

## GRADE LEVEL

11 – 12

## PERIODS PER WEEK

5 or Block Scheduling

## COURSE LENGTH

1 School Year

## CREDIT(S)

1 (single period format – ½ class for content/ ½ class for application)

2 (double period format – 1 period for content/1 period for application)

### Course Description

This high school course is designed for students to learn the relationships between science, food, and nutrition. Students will explore the characteristics of each component found in food. Experiments done in class will help students understand and analyze how scientific principles are applied to creating nutritious food products. Understanding the relationship between food and science will help students evaluate the health impact of different foods.

Students completing this course will gain specific knowledge and skills for advancement to Food Science II

### Careers in Food Science

- Flavor Chemist
- Food Microbiologist
- Quality Assurance Technician
- Analytical Researcher
- Food Scientist
- Research Dietician
- Product Development Specialist
- Food Packaging Specialist

### Internships/Job Shadow Opportunities in Food Science

- Chr. Hansen
- USDA – Department of Agriculture
- Coca-Cola
- Kraft Food
- Tyson Foods
- Cargill
- Nabisco
- Palermo's Pizza

### Colleges and Universities with Food Science Majors/ Minors/ and Certifications

- University of Wisconsin- Madison
- Purdue University
- University of Illinois – Urbana Champaign
- Cornell University
- University of Maryland – College Park
- University of Florida
- University of California – Davis
- Pennsylvania State University

### Career Development & FFA

- Food Science and Technology
- Milk Quality and Products
- Meats Evaluation and Technology
- World Food Prize Youth Institute
- Public Speaking

## GOALS

- To encourage students to risk mistakes and nurture curiosity.
- To engage students in learning, discovery, and problem solving with innovative creativity.
- To enable students to develop their abilities to analyze, evaluate, and synthesize information to prepare for college and careers.
- To offer students the opportunity to engage hands on in multiple disciplines of food science
- To provide opportunities for students to engage in scientific investigations - both thought provoking and relevant.
- To engender an awareness of open-minded evaluation of different opinions.

## OBJECTIVES

- Students will be able to demonstrate both an understanding of, and ability to apply:
  - Scientific facts and concepts
  - Investigative methods and techniques
- Students will be able to demonstrate an ability to construct, analyze, and evaluate:
  - Hypotheses, research questions, and predictions
  - Investigative strategies and techniques to collect authentic data
  - Present research findings to peers

## TOPICS OF INSTRUCTION

### **Food Science: An Old but New Subject**

- What is Food Science?
- Recent Contributions of Food Scientist
- Why study food Science

### **Scientific Evaluation: Being Objective**

- Science in the Food Industry
- Measurement & Scientific Method

### **Sensory Evaluation: The Human Factor**

- Influences on Food Likes & Dislikes
- Sensory Characteristics of Food Products
- Taste Test Panels

### **Basic Food Chemistry: The Nature of Matter**

- The Basic Nature of Matter
- Chemical Bonding
- The Classification of Matter
- Physical and Chemical Change

### **Energy: Matter in Motion**

- Potential and Kinetic Energy
- Forms of Energy
- Measuring Energy
- How Heat is Transferred
- Factors that Affect Rates of Reaction in Food Preparation

### **Ions: Charged Particles in Solution**

- Defining Acids and Bases
- Measuring Acids and Bases
- Application of pH

### **Water: The Universal Solvent**

- The Structure of Water
- Functions of Water in Food Preparation
- Water Content in Foods
- Functions of Water in the Body

### **Sugar: The Simplest of Carbohydrates**

- Carbohydrate Production
- Sources of Sugar
- Functions of Sugars in Food Preparation
- The Nutritional Value of Sugars

### **The Complex Carbohydrates: Starches, Cellulose, Gums, and Pectin**

- Types of Complex Carbohydrates
- Functions of Complex Carbohydrates in Food Preparation

Disclaimer: This course syllabus has been adapted from various educational curriculum medium.

All content has been reformatted selected and approved for instructional purposes by n-gAged Learning, LLC consultants.

- Physical Properties of Starch and Mixtures
- Thickening Sauces with Starch
- Nutritional Impact of Complex Carbohydrates

#### **Lipids: Nature's Flavor Enhancers**

- Chemical Structures of Lipids
- Categories of Lipids
- Physical Characteristics of Lipids
- Functions of Lipids in Food Preparation
- Lipid in Your Diet

#### **Proteins: Amino Acids and Peptides**

- The Structures of Protein
- Denaturation of Proteins
- Function of Protein in Foods
- The Nutritional Contributions of Protein

#### **Enzymes: The Protein Catalyst**

- Enzymes are Specialized Catalysts
- Factors that Affect Enzyme Activities
- Enzymes and the Food Supply

### **INSTRUCTIONAL METHODS**

- Specialized Learning
  - Differentiated Learning
  - Cooperative Learning
  - Scientific Inquiry Based Learning
  - Experiential Learning
- Project Based Learning Activities
  - Honey Processing
  - Vegetable/Fruit processing
  - Product Development Exercises
  - Quality Assurance & HACCP programs for classroom production
  - Nutritional Evaluation/Planning of diets
  - Cooperative Conflict
  - Journal Readings
  - Field Trips
  - Resource Speakers
- Cross-Curricula Learning Activities
  - Thanksgiving Dinner
  - Candy Bar Development, Marketing, Production, and Packaging
  - Farmstand/Flower & Garden/Farmer's market sales
  - World Food Prize
  - Hunger Banquet
  - Food Related Science Fair Projects

#### **Supplemental Material**

- The Science of Cooking: Every Question Answered to Perfect Your Cooking  
Stuart Farrimond (*Author*)
- What I Eat: Around the World in 80 Diets  
Faith D'Aluisio and Peter Menzel (*Authors*)
- The Spice Diet  
Chef Judson Allen (*Author*)
- Principles of Food Science, *4th Edition*  
Janet D. Ward and Larry Ward (*Authors*)
- ThinkCERCA  
Personalized computer literacy curriculum and platform empowers teachers to grow students' critical thinking skills, while increasing literacy.

- <https://www.teachingchannel.org/videos/differentiating-instruction>
- Differentiating Learning – Differentiating the Process PP - Pepper Skodack
- World Food Prize Youth Institute – Global Challenge