



Food & Nutrition Cards

Using Food to Teach Applied Mathematics and Science

Geared toward grades 3 – 5 • Adaptable for Grades 6 – 8

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Food & Nutrition Cards

Using Food to Teach Applied Mathematics and Science



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Section 1: Measurement



Kitchen Math!

Let's explore the different ways to measure!

Did You Know?

We measure dry ingredients and wet ingredients with different tools. Take a close look at all of your measuring cups. You can tell which one to use because dry measuring cups have a flat rim while liquid measuring cups have a pour spout!

Food For Thought!

There are 3 teaspoons in 1 tablespoon. In other words, a teaspoon is $\frac{1}{3}$ of a tablespoon or 3 teaspoons is equal to 1 tablespoon. How many tablespoons are there in a 1 cup measure? What fraction of a cup would that represent?

Explore It Yourself!

Discover as many equivalents as you can by using your tools, bowls, flour, and water!

Supplies

EQUIPMENT

- Dry measuring cups
- Measuring spoons
- Liquid measuring cup
- Plastic butter knife

FOOD

- Flour
- Water

Directions

1. Demonstrate how each tool is used to measure ingredients. Be sure to show participants how to level off dry ingredients using the back of their plastic butter knives.
2. Allow paired participants to see and touch the measuring tools.
3. Facilitate observation of fractions. Encourage paired participants to ask their own questions to explore and answer. For example, participants might try measure 1 cup of flour by using a $\frac{1}{4}$ cup multiple times. They may come to the conclusion that the fraction is a portion of a whole.
4. Allow free experimentation and guide participants to choose a way to organize their findings.

Extension Ideas

- Remove some tools and ask participants to figure out how to measure without those tools. For example, remove the teaspoon and tablespoon and ask the participant to measure out a tablespoon with the remaining $\frac{1}{2}$ teaspoon.



Weigh Cool!

Let's find out how to use a food scale to weigh dry ingredients!

Did You Know?

The standard way of measuring ingredients is different depending on where you are in the world. For example, in the United States there are dry measuring cups and spoons to measure out ingredients such as flour, but in other parts of the world, it is more common to weigh dry ingredients using a food scale.

Food For Thought!

How do professional chefs get the same great recipe results every time? They use food scales in their kitchens because they are much more accurate than measuring cups!

Explore It Yourself!

Use measuring cups and spoons to portion dry ingredients and then weigh the dry ingredient on a food scale in ounces and/or grams.

Supplies

EQUIPMENT

- Dry measuring cups
- Measuring spoons
- Food scale

FOOD

- Flour

Directions

1. Place the 1 cup measuring cup on the food scale and zero the scale.
2. Remove the cup from the food scale without zeroing the scale.
3. Use the cup to measure out 1 cup of flour.
4. Place the measuring cup full of flour onto the food scale.
3. Record the weight of the 1 cup in ounces and/or grams.
4. Repeat the steps with other units of measure. For example, a teaspoon.
5. Discuss the weights that participants recorded. Why did certain measuring tools have more weight?

Extension Ideas

- Using the recorded weights, have participants estimate what the weight of 2 cups of flour would be.
- Review abbreviations for household and weight measures. For example, teaspoon (tsp) or ounce (oz).



Practice Being Weigh Cool!

Let's use dry measuring cups and our food scale to find out the difference in the weight between the two ways of measuring!

Did You Know?

One way to measure dry ingredients like flour, sugar and salt is by using dry measuring cups and measuring spoons, but the best way is to use a food scale!

Food For Thought!

When you use a measuring cup to measure dry ingredients, it's hard to be sure you measured the exact amount of an ingredient for a recipe. That's because when you use measuring cups you might have pushed down or packed your ingredient more one time than another, or you might not have filled the cup quite full enough. Chefs use food scales to measure exactly the right amount of ingredients in a recipe so they can make it perfectly every time!

Explore It Yourself!

Have some fun with your dry measures and food scale! Find out how much each cup measure of your dry ingredients weighs!

Supplies

EQUIPMENT

- Dry measuring cups
- Food scale
- Small bowl
- Sifter
- Plastic butter knife

FOOD

- Flour

SCHOOL SUPPLIES

- Pen or Pencil
 - Paper
-

Directions

1. Place a small bowl on the food scale and zero it.
 2. Measure 1 cup of flour and place it in the small bowl.
 3. Record the weight of the flour in the small bowl.
 4. Repeat steps 1-3 but sift or pack the flour.
 5. Compare the recorded weight of one cup of the flour for each technique.
 6. Explain to participants that individuals measuring with household measuring tools have variations in technique. Some handle the flour more gently while others might cause more packing in the container thus weights may differ.
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Extension Ideas

- Repeat the activity with other dry ingredients.



The Heavyweight Champ!

Let's find out the weights of different dry ingredients!

Did You Know?

Look at a food label. The ingredients on food labels are listed in descending order by weight. This means that the ingredient amount that weighs the most is listed first and the ingredient amount that weighs the least is listed last.

Food For Thought!

Which is heavier, one cup of packed brown sugar or one cup of granulated sugar? Why?

Explore It Yourself!

Look at all the ingredients you have been given. Can you guess which will be heavier?

Supplies

EQUIPMENT

- Dry measuring cups
- Food scale
- Small bowl

SCHOOL SUPPLIES

- Pen or pencil
- Paper

FOOD (SUGGESTED)

- Flour
- Sugar
- Brown Sugar
- Chocolate Chips

Directions

1. Place a small bowl on the food scale and zero the scale.
2. Measure 1 cup of flour and place it in the bowl.
3. Record the weight of 1 cup of flour.
4. Repeat steps 1 – 3 with each dry ingredient.
5. Compare the weight of each dry ingredient.
6. Have participants create a scaled picture graph or a bar graph to represent their findings.
7. Facilitate a discussion about the weight comparison.

Extension Ideas

- Let each group participant have a chance to conduct the experiment and compare recorded results. Which ingredient had the least variation in weight across the recorded measures and why?



The Gallon Lab!

Let's explore the different units of liquid measurements!

Did You Know?

We use liquid measuring cups to measure wet ingredients when cooking and baking. But sometimes we need to measure larger amounts! That's when we need to use measuring tools like gallons, quarts, pints, and cups.

Food For Thought!

When you measure liquids, you are measuring the volume of the liquid! Volume is the measurement of the amount of space a substance or ingredient takes up in a container.

Explore It Yourself!

Use a clean empty gallon container to make your own model of the most common liquid units of measure!

Supplies

EQUIPMENT

- Clean empty gallon container
- Gallon pitcher
- Funnel
- Liquid measuring cup

FOOD

- Water

SCHOOL SUPPLIES

- Marker
-

Directions

1. Discuss with participants about how 2 cups make up a pint, 2 pints make up a quart, and 4 quarts make up a gallon, and that they will be creating a visual for this concept.
 2. Give each group an empty gallon container and a gallon of water in a pitcher.
 3. Have each group member add 1 cup of water at a time and use the marker to indicate the water level for each cup.
 4. Use the marker to indicate when the water level is at a pint, a quart, 2 quarts, and a gallon.
 5. Create a conversion table for their findings. For example, 1 gallon = 4 quarts.
-

Extension Ideas

- Quiz the participants on how many cups are in a pint, pints in a quart, and quarts in a gallon.
- Make the quiz more challenging by asking how many cups are in a quart and how many cups are in a gallon.
- Discuss other ways to remember the information that was reviewed. For example, The Royal Land of Gallon.



Making Sense Of Milliliters!

Let's compare kitchen units to scientific units when measuring liquids!

Did You Know?

Although in the kitchen we measure liquids in teaspoons, tablespoons and cups, scientists use graduated cylinders to measure in milliliters. Look at your liquid measuring cup and compare it to a graduated cylinder. Notice that the graduated cylinder uses milliliters while the liquid measuring cup uses fractions and ounces.

Food For Thought!

Scientists measure in milliliters because it is a lot more accurate than measuring liquids with kitchen units. This is because milliliters can measure smaller amounts of liquids than kitchen units can.

Explore It Yourself!

How many milliliters is in one cup? How about a tablespoon? Find out by measuring the volume of a liquid using kitchen units and scientific units.

Supplies

EQUIPMENT

- Liquid measuring cup
- Graduated cylinder

FOOD

- Water

Directions

1. Measure 1 cup of water using the liquid measuring cup.
2. Transfer water to the graduated cylinder.
3. Write down the amount of water in the graduated cylinder. For example, 1 cup of water = 237 milliliters.
3. Practice with different amounts and different liquid measuring tools.

Extension Ideas

- Review a liquid conversion chart.
- Have participants create their own liquid conversion chart.
- Weigh different liquid amounts on a food scale and record ounces and/or grams.
- Review unit measurement abbreviations. For example, teaspoon (tsp), milliliters (mL), or ounce (oz).



Let's Make No Bake!

Let's practice our measuring skills by making some chocolately goodness!

Did You Know?

Accurately measuring ingredients with the right measuring tools will give you the results you are looking for when following a recipe.

Food For Thought!

Sometimes the smallest change in the amount of one ingredient in a recipe can make a big difference in the appearance, texture and taste of a food. For example, adding too much liquid can make your cookies too thin!

Explore It Yourself!

Read this no-bake cookie recipe and show off your measurement skills to mix up a great batch of cookies!

Supplies

EQUIPMENT

- Cookie sheet pan
- Large bowl
- Mixing spoon
- Refrigerator

- Spoon
- Parchment Paper

FOOD

- 2 tablespoons oil
- 1/2 cup brown sugar

- 1/2 teaspoon salt
- 3 tablespoons milk
- 1 tbs vanilla extract
- 1 1/2 cup oat flour
- 1/2 cup chocolate chips

Directions

1. Line a cookie sheet pan with parchment paper, set aside.
2. In a large bowl, mix the oil and brown sugar.
3. Add the milk and vanilla to the same bowl and combine.
4. Once the wet ingredients are combined add in the oat flour and salt, stirring until just incorporated. Once the dough has formed gently fold in the chocolate chips.
5. Using a spoon, scoop approximately 2 tablespoons of dough into your hand. Roll into a ball then place on the lined cookie sheet pan and press down to a 1/2 inch thickness.
6. Repeat the process until you have used all of the cookie dough.
7. Allow to set in the refrigerator for a minimum of 20 minutes. Enjoy!

These cookies can be kept covered and stored in the refrigerator for up to 10 days.

Extension Ideas

- Convert the recipe to weight measures and make the recipe using weight measurements.



Section 2: Food Safety



Healthy Hands!

Let's find out how effective handwashing is and learn how to be expert bacteria busters!

Did You Know?

People spread bacteria when they don't wash their hands. Your hands are the biggest movers of bacteria to the surfaces you touch and most importantly, to the food you might be preparing!

Food For Thought!

You might be surprised to know how poorly people wash their hands! A few know exactly how long it takes for warm water and soap to eliminate all the bacteria and what areas, such as underneath nails and in between fingers, need extra scrubbing. Washing hands isn't just for restroom visits! Remember to wash after blowing your nose, coughing, sneezing, caring for pets and taking out the trash.

Explore It Yourself!

Use Glo Germ™ gel and a UV light to see just how well you are really washing your hands!

Supplies

EQUIPMENT

- UV light
- Sink or washing station

GENERAL SUPPLIES

- Glo Germ™ gel
- Hand soap
- Paper towels

SCHOOL SUPPLIES

- Paper
- Pen or pencil
- Colored pencils

Directions

1. Trace your hand on a piece of paper. Draw your prediction for where bacteria will be found using a green pencil.
2. Spread a quarter size amount of Glo Germ™ over both hands, wrists, between fingers and under fingernails.
3. Place your hands under the UV light to view the bacteria present. This works best in a darkened room.
4. Draw observations of where the most bacteria are present on unwashed hands using a yellow pencil.
5. Discuss the steps for correct handwashing and then wash your hands according to the procedure:
 - a. Wet your hands with warm running water.
 - b. Use enough soap to make lots of bubbles.
 - c. Rub your hands together for 20 seconds.
 - d. Scrub under your fingernails and between your fingers.
 - e. Rinse off all soap under running water.
 - f. Dry your hands with a clean paper towel.
 - g. Use the same paper towel to turn off the water.
6. Repeat steps 2 and 3. Draw observations of bacteria using the red pencil. Compare to your prediction in step 1.

Extension Ideas

- Discuss why hand washing is able to remove bacteria.



Movin' Microbes!

Let's find how bacteria can travel around your kitchen!

Did You Know?

Cross contamination is the term for when harmful bacteria from one place hitches a ride on your hands, the counter or utensils and ends up spreading to another surface or food!

Food For Thought!

Bacteria from food can contaminate different surfaces in the kitchen, such as a cutting board. Bacteria can live on surfaces between 4 hours to months!

Explore It Yourself!

Let's use Glo Germ™ to discover surface cleanliness.

Supplies

EQUIPMENT

- UV Light
- Sink or washing station
- Plastic or wood cutting board

GENERAL SUPPLIES

- Glo Germ™ gel
 - Dish soap
 - Sponge
-

Directions

1. Spread Glo Germ™ evenly to cover the entire cutting board.
 2. Use the UV light to examine the cutting board. Make observations.
 3. Wash the cutting board using soap, warm water, and a sponge.
 4. Use the UV light to examine the cutting board. Compare your observations from step 2.
 5. Discuss how bacteria can spread from surfaces to foods.
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Extension Ideas

- Compare a new cutting board to a used cutting board.
- Compare wood and plastic cutting boards.
- Discuss as a group why the bacteria was able to live on some surfaces before being washed and why it wasn't able to live on surfaces after washing.



The Big Bread Wipe!

Let's see what happens when you plant bacteria on purpose!

Did You Know?

Bacteria are by far the greatest cause of what makes you sick. This bacteria can get into our bodies through the foods we eat.

Food For Thought!

The point of washing your hands is to get rid of bacteria that could make you sick. It is easy to forget about the bacteria you can't see on your hands when touching your food.

Explore It Yourself!

Bacteria love to live on food! Use a slice of bread to discover the impact of food handling on bacteria growth.

Supplies

GENERAL SUPPLIES

- 2 plastic sandwich bags
- Pen or marker

FOOD

- 2 slices of bread
-

Directions

1. Label one bag “unwashed hands” and one bag “washed hands.”
 2. Take one slice of bread and rub your hands all over it and place it in the bag labeled “unwashed hands”.
 3. Wash your hands well.
 4. Place the other slice of bread in the bag labeled “washed hands”.
 5. Place both bags on the counter for a few days or a week.
 6. Observe and compare bacteria growth.
-

Extension Ideas

- Discuss the different harmful bacteria.
- Discuss why the bacteria was able to grow.



Hot or Cold?

Let's become experts at taking temperature readings!

Did You Know?

A common type of kitchen thermometer is called a bimetallic stem thermometer.

Food For Thought!

Most bacteria can not survive high temperatures. This is why certain foods should be cooked to certain temperatures. If foods are not cooked to the correct temperatures, they can still have the bacteria that can make us sick. Chefs use thermometers regularly to check the temperature of foods to make sure that the food is safe to eat.

Explore It Yourself!

Experiment with how to use a bimetallic stem thermometer.

Supplies

EQUIPMENT

- Bimetallic stem thermometer
- 2 clear cups

FOOD

- Water (hot and cold)
 - Ice
-

Directions

1. Demonstrate how to use the bimetallic stem thermometer. (Point out the sensing area on the bottom/tip.)
 2. Have the participants place the stem of the thermometer into the cup of hot water. Remind participants that the whole sensing area must be underwater and that the stem should not touch the bottom or sides of the cup.
 3. Watch as the needle moves and then comes to a stop. Explain the meaning of the markings on the thermometer and read the temperature.
 4. Repeat steps 2 and 3 in the cold water. Repeat again with ice added to the cold water.
-

Extension Ideas

- Discuss how other professions use thermometers.
- Show participants a variety of thermometers and/or have participants list all the types of thermometers and uses.
- Discuss the difference between Celsius and Fahrenheit.
- Discuss how bacteria are not able to survive all temperatures.



Keep Leftovers Fresh for Later!

Let's learn about which is the best way to store food!

Did You Know?

Air is the enemy of food freshness! Food storage containers help keep food fresh by cutting down the amount of air that gets in and around the food that would cause bacteria to grow.

Food For Thought!

There are different types of food storage containers such as plastic or glass.

Explore It Yourself!

Test various food storage containers to see which one promotes or prevents the growth of bacteria.

Supplies

EQUIPMENT

- Plastic container with lid
- Glass container with lid

FOOD

- 4 slices of bread

GENERAL SUPPLIES

- Plastic bag with zipper closure
 - Paper plate
-

Directions

1. Place one slice of bread in each of the food storage containers and one on a paper plate.
 2. Leave the food storage containers and paper plate on the counter for a few days or a week.
 3. Compare the bacteria growth in all of the slices of bread.
 4. Discuss which food storage container had the least bacteria growth.
-

Extension Ideas

- Compare food storage container in different locations and/or at different temperatures.
- Discuss how foods are stored safely including temperatures and humidity.
- Discuss which environment the bacteria seem to survive the best/worst in.



Stay Out of the Danger Zone!

Let's observe the impact of temperature on bacteria growth.

Did You Know?

Bacteria grow most rapidly in the range of temperatures between 41° F and 135° F. This range of temperatures is often called the "Temperature Danger Zone."

Food For Thought!

If food is in the Temperature Danger Zone for 2 hours or more, that food may no longer be safe to eat. This is because bacteria may have grown during that time it was in the Temperature Danger Zone.

Explore It Yourself!

Use bread to demonstrate the impact of temperature on bacteria growth.

Supplies

GENERAL SUPPLIES

- 2 plastic bags with zipper closure

EQUIPMENT

- Refrigerator

FOOD

- 2 slices of bread
-

Directions

1. Place one piece of bread in each bag.
 2. Place one bag on the counter and put one bag in a refrigerator.
 3. Check to see what happens to the bread over a few days or a week.
 4. Compare the difference of bacteria growth on each piece of bread.
-

Extension Ideas

- Visit the U.S. Department of Agriculture website www.usda.gov and search Temperature Danger Zone. Review and discuss the information.
- Check the temperature of your home and/or facility refrigerator (40° F or below) and freezer (0° F) to ensure proper temperature control.
- Discuss which environment the bacteria seem to survive the best/worst in.



Temperature Game Time!

Let's learn about the specific cooking temperatures that every safe chef knows about!

Did You Know?

Handling and cooking meat incorrectly can make you sick. Preventing bacteria from making us sick starts with safe and clean food handling practices. Cooking food to the proper temperature can eliminate the bacteria that can make us sick!

Food For Thought!

Different meats may have different temperature requirements. This is because bacteria affects each meat differently.

Explore It Yourself!

Create a game to learn and remember the safe cooking temperatures for various meats.

Supplies

SCHOOL SUPPLIES

- Index cards
 - Pen or marker
-

Directions

1. Visit the U.S. Department of Agriculture website www.usda.gov and search meat temperature chart.
 2. Review and discuss the information.
 3. Using the meat temperature chart, have group participants create a game for learning internal cooking temperatures for various meats.
 4. Create a set of directions for the game and play cards.
-

Extension Ideas

- Have group participants play the games created by other groups.
- Demonstrate cooking a hamburger patty. Cut the patty open to show the inside at various cooking temperatures.
- Discuss how bacteria is not able to survive all temperatures.



Super Food Safety Inspector!

Let's become a food safety inspector!

Did You Know?

Following proper food safety guidelines at school and at home can help keep away the bacteria that makes you sick and keep you healthy!

Food For Thought!

The Department of Public Health employs Public Health Sanitarians to inspect public food preparation facilities. Sanitarians enforce health and safety regulations.

Explore It Yourself!

Use the Food Safety Inspection Checklist found on our website to evaluate your personal food safety practices.

Supplies

SCHOOL SUPPLIES

- Food Safety Inspection Checklist (foodmaster.org/FAN/2.8.pdf)
- Pen or pencil

Directions

1. Use the checklist to see how you and your space are staying safe!
2. Discuss as a group why each item is important.

Extension Ideas

- Using the checklist, have participants work with parents to inspect their home kitchens.
- Visit www.fightbac.org for additional food safety education.



Section 3: Vegetables



Eating a Variety of Vegetables

VEGETABLES 3.1

Veggie Variety Challenge!

Let's learn more about the many different vegetables!

Did You Know?

Most Americans do not eat the variety or number of vegetables that they need to get enough vitamins and minerals.

Food For Thought!

There are 1,097 different vegetable species around the world. Because of this, food scientists group vegetables based on where the vegetable grows on the plant. For example, a tomato is a vegetable we eat but is the fruit of the plant while lettuce is the leaf of the plant.

Explore It Yourself!

Complete the vegetable survey found on our website to find out if you're eating a variety of vegetables.

Supplies

SCHOOL SUPPLIES

- Vegetable Survey Worksheet (foodmaster.org/FAN/3.1.pdf)
- Pen or pencil

Directions

1. Ask participants to complete the survey. Which vegetables have they tried? How often do they consume them?
2. Discuss a goal for the students to try at least one new vegetable.
3. Save this list and check off the new vegetables you try!

Extension Ideas

- How many servings of vegetables should you eat every day?
- Discuss different ways to eat and enjoy new vegetables.



Inspector Green Bean!

Let's inspect the quality of food and talk about food waste!

Did You Know?

When we eat, we use all five senses, especially our eyes. If food does not look appealing, we won't want to eat it and it's thrown away. That creates food waste.

Food For Thought!

Every year, about one-third of food produced, intended for human consumption, is wasted or lost. That is over \$1 trillion dollars and around 1.3 billion tons of food, enough to feed 3 billion people!

Explore It Yourself!

Become a food quality inspector! Sort and weigh canned whole green beans to discover how much food loss there might be.

Supplies

EQUIPMENT

- Strainer
- Can opener
- Food scale
- Sink

GENERAL SUPPLIES

- 6 paper plates

FOOD

- 3 cans whole green beans, all different brands
-

Directions

1. Label your plates Can A, Can A defects, Can B, Can B defects, Can C, and Can C defects.
 2. Open one can of whole green beans and drain the liquid using the strainer.
 3. Using the scale, weigh the plate labeled Can A and record the amount.
 4. Place all of the drained green beans from Can A on the plate and weigh. Subtract the weight of the plate and record.
 5. Sort the green beans with defects from the uniform green beans. Record the counts and weights of both piles.
 6. Repeat steps 3-5 with the remaining brands. Which can had the least number of defects?
 7. Compare the weights of the uniform whole green beans and the defects for all of the cans.
-

Extension Ideas

- Does the price of the can of green beans determine the quality of the uniform beans?
- Find out where in the world each can of green beans were grown in. Is there a difference between the quality of the beans and where they were grown?



Spectacular Spud!

Let's look at the difference between a potato before and after cooking it!

Did You Know?

Root vegetables like potatoes are high in antioxidants. When they are cooked, the vitamins and minerals are released from the cell walls in the potato with the loss of water. That lowers the nutrient content!

Food For Thought!

We cook potatoes instead of eating them raw since raw potatoes typically have a bitter taste and a starchy texture that may be unappealing. Raw potatoes may also cause more digestive issues than cooked potatoes.

Explore It Yourself!

Observe the changes in the potato after cooking it.

Supplies

EQUIPMENT

- Microwave
- Microwave safe plate
- Knife
- Fork (not plastic)

GENERAL SUPPLIES

- Magnifying glass
- Tape measure
- Food scale

FOOD

- 2 potatoes

Directions

1. Weigh both potatoes on a food scale and record the weights.
2. Measure length, height and around the potatoes using the tape measure and record.
3. Next, poke holes in one of the potatoes using a fork.
4. Place the potato with holes in the microwave and cook for 5 minutes on a microwave safe plate.*
5. Once the potato is done and cool enough to touch, repeat steps 1 and 2.
6. Measure length, height and around the cooked potato using the tape measure and record.
7. Create a graph to demonstrate the changes that occurred after cooking the potato.
8. Use a magnifying glass to observe the cooked potato compared to the uncooked potato and note differences.

*Cooking time may vary based on microwave and size of potato.

Extension Ideas

- Cook the cooked potato for 1 additional minute. What happens? How do you think this will impact the taste and texture?
- Can the changes that the potato experienced be reversed?



Vegetable Benefits by Color

VEGETABLES 3.4

Colorful Connections!

Let's discover which vegetables benefit specific parts of our bodies.

Did You Know?

Eating vegetables in a variety of colors is one way to get all the vitamins and minerals you need for your body. In general, people need to eat at least 2-4 servings of vegetables every day.

Food For Thought!

There are 5 color groups of vegetables: red, yellow/orange, green, blue/purple, and white/brown. Each color has its own health benefit for your body.

Explore It Yourself!

Create an artistic illustration of where each color of vegetable can benefit our bodies.

Supplies

SCHOOL SUPPLIES

- Crayons or colored pencils
 - Template of an anatomy body
-

Directions

1. Explain that various vegetables are different colors of the rainbow and that each color group benefits different parts of the body.
 2. Color the body using the color of the vegetables and where they are good for you! Show pictures of vegetables if possible.
 - a. Red – Heart, Head (memory) - beets, radishes, red peppers, red potatoes, tomatoes
 - b. Yellow/Orange - Heart, Eyes, Immune System - butternut squash, carrots, corn, orange peppers, pumpkin, sweet potatoes, yellow peppers, yellow squash
 - c. Green – Eyes, Bones, Teeth - artichokes, asparagus, avocados, bok choy, broccoli, Brussels sprouts, celery, collard greens, cucumber, green beans, leeks, okra, green onions, green peppers, peas, zucchini
 - d. Blue/Purple - Head (memory) - eggplant
 - e. White/Brown - Heart - cauliflower, garlic, mushrooms, onions, potatoes, parsnips, shallots
-

Extension Ideas

- Provide participants with a coloring sheet and have them color it based on the type and amount of vegetables they eat on average. Compare it to the coloring of the full rainbow diet.
- Challenge participants to try a new vegetable for each color group.



Preservation Particulars!

Let's observe how different preservation methods can change the taste and texture of spinach.

Did You Know?

There are different types of preservation methods, such as canning or freezing. All vegetables, fresh, frozen or canned, are good-for-you foods that can be enjoyed at any time!

Food For Thought!

The nutrient content of vegetables can vary depending on the type of vegetable, preservation method, length of storage, and cooking method.

Explore It Yourself!

Compare fresh, frozen and canned spinach for taste and texture differences!

Supplies

EQUIPMENT

- Food scale
- 3 paper plates
- Paper towels

FOOD

- Can of spinach
 - Bag of fresh spinach
 - Bag of frozen spinach
-

Directions

1. Allow participants to observe a fresh spinach leaf. Have them write down what they see, how it smells, the color, shape, etc.
 2. Weigh 2 ounces of fresh spinach on the food scale and set aside on a paper plate.
 3. Repeat steps 1 and 2 with the frozen and canned whole spinach.
 4. What observations can the participants make about each type of spinach?
 5. Discuss how preservation and cooking method might impact amount prepared.
-

Extension Ideas

- Prepare each type of spinach separate from the observation samples and conduct a taste test. Discuss preferences.
- Review the nutrition labels and discuss the nutrient content. Discuss how each preservation method might impact the nutrient content.
- Determine cost per ounce of spinach. Which preservation method is a wise choice based on cost?



Classification Creations!

Let's discover the parts of different vegetables by looking at what is inside them.

Did You Know?

There are different parts of vegetables. Some have seeds, skin, roots, layers and different structures.

Food For Thought!

Each vegetable part has a certain job for the plant. For example, the roots soak up the water and stalks transport the water to other parts of the plant.

Explore It Yourself!

Dissect various vegetables to compare their fascinating parts.

Supplies

EQUIPMENT

- Plastic butter knife
- Cutting board

FOOD

- Variety of vegetables (lettuce, carrots, celery, broccoli)
-

Directions

1. Discuss the types of vegetables you will be dissecting.
 2. Cut the vegetables and allow participants to look at the peel, roots, stems, seeds, and the flesh of each vegetable.
 3. Compare the similarities and differences of each vegetables.
 4. Discuss how each part of the vegetable has a function.
-

Extension Ideas

- Use all the senses to compare each vegetable.
- If available, have participants try the different types they didn't dissect.



Chlorophyll

VEGETABLES 3.7

Chlorophyll Curiosity!

Let's discover how acids and bases change chlorophyll inside green vegetables.

Did You Know?

Vegetables have colorful pigments which are appealing to the eyes when we eat them. These pigments are affected by acids and bases during the cooking process and that can change the way they taste.

Food For Thought!

Vegetables contain several classes of pigments: chlorophylls (green), carotenoids (yellow, orange and red), anthocyanins (red, blue, or violet), and betalains (red-violet).

Explore It Yourself!

Cook broccoli in an acidic and then a basic water and see if there is a color and/or texture change.

Supplies

EQUIPMENT

- 3 microwave safe containers
- Glass liquid measuring cup

EQUIPMENT

- Fresh broccoli
- 2 oz vinegar
- 2 tbsp baking soda
- Water

Directions

1. Prepare each container with 1 cup of water and a few broccoli florets. Make sure the florets are cut similar size and that there are enough to notice changes.
2. Add 2 oz vinegar to one of the containers and 2 tbsp baking soda to another container. Stir well.
3. Place each container into the microwave. Cook each sample for 2 minutes or until the broccoli is tender.*
4. After cooking each broccoli sample, remove the broccoli from the cooking water.
5. Observe each prepared sample and record the differences.
6. Would you still eat the broccoli after seeing the chemical change?

*Cooking time will vary based on the size of the broccoli florets and microwave.

Extension Ideas

- Once cool enough to touch, how has the texture of the broccoli been impacted? Compare to uncooked broccoli.
- Try the experiment with vegetables of another color to see what happens.



Cutting It Up!

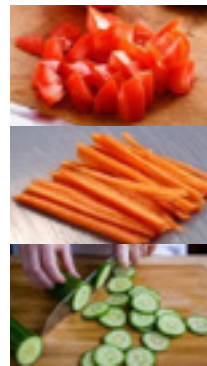
There are various vegetable cutting techniques! Let's make a tasty recipe that will help us learn knife skills.

Did You Know?

Dicing involves cutting a vegetable into small cubes, usually 1/2" by 1/2". Dicing is often used when cutting potatoes, tomatoes, carrots, or peppers.

Julienne is a technique used to slice vegetables into long strips, sometimes called matchsticks because they are long and skinny like matches. Vegetables that are often julienned include carrots, peppers, potatoes or zucchini.

Slicing is used to cut rounds or thin pieces of vegetables. Peppers, sweet potatoes, lettuce, and cucumbers can all be sliced.



Food For Thought!

A French fry is really just a potato cut julienne style into a long, thin matchstick before it is fried!

Explore It Yourself!

Practice your vegetable cutting skills and whip up a tasty salad!

Supplies

EQUIPMENT

- Cutting board
- Kid-safe knife
- Bowl & serving spoon
- Small plates or bowls for sampling

FOOD

- 1 head of lettuce
- 1 cucumber
- 1 tomato
- 2 carrots
- Dressing (optional)

Directions

1. Instruct participants to wash hands.
2. Using the information on the other side of the card, demonstrate dicing a tomato, slicing a cucumber, julienning a carrot, and slicing lettuce leaves.
3. Allow each participant to practice the techniques of each vegetable until they are comfortable.
4. Layer the lettuce, carrots, tomatoes, and cucumber in the bowl, top with dressing (optional), and serve on small plates or bowls so that each participant can sample it.

Extension Ideas

- What other vegetables could be diced, julienned, or sliced?
- Discuss why different cutting techniques may be preferred for certain recipes.
- Discuss the different presentation of each cutting techniques.



Indication Station!

Let's use red cabbage juice to find out if a substance is an acid or a base!

Did You Know?

Substances are classified as an acid or a base by its chemical make up. Depending on whether a substance is an acid or a base, it will determine how it will react during a chemical reaction.

Food For Thought!

We can determine whether a substance is an acid or a base using an indicator. When the indicator is added to a substance, it will chemically react depending on whether it is added to an acid or a base. For some indicators, this chemical reaction causes a color change!

Explore It Yourself!

Use red cabbage juice as an acid or base indicator in some common kitchen ingredients.

Supplies

EQUIPMENT

- Large liquid container
- 3 small clear cups
- Measuring spoons

FOOD

- Red cabbage powder
 - Baking soda
 - Cream of tartar
 - Water
-

Directions

1. Instruct participants to write predictions of how the color of the red cabbage juice will change when adding baking soda or cream of tartar.
 2. Follow powder instructions to make the red cabbage juice. Alternatively, red cabbage can be boiled to produce red cabbage juice.
 3. Fill each small cup with 2 ounces of red cabbage juice.
 4. In one cup, add 1/2 teaspoon baking soda and in another cup add 1/2 teaspoon of cream of tartar. Use the third cup to compare.
 5. Observe the color change and instruct participants to note the color for acidic and basic solutions.
-

Extension Ideas

- What happens to the color of 2 ounces of red cabbage juice when 1 teaspoon of cream of tartar or baking soda is added?
- What happens to the color if 1/2 teaspoon of baking soda is added to the cream of tartar solution that contains 1 teaspoon?



Section 4: Fruits



Inspector Citrus!

Let's inspect three brands of canned mandarin oranges to determine product quality.

Did You Know?

Before we decide to eat our food, we analyze whether that food is appealing. If food does not appear to be appealing, we avoid it and don't want to eat it, which creates food waste.

Food For Thought!

An average household wastes about \$2,000-2,500 of food every year. This is about 32% of the food that is purchased!

Explore It Yourself!

Sort and weigh canned mandarin oranges to inspect their quality.

Supplies

EQUIPMENT

- Strainer
- Food scale
- Can opener
- Sink

GENERAL SUPPLIES

- 6 paper plates

FOOD

- 3 cans of mandarin oranges, all different brands
-

Directions

1. Label your plates Can A, Can A defects, Can B, Can B defects, Can C, and Can C defects.
 2. Open one can of mandarin oranges and drain the liquid using the strainer.
 3. Using the food scale, weigh the plate labeled Can A and record the amount.
 4. Place all of the drained mandarin oranges from Can A on the plate and weigh. Subtract the weight of the plate and record.
 5. Sort the mandarin oranges with defects from the uniform mandarin oranges. Record the counts and weights of both piles.
 6. Repeat steps 3-5 with the remaining brands. Which can had the least number of defects?
 7. Compare the weights of the uniform mandarin oranges and the defects for all of the cans.
-

Extension Ideas

- Does the price of the can of mandarin oranges determine the quality of the uniform mandarin oranges?
- Find out where in the world each can of mandarin oranges were grown in. Is there a difference between the quality of the oranges and where they were grown?



Floating Fruits!

Let's use the science of sinking and floating to explore one of the characteristics of citrus fruits!

Did You Know?

Some fruits sink and some fruits float in water. This is because they have different buoyancies. Buoyancy is the ability to float in water or another fluid.

Food For Thought!

Oranges are buoyant because they have air pockets in their skins.

Explore It Yourself!

Test the buoyancy of a citrus fruit to discover the difference between floating and sinking fruit.

Supplies

EQUIPMENT

- Container to hold fruit and water
- Plastic butter knife

FOOD

- Citrus fruit (orange, lime, or lemon)
 - Water
-

Directions

1. Make observations about the properties of the citrus fruit.
 2. Pour water into the container, enough for the fruit to have room to float.
 3. Make observations about what will happen when the fruit is put in the water.
 4. Place the whole citrus fruit in the water. Record your findings.
 5. Remove the citrus fruit from the water and peel the citrus fruit, keeping the inside fruit whole.
 6. Place the fruit without the peel in the water. Record your findings.
 7. Remove the fruit from the water and place the peels in the water. Record your findings.
 8. Discuss your observations.
-

Extension Ideas

- What happens if you try a segment of the citrus fruit? Will it sink or float?
- Try this experiment with other types of fruit. If they float, what allows them to float?



Dehydration Contemplation!

Let's test how buoyant dehydrated fruit are compared to fresh fruit!

Did You Know?

Fresh fruits and dehydrated fruits will appear different in liquid mixtures because of their buoyancy.

Food For Thought!

Different fruits will float or sink depending on the kind of water and how heavy the juice is of the fruit.

Explore It Yourself!

Compare the buoyancy of a dehydrated fruit to the fresh version of it in different types of water.

Supplies

EQUIPMENT

- 2 tall, clear cups or containers

FOOD

- Water
- Carbonated water
- Raisins
- Grapes (older grapes if available)

Directions

1. Fill one cup with water and the other cup with the carbonated water.
2. Ask participants to create a hypothesis about what will happen when the raisin and grape are dropped in the water and carbonated water.
3. Drop a raisin and grape into the cup with water. Discuss what happens.
4. Next, drop a raisin and grape into the carbonated water. Discuss what happens.

Extension Ideas

- What other types of liquids could you try?
- What happens if you try a different type of fruit?
- Have participants make a flavored water product or other beverage using fresh fruit.



Grape Happenings!

Let's learn about the characteristics of grapes.

Did You Know?

Grapes come in more than 50 varieties in black, blue, blue-black, golden, red, green, purple, and white colors with a juicy pulp inside.

Food For Thought!

Nearly all the grapes consumed in the United States are now grown in California.

Explore It Yourself!

Learn the characteristics of grapes and the various colors of grapes.

Supplies

EQUIPMENT

- Paper plates
- Plastic butter knife

SCHOOL SUPPLIES

- Paper
- Pen or pencil

FOOD

- 3 different varieties of seedless grapes (green, red, blue-black)
-

Directions

1. Show participants the different varieties of grapes.
 2. Have participants write on their paper these categories: green, red, blue-black.
 3. Cut one of each type of grape in half so participants can view the inside and outside of the grape to compare.
 4. Participants should write down their observations on the paper for each type of grape.
 5. Distribute 1 of each grape to each participant.
 6. Ask participants to try each grape and write down their thoughts about the flavors.
 7. Take a survey of which grape was the favorite.
-

Extension Ideas

- As a group, calculate the percentage for each grape that the participants liked.
- Dehydrate the grapes to make raisins.



Fruit Favoritism!

What are some creative ideas for reducing fruit food waste?

Did You Know?

More than half of fresh fruit produce is thrown away because it is deemed too ugly to eat.

Food For Thought!

In retail stores, quality standards are based on appearance of fruit instead of ripeness.

Explore It Yourself!

Let's create a recipe using a ripe fruit that might otherwise go to waste and be thrown away.

Supplies

SCHOOL SUPPLIES

- Pen or pencil
- Paper

Directions

1. Select a type of fresh fruit that might often go to waste because of appearance.
2. Make a list of all the possible ways the fruit might otherwise be processed and utilized.
3. Select your favorite idea.
4. Create a recipe for the product.

Extension Ideas

- Discuss if the same recipe procedure would work for other fruits.
- Have participants prepare and test the recipe ideas.



Section 5: Grains



Pastabilities!

Let's find out about the many different types of pasta and create a visual organizer to compare their nutrition fact labels!

Did You Know?

The ingredients in traditional pasta is typically eggs, flour, and salt. Traditional pasta is available in a variety of shapes and sizes. According to the International Pasta Organization, there are more than 600 different shapes of pasta produced throughout the world!

Food For Thought!

Now you can buy many interesting and tasty alternative types of pasta made with vegetables, quinoa, buckwheat, glucomannan fiber, beans, legumes, or brown rice. Be sure to read the nutrition fact label to see what ingredients are in your pasta.

Explore It Yourself!

Let's take a look at some alternative types of pasta and compare their nutrition fact labels.

Supplies

SCHOOL SUPPLIES

- Pen or pencil
- Paper

FOOD

- 4 boxes of different types of pasta (chickpea, black bean, traditional, rice, vegetable, etc.)

Directions

1. Have participants create a chart with 4 columns labeled A, B, C and D, and a row for each of the following: color, shape, serving size, calories, fiber, protein, and ingredients.
2. Keeping the pastas anonymous, place a piece of each pasta on the respective letters on the participants' charts.
3. Allow participants to make observations of each pasta and record their observations.
4. Read the nutrition fact labels on the boxes for each pasta to the participants so they can complete the chart.
5. Have the participants identify the types of pastas based off of the information they have gathered on their charts.

Extension Ideas

- Compare the serving size for each type of pasta. How many calories are in each serving size? Can you compare the differences?
- Look at the cooking recommendations for each type of pasta. Are they similar or different?



Rice Explorers!

Let's determine what being a "whole grain" means and sample some brown rice!

Did You Know?

Whole grains are the seeds of plants that are made up of three parts: the bran, the germ, and the endosperm. The Bran is the hard shell or outer layer of the grain, and it contains antioxidants, B vitamins and fiber. The Germ is the embryo which can grow and sprout into a new plant. It contains B vitamins, fat, protein and minerals. The Endosperm is the large inner portion of the grain which provides energy or food to the new plant or growing germ.

Food For Thought!

Brown rice is a whole grain that contains all three parts of the grain, while white rice is a refined grain which only contains the endosperm. A refined grain has been processed to remove the bran and the germ, which removes all the nutritional benefits that these parts provide.

Explore It Yourself!

Sample some brown rice to taste-test and evaluate!

Supplies

EQUIPMENT

- Rice cooker
- Paper plates
- Plastic spoons

SCHOOL SUPPLIES

- Pen or pencil
- Paper

FOOD

- Brown rice
 - Water
-

Directions

1. Follow the specific directions of your rice cooker to prepare rice (typically 1.5 cups of water per 1 cup of rice).
 2. Once the rice is cooked, give each student a serving of rice.
 3. Have participants complete a taste-test evaluation to evaluate the color, smell, taste, and mouth feel of the rice.
-

Extension Ideas

- Discuss other types of rice, such as basmati, black rice, jasmine rice, white rice, or wild rice. Research these different types of rice to find the similarities and differences from brown rice.
- Find a diagram of a grain and label the parts of the grain.



Name That Grain!

Let's find out what makes a grain whole or refined and identify seven different types of grains.

Did You Know?

There are two grain groups, whole grains and refined grains. The whole grains are edible kernels that include three parts, the bran, germ, and endosperm. The refined grains are processed to remove the bran and the germ, so they only have the endosperm.

Food For Thought!

Both whole and refined grains are often ground into flour and then can be made into breads, cakes or noodles! Grains come from many different plants and can be made into all kinds of tasty products!

Explore It Yourself!

Play guess the grain game!

Supplies

GENERAL SUPPLIES

- Bowls
- Whiteboard or chalkboard or large paper

SCHOOL SUPPLIES

- Pen or pencil
- Paper

FOOD

- 7 different types of grains (suggested: oats, millet, rye, wheat, corn, barley, rice)

Directions

1. Prior to the session, pour each grain into a bowl and place them in stations around the room. Label each bowl with a letter or number. Do not label them with the name of the grain.
2. Write the name of the grains, in no particular order, on the board or on a large paper so participants can see the list.
3. Discuss with participants the difference between whole grains and refined grains.
4. Ask participants to look at the list of grains provided and discuss their experience with those grains.
5. Place participants in groups of 2 or 3.
6. Ask groups to rotate stations and guess which grain is at each station using their paper to record their guesses.
7. Discuss and compare grains at each station.

Extension Ideas

- Have participants guess what types of food can be made with each grain. Are they made with whole or refined grains?
- Discuss what happens to the grain when it is processed into a refined grain. How does it change the nutrition of the grain?



The Power of Wheat Flour!

Let's observe and experiment with gluten by separating gluten from flour.

Did You Know?

Gluten is a protein found in wheat, rye, and barley.

Food For Thought!

It is the development of gluten that occurs in batters and doughs that allows breads to rise when they are baked.

Explore It Yourself!

Let's make gluten!

Supplies

EQUIPMENT

- Bowl
- Sink or washing station
- Colander (Optional)

FOOD

- 1 cup bread flour (sub plain flour if needed)
 - 1 1/2 cups water
-

Directions

1. Put 1 cup of bread flour and 1 1/2 cups of water into a bowl.
 2. Mix the flour and water to form a dough. Your dough should be soft but not very sticky. If it is too sticky, add a little more flour.
 3. As you are mixing, gluten is forming. Pull and stretch the dough to mix it well.
 4. After it is thoroughly mixed, set it aside for 10 minutes.
 5. Rinse the dough with water to split the mixture into gluten and starch. If you prefer, place a colander under so you don't lose too much gluten.
 6. As you rinse, fold and stretch your dough to remove more starch. The mixture should not fall completely apart.
 7. Keep working the dough until all you have left is the sticky, almost chewing-gum like substance. You have separated the gluten!
-

Extension Ideas

- With a straw, make a gluten bubble by rolling the gluten into a ball, place the straw inside and blow it up!



Gluten Free Mix Up!

Let's find out which foods are gluten free.

Did You Know?

Some people are sensitive or intolerant to gluten and can experience inflammation in their small intestine when they eat a grain containing gluten.

Food For Thought!

Not all grains contain gluten. Naturally gluten free grains include corn, oats, quinoa, rice, and buckwheat.

Explore It Yourself!

Whip up a tasty snack mix featuring gluten free grains!

Supplies

EQUIPMENT

- Microwave
- Large mixing bowl
- Spoon
- Microwave safe bowl
- Parchment paper
- Sheet Pan

FOOD

- 3 cups rice squares cereal
- 3 cups corn squares cereal
- 2 cups whole grain oat cereal
- 2 cups gluten free pretzels (optional)
- 1 cup candy coated chocolate pieces (optional)
- 1 cup salted peanuts (optional)
- 1 pound white candy bark

Directions

1. In a large mixing bowl, place 3 cups of both rice and corn squares cereals and 2 cups of whole grain oat cereal.
2. Add the optional ingredients if desired.
3. Mix the ingredients together.
4. In a microwave safe bowl, melt 1 pound of white candy bark.
5. Pour melted white candy bark over the dry ingredients and mix well.
6. Pour mixture onto parchment paper on a sheet pan and let it set.
7. After the mixture sets, break it up and enjoy!

Extension Ideas

- Create your own gluten free snack mix recipe!



Nutrition Know How!

Let's promote whole grains and their benefits!

Did You Know?

Whole grains have plenty of nutrients including B vitamins, fiber, and some minerals.

Food For Thought!

The USDA recommends that half the grains you eat should be whole grains to make sure you get plenty of nutrients!

Explore It Yourself!

Create a poster to promote the benefits of new-to-you whole grain.

Supplies

SCHOOL SUPPLIES

- Poster paper
- Pen or pencil
- Markers
- Magazines or print outs of whole grains
- Glue or tape

Directions

1. Discuss whole grains and brainstorm all the grains you can think of as a group.
2. Tell participants that they will be creating a poster to promote the benefits of whole grains.
3. Participants should choose a grain they haven't tried before.
4. If participants have access to the internet, have them look up the grain they chose to discover its vitamin, mineral, and fiber content as well as any other information they may want to share. If internet access is not available, gather some research information for participants ahead of time.
5. Once participants have the information they need, they will create a poster about their grain.
6. Ask participants to present their poster to the group.

Extension Ideas

- Compare the different posters to see the nutritional information for each of the grains.



Popcorn Percentage!

Let's calculate the percentages of the number of popcorn kernels that pop!

Did You Know?

Popcorn kernels typically are 4% water. When heated, the water turns into steam and causes the popcorn to pop!

Food For Thought!

Some popcorn kernels may not pop if they have too little or too much water inside. Different brands of popcorn may have a different percentage of popcorn kernels that do not have optimal amount of water to pop the popcorn!

Explore It Yourself!

Be a popping expert and test different types of popcorn!

Supplies

EQUIPMENT

- Microwave
- 3 large bowls
- 3 small bowls

SCHOOL SUPPLIES

- Pen or pencil
- Paper

FOOD

- 3 different bags of microwave popcorn
-

Directions

1. Pop each bag of popcorn in the microwave (this may be done ahead of time).
 2. Ask participants to guess what percent of the kernels didn't pop in each bag. Have them write this down on their paper.
 3. Pour each bag into each large bowl.
 4. In groups, have participants separate the popped kernels from the un-popped kernels into the small bowls.
 5. Count how many kernels popped and how many were un-popped.
 6. What percentage of the kernels didn't pop?
 7. Compare your results.
-

Extension Ideas

- Measure the volume of the popcorn from each bag. Are they similar?



Section 6: Protein



Protein Power!

Let's learn why protein packed foods important and how to identify foods from the protein foods group.

Did You Know?

The protein food group is made up of more than just animal products. It also includes nuts, seeds, beans and legumes.

Food For Thought!

Most Americans eat enough from the protein food groups. Protein is important because it serves as a building block for bones, muscles, blood, skin, enzymes, vitamins, and hormones in our body.

Explore It Yourself!

Review proteins and choose foods in the protein group.

Supplies

SCHOOL SUPPLIES

- Protein Food Facts Handout (foodmaster.org/FAN/6.1.pdf)
- Pen or pencil

Directions

1. Discuss with participants about the health benefits of eating protein foods:
 - Lean meat, dry beans and peas are rich in protein.
 - MyPlate includes dry beans and peas in both the vegetable and the protein group, but they only count as one in a meal.
 - Its important to include protein in the diet because it serves as a building block for bones, muscles, blood, skin, enzymes, vitamins, and hormones.
 - B vitamins found in the protein food group help the body release energy, play a vital role in the nervous system, aid in the formation of red blood cells, and help build tissue.
 - Meat and beans provide minerals. Iron, magnesium, and zinc are the minerals found in protein foods.
 - Foods made from meat, poultry, fish, dry beans or peas, eggs, nuts, or seeds are protein foods.
 - Some meat can be high in saturated fat which can increase the risk for coronary heart disease.
 - Consuming fish, nuts, and seeds is an excellent way to incorporate other sources of protein.
2. Handout the Protein Food Facts Handout and review as a group.

Extension Ideas

- Research and discuss what proteins are chemically made of.



Positively Plant Protein!

Let's learn about the benefits of plant-based proteins.

Did You Know?

Proteins help build and repair muscle, skin, and other important cells in your body. Plant-based proteins are important because they contain some nutrients that we cannot get from animal-based proteins.

Food For Thought!

Beans are a great source of protein like meat, fish, and poultry. Beans also contain fiber, minerals and phytochemicals that help you feel your best and stay healthy.

Explore It Yourself!

Let's make a Colorful Bean Salad!

Supplies

EQUIPMENT

- Large salad bowl
- Strainer
- Plates
- Plastic utensils
- Can opener
- Mixing spoon
- Napkins
- Measuring spoons

FOOD

- 15 oz can no-salt added black beans
- 1 cup canned corn
- 1 cup chopped green pepper
- 1 cup chopped carrots
- 3/4 cup mild salsa
- 1 tablespoon olive oil

Directions

1. Open the cans of beans and corn.
2. Empty the cans into the strainer and rinse thoroughly.
3. Add beans and corn to the salad bowl.
4. Add chopped pepper, chopped carrots, olive oil and salsa to the salad bowl.
5. Mix together with a spoon and serve.
6. Enjoy a plant-based protein!

Extension Ideas

- What other sources of plant-based protein can you think of?
- Review the nutrition facts labels for the protein in the black beans. Compare them to meat, poultry, or fish!
- Research and discuss complete and incomplete proteins.



Fishing For Facts!

Let's compare a variety of canned fish items and create a chart with nutritional benefits.

Did You Know?

A 3 ounce serving of most cooked fish provides about 1/3 of the average daily recommended amount of protein.

Food For Thought!

Adding fish to your diet is an excellent way to add important nutrients. Fish contains high-quality protein, vitamins, minerals, and is a great source of healthy fats.

Explore It Yourself!

Compare different types of canned fish and discover their nutritional benefits!

Supplies

SCHOOL SUPPLIES

- Paper
- Pen or pencil

FOOD

- Variety of canned fish (tuna, salmon, sardines, anchovies, herring)
-

Directions

1. Create a chart to compare the nutrition fact labels of the canned fish. Create a column for each type of fish. Create a row for each of the following: protein, omega-3's, potassium, vitamin A, vitamin C, calcium, and iron.
 2. Using the nutrition fact labels, fill out the chart.
 3. Discuss your findings.
-

Extension Ideas

- Have participants taste the different canned fish.
- Compare nutrition fact labels to other protein sources.



I can't believe its not meat!

Let's find out the differences between meat alternatives by comparing nutrition fact labels.

Did You Know?

Meat substitutes provide the appearance and taste of meat products but are comprised of non-animal food sources. They are often made with soy, wheat, or beans.

Food For Thought!

Recently, companies have revolutionized the plant-based meat industry, creating burgers that look, cook, smell, and taste like beef!

Explore It Yourself!

Compare nutrition facts labels of different meat alternatives.

Supplies

GENERAL SUPPLIES

- Nutrition facts labels from different meats and meat alternatives (available online)

SCHOOL SUPPLIES

- Paper
- Pen or pencil

Directions

1. Create a chart to compare the different meats and meat alternatives with a column for each meat and meat alternative and a row for each of the following: calories, fat, saturated fat, sodium, protein, and ingredients.
2. Review meat alternative nutrition fact labels.
3. Compare the meat alternative nutrition fact labels to the meat nutrition facts labels.

Extension Ideas

- What surprised you about the nutrition fact labels?
- Purchase some meat alternatives products and sample.



MyProtein Plan!

Let's find out what your daily protein needs are and create a meal plan!

Did You Know?

Most protein recommendations for kids fall around approximately 1–1.5 grams (g) of protein for every two pounds (lbs) of body weight or 1 g of protein per kilogram (kg). (1 kg = 2.2 lbs)

Food For Thought!

Adding protein to your diet provides your body with energy to support growth and can keep you healthy in many essential ways. Protein in your diet maintains and repairs your organs, muscles, and skin.

Explore It Yourself!

Calculate your daily protein needs and create a daily meal plan that incorporates the total number of grams of protein you need!

Supplies

SCHOOL SUPPLIES

- Paper
 - Pen or pencil
-

Directions

1. Ask participants why they think protein is important in their diets and what sources of protein they eat.
 2. Using their weight in pounds, ask participants to calculate their protein needs with a range of 1–1.5 g per every 2 lbs of body weight. [Ex. A 60 lbs child may need 30–45 g of protein per day. $60 \text{ lbs} \times 1 \text{ g}/2 \text{ lbs} = 30 \text{ g/day}$. $60 \times 1.5 \text{ g}/2 \text{ lbs} = 45 \text{ g/day}$.]
 3. If participants have access to the internet, ask them to find different foods that can help them get to their daily protein needs. If participants don't have access to the internet, you may want to have a list of options for them to choose from.
 4. Create a meal plan with enough protein to meet their daily protein needs.
 4. Have participants share their meal plans with the group.
-

Extension Ideas

- Discuss different sources of proteins that participants may not be aware of (beans and legumes, etc).
- Ask participants to convert their weight in pounds to their weight in kilograms for a more accurate daily protein intake amount ($1 \text{ kg} = 2.2 \text{ lbs}$). (Ex $60 \text{ lbs} \div 2.2 \text{ lbs/kg} = 27.27 \text{ kg}$. $27.27 \text{ kg} \times 1 \text{ g/kg} = 27.27 \text{ g/day}$).



Eggcellent Eggonomics!

Let's demonstrate your eggonomic knowledge with eggs!

Did You Know?

Americans consume an average of 279 eggs per year. Each laying hen produces an average of 296 eggs per year. We need just about one laying hen per American to keep up with the demand!

Food For Thought!

It takes 26 hours for a hen to produce an egg. Twenty of those hours are required to form a shell.

Explore It Yourself!

Use applied economics to plan your own egg production facility.

Supplies

SCHOOL SUPPLIES

- Paper
- Pen or pencil
- Calculator

Directions

1. You have an egg production facility, and you are looking to expand. You want to add 100 laying hens in a cage system. Assume that the space for each hen needs to be 3 square feet. You will earn on average \$0.08 per egg sold. Each new hen will produce on average 296 eggs per year.
2. You were quoted a price of \$58.00 per square foot to construct your cage system. You will also need space for climate control machinery, which is about 200 square feet.
 - What square footage is needed for the cage system to accommodate 100 laying hens?
 - How much will cost to build the cage system?
 - Based on the average price of \$0.08 per egg, how long will it take the new hens to pay for the structure?

Extension Ideas

- Repeat this activity but with 500 hens instead of 100.
- What if your hens only produced 200 eggs per year, how long would it take to pay for the structure?
- Research and compare the difference between a cage system and a cage-free structure.



Section 7: Dairy



Many Milks!

Let's study some nutrition facts labels to compare milk alternatives to cow's milk.

Did You Know?

Some people are not able to drink cow's milk for various reasons, so they need to drink milk alternatives.

Food For Thought!

Some common alternatives to cow's milk are soy, almond, coconut, and rice milk.

Explore It Yourself!

Create a table to compare the nutrition facts of different milk alternatives to cow's milk.

Supplies

GENERAL SUPPLIES

- Nutrition fact labels from a variety of milk alternatives and one from cow's milk (suggestion: almond, soy, coconut, rice)
 - Paper
 - Pen or pencil
-

Directions

1. Create a table with the row: serving size, calories, fat, protein, sugars, added sugar, calcium, and ingredients. In each column, list the type of milk beverage.
 2. Study each nutrition facts label to complete the table.
 3. Discuss the ingredient lists on the food labels for each of the milk alternatives.
 4. Compare your findings.
-

Extension Ideas

- Brainstorm the various reasons why some people are not able to drink cow's milk.
- Taste test of each of the milk alternatives.



Shaking Butter!

Let's make our own butter using cow's milk.

Did You Know?

Butter is an anciently prepared food. People made butter 4,000 years ago the same way we will make it today!

Food For Thought!

Butter is made by agitating cream until the fats separate into butter and buttermilk.

Explore It Yourself!

Shake your way to make your own butter!

Supplies

EQUIPMENT

- 1 glass jar with lid
- Strainer
- Measuring spoons

FOOD

- 1 pint heavy whipping cream
 - 1/8 teaspoon salt
-

Directions

1. Pour cold heavy whipping cream into the glass jar, filling it half-way.
 2. Secure the lid and begin shaking vigorously. This may take 10-15 minutes of continuous shaking; it may help to partner up for this step.
 3. When you hear a difference in the shaking sound halfway through, add the salt. You can peek inside your progress!
 4. Put the lid back on and continue to shake.
 5. Once you can sense a solid mass shaking around the jar, the butter should be done.
 6. Use a strainer to separate the butter from the buttermilk.
 7. Discuss the process and science of making butter.
-

Extension Ideas

- Taste the butter using bread or crackers.
- Try adding different flavors to the butter, such as herbs or spices.



Sugary Milk!

Let's separate lactose or milk sugar into its two components: galactose and glucose.

Did You Know?

Lactose is a form of sugar found in animal milk. Lactose is a disaccharide, meaning it is made up of two monosaccharide units: glucose and galactose.

Food For Thought!

The enzyme lactase can break lactose down into glucose and galactose.

Explore It Yourself!

Break lactose into monosaccharide units using the enzyme lactase.

Supplies

GENERAL SUPPLIES

- Small plastic cup
- 2 glucose test strips
- Lactase pill

FOOD

- Dairy creamer pack (must contain milk)*

*Sub with milk if needed

Directions

1. Provide participants with a small plastic cup and a dairy creamer pack.
2. Empty the creamer into the cup and insert a glucose test strip. The test will be negative for glucose because it is still linked to a galactose unit.
3. Next, crush the lactase pill and add it to the creamer, dissolving well.
4. Test again using a new glucose test strip. This test will be positive for glucose because lactase breaks the lactose into glucose and galactose.

Extension Ideas

- What would happen if you tried this with a milk alternative?
- What would happen if you tested water, fruit juice, or other beverages?



Yummy Yogurt!

Let's taste yogurt and compare nutrition facts label.

Did You Know?

Yogurt is made by fermenting milk, which causes it to have healthful bacteria that is good for your digestive system! Yogurt is also packed with protein and calcium, both things your body needs to stay healthy.

Food For Thought!

Not all yogurts are very nutritious. Some contain high amounts of sugar and fat. Read the nutrition facts labels on your yogurt container to make a nutritious food choice.

Explore It Yourself!

Complete a yogurt taste test!

Supplies

GENERAL SUPPLIES

- Small plastic or paper cups
- Spoons
- Taste Test Evaluation Form
(foodmaster.org/FAN/7.4.pdf)

FOOD (SUGGESTED)

- Whole milk yogurt
- Low fat yogurt
- Dairy free yogurt
- Greek yogurt
- Flavored yogurt

Directions

1. Prepare the samples in the paper cups for each participant to try.
2. Pass out a Taste Test Evaluation form to each participant, 1 sheet for every type of yogurt.
3. Offer each participant a sample of each type of yogurt and have them complete the form for each sample.
4. Discuss your findings.
5. Use the nutrition fact labels to discuss the nutrition composition of each product and how that might impact the sensory characteristics of the yogurts.

Extension Ideas

- Provide a mystery yogurt sample and have students guess nutrition composition and/or type of yogurt.
- Brainstorm fun ways to eat yogurt.



Where did the casein go? Awhey!

Let's make cheese curds using cow's milk!

Did You Know?

Milk is made up of two proteins, casein and whey. Casein is a solid while whey is a liquid.

Food For Thought!

Heating milk and adding an acid and/or enzyme will cause the casein to clump together and form curds.

Explore It Yourself!

Add heat and an acid to cow's milk and observe what happens!

Supplies

EQUIPMENT

- Saucepan
- Electric burner
- Measuring spoons
- Spoon
- Strainer
- Liquid measuring cups

FOOD

- 2 cups milk
 - 4 teaspoons vinegar
-

Directions

1. Measure 2 cups of milk into the saucepan.
 2. Slowly bring the milk to a boil, stirring constantly to prevent burning.
 3. Once boiling, turn off the heat.
 4. Add 4 teaspoons vinegar to the milk. Stir to combine.
 5. Watch the milk as it curdles, forming curds and a liquid mixture.
 6. Use a strainer to separate the curds from the a liquid mixture.
 7. Discuss the composition of the curds and the composition of the a liquid mixture.
 8. Discuss whether this change is reversible or not.
-

Extension Ideas

- Discuss the difference between soft and hard cheeses.
- Have students taste test different types of cheeses.
- Cheese and butter come from milk. Use nutrition facts labels to discuss how are they different and how are they the same.



Colorful Milk!

Let's observe the dispersion of fat globules in cow's milk.

Did You Know?

Dish soap can break up fat molecules. When it is added to cow's milk, it causes the fat molecules to dissolve.

Food For Thought!

When you add food coloring to cow's milk, it floats on top because it is less dense than the milk. The fat of the milk causes the milk to be more dense than the food coloring.

Explore It Yourself!

Add food coloring to cow's milk and then dish soap to observe what happens.

Supplies

GENERAL SUPPLIES

- Bowl
- Cotton swab
- Dish soap

FOOD

- Cow's milk
 - Food coloring, multiple colors
 - Pepper (optional)
-

Directions

1. Pour enough milk into the bowl to cover the bottom. The milk should be still and not moving.
 2. Put a drop of each color in different places in the milk.
 3. Dab a tiny amount of dish soap on the cotton swab.
 4. Touch one of the colors with the cotton swab and watch.
 5. Continue this to make your own floating art piece.
-

Extension Ideas

- Try this with warm milk and cold milk, does it make a difference?
- Try with skim milk or a milk alternative, does the same thing happen?
- Sprinkle pepper on the milk before you use the dish soap, what happens to the pepper?



Section 8: Fats & Oils



Lava Lamp

Let's learn about immiscible liquids!

Did You Know?

Two liquids that will not mix are immiscible. Oil and water are liquids that normally do not mix. If you pour oil and water into a glass, you'll get a layer of oil and a layer of water. Even when you stir them, they'll separate into two layers.

Food For Thought!

Immiscibility, however, is not why oil floats on water. Oil floats on water because it is less dense. The immiscibility of oil and water is not related to the difference in density.

Explore It Yourself!

Create your own lava lamp!

Supplies

EQUIPMENT

- Bottle with a cap
- Antacid tablet

FOOD

- Oil
 - Water
 - Food coloring
-

Directions

1. Fill the bottle 3/4 full with oil.
 2. Fill the rest of the bottle with water.
 3. Add a few drops of food coloring.
 4. Break the antacid tablet into a few small pieces and drop them in the bottle, 1 piece at a time.
 5. Watch the lava lamp erupt! When the reaction slows down, you can add more antacid to make it erupt again.
-

Extension Ideas

- What happens if you use different temperature of the water when making the lava lamp?
- Try using different size bottles, do you get a different effect?
- What happens if you use different size pieces of the antacid tablet, do you get more blobs forming?



Shake Your Own Salad Dressing

Let's learn about what an emulsion is!

Did You Know?

An emulsifier is added to immiscible liquids to create an emulsion. An emulsion is a mixture of two liquids that would not mix. Salad dressings and mayonnaise are examples of food product emulsions.

Food For Thought!

An example of an emulsifier used in food is lecithin. Lecithin is in egg yolk and is used in making mayonnaise.

Explore It Yourself!

Whip up a tasty salad dressing and observe emulsifiers in action!

Supplies

EQUIPMENT

- Jar with lid
- Measuring cups
- Measuring spoons

FOOD

- 3 tablespoons olive oil
- 1/2 teaspoon garlic powder
- 1 tablespoon red wine vinegar
- 1 teaspoon Dijon mustard
- 1/2 teaspoon salt
- 1/4 teaspoon pepper

Directions

1. Discuss with participants about emulsions and emulsifiers.
2. Measure out the ingredients and add each ingredient into the jar.
3. Close the lid tightly and shake the jar.
4. Discuss observations about the salad dressing.
5. Enjoy the salad dressing!

Extension Ideas

- Discuss which ingredient is the emulsifier.
- Discuss other methods of how to mix the emulsion and test them out to see if it will give the same results.
- Research other foods that are emulsions.



Many Different Fats

Let's discover the different types of fats!

Did You Know?

There are two types of fats, unsaturated fats and saturated fats. Unsaturated fats are fats that are typically found in plants and certain types of fish. Saturated fats are fats from animals and animal products; palm and coconut oils are also saturated fats.

Food For Thought!

Unsaturated fats are generally liquid at room temperature like oil, while saturated fats are in a more solid form like butter or lard.

Explore It Yourself!

Complete a race with the different sources of unsaturated and saturated fats.

Supplies

GENERAL SUPPLIES

- 2 containers per group

SCHOOL SUPPLIES

- Notecards
 - Markers
-

Directions

1. Prior to the activity, create a set of notecards for each group with different types of unsaturated and saturated fats.
 2. Divide the participants into groups as evenly as possible. Have the groups line up and get ready for a race.
 3. Label the containers as unsaturated and saturated fats and place the containers at the end of the line for participants to drop their cards into.
 4. Shuffle the cards for each group and place them face down in front of the groups.
 5. Each participant will take the top card and run to place the card in the correct container.
 6. The first group to finish with the correct answers wins!
 7. Discuss with participants about the different items. Which of these items do they currently eat?
-

Extension Ideas

- Ask participants to search nutrition facts labels online and see how much unsaturated and saturated fats each item contains.



Misleading Labels

Let's learn about trans fats!

Did You Know?

Trans fats are found in commercially produced snack foods and fried foods, baked goods, and margarines. Trans fats can increase one's LDL (bad) cholesterol.

Food For Thought!

Trans fats should be labeled on our nutrition facts labels, however, even though the nutrition facts label may say zero trans fats, one serving of food can contain up to 0.5 grams of trans fat and still be labeled trans fat free. If you see the words hydrogenated or partially hydrogenated in the ingredient list then the food contains trans fats, even if it says zero trans fats!

Explore It Yourself!

Read nutrition facts labels to look for trans fats in our food products.

Supplies

SCHOOL SUPPLIES

- Nutrition facts labels (Suggested: peanut butters, margarine, granola bars, tortilla chips, crackers, cookies, French fries).

Directions

1. Review one of the nutrition facts labels with participants. Show them on the label where trans fats are listed.
2. Remind participants that even though the label may say zero trans fats, it is important to read the ingredient list for words like hydrogenated or partially hydrogenated.
3. Ask participants to review the nutrition facts labels to find which products have trans fats.

Extension Ideas

- Compare different brands of the items you choose. Do they have different trans fats or ingredients?



Oily Fireworks

Let's use the science of oil to make some fireworks!

Did You Know?

Density is the amount of mass per unit of volume. If you have two substances that are the same amount but different weights, the heavier substance is denser than the lighter substance.

Food For Thought!

Oil is less dense than water and will float on top of water.

Explore It Yourself!

Make Fireworks in a Jar!

Supplies

EQUIPMENT

- Clear jar
- Bowl
- Whisk
- Liquid measuring cup

FOOD

- Water
- Oil
- Food coloring

Directions

1. Pour some oil into the bowl. You will want enough to create a layer on top of the water, about 1/4-1/2 cup.
2. Add 3-4 drops of food coloring for each color you want to add into the oil, up to three different colors.
3. Whisk the food coloring into the oil.
4. Fill the jar about 3/4 full of water.
5. Add the oil into the jar with the water.
6. Observe the drops of color coming down from the oil.

Extension Ideas

- What happens if you use a different type of cooking oil?
- What happens if you use seltzer water?



Calorie Calculator

Let's analyze the fat content in food items!

Did You Know?

Including the right kinds of fats in our diets is extremely important for building our essential nerve tissue and hormones as well as keeping our bodies and minds active.

Food For Thought!

Eating a lot of fat can give us more calories than our bodies need. It's important to eat fat and other nutrients in moderation.

Explore It Yourself!

Analyze nutrition fact labels for their fat content and calculate the total number of calories from fat.

Supplies

SCHOOL SUPPLIES

- Paper
 - Pen or pencil
 - Internet access
-

Directions

1. As a group or individually, ask participants to think of three things they ate recently and look up the nutrition fact labels for each item. You could also bring in nutrition facts labels for three different items if you don't have internet access.
 2. Ask participants to create a chart. Create a column for each of the following: Food Choice 1, Food Choice 2, Food Choice 3, and Total. Create a row for each of the following: calories per serving, serving size, total fat, percent daily value from fat, saturated fat, trans fat, and total calories from fat (number of grams multiplied by 9).
 3. Complete the chart using the nutrition fact labels for each item.
 4. After reviewing all three labels, total up the columns. For example, add the calories from Food Choice 1, Food Choice 2, and Food Choice 3 together.
 5. Discuss if you were surprised by any of the food items.
-

Extension Ideas

- Discuss why it is important to include healthy fats in our diets.
- Discuss the difference between unsaturated, saturated, and trans fats.



Potato Chip Expert

Let's evaluate different types of potato chips and their average grease content!

Did You Know?

Potato chips are America's favorite snack food, consuming about 1.2 billion pounds a year!

Food For Thought!

Potato chips are made by slicing a potato into thin slices, they get rinsed in water and then usually fried in a vat of oil (fat).

Explore It Yourself!

Do your own investigation of how much grease different brands of potato chips have.

Supplies

SCHOOL SUPPLIES

- Graph paper
- Paper
- Pen or pencil
- Tape

GENERAL SUPPLIES

- Rolling pin
- Wax paper
- Window
- Sunlight

FOOD

- Several bags of different potato chip brands
-

Directions

1. Review the nutrition facts label for each brand of chips and record on a piece of paper what the serving size and fat content for each brand is. Hypothesize which brand of chips will be the greasiest?
 2. For each brand count out a number of chips equal to the serving size for that brand and record the amounts.
 3. Place each brand onto a separate sheet of graph paper.
 4. Lay the wax paper or large sandwich bag over the chips.
 5. Using the rolling pin, roll over the chips until they are totally pulverized.
 6. Throw the chips away and tape the graph paper to a window. You could also use an overhead projector if you have one.
 7. Count and record the number of squares where you see grease, they will appear translucent.
 8. Calculate the average grease per brand per serving size.
-

Extension Ideas

- Graph the total number of squares and total grams of fat per serving to compare the data.



Section 9: Meal Management



Recipe Creation!

Let's create a recipe using as many of the five food groups as possible!

Did You Know?

A recipe is a list of instructions that shows how to prepare or make something, such as a food dish. A recipe usually includes the name of the food being made, the time it will take to prepare, all the ingredients and equipment needed, and a list of steps to follow to prepare the recipe.

Food For Thought!

When creating a recipe, it is important to consider what a balanced meal consists of. A balanced meal typically is half fruits and vegetables, half whole grains and protein, and a serving of dairy. It is important to include a balance of these food groups in your recipe.

Explore It Yourself!

Create your own recipe using as many of the five food groups as possible!

Supplies

EQUIPMENT

- Grocery store newspaper ads or food magazines

SCHOOL SUPPLIES

- Paper
 - Pen or pencil
-

Directions

1. Review the five food groups with participants: vegetables, fruit, dairy, grains and protein.
 2. Ask participants to think of one of their favorite recipes or meals and discuss as a group what food groups those recipes include.
 3. Review the grocery store ads or magazines to find ingredients to create the new recipe. Make sure to include the amounts of each ingredient.
 4. Remind participants to include as many of the food groups as possible.
 5. Give your recipe a creative name!
-

Extension Ideas

- Prepare a recipe to test using as many food groups as possible. Discuss ways to improve the recipe or make any swaps to include all food groups.
- Using the grocery store ads, calculate how much their recipe would cost.



Food Critics!

Let's explore what it takes to become a food critic and practice the role!

Did You Know?

A critic is a professional who communicates an assessment and an opinion of various forms of creative works such as food.

Food For Thought!

A food critic may use a sensory test to evaluate a food item. A sensory test is a scientific evaluation that analyzes and measures human responses to the composition of food and drink. For example, appearance, touch, smell, texture, temperature, and taste.

Explore It Yourself!

Choose a food item, taste it and rate it, as if you are a food critic!

Supplies

EQUIPMENT

- Plates or bowls
- Napkins

SCHOOL SUPPLIES

- Pen or pencil
- Paper
- Food critic activity handout (foodmaster.org/FAN/9.2.pdf)

FOOD

- 3-4 different food items of choice
-

Directions

1. Discuss the role of a food critic. What should be considered when writing a review?
 2. Make a list of things that someone would want to learn from a review of a food item (visual appeal, smell, taste, texture, etc).
 3. Discuss as a group what a “1” score would look like or what a “5” score would look like on the rating scale.
 4. Distribute the first food item and ask participants to look at it, smell it, and taste it.
 5. Ask participants to review the selected food item, using the food critic scale. Encourage students to write about the food item using descriptive words.
 6. If participants rate the food item lower on the scale, ask what could be changed or improved to increase the rating?
 7. Repeat with the other food items.
 8. Discuss the scores.
-

Extension Ideas

- After the review is complete, practice presenting your findings to the group.
- Research what are the qualifications become a food critic.



Getting Pricey!

Let's learn about cost analysis and use your skills to determine the cost of various ingredients.

Did You Know?

Cost analysis helps us compare price based on the unit versus the whole item. This helps us understand how much one serving of an item costs instead of the entire item.

Food For Thought!

Homemade meals tend to cost less than meals from a restaurant. This is because when you buy a meal from the restaurant, you are not just paying for the food. The cost of that meal also includes labor, rent, and other costs to keep the restaurant running.

Explore It Yourself!

Use your analyzing skills to figure the cost of different food items.

Supplies

SCHOOL SUPPLIES

- Pen or pencil
- Paper

Formula for cost analysis: total cost divided by the number of servings in a package.

Example:

Eggs: A carton of eggs cost \$1.67. Each carton has 12 eggs. To figure out cost per egg, divide \$1.67 by 12. [$1.67/12 = 0.1392 \sim 14$ cents per egg.] If a recipe called for 4 eggs, then you would multiply 0.14 by 4. $4 \times 0.14 = 0.56$. The total cost of the four eggs to make your recipe is 56 cents.

Directions

1. Review the example cost analysis to figure the cost of each egg.
2. Distribute the items with price for participants to figure the cost per serving of each item.
3. Challenge participants to create a shopping list of the items with just a single serving of the ingredients for under \$5 without going over.

Extension Ideas

- Discuss the benefits of using cost analysis when using a recipe.
- Try to figure the cost analysis of a recipe.



Meal Mania!

Let's choose your favorite recipes and create an entire menu for a day!

Did You Know?

To stay healthy and to have enough energy to learn and play, you need about 3 balanced meals and some snacks throughout the day. When menu planning, think about breakfast, lunch, dinner and snacks.

Food For Thought!

Steps to create a meal plan:

- 1) Decide which meal you will be serving (breakfast, lunch or dinner) and how many people you will serve.
 - 2) Decide how much money you want to spend on each meal.
 - 3) Start choosing foods and recipes, selecting from all 5 food groups.
 - 4) Use your meal plan to create your shopping list.
-

Explore It Yourself!

Practice creating an entire day's menu, including breakfast, lunch, dinner and snacks!

Supplies

SCHOOL SUPPLIES

- Internet access
- Meal Planning Worksheet (foodmaster.org/FAN/9.4.pdf)
- Paper
- Pen or pencil

Directions

1. Discuss the benefits of creating a meal plan (saves money, eat healthier meals, less food waste, etc).
2. Brainstorm favorite meals for breakfast, lunch, dinner and snacks.
3. Create a meal plan using the meal planning worksheet.
4. Create a shopping list with the necessary ingredients if they are going to make their menu items.

Extension Ideas

- Complete a cost analysis for the meal plan or one of the recipes using an online grocery store.



Menu Math!

Let's calculate what a typical meal would cost!

Did You Know?

It is 5 times more expensive to order food from a restaurant than it is to cook at home. This is because you are not just paying for the ingredients of the meal, you are also paying for the labor that went into making the meal, the rent and other charges to keep the restaurant running. These are called “overhead” costs.

Food For Thought!

Approximately one-third of US children eat fast food on a given day.

Explore It Yourself!

Decide what your meal would cost at a fast food restaurant—use those math skills!

Supplies

SCHOOL SUPPLIES

- Restaurant Menu Sample (foodmaster.org/FAN/9.5.pdf)
- Paper
- Pen or pencil

Directions

1. Using the menu, answer the following questions by writing a numerical expression and solving each equation:
 - If 2 friends share a baked mac & cheese, a classic burger with cheese, and an order of onion rings and split the cost, how much would each have to pay?
 - How much would it cost to order 2 orders of coleslaw and a fresh lemonade?
 - How much would it cost to order a jalapeno burger, hand cut French fries and a soda? If you paid with a \$20 bill, how much change would you get after you pay?
 - How much would it cost to order a classic bacon cheeseburger?
 - How much would it cost to order 3 fried chicken sliders combo meal?
 - If you ordered a pizza burger, bag of potato chips and a soda, what would be the total cost? If the restaurant forgot to give you your potato chips and soda, how much money would they owe you?

Extension Ideas

- Create an order for your family, what would be the total cost?



Yummy Masterpiece!

Let's create some food art!

Did You Know?

A food stylist is a creative professional who prepares food for photographs or television. Their job is to arrange food so that it looks appealing, tasty, and fresh.

Food For Thought!

Food art is the art of preparing, cooking and presenting food in the most creative ways.

Explore It Yourself!

Using a variety of food items, create your own masterpiece of food art!

Supplies

SCHOOL SUPPLIES

- Markers or colored pencils
- Paper
- Examples of food art (found online)

Directions

1. Show participants different examples of food art.
2. Ask participants to use different food items to create their own food art.
3. Participants will draw their food art.
4. Share the finished art with the group and explain what food items were used.

Extension Ideas

- Create food art using real food items with the group!



Super Tasters!

Let's describe the mechanisms of super tasting and test the possibility that you are a super taster!

Did You Know?

Supertasters have many more fungiform (mushroom-shaped) papillae than average or non-tasters. These papillae are raised bumps that provide a sense of taste. Supertasters are especially sensitive to bitter tastes, but they are also sensitive to sweet, salty, and umami.

Food For Thought!

In terms of probability, 25-30% of the world's population are supertasters, 40-50% are average tasters, and 25-30% are non-tasters.

Explore It Yourself!

Perform a super taster test to find out if you are a supertaster!

Supplies

EQUIPMENT

- Super taster strips (also called PTC Paper)
- Trash can
- Hand sanitizer
- Optional: water and cups for super tasters to cleanse their palette

Directions

1. Provide each participant with a test strip.
2. Instruct participants to place the strip on their tongue and observe their reactions. Supertasters will experience a strong unpleasant taste and will likely display an animated reaction! Average-tasters will have a mild, delayed response to the bitterness. To non-tasters, the strip will just taste like paper and they will experience no reaction.
3. Instruct participants to dispose of test strips in the trash and sanitize their hands after the experiment.

Extension Ideas

- Calculate what percentage of the classroom were super tasters! Was anyone surprised they were a super taster?