

Lesson 6 Poisoned Picnic (1 hour 45 minutes – 2 hours 15 minutes)

Section

Diseases

Investigative Question

What is the cause of the mysterious disease in the scenario presented and how can future outbreaks be prevented?

Description of Content

This is one of two possible *culminating* activities for the infectious disease epidemiology module. It will work best with older (7th or 8th grade) or advanced students. In this lesson, students will bring together everything they have learned. In order to teach this lesson, you do not have to have taught all the other lessons, but your students should, at a minimum, have worked through Lesson 1.

The goal of this lesson is to engage students in the analysis of information, allowing them to arrive at conclusions and develop action plans based on that analysis. During the activity, students will apply their newly acquired knowledge of epidemiology to identify the agent responsible for an outbreak of a mysterious illness. Students must then present a proposal identifying the cause of the disease and measures to prevent future outbreaks.

Relevant Standards

This activity fulfills science and health education standards.

Objectives

Students will:

- Identify the disease agent responsible for a simulated outbreak of a mysterious disease
- Outline a strategy to prevent future outbreaks of the disease

Materials

For Students

- Poisoned Picnic Information Sheet
- KWL Chart
- Poisoned Picnic Information Cards
- Grand City Faculty Picnic Menu
- Faculty Information Cards
- Pathology Report
- Poisoned Picnic Data Table
- Bacteria Wanted Posters

For Teacher

- Completed Poisoned Picnic Data Table
- Poisoned Picnic Explanation
- Poisoned Picnic Faculty Conversion Sheets

Note to the Teacher

All of the resources for this activity are based in a fictitious setting. It may become more interesting for the students if you adapt this activity to your own school community. To do this, simply fill in the *Poisoned Picnic Faculty Conversion Table* using names from individuals on your staff in place of those provided. Then go into the other faculty conversion sheets and replace all of the numbers with the names of your faculty members they correspond to. Be sure to proofread all of the information and make the changes on all of the components. This includes the name of the town and school.

You might even hand faculty members their own cards, asking them to hand them out if students request them. This simulates a one-on-one interview. If the individual had been ill, you may also give them a badge with a red cross on it to indicate this.

Safety

Normal classroom safety guidelines should be observed.

Procedure

Engagement (10-15 minutes)

1. Introduce the activity by reading the following statement:

The faculty and staff of Grand City Middle School decided to hold one of their faculty meetings at Grand City Park one evening after school. The plan was to have a cookout and then proceed with the meeting after everyone had time to eat and relax. Many faculty and staff members brought family members to the picnic. Everything seemed to progress as planned, that is until later that evening. That's when people began to get sick. Many of the faculty came down with a mysterious illness.

Grand City officials were alarmed at the sicknesses and deaths, which seem to be associated with the event. They have promised a full investigation. Park managers said that most of the symptoms—such as dehydration, stomach cramps, nausea, and vomiting—seem to indicate some type of food poisoning; however, at this point they cannot be certain.

You are now part of a team of epidemiologists that have been called in to get to the bottom of this mystery. You will need to identify the cause of the disease and prevent any further outbreaks. Time is of the essence. The first thing you will want to do is meet with your team members and outline the information you have been given and then decide what additional information you need. Grand City authorities have promised complete cooperation in this matter. Good luck!

2. Ask students how they would proceed. Lead the class in a discussion and record any suggestions on the board. Students should decide that they need a lot of additional information.

Exploration 1 (15-20 minutes)

1. Divide the class into groups of 3 or 4. Provide each group of students with a copy of the *Poisoned Picnic Information Sheet* and a *KWL Chart*. Students should read through the information carefully with their group. Each group should record on their chart what they Know and what they Want to know as they read through the information. The L (for what they have Learned) will be completed later.
2. As students complete their charts, circulate throughout the room and distribute the *Poisoned Picnic Information Cards 1 and 2* at appropriate times. Students may then be able to fill in some portions of the L column based on this information, if they have a question that corresponds to the information on the cards.

Explanation 1 (5-10 minutes)

1. After students have had a chance to read through the information and complete their KWL chart, call the class back together and lead them in a discussion of what they have found so far. Ask students what information is in their W column. Students should have generated a lot of questions at this point.
2. At this time it may be necessary to explain the information on cards 1 and 2. The main concept that should be brought out is that the plant effluent data showed that there was no contamination in the water coming out of the plant or the water around the park.
3. Card 1 gives the impression that the hamburgers were mostly well done. Some students may point out that this tends to reduce the probability of contamination from the hamburger; however, this should probably not be ruled out at this time.
4. This would also be an appropriate time to distribute a copy of the *Grand City Faculty Picnic Menu* to each group. **This may be an appropriate time to end the day's discussion, depending on the class length.** Assign

students the task of analyzing the information they have collected.

The next exploration phase may be used to begin the next day's instruction.

Exploration 2 (5-10 minutes)

1. Many students should be asking who was sick and what everyone had eaten. After students have had time to share some of their questions, distribute a set of *Faculty Information Cards* to each group. Offer no suggestions at this time as to how they should be analyzed. You should also provide students with the *Pathology Report* for the deceased.
2. After analyzing the information from the faculty information cards, students should logically decide that the disease is probably some form of food poisoning. However, the information will probably seem a little overwhelming to them.

Explanation 2 (10-15 minutes)

1. Call the class back together and ask students what they have found. Students should be able to pick out certain main points, but there will probably be some confusion on the part of the students as to how to efficiently analyze the information. At this point, you may wish to distribute a copy of the *Poisoned Picnic Data Table* provided or have students develop a table of their own, in order to efficiently record the information. (A completed data table can be found at the end of this activity.) The table should allow students to see which teachers became ill, died, or were not affected. You may wish to have students highlight teacher's names based on their condition.
2. After students have had the opportunity to record the information, ask students what can cause food poisoning. Responses should include bacterial contamination. After this response, tell students that there are indeed many types of bacteria that can cause food poisoning. Provide each group with a set of *Bacteria Wanted Posters*.

Elaboration (15-20 minutes)

1. As students analyze the posters, ask students to describe the organisms represented. Point out the shape and gram stain classification on the posters. These indicate ways bacteria are classified.
2. Allow students time to investigate some of the Internet sources listed on the posters. Some of the information may prove useful in their investigation.

Evaluation (45 minutes)

1. Students are to identify the organism responsible for the illnesses, the contaminated food item, and outline a strategy to prevent future occurrences of this and other food borne illnesses. See the *Poisoned Picnic Explanation* for a full summary. You may choose to have students prepare a paper outlining the events that took place at the picnic and lead to the spread of the disease. The main points to be presented would include the improper preparation of the green bean casserole and the use of a single serving spoon. These points are addressed through the analysis questions included below. This component may be assigned as homework.
2. In order to meet the last requirement of a strategy to prevent this from happening again, students could design an educational brochure on proper food handling techniques or prepare a skit to be performed for the class that would represent a public television or radio announcement.

Analysis Questions

1. What organism caused the disease represented in this activity?
2. What food item was contaminated?
3. Briefly outline the events of the picnic that lead to the spread of this illness.
4. What types of bacteria were “suspects” in this activity?

Performance Descriptors

Rating	Poisoned Picnic
4	Student correctly identified the agent which caused the disease (toxin from <i>Clostridium botulinum</i>) and that the contaminated source (the food item and the contaminated serving spoon). Student presented a clear and accurate strategy for avoiding future outbreaks of this type through proper food handling techniques and hygiene.
3	Students correctly identified either the agent or the food source but not both. They presented a clear and accurate strategy for avoiding future outbreaks of this type through proper food handling techniques and hygiene.
2	Students did not correctly identify the agent responsible for the disease, but their strategy for avoiding future outbreaks of this kind was accurate and applicable for reducing the chance of a food borne illness.
1	Students did not correctly identify the agent responsible for the disease and the students’ strategy of prevention was not clear or appropriate for this situation.

Web Resources

CDC *BAM! Body and Mind*TM :

BAM! Body and Mind is brought to you by the Centers for Disease Control and Prevention (CDC), an agency of the U.S. Department of Health and

Human Services (DHHS). *BAM!* was created to answer kids' questions on health issues and recommend ways to make their bodies and minds healthier, stronger, and safer. *BAM!* also serves as an aid to teachers, providing them with interactive activities to support their health and science curriculums that are educational and fun.

Centers for Disease Control and Prevention (CDC): www.cdc.gov

The CDC Web site provides a comprehensive overview of the latest research on infectious diseases. From research studies on infectious diseases to information for travelers, this site provides a wealth of information. Some is written for medical professionals, but much of the information is written for health care consumers.

Web Resources on *Clostridium botulinum* and botulism

CDC: www.cdc.gov

Botulism: <http://emergency.cdc.gov/agent/botulism/>

This Web site features the CDC fact sheet on botulism and *Clostridium botulinum*.

U.S. Food and Drug Administration,
Center for Food Safety and Applied Nutrition: <http://www.fda.gov/>

Clostridium botulinum:

[http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm070879.htm?utm_campaign=Google2&utm_source=fdaSearch&utm_medium=website&utm_term=Clostridium botulinum:&utm_content=1](http://www.fda.gov/Food/ScienceResearch/LaboratoryMethods/BacteriologicalAnalyticalManualBAM/ucm070879.htm?utm_campaign=Google2&utm_source=fdaSearch&utm_medium=website&utm_term=Clostridium%20botulinum:&utm_content=1)

This more technical Web site includes information about *Clostridium botulinum* taken from the Food and Drug Administration's *Bad Bug Book*.

University of Nebraska Lincoln,
Institute of Agriculture and Natural Resources:

<http://ianrhome.unl.edu/>

Clostridium botulinum:

<http://foodsafety.unl.edu/pathogens/botulinum.html>

A brief fact sheet on botulism and *Clostridium botulinum*.

Todar's Online Textbook of Bacteriology: <http://www.textbookofbacteriology.net/>
The Pathogenic Clostridia: <http://textbookofbacteriology.net/clostridia.html>

A college-level textbook description of the genus *Clostridium*, including *Clostridium botulinum* and botulism. Includes photos.

Relevant Standards

National Science Education Standards

Content Standard C, Grades 5-8: Life Science

Disease is a breakdown in structures or functions of an organism. Some diseases are the result of intrinsic failures of the system. Others are the result of damage by infection by other organisms.

Content Standard F, Grades 9-12: Science in Personal and Social Perspectives

The severity of disease symptoms is dependent on many factors such as human resistance and the virulence of the disease-producing organism. Many diseases can be prevented, controlled or cured. Some diseases such as cancer, result from specific body dysfunctions and cannot be transmitted.

National Health Education Standards

Standard 1 Students will comprehend concepts related to health promotion and disease prevention.

- Explain the relationship between positive health behaviors and the prevention of injury, illness, disease and premature death.
- Analyze how environment and personal health are interrelated.
- Describe how lifestyle, pathogens, family history and other risk factors are related to the cause or prevention of disease and other health problems.

Standard 3

Students will demonstrate the ability to practice health-enhancing behaviors and reduce health risks.

- Demonstrate strategies to improve or maintain personal and family health.

KWL Chart

Use this table to record information and questions on the Poisoned Picnic

K What do you know?	W What do you want to know?	L What have you learned?

Poisoned Picnic Information Sheet

The picnic started at 6:00 p.m. Tuesday evening at Grand City Park. The park is located by the Grand River and contains several gazebos and picnic areas. The administration and faculty of Grand City Middle School organized the picnic as a relaxing event before their faculty meeting to be held after dinner. Many faculty and staff brought members of their family.

Mrs. Smith and Ms. Johnston arrived at 5:30 to set up. Mr. Albert was next to arrive to set up the grill. He brought his grill from home and had to take a few minutes to clean it off because it had not been used since last summer. Mr. Drake arrived next from the supermarket where he had picked up the hamburgers. After the charcoal was lit and aluminum foil was placed over the grills, Mr. Albert began to cook.

At 5:55, Mrs. Smith realized there was only one serving spoon. She left to get some more, returning about 30 minutes later. The other teachers waited for a while, but finally decided to start eating about 6:20.

When all of the food arrived there was a full menu that included baked beans, chicken, ham, green bean casserole, tuna casserole, cherry pie, pudding, potato salad, macaroni salad, corn, and hamburgers. Drinks included soda, water, coffee, and tea.

Mr. Drake was first through the line. He tried:

- green bean casserole
- ham
- a hamburger

Ms. Cummings was next. She ate:

- potato salad
- ham
- a hamburger

The third person through the line was Mr. Carlson. He ate:

- green bean casserole
- potato salad
- a hamburger

Mrs. Albert was next in line. She sampled:

- potato salad
- a hamburger
- cherry pie

Mrs. Smith arrived at this time with more serving spoons. Mrs. Bell came at the same time. She was a little late because she had to be sure that her chicken was done.

Mrs. Wolfe went through the line next. She ate:

- green bean casserole
- chicken
- a hamburger
- pudding

Next was Mr. Lewis, who ate:

- baked beans
- green bean casserole
- macaroni salad
- corn

The line became a little unorganized at this point and it is not clear who went through next. Mrs. Smith and Ms. Johnston were two of the last people through since they helped to serve.

Mrs. Smith ate:

- green bean casserole
- potato salad
- a hamburger
- pudding

Others in attendance included Mr. Harvey, Ms. Jackson, Mr. Dooley, Mrs. Jones, and Mrs. Darwin. A lot of the guests said they could not remember exactly what they ate, but Mr. Harvey, Mr. Dooley, Mrs. Jones, and Mrs. Bell all had hamburgers, baked beans, and macaroni salad.

Ms. Jackson and Mrs. Darwin had ham, baked beans, corn, and some pudding for desert.

Mrs. Cain, Mrs. Williams, Dr. Oakton, Mrs. Corning, and Mrs. Reid have not yet been interviewed. Some other staff members arrived just in time for the faculty presentations, which started at 7:45. These included Mrs. Robinson, Mrs. Brown, and Mrs. Wright.

Some of the faculty and staff walked around while they ate but most sat in one of the gazebos. The presentations were held in the main gazebo, which was a relief for some of the faculty because it seemed to be one of the few places free of duck droppings.

Even during the meeting, some of the kids chased ducks with their water guns. These kids never seemed to run out of water because the guns held almost a gallon each, but even if they did run out, they quickly refilled them from the river.

Just about everyone at the picnic except for those that came for the meeting only were soaked. Since it was a hot day, the only time anyone seemed to mind the soaking was when one of the kids missed their intended target and almost put out the grill. After this incident, which happened about 6:10, the kids stayed away from

the main gazebo, where the food was located, and turned their attention to the ducks and teachers walking around.

Grand City officials were alarmed by the sicknesses and deaths that seem to be associated with the event. They have promised a full investigation. Even the waste-water treatment plant just a few hundred yards up river will have to submit a report on their procedures for water treatment. This is the first time anything like this has happened at the park and officials want to be sure that it does not happen again.

Park managers said that most of the symptoms such as dehydration, stomach cramps, nausea, and vomiting seem to indicate some type of food poisoning however at this point they cannot be certain.

You are now part of a team of epidemiologists that has been called in to get to the bottom of this mystery. You will need to identify the cause of the disease and prevent any further outbreaks. Time is of the essence. The first thing you will want to do is meet with your team members and outline the information you have been given and then decide what additional information you need. Grand City authorities have promised complete cooperation in this matter. Good luck!

Grand City Middle School Faculty Picnic Menu

Baked beans: Simply purchased two large cans of baked beans and heated on stove top to boiling.

Pudding: Mixed four packets of chocolate pudding with four cups of milk. Heated and then refrigerated.

Chicken: Baked chicken legs for 1 hour.

Ham: Baked ham for 2 hours 30 minutes until thermometer read 150 degrees for 20 minutes.

Green Bean Casserole: Cracker crust covered with two cans of cream of mushroom soup and two jars of green beans. Topped with 2 cans of small onions. Baked for 20 to 25 minutes to warm.

Potato salad: One jar of salad dressing, assorted diced vegetables, 2 tablespoons sugar, 1/2 cup mustard, 6 cups diced and cooked potatoes.

Macaroni salad: One box elbow macaroni, 3 T mustard, one jar salad dressing, various diced vegetables.

Tuna casserole: Cracker crust, 3 cans tuna, one can cream of mushroom soup, one can cream of chicken soup. Mixed and topped with parmesan cheese topping.

Hamburgers: Purchased at the supermarket just before the picnic (receipt showed time was 12:25).

Corn: 2 large cans of corn heated to simmering.

Cherry pie: Mountain top cherry pie, baked 40 minutes, pre-made.

Poisoned Picnic Faculty Information Cards

<p>Mrs. Cain Brought plates and cups to the picnic. Had chicken, potato salad, pudding, green bean casserole. Became sick Tuesday evening. Symptoms included nausea, vomiting, and dizziness.</p>	<p>Mr. Lewis Organized a game of volleyball set up by the gazebo. The players were a favorite target for the water guns!!! The only foul was when Mrs. Cain stepped on a duck going after the ball. Mr. Lewis became ill Tuesday evening. He was treated and released from the hospital Wednesday morning.</p>
<p>Mrs. Williams Recovering. Became ill Tuesday night and was rushed to the hospital by her husband. Her son enjoyed his water gun, dowsing teachers with river water. She loved the burgers made by Mr. Albert. She also tried some green bean casserole, chicken, and pudding. Her son did not become ill.</p>	<p>Mrs. Reid Sampled a little bit of everything. She became ill Tuesday night and finally went to the hospital Wednesday morning. She complained of stomach cramps and nausea. Doctors quickly began an IV to help replenish lost fluids. She briefly went into a coma then slowly recovered.</p>
<p>Dr. Oakton Recovering. Had a great time except for when she stepped in duck droppings, which seemed to be everywhere. She didn't even mind being soaked. She tried a little bit of everything to eat.</p>	<p>Mr. Albert Mr. Albert took control of the grill. Mr. Drake soon showed up with the hamburger meat and started making the burgers. Mr. Albert had some potato salad, green bean casserole, a hamburger, and pudding for desert. Mr. Albert became ill, suffering from numbness, disorientation, nausea, and vomiting. He was treated and released after several days in the hospital.</p>
<p>Mrs. Corning Arrived late, just in time to grab a burger and some green bean casserole. Most of the utensils and food were already put away. She became ill Wednesday morning and had to leave work around 8:30. She suffered from nausea, dizziness, and was so disoriented that she could not drive home.</p>	<p>Mrs. Smith She arrived early with her son and helped to set up for the picnic. After many of the staff arrived, she realized that there was only one serving spoon so she went home to get some more. She returned about 30 minutes later with spoons, (after several faculty had gone through the line) to find her son chasing ducks with the water guns. Both Mrs. Smith and her son became ill.</p>
<p>Ms. Johnston Helped to set up for the picnic. She had a hamburger, baked beans, pudding, and corn. She and several other teachers spent their time sitting in one of the gazebos talking and watching the children dash about after the ducks. Ms. Johnston is lactose intolerant. She became ill just a couple of hours after the picnic suffering from severe stomach pains. She went to bed and recovered over night.</p>	<p>Mrs. Albert Complained of stomach cramps early Tuesday night. Her condition continued to worsen until she finally had to be taken to the hospital. She was given massive doses of antibiotics. Her condition became worse as her symptoms began to include vomiting and disorientation. She soon found that she could not remember much about the picnic. After some time her condition improved.</p>

Poisoned Picnic Information Card 1

We have since learned that luckily there was only one burger on the grill when it was soaked. Mr. Albert decided to throw it away because he had to lift up the grill and add more charcoal. Many times he would walk away from the grill to talk to someone and return to some very well done burgers. No one seemed to mind, that's the way they wanted them.

Poisoned Picnic Information Card 2

We have also learned that the wastewater treatment plant performed several tests on the water coming from their plant. The effluent (water being pumped out) was virtually void of any bacteria. The plant was doing a good job. They also did tests on the water around the park and found no notable bacterial contamination.

Pathology Report

Victim: Mrs. Wolfe

Admitted to hospital suffering from abdominal pain and vomiting. Began diagnostic tests but patient's condition deteriorated. Death due to respiratory and heart failure. Time of death: 3:30 a.m., 9/21/05.

Victim: Mr. Carlson

Paramedic response to home. Pronounced dead on arrival. Attempts to revive failed. Time of death: 11:30 p.m. 9/20/05

Victim: Mr. Drake

Admitted to hospital suffering from abdominal pain, headache, and paralysis of extremities. Lapsed into shock. Pulmonary failure followed. Time of death: 2:30 a.m. 9/21/05.

Victim: Ms. Cummings

Admitted to hospital suffering paralysis. Unable to communicate to hospital staff. Died of heart and respiratory failure. Time of death: 1:20 a.m., 9/21/05.

Completed Poisoned Picnic Data Table

Name	FOOD CONSUMED										
	Baked Beans	Pudding	Chicken	Ham	Green Bean Casserole	Tuna Casserole	Cherry Pie	Potato Salad	Macaroni Salad	Hamburger	Corn
Mrs. Smith		X			X			X		X	
Ms. Johnston	X	X								X	X
Mr. Albert		X			X			X		X	
Mr. Drake				X	X					X	
Ms. Cummings				X				X		X	
Mr. Carlson					X			X		X	
Mrs. Albert							X	X		X	
Mrs. Bell	X								X	X	
Mrs. Wolfe	X	X	X		X				X	X	X
Mr. Lewis	X				X				X		
Mr. Harvey	X									X	
Ms. Jackson	X	X		X							X
Mr. Dooley	X								X	X	
Mrs. Jones	X								X	X	
Mrs. Darwin	X	X		X							X
Mrs. Robinson											
Mrs. Brown											
Mrs. Wright											
Mrs. Cain		X	X		X			X			
Mrs. Williams		X	X		X					X	
Dr. Oakton	X	X	X	X	X	X		X	X	X	X
Mrs. Corning					X					X	
Mrs. Reid	X	X	X	X	X	X		X	X	X	X

Bacteria Wanted Posters

WANTED

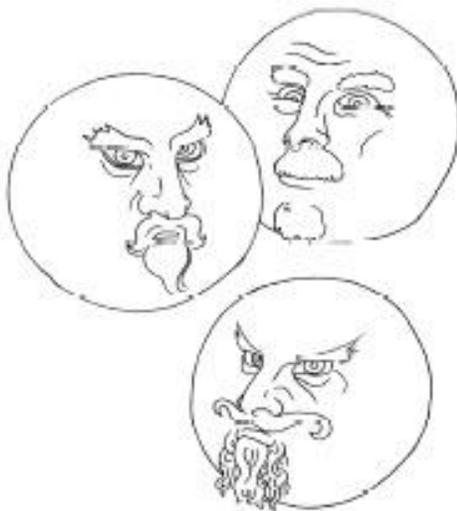
STAINED OR ATIVE

Cocci Convicts

AKA: *Staphylococcus aureus*

Gram Stain: Positive

Shape: round - coccus



Staph bacteria are very common on the skin of most animals including humans. The bacteria can, in rare instances, be very dangerous when ingested. Food poisoning can result if the bacteria were allowed to multiply and produce toxins on handled food before eating. Foods commonly contaminated in the United States include turkey, ham, processed meats, chicken salad, pastries, and ice cream in which *Staph* has grown. Infection is characterized by sudden nausea, vomiting, diarrhea, and often shock within a few hours of eating contaminated food. Usually other bacteria in the body help to keep *staph* at bay, but if something happens to upset this balance, such as the introduction of massive doses of antibiotics, infection can occur with fatal results.

For more information on this and other disease-causing microbes, check out the following sites:

www.cdc.gov/ncidod/dbmd/diseaseinfo/
www.cfsan.fda.gov/~mow/chap3.html

WANTED

STAINED OR ALIVE



Nim Rod
AKA: *Bacillus cereus*

Gram Stain: Positive
Shape: rod - bacillus

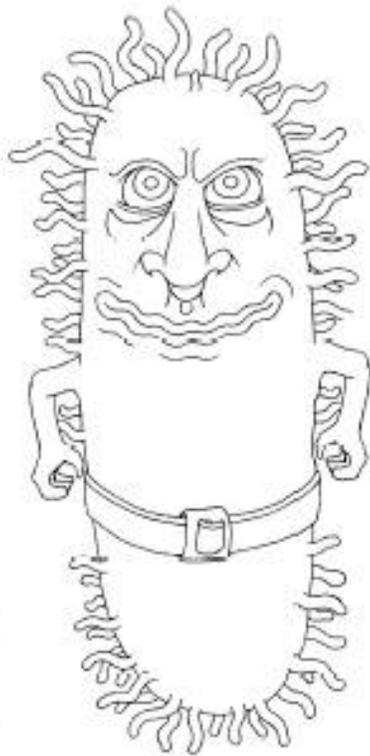
Bacillus cereus is one of the many types of bacteria that cause food poisoning. General symptoms of stomach cramps, dizziness, and vomiting can be attributed to the bacteria but the infection is rarely fatal. The illnesses caused by this unsightly intestinal intruder are actually caused by toxins it produces.

For more information on this and other disease-causing microbes, check out the following sites:

www.cdc.gov/ncidod/dbmd/diseaseinfo/
www.cfsan.fda.gov/~mow/chap12.html

WANTED

STAINED OR ALIVE



E. the kid coli
AKA: *Escherichia coli*
Gram Stain: Negative
Shape: rod - bacillus

E. coli bacteria are found in the intestines of healthy animals, including humans. There are many different strains or types of this bacterium and most are harmless to humans. However, some strains have been known to cause *E. coli* food poisoning. People can become infected by eating undercooked meat products (especially ground meat) that have been contaminated with animal feces. *E. coli* also can be contracted by ingesting other types of food, water, or anything else that has been contaminated with human or animal waste. Upon infection, the bacteria multiply and produce toxins. Victims usually suffer severe, bloody diarrhea and stomach cramps. Some suffer vomiting. Infection can be fatal, especially for the elderly and the young since their immune systems are not as strong as those in other age groups. Death can result from dehydration due to the loss of body fluid, or damage to the red blood cells and kidneys.

For more information on this and other disease-causing microbes, check out the following sites:

www.cdc.gov/ncidod/dbmd/diseaseinfo/
www.cfsan.fda.gov/~mow/chap15.html

WANTED

STAINED OR ALIVE



Foul *Sal monella*
AKA: *Salmonella typhimurium*

Gram Stain: Negative
Shape: rod - bacillus

This bacterium causes salmonella food poisoning. It is usually caused by eating undercooked fowl (such as chicken or turkey) but can also be contracted from a contaminated water supply. Symptoms include headache, chills, and stomach pain and are usually followed by nausea, vomiting, diarrhea, and fever. Symptoms usually last 3 to 4 days. After this time, an individual may become a carrier of the disease. Rarely fatal if treated quickly

For more information on this and other disease-causing microbes, check out the following sites:

www.cdc.gov/ncidod/dbmd/diseaseinfo/
www.cfsan.fda.gov/~mow/chap1.html

WANTED

STAINED OR ALIVE



Butch Botch

AKA: *Clostridium botulinum*

Gram Stain: Positive

Shape: rod - bacillus

This bacterium causes botulism. Botulism is actually caused by the toxins produced by the bacteria and not the presence of the bacteria itself. This organism reproduces by forming spores, which can be found in soil and therefore on vegetation. The bacteria are often found in meats and improperly canned foods. Infected individuals initially suffer from nausea, vomiting, and diarrhea. If enough toxin is ingested or produced, death can result from a general breakdown of the nervous system. Individuals may become paralyzed and death usually occurs as a result of respiratory paralysis.

For more information on this and other disease-causing microbes, check out the following sites:

www.cdc.gov/ncidod/dbmd/diseaseinfo/

www.cfsan.fda.gov/~mow/chap2.html

WANTED

STAINED OR ALIVE



Boss Streptococ

AKA: *Streptococcus pyogenes*

Gram Stain: Positive
Shape: round - coccus

This bacterium is widely distributed among humans. Infected individuals may spread this pathogen through respiratory droplets. This organism can cause sharp outbreaks of sore throats and scarlet fever. High fever and skin lesions characterize infection by this pathogen. Individuals with known infection should be isolated.

For more information on this and other disease-causing microbes, check out the following sites:

www.cdc.gov/ncidod/dbmd/diseaseinfo/

www.cfsan.fda.gov/~mow/chap21.html

WANTED

STAINED OR ALIVE



Gassy Gastro

AKA: *Clostridium perfringens*

Gram Stain: Positive

Shape: rod - bacillus

This bacterium causes gas gangrene. The condition can lead to a build up of gases in the muscles of the body rendering them useless. Infection also causes stomach pain and cramping (gastroenteritis). Disease is usually caused by eating meat that has been stewed or boiled and then set aside before reheating and serving.

For more information on this and other disease-causing microbes, check out the following sites:

www.cdc.gov/ncidod/dbmd/diseaseinfo/

www.cfsan.fda.gov/~mow/chap11.html

Poisoned Picnic Explanation

The culprit in this epidemic is actually a contaminated food item, the Green Bean Casserole. The contaminant is *Clostridium botulinum*. The toxin produced by this organism is one of the most toxic substances known. It is, however, easily destroyed by heating. In order for students to identify the correct food item and identify the correct toxin, they must piece together clues from a variety of sources.

The opening information states that there was only one serving spoon when the teachers began going through the line. Also, the first person through the line had green bean casserole. That person was one of the four fatalities. The next person through the line was also a fatality. This person did not eat green bean casserole. But the toxin was on the serving spoon after being used for the casserole and then for the potato salad. The second person through the line got it from the spoon! After this, the other serving spoons arrived and the cross contamination soon ended.

Students should realize that everyone that had the green bean casserole contracted the illness. Two people became ill, one of whom died, and did not have the green bean casserole. The second person through the line, as stated above, contracted the disease from the serving spoon. The other person was lactose intolerant and became ill because of the pudding, which was made with milk.

Students should also use the wanted posters to link the symptoms of the disease to botulism. From this and other research, students should see that botulism can come from improperly canned vegetables. The menu states that the green bean casserole was made using canned green beans. Botulism is easily destroyed by high heat. However, the menu also states that the casserole was only heated to warm. This would not have provided enough heat to destroy the toxin.

In addition to identifying the cause of the disease, students were also to outline a strategy to prevent future outbreaks of the disease. Since this outbreak was due to food poisoning, students should attempt to educate the public about proper food handling techniques. For this specific contaminant, information should include inspection of canned foods for bulges (a result of gas buildup from growth of the bacteria) and also stress the importance of sufficient heat to destroy the toxin. Other general information should include cleanliness in food preparation areas, washing of hands, and the use of clean utensils in food preparation. This information could be presented in the form of a brochure or a skit that would be broadcast on local television or radio stations.

Correct identification of the organism and food source along with a logical and appropriate strategy for prevention of food poisoning should result in a maximum score in evaluation of student work.

Poisoned Picnic Faculty Conversion Chart

ID #	Original Name	New Name	Condition	Card (if applicable)
1	Mrs. Smith		Sick	She arrived early with her son and helped to set up for the picnic. After many of the staff arrived, she realized that there was only one serving spoon so she went home to get some more. She returned about 30 minutes later with spoons, (after several faculty had gone through the line) to find her son chasing ducks with the water guns. Both Mrs. Smith and her son became ill.
2	Ms. Johnston		Sick	Helped to set up for the picnic. She had a hamburger, baked beans, pudding, and corn. She and several other teachers spent their time sitting in one of the gazebo's talking and watching the children dash about after the ducks. Ms. Johnston is lactose intolerant. She became ill just a couple of hours after the picnic suffering from severe stomach pains. She went to bed and recovered over night.
3	Mr. Albert		Sick	Mr. Albert took control of the grill. Mr. Drake soon showed up with the hamburger meat and started making the burgers. Mr. Albert had some potato salad, green bean casserole, a hamburger, and pudding for desert. Mr. Albert became ill, suffering from numbness, disorientation, nausea, and vomiting. He was treated and released after several days in the hospital
4	Mr. Drake		Deceased	No Card: Obtain information from pathology report
5	Ms. Cummings		Deceased	No Card: Obtain information from pathology report
6	Mr. Carlson		Deceased	No Card: Obtain information from pathology report
7	Mrs. Albert		Sick	Complained of stomach cramps early Tuesday night. Her condition continued to worsen until she finally had to be taken to the hospital. She was given massive doses of antibiotics. Her condition became worse as her symptoms began to include vomiting and disorientation. She soon found that she could not remember much about the picnic. After some time her condition improved.
8	Mrs. Bell			No Card: Obtain Information from Report.
9	Mrs. Wolfe		Deceased	No Card: Obtain information from pathology report
10	Mr. Lewis		Sick	Organized a game of volleyball set up by the gazebo. The players were a favorite target for the water guns!! The only foul was when Mrs. Cain stepped on a duck going after the ball. Mr. Lewis became ill Tuesday evening. He was treated and released from the hospital Wednesday morning.
11	Mr. Harvey			No Card: Obtain Information from Report.
12	Ms. Jackson			No Card: Obtain Information from Report.
13	Mr. Dooley			No Card: Obtain Information from Report.
14	Mrs. Jones			No Card: Obtain Information from Report.
15	Mrs. Darwin			No Card: Obtain Information from Report.
16	Mrs. Robinson			No Card: Obtain Information from Report.
17	Mrs. Brown			No Card: Obtain Information from Report.
18	Mrs. Wright			No Card: Obtain Information from Report.
19	Mrs. Cain		Sick	Brought plates and cups to the picnic. Had chicken, potato salad, pudding, green bean casserole. Became sick Tuesday evening. Symptoms included nausea, vomiting, and dizziness.
20	Mrs.		Sick	Recovering. Became ill Tuesday night and was rushed to the hospital by her husband. Her son

	Williams			enjoyed his water gun, dowsing teachers with river water. She loved the burgers made by Mr. Albert. She also tried some green bean casserole, chicken, and pudding. Her son did not become ill.
21	Dr. Oakton		Sick	Recovering. Had a great time except for when she stepped in duck droppings, which seemed to be everywhere. She didn't even mind being soaked. She tried a little bit of everything to eat
22	Mrs. Corning		Sick	Arrived late, just in time to grab a burger and some green bean casserole. Most of the utensils and food were already put away. She became ill Wednesday morning and had to leave work around 8:30. She suffered from nausea, dizziness, and was so disoriented that she could not drive home.
23	Mrs. Reid		Sick	Sampled a little bit of everything. She became ill Tuesday night and finally went to the hospital Wednesday morning. She complained of stomach cramps and nausea. Doctors quickly began an IV to help replenish lost fluids. She briefly went into a coma then slowly recovered.

Poisoned Picnic Information Sheet Faculty Conversion

The picnic started at 6:00 p.m. Tuesday evening at Your City Park. The park is located by the Your River and contains several gazebos and picnic areas. The administration and faculty of Your School Middle School organized the picnic as a relaxing event before their faculty meeting to be held after dinner. Many faculty and staff brought members of their family.

Mrs. 1 and Ms. 2 arrived at 5:30 to set up. Mr. 3 was next to arrive to set up the grill. He brought his grill from home and had to take a few minutes to clean it off because it had not been used since last summer. Mr. 4 arrived next from the supermarket where he had picked up the hamburgers. After the charcoal was lit and aluminum foil was placed over the grills, Mr. 3 began to cook.

At 5:55, Mrs. 1 realized there was only one serving spoon. She left to get some more, returning about 30 minutes later. The other teachers waited for a while, but finally decided to start eating about 6:20.

When all of the food arrived there was a full menu that included baked beans, chicken, ham, green bean casserole, tuna casserole, cherry pie, pudding, potato salad, macaroni salad, corn, and hamburgers. Drinks included soda, water, coffee, and tea.

Mr. 4 was first through the line. He tried:

- green bean casserole
- ham
- a hamburger

Ms. 5 was next. She ate:

- potato salad
- ham
- a hamburger

The third person through the line was Mr. 6. He ate:

- green bean casserole
- potato salad
- a hamburger

Mrs. 7 was next in line. She sampled:

- potato salad
- a hamburger
- cherry pie

Mrs. 1 arrived at this time with more serving spoons. Mrs. 8 came at the same time. She was a little late because she had to be sure that her chicken was done.

Mrs. 9 went through the line next. She ate:

- green bean casserole
- chicken
- a hamburger
- pudding

Next was Mr. 10, who ate:

- baked beans
- green bean casserole
- macaroni salad
- corn

The line became a little unorganized at this point and it is not clear who went through next. Mrs. 1 and Ms. 2 were two of the last people through since they helped to serve.

Mrs. 1 ate:

- green bean casserole
- potato salad
- a hamburger
- pudding

Others in attendance included Mr. 11, Ms. 12, Mr. 13, Mrs. 14, and Mrs. 15. A lot of the guests said they could not remember exactly what they ate, but Mr. 11, Mr. 13, Mrs. 14, and Mrs. 8 all had hamburgers, baked beans, and macaroni salad.

Ms. 12 and Mrs. 15 had ham, baked beans, corn, and some pudding for desert.

Mrs. 19, Mrs. 20, Dr. 21, Mrs. 22, and Mrs. 23 have not yet been interviewed. Some other staff members arrived just in time for the faculty presentations, which started at 7:45. These included Mrs. 16, Mrs. 17, and Mrs. 18.

Some of the faculty and staff walked around while they ate but most sat in one of the gazebos. The presentations were held in the main gazebo, which was a relief for some of the faculty because it seemed to be one of the few places free of duck droppings.

Even during the meeting, some of the kids chased ducks with their water guns. These kids never seemed to run out of water because the guns held almost a gallon each, but even if they did run out, they quickly refilled them from the river. Just about everyone at the picnic except for those that came for the meeting only were soaked. Since it was a hot day, the only time anyone seemed to mind the soaking was when one of the kids missed their intended target and almost put out the grill. After this incident, which happened about 6:10, the kids stayed away from the main gazebo, where the food was located, and turned their attention to the ducks and teachers walking around.

Your City officials were alarmed by the sicknesses and deaths that seem to be associated with the event. They have promised a full investigation. Even the waste-water treatment plant just a few hundred yards up river will have to submit a report on their procedures for water treatment. This is the first time anything like this has happened at the park and officials want to be sure that it does not happen again.

Park managers said that most of the symptoms such as dehydration, stomach cramps, nausea, and vomiting seem to indicate some type of food poisoning however at this point they can not be certain.

You are now part of a team of epidemiologists that has been called in to get to the bottom of this mystery. You will need to identify the cause of the disease and prevent any further outbreaks. Time is of the essence. The first thing you will want to do is meet with your team members and outline the information you have been given and then decide what additional information you need. Your City authorities have promised complete cooperation in this matter. Good luck!

Poisoned Picnic Faculty Information Cards
Faculty Conversion Pathology Report Faculty Conversion

<p>Mrs. 19 Brought plates and cups to the picnic. Had chicken, potato salad, pudding, green bean casserole. Became sick Tuesday evening. Symptoms included nausea, vomiting, and dizziness.</p>	<p>Mr. 10 Organized a game of volleyball set up by the gazebo. The players were a favorite target for the water guns!!! The only foul was when Mrs. Cain stepped on a duck going after the ball. Mr. 10 became ill Tuesday evening. He was treated and released from the hospital Wednesday morning.</p>
<p>Mrs. 20 Recovering. Became ill Tuesday night and was rushed to the hospital by her husband. Her son enjoyed his water gun, dowsing teachers with river water. She loved the burgers made by Mr. 3 . She also tried some green bean casserole, chicken, and pudding. Her son did not become ill.</p>	<p>Mrs. 23 Sampled a little bit of everything. She became ill Tuesday night and finally went to the hospital Wednesday morning. She complained of stomach cramps and nausea. Doctors quickly began an IV to help replenish lost fluids. She briefly went into a coma then slowly recovered.</p>
<p>Dr. 21 Recovering. Had a great time except for when she stepped in duck droppings, which seemed to be everywhere. She didn't even mind being soaked. She tried a little bit of everything to eat.</p>	<p>Mr. 3 Mr. 3 took control of the grill. Mr. 4 soon showed up with the hamburger meat and started making the burgers. Mr. 3 had some potato salad, green bean casserole, a hamburger, and pudding for desert. Mr. 3 became ill, suffering from numbness, disorientation, nausea, and vomiting. He was treated and released after several days in the hospital.</p>
<p>Mrs. 22 Arrived late, just in time to grab a burger and some green bean casserole. Most of the utensils and food were already put away. She became ill Wednesday morning and had to leave work around 8:30. She suffered from nausea, dizziness, and was so disoriented that she could not drive home.</p>	<p>Mrs. 1 She arrived early with her son and helped to set up for the picnic. After many of the staff arrived, she realized that there was only one serving spoon so she went home to get some more. She returned about 30 minutes later with spoons, (after several faculty had gone through the line) to find her son chasing ducks with the water guns. Both Mrs. 1 and her son became ill.</p>
<p>Ms. 2 Helped to set up for the picnic. She had a hamburger, baked beans, pudding, and corn. She and several other teachers spent their time sitting in one of the gazebos talking and watching the children dash about after the ducks. Ms. 2 is lactose intolerant. She became ill just a couple of hours after the picnic suffering from severe stomach pains. She went to bed and recovered over night.</p>	<p>Mrs. 7 Complained of stomach cramps early Tuesday night. Her condition continued to worsen until she finally had to be taken to the hospital. She was given massive doses of antibiotics. Her condition became worse as her symptoms began to include vomiting and disorientation. She soon found that she could not remember much about the picnic. After some time her condition improved.</p>

**Pathology Report
Faculty Conversion**

Victim: Mrs. 9

Admitted suffering from abdominal pain and vomiting. Began diagnostic tests but patient's condition deteriorated. Death due to respiratory and heart failure. Time of death: 3:30 a.m., 9/21/05.

Victim: Mr. 6

Paramedic response to home. Pronounced dead on arrival. Attempts to revive failed. Time of death: 11:30 p.m., 9/20/05

Victim: Mr. 4

Admitted suffering from abdominal pain, headache, and paralysis of extremities. Lapsed into shock. Pulmonary failure followed. Time of death: 2:30 a.m., 9/21/05.

Victim: Ms. 5

Admitted suffering paralysis. Unable to communicate to hospital staff. Died of heart and respiratory failure. Time of death: 1:20 a.m., 9/21/05.

Poisoned Picnic Information Card 1 Faculty Conversion

We have since learned that luckily there was only one burger on the grill when it was soaked. Mr. 3 decided to throw it away because he had to lift up the grill and add more charcoal. Many times he would walk away from the grill to talk to someone and return to some very well done burgers. No one seemed to mind, that's the way they wanted them.

Poisoned Picnic Information Card 2 Faculty Conversion

We have also learned that the wastewater treatment plant performed several tests on the water coming from their plant. The effluent (water being pumped out) was virtually void of any bacteria. The plant was doing a good job. They also did tests on the water around the park and found no notable bacterial contamination.