



Statewide Framework Document for: 190504

Standards may be added to this document prior to submission, but may not be removed from the framework to meet state credit equivalency requirements. Performance assessments may be developed at the local level. In order to earn state approval, performance assessments must be submitted within this framework. **This course is eligible for 1 credit of laboratory science.** The Washington State Science Standards performance expectations for high school blend core ideas (Disciplinary Core Ideas, or DCIs) with scientific and engineering practices (SEPs) and crosscutting concepts (CCCs) to support students in developing usable knowledge that can be applied across the science disciplines. These courses are to be taught in a [three-dimensional manner](#). The details about each performance expectation can be found at [Next Generation Science Standards](#), and the supporting evidence statements can be found under [Resources](#).

Food Science, Dietetics, and Nutrition

Course Title: Food Science, Dietetics, and Nutrition		Total Framework Hours: 180
CIP Code: 190504	<input checked="" type="checkbox"/> Exploratory <input type="checkbox"/> Preparatory	Date Last Modified: May 4, 2015
Career Cluster: Health Science		Cluster Pathway: Therapeutic Services
Eligible for Equivalent Credit in: <input type="checkbox"/> Math <input checked="" type="checkbox"/> Science		Total Number of Units: 6

Course Overview

Summary:

The food science industry is the largest industry in the United States with many job opportunities from the farm to the table. In Food Science, Dietetics, and Nutrition, students learn the knowledge, skills, and practices required for careers in food science, dietetics, and nutrition. The course focuses on the relationship between food consumption, health, and human development. Instruction includes risk management procedures, nutritional therapy, technology in food production, and diet and nutritional analysis and planning. Science is integrated throughout the course in such experiments as the caramelization of sugars and starches, the production and growth of yeast, or the effects of temperature on chocolate. Students may study such topics as the effects of antioxidants on humans, the shelf life of food products, and the positive and negative effects of bacteria on food.

During this course, students will work in teams to prepare and conduct food experiments. They will then predict, interpret, and evaluate food laboratory results. Throughout the course, students will discover exciting careers in the food science industry. This framework is based on the National Family & Consumer Sciences (FACS) industry standards and is aligned with the Washington State Science Standards.

Resources for this course include:

- Principles of Food Science textbook (requested new text for 2014)

- Washington State Department of Health (www.doh.wa.gov)
- *The 12 Most Unwanted Bacteria* assignment
- Family & Consumer Sciences National Standards
- Family Career and Community Leaders of America (FCCLA)

Unit 1: Food Safety and Sanitation	Total Learning Hours for Unit: 15
<p>Unit Summary: In this unit, students will:</p> <ul style="list-style-type: none"> • Identify food industry sanitation procedures. • Assess the safety of food preparation methods. • Examine factors that contribute to maintaining safe and healthy work and community environments. • Explain how the Food Handler’s Card is obtainable through the Health Department. • Describe types of food contamination. • Identify types, sources and symptoms of food borne illnesses. • Explain the role of various government agencies that keep the food supply safe. • Use correct food handling, sanitation, and storage procedures. 	
<p>Performance Assessments: <i>Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.</i></p> <p><i>It is expected that students will:</i></p> <ul style="list-style-type: none"> • Complete the <i>12 Most Unwanted Bacteria</i> assignment researching the 12 most common food contaminants. • Study the document <i>Food Safety is Everybody’s Business</i> from http://www.doh.wa.gov/ • Complete the <i>Bacteria in Milk</i> lab. • Perform controlled lab experiments to demonstrate and learn about food safety, handling, and sanitation requirements, government and food safety. • Use STAR Events: <ul style="list-style-type: none"> • Culinary Knife Skills, an individual event, will showcase the best of participants’ knife skills. Participants will produce six uniform pieces for each knife cut meeting industry standards and demonstrate proper safety and sanitation procedures. • Evaluate various food labels for language and deceptive information for the consumer. • Read, study and prepare for the Food Handlers Permit exam. • Perform a simulation of contamination using glo-germ kit or another method. • Complete various assignments regarding the food insecure population and humane treatment of animals on our planet. 	
<p>Leadership Alignment:</p> <ul style="list-style-type: none"> • Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students. • The event, activity, or project and the associated 21st Century Skill should be clearly articulated. Example: Students will demonstrate the ability to communicate clearly through their group project presentation. <p>Students evaluate various food labels for label language and deceptive information for the consumer. Students complete various assignments regarding the food insecure population and humane treatment of animals on our planet. Students may also demonstrate 21st Century Skills while participating in a FCCLA project, <i>Foods and Nutrition</i>, or the knife skills demonstration.</p>	

Industry Standards and Competencies

National Standards for Family and Consumer Sciences Education - Food Science, Dietetics, and Nutrition:

- 9.1 Content Standard: Analyze career paths within food science, food technology, dietetics, and nutrition industries.
 - 9.1.1 Explain the roles and functions of individuals engaged in food science, food technology, dietetics, and nutrition careers.
 - 9.1.2 Analyze opportunities for employment and entrepreneurial endeavors.
 - 9.1.3 Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition.
 - 9.1.4 Analyze the impact of food science, dietetics, and nutrition occupations on local, state, national, and global economies.
 - 9.1.6 Analyze the role of professional organizations in food science, food technology, dietetics, and nutrition careers.
- 9.2 Apply risk management procedures to food safety, food testing, and sanitation.
 - 9.2.1 Analyze factors that contribute to food borne illness.
 - 9.2.2 Analyze food service management safety and sanitation programs.
 - 9.2.3 Implement industry standards for documenting, investigating, and reporting food born illnesses.
 - 9.2.4 Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes to minimize the risks of food borne illness.
 - 9.2.5 Demonstrate practices and procedures that assure personal and workplace health and hygiene.
 - 9.2.6 Demonstrate standard procedures for receipt and storage of raw and prepared foods.
 - 9.2.9 Demonstrate waste disposal and recycling methods.
- 9.3 Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
 - 9.3.2 Analyze nutritional data.
- 9.5 Demonstrate use of current technology in food product development and marketing.
 - 9.5.7 Conduct testing for safety of food products, utilizing available technology.
- 9.6 Demonstrate food science, dietetics, and nutrition management principles and practices.
 - 9.6.9 Use Food Code Points of time, temperature, date markings, cross contamination, hand washing, and personal hygiene as criteria for safe food preparation.

Aligned Washington State Standards

Washington Science Standards (Next Generation Science Standards):

- HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
- HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Additional Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs):

The local district must list one or more projects to be completed in this unit that will cumulatively address all of the following additional SEPs, DCIs, and CCCs.

Specific Project Title(s): MUST BE ADDED AT LOCAL LEVEL

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept
Asking Questions and Defining Problems	LS1B: Growth and Development of Organisms	Cause and Effect

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 9-10):

Reading

- RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
- RST.9-10.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
- RST.9-10.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
- RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
- RST.9-10.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

Writing

- WHST.9-10.1 Write arguments focused on discipline-specific content.
- WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
- WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
- WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

Washington English Language Arts Standards (Common Core State Standards) - Speaking and Listening (Grade 9-10):

- SL.9-10.1a Come to discussions prepared having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.
- SL.9-10.1c Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.

Unit 2: What is Food Science?**Total Learning Hours for Unit: 15****Unit Summary:**

In this unit, students will:

- Trace the development of the scientific study of food.
- Describe areas included in the field of food science.
- Identify different types of work that food scientists do.
- Describe personal benefits of studying topics in food science.
- Explain the continued role of food science in preserving the environment.
- Explain contributions of food science to nutrition and food safety.
- Relate food science to social change and technological advances.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

It is expected that students will:

- Participate in a garden burger demonstration and analysis.
- Explore the impact of food sciences on the economy (sustainability).
- Create informative posters about nutrition for a health fair.
- Complete and organize individual research projects on the Food Insecure and Hungry Planet.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

Students create a PowerPoint presentation to reflect on and critique information observed in *Forks Over Knives* documentary film. Students research Jamie Oliver's Food Revolution website. Using the WA Department of Agriculture website, students evaluate humane and/or inhumane treatment of livestock designated for human consumption. Alternatively, students may demonstrate 21st Century Skills through an FCCLA Activity such as *Illustrated Talk* or *Environmental Ambassador*.

Industry Standards and Competencies**National Standards for Family and Consumer Sciences Education - Food Science, Dietetics, and Nutrition:**

- 9.1 Content Standard: Analyze career paths within food science, food technology, dietetics, and nutrition industries.
- 9.1.1 Explain the roles and functions of individuals engaged in food science, food technology, dietetics, and nutrition careers.
 - 9.1.2 Analyze opportunities for employment and entrepreneurial endeavors.
 - 9.1.3 Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition.
 - 9.1.4 Analyze the impact of food science, dietetics, and nutrition occupations on local, state, national, and global economies.
 - 9.1.6 Analyze the role of professional organizations in food science, food technology, dietetics, and nutrition careers.
- 9.2 Apply risk management procedures to food safety, food testing, and sanitation.
- 9.2.2 Analyze food service management safety and sanitation programs.
 - 9.2.3 Implement industry standards for documenting, investigating, and reporting food born illnesses.
 - 9.2.4 Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes to minimize the risks of food borne illness.

- 9.2.5 Demonstrate practices and procedures that assure personal and workplace health and hygiene.
- 9.2.6 Demonstrate standard procedures for receipt and storage of raw and prepared foods.
- 9.2.9 Demonstrate waste disposal and recycling methods.
- 9.3 Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
 - 9.3.2 Analyze nutritional data.
- 9.5 Demonstrate use of current technology in food product development and marketing.
 - 9.5.7 Conduct testing for safety of food products, utilizing available technology.

Aligned Washington State Standards

Washington Science Standards (Next Generation Science Standards):

- HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
- HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.
- HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
- HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
- HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
- HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 9-10):

Reading

- RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- RST.9-10.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
- RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
- RST.9-10.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
- RST.9-10.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

Writing

- WHST.9-10.1 Write arguments focused on discipline-specific content.
- WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
- WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of

technology's capacity to link to other information and to display information flexibly and dynamically.

WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

Washington English Language Arts Standards (Common Core State Standards) - Speaking and Listening (Grade 9-10):

SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Unit 3: Equipment Identification, Culinary Fundamentals & Lab Procedures

Total Learning Hours for Unit: 45

Unit Summary:

In this unit, students will:

- Choose laboratory equipment that is suited for specific tasks.
- Demonstrate proper use and maintenance of laboratory equipment while using proper safety techniques.
- Demonstrate how to make accurate and precise laboratory measurements.
- Distinguish between metric units of length, mass, and volume and the prefixes used with them.
- Describe in order the steps in a scientific method.
- Explain the role of reasoning skills in forming a hypothesis.
- Identify variables in a food science experiment and explain how they may affect the results.
- Demonstrate completing a data table and report form for a food science experiment.
- Distinguish between a hypothesis and a scientific theory.
- Suggest guidelines for doing a food science research project.
- Compare temperatures on the Celsius and Fahrenheit temperature scales.
- Demonstrate techniques for measuring length, volume, mass and temperature. Explain the role of sensory evaluation in the food industry.
- Explain the relationship between sensory characteristics and nutrition.
- Explain how various influences affect food choices.
- Demonstrate the ability to plan and evaluate labs based on the analysis of ingredients, meal patterns, purchasing/cost calculations, the safe use of equipment, proper ingredient handling, cleanliness, and established work procedures.
- Verify standards for food/product quality.
- Prepare food for presentation and assessment.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

It is expected that students will:

- Complete the *Thermometer Labs*.
- Complete the *Metric Snickerdoodles Lab*.
- Participate in various teacher-directed labs.
- Explore *Science in the Foods Lab* - Page 153 Colonel Popcorn or Text Lab Manual Experiment 5.1.
- FCCLA Planning Process, Food Production STAR Events guidelines, Leaders at Work: Interpersonal Relationships and Management units:
Students will work together in teams, to plan, select, manage, and carry out food/lab experiments and production using nutrition and science. Work practices will reflect knowledge of a workstation, performance of lab experiments using scientific methods and procedures, statistical measurement, sensory food analysis, and lab equipment (calibration and safe use). Students will consistently follow standards in safety and sanitation, in preparation, in the use of equipment and facilities, and in chemical and nutritional food analysis.
- Create a data table for use with experiments (page 45 Lab Manual).
- Create a PowerPoint presentation, reflecting on and critiquing information observed in the *Forks over Knives* documentary film.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

Students apply technology effectively while creating a PowerPoint to reflect on and critique information observed in the *Forks Over Knives* documentary film. Alternatively, students may demonstrate 21st Century Skills through an FCCLA Activity such as *Culinary Arts*.

Industry Standards and Competencies

National Standards for Family and Consumer Sciences Education - Food Science, Dietetics, and Nutrition:

- 9.1 Content Standard: Analyze career paths within food science, food technology, dietetics, and nutrition industries.
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 - 9.1.2 Analyze opportunities for employment and entrepreneurial endeavors.
 - 9.1.3 Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition.
 - 9.1.4 Analyze the impact of food science, dietetics, and nutrition occupations on local, state, national, and global economies.
 - 9.1.6 Analyze the role of professional organizations in food science, food technology, dietetics, and nutrition careers.
- 9.2 Apply risk management procedures to food safety, food testing, and sanitation.
- 9.2.1 Analyze factors that contribute to food borne illness.
 - 9.2.2 Analyze food service management safety and sanitation programs.
 - 9.2.3 Implement industry standards for documenting, investigating, and reporting food born illnesses.
 - 9.2.4 Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes to minimize the risks of food borne illness.
 - 9.2.5 Demonstrate practices and procedures that assure personal and workplace health and hygiene.
 - 9.2.6 Demonstrate standard procedures for receipt and storage of raw and prepared foods.
 - 9.2.8 Use Occupational Safety and Health Administration's (OSHA) Right to Know Law and Material Safety Data Sheets (MSDS) and explain their requirements in handling hazardous materials.
 - 9.2.9 Demonstrate waste disposal and recycling methods.

- 9.3 Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
 - 9.3.2 Analyze nutritional data.
 - 9.3.3 Apply principles of food production to maximize nutrient retention in prepared foods.
 - 9.3.5 Analyze recipe/formula proportions and modifications for food production.
 - 9.3.6 Critique the selection of foods to promote a healthy lifestyle.
- 9.5 Demonstrate use of current technology in food product development and marketing.
 - 9.5.3 Prepare food for presentation and assessment.
 - 9.5.4 Maintain test kitchen/ laboratory and related equipment and supplies.
 - 9.5.7 Conduct testing for safety of food products, utilizing available technology.
- 9.6 Demonstrate food science, dietetics, and nutrition management principles and practices.
 - 9.6.1 Build menus to customer/client preferences.
 - 9.6.2 Implement food preparation, production, and testing systems.
 - 9.6.3 Apply standards for food quality.
- 9.6 Demonstrate food science, dietetics, and nutrition management principles and practices.
 - 9.6.5 Manage amounts of food to meet needs of customers, clients.
 - 9.6.7 Implement procedures that provide cost effective products.
 - 9.6.8 Establish par levels for the purchase of supplies based on an organization's needs.
 - 9.6.9 Use Food Code Points of time, temperature, date markings, cross contamination, hand washing, and personal hygiene as criteria for safe food preparation.

Aligned Washington State Standards

Washington Science Standards (Next Generation Science Standards):

- HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
- HS-PS1-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
- HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
- HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
- HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.
- HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.
- HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).
- HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.
- HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
- HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
- HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 9-10):

Reading

- RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
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- RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
- RST.9-10.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
- RST.9-10.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
- RST.9-10.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

Writing

- WHST.9-10.1 Write arguments focused on discipline-specific content.
- WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
- WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
- WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

Washington English Language Arts Standards (Common Core State Standards) - Speaking and Listening (Grade 9-10):

- SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
- SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
- SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.
- SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Unit Summary:

In this unit, students will:

- Explain the difference between physical and chemical properties.
- Distinguish between pure substances and mixtures.
- Explain the relationship between elements and compounds.
- Compare heterogeneous and homogeneous mixtures.
- Identify chemical symbols and formulas.
- Compare chemical reactions to physical changes.
- Explain how ionic and covalent bonds are formed.
- Identify the parts of chemical equations.
- Distinguish between reversible and irreversible reactions and changes.
- Relate water's composition and structure to its properties.
- Compare bonds in water.
- Explain the functions of heat of fusion and heat of vaporization.
- Explain the effect of air pressure changes on boiling point.
- Explain sublimation and surface tension.
- Explain the functions of water in food preparation.
- Describe hard and soft water.
- Describe how the body uses water.
- Relate the process of ionization to the formation of acids and bases.
- Explain qualities of acids and bases.
- Compare the acidity of substances, using the pH scale and pH indicators.
- Contrast the concepts of strength and concentration in acids and bases.
- Compare general qualities of acids and bases in foods.
- Compare units of heat measure.
- Describe the relationship between molecular motion and temperature.
- Compare processes of heat transfer.
- Identify the factors that have an effect on chemical reaction rates in food.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

It is expected that students will:

- Create their own experiment from one of the following topics: lipids, carbohydrates, colloidal dispersions, enzymes, protein, or the biochemistry of milk.
- Complete various Food Science Lab experiments assessing the competencies.
- Participate in FCCLA Stars events: Food Innovations (Students create a prototype formula and test it through focus groups. Students also develop a marketing strategy.)
- Create a nutritious meal plan for a competitive athlete.
- Practice experimental plant-based recipes in their test kitchens.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

Students complete the Feeding America Project in which students study food insecurities in our nation and present information about national food banks. Students collaborate in groups to recognize our growing population and reflect on its demand for a greater food supply. Students research careers and present their food science career to the class. Students will create a PowerPoint presentation on careers within food science. Students discuss the role of a food scientist such as the Church & Dwight Food Scientist in charge of gummy vitamins. Alternatively, students may demonstrate 21st Century Skills through an FCCLA activity such as *Sports Nutrition*.

Industry Standards and Competencies**National Standards for Family and Consumer Sciences Education - Food Science, Dietetics, and Nutrition:**

- 9.1 Content Standard: Analyze career paths within food science, food technology, dietetics, and nutrition industries.
- 9.1.1 Explain the roles and functions of individuals engaged in food science, food technology, dietetics, and nutrition careers.
 - 9.1.2 Analyze opportunities for employment and entrepreneurial endeavors.
 - 9.1.3 Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition.
 - 9.1.4 Analyze the impact of food science, dietetics, and nutrition occupations on local, state, national, and global economies.
 - 9.1.6 Analyze the role of professional organizations in food science, food technology, dietetics, and nutrition careers.
- 9.2 Apply risk management procedures to food safety, food testing, and sanitation.
- 9.2.1 Analyze factors that contribute to food borne illness.
 - 9.2.2 Analyze food service management safety and sanitation programs.
 - 9.2.3 Implement industry standards for documenting, investigating, and reporting food born illnesses.
 - 9.2.4 Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes to minimize the risks of food borne illness.
 - 9.2.5 Demonstrate practices and procedures that assure personal and workplace health and hygiene.
 - 9.2.6 Demonstrate standard procedures for receipt and storage of raw and prepared foods.
 - 9.2.9 Demonstrate waste disposal and recycling methods.
- 9.3 Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
- 9.3.2 Analyze nutritional data.
 - 9.3.3 Apply principles of food production to maximize nutrient retention in prepared foods.
- 9.5 Demonstrate use of current technology in food product development and marketing.
- 9.5.7 Conduct testing for safety of food products, utilizing available technology.

Aligned Washington State Standards**Washington Science Standards (Next Generation Science Standards):**

- HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
- HS-PS1-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
- HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
- HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
- HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).

HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 9-10):

Reading

RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.

RST.9-10.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

RST.9-10.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.

RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

RST.9-10.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

RST.9-10.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

Writing

WHST.9-10.1 Write arguments focused on discipline-specific content.

WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

Washington English Language Arts Standards (Common Core State Standards) - Speaking and Listening (Grade 9-10):

SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Unit 5: Careers and Employability

Total Learning Hours for Unit: 15

Unit Summary:

In this unit, students will:

- Explore employment opportunities in the field of food science and nutrition with the help of a guest or while on field trips.
- Model employability skills and professionalism.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

It is expected that students will:

- Complete an independent research project on food science careers using a PowerPoint presentation.
- Complete food science experiments and labs.
- Students share their traditional/cultural food & etiquette practices with the class.
- Discuss time management and goal setting within student's school day with emphasis on prioritization.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

The leadership activity should be an FCCLA activity such as *Career Connections* or a specific activity that demonstrates how each of the 21st Century Skills are integrated into the performance assessment or classroom.

Industry Standards and Competencies

National Standards for Family and Consumer Sciences Education - Food Science, Dietetics, and Nutrition

9.1 Content Standard: Analyze career paths within food science, food technology, dietetics, and nutrition industries.

9.1.1 Explain the roles and functions of individuals engaged in food science, food technology, dietetics, and nutrition careers.

9.1.2 Analyze opportunities for employment and entrepreneurial endeavors.

9.1.3 Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition.

9.1.4 Analyze the impact of food science, dietetics, and nutrition occupations on local, state, national, and global economies.

- 9.1.5 Create an employment portfolio for use with applying for internships and work-based learning opportunities in food science, food technology, dietetics, and nutrition careers.
- 9.1.6 Analyze the role of professional organizations in food science, food technology, dietetics, and nutrition careers.
- 9.2 Apply risk management procedures to food safety, food testing, and sanitation.
 - 9.2.2 Analyze food service management safety and sanitation programs.
 - 9.2.3 Implement industry standards for documenting, investigating, and reporting food born illnesses.
 - 9.2.4 Use the Hazard Analysis Critical Control Point (HACCP) during all food handling processes to minimize the risks of food borne illness.
 - 9.2.5 Demonstrate practices and procedures that assure personal and workplace health and hygiene.
 - 9.2.8 Use Occupational Safety and Health Administration's (OSHA) Right to Know Law and Material Safety Data Sheets (MSDS) and explain their requirements in handling hazardous materials.
- 9.5 Demonstrate use of current technology in food product development and marketing.
 - 9.5.3 Prepare food for presentation and assessment.

Aligned Washington State Standards

Washington Science Standards (Next Generation Science Standards):

HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 9-10):

Reading

- RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
- RST.9-10.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
- RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
- RST.9-10.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
- RST.9-10.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

Writing

- WHST.9-10.1 Write arguments focused on discipline-specific content.
- WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
- WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the

usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
WHST.9 Draw evidence from informational texts to support analysis, reflection, and research.

Washington English Language Arts Standards (Common Core State Standards) - Speaking and Listening (Grade 9-10):

- SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
- SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
- SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.
- SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Unit 6: Nutrition

Total Learning Hours for Unit: 45

Unit Summary:

In this unit, students will:

- List the various nutrients found in foods.
- Understand the role that nutrients play in our bodies.
- Develop a working knowledge of the nutrients that foods supply.
- Experience and explain the impact that food preparation techniques can have on a nutrient through the application of scientific knowledge of molecules, heat transfer, and chemical interactions.

Performance Assessments:

Performance assessments may be developed at the local level. In order to earn approval at the state level, performance assessments must be submitted within this framework.

Possible activities include:

- Students will demonstrate a basic understanding of nutrients and their function in the body through a presentation and application in menu planning.
- Students create informative posters about nutrition for a health fair.
- Students will participate in a variety of Science and food lab experiments that highlight the relationships between food consumption, health, and human development.
- Students will design and prepare menus for special dietary needs.
- Students will conduct experiments on how cooking methods impact nutrition and nutrition absorption.

Leadership Alignment:

- Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
- The event, activity, or project and the associated 21st Century Skill should be clearly articulated.
Example: Students will demonstrate the ability to communicate clearly through their group project presentation.

The leadership activity should be an FCCLA activity such as *Nutrition and Wellness* or *Food Innovations*, or a specific activity that demonstrates how each 21st Century Skill is integrated into the performance assessment or classroom.

Industry Standards and Competencies

National Standards for Family and Consumer Sciences Education - Food Science, Dietetics, and Nutrition:

- 9.1 Content Standard: Analyze career paths within food science, food technology, dietetics, and nutrition industries.
 - 9.1.1 Explain the roles and functions of individuals engaged in food science, food technology, dietetics, and nutrition careers.
 - 9.1.3 Summarize education and training requirements and opportunities for career paths in food science, food technology, dietetics, and nutrition.
- 9.2 Apply risk management procedures to food safety, food testing, and sanitation.
 - 9.2.1 Analyze factors that contribute to food borne illness.
- 9.3 Evaluate nutrition principles, food plans, preparation techniques and specialized dietary plans.
 - 9.3.1 Analyze nutrient requirements across the life span addressing the diversity of people, culture, and religions.
 - 9.3.2 Analyze nutritional data.
 - 9.3.3 Apply principles of food production to maximize nutrient retention in prepared foods.
 - 9.3.4 Assess the influence of socioeconomic and psychological factors on food and nutrition and behavior.
 - 9.3.5 Analyze recipe/formula proportions and modifications for food production.
 - 9.3.6 Critique the selection of foods to promote a healthy lifestyle.
 - 9.3.7 Categorize foods into exchange groups and plan menus, applying the exchange system to meet various nutrient needs.
- 9.4 Apply basic concepts of nutrition and nutritional therapy in a variety of settings.
 - 9.4.1 Analyze nutritional needs of individuals.
 - 9.4.2 Use nutritional information to support care planning.
 - 9.4.3 Use a selective menu.
 - 9.4.4 Construct a modified diet based on nutritional needs and health conditions.
 - 9.4.5 Design instruction on nutrition for health maintenance and disease prevention.
- 9.6 Demonstrate food science, dietetics, and nutrition management principles and practices.
 - 9.6.1 Build menus to customer/client preferences.
 - 9.6.4 Create standardized recipes.
 - 9.6.5 Manage amounts of food to meet needs of customers, clients.
 - 9.6.6 Analyze new products.

American Culinary Foundation:

- 3.1. Characterize the roles of carbohydrates, proteins, fiber, and fats in people's diets and identify foods that contain these nutrients.
- 3.2. Describe cholesterol and list foods in which it is found.
- 3.3. Describe the roles of proteins, water, vitamins, and minerals in people's diets and identify foods that contain these nutrients.
- 3.4. Differentiate between complete and incomplete proteins.
- 3.5. List food groups and recommended servings in USDA Food Guide Plate (www.choosemyplate.gov).
- 3.6. Discuss dietary guidelines and recommended dietary allowances.
- 3.7. Interpret food labels in terms of the portion size, ingredients and nutritional value.
- 3.10. Suggest healthful substitutes for high-fat ingredients.
- 3.11. Understands and documents a person's nutritional requirements.
- 3.12. Practices cooking and storage methods that maximize nutrition.
- 3.13. Uses natural Ingredients and flavors.
- 3.14. Describe the process of human digestion.
- 3.17. Designs menus using proper dietary requirements.
- 3.18. List basic menu planning principles.
- 3.19. Develop an understanding of basic menu planning and layout principles.
- 3.20. Create menu item descriptions following established truth-in-menu guidelines.
- 3.21. Apply principles of nutrition to menu development (adapt recipes to new dietary guidelines, be more healthful).

Aligned Washington State Standards

Washington Science Standards (Next Generation Science Standards):

- HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
- HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
- HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
- HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
- HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.
- HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Washington English Language Arts Standards (Common Core State Standards) - Science and Technology Literacy Standards (Grades 9-10):

Reading

- RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
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- RST.9-10.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
- RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
- RST.9-10.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
- RST.9-10.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

Writing

- WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
- WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

Washington English Language Arts Standards (Common Core State Standards) - Speaking and Listening (Grade 9-10):

SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

21st Century Skills

Students will demonstrate in this course:

LEARNING & INNOVATION

Creativity and Innovation

- Think Creatively
- Work Creatively with Others
- Implement Innovations

Critical Thinking and Problem Solving

- Reason Effectively
- Use Systems Thinking
- Make Judgments and Decisions
- Solve Problems

Communication and Collaboration

- Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and Manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
- Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others