1. Procedure
2. Introduction
3. Introduction of lesson topic
4. Developmental
5. **On the website: Food Safety Principles**
6. **What is Foodborne Illness?** “Ask students, “How many of you have ever gotten ‘food poisoning,’ or know someone who did? About 76 million Americans are affected by foodborne illness each year. This means the illness comes from eating food contaminated with harmful pathogens (viruses/bacteria/mold). Foodborne illness is preventable, which is why it is important to understand the concepts of food safety to reduce the risk of foodborne illness for you and those around you.
7. **Bacteria and Viruses**

Foods can have microbes, such as bacteria and viruses, in and on them. Some microbes are not harmful to humans (such as the bacteria used to make yogurt), but other types, called pathogens, can cause illness. Bacteria and viruses are the most common cause of foodborne illness. The symptoms of foodborne illness vary depending on the pathogen that has contaminated the food. Certain pathogens are associated with certain types of food. The table highlights the top ten most common pathogens that cause foodborne illness, as well as the types of food where they are commonly found.

*Review the slide with the class, highlighting some of the pathogens and their associated food sources.*

1. **How Is Foodborne Illness Prevented?**

The behaviors most likely to prevent food safety problems are

1. Washing hands

2. Rinsing vegetables and fruits

3. Preventing cross-contamination

4. Cooking foods to safe internal temperatures

5. Storing foods safely in the home

These points are highlighted in the four basic food safety principles.

1. **Fight BAC!®**

In order to limit pathogens from the food you eat, it is important to follow four safe food handling steps when storing, preparing and eating foods. These four steps are: clean, separate, cook, and chill.

1. **Clean**

1. Bacteria and viruses are everywhere, and they can be spread throughout different areas of the kitchen and get onto hands, food, and food preparation areas. This is a concept called "cross-contamination.”

2. Hands: Practice proper hand-washing techniques:

*Ask a student to demonstrate proper hand-washing techniques.*

To properly wash your hands, wet hands with warm water and apply soap. Rub your hands together and scrub for 20 seconds. Rinse your hands well under warm running water and dry your hands with a clean paper towel. Use the paper towel to turn off the water.

*Ask students when hands should be washed.*

After using the restroom, before starting any food preparation, before and after

handling any raw meat or potentially contaminated food, after touching any

potentially contaminated surface, hair, face, garbage, chemicals, etc.

3. Surfaces: Clean utensils and small cutting boards with hot, soapy water after

each use. Wash surfaces (e.g., tables, countertops) and cutting boards after each

use and use a bleach solution to sanitize. Also keep the inside and outside of

appliances clean (e.g., microwaves, mixers) as food can get stuck on them. Clean

out the refrigerator often. Routinely clean and disinfect the surfaces of the

refrigerator.

4. Food: Thoroughly rinse all fruits and vegetables. Place the produce under running water just before eating, peeling, cutting, or cooking. Do not use soap or detergent; commercial produce washes are not needed. Scrub firm produce, such as melons and cucumbers, with a clean produce brush while rinsing it. Raw seafood, meat, and poultry should not be rinsed. Bacteria in these raw juices can spread to other foods, utensils, and surfaces, leading to foodborne illness.

**7. Separate**

1. Another step in preventing cross-contamination is separating foods that are

ready-to-eat such as fruits, vegetables, and grains from foods that need to be

cooked, such as raw meat, poultry, seafood, and eggs. Pathogens in the raw juices

of meat, poultry, or seafood can spread to other surfaces, foods, and hands if they

are not kept separate.

1. Shopping and storing: Keep these foods separate when shopping at the grocery

store *and* at home when storing and preparing them. In the refrigerator, store raw seafood, meat, and poultry below ready-to-eat foods to prevent raw juices from dripping and contaminating other foods.

1. Preparing and serving: Never place a ready-to-eat or cooked food on a plate that previously held raw meat, poultry, seafood, or eggs without first thoroughly cleaning and sanitizing the plate. Use one cutting board for produce and a separate one for raw meat, seafood, and poultry.

8. **Cook**

*Ask the students: How many of you cook or help your family with cooking? Do you*

*ever use a food thermometer at home to measure the temperature of meat and hot*

*dishes?*

Many people decide when their food is done by looking at its color. Unfortunately, color is not a reliable indicator of whether or not a food is fully cooked. It is important to measure the internal temperature of cooked meat, poultry, and egg dishes to make sure that the food is cooked to a safe internal temperature. When taking the temperature, make sure of the following points:

1. Insert the food thermometer into the thickest part of the food to get the most accurate reading

2. Cook steaks, roasts, and chops to 145ºF (fresh beef, veal, and lamb)

3. Cook ground beef, pork, veal, and lamb to 160ºF

4. Cook poultry to 165ºF

5. Cook eggs until the yolk and white are firm

6. Keep hot foods at a hot temperature of at least 140ºF

7. Bacteria can easily grow in food that has been sitting out for more than two hours and is in the temperature "danger zone" of 40ºF to 140º

**9. Chill** 1. At room temperature, the number of bacteria on food can **double** every

20 minutes. One of the most important steps to prevent foodborne

illness is to

refrigerate perishables.

2. Chill leftovers or takeout foods within 2 hours. Hot foods should not be left to cool on a counter. Leftovers or extra food should be refrigerated in shallow containers as soon as possible to slow the growth of bacteria. Keep the refrigerator at 40ºF or below. Cold temperatures slow the growth rate of harmful bacteria, but do not kill them. a. It is not always possible to tell if a food has gone bad by its smell or appearance. Cooked leftovers should be discarded after 4 days; raw poultry and ground meats, 1 to 2 days.

3. Thaw frozen meat, poultry, and seafood in the refrigerator, never at room temperature.

**10. High-Risk Foods**

Some foods pose a higher risk of causing foodborne illness than others.

Make sure that all milk and cheeses are pasteurized. The container they

come in should say “pasteurized.” Additionally, avoid raw sprouts and raw \

or undercooked meats, seafood, poultry, and eggs.

**11. High-Risk Populations**

EVERYONE is at risk for foodborne illness, but some groups of people are

at higher risk than others.

1. Pregnant women are at higher risk for getting sick from a harmful

bacterium called Listeria and other foodborne illnesses. Listeria

can cause premature delivery, serious sickness, and even miscarriage/infant death. Pregnant women should avoid foods such as hot dogs, deli meats, premade salads such as chicken and tuna salad, and unpasteurized milk and cheeses such as feta and brie.

2. Infants and young children are at a higher risk of foodborne illness because their immune systems are not adequately developed until about three years of age.

3. As adults age, immune systems may become weaker, increasing the risk for contracting foodborne illness. Additionally, the elderly are more likely to be on medications for different diseases and sometimes these medications have side effects which weaken their immune systems even more.

4. Individuals with weakened immune systems, such as those living with HIV infection, cancer treatment, organ transplant, or liver disease, are more susceptible than the general population to the effects of foodborne illnesses.

**12. Activity – Food Safety Trivia (see instructions)**

**13. Questions?**

**C. Activity: Food Safety Trivia**

Make a "deck of cards" and/or a wheel (like wheel of fortune). Label each card, or

section of the wheel with either "Clean," "Separate," "Cook," or "Chill." Have

students choose a card or spin the wheel and ask a question from the category they

get.

**II. Conclusion:**

A. Distribute hand wipes.

B. Provide each student with a food tasting and encourage him or her to make small changes in his or her diet now. Explain why this food is a healthy option.

C. Thank the students for their participation and answer any questions the students have.

**Food Safety Trivia Questions**

**Clean:**

1. How long should you scrub your hands with soap and water to effectively remove bacteria?

*20 seconds*

2. True or False: If you are peeling an apple, it should be rinsed.

*TRUE! The utensil you use to peel your produce can pick up pathogens from the peel and can spread them to the inside of the food. Always wash fruits and vegetables even if you are not eating the peel.*

3. True or False: Wash poultry and meats before cooking.

*FALSE! Poultry, meats, and seafood naturally have bacteria in their raw juices. If they are rinsed in the sink, pathogens can easily spread to other surfaces which can cause cross-contamination, putting you at higher risk of contaminating other food and becoming sick.*

4. Before handling any food, what is the first thing a person should do?

*Wash his/her hands*

**Separate**

1. True or False: Meat and poultry should be stored at the top shelf of the refrigerator to keep them separate from other foods.

*FALSE! Raw seafood, meats, and poultry should be placed at the bottom shelf. Their raw juices can contain an abundance of bacteria that can drip onto other foods. If you notice raw juices, clean and sanitize the area!*

2. Give an example of how you can prevent cross-contamination when preparing food.

*Use separate cutting boards (e.g., one for raw meat, poultry, and seafood, and one for fruits and vegetables); wash and sanitize surfaces between tasks; wash hands before preparation and any time you change tasks (e.g., switching from slicing raw chicken to cutting fresh vegetables); do not place cooked or ready-to-eat food on a dish that previously held raw seafood, meat, or poultry.*

3. What could happen if you placed cooked food on a plate that previously held raw meat, poultry, or seafood?

*Since there are bacteria on the plate from the raw juices, you can cause cross-contamination and spread the potentially pathogenic bacteria to the cooked food. This could lead to a foodborne illness.*

4. True or False: Using a separate cutting board for raw foods, like meat, poultry, and seafood and another fresh foods, like fruits and vegetables, can cause cross-contamination.

*FALSE! Always separate foods that you will not be cooking from foods that need to be cooked since uncooked foods can contaminate ready-to-eat foods. Any pathogens on the cutting board from the raw meat, poultry, or seafood could contaminate the fruits and vegetables and lead to foodborne illness.*

**Cook**

5. True or False: Once chicken turns white in the middle, it is cooked to a safe internal temperature.

*FALSE! You cannot use color as a way to guarantee if a food is fully cooked. The only way to know if a food has been cooked to a safe temperature is by using a food thermometer. Chicken should be cooked to 165ºF.*

6. When checking to see if food is done cooking, what part of the meat, poultry, or seafood should you place the food thermometer?

*The thickest part*

7. How hot should you keep food when serving it?

*140°F*

8. True or False: Cookie dough should not be eaten until it is cooked

*TRUE! Raw egg in the dough may contain pathogens. It may be tempting to lick the spoon, but wait until the cookies are baked to ensure that the egg is fully cooked.*

**Chill**

1. What is the best way to defrost frozen meats, poultry and seafood?

*The best way to defrost frozen meats, poultry, and seafood is in the refrigerator. Defrosting at room temperature is dangerous because while the inside might stay cold for a while, the outer parts of the food can become too warm and promote the growth of bacteria. Other safe defrosting methods include the microwave or submersion in cold water.*

2. At what temperature should perishable items like meats, poultry, and seafood be stored?

*40º F or less*

3. How long can you leave leftovers out of refrigeration?

*Leftovers should not be left out for more than two hours.*

4. What is the "temperature danger zone" and why is it important?

*The temperature danger zone is 40º F to 140º F. If perishable foods are kept in this zone for more than two hours, bacteria can grow very quickly. In fact, the amount of bacteria doubles every 20 minutes when perishable foods are at room temperature.*

5. True or False: You should not put hot food in the refrigerator because it will make the refrigerator have to work harder.

*FALSE! To ensure that hot food cools quickly, place it in shallow containers. Some foods (like pasta or rice) can be rinsed under cold water to cool them prior to packaging in shallow containers. If that is not possible, the outside of the container can be rinsed under cold water to promote quicker cooling (be careful not to let water into the container).*

**Miscellaneous**

1. What is an example of a "high-risk food?"

*Undercooked or raw eggs, meat, poultry, or seafood; unpasteurized milk and cheeses; raw sprouts.*

2. What makes a food "high-risk?

*High risk foods can contain harmful pathogens that require cooking in order to be destroyed.*

3. Give an example of someone who is at high-risk for foodborne illness.

*Pregnant women and their unborn babies, infants and young children, older adults, and people with weakened immune systems.*

4. True or False: Leftovers are safe to eat until they smell bad.

*FALSE! Smell is not a good indicator if the food is still safe to eat. To be safe, go through your refrigerator every week and discard leftovers that have been in there for four days or more. It is a good idea to mark the date on your containers so you can remember how long you have been storing the food.*

5. What are the temperatures from 40-140 ºF called?

*The “Danger Zone”*

*SOURCE: Katie Belazis, Pennsylvania FACS teacher*