

UTICA CITY SCHOOL DISTRICT

Healthy By Design

Agritect Module

7th Grade

Essential Question: How can we develop a healthy snack food that will appeal to young adolescents?

Project Background

Grocery stores across the country devote entire aisles to sodas, snack foods, cookies, candy, and sugary breakfast cereals. These foods are made with inexpensive ingredients, advertised with enormous budgets, and manufactured by some of the largest food corporations in the world.

The U.S. government plays a major role in the production of these high-calorie, high-fat, low-nutrition foods by subsidizing commodity crops like corn and other grains that are used in their production. In fact, 61 percent of federal subsidies over the last several years have gone to these crops. And yet fruits and vegetables constitute only 10 percent of the government subsidies, while the government recommends that half of Americans' daily nutrition comes from fruits and vegetables.

The target consumer group for most of these "snack" foods are children and adolescents. One obvious result is obese, unhealthy children. "Real, whole, fresh food is the most powerful drug on the planet," says the author of *The Blood Sugar Solution Cookbook*, Dr. Mark Hyman, "It regulates every biological function of your body." So, how do we create a healthy snack food that children and adolescents will not only enjoy but also will be healthy for them? The general questions to answer are

- How do we develop a snack food with enough calories to be satisfying, but not so many calories that it becomes a meal?
- How can we develop a snack food with less fat and saturated fat than similar snacks?
- How can we develop a snack food with whole grains and fiber, protein, and/or other nutrients that give them staying power?

These questions pinpoint the purpose of this project – to produce a nutritious snack that will provide an alternative to currently marketed snack products.

Project Scenario

You are a member of a food science team at a nutrition company. The health risks associated with most snack foods targeted at children and adolescents have created a need for healthier alternatives. Your task is to create a new snack or adapt an existing one that will appeal to children or adolescents.

To accomplish your task, you will review up-to-date research on balanced nutrition and food preparation. Some research considerations include macronutrients and micro/phytonutrients, the health impact of ingredient choices, and the health impact of preparation techniques. You will propose a new snack and the process of creating it, including an evaluation of its taste and nutrition.

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You will write a formal recipe for your snack that communicates the macro-nutrients along with a descriptive paragraph of how your dish tastes and what makes it healthier than the alternative.

Deliverables:

- Snack development documentation
- Sample snack
- Comparison chart between your snack and a comparable snack
- Recipe and descriptive paragraph
- Professional notebook

Preparation Notes

This project is best taught in conjunction with the Better Plant project. Students will start the better plant project and can then switch over to this project as their fruits and vegetables are growing. This project will require students to cook, so you will need to secure food items through your school or district process. Students may also wish to use some of the crops they are growing in the dishes for this project, or they may want to broaden out to try other fruits and vegetables that cannot be easily grown indoors. You will also want to incorporate mini-lessons on chef skills that will be needed to produce their recipes.

Content Standards

The 7th-grade health science module dives students into learning more about possible careers in Agritech through solving of growing fruits, vegetables or herbs and then preparing a dish with them. As such, this module supports the [NYSED CTE FACS Modules in Nutrition and Wellness](#). In particular, students will learn and explore the following topics:

- Culinary Management
- Nutrition Across the Lifespans (particular focus on Macro and Micro Nutrients in foods and how they contribute to health)
- Consumer Resources and Finance

This unit incorporates the use of a design process, team collaboration, and various types of verbal and written communication. Therefore, they will also learn skills and concepts from NYSED CTE Theme Modules of [Communication and Interpersonal Relationships](#) and [Problem-Solving and Innovation](#).

The unit overview below connects [Utica's CTE Career Ready Practices](#) and [NYSE Computer Science and Digital Fluency Standards](#) (CSDF). Throughout the unit of study, students will need their [Power Skills](#) to fully engage in the project; these have been indicated on the Maps of Student Learning.

Unit Overview

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Unit Phase	Career Ready Practices and Digital Fluency Standards (CSDF)	Skills/Topics	Assessments	Resources and Texts
Ask 6 Days	Career Ready Practices 1. Act as a responsible and contributing citizen and employee. 12. Work productively in teams while using cultural global competence.	Project Launch Task Analysis & Team Contract	Healthy By Design Project Rubric Know/Need-to-Know Team Contract Professional notebook	Healthy by Design Project Scenario Food Pictures Video: Healthy Diet, Healthy Word
	Career Ready Practices 1. Act as a responsible and contributing citizen and employee. 2. Apply appropriate academic and technical skills. 7. Employ valid and reliable research strategies. 12. Work productively in teams while using cultural global competence.	Lesson: What makes a Food Healthy? <ul style="list-style-type: none"> ● Define macronutrients and micronutrients. ● Explain how macronutrients contribute to our overall health. ● Determine guidelines for how we will improve the healthiness of our chosen snacks. 	GIST Handout Discussions	What Makes a Food Healthy Slides Video: Myths you learned in Health Class Article: Carbohydrates, Proteins, and Fats Article: How to Understand and Use Nutrition Facts Label USDA: MyPlate - Teens
	Career Ready Practices 1. Act as a responsible and contributing citizen and employee. 2. Apply appropriate academic and technical skills. 4. Communicate clearly and effectively and with reason. 8. Utilize critical thinking to make sense of problems and persevere in solving them.	Lesson: Macronutrient Calculations <ul style="list-style-type: none"> ● Calculate the Calories, Fat, Protein, and Carbohydrates in a portion of food. 	Calculating Macronutrients Activity Calculating Macronutrients in a Recipe Activity	Macronutrient Slides Oreo Example Cheesy Quesadilla Example Video: 10 Rules for Reading Food Labels https://fdc.nal.usda.gov/ (nutrition facts) https://www.nutritionvalue.org/ (nutrition facts)

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	<p>Career Ready Practices 1. Act as a responsible and contributing citizen and employee. 2. Apply appropriate academic and technical skills. 4. Communicate clearly and effectively and with reason. 8. Utilize critical thinking to make sense of problems and persevere in solving them.</p>	<p>Develop Problem Statement</p> <ul style="list-style-type: none"> Write a problem statement detailing the snack we plan to healthify. 	<p>Final Problem Statement Professional notebook – team meeting notes</p>	<p>https://www.tasteofhome.com/collection/recipes-kids-should-know-heart/ (Recipes)</p>
	<p>Imagine 4 Days</p>	<p>Career Ready Practices 1. Act as a responsible and contributing citizen and employee. 2. Apply appropriate academic and technical skills. 3. Attend to personal health and financial well-being. 4. Communicate clearly and effectively and with reason. 8. Utilize critical thinking to make sense of problems and persevere in solving them. 11. Use technology to enhance productivity. 12. Work productively in teams while using cultural global competence.</p>	<p><u>Lesson: Micronutrients</u></p> <ul style="list-style-type: none"> Define micronutrients. Name the micronutrients found in common foods. Name common diseases that result in a deficiency of micronutrients. Look up micronutrient information for crops they are growing and/or potential ingredients for their healthy snack. 	<p><u>Vitamins and Minerals: Why are They Important</u></p>
		<p>Career Ready Practices 1. Act as a responsible and contributing citizen and employee.</p>	<p>Team Meeting & Brainstorming - Determine 3 possible recipes to healthify my snack</p>	<p>Professional Notebook</p> <ul style="list-style-type: none"> Recipe research notes Optional: created recipe from research

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Unit Phase	Career Ready Practices and Digital Fluency Standards (CSDF)	Skills/Topics	Assessments	Resources and Texts
	3. Attend to personal health and financial well-being. 6. Demonstrate creativity and innovation. 7. Employ valid and reliable research strategies 8. Utilize critical thinking to make sense of problems and persevere in solving them. 11. Use technology to enhance productivity. 12. Work productively in teams while using cultural global competence.	Optional: Students practice their unit rate math to calculate the cost of each recipe idea. This will be used in determining the best idea they will recreate.	<ul style="list-style-type: none"> Option: Recipe Cost Calculations 	
	Plan/ Create 8 Days	Career Ready Practices 1. Act as a responsible and contributing citizen and employee. 2. Apply appropriate academic and technical skills. 12. Work productively in teams while using cultural global competence.	Common Healthy Cooking Terms Essential Vocabulary Word Sort <ul style="list-style-type: none"> Use healthy cooking terminology 	Vocabulary categories Team Discussions Whole Group Share
Career Ready Practices 1. Act as a responsible and contributing citizen and employee. 4. Communicate clearly and effectively and with reason. 8. Utilize critical thinking to make sense of problems and persevere in solving them.		Team Meeting: Decision Matrix <ul style="list-style-type: none"> Determine the best recipe to produce given all constraints and criteria. 	Completed Decision Matrix Revised Know/NTK Chart Final Recipe Choice along with shopping list	Decision Matrix Lesson – from Better Plant Project
Career Ready Practices		Various Lessons on Chef Skills needed to make recipes	Observations from practice sessions	

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	<p>1. Act as a responsible and contributing citizen and employee. 2. Apply appropriate academic and technical skills. 6. Demonstrate creativity and innovation. 12. Work productively in teams while using cultural global competence.</p>	<p>– it will depend on student needs</p> <ul style="list-style-type: none"> ● Practice recipe preparation skills needed for my recipe. 	<p>Professional Notebook notes</p>	
	<p>Career Ready Practices 1. Act as a responsible and contributing citizen and employee. 2. Apply appropriate academic and technical skills. 3. Attend to personal health and financial well-being. 4. Communicate clearly and effectively and with reason. 6. Demonstrate creativity and innovation. 8. Utilize critical thinking to make sense of problems and persevere in solving them. 9. Model integrity, ethical leadership, and effective management. 11. Use technology to enhance productivity. 12. Work productively in teams while using cultural global competence.</p> <p>NY Digital Fluency Standards 4-6.CT.3 Visualize a simple data set in order to highlight</p>	<p>Team Creation Time</p> <ul style="list-style-type: none"> ● Calculate the macronutrients of my recipe. ● Calculate the micronutrients of the recipe. ● Compare the nutrients between your original snack and the healthy version. ● Apply my knowledge of cooking to create my recipe. ● Test my recipe and develop ideas for improving the recipe. 	<p>Healthy By Design Rubric</p> <p>Calculations of recipe macro-and micronutrients</p> <p>Comparison Chart between original snack and healthier snack</p> <p>Draft of healthy recipe with a summary of how the recipe is healthier</p> <p>Healthier snack creation</p> <p>Initial taste test results with improvement notes (if students are going to do a second round of cooking)</p>	<p>Project management task list</p>

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Unit Phase	Career Ready Practices and Digital Fluency Standards (CSDF)	Skills/Topics	Assessments	Resources and Texts
	<p>relationships and persuade an audience.</p> <p>7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.</p> <p>7-8.DL.4 Select and use digital tools to create, revise, and publish digital artifacts.</p>			
<p><u>Evaluate/ Improve</u></p> <p>2+ Days</p>	<p>Career Ready Practices</p> <ol style="list-style-type: none"> 1. Act as a responsible and contributing citizen and employee. 2. Apply appropriate academic and technical skills. 4. Communicate clearly and effectively and with reason. 6. Demonstrate creativity and innovation. 8. Utilize critical thinking to make sense of problems and persevere in solving them. 11. Use technology to enhance productivity. 12. Work productively in teams while using cultural global competence. <p>NY Digital Fluency Standards</p> <p>7-8.DL.2 Communicate and collaborate with others using a variety of digital tools to create and revise a collaborative product.</p>	<p>Recipe Creation Part 2 – based on the initial taste test students improve their dish and recipe</p> <ul style="list-style-type: none"> ● Determine improvements to my dish. <p>Note: If students are not creating a 2nd recipe, they should note what they would improve after the taste-testing event.</p>	<p>Updated and finalized documentation</p> <p>Professional notebook notes</p>	

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Unit Phase	Career Ready Practices and Digital Fluency Standards (CSDF)	Skills/Topics	Assessments	Resources and Texts
	<p>7-8.DL.4 Select and use digital tools to create, revise, and publish digital artifacts.</p>			
	<p>Career Ready Practices</p> <ol style="list-style-type: none"> 1. Act as a responsible and contributing citizen and employee. 2. Apply appropriate academic and technical skills. 3. Attend to personal health and financial well-being. 4. Communicate clearly and effectively and with reason. 8. Utilize critical thinking to make sense of problems and persevere in solving them. 11. Use technology to enhance productivity. 12. Work productively in teams while using cultural global competence. <p>NY Digital Fluency Standards</p> <p>4-6.CT.10 Describe the steps taken and choices made to design and develop a solution using an iterative design process.</p>	<p>Taste-testing Event</p> <ul style="list-style-type: none"> ● Communicate my final design to an audience. 	<p>Healthy by Design Rubric</p> <ul style="list-style-type: none"> ● Final Documentation ● Recipe with summary ● Calculations ● Comparison Chart ● Taste-testing feedback form (created by students) 	

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Healthy by Design: Ask Phase

Goal of Phase

Students will start the project by considering what they currently know about healthy eating habits and how foods nourish the body. They will then conduct reading and research to learn more about different aspects of healthy eating and foods and reading nutrition labels. Students will produce a draft problem statement.

Teacher Notes & Preparation

Key Concepts and Big Ideas

- The overall nutritional value of a food is dependent on its macro and micronutrients as well as its additives.
- Our bodies need macronutrients and micronutrients to maintain a healthy system and growth.

Preparation Notes

While this project is meant to help students understand what makes a food good for their bodies over foods that might be less healthy for their bodies, it is important to stress that there are no bad foods. Some foods are more body-nourishing than others. The goal is to give students better insight into how the foods we eat contribute to our overall health. In conjunction with the Better Plant Project, students may also see the connection with how agriculturally produced products play a role in our overall health as a society. Throughout the project, keep coming back to these two themes where appropriate: The foods we eat contribute to our overall health and agriculture supports our health through the products they produce.

Students may start this project mid-way through the better plant project. As students learn about the micronutrients that fruits and vegetables provide, they will want to look up the micronutrients in some of the plants and vegetables they are growing. Students are making a separate dish for the Better Plant project; however, they may also choose to use some of the crops they are growing for their “healthier” snack.

Project launches are great ways to involve community partners. For this project, local restaurant owners, food scientists from food manufacturing facilities, or chefs would make good partners.

Key Questions

What does it mean to eat healthy?
 How do macro and macro and micronutrients contribute to overall health?
 How do we calculate the macronutrients in a portion of food using the nutrition facts label?

Key Vocabulary

Macronutrient – a chemical element (e.g., fat, protein, carbohydrates, potassium, magnesium, calcium) required in large amounts for plant growth and development.

Micronutrient – a chemical element or substance required in trace amounts for the normal growth and development of living organisms.

Ratio – the quantitative relation between two amounts showing the number of times one value contains or is contained within the other

Proportion – a part, share, or number considered in comparative relation to a whole.

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Map of Student Learning

Day	Learning Goals	Student Learning Tasks	Teacher Supports
1	<p>Learning Targets:</p> <ul style="list-style-type: none"> • Launching the Project <p>Career Ready Practices: 1, 12</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> • Collaboration • Initiative • Self-Management 	<p>Project Launch</p> <ul style="list-style-type: none"> • Food Carousel Writing: Use a selection of these food pictures or choose your own of different kinds of food (both healthy and unhealthy options) on chart paper around the room. Have students rotate through the pictures and write responses to the pictures. • After students have visited several of the pictures, ask students, “Which ones would they most like to eat? Why?” (take note of their choices or have students stand by their favorite option). Then ask students, “Which options would you consider to be the healthiest options?” Take note of any differences and ask students: <ul style="list-style-type: none"> ○ How do you know something is healthy? Or What does it mean for something to be healthy? ○ Why don’t we always want to eat what is considered healthy for us? ○ What is the role of less healthy food in our overall diet? • Show students the video, Video: Healthy Diet. Healthy Word. Ask students for their reactions and for them to think about: <ul style="list-style-type: none"> ○ How can we encourage more teens to eat more fruits and vegetables? Or How might we create healthier versions of our favorite snacks? <p>Optional Launches:</p> <p>Task Analysis & Team Contract</p> <ul style="list-style-type: none"> • Divide students into their design teams of 2 – 4 students. Once in teams, have students complete the team contract. 	<p>As students read through the project scenario, rotate and help students pull out the most important information. As students work through the K/NTK chart, help them pull out information from the project scenario they need to solve the problem and put this in their Know column. Help students bring in prior knowledge they may have about healthy eating and cooking. Encourage students to be curious and ask questions as they fill out the NTK column.</p> <p>Students will revisit this chart several times throughout the project to track their learning and progress. It also helps to have a class Know/NTK chart on a wall or on a class Learning Management System (such as Google Classroom) that can be a class visual for their progress through the project.</p> <p>Use the NTK to see what questions students are asking and how future activities will help them to answer those questions.</p>

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Day	Learning Goals	Student Learning Tasks	Teacher Supports
		<ul style="list-style-type: none"> ● Introduce the guiding question, “How can we develop a healthy snack food that will appeal to young adolescents?” for this project and hand out the project scenario. ● Have them individually read the scenario and highlight key facts they will need for this project. ● Either give each student a copy of the Know/NTK chart or have them copy the chart into their professional notebooks. Teams will complete the K-NTK charts as a team, but everyone should write their information individually on their chart. ● Student teams first complete the Know column, “What do you know that will help solve this problem?” First start by sharing important facts from the project scenario, then add in their own personal background knowledge about the topic. ● You may want to pause and have each student group share one thing on their KNOW column that gets collected on a class K-NTK Chart ● Student teams then develop questions for their project, “What will you need to know to solve this project?” ● Ask students to go through their questions and pick out the top three questions that will need to be answered right away. ● Have each group share one question. If their top question was answered, they share their 2nd most important questions, and so on. ● After each group has shared one question, open it up for anyone to share questions relating to the project. ● Ask students to write any questions they didn’t consider on their NTK chart. <p>Note on Rubrics: A single-point rubric has been provided for this project. Some students like to see a rubric up front, others it may be more helpful to provide it just as you need it for revising</p>	

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Day	Learning Goals	Student Learning Tasks	Teacher Supports
		work. The rubric is designed so you can isolate sections at a time as needed. Use your best judgment of your students on how you wish to use the project rubric.	
2 – 3	<p>Learning Targets:</p> <ul style="list-style-type: none"> ● Define macronutrients and micronutrients. ● Explain how macronutrients contribute to our overall health. ● Determine guidelines for how we will improve the healthiness of our chosen snacks. <p>Career Ready Practices: 1, 2, 7, 12</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> ● Perseverance ● Collaboration ● Professionalism 	<p>Lead students through the Lesson: What makes a Food Healthy? Students will learn about macronutrients and read nutrition labels. Students will also learn a little about micronutrients. Students will explore the USDA: MyPlate - Teens for more information on what it means to eat healthy. The lesson ends with students listing some criteria they can use to “healthify” their snacks.</p> <ul style="list-style-type: none"> ● What Makes a Food Healthy Slides ● Video: Myths you learned in Health Class ● GIST Handout ● Article: Carbohydrates, Proteins, and Fats ● Article: How to Understand and Use Nutrition Facts Label ● USDA: MyPlate - Teens 	<p>The articles provided can be dense articles for middle schoolers. The lesson uses the Jigsaw reading technique along with the GIST summarizing strategy to help students pull out the most important information. You may need to supplement this information with other videos or infographics.</p>
4 – 5	<p>Learning Targets:</p> <ul style="list-style-type: none"> ● Calculate the Calories, Fat, Protein, and Carbohydrates in a portion of food. <p>Career Ready Practices: 1, 2, 4, 8</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> ● Perseverance ● Collaboration ● Professionalism 	<p>Lead students through the Lesson: Macronutrient Calculations – Students will use the nutritional Facts labels on various snacks typically considered unhealthy in a teen diet. This lesson will help them learn how to determine calories, fat, protein, and carbohydrates for a portion of food. Students will repeat the calculation for an example recipe.</p> <ul style="list-style-type: none"> ● Macronutrient Calculations Slides ● Calculating Macronutrients Activity <ul style="list-style-type: none"> ○ Oreo Example ● Calculating Macronutrients in a Recipe Activity <ul style="list-style-type: none"> ○ Cheesy Quesadilla Example ● Access to the following videos or websites 	<p>This lesson requires students to have junk food-type snacks available if possible. Students will need full-size bags and not pre-portioned bags. This will ensure that they use ratio and proportional reasoning to calculate the macronutrients. While students are learning and practicing math, this is designed to be a fun break from the reading in the previous lesson.</p>

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Day	Learning Goals	Student Learning Tasks	Teacher Supports
	<ul style="list-style-type: none"> ● Communication ● Problem-Solving 	<ul style="list-style-type: none"> ○ Video: 10 Rules for Reading Food Labels ○ Website: https://fdc.nal.usda.gov/ (nutrition facts) ○ Website: https://www.nutritionvalue.org/ (nutrition facts) ○ https://www.tasteofhome.com/collection/recipes-kids-should-know-heart/ 	
6	<p>Learning Targets:</p> <ul style="list-style-type: none"> ● Write a problem statement detailing the snack we plan to healthify. <p>Career Ready Practices: 1, 2, 4, 8</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> ● Collaboration ● Problem-Solving 	<p>Team Meeting</p> <ul style="list-style-type: none"> ● Students choose a snack they plan to “healthify”. It could be one of the snacks provided for the “Calculating Macronutrients Activity” or it could be one of their choosing. ● Students develop problem statements and consider <ul style="list-style-type: none"> ○ What makes this snack so delicious? ○ What makes this snack a less healthy choice? ○ How might we improve its healthiness? (For example: reduce the number of calories or fat, make out of fruits and vegetables, increase the amount of protein, etc) ○ What factors about the snack do we want to keep? (For example saltiness, crunchiness, sweetness, etc) ○ Students can update their problem statement as they learn new information relevant to their problem in the Imagine phase. 	

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Healthy by Design: Imagine Phase

Goal of Phase

Students will explore how fruits and vegetables give us necessary macronutrients. They will research and brainstorm recipes to make healthier versions of their chosen snacks.

Teacher Notes & Preparation

Key Concepts and Big Ideas

- Fruits and vegetables provide necessary micronutrients for healthy bodies and brains.
- One way to “healthify” a snack is to add or substitute ingredients with fruits or vegetables.

Preparation Notes

Type here

Key Questions

What are micronutrients and how do they help our bodies?
 How can I use my knowledge of micronutrients to increase the healthiness of my snack?
 What recipes are out there that can help healthify my snack?

Key Vocabulary

Micronutrients – a chemical element or substance required in trace amounts for the normal growth and development of living organisms.

Map of Student Learning

Day	Learning Goals	Student Learning Tasks	Teacher Supports
8 – 9	Learning Targets: <ul style="list-style-type: none"> ● Define micronutrients. ● Name the micronutrients found in common foods. ● Name common diseases that result in a deficiency of micronutrients. ● Look up micronutrient information for crops they are growing and/or potential ingredients for their healthy snack. 	<p>Lead students through the Lesson: Micronutrients (adapted from: https://agclassroom.org/matrix/lesson/668/) – students will learn about micronutrients and how they support healthy growth and body functions.</p> <ul style="list-style-type: none"> ● Micronutrient Slides ● Vitamins and Mineral Fact Cards ● Vitamins and Minerals: Why are They Important ● Access to the following links: <ul style="list-style-type: none"> ○ Video: Discover the Benefits of Fruits and Vegetables ○ https://fdc.nal.usda.gov/ (nutrition facts) ○ https://www.nutritionvalue.org/ (nutrition facts) 	

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	<p>Career Ready Practices: 1, 2, 3, 4, 8, 11, 12</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> ● Collaboration ● Professionalism ● Problem-Solving ● Communication 	<p>Have them look up the micronutrient values in their “unhealthy” snack and take note of them in their professional notebook. The goal is for students to increase at least one of these values in their healthier version. (also noted at the end of the Macronutrient Lesson)</p>	
<p>10 – 11</p>	<p>Learning Targets:</p> <ul style="list-style-type: none"> ● Determine 3 possible recipes to healthify my snack. <p>Career Ready Practices: 1, 3, 6, 7, 8, 11, 12</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> ● Perseverance ● Collaboration ● Professionalism ● Problem-Solving ● Self-Management ● Initiative 	<p>Team meeting, Research and Brainstorming</p> <ul style="list-style-type: none"> ● Brainstorm different options for the snack they want to “healthify” ● Students research different options for healthifying their recipe and bring their findings back to the group ● If needed, students brainstorm more ideas for the recipes or create a new recipe based on the ones they found in their research. ● Students narrow down their recipe ideas to 2-3 ideas. <p>Optional: Have students practice their unit rate math by calculating the cost of each recipe idea. This will help them determine the best idea to recreate.</p>	<p>You may need to encourage each group member to find different possible recipes. When they return to their group, they compare and contrast each recipe. You can challenge some groups to develop their own recipes based on the recipes they explored.</p> <p>To link back to prior learning, have students note any health benefits to each recipe including:</p> <ul style="list-style-type: none"> ● Increase or decrease in key macronutrients ● Increase in micronutrients ● Cooking techniques (such as baking instead of frying)

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Healthy by Design: Plan/Create Phase

Students will narrow down their recipe ideas to one idea. Students will learn chef skills and create the dish for testing.

Teacher Notes & Preparation

Key Concepts and Big Ideas

- A decision matrix is a tool used in the design industry to narrow down choices to the best choice given all the constraints.
- Being healthy is a sliding scale. Students will consider the best option for sliding their favorite snack toward a more healthy option.
- How you prepare food can help in making it healthier.

Preparation Notes

This phase includes a lesson about using a decision matrix to determine their best option. Students may or may not need this lesson in order to use it effectively.

Time has been allotted below for students to gain the necessary chef skills to produce their dishes. Use your judgment on what students will need and how to best teach them those skills.

Key Questions

What criteria will we use to determine which option is our best option for healthifying our recipe?

What is our best recipe option to try?

Key Vocabulary

[Common Healthy Cooking Vocabulary Terms](#)

Decision Matrix – a tool to evaluate and select the best option between different choices.

Map of Student Learning

Day	Learning Goals	Student Learning Tasks	Teacher Supports
12	<p>Learning Targets:</p> <ul style="list-style-type: none"> • Use healthy cooking terminology. <p>Career Ready Practices: 1, 2, 12</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> • Professionalism • Collaboration 	<p>Common Healthy Cooking Terms Essential Vocabulary Word Sort</p> <ul style="list-style-type: none"> • Give each group a copy of the Common Healthy Cooking Terms definitions and a copy of the word cards. You do not need to go over the definitions first. Students will read and learn them as they go through the word sort. You may have students cut up the cards prior to playing or have them pre-cut. • Round 1: In their groups, students sort the words into 5 categories of their choosing. They can use the vocabulary sheet to determine the meaning of each word and sort accordingly. Once all groups have sorted them, ask groups to share and defend their categories. 	<p>Students may have been exposed to new vocabulary terms as they were researching their recipes. This vocabulary protocol allows students to gain familiarity with vocabulary commonly associated with healthy cook with a bit of competition. The first round will take the longest. Each subsequent round will go faster.</p>

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		<p>Any group can challenge another group's category.</p> <ul style="list-style-type: none"> ● Round 2: Groups now sort the cards into 4 different categories. Once all groups have sorted them, ask groups to share and defend their categories. Any group can challenge another group's category. ● Round 3: Groups now sort the cards into 3 different categories. Once all groups have sorted them, ask groups to share and defend their categories. Any group can challenge another group's category. 	
13	<p>Learning Targets:</p> <ul style="list-style-type: none"> ● Determine the best recipe to produce given all constraints and criteria. <p>Career Ready Practices: 1, 4, 8</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> ● Professionalism ● Collaboration 	<p>Team Meeting: Decision Matrix</p> <ul style="list-style-type: none"> ● Students revisit their Know/NTK document and check off answered questions and document what they now know about how to increase the healthiness of a recipe. If there are some unanswered questions that will help them determine the best recipe, allow students to research and find answers to their questions. ● Give each group a copy of the decision matrix protocol. Remind them that in this case their “design” is their healthy recipe (whether they created the recipe or found it online or in another resource). ● Students list criteria and constraints to measure each recipe against. Examples include: <ul style="list-style-type: none"> ○ Perceived taste ○ Cost to create ○ Available materials ○ Time needed to create ○ Increased health ● Student teams use the decision matrix to determine the best recipe. <p>Students submit the best recipe and material list to the teacher for final approval.</p>	<p>The Better Plant project has a lesson on using the Decision Matrix. If you have not yet done that lesson, you may want to incorporate it here.</p>
14 – 16	<p>Learning Targets:</p> <ul style="list-style-type: none"> ● Practice recipe preparation skills needed for my recipe. <p>Career Ready Practices: 1, 2, 6, 11</p> <p>Power Skills Needed:</p>	<p>Lessons: Chef skills – from FACS curriculum</p> <ul style="list-style-type: none"> ● Knife skills ● Proper food handling ● Cooking techniques 	<p>Based on what students will need, provide small or whole group instruction to develop their chef skills.</p>

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	<ul style="list-style-type: none"> ● Professionalism ● Self-management ● Perseverance 		
<p style="text-align: center;">17 – 19</p>	<p>Learning Targets:</p> <ul style="list-style-type: none"> ● Calculate the macronutrients of my recipe. ● Calculate the micronutrients of the recipe. ● Compare the nutrients between your original snack and the healthy version. ● Apply my knowledge of cooking to create my recipe. ● Test my recipe and develop ideas for improving the recipe. <p>Career Ready Practices: 1, 2, 3, 4, 6, 8, 9, 11, 12</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> ● Perseverance ● Collaboration ● Professionalism ● Problem-Solving ● Initiative ● Communication 	<p>Creation Components:</p> <ul style="list-style-type: none"> ● Documentation <ul style="list-style-type: none"> ○ Calculate the macronutrients of the recipe and per serving (calories, fat, protein, carbohydrates, fiber) ○ Calculate the micronutrients of their recipe and per serving or if amount information is not available, list what micronutrients are in the dish. ○ Create a comparison table between their original snack and the healthy version of their snack. ○ Start writing out their recipe in a Word or Google Doc that includes the story of how this recipe is healthier than the original and the nutrient comparison chart. ● Develop a taste testing form for their group and anyone outside of the group to provide feedback. For example, if they want to maintain the crunch factor of their original snack, they want any person trying the dish to rate the crunch factor of the new dish. ● Their healthier version of their snack. ● Taste testing from the group and at least one other person. ● If needed, give groups this project-management task list. It has the above tasks listed along with blank rows for students to add more tasks. Students need to assign each other a task to do. As they are complete, they need your official signature to make it officially done. ● Note: If students are not going to create an improved dish, you may wish to skip to the taste testing event under the “Improve/Evaluate/Communicate” phase. 	<p>Depending on the availability of the kitchen space, students may need to work on documentation components while waiting for space in the kitchen. You will need to determine if food products can be saved for one taste-testing session, or if you will need to taste-test as you go. For this first taste test, students may only need their teammates and one other person (another student in the classroom, the teacher, or another adult) to provide feedback).</p>

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Healthy by Design: Evaluate/Improve/Communicate Phase

Goal of Phase

Students will improve their chef skills or recipe creation and prepare for the final taste-testing event. Students write up their entry for the class healthy cooking recipe book.

Teacher Notes & Preparation

Key Concepts and Big Ideas:

- Improvement is part of every design process, even when creating and preparing recipes.

Preparation Notes:

Depending on time, you can collapse or expand this phase as needed. Even if students do not create an improved dish, it still helps to have them thinking about how they might improve the recipe. Trying a recipe again allows students to deepen their chef skills and practice how a chef or recipe designer thinks about their craft.

Key Questions

How can I improve my dish?
How do I communicate the benefits of my dish to an audience?

Key Vocabulary

Map of Student Learning

Day	Learning Goals	Student Learning Tasks	Teacher Supports
19 – 20	<p>Learning Targets:</p> <ul style="list-style-type: none"> • Determine improvements to my dish. <p>Career Ready Practices: 1, 2, 4, 6, 8, 11, 12</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> • Perseverance • Collaboration 	<p>Team meeting: After cooking and getting feedback, students revisit and revise their recipe and any ingredients they may want to increase or decrease.</p> <p>Recipe Creation Part 2 – time allowing, you can stop with just the edits of the recipe; however, doing a recipe again allows students to gain confidence in their chef skills.</p> <p>Students update their documentation with their final recipes, summaries, and nutritional comparison charts.</p>	

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	<ul style="list-style-type: none"> ● Professionalism ● Problem-Solving ● Initiative ● Communication 		
21 – 22	<p>Learning Targets:</p> <ul style="list-style-type: none"> ● Communicate my final design to an audience <p>Career Ready Practices: 1, 4, 8, 12</p> <p>Power Skills Needed:</p> <ul style="list-style-type: none"> ● Collaboration ● Professionalism ● Self-Management ● Integrity ● Communication 	<p>Taste-testing event – The judging panel gets a little from each dish. Students can choose which dishes they want to try from their classmates. Students give the judges their taste-testing form to collect feedback on their recipes.</p> <p>Students submit their cookbook entries. The teacher collects these and puts them in a combined document to share with all students and their families.</p>	