



Grade Level: 6-8

Essential Skills: 1, 3, 5, 6,7

NGSS: MS-LS3-1

CCSS: 6.L.3., 6.L.4, 7.L.3, 7.L.4, 8.L.3, 8.L.4

Health: HE.1.6.1, HE.1.6.4, HE.6.6.2, HE.7.6.2, HE.8.6.2, HE.1.7.1, HE.1.7.4, HE.6.7.2, HE.7.7.2, HE.8.7.2, HE.1.8.1, HE.1.8.4, HE.6.8.2, HE.7.8.2, HE.8.8.2

Time: 2 class periods

Materials:

-Computer
- Tracking Pathogens and Preventing Outbreak Worksheet

AITC Library Resources:

More Lessons:

Understanding Bacteria
Chain of Food
Mystery Juice
Ultra High Pressure Treatment
Hands off, Bacteria!
Beef Blasters

References:

Cornell University's- The Pathogen Tracker Game

06/19

Lesson to Grow

Food Illness Outbreak Prevention & Detection

Description:

Students will explore a foodborne illness outbreak in the role of an Foodborne Illness Investigator (FBII). Using a game simulation, students will determine the type of foodborne illness through the riboprinting of patients and potential contamination sources. Students will then develop their own investigation, identifying a food of their interest and create a safety protocol to prevent potential contaminants.

Background:

Foodborne illnesses affects many Americans each year. In the U.S., an estimated 48 million people are infected with foodborne illnesses. It is everyones responsibility to ensure we are practicing safe procedures in the growing, processing, handling and cooking of our food. In Oregon, the Oregon Health Authority works with county health departments, other state health departments and the Center for Disease Control and Prevention to investigate, track and prevent the spread of illnesses and diseases. The Oregon Department of Agriculture (ODA) also plays a significant role in combating the spread of foodborne illnesses. The ODA Food Safety Program provides licenses to Oregon companies and requires routine inspections of food facilities. These inspections work to educate new food processors on safe food handling procedures and regularly inspect equipment for adherence to protocol and potential contaminations.

Directions:

1. Distribute the *Tracking Pathogens and Preventing Outbreaks Worksheet* to students.
2. Explain that today they will be assuming the role of a Foodborne Illness Investigators to determine a potential foodborne illness outbreak. Using knowledge they obtain through *Cornell University's Pathogen Tracker Game*, they will identify the foodborne illness, gather patient information, determine if it should be classified as an outbreak and trace the illness back to the original contamination site.
3. Students should fill out the worksheets as they work through the game. If students are unable to finish the game in one sitting, there are two checkpoints. One after finishing part I or after they finish part II.
4. After students have completed all three levels of the pathogen tracking games, they should proceed to Part IV of their worksheet.
5. Students will choose a food of their choice, identify each major ingredient and develop a food safety guide for it using the 4 C's: Cook, Clean, Chill and Cross Contaminate. They should format these into a flyer that could be hung at a place of employment, at home or shared with the community.

Review Key Concepts:

- What is riboprinting? Why is it important in determining outbreaks?
- What agencies work to investigate foodborne illness in Oregon?
- How do the concepts analyzed through this simulation relate to you and your family's meals?
- What can you do to prevent foodborne illnesses?



Tracking Pathogens and Preventing Outbreaks

Student Name: _____

This fun simulation will take you on a journey to investigate a potential foodborne illness outbreak. Through this game, learn the steps taken to identify outbreaks and the steps taken to prevent further contaminations.

Part I: Identifying the Outbreak

1. Visit (game.pathogen tracker.net/Intro/introduction/frontpage.htm) to start tracking the possible foodborne illness outbreak from the view of a Foodborne Illness Investigator (FBII)
2. Click **Play the Game** button to begin.
3. **Begin a new game**, follow the directions in the game and record the information as you take each step on the worksheet below.

4. What states have the illnesses occurred in?

5. What are the symptoms?

6. Which foodborne illness is most similar to the symptoms present?

7. Determine if an outbreak is occurring by comparing riboprints. Draw the riboprint you are looking for below to reference as you move forward in this game.

8. Explain how DNA fingerprinting or ribotyping is used to determine consistencies among patients.

9. List the patients who have the same riboprint as the one you drew above.

To determine the Strain and Species, click the **PT Database** button and The Pathogen Tracker 2.0 will open in a new tab. Select one of the riboprints from the individuals you selected as having similar riboprints. This will open information regarding the foodborne illness sample.

10. After reviewing the information from the database, determine the name of the strain and list it below (Hint: the name starts with DUP)

Return to the tab with the Pathogen Tracker game, click the red **continue** button.

Now that you've determined both the bacteria and strain of the outbreak, you must decide whether or not it should be considered an outbreak or an isolated incident.

11. What considerations are taken into account when determining whether or not an outbreak has occurred?

12. Based on the information you reviewed on the graphs, should an outbreak be declared?

Part II: Determine the Food Causing the Outbreak

1. List foods commonly associated with the bacteria.
2. Compare foods that infected patients consumed that the control group has not. List foods below that the infected person ate that the control person did not.
3. Make a guess about which food caused the outbreak based on the eating of those infected. List your guess below.
4. Use the histogram provided to compare food ate from the infected group of people versus food ate by the control group. Make a prediction after viewing the graph of which food was most likely contaminated, list your prediction below.

Part III: Determine the source of the contamination

1. Review each patient and where they got their hotdogs as a starting point to begin determining where the contamination came from. List each patient below and where they bought their hot dog from.
2. Review the hot dog vendors and the meat companies by where their hot dogs are purchased. List them below.
3. Which meat company is the source of the contamination?
4. Next, we will sample the hot dogs from the time periods of the outbreaks. Which month should you test samples from based on when the outbreaks occurred?
5. Was the bacteria found in the hotdog samples during that month?
6. Review how hotdogs are made to determine the contamination source. What is used to match the source of contamination when swabs are taken from the potential contamination sources?

7. To review contamination detecting protocol, answer the following questions below as you follow in the game.

Step 1:

Step 2:

Step 3:

Step 4:

8. Where was the DUP1042B bacteria present at Frank N. Furter Inc.?

9. Identify which source has the matching riboprint using the Pathogen Tracker Database.

10. Was there a match? If so, where at?

11. What agency is in charge of working with processing plants who have had an outbreak?

12. What is their procedure after an outbreak has occurred?

Congratulations, you completed the investigation!

Part IV: Development of 4 C's Guide to Minimize Contamination Risks

1. Choose your favorite meal either from a family dinner or at a restaurant.

2. Develop a flyer with helpful hints about preventing the spread of potential foodborne illnesses related to that meal, make sure to cover the 4 C's (Clean, Cook, Chill and Cross Contamination Prevention). Make sure to address each ingredient on the flyer. Use credible sources when researching food safety information on your chosen food.