

Lesson 2 – Foodborne Illnesses

Lesson Overview

Foodborne illness is transmitted to humans by eating food that has been contaminated. This contamination is from unwanted microbes and pathogens, the microorganisms that cause foodborne illness. This lesson will explain many common pathogens and microbes causing foodborne illnesses.

Lesson Objectives

After completing this lesson, participants will be able to:

- Define key vocabulary terms relating to foodborne illness
- Understand common foodborne pathogens and where they are found
- Learn how to prevent common foodborne illnesses

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	<ul style="list-style-type: none"> • PowerPoint Presentations Slide 8 • <i>Foodborne Illness Key Vocabulary</i> handout • <i>Foodborne Illness Key Vocabulary Definitions</i> 	<ol style="list-style-type: none"> 1. Prepare to show Presentation Slide 8 2. Print/photocopy the <i>Foodborne Illness Key Vocabulary</i> handout (one per participant) 	5 - 10 minutes
LEARN	<ul style="list-style-type: none"> • <i>Research Graphic Organizer</i> • Internet access • <i>Common Pathogens Known to Cause Foodborne Illness</i> 	<ol style="list-style-type: none"> 1. Print/photocopy the <i>Research Graphic Organizer</i> (one per participant) 2. Ensure Internet access for participants 3. <i>Common Pathogens Known to Cause Foodborne Illness</i> handout (one per participant) 	60 – 90 minutes
REVIEW	<ul style="list-style-type: none"> • <i>Foodborne Illness Vocabulary Quiz</i> • <i>Foodborne Illness Vocabulary Quiz Answer Key</i> 	<ol style="list-style-type: none"> 1. Print/photocopy the <i>Foodborne Illness Vocabulary Quiz</i> (one per participant) 	5 - 10 minutes

Lesson 2 – Foodborne Illnesses

FOCUS: Key Vocabulary

5 – 10 minutes

Purpose:

Students will learn to define key vocabulary terms that relate to foodborne illnesses in order to recognize and prevent against food contamination.

Materials:

- PowerPoint Presentation Slide 8
- *Foodborne Illness Key Vocabulary* handout
- *Foodborne Illness Key Vocabulary Definitions*

Facilitation Steps:

1. Show Presentation Slide 8. Share the following statistic with participants:

*The CDC estimates that 48 million Americans get sick each year, 128,000 are hospitalized, and up to 3000 die of foodborne diseases each year.*⁴

2. Ask students if these statistics are surprising to them.
3. Give students the *Key Vocabulary* handout. Have them fill in the definition as you review each term.

Foodborne Illness Key Vocabulary Definitions

foodborne illness	Illness caused by eating foods contaminated by unwanted microorganisms.
microorganism	Bacteria, parasites, and viruses that can cause foodborne illness
pathogen	Microorganisms that cause disease upon infecting a host organism. Pathogens include certain viruses, bacteria, and fungi. Pathogens are harmful to people
microbe	A microorganism, especially a bacteria-causing disease or fermentation
food poisoning	Also known as foodborne illness
bacteria	Single-celled microorganisms that live everywhere in the world, including in food. They can be helpful or harmful
yeast	A microscopic fungus consisting of single oval cells that reproduce by budding, and are capable of converting sugar into alcohol and carbon dioxide
molds	Microscopic fungi that live on plant or animal matter
viruses	Tiny organisms that may lead to mild to severe illnesses in humans, animals, and plants
parasites	An organism that lives in another organism, called the host, and often harms it. It is dependent on its host for survival. It has to be in the host to live, grow, and multiply. A parasite cannot live independently
food safety	The practice of protecting the food supply from contamination by harmful chemicals or disease-causing microorganisms
food processing	Practices that are used by food industries to transform the raw plant and animal materials into food products for consumers
pesticide	A substance used to kill, repel, or control anything deemed a pest. This could include things like insecticides or herbicides.

clean	Free of visible dirt
sanitized	Free of live microorganisms
contaminate	To make unclean by contact or mixture
cross-contaminate	Transfer of harmful microorganisms from one food to another by means of dirty hands, utensils or from raw food to cooked food
pasteurized	Heating a beverage or food (milk) to a specific temperature for a given time to kill microorganisms that cause food spoilage or disease

Foodborne Illness Key Vocabulary

foodborne illness	
microorganism	
pathogen	
microbe	
food poisoning	
bacteria	
yeast	
molds	
viruses	
parasites	
food safety	
food processing	
pesticide	

Understanding Basic Food Safety

clean	
sanitized	
contaminate	
cross-contaminate	
pasteurized	

Lesson 2 – Foodborne Illnesses

FOCUS: Research Project

60-90 minutes

Purpose:

The purpose of this activity is to have participants choose and research one foodborne pathogen known to cause foodborne illness.

Materials:

- *Research Graphic Organizer* handout
- *Common Pathogens Known to Cause Foodborne Illness* handout
- Internet access

Facilitation Steps:

1. Explain to participants that, according to the CDC, there are at least 31 pathogens known to cause foodborne illness.⁵ Many of these are tracked by public health systems that track diseases and outbreaks. There are also a number of unspecified agents that also cause foodborne illness. Common symptoms of any foodborne illness often include stomach cramps, nausea, vomiting, diarrhea, and fever.
2. Give each student the *Common Pathogens Known to Cause Foodborne Illness* sheet. Explain that the ones in bold are known to cause to more illnesses, hospitalizations, and death each year. Explain that they are each to choose one pathogen to further research.
3. Information that they should be looking for during their research is:
 - Definition of what the pathogen is
 - What the common symptoms after eating food with this contaminant are
 - Where is it found
 - How you can avoid this pathogen or what food safety procedures you can follow to prevent it
 - Photo or diagram of it, if possible

3. Give each participant the *Research Graphic Organizer*. Give participants one class period to complete their research. You can also assign this as homework. Participants should prepare a short 5-minute presentation about this pathogen, including the information on the graphic organizer.
4. Have each participant present their pathogen research to the group.
5. Here is a suggested grading rubric for the class presentation:

50 points – Completed all information on the *Research Graphic Organizer* handout

10 points – Prepared for the presentation

10 points – The presentation content was clear, concise, and gave a good understanding of this pathogen

20 points – Demonstrated the ability to think critically, taking information from other sources to create something new

10 points – Demonstrated time management skills by delivering a well-planned 5-minute presentation

Common Pathogens Known to Cause Foodborne Illness⁵

Astrovirus

Bacillus cereus

Botulinum

Brucella

Campylobacter jejuni

Cayetanensis

Clostridium

Cryptosporidium

Cyclospora

E. coli

Enterotoxigenic E. coli

Giardia intestinalis

Hepatitis A

Listeria

Monocytogenes

Mycobacterium bovis

Noroviruses

Parahaemolyticus

Perfringens

Rotavirus

Salmonella

Sapovirus

Shigella

Staphylococcus aureus

Toxoplasma gondii

Trichinella

Vibrio

Vibrio vulnificus

Yersina enterocolitica

** Most common pathogens to cause foodborne illnesses are in bold

Research Graphic Organizer

Choose and find information about a common pathogen. Record your findings in the organizer and use this information to create your short presentation.

Information	Findings
Pathogen name	
Definition of what the pathogen is	
Common symptoms after eating food with this contaminant	
Where is it found?	
How can you avoid this pathogen, or what food safety procedures can you follow to prevent it?	
Photo or diagram found and source	

Lesson 2 – Foodborne Illnesses

REVIEW: Vocabulary Quiz

5-10 minutes

Purpose:

To review key vocabulary terms relating to pathogens and foodborne illnesses.

Materials:

- *Foodborne Illness Vocabulary Quiz*
- *Foodborne Illness Vocabulary Quiz Answer Key*

Facilitation Steps:

1. Give each student the Foodborne Illness Vocabulary Quiz. Allow approximately 5 minutes for completion.
2. Have students exchange completed quizzes and peer check as you review the answers.

Foodborne Illness Vocabulary Quiz

Choose the correct definition for each term.

- A. pathogen _____ Bacteria, parasites, and viruses that can cause foodborne illness.
- B. bacteria _____ A microorganism, especially a bacteria causing disease or fermentation.
- C. molds _____ A single-celled microorganism that lives everywhere in the world, including in food. They can be helpful or harmful.
- D. food safety _____ Microscopic fungi that live on plant or animal matter.
- E. pasteurized _____ An organism that lives in another organism called the host, and often harms it. It depends on the host for survival.
- F. foodborne illness _____ Practices that are used by food industries to transform the raw plant and animal materials into food products for consumers.
- G. food poisoning _____ Free of visible dirt.
- H. microorganism _____ To make unclean by contact or mixture.
- I. cross-contaminate _____ Heating a beverage or food to a specific temperature for a given time to kill microorganisms that cause food spoilage or disease.
- J. sanitized _____ Illness caused by eating foods contaminated by unwanted organisms.
- K. clean _____ Microorganisms that cause disease upon infecting a host organism.
- L. microbe _____ Also known as foodborne illness.
- M. yeast _____ A microscopic fungus consisting of single oval cells that reproduce by budding and are capable of converting sugar into alcohol and carbon dioxide.
- N. viruses _____ Tiny organisms that may lead to mild or severe illnesses in humans, animals, and plants.
- O. food processing _____ The practice of protecting the food supply from contamination by harmful chemicals or disease-causing microorganisms.
- P. parasites _____ A substance used to kill, repel, or control anything deemed a pest.
- Q. pesticide _____ Free of live microorganisms.
- R. contaminate _____ Transfer of harmful microorganisms from one food to another by dirty hands, utensils, or from raw food to cooked food.

Foodborne Illness Vocabulary Quiz Answer Key

Choose the correct definition for each term.

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|----------------------|--|
| A. pathogen | <u>H</u> Bacteria, parasites and viruses that can cause foodborne illness. |
| B. bacteria | <u>L</u> A microorganism, especially a bacteria causing disease or fermentation. |
| C. molds | <u>B</u> A single-celled microorganism that lives everywhere in the world, including in food. They can be helpful or harmful. |
| D. food safety | <u>C</u> Microscopic fungi that live on plant or animal matter. |
| E. pasteurized | <u>P</u> An organism that lives in another organism called the host, and often harms it. It depends on the host for survival. |
| F. foodborne illness | <u>O</u> Practices that are used by food industries to transform the raw plant and animal materials into food products for consumers. |
| G. food poisoning | <u>K</u> Free of visible dirt. |
| H. microorganism | <u>R</u> To make unclean by contact or mixture. |
| I. cross-contaminate | <u>E</u> Heating a beverage or food to a specific temperature for a given time to kill microorganisms that cause food spoilage or disease. |
| J. sanitized | <u>F</u> Illness caused by eating foods contaminated by unwanted organisms. |
| K. clean | <u>A</u> Microorganisms that cause disease upon infecting a host organism. |
| L. microbe | <u>G</u> Also known as foodborne illness. |
| M. yeast | <u>M</u> A microscopic fungus consisting of single oval cells that reproduce by budding and are capable of converting sugar into alcohol and carbon dioxide. |
| N. viruses | <u>N</u> Tiny organisms that may lead to mild or severe illnesses in humans, animals, and plants. |
| O. food processing | <u>D</u> The practice of protecting the food supply from contamination by harmful chemicals or disease-causing microorganisms. |
| P. parasites | <u>Q</u> A substance used to kill, repel, or control anything deemed a pest. |
| Q. pesticide | <u>J</u> Free of live microorganisms. |
| R. contaminate | <u>I</u> Transfer of harmful microorganisms from one food to another by dirty hands, utensils, or from raw food to cooked food. |