



2.3 – Foodborne Pathogens



1

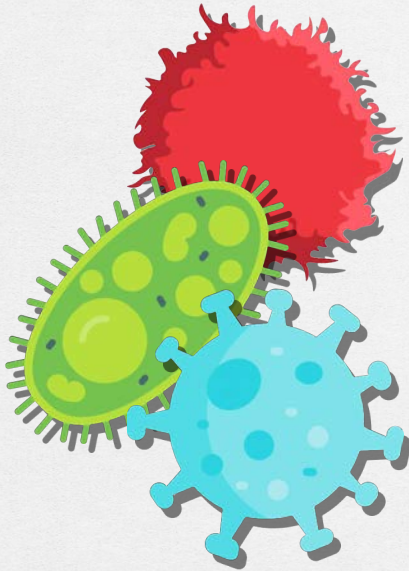
Discussion



What are microorganisms?

Discuss as a class, then review the definition and examples on the next slide!

Microorganisms



Microorganisms are tiny living things that are too small to be seen with the naked eye.

They include things like bacteria, viruses and parasites.

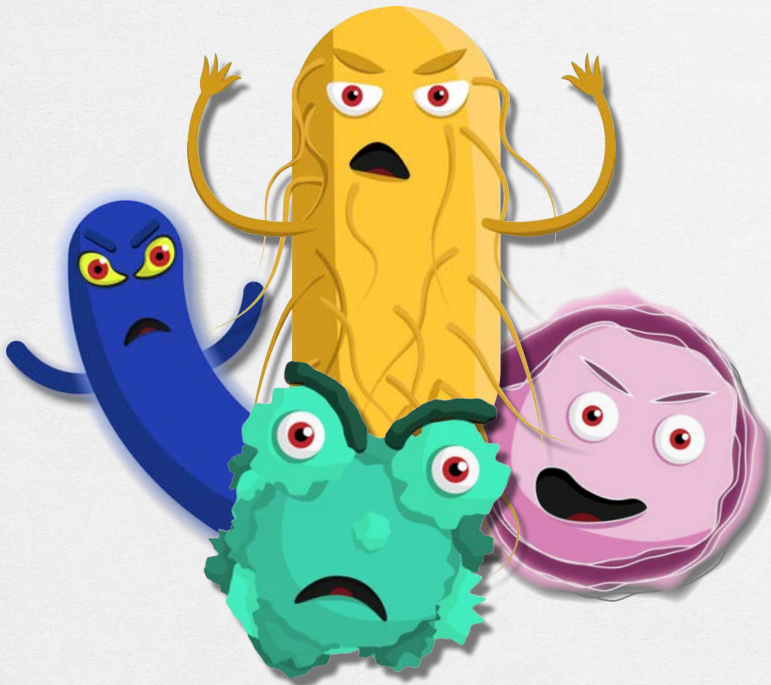
Some microorganisms can make people sick, while we need others to help our bodies to work properly.



2

Foodborne Pathogens

Pathogens



Pathogens are tiny organisms that can cause disease. They can be bacteria, viruses, parasites or other types of microorganisms.

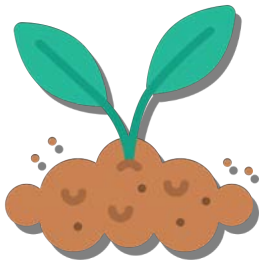
When we come into contact with pathogens, they can make their way into our bodies and make us sick.

Foodborne Illness



Foodborne illness is an illness caused by eating food that has been contaminated with pathogens (harmful microorganisms or their toxins). It can also be called food poisoning.

Where Do Microorganisms Exist?



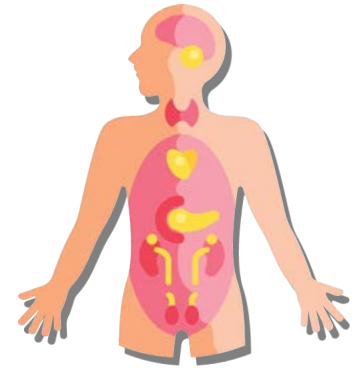
Soil



Water



Air



Bodies

Microorganisms are present in our daily lives. We may not be able to see them, but they are there!

Cross-Contamination



Cross-contamination happens when harmful microorganisms are transferred from one surface or food to another.

For example, cross-contamination can happen when a cutting board is used to cut raw meat and then isn't washed before it's used to cut washed vegetables or other ready-to-eat food.

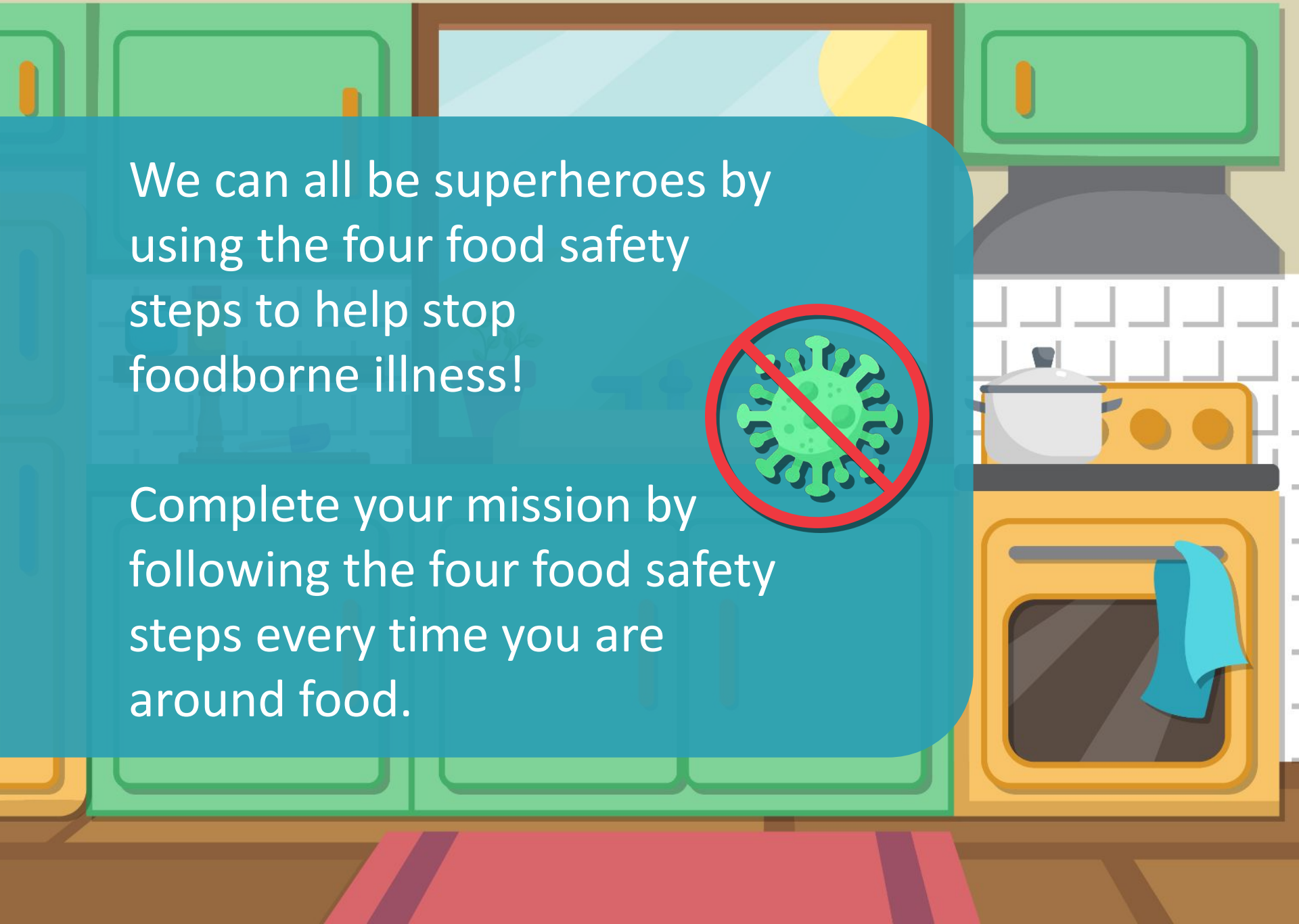
A colorful illustration of a kitchen. On the left, there are light green upper and lower cabinets with orange handles. A wooden shelf with jars and a pink vase with a plant sits on the counter. In the center, a window shows a bright yellow sun, blue sky, and green hills. To the right, a yellow stove with a grey range hood has a white pot on top. A blue cloth hangs from the oven door. The floor is brown with a red rug in the foreground.

3

The Four Food Safety Steps

We can all be superheroes by using the four food safety steps to help stop foodborne illness!

Complete your mission by following the four food safety steps every time you are around food.



CLEAN

Scrub-a-dub-dub! Cleaning and sanitizing surfaces keeps pathogens from transferring to other foods or surfaces.



SEPARATE

Personal space, please! Separating food (using different cutting boards, for example) prevents cross-contamination because the foods don't share surfaces.



COOK

CHILL

Hot hero showdown! Cook food to a safe internal temperature to kill pathogens. The only way to be sure is to use a digital food thermometer.



Let's chill! Cold temperatures (4°C or cooler) keep pathogens from growing.





4

Bacteria, Viruses and Parasites

Common Foodborne Pathogens

Salmonella [bacteria]



Photo courtesy of National Institute of Allergy and Infectious Diseases (NIAID)

Listeria [bacteria]



Photo courtesy of CDC/Dr. Balasubramanian Swaminathan; Peggy Hayes

E. coli [bacteria]



Cyclospora [parasite]

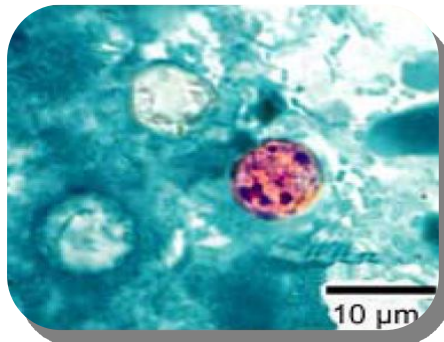
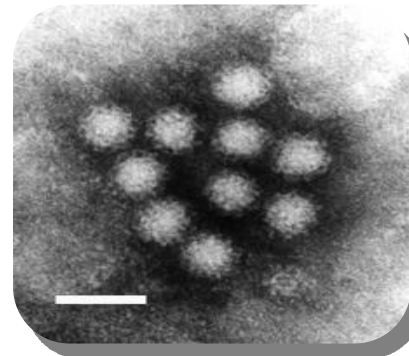


Photo courtesy of CDC/DPDx – Melanie Moser

Norovirus [virus]



Salmonella

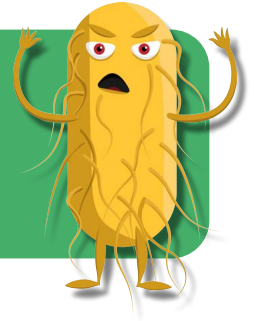


Photo courtesy of National Institute of Allergy and Infectious Diseases (NIAID)

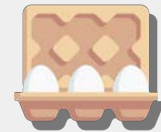
These bacteria live in the intestines of animals and humans. Some kinds of *Salmonella* bacteria can cause severe illness.

Some foods that *Salmonella* can be found in include:

- Raw or undercooked poultry, pork and ground beef



- Raw or undercooked eggs and egg products



- Raw fruits and vegetables



Signs and Symptoms

Diarrhea

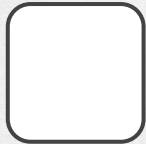
Fever and chills

Stomach pains

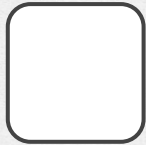
Vomiting



How Can I Protect Myself?



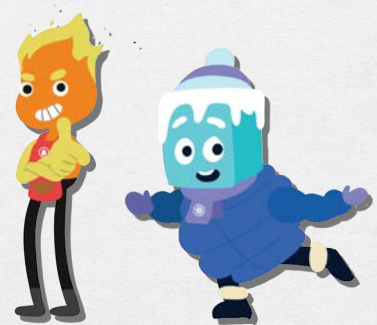
Wash your hands often and properly.



Follow the four food safety steps.



Cook your food to its recommended safe internal temperature.



Listeria

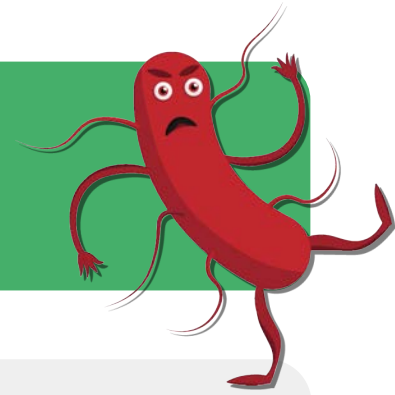




Photo courtesy of CDC/Dr. Balasubr Swaminathan;
Peggy Hayes

These bacteria live in soil,
plants and untreated water.

Some foods that *Listeria* can
be found in include:

- Refrigerated
smoked fish 
- Ready-to-eat
meats like pâté, deli
meats and hot dogs 
- Produce like
packaged salads
cantaloupe 

Signs and Symptoms

Diarrhea

Fever and chills

Muscle aches

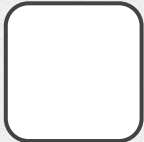
Nausea



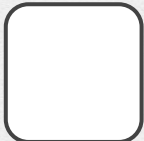
How Can I Protect Myself?



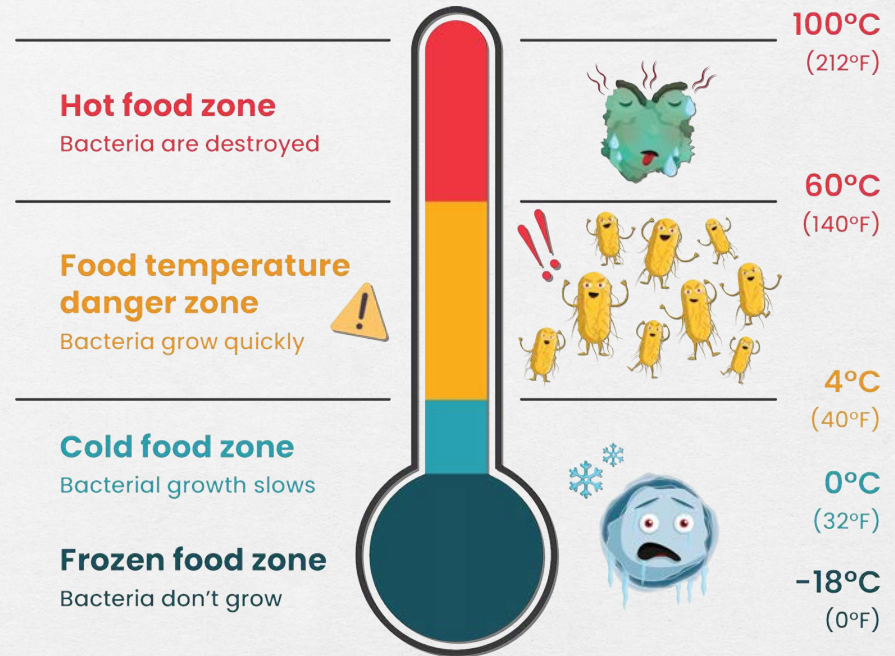
Wash your hands often and properly.



Follow the four food safety steps, especially proper food storage.



Keep food out of the food temperature danger zone.






E. coli

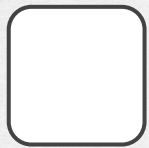


These bacteria live naturally in the intestines of cattle, poultry and other animals. People can also carry these bacteria in their gut.

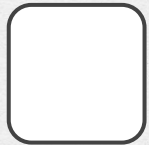
Some foods that *E. coli* can be found in include:

- Raw or undercooked beef 
- Contaminated raw fruits and vegetables 
- Untreated water and unpasteurized (not sterilized) juices and milk 

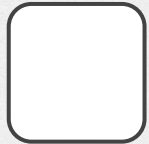
Signs and Symptoms



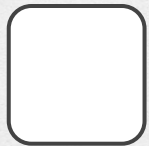
Watery diarrhea



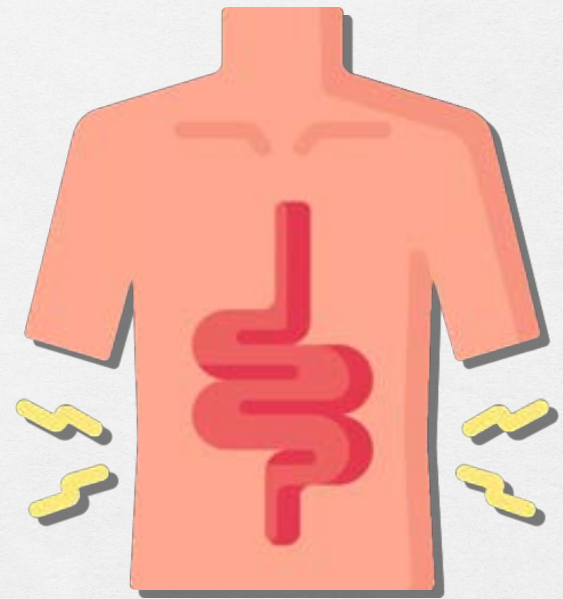
Stomach pains



Vomiting



Bloody diarrhea and possibly kidney problems (severe cases)



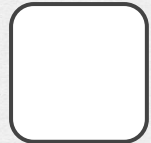
How Can I Protect Myself?



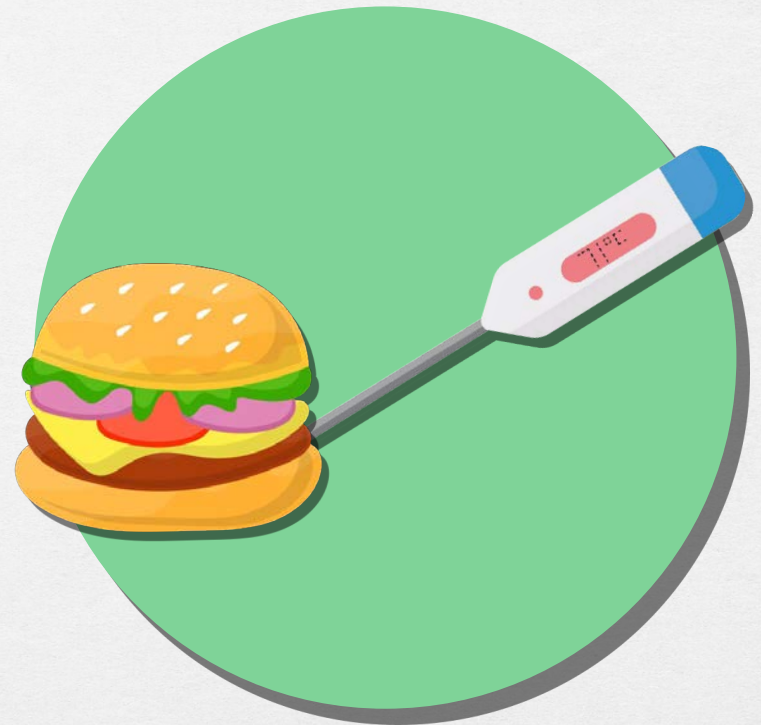
Wash your hands often and properly.



Follow the four food safety steps.



Cook ground meat to its recommended safe internal temperature.



Cyclospora

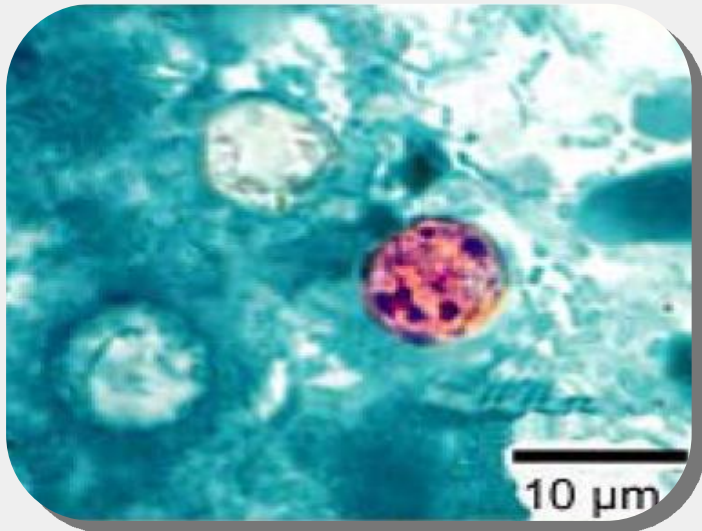
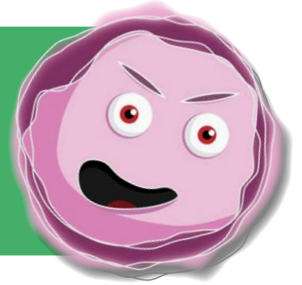






Photo courtesy of CDC/DPDx – Melanie Moser

These microscopic parasites are spread when people ingest something, such as food or water, that has been contaminated by the feces of an infected person.

Some foods that *Cyclospora* can be found in include:

- Basil and cilantro 
- Raspberries and blackberries 
- Some types of lettuce 
- Snow and snap peas 

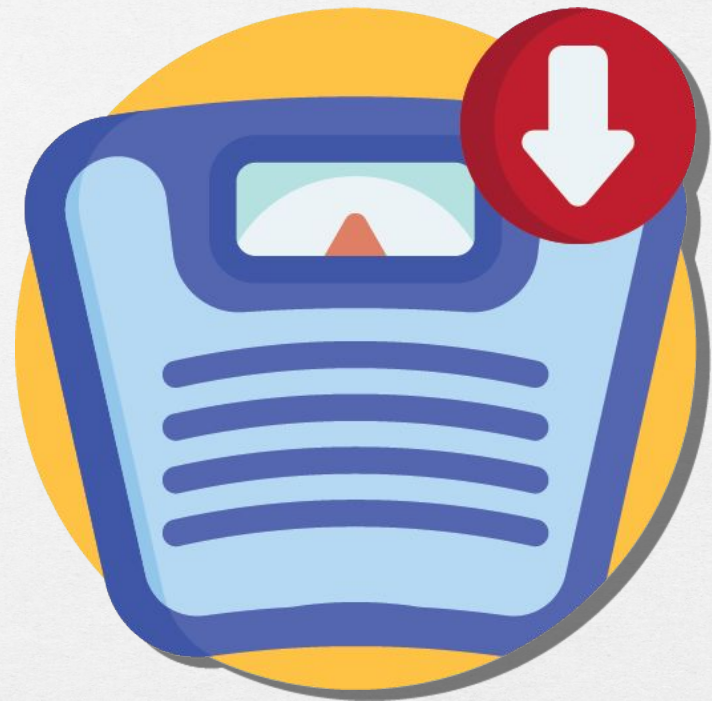
Signs and Symptoms

Watery diarrhea

Loss of appetite

Tiredness

Weight loss



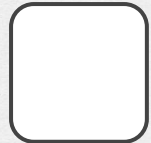
How Can I Protect Myself?



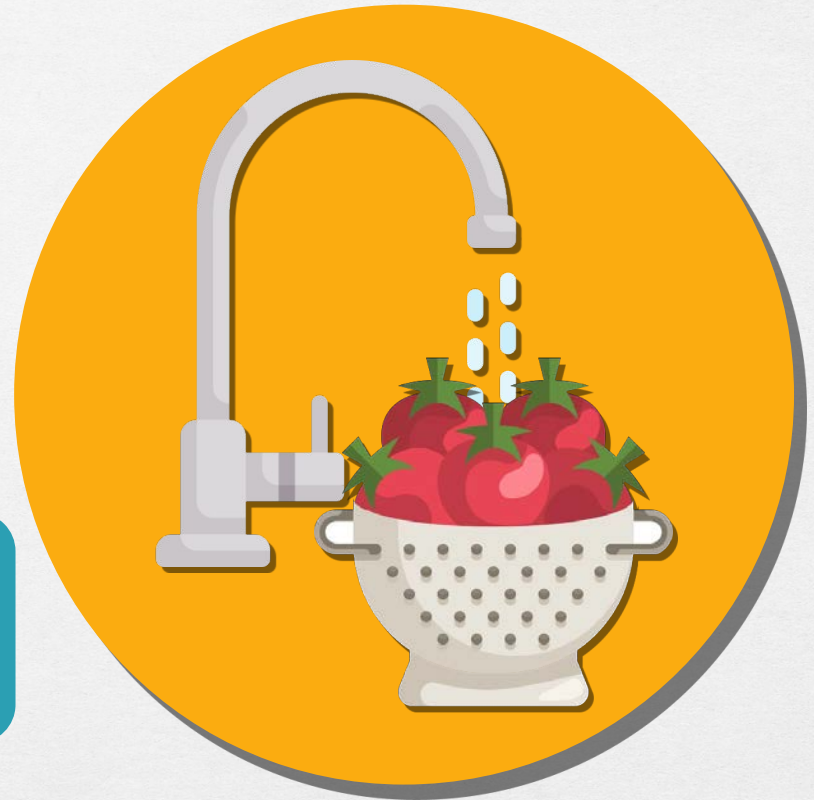
Wash your hands often and properly.



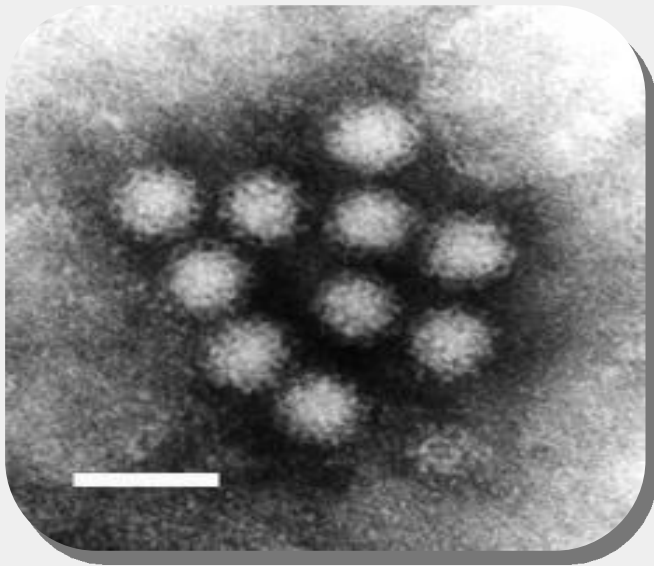
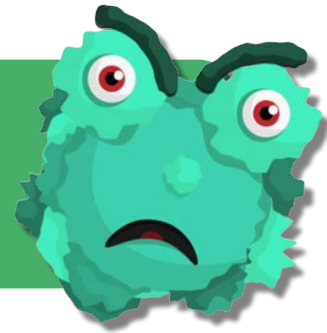
Follow the four food safety steps.



Wash all fruits and vegetables thoroughly under cool running water.



Norovirus



This very contagious virus causes diarrhea and vomiting, and it lives in the feces or vomit of infected people.

Some places and food that norovirus can be found in include:



- Food contaminated by food handlers who have the virus

- Shellfish, such as oysters, contaminated by sewage in water



- Water that's been contaminated by sewage



Signs and Symptoms

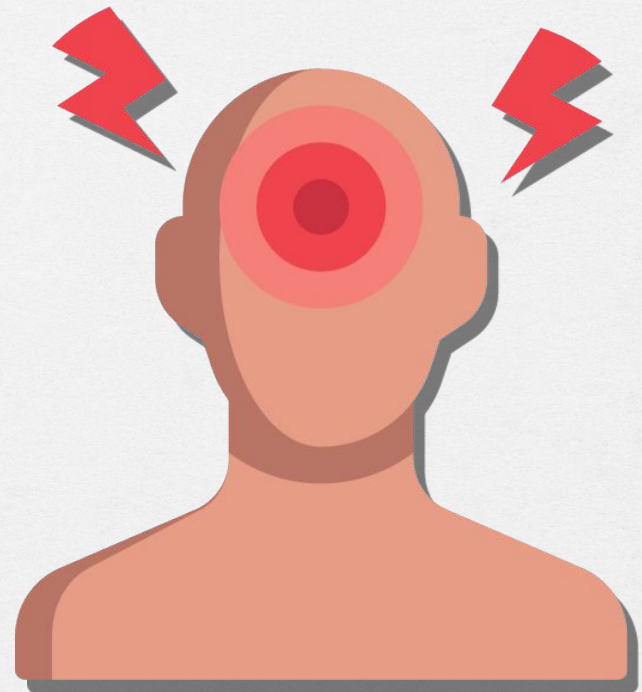
Diarrhea

Fever and chills

Stomach pains

Nausea and vomiting

Headaches



How Can I Protect Myself?



Wash your hands properly and often.



Follow the four food safety steps.



Only eat cooked shellfish.





5

Symptoms

About the Symptoms

Symptoms can start hours, days or even weeks after eating contaminated food.



Usually, people recover quickly and completely.



Children five and under, adults over 60, pregnant people and people with weakened immune systems are at a higher risk for becoming seriously ill.



Sometimes, foodborne illness can cause serious complications, including death.

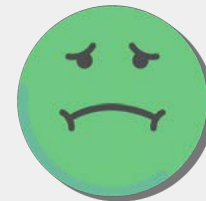
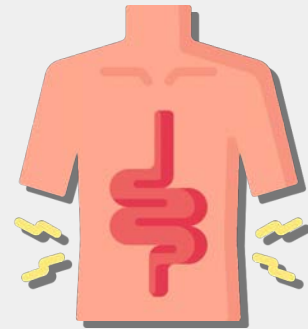
Most Common Symptoms

Diarrhea

Fever

Nausea and vomiting

Stomach cramps





6

**Control the
Growth**

Did you know that by combining the superpowers of the four food safety steps, you can fight back against pathogens? Let's review the four food safety steps.



CLEAN



- Wash your hands before and after handling food and after using the bathroom.
- Clean all cooking surfaces and utensils using hot water and soap.
- Rinse fresh produce under cool running water.



SEPARATE



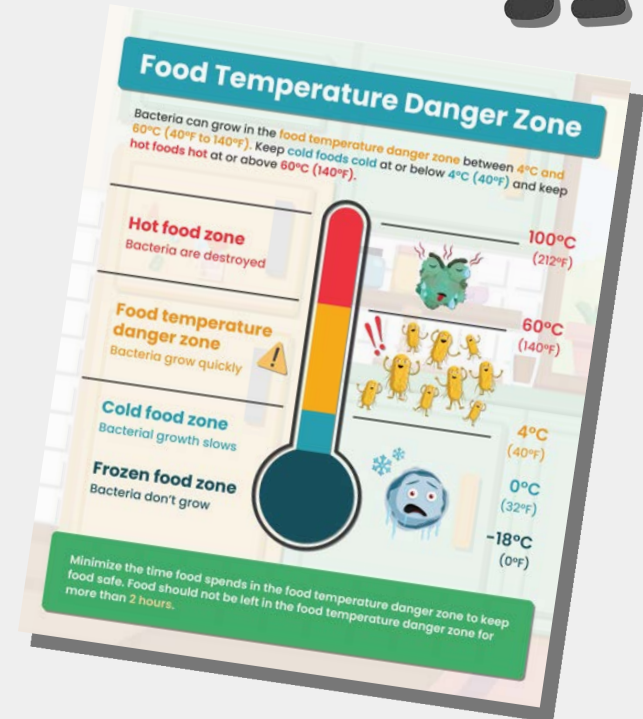
- Separate raw and ready-to-eat foods in the grocery cart, grocery bags, the fridge and while preparing them.
- Use separate cooking utensils (or wash them between uses) for raw and ready-to-eat foods.



COOK



- Cook food to its recommended safe internal cooking temperature.
- Use a digital food thermometer to check that all food is cooked to its recommended safe internal temperature.



CHILL



- Keep cold foods cold and refrigerate cold foods promptly.
- Do not leave cooked food at room temperature for more than 2 hours.
- Thaw frozen foods using the fridge, cold water or microwave. Do not thaw frozen foods at room temperature.



Recall Alert



In addition to following safe food practices, we also need to stay informed about food recalls.

The government notifies Canadians about possible food safety concerns related to a food product.

These notifications are called **recall alerts**.

Today, we have a special recall alert for you to learn about and bring awareness to.

Recall: ABC Greens Lettuce



There has been a food recall for ABC Greens lettuce, which is sold at your local grocery store. Some batches of lettuce were contaminated with *E. coli*. In this case, *E. coli* contamination likely happened when lettuce was grown in fields sprayed with contaminated water. You can't see, taste or smell *E. coli* in lettuce, which makes it a sneaky culprit! If anyone has ABC Greens lettuce at home, they should throw it out or return it to their place of purchase for a refund.

Uncover the Basics



Glad you are here, detectives! You and your group must work together to highlight the important facts about the lettuce recall. You will create a poster to catch the public's attention and help share the recall information. The posters can be done on paper or digitally.

Hint: Lots of colour, pictures and useful information will help draw attention to your poster!

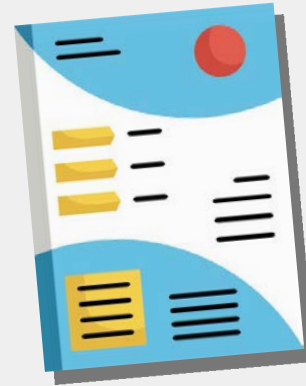


Recall: ABC Greens Lettuce



On your poster, make sure you answer these questions:

1. What is the product?
2. What is the issue?
3. What should you do?
4. Who does this impact?
5. Where has it been sold?



Good luck!