

# EXPLORE

FOOD AND NUTRITION PROJECT



## FOOD AND NUTRITION

*KEEPING FOOD SAFE*



[texas4-h.tamu.edu](http://texas4-h.tamu.edu)

The members of Texas A&M AgriLife will provide equal opportunities in programs and activities, education, and employment to all persons regardless of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation or gender identity and will strive to achieve full and equal employment opportunity throughout Texas A&M AgriLife.



# EXPLORE

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### KEEPING FOOD SAFE



#### Description

The Texas 4-H Explore series allows 4-H volunteers, educators, members, and youth who may be interested in learning more about 4-H to try some fun and hands-on learning experiences in a particular project or activity area. Each guide features information about important aspects of the 4-H program, and its goal of teaching young people life skills through hands-on experiences. Additionally, each guide contains at least six learning experiences, which can be used as a project guide, or as activities for six different 4-H meetings.

With a network of more than 6 million youth, 600,000 volunteers, 3,500 professionals, and more than 25 million alumni, 4-H helps shape youth to move our country and the world forward in ways that no other youth organization can.

#### Texas 4-H

Texas 4-H is like a club for kids and teens ages 5-18, and it's BIG! It's the largest youth development program in Texas with more than 550,000 youth involved each year. No matter where you live or what you like to do, Texas 4-H has something that lets you be a better you!

You may think 4-H is only for your friends with animals, but it's so much more! You can do activities like shooting sports, food science, healthy living, robotics, fashion, and photography.

Look for 4-H clubs at your school, an after-school program, a community center, or even on a military base or through the reserves for military families.

Texas 4-H is part of the Texas A&M AgriLife Extension Service and the Texas A&M System. Founded in 1908, 4-H is the largest youth development program in Texas, reaching more than 550,000 youth each year.

#### The 4-H Motto and Pledge

"To Make the Best Better!"

I pledge: My HEAD to clearer thinking, My HEART to greater loyalty, My HANDS to larger service and My HEALTH to better living, For my Club, my Community, my Country, and my world.

#### Participating in 4-H

4-H is a great program because it provides options for young people to participate. From a 4-H club located in your community, a SPIN club that focuses on one particular project area, or participating in 4-H through your classroom at school, 4-H allows youth to learn in many different environments. If you are interested in joining 4-H, contact your County Extension Office and ask for a list of the 4-H clubs in your area. If you are a school teacher/educator and would like to use 4-H curriculum or these project guides in your classroom, contact your Extension Office as well for assistance.

#### Purpose

Texas 4-H is designed to develop the youth of our state into productive adult citizens. The 4-H Program uses a non-formal educational process of engaging youth in a "learning by doing" process. This includes hands-on opportunities, participation in workshops and clinics conducted by volunteer leaders or professionals, as well as competitive experiences which allow 4-H members to demonstrate the knowledge they have gained. Through this entire process, the youth are learning key life skills such as working with others, teamwork, cooperation, and goal setting. Through all experiences, youth get to interact with adult volunteers and county Extension agents.

#### What is 4-H?

4-H members across the nation are responding to challenges every day in their communities and their world.

As the youth development program of the Cooperative Extension System of land-grant universities, 4-H is the nation's largest youth development organization, empowering six million young people throughout the United States. Cooperative Extension of 1862 and 1890 land-grant universities provide leadership to engage young people in 4-H in all 3,007 counties of the United States. The impact of the Cooperative Extension partnership is profound, bringing together National Institute of Food and Agriculture of USDA, land grant universities and county government to resource learning opportunities for youth.

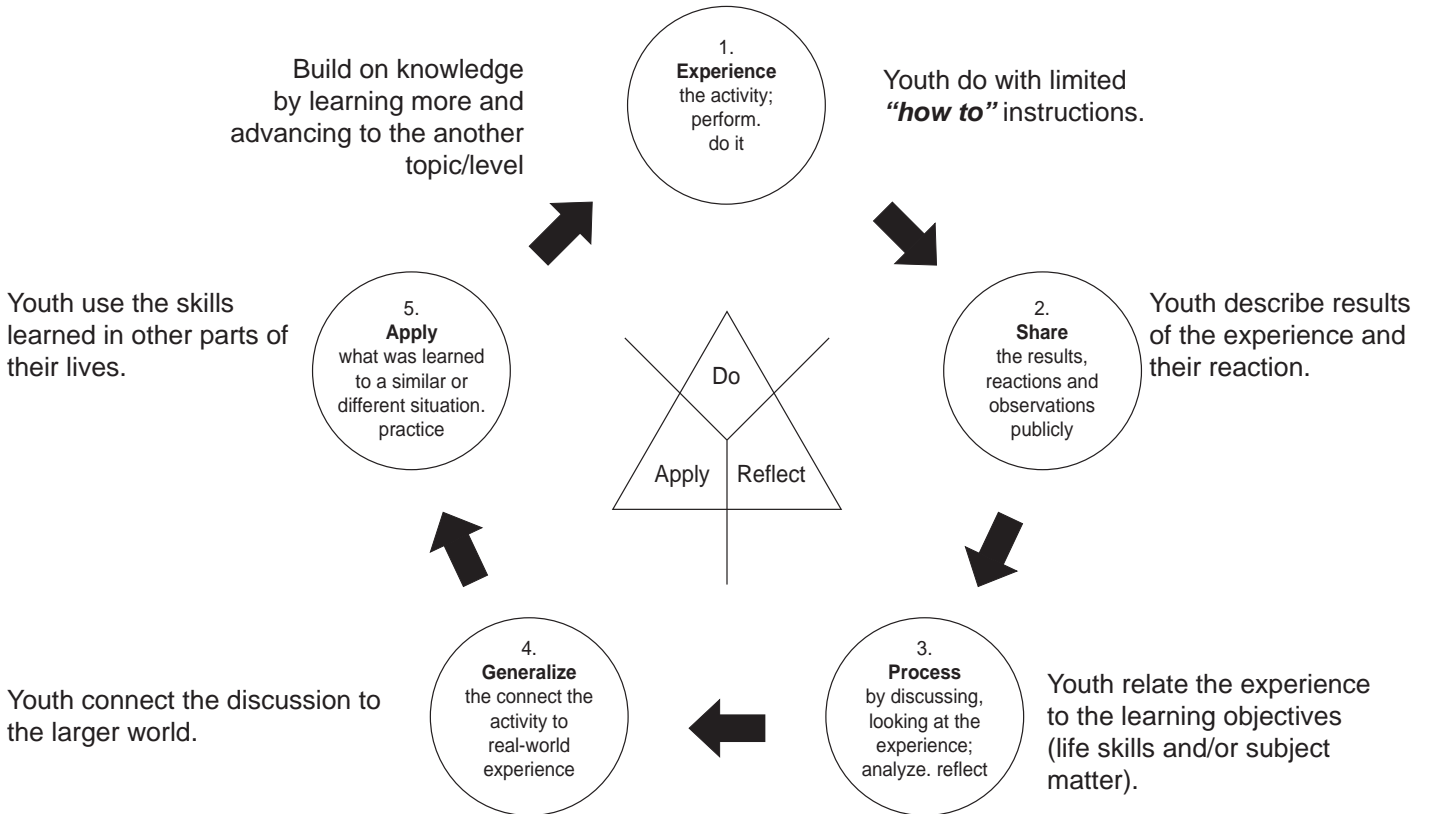
Through America's 110 land-grant universities and its Cooperative Extension System, 4-H reaches every corner of our nation—from urban neighborhoods to suburban schoolyards to rural farming communities.



## 4-H “Learning by Doing” Learning Approach

The Do, Reflect, Apply learning approach allows youth to experience the learning process with minimal guidance from adults. This allows for discovery by youth that may not take place with exact instructions.

### EXPLORE THE CONTENT Introduction of the topic, overview and exploration of content, and review of objectives



4-H FOOD AND NUTRITION PROJECT *Lessons* 



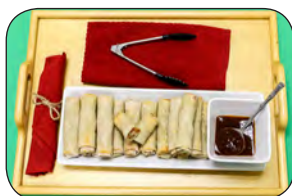
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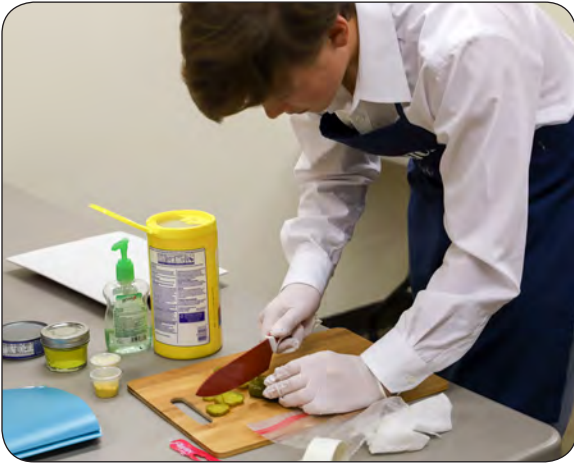
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Developed by:  
Julie Gardner, PhD, Extension Specialist  
Alaina O'Daniel, Extension Agent  
Alyssa Witt, MPH, Extension Agent  
Rebecca Dittmar, Extension Specialist

**EXPLORE**  
FOOD AND NUTRITION PROJECT



# Squirmy Germs

**TIME:**

20-30 minutes

**OBJECTIVES:**

The 4-H member will:

- The 4-H member will:
- Learn about germs
- Learn how to prevent the spread of germs in food preparation, cooking and eating

**EXPLORE THE CONTENT:**

Bacteria are tiny organisms that live on the surfaces of our environment- from our bodies, to our beds to the food that we eat. Germs have the ability to reproduce quickly and make us sick if we do not handle our food properly. It is important that we learn how to reduce the spread of germs when cooking in the kitchen to protect ourselves and others

**What types of germs are there?**

Germs can also be called pathogens. They are organisms that can cause disease in a living species- whether it is a plant, an animal or humans. There are a few different kinds of germs that we need to be aware of before we cook in the kitchen.

Bacteria are tiny, one-celled creatures that get nutrients from their environments in order to live. In some cases that environment is a human body. Bacteria can reproduce outside of the body or within the body as they cause infections. Some infections that bacteria can cause include ear infections, sore throats (tonsillitis or strep throat), cavities, and pneumonia.

Viruses need to be inside living cells to grow and reproduce. Most viruses can't survive very long outside of a living thing like a plant, animal, or person. Whatever a virus lives in is called its host. When viruses get inside people's bodies, they can spread and make people sick. Viruses cause chickenpox, measles, flu, and many other diseases. Some viruses can also live for a short time on something like a doorknob or countertop, so be sure to wash your hands regularly!

Fungi are multi-celled (made of many cells), plant-like organisms. Unlike other plants, fungi cannot make their own food from soil, water, and air. Instead, fungi get their nutrition from plants, people, and animals. They love to live in damp, warm places, and many fungi are not dangerous in healthy people. An example of something caused by fungi is athlete's foot, an itchy rash that teens and adults sometimes get between their toes.

Protozoa are one-cell organisms that love moisture and often spread diseases through water. Some protozoa cause intestinal infections that lead to diarrhea, nausea, and belly pain

**What do germs do?**

Once germs get inside our bodies they make themselves at home. They devour the nutrients and energy we get from food and multiply to make friends for themselves. They can also produce

toxins that are harmful to the body. Those toxins can cause symptoms of common infections like fevers, sniffles, rashes, coughing, vomiting and diarrhea.

Harmful germs that can cause sickness are everywhere- in the air, the soil or in the dirt, on your hands, on animals, inside our bodies and on the bodies of animals. Germs that can cause sickness cannot be seen because they are so small that you would need a microscope to see them. Germs can be spread a lot of different ways in a kitchen- from food to food, or from dirty utensils to food.

### **How can you protect yourself from germs?**

Most germs are spread through the air in sneezes, coughs, or even breaths. Germs can also spread in sweat, saliva, and blood. Some pass from person to person by touching something that is contaminated, like shaking hands with someone who has a cold and then touching your nose.

Steering clear of the things that can spread germs is the best way to protect yourself. Below are healthy habits to prevent germs from spreading.

- Handle and prepare food safely. Food can carry germs. Wash hands, utensils, and surfaces often when preparing any food, especially raw meat. Always wash fruits and vegetables. Cook and keep foods at proper temperatures. Don't leave food out – refrigerate promptly! For more information on food safety practices, see the food safety lesson in the “Exploring the Food Challenge” book.
- Wash your hands often. This is the easiest and best way to protect yourself from germs. Wash your hands every time you cough or sneeze, before you eat or prepare foods, and after you use the bathroom, touch animals and pets, play outside, or visit a sick relative or friend. The germs on your hands can contaminate the food that you or others eat. Wash your hands for 20 seconds with soap and water to make sure the germs are gone.
- Clean and disinfect commonly used surfaces. Germs can live on surfaces. Cleaning with soap and water is usually enough. However, you should disinfect your bathroom and kitchen regularly. You can use a certified disinfectant or bleach solution.
- Cough and sneeze into your sleeve. Cover your nose and mouth when you sneeze and cover your mouth when you cough to keep from spreading germs. It is best to cough or sneeze into your elbow so you do not contaminate your hands. Using tissues for your sneezes and sniffles is another great weapon against germs. But don't just set aside the used tissues to pick up later. Toss them in the trash and, again, wash your hands!
- Clean Clothes: Dirty clothes can bring bacteria and dirt into food preparation areas. Keeping our clothes clean and wearing clean clothes can help prevent this. It's often a good idea to wear an apron over clothes. Wearing an apron can help stop dirt and bacteria from getting onto clothes.
- Get vaccinated. No one likes to get shots but these help keep your immune system strong and prepared to battle germs.
- Stay home when you are sick. Going to school or work, or even a friend's house, while you are sick will only spread your germs to others.

### **Bacteria in the kitchen**

When bacteria are on us and on our food and we don't practice good food safety, we can make others sick. We make food safety a habit so that we can avoid making others sick. Washing our hands is one of the easiest and most important things we can do to keep from getting sick and prevent others from getting sick. Washing hands can reduce getting sick from contaminated food almost by half. We need to wash our hands for at least 20 seconds with warm, running water and soap- washing all areas of our hands including between fingers and under fingernails.



## DO: Where are the Squirmy Germs?

Please note: this activity requires a darkened environment (a place where lights can be turned off).

As you begin the activity, remind youth of the key points of hand washing.

- Bacteria are on our hands even if we do not see them.
- Wash hands well before eating or handling food to avoid getting yourself or others sick.
- Wash hands immediately after handling any raw meat or eggs.
- Wash hands for at least 20 seconds, typically how long it takes to sing "Happy Birthday" or the alphabet.
- Wash hands thoroughly and often.

Instructions:

1. Prior to the activity, ask youth if they can tell how clean their hands are by how they look.
2. Have them touch the bottom of their shoes and then look at their hands to see if they can tell how clean they are by how they look.
3. Give each child fluorescent lotion on their hands and have them rub it into their skin.
4. Then, have each child wash their hands with cold water (no soap).
5. Provide the ultraviolet light for youth in a darkened environment to see if any lotion is on their hands.
6. Have each youth wash their hands again, but this time with warm, soapy water at the sink for at least 20 seconds. If available, provide each with a nail scrub brush to use.
7. Provide the ultraviolet light for youth in a darkened environment to see if any lotion is on their hands, comparing it with what was left on their hands after the first washing.

## REFLECT:

- What did you see after the first time you washed your hands with cold water and no soap?
- What did you see on your hands after you washed your hands a second time with warm, soapy water for 20 seconds?
- Can you tell how clean your hands are by how they look?
- What are 3 ways that you can prevent germs from spreading?

## APPLY:

- Why is hygiene important to wash your hands well before eating or handling food?
- How is this information important to food service workers in cafeterias or restaurants?
- How do healthy hygiene practices apply to those in the foodservice industry?

## REFERENCES:

- Dodd, C., & Clawson, S. (n.d.). Explore Food and Nutrition Cooking in the Kitchen [Scholarly project].



# Food Shopping & Food Safety

**TIME:**

20 to 30 minutes

**MATERIALS NEEDED:**

- Weekly Menu Plan Worksheet
- Paper Food Models
- Pencils

**OBJECTIVES:**

The 4-H member will be able to:

- practice critical-thinking skills when making health decisions
- explain the positive and negative consequences of making a health-related choice
- analyze healthy and unhealthy dietary practices

**EXPLORE THE CONTENT:**

We all enjoy eating a home cooked meal, or even helping cook in the kitchen. However, cooking in the kitchen can be dangerous for a variety of reasons- one of them being how safe our food is. We want to make sure that the food we're serving and eating is safe to eat. The first place we can be practicing food safety is when we go shopping for food.

When shopping at the grocery store it is easy for bacteria to get passed around from all the different foods in your cart. Food safety while shopping is important so we don't carry home unnecessary germs on our food. When we're careful with the way we purchase our food, we're more likely to save money. When we purchase ingredients correctly and safely, they last longer and taste better. Plus when we're careful about what we buy we have smaller amounts of food waste.

In order to maximize our ability to keep our food safe, it is important to go into the grocery store with a plan. Sitting down and making a meal plan of what you're going to eat for the next week and then make a list for the store from what you want to eat. Making a meal plan each week helps save money and time. When you have a plan when you go into the store you're not wandering around the store looking for things and letting germs multiply and you get exactly what you need.

When creating a healthy meal, it's important to include foods from all 5 food groups- vegetables, fruit, protein, dairy and grains on the plate at each meal. Each food group contains essential vitamins, minerals and nutrients that are critical for health.

- **Vegetables:** Vary your veggies to make sure a wide variety of vitamins and minerals that are in your diet. When eating vegetables it's important to eat all of the different colors- from dark green to orange to red they're all important. Eat 2 ½ cups of vegetables every day
- **Fruit:** Fruit is nature's sweet treat. It contains nutrients that are important for growth and development. Make sure to eat a variety of fruits but only 2 cups every day. 100% fruit juice counts as a serving of fruit
- **Protein:** All foods made from meat, poultry, seafood, beans, and peas, eggs, nuts and seeds are considered part of the protein group. Protein helps muscle growth and is a important



part of every cell in the body. Hair and nails are mostly made up of protein. Eat 5 ounces of protein every day.

- **Grains:** Grains pack a lot of nutritional value and they are a source of energy for the body. Any food made from wheat, rice, oats, cornmeal is a grain product. Bread, pasta, oatmeal, breakfast cereal, tortillas are examples of grain products. Make sure to choose whole grains. Whole grains contain 3 parts, the bran, the germ and the endosperm. These three parts keep your body, skin and hair healthy. Eat 6 ounces of grains every day.
- **Dairy:** Dairy contains nutrients like calcium, vitamin D and potassium which are all needed for bone health. Cheese, liquid milk, sour cream, yogurt are all considered dairy products. Make sure to get 3 cups of dairy every day.

## Safety while food shopping

Food safety starts when we purchase our food at the store. It's important that we are mindful of selecting and transporting food from the store to the home and keep it safe. There are certain ways we can handle and place our food while at the store to make sure we're being food safe.

- **Be careful in the cart:** Do not cross-contaminate in the cart. Certain foods like raw proteins and eggs should be separate from everything else.
- **Pick up perishables right before check-out.** Gather non-perishable items first, and then select refrigerated and frozen items. Make sure your frozen or cold food stays cold. Pick up perishable items like dairy, eggs, and meat right before you check out.

## Now, for choosing your ingredients:

- **Produce:** When buying fresh produce be on the lookout for signs of rotting- especially in pre-packaged fruits and vegetables. We also want to watch out for film, goo or signs of mold on the produce. But don't confuse "ugly" or dirty produce with dangerous produce – ugly will still be safe and tasty to eat.
- **Eggs:** Open the carton and look at the eggs! Look for eggs that have clean shells, free of cracks.
- **Fish, Meat, Poultry:** Make sure the fish, meat or poultry your buying is cold- and skip anything that feels warm to the touch or looks/smells funny. There should not be tears or signs of liquid or leaking in the packaging.
- **Prepared or Canned Foods:** Check the "sell-by" or "use-by" dates and skip items with tears in the packaging, opened tops, dents, bulges, leaks, or signs of rust.
- **Check Dairy and Milk Products:** When buying dairy, check the date and make sure that the container is cold. Buy milk and other dairy items towards the end of your shopping trip. This will make sure that it stays cold.
- **At Home:** Take groceries home and store them right away. Perishable food must be refrigerated quickly. In the summer, keep perishable food out of the hot trunk and in the air-conditioned car instead. Storing food after it's purchased is an important step in making sure that our food stays safe. When you have a question about to store food, consider how it was stored at the store- was it cold, in the freezer or on a shelf. You can also check the label for more information- some things you may have to store differently once it has been opened.

**DO: Shop 'til you Drop** (Grade Level: all.)**Preparation:**

Print and cut out a selection of the National Dairy Council's food models found at [www.nationaldairycouncil.org/content/2019/nutrition-education-with-visual-food-models](http://www.nationaldairycouncil.org/content/2019/nutrition-education-with-visual-food-models). Place the food models around a table or two so the cutouts are reachable. Also print out a meal planning worksheets for each of the groups.

**Instructions:**

Separate the kids into groups of 2-3 and hand them a meal planning worksheet. Have the kids work together to create a meal plan for 1 week. Encourage them to make sure they're getting 5 servings of fruits and vegetables each day.

After they have created their meal plan, let them go 'shop' around the room with the food models, taking things off the table as it fits their meal plan. If their ideal item is gone, work with them to think of possible substitutions.

**REFLECT:**

1. What is the most important thing you learned from this lesson?
2. How would you summarize this in one sentence?

**APPLY:**

1. Do you think this will be helpful as an adult?
2. How will you remember to shop safely in the store?

**REFERENCES:**

- FOUNG, J. (2015, April 23). Scared of Food Safety? Don't Be. Here's Your Ultimate Guide to Food Safety in the Kitchen. Retrieved January 14, 2019, from <https://www.thekitchn.com/wipe-away-fears-of-food-safety-and-sanitation-with-this-tidy-list-of-rules-facing-fears-218542>
- What is MyPlate? (2018, December 14). Retrieved from <https://www.choosemyplate.gov/MyPlate>



# Clean and Separate



## EXPLORE THE CONTENT:

### Food Safety in Food Prep & Sanitation

Handling food properly before we cook is not a fancy process. Bacteria can spread throughout the kitchen and get on hands, cutting boards, knives, and countertops. Frequent cleaning and keeping surfaces sanitized and ingredients separate from each other can decrease bacteria growth.

The most important and easy way to prevent people from getting sick from food is to be aware of anything that comes in contact with food- including hands, clothing, food preparation and serving, clean up areas, kitchenware, utensils, plates, glasses etc are clean.

### TIME:

20-30mins

### MATERIALS NEEDED:

- Sponges
- Acrylic Paint
- Cutting Board
- Knife
- Cucumber or Zucchini

### OBJECTIVES:

The 4-H member will:

- discuss ways in which prevention and transmission of disease are affected by individual behaviors
- analyze healthy and unhealthy dietary practices
- describe various modes of disease transmission
- practice critical-thinking skills when making health decisions

- **Wash your hands!** Minimize the amount of bacteria before you begin cooking or preparing ingredients to cut down on how much bacteria is present overall. Wash your hands with warm running water with soap for 20 seconds.
- **Wash produce, not chicken:** As for produce, rinse and scrub all produce with water before cutting, peeling, and cooking. It's easy to transfer bacteria from the peel or rind to the inside of vegetables- washing the outside cuts down on the amount of germs present. However skip rinsing off chicken. Rinsing raw poultry and other proteins can spread bacteria to your sink, counter, and other surfaces when the juices and water splash.
  - » Rinse fresh fruits and vegetables under running tap water, including those with skins and rinds that are not eaten.
  - » Rub firm-skin fruits and vegetables under running tap water or scrub with a clean vegetable brush while rinsing with running tap water.

### Separate

- **Cross-contamination:** The transfer of harmful microorganisms from one food to another food. We can avoid cross contamination by consistently following a few simple steps.
- **Use separate cutting boards:** Once you begin to prepare ingredients and start cooking, make sure to use individual cutting boards for meat, poultry, fish and produce. Cross contamination between raw meat and produce is stoppable. Afterwards, thoroughly wash the boards with warm soap and water.

- **Clean surfaces after cooking protein and eggs:** Be detailed in your cleaning. Clean all surfaces and utensils that come into contact with raw meat or eggs with warm soapy water or the dishwasher when applicable. Also take care to wash hands, sponges and thermometers.
- **Be cautious of surfaces that touched raw proteins:** Never reuse (before cleaning) plates or serving utensils that touched raw meats or eggs. And if reusing any marinade, be sure to boil the liquid rapidly at a high temperature. Any bacteria present in the raw meat or juices can contaminate the safely cooked product. Serve cooked products on clean plates using clean utensils and hands.
- **Go over how to store things in the fridge for safety:**  
Store raw products under cooked or ready-to-eat foods to prevent cross contamination  
RTE foods on top- whole washed fruit, cut melon, deli meat  
Then unwashed produce  
Then roast beef, corned beef, fish and pork  
Ground meats, egg dishes  
Poultry, stuffed meats, stuffing.

Keep different species of raw animal foods separate during storage.

### Summary:

- Clean your hands and surfaces often: Always wash your hands with soap and warm water for 20s before and after handling food
- Separate: don't cross contaminate: Keep raw meat, poultry, fish and their juices away from other food. After cutting raw meats wash cutting board, knife and countertops with hot , soapy water

### DO: Safely Separate (Grade level: 2nd-6th)

- Preparation:  
Gather 2 sponges, paint, a cutting board, a knife, cucumber or zucchini to cut
- Procedure:  
Dampen both sponges. Set one sponge aside to represent the "cooked chicken."  
Paint both sides of the other sponge to represent raw chicken. Pretend that the paint is the juice of the chicken that may have been contaminated with Salmonella!  
Place the painted sponge on the cutting board and use a knife to cut the sponge in half. Move the painted sponge onto the plate, and don't wash the cutting board.  
Next, cut a slice of raw cucumber on the same cutting board you used in Procedure #3.  
Now, place the clean sponge ("cooked chicken") that was cooked well-done on the plate with the "raw chicken" sponge

### DO: White Powder Identification (Grade level: 7th - 12th)

- Preparation:  
Place a variety of white ingredients in containers  
Flour, sugar, salt, baking powder, baking soda, cream of tartar, potato flakes, dried creamer
- Procedure:  
Have them identify what each white powder is



**REFLECT:**

1. What was surprising about what I learned?
2. Why is it important to clean and separate?

**APPLY:**

1. Why is cleaning and separating important, for someone who may be preparing food?
2. How will this lesson and practice benefit you in your food & nutrition project?

**RESOURCES:**

- FOUNG, J. (2015, April 23). Scared of Food Safety? Don't Be. Here's Your Ultimate Guide to Food Safety in the Kitchen. Retrieved January 14, 2019, from
- Food Protection Management (FPM) and Food Handlers Materials. (n.d.). Retrieved from [http://fcsagents.tamu.edu/food\\_and\\_nutrition/food\\_protection\\_management/index.php](http://fcsagents.tamu.edu/food_and_nutrition/food_protection_management/index.php)
- Keep Food Safe! Food Safety Basics [Digital image]. (2007, April). Retrieved from [https://www.fsis.usda.gov/wps/wcm/connect/af5e93b4-36ea-48c5-af1c-a93c49b28bf4/Keep\\_Food\\_Safe\\_Food\\_Safety\\_Basics.pdf?MOD=AJPERES](https://www.fsis.usda.gov/wps/wcm/connect/af5e93b4-36ea-48c5-af1c-a93c49b28bf4/Keep_Food_Safe_Food_Safety_Basics.pdf?MOD=AJPERES)

# Cook and Chill

**TIME:**

20-30mins

**MATERIALS NEEDED:**

- Danger Zone illustration, page 6: <https://www.ag.ndsu.edu/food/global-foods/documents/CookChilllessonplanClassNo2.pdf>
- Refrigerator, freezer, and cabinet (or pictures)
- Sticky notes with food item names
- Microwave
- Glasses
- Ice
- Water
- Food thermometer
- Two microwave-safe bowls
- Measuring cups
- Six packets of instant oatmeal for each group.

**OBJECTIVES:**

The 4-H member will:

- Learn essential vocabulary including chill, defrosting/thawing, and perishable foods.
- Learn that leftovers and perishables must be refrigerated within two hours of purchase or preparation.
- Learn the “danger zone” temperatures for bacteria growth
- Know the “dos” and “don’ts” for using a food thermometer to check for doneness
- Recognize safe thawing techniques

**Essential Vocabulary:**

- Defrosting/thawing: A way of “unfreezing” frozen food, such as meat, poultry, and fish.
- Chill: To cool down or store foods in a cool temperature at or below 40 degrees F in order to slow the growth of bacteria and keep foods out of the “Danger Zone.”
- Perishable foods: Foods that are refrigerated and spoil or “go bad” after they are not stored properly for a period of time. Perishable foods include meat products, fruits and vegetables, and prepared foods such as leftovers. These foods also contain a lot of water, which is what bacteria like to grow in.

**EXPLORE THE CONTENT:**

Bacteria are all over our food- from the soil, to the air and water. When the environment is right, bacteria can grow rapidly. Some of these bacteria can cause us to get sick. This sickness is called foodborne illness. Let's talk about how to keep our food safe to prevent foodborne illness.

Chill:

1. Keeping our food cold is one of the most important ways we keep food safe because it slows the growth of bacteria. This is why we store foods in the refrigerator and freezer.
  - Not too long ago, a refrigerator was a box with a block of ice to supply the cold air needed to keep food fresh. Now our refrigerators are kept at temperatures below 40 degrees F to keep food safe.
  - Cooling foods to temperatures below 40 degrees F slows bacterial growth and protects us from getting sick. Freezers cool food to temperatures of 0 degrees F or lower, which slows the growth of bacteria even more than your refrigerator.
  - Foodborne illness bacteria can grow quickly in what is called the “Danger Zone”. The Danger Zone are temperatures that range from 40 degrees to 140 degrees F. You can't see, taste or smell these bacteria on the food but they will make you sick.
2. Bacteria need time and the right environment to grow and multiply, such as moisture and warmth. For this reason, you should store food in the refrigerator as soon as possible.
  - As a general rule, when perishable food is kept out for two hours or longer, it should be thrown out. This is called the 2-hour rule.
  - Most foodborne illness bacteria can double their numbers every 20 minutes at temperatures in the Danger Zone (40

to 140 degrees F).

- When you leave food in the Danger Zone for 2 hours or longer, bacteria multiply and produce toxins that can cause foodborne illness. Even when you cook your food again, this bacteria may not be fully destroyed.
- When storing hot food in the refrigerator, it's important to allow for proper cooling and air flow to avoid. Allowing food to cool quickly reduces time food spends in the Danger Zone.
- Large portions of food like soup can take a long time to cool, even in the refrigerator. To help it cool down faster, place it in a cold water bath before storing.
- Food can also be divided into 1) smaller or thinner portions, loosely covered, or 2) loosely covered shallow pans.

## Cook:

All food can grow bacteria and cause foodborne illness, but there are some foods that can grow bad bacteria very quickly. We have to be careful to keep these foods cold or really hot to prevent the bacteria from growing. These foods are meat, poultry, eggs, and fish.

1. Before cooking frozen meat, poultry, pork, and fish, it is important to thaw these foods safely to prevent growth of bacteria that cause foodborne illness.
  - Never thaw food at room temperature, or in the Danger Zone.
  - There are four safe ways to thaw food:
    - In the refrigerator. This allows for slow thawing at safe, cold temperatures. Store raw meat at the bottom of the fridge and on a plate to make sure meat and poultry juices don't drip onto other foods.
    - In the sink under cold, running water for faster thawing. Place food in a leak-proof plastic bag and submerge under cold water. Change the water every 30 minutes and cook immediately after its thawed.
    - In the microwave. Microwave on low heat to thaw, or on the "defrost" setting, or 30% power. Cook immediately after its been thawed.
    - As part of the cooking process. You can cook chicken and beef from frozen on the stove or in the oven.
  
2. We can prevent bacteria growth by keeping food cold. We can also destroy some bacteria through cooking. Some foods, such as meat, eggs, and fish, already have disease-causing bacteria on them and need to be cooked to complete doneness to destroy the bacteria. The best way to check if your food is completely done cooking is by checking the temperature with a food thermometer.
  - Food thermometers can be used by:
    - First, testing it for accuracy in ice water to make sure it reaches within 2 degrees of 32 degrees F.
    - Calibrate your thermometer based on your ice water reading using the thermometer's instructions.
    - Place the thermometer in the thickest part of the food, preferably at least an inch deep, making sure to not touch bone, fat, or gristle.
    - Wait the recommended of time for your thermometer (see its instructions). For meat products, use the food thermometer before removing the food from the heat source.
    - Clean your thermometer with hot, soapy water after each use to prevent cross-contamination.
  
  - Food needs to reach a safe internal temperature while cooking. These temperatures are:
    - Beef, pork, veal, lamb: 145 degrees F with a three-minute "rest time" after removal from the heat source
    - Ground meats: 165 degrees F
    - Poultry: 165 degrees F
    - Eggs and egg dishes: 160 degrees F, but cook eggs until both the yolk and white are firm. Scrambled eggs should not be runny.
    - Leftovers: 165 degrees F.
    - Fish: 145 degrees F
    - Guidelines for seafood:
      - Shrimp, lobster, crab: pearly and opaque



- Clams, oysters, mussels: shells open during cooking
- Scallops: milky white, opaque and firm

### Storing Food:

- Once cooked, hot food should be kept at 140 degrees or warmer to prevent bacterial growth. Cold food should be kept at 40 degrees F or cooler. Dry foods should be kept between 50 and 70 degrees.
- Once food has been opened or prepared, it should be discarded after seven days.

## **DO: Where Does it Go?** (Grade Level: 2nd - 5th)

### **Preparation:**

Paste pictures of a refrigerator, freezer, and cabinet up in the room if you do not have access to these in a kitchen. Prepare sticky notes with food item names. Have kids work together to decide where food should be stored.

### **Instructions:**

Now that we know about storing food safely and keeping food at the right temperatures to keep food safe to eat, we are going to do an activity. I'm going to give you sticky notes with food item names on them, and you must decide where they go: the refrigerator, cupboard, or freezer.

### **REFLECT:**

- What does this activity show about food safety?
- What is the "danger zone"?
- What are safe food storage methods?

### **APPLY:**

- Why do you think it's important to store food safely?
- Do you store your food safely at home?
- Do you put food away quickly after a meal at home?
- What could you do at home to encourage family members to be more food safe?

## **DO: Calibrate a Thermometer & Cooling Down Hot oatmeal** (Grade Level: 6th - 12th)

### **Preparation:**

Divide students into groups of 4-6. Gather glasses, ice, water, a food thermometer, two microwave-safe bowls, measuring cups, and six packets of instant oatmeal for each group.

### **Instructions:**

Calibrate your thermometer by filling a glass with ice and topping it off with cold water. Stir the water and let sit for three minutes. Stir again, and insert your thermometers into the glass (make sure to not touch the sides). The temperature should read 32 degrees F. Record the difference and offset your thermometer as appropriate.

1. Pour 3 packets of oatmeal in Bowls 1 and 2. Fill each with 1-1/2 cups of water and mix.
2. Heat the oatmeal in the microwave according to package directions, one at a time.
3. When Bowl 1 is done, remove from microwave and check the temperature by inserting a food thermometer at least an inch deep into the center. It should read 140°F or higher (outside of the "danger zone").
4. Record the time and temperature of the oatmeal.
5. Leave Bowl 1 on the counter and check and record the temperature every 20 minutes

6. When Bowl 2 is done, remove from microwave and check the temperature by inserting a food thermometer at least an inch deep into the center. It should read 140°F or higher.
7. Evenly divide contents of Bowl 2 into two shallow storage containers. Record time and temperature for one of the shallow storage containers and put the storage container in to refrigerator.
8. Continue to check the temperature of Bowl 1 on the counter and the storage container in the fridge until the fridge container reaches 40 degrees F.

**REFLECT:**

- How long did it take for each container to reach 40 degrees F?
- What was the temperature after one hour of cooling?
- Which method was the most effective for cooling down the oatmeal? Why?

**APPLY:**

- Do you store food safely at home?
- What could you do at home to encourage family members to be more food safe?
- What is one thing you learned from this lesson?

**RESOURCES:**

- University of Rhode Island Cooperative Extension (March 2010). Food Safety Smart Curriculum. Retrieved from: [https://web.uri.edu/foodsafety/files/Food\\_Safety\\_Smart\\_curriculum.pdf](https://web.uri.edu/foodsafety/files/Food_Safety_Smart_curriculum.pdf)
- USDA FSIS (March 23, 2015). Refrigeration and Food Safety. Retrieved from: [https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/refrigeration-and-food-safety/ct\\_index](https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/refrigeration-and-food-safety/ct_index)
- USDA FSIS (April 2007). Keep Food Safe! Food Safety Basics. Retrieved from: [https://www.fsis.usda.gov/wps/wcm/connect/af5e93b4-36ea-48c5-af1c-a93c49b28bf4/Keep\\_Food\\_Safe\\_Food\\_Safety\\_Basics.pdf?MOD=AJPERES](https://www.fsis.usda.gov/wps/wcm/connect/af5e93b4-36ea-48c5-af1c-a93c49b28bf4/Keep_Food_Safe_Food_Safety_Basics.pdf?MOD=AJPERES)
- USDA FSIS (August 8, 2013). Appliance Thermometers. Retrieved from: <https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/appliances-and-thermometers/appliance-thermometers/appliance-thermometers>
- Where Does It Go? Activity, page 87: [https://web.uri.edu/foodsafety/files/Food\\_Safety\\_Smart\\_curriculum.pdf](https://web.uri.edu/foodsafety/files/Food_Safety_Smart_curriculum.pdf)
- Calibrate a thermometer and cooling down hot oatmeal, page 118: [https://web.uri.edu/foodsafety/files/Food\\_Safety\\_Smart\\_curriculum.pdf](https://web.uri.edu/foodsafety/files/Food_Safety_Smart_curriculum.pdf)



# Safe Microwave Cooking & Food Safety After School



## EXPLORE THE CONTENT:

### Cooking safely in the microwave

1. How do microwaves work?
  - Microwaves use short radio waves to cook food from the outside in. The waves can penetrate food to a depth of 1 to 1.5 inches.
  - The short waves excite the water, fat, and sugar molecules that are present in food. This excitement makes them wiggle, which creates heat and cooks the food.
  - Microwaves can cook unevenly and leave 'cold spots' where harmful bacteria can survive.
2. How to use a microwave properly
  - Microwaves are convenient and easy kitchen tool to use. However, there are special rules about what can or cannot go in to the microwave. Some containers are microwave safe, but most are not.
  - Use only microwave safe cookware. These include:
    - Glass
    - Paper plates that have a microwave safe symbol, and
    - Some plastics that have a microwave safe symbol.
    - If you aren't sure or can't find a microwave safe symbol, it is safest to use glass.
  - Things that are NOT safe to put in the microwave include:
    - Cold storage containers: margarine tubs, cottage cheese and yogurt cartons, etc. These materials are not approved for cooking and chemicals can migrate into food.
    - Brown paper bags and newspapers.
    - Metal pans, utensils, and aluminum or tin foil.
    - Foam-insulated cups, bowls, plates or trays.
    - China with metallic paint or trim.
    - Chinese "take-out" containers with metal handles.
    - Metal "twist ties" on package wrapping.
    - Food wrapped in aluminum foil.
    - Food cooked in any container or packaging that has warped or melted during heating.
  - To cook food in a microwave oven, you need to know the time and temperature needed to cook. Follow package directions for this and use a food thermometer.
    - When cooking raw meats such as beef, poultry, pork, or fish, and when cooking eggs in a microwave, it is important to use a food thermometer to ensure doneness and prevent foodborne illness.

### TIME:

20-30 minutes

### MATERIALS NEEDED:

- Microwave
- Water
- Ice
- 2-cup glass container
- 3 large raw eggs
- 3 mugs or microwave-safe containers
- $\frac{1}{3}$  cup of water

### OBJECTIVES:

The 4-H member will:

- Learn how to use the microwave safely
- Learn how to determine the wattage of their microwave
- Learn safe practices for food safety after school

- After removing food from the microwave, allow food to sit for 3 minutes. This allows time for the food to complete the cooking process. Then, use a clean food thermometer to check the internal temperature of the food.
  - Beef, pork, veal, lamb: 145 degrees F with a three-minute “rest time” after removal from the heat source
  - Ground meats: 165 degrees F
  - Poultry: 165 degrees F
  - Eggs and egg dishes: 160 degrees F, but cook eggs until both the yolk and white are firm. Scrambled eggs should not be runny.
  - Fish: 145 degrees F
- When cooking convenience foods such as microwavable pasta and soup or frozen ready-to-eat foods:
  - Follow package directions for time and temperature of microwave cooking.
  - Use only microwave-safe cookware.
  - Microwavable convenience foods such as soups and pasta dishes should be handled carefully. Hot liquids can spill and cause burns. Don’t lift hot foods over your head to prevent spills and burns.
  - Use pot holders when removing food from the microwave.
  - Steam can also cause burns. Carefully remove lids and plastic wrap, with hands and arms facing away from the steam, to prevent burns.
  - Stir all drinks, soups, and other stirrable microwave foods before eating or drinking to prevent mouth burns.
- Heat ready-to-eat foods such as hot dogs, lunch meats, fully cooked ham, and leftovers until steaming hot. Allow food to sit for two minutes to allow heat to distribute and to prevent mouth burns.
- When reheating leftovers, food should reach a temperature of 165 degrees F. After heating, let it stand for two minutes to allow the heat to distribute evenly.
  - Cover foods with a microwave safe lid or plastic wrap to hold in moisture and provide safe, even heating. Turn back a corner for the steam to vent
  - Rotate and stir foods while cooking to distribute heat
  - After heating, use a clean food thermometer to check that food has reached 165 degrees F
  - Allow the food to stand for two minutes to distribute heat

## Food Safety After School

1. Everyone is at risk for foodborne illness, but there are some groups of people that are at greater risk. One of these groups is small children. Your immune system helps fight sickness and is still development when you are a child. This meant it’s easier for young children to get sick.
2. It’s important to be able to recognize food poisoning symptoms and know who to call.
  - Symptoms of food poisoning can happen within minutes or within weeks after eating contaminated food. Symptoms are usually similar to the flu and include: nausea, vomiting, fever, diarrhea, bloody diarrhea, abdominal pain, feeling weak, headache
  - Tell your parents and call the doctor if you think you have food poisoning, and especially if you have bloody diarrhea.
3. There are things you can do to prevent getting food poisoning after school. These include:
  - Placing all school books and bags on the floor and not on kitchen counters
  - Clean lunch boxes: throw away “refrigerator” type foods, such as sandwiches, yogurt, cheese, and deli meat. Don’t eat leftover lunch items after school.
  - Wash hands before making a snack
  - Use clean spoons, forks, knives, and plates.
  - Wash fruits and vegetables with running water before eating them



- Don't eat foods that are bruised or have mold, such as bread and fruits and vegetables
- Don't eat raw cookie dough. Raw eggs can have Salmonella bacteria and cause food poisoning.
- Don't leave cold items, such as cheese, milk, lunchmeat, eggs, or yogurt on the counter. Put them back in the refrigerator as soon as you're done serving yourself.
- Don't leave perishable foods or cooked leftovers such as rice, pizza, soup, and pasta on the counter. Put them back in the refrigerator as soon as you're done serving yourself. Food shouldn't be left in the "Danger Zone" (40 to 140 degrees F) for more than 2 hours at a time. This is known as the 2-hour rule.

4. If you have a food safety questions, you can ask FSIS' Karen.gov.

- Mobile users: m.askkaren.gov or pregunteleaKaren.gov

## **DO: Time to Boil** (Grade Level: All)

### **Preparation:**

The higher wattage of a microwave oven, the faster it will cook food, so it is important to know your microwave's wattage. Measure a cup of water in a 2-cup glass container. Add ice cubes and stir until water is cold. Discard ice cubes and pour out any water until no more than one cup of water remains in the container.

### **Instructions:**

Put container in the microwave and turn it on high for four minutes. Watch to see when the water boils and record the time. If the water boils in:

- Less than 2 minutes, it is a very high wattage oven of 1000 watts or more.
- In 2 ½ minutes, it is a high wattage oven of about 800 watts or more.
- In 3 minutes, it is an average wattage oven of 650 to 700 watts or more.
- More than 3 minutes or not by 4 minutes, it is a low wattage oven of 300 to 500 watts.

### **REFLECT:**

- Where else could you find the wattage of your microwave?
  - Inside of the oven's door
  - Serial number plate on the back of the oven
  - Owner's manual
- Why is it useful to know the wattage of your microwave?
- What do you typically use the microwave for?
- Have you ever been burned from cooking something in the microwave?

### **APPLY:**

- When heating a frozen burrito, the package directions state to cook for 2-4 minutes, rotating halfway through. If your microwave is a high-wattage oven, should you use the minimum or maximum cooking time?
- Why is the internal temperature of food important?
- What is the 2-hour rule?
- How will you use the information from today's lesson at home?

## **DO: Be a Good Egg** (Grade Level: All)

### **Preparation:**

Gather 3 large raw eggs, 3 mugs or microwave-safe containers, and ⅓ cup of water.

### **Instructions:**

*Be a Good Egg:*

- Gently crack each egg into a mug, making sure it's covered in water.



- Prick the yolk with a fork or toothpick
- Cover the mugs with a microwave-safe cover and microwave each on high for:
  - 45 seconds
  - One minute, and
  - 1.5 minutes
- Remove egg from water with a slotted spoon at set on a plate. Cut each egg in half and compare doneness.

## REFLECT:

- Compare and contrast how the eggs look (runny, firm).
- What happens when you cook the egg longer?
- Why is it important to cook eggs until firm?

## APPLY:

- Do you think you'd be able to cook an egg in the microwave at home after this lesson?
- How can you tell if an egg is sufficiently cooked?
- Is it okay to eat raw eggs if they are in cookie dough?

## SOURCES:

- The Partnership for Food Safety Education (2019). Experiments for Fighting Bac!. Retrieved from: <http://www.fightbac.org/wp-content/uploads/2017/06/grades4-8experiments.pdf>
- USDA FSIS (June 16, 2013). Food Safety After School. Retrieved from: [https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/food-safety-after-school/ct\\_index](https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/food-safety-after-school/ct_index)
- USDA FSIS (April 2007). Keep Food Safe! Food Safety Basics. Retrieved from: [https://www.fsis.usda.gov/wps/wcm/connect/af5e93b4-36ea-48c5-af1c-a93c49b28bf4/Keep\\_Food\\_Safe\\_Food\\_Safety\\_Basics.pdf?MOD=AJPERES](https://www.fsis.usda.gov/wps/wcm/connect/af5e93b4-36ea-48c5-af1c-a93c49b28bf4/Keep_Food_Safe_Food_Safety_Basics.pdf?MOD=AJPERES)
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- USDA FSIS (August 8, 2013). Cooking Safely in the Microwave Oven. Retrieved from: <https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/appliances-and-thermometers/cooking-safely-in-the-microwave/cooking-safely-in-the-microwave-oven>
- USDA FSIS (August 2011). Food Safety After School. Retrieved from: [https://www.fsis.usda.gov/wps/wcm/connect/663a82f6-dfa6-4102-9a73-c21b89cc294d/Food\\_Safety\\_After\\_School.pdf?MOD=AJPERES](https://www.fsis.usda.gov/wps/wcm/connect/663a82f6-dfa6-4102-9a73-c21b89cc294d/Food_Safety_After_School.pdf?MOD=AJPERES)
- "Time-to-Boil Test" and "Be a Good Egg" <http://www.fightbac.org/wp-content/uploads/2017/06/grades4-8experiments.pdf> page 5

## ADDITIONAL RESOURCES:

### Take-Home Microwave Recipes

<b>Nutrition Facts</b>	
servings per container	
<b>Serving size</b>	<b>(126g)</b>
<b>Amount per serving</b>	
<b>Calories</b>	<b>180</b>
<b>% Daily Value*</b>	
<b>Total Fat</b> 10g	<b>13%</b>
Saturated Fat 4g	<b>20%</b>
Trans Fat 0g	
<b>Cholesterol</b> 210mg	<b>70%</b>
<b>Sodium</b> 520mg	<b>23%</b>
<b>Total Carbohydrate</b> 9g	<b>3%</b>
Dietary Fiber 0g	<b>0%</b>
Total Sugars 2g	
Includes 0g Added Sugars	<b>0%</b>
<b>Protein</b> 14g	
Vitamin D 1mcg	6%
Calcium 103mg	8%
Iron 2mg	10%
Potassium 259mg	6%

\*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

## Quick Quiche

Serves 1

Ingredients:

- 1 egg
- 1 ½ T 2% milk
- 1/8 t pepper
- ¼ of an english muffin
- 2 t cream cheese
- 1 slice deli ham
- ½ tsp dry thyme

1. Beat egg and milk together with a fork in a mug with salt and pepper. Tear bread into dime-size pieces; stir in. Add cream cheese; stir in. Tear deli meat into small pieces and add to mixture.
2. Microwave on high until done, about 1 minute and ten seconds. Garnish with tomatoes, cheese, and chives.

Recipe adapted from: Hogan, Bill. (May 1, 2012). Coffee Cup Quiche. In St. Louis Post-Dispatch. Retrieved from: [https://www.stltoday.com/lifestyles/food-and-cooking/recipes/coffee-cup-quiche/article\\_2d121f31-d6b0-564c-bbac-6fca97a08276.html](https://www.stltoday.com/lifestyles/food-and-cooking/recipes/coffee-cup-quiche/article_2d121f31-d6b0-564c-bbac-6fca97a08276.html)

<b>Nutrition Facts</b>	
servings per container	
<b>Serving size</b>	<b>(310g)</b>
<b>Amount per serving</b>	
<b>Calories</b>	<b>350</b>
<b>% Daily Value*</b>	
<b>Total Fat</b> 8g	<b>10%</b>
Saturated Fat 1.5g	<b>8%</b>
Trans Fat 0.5g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 380mg	<b>17%</b>
<b>Total Carbohydrate</b> 63g	<b>23%</b>
Dietary Fiber 7g	<b>25%</b>
Total Sugars 4g	
Includes 0g Added Sugars	<b>0%</b>
<b>Protein</b> 8g	
Vitamin D 0mcg	0%
Calcium 47mg	4%
Iron 3mg	15%
Potassium 1605mg	35%

\*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

## Microwave Baked Potatoes

Serves 1

Ingredients:

- 1 Potato
- 2 t Butter or margarine
- 1/8 t Salt
- 1/8 t Pepper

1. Coat the potato with oil or melted butter and sprinkle with salt and pepper.
2. Prick potato with a fork a few times.
3. Place potato on a microwave safe dish and microwave at full power for five minutes. Turn the potato over and microwave for another three to five minutes.
4. Check potato for doneness by sticking a fork through the center. The potato should be soft.

Recipe adapted from: Christensen, Emma. (January 15, 2016). How to Bake a Potato in the Microwave. In The Kitchn. Retrieved from: <https://www.thekitchn.com/how-to-bake-a-potato-in-the-microwave-226751>



<b>Nutrition Facts</b>	
servings per container	
<b>Serving size</b>	<b>(145g)</b>
<b>Amount per serving</b>	
<b>Calories</b>	<b>180</b>
	<b>% Daily Value*</b>
<b>Total Fat</b> 11g	<b>14%</b>
Saturated Fat 4g	<b>20%</b>
Trans Fat 0g	
<b>Cholesterol</b> 375mg	<b>125%</b>
<b>Sodium</b> 280mg	<b>12%</b>
<b>Total Carbohydrate</b> 3g	<b>1%</b>
Dietary Fiber 0g	<b>0%</b>
Total Sugars 2g	
Includes 0g Added Sugars	<b>0%</b>
<b>Protein</b> 17g	
Vitamin D 2mcg	10%
Calcium 154mg	10%
Iron 2mg	10%
Potassium 198mg	4%
*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

## Microwave Scrambled Eggs

Serves 1

Ingredients:

- 2 eggs
- 2 T 2% milk
- 2 T shredded cheddar cheese
- 1/8 t Pepper
- 1/8 tsp spice dried cilantro or herb of your choice

1. Coat a 12oz microwave safe mug or container with cooking spray. Add eggs and milk and stir until blended.
2. Microwave on HIGH for 45 seconds and stir. Microwave until eggs are set (no longer runny), about 30 to 45 seconds longer.
3. Top with cheese and season.

Recipe adapted from: Where the Cookies Are. (February 3, 2012). 2 Minute Scrambled Eggs. In Home Is Where the Cookies Are. Retrieved from: <http://www.wherethecookiesare.com/2012/02/03/2-minute-scrambled-eggs/>

<b>Nutrition Facts</b>	
servings per container	
<b>Serving size</b>	<b>(265g)</b>
<b>Amount per serving</b>	
<b>Calories</b>	<b>230</b>
	<b>% Daily Value*</b>
<b>Total Fat</b> 6g	<b>8%</b>
Saturated Fat 3g	<b>15%</b>
Trans Fat 0g	
<b>Cholesterol</b> 15mg	<b>5%</b>
<b>Sodium</b> 530mg	<b>23%</b>
<b>Total Carbohydrate</b> 25g	<b>9%</b>
Dietary Fiber 0g	<b>0%</b>
Total Sugars 4g	
Includes 0g Added Sugars	<b>0%</b>
<b>Protein</b> 19g	
Vitamin D 0mcg	0%
Calcium 312mg	25%
Iron 1mg	6%
Potassium 123mg	2%
*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

## Mac in a Mug

Serves 1

Ingredients:

- 1/3 cup dry macaroni elbow noodles
- 1/2 cup water
- 1/4 cup 2% milk
- 1/2 cup shredded low-fat cheddar cheese

1. Put the macaroni and the water into a mug. Microwave on full power for 2 minutes. Stir. (Note: the water will boil over just a bit, that is fine)
2. Microwave for another minute. Stir.
3. Microwave for a fourth minute, and then check to see that all the water has been absorbed. If not, microwave a bit more, until it is gone.
4. Stir in the milk and shredded cheese and microwave for a final 30-60 seconds. Stir well, and enjoy.

Recipe adapted from: The View from Great Island. (January 14, 2015). Instant Microwave Macaroni and Cheese. In The View from Great Island. Retrieved from: <https://theviewfromgreatisland.com/instant-microwave-macaroni-and-cheese-in-a-mug/>

<b>Nutrition Facts</b>	
servings per container	
<b>Serving size</b>	<b>(117g)</b>
<b>Amount per serving</b>	
<b>Calories</b>	<b>240</b>
	<b>% Daily Value*</b>
<b>Total Fat</b> 11g	<b>14%</b>
Saturated Fat 3.5g	<b>18%</b>
Trans Fat 0g	
<b>Cholesterol</b> 15mg	<b>5%</b>
<b>Sodium</b> 1110mg	<b>48%</b>
<b>Total Carbohydrate</b> 28g	<b>10%</b>
Dietary Fiber 1g	<b>4%</b>
Total Sugars 3g	
Includes 0g Added Sugars	<b>0%</b>
<b>Protein</b> 8g	
Vitamin D 0mcg	0%
Calcium 162mg	10%
Iron 2mg	10%
Potassium 176mg	4%
*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

## Pizza in a Mug

Serves 1

Ingredients:

- 4 T flour
- 1/8 t baking powder
- 5/8 t baking soda
- 3 T 2% milk
- 1 tsp oil
- 1 T marinara sauce
- 1 T shredded low moisture, part skim mozzarella cheese
- 7 mini pepperoni
- 1/2 t dried oregano

1. Mix flour, baking powder, baking soda and salt together in a microwavable mug.
2. Add in milk and oil then mix together. Some lumps are okay.
3. Spoon on the marinara sauce and spread it around the surface of the batter.
4. Sprinkle on the cheese, pepperoni, and dried herbs
5. Microwave for 1 minute 10 - 1 minute 20 seconds, or until it rises up and the toppings are bubbling (timing may vary)

Recipe adapted from: Stafford, Gemma. (March 21, 2018). Microwave Mug Pizza. In Bigger Bolder Baking. Retrieved from: <https://www.biggerbolderbaking.com/microwave-mug-pizza/>

<b>Nutrition Facts</b>	
servings per container	
<b>Serving size</b>	<b>(135g)</b>
<b>Amount per serving</b>	
<b>Calories</b>	<b>470</b>
	<b>% Daily Value*</b>
<b>Total Fat</b> 25g	<b>32%</b>
Saturated Fat 4.5g	<b>23%</b>
Trans Fat 0g	
<b>Cholesterol</b> 5mg	<b>2%</b>
<b>Sodium</b> 500mg	<b>22%</b>
<b>Total Carbohydrate</b> 53g	<b>19%</b>
Dietary Fiber 3g	<b>11%</b>
Total Sugars 29g	
Includes 26g Added Sugars	<b>52%</b>
<b>Protein</b> 9g	
Vitamin D 0mcg	0%
Calcium 145mg	10%
Iron 3mg	15%
Potassium 307mg	6%
*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

## Peanut Butter Mug Cake

Serves 1

Ingredients:

- 3 T flour
- 2 T sugar
- 1 1/2 T cocoa
- 1/4 t baking powder
- Pinch of salt
- 3 T 2% milk
- 1 T vegetable oil
- 1 T peanut butter

1. In a large mug, stir together the dry ingredients (flour, sugar, cocoa powder, baking powder and salt). Add the milk, vegetable oil and peanut butter. Stir until smooth.
2. Cook in the microwave on high for 1 minute and 10 seconds. Serve warm.

Recipe adapted from: Segarra, Jessica. (February 22, 2013). Chocolate Peanut Butter Mug Cake. In The Novice Chef. Retrieved from: <https://thenovicechefblog.com/chocolate-peanut-butter-mug-cake/>

# Nutrition Facts

servings per container

**Serving size** (147g)

Amount per serving

**Calories** 300

% Daily Value\*

**Total Fat** 9g 12%

Saturated Fat 1g 5%

Trans Fat 0g

**Cholesterol** 0mg 0%

**Sodium** 210mg 9%

**Total Carbohydrate** 45g 16%

Dietary Fiber 4g 14%

Total Sugars 9g

Includes 0g Added Sugars 0%

**Protein** 11g

Vitamin D 0mcg 0%

Calcium 140mg 10%

Iron 3mg 15%

Potassium 428mg 10%

\*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

## Banana Bread in a Mug

Serves 1

Ingredients:

- ½ medium size banana, mashed
- 1 T almond or other nut butter
- 1 egg white
- ½ tsp vanilla extract
- 4 ½ T flour
- ¼ t baking powder
- ¼ t ground cinnamon

1. Place banana in a microwave safe cup. Stir in almond butter, egg white, and vanilla extract. Add oat flour, baking powder, cinnamon, and salt and mix until well combined.
2. Microwave on High for 45 seconds to 1 minute or until the middle of the cake is firm. Top with banana slices and sprinkle with cinnamon.
3. Cooking time may vary based on microwave power and mug size.

Recipe adapted from: KitchMe (2019). Skinny Microwave Banana Mug Cake.

In KitchMe. Retrieved from: [http://www.kitchme.com/recipes/skinny-microwave-banana-mug-cake?utm\\_source=tgs&utm\\_medium=article&utm\\_campaign=mugcakes](http://www.kitchme.com/recipes/skinny-microwave-banana-mug-cake?utm_source=tgs&utm_medium=article&utm_campaign=mugcakes)

# Packing Your Own Lunch and Food Safety Away from Home



## EXPLORE THE CONTENT:

### Pack a Safe Lunch 101

1. Wash hands with warm water and soap for 20 seconds before and after handling food. Use hot water and soap to make sure food preparation surfaces and utensils are clean.
  - A solution of 1 tablespoon of unscented, liquid chlorine bleach in 1 gallon of water may be used to sanitize surfaces and utensils.
  - Always use a clean cutting board. Use separate cutting boards for raw meat and poultry, and foods that will not be cooked, such as bread, lettuce, and cheese.
2. Keep perishable items cold using a cold or gel pack (sandwiches, fruits, vegetables). Pack just the right amount that will be eaten at lunchtime. Cold packs will only keep food cold enough until lunch time.
3. Rinse fresh fruits and vegetables under running tap water, including those with skins and rinds that are not eaten. Dry completely before packing and keep chilled to prevent mold growth.
  - Do not put wet produce back in the refrigerator. Allow to dry completely. Produce will spoil more quickly when wet, even in the refrigerator.
  - Do not rinse poultry or other raw meats. Doing this spreads bacteria to your sink and countertops and does not reduce bacteria on the chicken.
4. When packing lunches the night before, store items in the refrigerator until school.
  - Prepare cooked food ahead of time to allow for chilling time in the refrigerator. Divide large amounts of food into shallow containers for fast chilling.
5. Insulated, soft lunch bags are best for keeping lunches and perishables chilled. Two cold sources should be packed with perishable foods, including frozen gel packs, blue ice, or a frozen juice pack. Frozen gel packs are not recommended for all day storage but will keep foods chilled until lunchtime.
  - Harmful bacteria multiply quickly in the “danger zone” of 40 to 140 degrees F. This means that perishable foods without an ice source won’t stay safe long.
  - Foods that are safe without a cold source are non-perishable items, such as whole fruits and vegetables, hard cheese, canned meat and fish, bread, crackers, peanut

## TIME:

20-30 minutes

## MATERIALS NEEDED:

- All-purpose cleaner, cutting boards, or paper towels
- Hand sanitizer or sink and soap
- Lunch materials:
  - » Ingredients for Instant Mac and Cheese in a Mug (recipe below)
  - » Microwave-safe container for each student
  - » Fruit
  - » Vegetable
  - » Crackers
  - » Frozen water bottles
  - » Paper bags
  - » Materials for making cold packs (see below)
  - » Sandwich bags

## OBJECTIVES:

The 4-H member will:

- Learn the basics of packing a food-safe lunch
- Learn when to discard leftover foods
- Practice packing a food-safe lunch

butter, jelly, mustard, and pickles.

6. Keep hot foods hot using an insulated bottle or thermos. First, fill the thermos with boiling water and let it stand for a couple of minutes. Empty the bottle and fill with very hot food. Keep closed until lunchtime.
7. Throw out all used food packaging and leftovers from perishable foods. Don't reuse plastic bags, as they could contaminate other foods and lead to food poisoning.
8. Keep lunches in cool, dry areas. Keep lunches away from direct sunlight, heaters, radiators, and baseboards.

#### Safe Handling of Take-Out Foods

1. Take-out and delivered foods are popular and fun to eat occasionally. Foods from fast-food and sit-down restaurants are usually eaten immediately. Take-out foods are purchased in advance. Some foods are hot and some are cold when they are purchased. It is important to remember to keep hot food hot, and cold food cold to avoid the Danger Zone.
  - Keep hot foods at 140 degrees F or above.
  - Keep cold foods at 40 degrees F or colder.
  - Put restaurant leftovers in the refrigerator as soon as possible. All perishable foods, such as meat, poultry, eggs, and casseroles left at room temperature longer than 2 hours should be discarded. This is called the 2-hour rule. Foods that are left in temperatures above 90 degrees F should be discarded after an hour.
  - Keep food covered to keep away from insects which can be a source of food-poisoning bacteria.
2. When storing perishables, follow these guidelines for how long to keep them in the refrigerator before discarding:
  - Refrigerated foods:
    - Cooked meat and poultry: 3 to 4 days
    - Pizza: 3 to 4 days
    - Lunch or deli meats: 3 to 5 days
    - Egg, tuna, and macaroni salads: 3 to 5 days
  - Freezer foods:
    - Cooked meat or poultry: 2 to 6 months
    - Pizza: 1 to 2 months
    - Lunch or deli meats: 1 to 2 months
    - Foods kept frozen for longer than these storage times are still safe but may be more dry and not taste as good.
3. When in doubt, throw it out.
4. Reheat meals to a temperature of 165 degrees F and let sit for two minutes. Reheat sauces, soups, and gravies to a boil. If reheating in the oven, set the temperature to 325 degrees F or higher.

### **DO: Pack a Safe Lunch** (Grade Level: All)

#### **Preparation:**

Gather lunch supplies and cutting boards and knives.

Prepare to set up 5 stations with students:

- Station 1: Microwave Option.  
For a Mac and cheese station (or see alternate microwave recipes in Lesson 5), thermoses, microwave safe jars or mugs with covers, microwave



## Mac in a Mug

Serves 1

### Ingredients:

- 1/3 cup dry macaroni elbow noodles
- 1/2 cup water
- 1/4 cup milk
- 1/2 cup shredded cheddar cheese

1. Put the macaroni and the water into a mug. Microwave on full power for 2 minutes. Stir. (Note: the water will boil over just a bit, that is fine)
2. Microwave for another minute. Stir.
3. Microwave for a fourth minute, and then check to see that all the water has been absorbed. If not, microwave a bit more, until it is gone.
4. Stir in the milk and shredded cheese and microwave for a final 30-60 seconds. Stir well, and enjoy.

Recipe adapted from: The View from Great Island. (January 14, 2015). Instant Microwave Macaroni and Cheese. In The View from Great Island. Retrieved from: <https://theviewfromgreatisland.com/instant-microwave-macaroni-and-cheese-in-a-mug/>

- Station 2: Veggies  
Crackers and carrots, plastic baggies
- Station 3: Fresh Fruit  
Fruit, knife and baggies
- Station 4: Cool pack making station  
Quart size plastic baggie, 1 1/2 cups of water, 1/2 cup rubbing alcohol  
combine water and alcohol in ziploc baggie, seal and put in freezer overnight
- Station 5: Packing station  
Frozen water bottles and paper bags

### Instructions:

Clean your working area with all-purpose cleaner or water and soap. Dry completely. Wash hands. Set up the five stations as outlined above, and allow participants to pass through each station, one-by-one, to pack their lunch. Use the included Back to School Food Safety Tips Infographic on the next page as a guide.

### Alternate ideas:

- Pack a Safe Lunch practice or this worksheet, page 126: [https://web.uri.edu/foodsafety/files/Food\\_Safety\\_Smart\\_curriculum.pdf](https://web.uri.edu/foodsafety/files/Food_Safety_Smart_curriculum.pdf)
- Make a homemade cold pack, ideas: <https://www.themakeyourownzone.com/5-ways-to-make-homemade-ice-packs/>
- Packing a lunch coloring sheet (for younger children): [http://www.fightbac.org/wp-content/uploads/2015/07/hot\\_cold\\_coloring\\_page.gif](http://www.fightbac.org/wp-content/uploads/2015/07/hot_cold_coloring_page.gif)







# Back-to-School FOOD SAFETY TIPS



Chances are you worry more about whether your children will eat the food in their lunch boxes than about whether that food will be safe to eat. But children are the most vulnerable to food poisoning, so it makes sense to take extra precautions when preparing the lunches they take to school.



**128,000**

Estimated annual hospitalizations from foodborne illnesses



**42,000**

Estimated annual reports of salmonella infections, the most frequent cause of foodborne illnesses

Of the estimated 42,000 annual salmonella infections, almost



of those are infants and school-age children.

Because many milder cases are not diagnosed or reported, the actual number of salmonella infections may be 29 or more times greater. That's more than

**1.2 MILLION**

estimated cases annually.



## Tips to keep your kids healthy

**CLEAN**

If you're making lunch the night before, be sure to wash your hands and use clean cutting boards, utensils and countertops. Making lunch on the same surfaces you used to prepare raw meat or poultry for dinner may result in cross-contamination and lead to salmonella-related illness.

**SEPARATE**

Use one cutting board for fresh produce and a separate one for meat and poultry.

**COOK**

Cook foods to the right temperature using a food thermometer.

**CHILL**

If the lunch contains perishable food items like luncheon meats, eggs, and yogurt, make sure to pack it with at least two cold sources (e.g., freezer packs and frozen water bottles).

## Pack a Safe Lunch

Send your kids back to school with safe and satisfying lunches by following these simple tips:

**Tip 1**

Frozen juice boxes can also be used as freezer packs. By lunchtime, the juice should be thawed and ready to drink!

**Tip 2**

Perishable food can be unsafe to eat by lunchtime if packed in a paper bag. Use an insulated box or bag instead.

**Tip 3**

Children should wash their hands for 20 seconds with warm soapy water before eating. Have them sing the ABCs twice while washing if they sometimes finish early.

**Tip 4**

If possible, your child's lunch should be stored in a refrigerator. But leave the lid of the lunchbox or an insulated, soft-sided bag open in the fridge so that cold air can circulate and keep the food cold.

**Tip 5**

If you're packing a hot lunch, like soup, chili or stew, use an insulated container to keep it hot. Fill the container with boiling water, let stand for a few minutes, empty, and then put in the piping hot food. Tell your child to keep the insulated container closed until lunchtime to keep the food hot — 140°F or above.

**Tip 6**

After lunch, discard all leftover food, used food packaging, and paper bags. Do not reuse packaging because it could contaminate other food.

Additional source: CDC



For more Back to School Food Safety Tips go to

**FoodSafety.gov**

**REFLECT:**

- Out of the foods that go into our lunch, what were the perishable items? Where did we place the perishables in our lunch bags?
  - Between the two cold sources
- What did we do to our surface area before we started?
- How many cold sources did we have and why?
  - 2 cold sources for perishable items
  - If keeping food cold, keep below 40 degrees F and use an insulated lunch bag. Use two cold sources (frozen water bottle and ice pack).
- What would be the best way to pack our hot item? What are the steps for ensuring our hot food stays hot?
  - Insulated container such as a thermos
  - Keep food above 140 degrees F.
  - First fill the thermos with boiling water and let stand for a few minutes. Then empty the piping hot food into the container and keep closed until lunchtime.

**APPLY:**

- What are some ways we could improve the safety of this lunch?
  - Use insulated lunch bags
  - Use an insulated container for hot items such as a thermos
- What items do you typically have in your lunches that are perishable and need to be kept hot or cold?
- How quickly should we eat this lunch before we have to start being worried about its safety?
  - Cold packs should keep our perishables cool until lunchtime
- How could you improve the safety of your home lunches or food eaten away from home?

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MARKING INSTRUCTIONS

CORRECT: ● INCORRECT: ✗ ⊗ ⊖ ⊕

4-H Explore  
Project Book Evaluation  
Food & Nutrition #2 - Keeping it Safe

1. Please read the statement in the left column of the table below. Bubble in the circles that describe your level of understanding **BEFORE** attending this program. In the section on the far right, bubble in the circles that describe your level of understanding **AFTER** attending this program. You will have two bubbles per row.

LEVEL OF UNDERSTANDING: 1 = Poor, 2 = Average, 3 = Good, 4 = Excellent	BEFORE				AFTER			
	1	2	3	4	1	2	3	4
My understanding of what I can do to prevent the spread of germs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My understanding of the difference of unhealthy and healthy choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My understanding of the dangers of cross contamination.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My understanding of how to properly use a food thermometer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My understanding of how food cooks in the microwave.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My understanding of how to pack a food safe lunch.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. For each statement below, fill in the bubble that best describes you.

INTENTIONS TO ADOPT: As a result of participating in the Food & Nutrition Project lessons and activities...	Yes	No	Unsure
I plan to practice healthy habits to prevent the spread of germs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan to properly wash my hands and clean surfaces behavior cooking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan to correctly and safely cook safe dishes in the microwave.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will practice safe food handling in the kitchen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan to properly pack a safe food lunch to keep cold food cold and hot foods hot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. For each statement below, fill in the bubble that best describes your level of agreement with the following statements.

BEHAVIOR CHANGES: As a result of participating in the Food & Nutrition Project lessons and activities...	Strongly Disagree	Disagree	Agree	Strongly Agree
I am more comfortable working in a team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am more willing to listen to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am more comfortable speaking with others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am more confident in my abilities as a leader.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**MARKING INSTRUCTIONS**

CORRECT: ● INCORRECT: ☒ ☓ ☐ ☑

3. What is the most significant thing you learned in the Food & Nutrition project?

Please tell us about yourself.

**Gender:**       Female     Male

**I consider myself to be:**     African American                       White  
    Asian American                             Other  
    Native American

**I consider myself to be:**     Hispanic     Non-Hispanic

**Grade:**     3rd     5th     7th     9th     11th  
                  4th     6th     8th     10th     12th

**Most of the time, you live . . .**

<input type="radio"/> Farm or ranch	<input type="radio"/> Suburb of city between 50,000
<input type="radio"/> Town less than 10,000	<input type="radio"/> Central city/urban center with more than 50,000
<input type="radio"/> City between 10,000 - 50,000	

Please provide any additional comments below.



