July 2001

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Food Science Technology
Occupational Area:	Family and Consumer Sciences
	Secondary
Program Numbers	**8500395**
CIP Number	09200.115PA
Grade Level	9-12, 30, 31
Length	1 credit
Certification	VOC HME EC @4 GEN HME EC @4 HOME EC 1 @2
Facility Code	231
CTSO	FCCLA
Coop Method	No
Apprenticeship	No

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this course is to provide a science-based foods and nutrition curriculum. The content should include (but is not limited to):

- Food microbiology labs that use microscopes and other equipment; topics include microorganisms and methods of food preservation.
- Conduct experiments and observations of physical and chemical changes in foods.
- Identify the structures and functions of nutrients; awareness of human physiology, food chemistry labs to include emulsions, mixtures, additives, & other chemical reactions.

II. **LABORATORY ACTIVITIES:** Instruction and learning activities are provided in a laboratory or classroom setting using hands-on experiences related to scientific experiments that have a major emphasis on foods and nutrition. Activities will include, but not limited to, experiments related to food spoilage, mold growth analysis, changes in evaporation, condensation, boiling and freezing experimental modification, toxicology and the role of acids and bases in food production.

III. **SPECIAL NOTE:** Family, Career and Community Leaders of America, is the appropriate career and technical student organization (ctso) for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations, when provided, shall be an integral part of the instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, FAC.

This course may be implemented using the team teaching method between the Family and Consumer Sciences teachers and Science teachers.

IV. **INTENDED OUTCOMES:** After successfully completing this program, the student will be able to:

01.0 Use scientific methods to solve problems, employ metric measurements, and demonstrate safe and effective use of laboratory instruments; write detailed lab reports that record, interpret and evaluate data.
02.0 Identify basic scientific information on elements, compounds, and mixtures; recognize and apply symbols, formulas, and equations that chemists use and describe changes that occur during chemical reactions.
03.0 Contrast the effects of acids and bases on foods during preparation.
04.0 Explain the science and math process skills to qualify and analyze information gained from sensory evaluations.
05.0 Identify and explain the effects of microorganisms on food.
06.0 Compare and contrast the different methods of food preservation.
07.0 Describe the molecular structure and functions of the six basic nutrients.
08.0 Analyze the change in nutrients during food preparation and processing.
09.0 Describe relationships between diet and a healthy body.
10.0 Investigate food science topics and develop experiments; analyze findings and use knowledge previously gained in this course to record, interpret, and evaluate data.
11.0 Recognize how food science interacts with technology and society; explore food science trends and careers.
12.0 Demonstrate leadership and organizational skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Food Science Technology
Secondary Number: 8500395
Postsecondary Number:

01.0 USE SCIENTIFIC METHODS TO SOLVE PROBLEMS, EMPLOY METRIC MEASUREMENTS, AND DEMONSTRATE SAFE AND EFFECTIVE USE OF LABORATORY INSTRUMENTS; WRITE DETAILED LAB REPORTS THAT RECORD, INTERPRET AND EVALUATE DATA--The student will be able to:

LA.A.1.4.1, LA.A.1.4.2, LA.A.1.4.3, LA.A.1.4.4, LA.A.2.4.4, LA.A.2.4.6, LA.A.2.4.7, LA.A.2.4.8, MA.A.1.4.1, MA.A.1.4.2, MA.A.1.4.3, MA.A.1.4.4, MA.A.3.4.1, MA.A.3.4.2, MA.A.3.4.3, MA.A.3.4.4, MA.B.2.4.1, SC.H1.4.1

01.01 Explain the importance of scientific exploration of food.
01.02 Identify and use the basic units of the metric system of measurement.
01.03 Demonstrate effective manipulation of scientific materials and equipment in the Food Science laboratory.
01.04 Practice the expected safety procedures and care while working in the Food Science laboratory.
01.05 Describe and discuss the steps of the scientific methods using math applications.
01.06 Design and write accurate and complete reports of Food Science laboratory experiments including the mathematical and statistical examples for the evaluation of collected data.

02.0 IDENTIFY BASIC SCIENTIFIC INFORMATION ON ELEMENTS, COMPOUNDS, AND MIXTURES; RECOGNIZE AND APPLY SYMBOLS, FORMULAS, AND EQUATIONS THAT CHEMISTS USE; AND DESCRIBE THE PHYSICAL AND CHEMICAL CHANGES THAT OCCUR DURING CHEMICAL REACTIONS--The student will be able to:

LA.A.1.4.1, LA.A.1.4.2, LA.A.1.4.3, LA.1.A.4.4, LA.B.1.4.1, LA.B.1.4.2, LA.B.1.4.3, MA.A.1.4.1, MA.A.1.4.2, MA.A.1.4.3, MA.A.1.4.4, MA.A.3.4.1, MA.A.3.4.2, MA.A.3.4.3, MA.A.3.4.4, MA.D.2.4.1, MA.D.2.4.2, MA.D.2.4.3, MA.D.2.4.4, SC.A.1.4.4, SC.A.2.4.2

02.01 Identify chemical symbols for common elements found in foods.
02.02 Use scientific information to identify, classify, and compare elements, compounds, and mixtures.
02.03 Define and differentiate between chemical and physical changes in food.
02.04 Identify and categorize the forms of energy; recognize the importance of energy in physical and chemical changes.
02.05 Describe and demonstrate methods of energy transfer used in food preparation, such as boiling, freezing, and using microwaves.
02.06 Describe the chemical reactions responsible for some of the changes observed in foods.

03.0 CONTRAST THE EFFECTS OF ACIDS AND BASES ON FOOD DURING PREPARATION--The student will be able to:

LA.A.2.4.1, LA.A.2.4.2, LA.A.2.4.3, LA.A.2.4.4, LA.A.2.4.5, LA.A.2.4.6, LA.A.2.4.7, LA.A.2.4.8, LA.B.2.4.1, LA.B.2.4.2, LA.B.2.4.3, MA.D.1.4.1, MA.D.1.4.2, MA.D.2.4.1, MA.D.2.4.2, MA.E.1.4.1, MA.E.1.4.2, MA.E.1.4.3, SC.F.1.4.1, SC.G.1.4.1

03.01 Differentiate between the properties of acids and bases.
03.02 Calculate the concentration of an acid or base from titration data.
03.03 Identify the importance of acids and bases in food preparation and give examples of each.
03.04 Explain the role acids and bases play in the digestive process.

04.0 EXPLAIN THE SCIENCE AND MATH PROCESS SKILLS TO QUALIFY AND ANALYZE INFORMATION GAINED FROM SENSORY EVALUATIONS--The student will be able to:

LA.A.2.4.1, LA.A.2.4.2, LA.A.2.4.3, LA.A.2.4.4, LA.A.2.4.5, LA.A.2.4.6, LA.A.2.4.7, LA.A.2.4.8, LA.B.2.4.1, LA.B.2.4.2, LA.B.2.4.3, MA.D.2.4.1, MA.D.2.4.1, MA.D.2.4.2, MA.E.1.4.1, MA.E.1.4.2, SC.F.1.4.1, SC.F.1.4.2, SC.G.1.4.1

04.01 Outline characteristics and design a successful sensory evaluation process.
04.02 Describe the components of sensory evaluation experimentation.
04.03 Use science and math process skills to conduct sensory experimentation; quantify and analyze the information to determine which foods appeal to people.

05.0 IDENTIFY AND EXPLAIN THE EFFECTS OF MICROORGANISMS ON FOOD--The student will be able to:

LA.A.2.4.1, LA.A.2.4.2, LA.A.2.4.3, LA.A.2.4.4, LA.A.2.4.5, LA.A.2.4.6, LA.A.2.4.7, LA.A.2.4.8, LA.B.2.4.1, LA.B.2.4.2, LA.B.2.4.3, MA.E.1.4.1, MA.E.1.4.2, SC.F.1.4.1, SC.F.1.4.2, SC.G.1.4.1, SC.G.1.4.2, SC.G.1.4.3

05.01 Compare the beneficial and detrimental effects of microorganisms on food.
05.02 Identify the characteristic of selected microorganisms and related food borne diseases.
05.03 Describe the environmental conditions necessary for the growth of selected microorganisms.
05.04 Explain and demonstrate the cause and effect relationship between using accepted food handling procedures and preventing food borne diseases.
05.05 Conduct and appraise scientific experimentation of the biological magnification of certain classified microorganisms, such as yeast, mold and bacteria.

06.0 COMPARE AND CONTRAST THE DIFFERENT METHODS OF FOOD PRESERVATION--The student will be able to:

LA.A.2.4.1, LA.A.2.4.2, LA.A.2.4.3, LA.A.2.4.4, LA.A.2.4.5, LA.A.2.4.6, LA.A.2.4.7, LA.A.2.4.8, LA.B.2.4.1, LA.B.2.4.2, MA.B.1.4.2, MA.B.1.4.3, SC.G.1.4.2, SC.G.1.4.3

06.01 Describe and give methods of how fermentation is useful in preserving foods.
06.02 Describe and give examples of how chemicals are useful in preserving foods.
06.03 Describe and give examples of temperature-related methods used in preservation of foods.
06.04 Conduct an experiment in fermentation, chemical, or temperature-related method of food preservation.

7.0 DESCRIBE THE MOLECULAR STRUCTURE AND FUNCTIONS OF THE SIX BASIC NUTRIENTS--The student will be able to:

LA.A.2.4.4, LA.A.2.4.6, LA.A.2.4.7, LA.A.2.4.8, MA.C.1.4.1, MA.D.2.4.1, MA.D.2.4.2, SC.A.1.4.3, SC.A.1.4.5

07.01 List the chemical substances that compose food.
07.02 Compare and contrast the properties and functions of the six basic nutrients.
07.03 Write chemical equations using molecular formulas for the reactions that occur involving the six basic nutrients.
07.04 Describe the role of enzymes as catalyst in chemical reactions.
07.05 Draw the molecular structures for the six basic nutrients.

08.0 ANALYZE THE CHANGE IN NUTRIENTS DURING FOOD PREPARATION AND PROCESSING--The student will be able to:

LA.A.1.4.1, LA.A.1.4.2, LA.A.1.4.3, LA.1.A.4.4, LA.A.2.4.1, LA.A.2.4.2, LA.A.2.4.3, LA.A.2.4.4, LA.A.2.4.5, LA.A.2.4.6, LA.A.2.4.7, LA.A.2.4.8, MA.D.2.4.1, MA.D.2.4.2, MA.D.2.4.3, MA.D.2.4.4, SC.A.1.4.3

08.01 Describe the effects of food preparation processing methods on the structure protein.
08.02 Demonstrate the effect of heat, light, and pH on vitamins and mineral stability.
08.03 Conduct experiments to demonstrate the effect of light, air, temperature, water and storage on the quality and stability of fats.
08.04 Explain the effects of temperature, molecular, agitation, preparation methods, and storage on carbohydrates.
08.05 Write chemical equations to illustrate enzymatic reaction in food preparation.
08.06 Describe the methods used to control enzymatic reactions during food preparation and processing.
08.07 Compare and contrast the interrelationships among the six basic nutrients during food preparation.

09.0 DESCRIBE RELATIONSHIPS BETWEEN DIET AND A HEALTHY BODY--The student will be able to:

LA.A.1.4.1, LA.A.1.4.2, LA.A.1.4.3, LA.A.1.4.4, LA.A.2.4.1, LA.A.2.4.2, LA.A.2.4.3, LA.A.2.4.4, LA.A.2.4.5, LA.A.2.4.6, LA.A.2.4.7, LA.A.2.4.8, MA.A.5.4.1, MA.B.1.4.3, MA.B.3.4.1

09.01 Describe the processes used by the body in utilization of the six basic nutrients.
09.02 Define anabolism and catabolism as two opposing processes of metabolism.
09.03 Analyze the relationship between food intake, energy use, and body weight.
09.04 Explain the interrelationship between diet and individual medical conditions.
09.05 Describe the characteristics of a healthy diet.

10.0 INVESTIGATE FOOD SCIENCE TOPICS AND DEVELOP EXPERIMENTS; ANALYZE FINDINGS AND USE KNOWLEDGE PREVIOUSLY GAINED IN THIS COURSE TO RECORD, INTERPRET, AND EVALUATE DATA--The student will be able to:

LA.A.1.4.1, MA.D.2.4.1, MA.D.2.4.2, SC.H.1.4.1

10.01 Demonstrate the methodology associated with acquiring data on a Food Science topic.
10.02 Formulate the hypothesis in the area of Food Science that can be tested by experimentation.
10.03 Design a procedure for a food science experiment and conduct the experiment.
10.04 Record the observations, analyze the results, and compare the findings with the original hypothesis.
10.05 Prepare a report and a poster display of the food science experiment.

11.0 RECOGNIZE HOW FOOD SCIENCE INTERACTS WITH TECHNOLOGY AND SOCIETY; EXPLORE FOOD SCIENCE TRENDS AND CAREERS--The student will be able to:

LA.A.1.4.1, SC.H.3.4.1, SC.H.3.4.2

11.01 Describe how various technological advances in food sciences and nutrition could affect the individual.
11.02 Demonstrate successful problem solving skills in making wise consumer choices and analyzing information from public media.
11.03 Describe career opportunities resulting from science, nutrition, and related technology.

12.0 DEMONSTRATE LEADERSHIP AND ORGANIZATIONAL SKILLS--The student will be able to:

LA.C.1.4.1, LA.C.1.4.2, LA.C.1.4.3, LA.C.1.4.4, MA.A.4.4.1, MA.A.4.4.3, MA.A.4.4.4, MA.E.3.4.1, MA.E.3.4.2, HE.B.3.4.1, HE.B.3.4.2, HE.B.3.4.3, HE.B.3.4.4, HE.B.3.4.5, HE.B.3.4.6, HE.C.1.4.5, HE.C.1.4.6, HE.C.2.4.4, HE.C.2.4.5, HE.C.2.4.6

12.01 Identify professional and youth organizations.
12.02 Identify purposes and functions of professional and youth organizations.
12.03 Identify roles and responsibilities of members of professional and youth organizations.
12.04 Work cooperatively as a group member to achieve organizational goals.
12.05 Demonstrate confidence in leadership roles and organizational responsibilities.
12.06 Demonstrate commitment to achieve organizational goals.