

Wallenpaupack Area School District Planned Course Curriculum Guide

HIGH SCHOOL SCIENCE

Food Chemistry

Course Description:

Food chemistry is a course designed for any student to take in lieu of a traditional chemistry course but is geared for those students interested in the culinary pathway. Students will learn about mathematical techniques that are important in both the kitchen and the lab, chemicals in food, physical and chemical changes (particularly the Maillard reaction), water, the states of matter, the essential macromolecules necessary for a proper diet, and microwaves. Food chemistry is heavily hands-on and emphasizes proper lab techniques and behavior for the duration of the course.

Revision Date:2022, Snyder

Wallenpaupack Area School District Curriculum	
COURSE: Food Chemistry	GRADE/S: 10-12
UNIT 1: Lab Safety	TIME FRAME: 6-7 Blocks

PA COMMON CORE/NATIONAL STANDARDS:

UNIT OBJECTIVES (SWBATS):
 By the conclusion of this unit, students should:

- Know the location and proper usage of all laboratory safety equipment.
- Be able to identify and know how to use laboratory glassware and equipment.
- Know how to conduct themselves responsibly in a chemistry lab.
- Know how to dress appropriately when conducting an experiment.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Complete all sections of the “Laboratory Procedures” packet
- Review the “What Not to Wear in the Chemistry Lab” PowerPoint
- Watch the Lab Safety Video

ANCHOR VOCABULARY:

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- “What Not to Do in the Chemistry Lab” Assignment
- Lab Safety Poster

EVIDENCE OF MASTERY/Cut Score (Keystone Exam):

DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

- [Lab Safety Video](#)

RESOURCE SPECIFIC VOCABULARY:

Wallenpaupack Area School District Curriculum	
COURSE: Food Chemistry	GRADE/S: 10-12
UNIT 2: Kitchen Math	TIME FRAME:

PA COMMON CORE/NATIONAL STANDARDS:

UNIT OBJECTIVES (SWBATS):
 By the conclusion of this unit, students should:

- Be able to convert numbers into scientific notation and back to standard notation.
- Understand significant figures and be able to adhere to significant figure rules in calculations and while measuring.
- Evaluate the density of substances and perform calculations with density.
- Use dimensional analysis and conversion factors to convert between two units.
- Understand the difference between accuracy and precision and be able to apply each to experimental data.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Watch the video titled “Do You Even Science?”, take notes on the supplemental worksheet, and complete the “Scientific Notation” WS
- Watch the video titled “What’s the Significance?”, take notes on the supplemental worksheet, and complete the “Introduction to Significant Figures” WS
- Complete the Significant Figures stations activity
- Actively participate in the Calculations with Significant Figures whiteboard activity
- Watch the video titled “The Case of the Sunken Ice Cube”, take notes on the supplemental worksheet, and complete the “Density” WS
- Complete the lab titled “How Sweet It Is!”
- Watch the video titled “Calculations in the Kitchen”, take notes on the supplemental worksheet, and complete the “Dimensional Analysis” WS
- Complete the “Introduction to Dimensional Analysis Online Activity”
- Complete the “Dimensional Analysis Partner Activity”
- Participate in the Nutrition Labels Activity and complete the supplemental worksheet
- Complete the lab titled “Water, Water Everywhere”
- Watch the video titled “Accurate, Precise, Both, or Neither?” take notes on the supplemental worksheet, and complete the “Accuracy and Precision” WS

ANCHOR VOCABULARY:

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- Significant Figures Poster Project
- Read the article titled “New Math: Zero ≠ 0” and write a 10% summary
- How Sweet It Is! Lab
- A Flapjack of a Problem Worksheet
- Diabolically Delicious Project
- Accuracy of Home Measures Lab

EVIDENCE OF MASTERY/Cut Score (Keystone Exam):

DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

RESOURCE SPECIFIC VOCABULARY:

Wallenpaupack Area School District Curriculum	
COURSE: Food Chemistry	GRADE/S: 10-12
UNIT 3: Chemicals in Food	TIME FRAME:

PA COMMON CORE/NATIONAL STANDARDS:

UNIT OBJECTIVES (SWBATS):
 By the conclusion of this unit, students should:

- Be able to differentiate between major elements, essential trace elements, toxic trace elements, and chemical food preservation elements in food and be able to identify elements in each category.
- Be able to differentiate between elements, compounds, and mixtures.
- Understand the phrase “the dose makes the poison”.
- Identify food additives and understand their importance in the American diet.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Watch the video titled “The Periodic Table Does the Body Good” take notes on the supplemental worksheet, and complete the “Chemical Elements in Food” WS
- Watch the video titled “What’s the Matter?” take notes on the supplemental worksheet, and complete the “Types of Matter” WS
- Read the article titled “An Ingredients Label for the Mango”; research one ingredient and make a small poster to share with the class
- Complete the lab titled “Milk and Its Sticky Stepchild”
- Watch the video titled “5 Chemicals That Are In (Almost) Everything You Eat”
- Watch the video titled “The Sweet and Low-Down on Sweeteners”, annotating the video online and sharing the information in a section of the video with the class
- Complete the labs titled “Food Additives”, “Improving Upon Nature”, and “Doesn’t That Look Delicious?”

ANCHOR VOCABULARY:

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- Pre and post assessment to evaluate student growth
- Research the chemical elements found in food and create a class mural.
- Read the article titled “The Story of Saccharin” and write a 10% summary
- Read the article titled “Perchance to Enhance: What is MSG and Does It Really Enhance Flavors?” and write a 10% summary

EVIDENCE OF MASTERY/Cut Score (Keystone Exam):

DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

- [5 Chemicals That Are In \(Almost\) Everything You Eat](#) YouTube Video
- [The Sweet and Low-Down on Sweeteners](#) YouTube Video

RESOURCE SPECIFIC VOCABULARY:

Wallenpaupack Area School District Curriculum	
COURSE: Food Chemistry	GRADE/S: 10-12
UNIT 4: To Cook or Not To Cook	TIME FRAME:

PA COMMON CORE/NATIONAL STANDARDS:

UNIT OBJECTIVES (SWBATS):
 By the conclusion of this unit, students should:

- Be able to differentiate between physical and chemical changes.
- Explain the importance of the Maillard Reaction in preparing cooked food.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Watch the video titled “To Cook or Not to Cook”, take notes on the supplemental worksheet, and complete the “Physical and Chemical Changes” WS
- Complete the lab titled “Are We Cooking?!”
- Complete the lab titled “I Can’t Believe It IS Butter!”
- Complete the lab titled “Cheese, Please!”
- Watch the YouTube Video titled “The Chemistry of Cookies” and complete the lab titled “Smelling the Maillard Reaction”
- Read an excerpt from the book titled “Culinary Reactions” and participate in the Jigsaw activity
- Watch the YouTube Video titled “Why the Maillard Reaction Makes Everything Taste So Delicious”
- Complete the lab titled “Secret Marshmallow Message”

ANCHOR VOCABULARY:

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

EVIDENCE OF MASTERY/Cut Score (Keystone Exam):

- “Chemicals in Ice Cream” Lab
- Make Your Own Maillard Reaction Project
- Read the article titled “Two Kinds of Browning” and write a 10% summary
- Hilly’s Pumpkin Caramel Pie Assessment

DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

- [The Chemistry of Cookies](#) YouTube Video
- [Why The Maillard Reaction Makes Everything Delicious](#) YouTube Video

RESOURCE SPECIFIC VOCABULARY:

Wallenpaupack Area School District Curriculum	
COURSE: Food Chemistry	GRADE/S: 10-12
UNIT 5: The Wonders of Water	TIME FRAME:

PA COMMON CORE/NATIONAL STANDARDS:

UNIT OBJECTIVES (SWBATS):
 By the conclusion of this unit, students should:

- Identify properties of water that make it unique relative to other molecules.
- Understand that the temperature of a substance is a measure of its kinetic energy, or how fast its particles move.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Complete the lab titled “What Makes Water So Special?”
- Watch the YouTube video titled “Why Does Ice Float in Water?”
- Complete the lab titled “Energy Changes of Water”
- Watch the video titled “The Wonders of Water”, take notes on the supplemental worksheet, and complete the “The Exceptional Properties of Water” WS
- Watch the video titled “How to Sous-Vide Steak” and complete the supplemental worksheet

ANCHOR VOCABULARY:

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- Pre and post assessment to evaluate student growth
- Read the article titled “A Tight Squeeze” and write a 10% summary
- Read the article titled “How Now, Brown Cowburger” and write a 10% summary

EVIDENCE OF MASTERY/Cut Score (Keystone Exam):

DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

- [Why Does Ice Float in Water?](#) YouTube Video
- [How to Sous-Vide Steak](#) YouTube Video

RESOURCE SPECIFIC VOCABULARY:

Wallenpaupack Area School District Curriculum	
COURSE: Food Chemistry	GRADE/S: 10-12
UNIT 6: The Nose Knows – States of Matter	TIME FRAME:

PA COMMON CORE/NATIONAL STANDARDS:

UNIT OBJECTIVES (SWBATS):
 By the conclusion of this unit, students should:

- Identify properties of gases that make them helpful in the kitchen.
- Understand why certain foods have a distinct smell and what makes them smell.
- Be able to identify kitchen solids upon performing a qualitative analysis.
- Understand the difference between baking soda and baking powder.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Complete the lab titled “Observations on Popcorn”
- Watch the video titled “Passing Gas in the Kitchen”, take notes on the supplemental worksheet, and complete the “Gases in the Kitchen” WS
- Complete the lab titled “The Secret to Easy Peel Eggs”
- Complete the lab titled “The Effect of Temperature on The Acidity of Soda”
- Research a compound that makes a characteristic food smell and create a small poster.
- Complete the lab titled “Kitchen Solids”.
- Complete the lab titled “Are Gummy Bears Solid?”

ANCHOR VOCABULARY:

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- Read the article titled “John Dalton and William Henry Explain Why Soft Drinks Go Flat” and write a 10% summary
- Read the article titled “Does Aluminum Cause “What’s-His-Face Disease?” and write a 10% summary
- Explain how baking soda and/or baking powder help create a delicious treat of your choosing.

EVIDENCE OF MASTERY/Cut Score (Keystone Exam):

DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

- [Good Eats: Baking Soda vs. Baking Powder](#) YouTube Video
- [What's the Difference Between Baking Soda and Baking Powder?](#) YouTube Video

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COURSE: Food Chemistry	GRADE/S: 10-12
UNIT 7:	TIME FRAME:

PA COMMON CORE/NATIONAL STANDARDS:

UNIT OBJECTIVES (SWBATS):
 By the conclusion of this unit, students should:

- Understand how nutritional labels are organized.
- Identify past and present food guides and understand why dietary guidance has changed over time.
- Differentiate between carbohydrates, proteins, and fats and their importance in the American diet.
- Use data to evaluate snack foods and rank them based on “health”.
- Summarize how food Calories are experimentally determined.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Complete the What’s On The Label? Activity
- Participate in the Introduction to Food Guides Activity
- Read the article titled “Your Body’s Need for Food” and fill in the supplemental graphic organizer
- Complete the lab titled “Introduction to Carbohydrates”
- Complete the lab titled “Carbohydrates on the Rise”
- Complete the lab titled “Testing for Proteins and Nucleic Acids”
- Complete the lab titled “Understanding Lactose Intolerance”
- Complete the lab titled “All Fats are Not Created Equal”
- Complete the lab titled “Hot Diggity Dog”
- Watch the video titled “Cheeseburger in Hydrochloric Acid”
- Participate in the Visualizing Digestion Activity
- Complete the lab titled “Counting Calories in Snack Foods”

ANCHOR VOCABULARY:

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- Pre and Post Learning (Food Guides) – Monitoring Conceptual Change
- Read the articles titled “Health Foods and Junk Foods” and “You Can’t Tell a Book by Its Cover, but the Side of a Cereal Box Reveals a Lot About its Contents” and write a 10% summary.
- Health Food or Junk Food? – Ranking Foods and Defending Choice
- Read the article titled “Fill ‘Er Up” and write a 10% summary

EVIDENCE OF MASTERY/Cut Score (Keystone Exam):

DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

- [Boost Your Iron Absorption with This Tip!](#) YouTube Video
- [Factors that Affect Iron Absorption](#) YouTube Video
- [What is a Calorie?](#) YouTube Video
- [Cheeseburger in Hydrochloric Acid](#) YouTube Video

RESOURCE SPECIFIC VOCABULARY:

Wallenpaupack Area School District Curriculum	
COURSE: Food Chemistry	GRADE/S: 10-12
UNIT 8: Those Mysterious Microwaves	TIME FRAME:

PA COMMON CORE/NATIONAL STANDARDS:

UNIT OBJECTIVES (SWBATS):
 By the conclusion of this unit, students should:

- Understand the electromagnetic spectrum.
- Explain why microwaves are a minuscule source of radiation.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Read and debunk the article titled “Why It’s Time to Throw Out Your Microwave”
- Watch the video titled “There’s No Escaping Radiation” and take notes on the supplemental worksheet
- Listen to the Electromagnetic Spectrum Song
- Complete the Electromagnetic Spectrum Jigsaw Activity
- Measuring the Wavelength of Microwave Radiation Activity

ANCHOR VOCABULARY:

ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

- Point & Click Games
- Write a 1-2 page essay on the facts presented to refute the “Why It’s Time to Throw Out Your Microwave” article.

EVIDENCE OF MASTERY/Cut Score (Keystone Exam):

DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

- [Electromagnetic Spectrum Song](#)
- [Parts of the Electromagnetic Spectrum Point & Click Game](#)
- [Characteristics of the Electromagnetic Spectrum Point & Click Game](#)

RESOURCE SPECIFIC VOCABULARY: