Identify chemical symbols and formulas. **Chapter 8** Compare chemical reactions to physical changes. Compare the parts of an atom. Calculate the mass of one mole of an element or compound. Explain how ionic and covalent bonds are formed. Identify the parts of chemical equations. Distinguished between reversible and irreversible	generalization about elements from data of observed patterns in atomic structure and/or position on the periodic table. ❑ SC-HS1.18 • Explain the importance of chemical reactions in a real-world context; • Justify conclusions using evidence/data from chemical reactions ❑ Sc-HS-1.1.2 that the atom's nucleus is composed of protons and neutrons that are much more massive than electron. When an element has atoms that differ in the number of neutrons, these atoms are called different isotopes of the element. ❑ SC-HS1.1.3 undderstand that solids, liquids, and gases differ in the distances between molecules or atoms and therefore the energy that binds them together. In solids, the structure is nearly rigid; in liquids, molecules or atoms move around each other but do nor move apart; and in gases, molecules or atoms move almost independently of each other and are relatively far apart.	property • Property • Pure Substance • Solutation **Chapter 8** • Atomic Mass • Atomic Number • Chemical Bond • Chemical Equation • Chemical Reaction • Covalent Compound • Covalent Bond • Electron • Ion • Ionic Bond • Ionic Compound • Mass Number • Mole • Nucleus • Neutron • Periodic Table • Physical Change • Product • Proton • Reactant	**Chapter 8** • Terms on page 115 • Questions page 126 Using The Knowledge. • Questions page 127 Skills Building • Experiment 8-1 Physical Changes and Chemical Reactions. • Experimetn 8-2 Changes In Making Peanut Brittle. • Experimetn 8-3 Boiling Point of Sugar Salt Solution.

Unit 3: Chemistry Fundamentals Suggested Length:

Essential Questions	*Program of Studies* and Core Content	Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
reactions and changes. **Chapter 9** Relate water's composition and structure to its property. Compare bonds in water. Explain the functions of heat of fusion and heat vaporization. Explain the effect of air pressure changes in boiling point. Explain sublimation and surface tension. Explain the functions of water in food preparation. Describe hard and soft water. **Chapter 10** Relate the process of ionization to the formation of acids and bases. Explain qualities of		**Chapter 9** • Boiling Point • Bound Water • Colloidal Dispersion • Density • Emulsifier • Emulsion • Free Water • Hard Water • Heat of Fusion • Heat of Vaporization • Hydrogen Bond • Immiscible • Latent Heat • Medium • Melting Point • Polar Molecule • Solute • Solvent • Sublimation • Surface Tension **Chapter 10** • Acid • Base • Buffer • Concentration • Equivalence Point • Indicator	**Chapter 9** • Page 129 Terms • Page 142 Using Your Knowledge. • Page 143 Skills Building Activities. • Page 143 Thinking Lab Pretreating Water. • Study Guide • Experiment 9-1 Solvent Properties of Water. • Experiment 9-2 Purifying Water. • Experiment 9-3 Bottled Water Taste Test. **Chapter 10** • Terms page 145 • Using Your Knowledge 156 • Skills Building Activities Page 157 • Experiment 10-1 Neutralization • Experiment 10-2 pH of Common Foods • Experiment 10-3 Red Cabbage Juice Indicator. • Academic Molarity Page 296

Unit 3: Chemistry Fundamentals Suggested Length:

Essential Questions	*Program of Studies* and Core Content	Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
acids of acid bases. Compare the acidity of substances, using the pH scale and pH indicators. Use molarity and titration to determine the concentration of an acid. Contrast the concepts of strength and concentration in acids and bases. Compare general qualities of acids and bases in foods. Explain the importance of pH to physical health. **Chapter 11** Compare units of heat and measure. Describe the relationship between molecular motion and temperature. Compare processes of heat transfer.		• Ionization • Molarity • Neutral • Neutralization • pH Scale • Titration **Chapter 11** • Absolute zero • Anorexia nervosa • Bulimia • Calorie • Conduction • Convection • Energy • Heat • Joule • Kilocalorie • Microwaves • Obesity • Radiation	**Chapter 11** • Terms page 159 • Using Your Knowledge page 170 • Real World Impact: Concerns about weight open response. • Skills Building Activities page 171 • Thinking Lab: Rates of Chemical reactions in cooking, • Unit 3 test oiver Chapters 7-11. • Experiment 11-1:Effect of Surface: Area on Cooking Rate. • Experimetn 11-2: Effect of Temperature on cooking rate. • Experimetn 11-3: Heat Transfer Through Metal.

Unit 3: Chemistry Fundamentals Suggested Length:

Essential Questions	*Program of Studies* and Core Content	Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
Explain what affects rates of chemical reaction in food. Analyze the relationship between food intake and body weight.			

Unit 4: The Science of Nutrition Suggested Length:

Essential Questions		Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
Chapter 12 Relate earlier scientific findings to today's understanding of nutrition. Explain the role of respiration and oxidation in nutrients. Identify and briefly describe essential nutrients. Explain how different nutritional guidelines are formulated and used. Choose healthful	Program of Studies: AC-9 Analyze the role of science plays in everyday life and compare different careers in science. S1-1 Identify and refine questions and identify scientific concepts to guide the design of scientific investigations. S1-2 Design and conduct different kinds of scientific investigations for a wide variety of reasons. LS-13 Analyze the flow of water and matter energy through and between living systems and environments. Students will: ❑ SC-HS-3.6.1Living systems require a continuous input of energy to maintain their chemical and physical organization since the iniversal tendency is toward disorganized states. The energy for life primarily derives from the Sun. Plants capture energy by absorbing light and using it tp from stron covalent chemical	**Chapter 12** • Daily Values (DVs) • Dietary Reference Intakes (DRI) • Enzymes • Essential Nutrients • Nutrient Dense • Nutrients • Nutrition • Oxidation • Recommended Dietary Allowances (RDAs) • Respiration • Scurvy	**Chapter 12** • Terms page 175 • Real World Impact Symbols of good eating. • Using Your Knowledge 190 • Skills Building Activities. • Thinking Lab: Unlocking The Door To Nutrition. • Experiment 12-1: Identifying Basic Nutrients In Food. • Experiment 12-2: Calcium In Milk. • Experiment 12-3 Nutrition Facts Panel.

Unit 4: The Science of Nutrition Suggested Length:

Essential Questions		Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
foods according to the Dietary Guidelines for Americans. Demonstrate how to use food labels to compare nutrients in foods. Plan healthful menus using the Food Guide Pyramid. Relate the understanding of nutrition to physical well-being. **Chapter 13** Identify in order the parts of the alimentary canal. Describe the processes that take place in each part of the digestive tract. Explain the function of enzymes in digestion. Describe the roles of accessory organs in digestion. Explain how	bonds between the atoms of carbon-containing molecules. These molecules can be used to assemble larger molecules (DNA, proteins, sugars, fats). In addition. The energy stored in bonds between the atoms can be used as sources of energy for life processes. ❑ SC-HS-3.6.2The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compound with lower energy bonds are formed. Cells usually store this energy temporarily in the phosphate bonds of ATP. During the process of cellular respiration, some energy is lost as heat	**Chapter 13** • Alimentary Canal • Bile • Cardiac Sphincter • Digestion • Epiglottis • Esophagus • Mastication • Pancreatic Juice • Peristalsis • Pyloric Sphincter • Saliva	**Chapter 13** • Terms page 193 • Using Your Knowledge Page 202 • Skills Building Activities page 203 • Experiment 13-1: Digestion • Experiment 13-2 Osmois

Unit 4: The Science of Nutrition Suggested Length:

Essential Questions		Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
nutrients are absorbed. **Chapter 14** Explain the purpose of metabolism and the conditions needed for it to occur. Explain the role of energy in metabolism. Compare anabolism and catabolism. Explain the process that stores and transfers energy into the body. Explain how cells maintain chemical balance. Relate the influence of various factors to metabolic rate. Relate basal metabolism and voluntary activity to energy needs. Evaluate weight loss diets and exercise habits in relation to		**Chapter 14** • Adenosine Triphosphate • Anabolism • Cytoplasm • Glycogen • Homeotasis • Lactic Acid • Membranes • Metabolic Rate • Osmosis • Semipermeable Voluntary Activities	**Chapter 14** • Experiment 14-1: Kilocalories if food. • Experiment 14-2 Cellelar Resperation • Using Your Knowledge page 216 • Skills Building Activities page 217 • Thinking Lab: Feed a Fever, Starve a Cold.

Unit 4: The Science of Nutrition Suggested Length:

Essential Questions		Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
metabolism and health. **Chapter 15** Explain the chemical reaction by which plants produce carbohydrates. Describe the molecular structure of simple and complex carbohydrates. Describe properties of sugar. Summarize how glucose is made available to the body. Contrast healthy blood glucose regulation to the complications of diabetes. Discuss caramelization. Compare the structures of amylase and amylopectin and how these structures		**Chapter 15** • Amylopectin • Amylose • Caramelization • Carbohydrates • Gelatinization • Glucose • Hormone • Hydrolysis • Hydroxyl Group • Inversion • Photosynthesis • Polymer • Retrogradation • Saccharide • Supersaturateed • Syneresis • Viscosity	**Chapter 15** • Terms page 219 • Experiment 15 Pages 235-236 • Using Your Knowledge page 236. • Experiment 15-1 Thickening Agents. • Experiment 15-2 Making Fondant. • Study Guide

Unit 4: The Science of Nutrition Suggested Length:

Essential Questions		Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
affect cooking properties. Define the terms gelatinization, paste, retrogradation, and syneresis as used in starch cookery. **Chapter 16** Explain the tree categories of lipids. Describe how fatty acids form triglycerides. Compare the structures of saturated and unsaturated fats. Describe the properties of triglycerides. Relate the compositions of lipids to their functions in foods and in the body. Explain the relationship between cholesterol and heart disease. Develop an eating plan that keeps		**Chapter 16** • Adipose Tissue • Atherosclerosis • Carboxyl Group • Cholesterol • Double bond • Fatty Acids • Hydrogenation • Lipids • Lipoproteins • Plaque • Rancid • Saturated Fat • Single Bond • Smoke Point • Solidfication Point • Triglycerides • Unsaturated Fat	**Chapter 16** • Experiment 16-1 Effects of Light on flavor. • Experiment 16-2 Flat content of Beef. • Experiment 16-3 Lipids and Tenderizing. • Study Guide • Terms page 239 • Using Your Knowledge page 254. **Chapter 17** • Terms page 257

Unit 4: The Science of Nutrition Suggested Length:

Essential Questions		Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
dietary lipids within healthful levels. **Chapter 17** Describe the chemical structure of protein. Explain how amino acids link to form polypeptide bonds. Relate the processes of denaturation and coagulation to the uses of protein in cooking. Compare proteins found in different foods. Explain the relationships between egg proteins and storage. Describe different functions of protein in the body. Explain the significance of essentials amino acids and complete proteins. Evaluate foods as		**Chapter 17** • Albumen • Amine Group • Amino Acids • Antibodies • Chalaza • Coagulation • Complete Protein • Denaturation • Essential Amino Acids • Foam • Gluten • High-Quality Protein • Incomplete Protein • Macromolecules • Peptide Bonds • Polypeptide	• Page 272 Using Your Knowledge • Page 273 Skills Building Activities • Experiment 17-1 Effect of Acid On Protein • Experiment 17.2 Egg Foam Stability • Academic Connections: Nutrient Percentages • Crossword Puzzle for Chapters 17-18. **Chapter 18** • Terms on page 275

Unit 4: The Science of Nutrition Suggested Length:

Essential Questions		Key Terms and Vocabulary	Classroom Instruction and Assessment Student will:
sources of dietary protein. **Chapter 18** Explain in general how vitamins and minerals functions in the body. Describe the basic structure of vitamin molecules. Explain specific contributions of different vitamins and minerals. Relate vitamins and minerals deficiencies to the diseases that result. Explain some interrelationships among vitamins and minerals.		**Chapter 18** Beriberi Beta Carotene Deficiency Disease Fat-Soluble Vitamins Major Minerals Megadoses Minerals Osteoporosis Pellagra Phytochemicals Precursor Rickets Trace Minerals Vitamins Water-Soluble Vitamins	• Experiment 18 Iron as an Additive in Cereals • Questions page 290 Using Your Knowledge. • Questions page 291 Skills Building Activities. • Unit Test • Open Response • Experiment 18-1 Iron as Additive in Cereals • Experiment 18-2 Titration of Vitamins