Unit 03: Food Production

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **FY**
Status: **Published**

Standards Alignment

New Jersey Student Learning Standards

Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

Ask questions that arise from careful observation of phenomena, or unexpected results, to clarify and/or seek additional information.

Define a design problem that involves the development of a process or system with interacting components and criteria and constraints that may include social, technical, and/or environmental considerations.

SCI.HS-LS1	From Molecules to Organisms: Structures and Processes
SCI.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.
SCI.HS-LS3	Heredity: Inheritance and Variation of Traits
SCI.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.
SCI.HS-LS3-2	Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
SCI.HS-LS3-3	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
HPE.2.1.12.B	Nutrition
HPE.2.1.12.B.1	Determine the relationship of nutrition and physical activity to weight loss, weight gain, and weight maintenance.
HPE.2.1.12.B.2	Compare and contrast the dietary trends and eating habits of adolescents and young adults in the United States and other countries.
HPE.2.1.12.B.3	Analyze the unique contributions of each nutrient class (fats, carbohydrates, protein, water, vitamins, and minerals) to one's health.
HPE.2.1.12.C	Diseases and Health Conditions
HPE.2.1.12.C.2	Develop strategies that will impact local, state, national, and international public health efforts to prevent and control diseases and health conditions.

Integration of Career Readiness, Life Literacies and Key Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology / Integration of Computer Science and Design Thinking

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

	Key Ideas and Details
LA.K-12.NJSLSA.R1	Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.K-12.NJSLSA.R2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
LA.K-12.NJSLSA.R3	Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
	Integration of Knowledge and Ideas
LA.K-12.NJSLSA.R7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
LA.RI.11-12	Reading Informational Text
LA.RI.11-12.1	Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.), to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain.
LA.K-12.NJSLSA.W	Writing
LA.RI.11-12.2	Determine two or more central ideas of a text, and analyze their development and how

	they interact to provide a complex analysis; provide an objective summary of the text.
	Text Types and Purposes
LA.RI.11-12.3	Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.
LA.K-12.NJSLSA.W1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
LA.K-12.NJSLSA.W2	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.RI.11-12.7	Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
LA.K-12.NJSLSA.W9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
LA.W.11-12.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
LA.W.11-12.1.C	Use transitions (e.g., words, phrases, clauses) to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
LA.W.11-12.1.E	Provide a concluding paragraph or section that supports the argument presented (e.g., articulating implications or the significance of the topic).
LA.W.11-12.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.W.11-12.2.A	Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
LA.W.11-12.2.B	Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
LA.W.11-12.2.F	Provide a concluding paragraph or section that supports the argument presented (e.g., articulating implications or the significance of the topic).
LA.W.11-12.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale

Unit Rationale

The purpose of this unit…

The purpose of this unit is to understand how food is grown on a farm and raised as livestock , then sold to food companies and marketed to consumers in stores

Meaning

Essential Questions

Essential Questions

- Where does the food made available in grocery stores originate from?
- What techniques do food companies use to market their food to consumers?
- What is the difference between organic versus inorganic and GMO versus non-GMO foods?
- Are there any precautions one should take before consuming food?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

Students will understand that:

- Food sold by grocery stores is grown and raised on a farm, and then sold to food companies and distributors
- Food companies use specific techniques to market their goods towards consumers of all ages
- The term "organic" refers to the way farmers grow and process agricultural products, such as fruits, vegetables, grains, dairy products and meat'

- Scientists genetically alter the DNA of GMO organisms for desired results
- Food must be prepared properly in order to prevent illness or even death

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know…

- Having the right type of soil that is nutrient-rich is a major step to growing high-quality produce. The soil needs to be rich in nutrients such as phosphorus, nitrogen potassium and other micronutrients. It also needs to be alive with microorganisms that will allow the nutrients to be usable by plants.
- Technology like laser leveling is used to tilt beds in the farm to maximize drainage; GPS technology is also used to ensure that rows of seeds remain even while providing efficient placement of irrigation systems. A few weeks after the soil has been tilled, and the beds are ready for planting, machines plant seeds into the soil.
- Once the seeds have been sowed, the growing cycle begins and lasts anywhere from three to six weeks (depending on the crop). During this time, the plants are nurtured and taken care of consistently.
- Crops are protected from pests and weeds either by using safe herbicides and pesticides, or utilizing cover crops and drip irrigation systems to keep weeds at bay.
- Harvesting is the process of gathering a ripe crop from the fields. Reaping is the cutting of grain or pulse for harvest, typically using a scythe, sickle, or reaper. On smaller farms with minimal mechanization, harvesting is the most labor-intensive activity of the growing season.
- Crops need to be harvested before it gets too hot and their leaves become too soft to pick. Once harvested, the produce needs to be kept at specific temperatures until it is inspected and shipped.
- Once trucks arrive from the field, a quality assurance specialist inspects the produce decide whether it is acceptable. Once accepted, some types of produce may be sent to a facility to be washed.
- Carriers, who are contracted to drive their refrigerated trucks to the processing facility, handle a significant amount of the delivery of produce from farms. Farms usually have regulations in place to ensure that fresh produce is promptly picked up from the facility.
- Restaurants and grocery stores schedule pick up or delivery of produce from the distribution centers, usually within a day of its arrival.
- Which fruits and vegetables should be refrigerated
- Livestock farming is the rearing of animals for food and for other human uses. The word 'Livestock' applies primarily to cattle or dairy cows, chickens, goats, pigs, horses and sheep.
- Livestock farms have been benefiting us in many ways for ages - they provide us with eggs, honey, meat, milk, etc. The skins or hides and even hair of these animals have been used to make blankets, clothing, shoes and the like. The hoofs and horns of these farm animals have been used to make common items like buttons and combs
- Pigs and poultry are reared intensively in indoor environments. However, indoor animal farming has often been criticized for multiple reasons - on grounds of pollution and for animal welfare reasons. Outdoor farming of livestock stands for rearing animals in bigger enclosures like ranches and fenced pastures.
- Cattle breeding involves selection of stock; insemination (both natural and artificial) as well as embryo transfers for producing genetically improved offsprings.
- Inbreeding remained the prominent form of cattle breeding till the 1950s when the positive effects of crossbreeding of cattle first came to light.
- Artificial Insemination was that revolutionary find that wove success-stories around dairy farms. AI, wherein semen from a superior-quality bull was injected in the reproductive tract of a cow to make her pregnant proved immensely beneficial and boosted dairy production manifold times. scientists evolved an innovative way for storing semen for indefinite periods – frozen semen was preserved in liquid nitrogen.
- The development of the Embryo Transfer Technique is another milestone event in cattle breeding. With the arrival of this technique, it has now become possible to pass on the genetic traits of top quality female animals to future generations.
- organic versus inorganic

- Organic fruits are grown without using artificial substances like fertilizers, pesticides, antibiotics, hormones or additives. Growing conditions and certifying fruit as organic, vary from place to place and is different from those for conventionally grown fruits. In the US they must be largely free of any GM organism.
- GM Food is a food product that has been derived from a genetically modified organism (GMO)
- The ‘genetic modification’ or ‘genetic reconstitution’ of these life forms is based on the advanced form of Genetic Engineering, Recombinant DNA technology, which attempts to improve the food-yield (from the organism) – both quality and quantity wise – by combining genes from different organisms.
- GM not only improves the quality of the yield, you get increased produce and that in less time. It also endows the crops with greater resistivity to common diseases and harsh weather conditions.
- Genetically modified foods arrived in the market in the early 1990s. The first genetically modified food crop grown on a commercial scale was the tomato called FlavrSavr (created by Calgene in 1992). It was released in the US market post FDA approval in 1994.
- The benefits of locally grown food
- Water Footprints of crops and livestock
- Restaurants make it extremely easy to eat larger than needed portion sizes and eat/drink too many calories
- Food companies use specific techniques and spend billions of dollars to market food to children
- Food marketed towards children is typically highly processed and low in nutritional content
- The lay-out of the grocery store is intended to stimulate consumer shopping and influence spending
- Healthy eating begins at the grocery store. The shopper can follow tips and techniques to help them plan for healthy eating without spending a fortune
- **Cooked food is safe only after it's been heated to a high enough temperature to kill harmful bacteria**
- **Color and texture alone won't tell you whether your food is done. Instead, use a food thermometer to be sure**

Skills

Skills

Student will be skilled at …

- Identify key aspects of farming both produce and livestock
- Identify the connection between artificial selection and techniques farmers use to produce genetically improved livestock
- Understand how to keep produce fresh and which types should be refrigerated
- Compare/Contrast the differences between growing food organically and inorganically
- Distinguish both the pros and cons of organic farming
- Describe how scientists create genetically modified food (GMO's)
- Evaluate the pros and cons of consuming genetically modified food (GMO's)
- Examine the benefits of locally grown food
- Analyze the relationship between different crops and water usage
- Evaluate the effectiveness of marketing techniques both food companies and grocery stores use towards the consumer
- Develop effective methods for grocery shopping while maintaining an inexpensive and healthy habits
- Describe the importance of properly cooking and preparing food to prevent illness or even death

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

- **Powerpoint presentations**
- **Scienceworld Magazines**
- **Nutrition Magazines**
- **Recipe Magazines**
- **Articles related to topics**
- **Youtube videos**
- **Materials for labs**
- **Journals**
- **National Geographic**

Formative Assessment Strategies

Formative Assessment Strategies

- Nutrition and Health Portfolio
- Food Production Quiz
- RACE prompt: Pros versus Cons of GMO's
- Controversial Essay: Are Food Companies Misleading their Consumers?
- Graphic Organizers
- Quick Thoughts
- Exit Slips
- Kahoot
- Bingo
- White Board Participation
- Homework
- Teacher Check
- Thumbs up/thumbs down
- Create a Test/Take a Test
- Whole class questioning and answering
- Homework/Classwork

Learning Activities/Unit of Study

Learning Activities/Unit of Study

- Nutrition and Health Portfolio - Students will build a nutrition and health portfolio throughout the entire school year. Students will continuously add information
- Taste test: Organic versus inorganic fruits and vegetables
- Create a Grocery List: produce a grocery list that will include three meals a day, including snacks, for an entire week
- Foodborne Illness Chart: create a chart that includes 5 different illness caused by food consumption, symptoms, treatment and prevention tips
- From the farm to the table: Trace the path of food and the steps that are taken from food grown in a farm to ending up being purchased by a consumer from a grocery store
- "Cowspiracy" movie/ Student Discussion and Journal Entry
- "Rotten; Big Bird" Netflix episode: Watch and Respond
- "Rotten; Cod is Dead" Netflix episode: Watch and Respond
- Listen and Respond Google Chat Room: Ted Talks-Marketing food to children https://www.youtube.com/watch?v=0bop3D7-dDM
- Interactive powerpoint presentation notes

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, GIfted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the

concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure

he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.