Arkansas CTE

Food Science: Grades 10, 11, 12

Adopted 2008

Orientation to Food Science

1.1 Define terms related to food science and food industry

1. Demonstrate knowledge of food science terms using correct context 1.1.1

1.2 Identify usage and care of scientific laboratory equipment

1. Demonstrate usage and care of equipment 1.2.1

1.3 Explain procedures for labs

1. Demonstrate correct use of personal protection equipment and safety 1.3.1
2. Demonstrate first aid procedures for emergencies 1.3.2
3. Submit a correct lab report 1.3.3
4. Apply the steps of the scientific method 1.3.4

1.4 Identify qualities that make up the sensory characteristics of food

1. Take part in sensory evaluation 1.4.1
2. Create a sensory evaluation 1.4.2

1.5 Examine entry-level and higher-level jobs in the food industry

1. Using Internet technology to research careers available in the food industry 1.5.1
2. Discuss the role of food scientist or food technologist in producing a safe and nutritious food supply 1.5.2

Fundamentals of Ionization

2.1 Define terms related to ionization of food substances

1. Demonstrate knowledge of ionization terms using correct context 2.1.1

2.2 Explain the properties of water

1. Illustrate water as a polar molecule 2.2.1
2. Examine the following properties of water: freezing, melting, boiling, condensing, sublimation, and surface tension 2.2.2

2.3 Explain function of water in food preparation

1. Compare solubility of free and bound water 2.3.1
2. Compare free and bound water 2.3.2

2.4 Describe the process of ionization and how it relates to the formation of acids and bases

1. Diagram the process of ionization 2.4.1
2. Explain hydrogen and hydroxide ions 2.4.2

2.5 Explain neutralization

1. Diagram the process of neutralization 2.5.1
2. Demonstrate titration 2.5.2

2.6 Describe the properties of acids and bases

1. Identify the pH of common foods 2.6.1
2. Create a chart of acids and bases using color, taste, and texture 2.6.2

Science of Nutrition

3.1 Define terms related to the science of nutrition

1. Demonstrate knowledge of nutrition terms using correct context 3.1.1

3.2 Describe monosaccharides and disaccharides

1. Display samples of monosaccharides and disaccharides 3.2.1

3.3 Describe the properties of sugar

1. Experiment with the following properties of sugar: sweetness, caramelization, solubility, and crystallization 3.3.1

3.4 Compare structures of amylose and amylopectin

1. Explain the different effects of these two types of molecules on cooking 3.4.1
2. Compare the efforts of thickening agents in food products 3.4.2

3.5 Examine the structure of triglycerides

1. Explain the importance of a carboxyl group to the structure of triglycerides 3.5.1
2. Compare and contrast properties of saturated and unsaturated fats 3.5.2

3.6 Describe the oxidation of fat in foods

1. Analyze ways lipid oxidation can be controlled in food 3.6.1

3.7 Describe the chemical structure of protein

1. Explain what happens during the denaturization of protein 3.7.1
2. Demonstrate factors that affect the stability of egg foam 3.7.2

3.8 Describe ways in which protein is used in food preparation

1. Analyze the affect of acid on protein 3.8.1
2. Examine the use of proteins in emulsions, foams, gels, and gluten 3.8.2

Chemistry of Food

4.1 Define terms related to chemistry of food

1. Demonstrate knowledge of terms using correct context 4.1.1

4.2 Describe how enzyme reactions affect preparation of foods

1. Explain the functions of enzymes as catalysts in chemical reactions 4.2.1
2. Demonstrate enzymatic browning in fruit 4.2.2
3. Explain the following conditions that affect enzyme activity: temperature, pH, and water 4.2.3

4.3 Describe the properties of saturation and solubility in a solution

1. Observe the effect of temperature on solubility of sugar and salt solutions 4.3.1
2. Calculate the concentration of solution, using mass percent 4.3.2

4.4 Identify foams and emulsions

1. Determine the role of foams and emulsions in foods 4.4.1
2. List various food in each type of emulsion 4.4.2
3. Make an emulsion 4.4.3

4.5 Identify function and properties of leavening agents

1. Observe production of carbon dioxide using baking powder 4.5.1
2. Compare different amounts of leavening agents used in cake 4.5.2

4.6 Describe mold, yeast and bacterial fermentation

1. Observe how a variety of environments affect yeast growth 4.6.1
2. Use guest speaker or have students provide samples to illustrate fermentation 4.6.2

Science of Food Processing

5.1 Define terms related to the science of food processing

1. Demonstrate knowledge of terms using correct context 5.1.1

5.2 Identify causes of food spoilage with emphasis on the microorganisms

1. Analyze the growth rate of microorganisms 5.2.1
2. Identify foods susceptible to growth and the spread of foodborne illnesses 5.2.2

5.3 Describe properties of microorganisms that cause foodborne illness and spoilage

1. Compare bacteria populations in meat 5.3.1
2. Discuss personal habits during food preparation/handling that prevent foodborne illness 5.3.2

5.4 Describe the function of the FDA

1. Research the FDA on the Internet 5.4.1

5.5 Identify how additives are regulated

1. Describe the differences between the Delaney Clause and GRAS List 5.5.1

5.6 Identify advantages and disadvantages of using food additives

1. Describe the main function of food additives 5.6.1
2. Explain the differences between natural and artificial additives 5.6.2

5.7 Describe how freezing affects food preservation

1. Compare methods of freezing food 5.7.1
2. Identify types of food that can be successfully freeze dried 5.7.2

5.8 Describe how irradiation preserves food

1. Examine the arguments for and against irradiation of food 5.8.1

5.9 Examine packaging used to contain foods

1. Compare modified atmosphere and aseptic packaging 5.9.1