IGNITEMYFUTURE

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SUBJECTS

Social Studies
Science
Health

COMPUTATIONAL THINKING PRACTICE

Collaborating Around Computing

COMPUTATIONAL THINKING STRATEGIES

Finding Patterns
Decomposition
Abstraction

MATERIALS

Sticky notes

Daily Healthy Eating Plan student capture sheet

Food Label Comparison student capture sheet

Food Label Template student capture sheet

Food Label Peer Evaluation student capture sheet

Computers with Internet access

Smartphones and Layar app (can use paper and drawing materials instead)

LESSON TITLE
Healthy Eating Is for Everyone!

Guiding Question: Is Life Fair?

Ignite Curiosity

- Are your favorite foods good for you?
- Which is more expensive: A potato or a bag of potato chips?
- Which types of foods are more expensive: fresh or prepared, uncooked or processed?
- What is meant by the terms "all-natural" and "organic" that we see on food labels? If a food is "low fat," is it healthy?

In this lesson, students will use the computational thinking strategy of decomposition to break apart the process of healthy eating to design a food label that helps people eat healthier. Students will identify patterns in recommendations for healthy eating and use these patterns to design and create the label. In **THINK**, students will act as marketers challenged to develop packaging that educates people about healthy eating and makes it easier for people to eat healthy. They will begin to decompose and identify patterns in recommendations for healthy eating by exploring various websites. They will obtain scientific explanations from text and multimedia sources and combine parts of each to reach a consensus around a general, basic healthy eating strategy. In **SOLVE**, they will apply these patterns to design a new food label for each of the main food groups in the plan. In **CREATE**, students will build and modify their new label using the free website Layar. They will integrate quantitative information, words, and text with visual information and a graph and evaluate one another's solutions to look for ways to improve them. In **CONNECT**, students will communicate and evaluate their labels and make connections to careers in marketing, health, and food service.

Students will be able to:

- **Understand** the problem of making healthy eating more accessible,
- **Evaluate** the descriptions used in food marketing and analyze against patterns in recommendations for healthy eating, and
- **Create** an improved food label that makes it easier for a consumer to understand the nutritional values of foods.

Students will act as marketers challenged to develop packaging that educates people about healthy eating and makes it easier for people to eat healthy.

1 **Read** the following scenario to students:

Imagine that you are a marketer working for the National Institutes of Health. Your team has been challenged to create new labels for healthy foods that educate people about healthy eating and make it easier for people to prepare healthy foods. Your team will provide the new labels to companies that produce these healthy foods to encourage people to buy the foods and lead healthier lives. You want to emphasize these points:

- *Healthy foods often cost less than processed foods.*
- *Preparing healthy foods can be easy and fun.*
- *A variety of fruits and vegetables and recipes from different cultures provide interest to everyone's diet!*

2 **To begin**, instruct students to brainstorm healthy eating ideas using sticky notes. Give each student three sticky notes and ask students to write one thought about healthy eating on each sticky note. Here are some questions to ignite their thinking:

- What food did you eat for breakfast or lunch today that you think is healthy?
- What is one food that you eat every day that you think is healthy?
- What is one food that you would like to eat more often that you think is healthy?
- What makes a food healthy or unhealthy?

3 **As the students write their thoughts**, they can bring the sticky notes to a central location. Have them read the posted notes as they add theirs. Any duplicates can be placed on top of each other.

4 **Read the notes and discuss** students' answers as a class. What thoughts or foods seem to be repeated? Ask the students to help you identify patterns.

5 **Be sure to redirect** any thinking of "healthy food tastes bad" or "healthy food is too hard or too expensive." Explain to students that many times how the food is prepared is what makes it taste bad or good. No one likes an overcooked vegetable or burnt food. Some prefer raw vegetables or smoothies, and these can be very nutritious. Tell the students that they will be exploring which foods are most expensive during the lesson.

6 **This discussion may lead to ideas** about serving sizes, which are important; if not, guide students to think about this topic. Use the portion distortion tool at the National Institutes of Health website in a group discussion with the class to emphasize that most foods can be eaten as part of a healthy diet in the correct serving size. The students should recognize the pattern of serving size as one of the basic parts of a healthy diet. If not, be sure to emphasize this pattern.

7 **Next**, instruct students to work in groups to decompose the problem by exploring various websites to look for patterns. What are the components of a healthy diet? (Students should say food groups. If not, lead them to this answer.)

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8 Distribute the Daily Healthy Eating Plan capture sheets to students. Tell students that they will use the computational thinking skill of abstraction to help them build a basic eating plan. They will attempt to remove the details assigned to different eating plans to reveal the threads underneath.

9 Assign each group one of the following websites: www.myplate.gov, NIH, CDC, or HHS. Using the Daily Healthy Eating Plan student capture sheet, instruct students to answer the following questions:
- What diseases or conditions can a basic healthy diet possibly prevent or reverse? What does scientific research show?
- With so many opinions on healthy eating, what could constitute a basic, healthy diet?
- What patterns do you see repeated among the various types of foods? Are some foods considered healthy in most or all diets?
- Within the basic groups of proteins, vegetables, fruits, grains, sweets, and fats, where do you find a consensus that constitutes a healthy diet?
- Be sure to record an appropriate measurement for serving/portion size for each category that most plans agree is reasonable.
- According to the various websites, how should the eating plan record drinks? What is an appropriate serving size of milk or juice? Into what category should sodas be placed?
- Emphasize to the students that unsweetened tea, coffee, and water have a place in a balanced diet. What do the different websites agree is their place?

10 Instruct students to investigate existing labels used on food to determine if they accurately represent healthy food choices. Ask each student to research two similar foods such as breakfast bars that are marketed as "healthy options." Guide them to answer the following questions:
- Are they really healthy?
- Are they labeled as "low fat," "no added sugar," "low calorie," or a similar designation?
- Compare the existing food label with the Daily Healthy Eating Plan student capture sheet: What patterns do you see?
- Do these designations accurately reflect the healthiness of the food according to the Daily Healthy Eating Plan student capture sheet?
- Students can use the Food Label Comparison capture sheet to record their findings.

11 Summarize and check for understanding by distributing sticky notes again and asking the students to write one fact that they have learned about healthy eating. Here are some guiding questions:
- What is so important about serving sizes?
- What is a typical serving size for a protein/vegetable/fruit/grain?
- What is an appropriate serving size for milk, juice, or soda? Can these be part of a healthy diet? Why or why not? *[If students have trouble with this question, explain to them that milk, although a liquid, is a food and has a daily serving size. In addition, juice is not water but concentrated fruit and should be subject to the same serving sizes.]*
- What diseases or conditions can a basic healthy diet possibly prevent or reverse? What does scientific research show?



After they have identified patterns in recommendations for healthy eating, recorded them on the capture sheet, and investigated existing food labels, students will work in groups to create different aspects of their improved food label.

1 **Assign** each group a food group that is part of the healthy eating plan: protein, dairy, vegetables/fruits, and grains. Emphasize to the groups that they should incorporate the sweets/fats group into the other groups as appropriate. For example, an avocado is an example of a healthy fat. The label for an avocado could include a recipe for using avocado instead of mayonnaise in chicken salad. Fresh berries or apples baked with just a sprinkle of spices and oatmeal make a delicious dessert.

2 **As the groups design their label**, they will choose four foods and answer the following questions for each:

- What are easy, budget-friendly ways to prepare each food?

- Are any healthy foods available locally?

- Could my foods utilize "organic," "all-natural," "real food," "locally grown," or other designations? Remind the students of their research on current labels. Some good resources for healthy food tags are https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm385663.htm#QA and https://www.foodpackaginglabels.net/healthy-food-tags/

3 **As the groups work** on the different aspects of their improved food label for each food, they will use the Food Label Template capture sheet to help them organize their thoughts. Each food's label should include the following:

- A unique icon that incorporates color coding from www.myplate.gov for their food (red for fruits, green for vegetables, brown for grains, blue for dairy, and purple for proteins)

- A simple recipe

- A grocery list

- A link to a cooking video

4 **When searching** for recipes and videos, students should be encouraged to include recipes, foods, and videos from a variety of cultural backgrounds. Utilizing many different types of foods and styles of cooking adds interest and variety to meal planning.

5 **The label should be able to be modified** for a canned food or a fresh food, especially for healthy fresh foods available locally. (Emphasize fresh, local foods whenever possible.) The label should include a section for incorporating and choosing ripe fruits and vegetables, and should utilize "organic," "all-natural," "real food," "locally grown," or other designations as appropriate.

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Students will incorporate the different aspects of the label into one document using the Layar website and app.

1 **Still working in groups**, instruct students to finalize the icon they began in Solve.

2 **Then**, have students condense the information from the capture sheet into an image that has the least amount of text possible for the different parts of the label.

3 **Recipes and grocery lists** will be converted to formats that work well for Layar (.jpg, .png, .pdf).

4 **Cooking videos can be links**, or students can create and film their own videos as an extension activity.

5 **The final part** of the label will be a graph that shows where the food falls in comparison with the price of a less-healthy alternative. (For example, a label for a fresh potato could show how it compares with a bag of frozen French fries in terms of cost per serving size.) A nice tool for quick graphs can be found at https://www.desmos.com/calculator. Here is a screen shot of a sample graph:
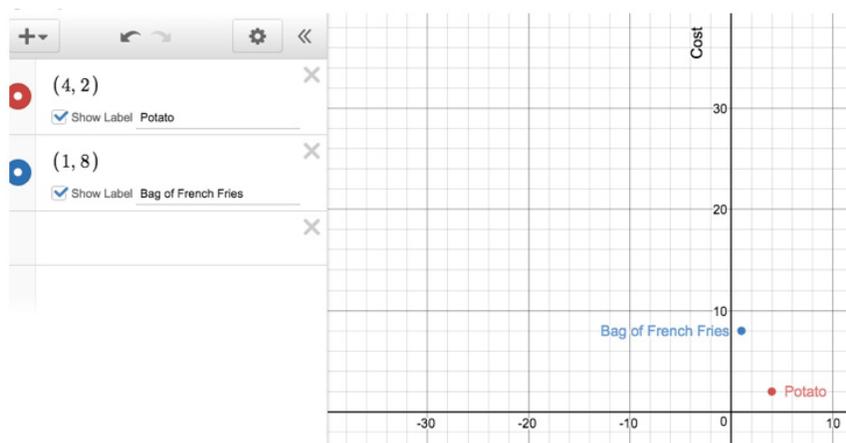
6 **To use the Layar application**, students should first create an account at www.layar.com.
- Choose a username and password, and verify by checking for an email message.
- Choose a campaign type.
- Add buttons as desired.
- Drag and drop images into the document.
- Download the Layar app to a smartphone.
- Publish the document, and test it by viewing it through your smartphone.

7 **After students have created their labels**, they can share them with partners or in groups and give one another feedback and suggestions for making the labels more visually engaging, more educational, or more relevant to the food. Peers can record their feedback on the Food Label Peer Evaluation capture sheet, and students can use these sheets to revise their labels to make them more effective.

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Select one of the strategies listed below to help students answer these questions:

- **How do this problem and solution connect to me?**
- **How do this problem and solution connect to real-world careers?**
- **How do this problem and solution connect to our world?**

1 Write the three questions on PowerPoint or flip chart slides and invite students to share out responses.

2 Display pieces of chart paper around the room, each with one question written on it. Ask students to write down their ideas related to the questions on each sheet.

3 Assign one of the questions to three different student groups to brainstorm or research, and then share out responses.

4 Invite students to write down responses to each question on a sticky note, and collect them to create an affinity diagram of ideas.

How does this connect to students?

Students who have completed this lesson will have more concrete knowledge of how computers make tedious tasks easier and understand the power of thinking like a computer by decomposing this problem and finding patterns.

By the end of this lesson, students will have learned many specific things about food and healthy eating habits. They will also have experienced the benefit of working in teams, breaking down tasks into steps, and finding patterns, all of which make any daily task or job easier.

Extensions of this lesson could be to have students communicate with friends or family their basic Healthy Eating Plan, survey their neighbors about healthy eating habits, or analyze the school breakfast or lunch program offerings.

How does this connect to careers?

Chefs and Head Cooks oversee the daily food preparation at restaurants and other places where food is served. They direct kitchen staff and handle any food-related concerns.

Dietitians and Nutritionists are experts in the use of food and nutrition to promote health and manage disease. They advise people on what to eat to lead a healthy lifestyle or achieve a specific health-related goal.

Restaurant Managers and Food Service Managers are responsible for the daily operation of restaurants and other establishments that prepare and serve food and beverages. They direct staff to ensure that customers are satisfied with their dining experience, and they manage the business to ensure that it is profitable.

Health Educators and Community Health Professionals share information about healthy eating habits and preventing diseases with at-risk populations.

Advertising, Promotions, and Marketing Managers plan programs to generate interest in products or services. They work with art directors, sales agents, and financial staff members.

How does this connect to our world?

Everyone needs to eat as healthy as possible, but often this can seem difficult. This is especially true for those with chronic health conditions like diabetes. There are many ideas of a "healthy diet," but do these ideas have anything in common? It takes knowledge to purchase ripe fruits or to ripen fruits. What about frozen vegetables? Are they as healthy as fresh? How can food be prepared easily? Are there shelf staples that can be used? While this lesson lends itself to chef, cooking, nutritionist, and marketing careers, everyone can utilize the basic ideas of good food and a healthy diet.

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National Standards

NEXT GENERATION SCIENCE STANDARDS

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models **Develop a model to describe unobservable mechanisms.**	**LS1.C: Organization for Matter and Energy Flow in Organisms** Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy.	**Energy and Matter** Matter is conserved because atoms are conserved in physical and chemical processes.

THE COLLEGE, CAREER, AND CIVIC LIFE (C3) FRAMEWORK FOR SOCIAL STUDIES STATE STANDARDS: GUIDANCE FOR ENHANCING THE RIGOR OF K-12 CIVICS, ECONOMICS, GEOGRAPHY, AND HISTORY

Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Economic Decision Making
BY THE END OF GRADE 8
D2.Eco.1.6-8. Explain how economic decisions affect the well-being of individuals, businesses, and society

NATIONAL HEALTH EDUCATION STANDARDS

1 Students will comprehend concepts related to health promotion and disease prevention to enhance health.

2 Students will demonstrate the ability to access valid information, products, and services to enhance health.

3 Students will demonstrate the ability to use interpersonal communication skills to enhance health and avoid or reduce health risks.

4 Students will demonstrate the ability to use decision-making skills to enhance health.

5 Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

K-12 COMPUTER SCIENCE FRAMEWORK

Practice 2. Collaborating Around Computing
Collaborative computing is the process of performing a computational task by working in pairs and on teams. Because it involves asking for the contributions and feedback of others, effective collaboration can lead to better outcomes than working independently. Collaboration requires individuals to navigate and incorporate diverse perspectives, conflicting ideas, disparate skills, and distinct personalities. Students should use collaborative tools to effectively work together and to create complex artifacts.

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Daily Healthy Eating Plan

List examples and serving sizes for each.

| Proteins	Vegetables	Fruits	Grains

What diseases or conditions can a basic healthy diet possibly prevent or reverse?

What does scientific research show?

Food Label Comparison Capture Sheet

	Food #1	Food #2
Label Designation		
Calories appropriate for food group?		
Sugars appropriate for servings/per day		
Balance of proteins/fats/ sugars appropriate?		
Better for child or adult?		
Serving size accurate according to MyPlate.gov?		

Food Label Template
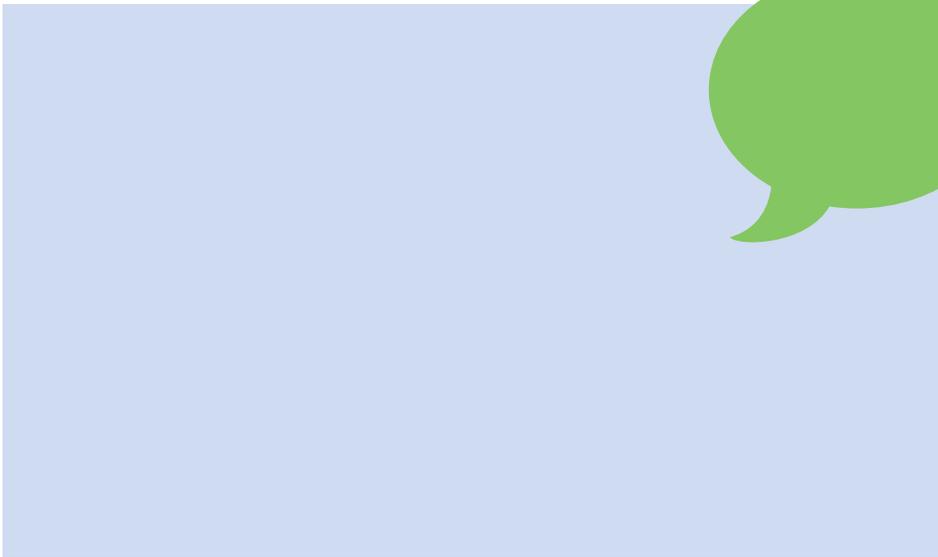
Shopping List

Video Link

Recipe

Price Comparison Graph

Food Label Peer Evaluation

Mark "yes" or "no" for each criterion as you evaluate your classmate's label. Then, write comments, such as what is particularly well done and what may be confusing, and suggestions in the columns on the right.

Criterion	Yes	No	Comments	Suggestions
Label is visually engaging.				
All parts of the label are easy to read.				
Label includes an icon that shows the correct food group.				
Recipe is simple and easy to follow.				
Shopping list includes all ingredients for recipe.				
Label includes graph showing price comparison.				
Label includes link to a cooking video.				
All elements on label are relevant to the food.				

Additional Comments and Suggestions: