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

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

Disclaimer: This course syllabus has been adapted from various educational curriculum medium.
All content has been reformatted selected and approved for instructional purposed by n-gAGed Learning, LLC consultants.
• https://www.teachingchannel.org/videos/differentiating-instruction
• Differentiating Learning – Differentiating the Process PP - Pepper Skodack
• World Food Prize Youth Institute – Global Challenge