

# What's Lurking in Lunch?

## Facilitator Guide

A game for 3 - 4 players.

### Materials

#### Included in Game Package:

Facilitator Guide

Food-Pathogen Location Chart

Attack-Rate Chart

Lab-Test Pathogen Chart

Player Guide

Confirmation Envelope

Location Cards (laminated\*)

Pathogen Cards (laminated\*)

Lab-Test Cards (laminated\*)

Food-Attack-Rate Cards  
(laminated\*)

Food-Reveal Cards (laminated\*)

Culprit Cards (laminated\*)

Medical Files (laminated\*)

Game Board

Outbreak Notepads

Player Pieces (unassembled)

\*Laminating these items will make them reusable as they may be written on using wet-erase markers. If lamination is not an option, new Food-Attack Rate and Lab-Test Cards may be printed each time the game is played.

#### Not Included in Game Package:

Wet- (or dry-) erase markers

Calculators

2 six-sided dice (can be purchased at Walgreens® or other pharmacies)

Highly recommended: class set of small clipboards for kids to organize notepads and cards

Highly recommended: plastic storage box for each game set

### Object

The object of the game is for players to understand the field of epidemiology. Players are challenged to discover the cause of a foodborne illness outbreak.

Your students' goal is to discover the cause of a foodborne illness outbreak. They will need to discover the following:

- **Culprit:** Who caused the illness by not following proper food-handling procedures?
- **Pathogen:** What toxic microorganism caused the food poisoning outbreak?
- **Location:** Where did infection occur? Was it in a neighborhood restaurant or the school cafeteria?
- **Food:** What did the pathogen contaminate to cause the outbreak?

In order to confirm their suspicions, players will visit the hospital to collect symptom data, eateries to interview employees about their food-handling practices, a microbiology lab to obtain test results, and the Department of Public Health to gather data about food choices and to calculate attack rates.

## Recommended Time Frame

**Day 1**, one 50-minute class period.

Introduce foodborne illness and epidemiology. Ask kids to share personal experiences with both. Research past outbreaks or use materials from *Patterns in Patients* found in the Post-Visit Activities on this website: [http://azscience.org/who\\_are\\_you/pathways\\_educators](http://azscience.org/who_are_you/pathways_educators). Review Job Descriptions found in the Player Guide. Review the Culprit Cards, Lab-Test Cards, Food-Attack-Rate Cards, Medical Files, Game Board, Microbe Reference Manual, Glossary, Outbreak Notepad, and Student Handbook.

**Days 2 and 3**, two 50-minute class periods.

This assumes that it will take 20 minutes to set up and clean up each period with 30 minutes of uninterrupted game play.

## Set Up

**Set Up for Classroom Play.** Preparation is time consuming BUT, once complete, you will have the game for years to come and will only need to set up the different scenarios when you are ready to play. For a class of 32 students (8 games), expect to spend about 1 hour printing the pages, 1 hour laminating, 3 hours cutting/folding/gluing all of the cards, 1 hour setting up the game into storage boxes, and 1 hour practicing the game before attempting it with students. This is a good project for student aides or volunteers to prepare on a teacher's behalf.

1. Assign a Location and Pathogen to each student group.
2. Using the Food-Pathogen Location Chart (Appendix), choose a contaminated food that corresponds to the Location and Pathogen assigned to each group.
3. Check the contaminated food on the corresponding Food-Reveal Card.
4. Randomly select a Culprit for each group.
5. Place the Pathogen, Location, Food-Reveal, and Culprit Cards into the Confirmation Envelope for each student group. (Players do not use the Pathogen cards during the game. They are only used by the game facilitator during set up.)
6. Using the Attack-Rate Chart (appendix), write in the corresponding attack rates on the laminated Food-Attack-Rate Cards, for each group, using a wet-erase marker and set aside for game play.
7. Using the Lab-Test Pathogen Chart (appendix), check off the corresponding results on the Laboratory Test Cards using a wet-erase marker and set aside for game play.
8. Select the corresponding Medical File for the chosen Pathogen, for each group, and set aside for game play.

Note: An example of each card may be viewed in the appendix.

**Teacher Note: Encourage students to browse through the Player Guide to research and validate data when it is not their turn. Encourage students to ensure they've collected all necessary data before jumping to conclusions!**

## Concepts for Further Exploration

Is it actually true that other foods would have such a high percentage of people getting sick? Yes, because many foods are often eaten together and so may appear to be the contaminated food when they actually are not.

The symptoms don't always match up because other causes could be creating symptoms (e.g., dehydration, fever) rather than the pathogen itself.

A note on molecular tests – normally investigators wouldn't run all of these tests at once because it would be prohibitively expensive.

## How to Make Player Pieces

Print the following page on 110lb card stock or white construction paper. Cut along all solid lines and fold along all dashed lines. Fit the slotted bottoms together to make a tent.

**Show a representative of each card type.**

## Food-Pathogen-Location Chart

		Campylobacter jejuni	Listeria Monocytogenes	Norovirus	Salmonella	Staphylococcus aureus	Burrito Barn	Chicken Coop	Hamburger Hamlet	Ice Cream Igloo	School Cafeteria	Sub Shack
Condiments	Cherries	x		x		x				x		
	Fudge Sauce	x		x		x				x		
	Hot Sauce			x		x	x					
	Ketchup	x		x		x			x	x		
	Mayonnaise	x		x	x	x		x				
	Pickles	x		x		x			x			
	Ranch Dressing	x		x		x					x	
	Tartar Sauce	x		x		x					x	
Dairy	2% Milk	x	x	x	x	x					x	
	Cheese, Cheddar	x	x	x	x	x	x	x	x	x	x	
	Cheese, Mozzarella	x	x	x	x	x						x
	Ice Cream, Chocolate	x	x	x	x	x				x	x	
	Ice Cream, Vanilla	x	x	x	x	x				x	x	
	Whipped Cream	x	x	x		x				x		
Deli Meats	Bacon	x	x	x		x		x	x			
	Chorizo	x	x	x		x	x					
	Ham	x	x	x		x					x	
	Hotdogs	x	x	x		x				x		
	Pepperoni	x	x	x		x						x
Pre-Cooked / Packaged Foods	6" Roll	x		x								x
	Buns	x		x				x	x			
	Cola			x					x	x		x
	Fish Sticks	x		x		x					x	
	French Fries	x		x		x			x	x		
	Lemonade	x		x		x		x				
	Marinara Sauce	x		x		x						x
	Orange Juice	x		x	x	x					x	
	Pinto Beans	x		x		x	x					
	Potato Chips	x		x				x				x
	Tater Tots	x		x							x	
	Tortilla	x		x		x	x					
Tortilla Chips	x		x			x						
Uncooked Produce	Avocado	x		x	x	x	x					
	Cucumbers	x		x	x	x					x	
	Lettuce	x		x	x	x		x	x		x	x
	Onions	x		x	x	x	x			x		
	Tomatoes	x		x	x	x	x		x	x	x	
	Tomato Salsa	x		x	x	x	x					
Undercooked Meats	Beef, Chili									x		
	Beef, Patty								x			
	Chicken, Grilled	x		x	x	x		x				
	Chicken, Shredded	x		x	x	x	x					
	Beef,, Meatballs	x		x		x						x

## Attack Rate Chart

**Instructions:** After choosing the contaminated food, write in the corresponding ‘Number Who Got Sick’ and ‘Number Who Ate Food’ data on the appropriate Food-Attack-Rate cards. Then, simply copy the remaining data into the remaining spaces on the Food-Attack-Rate cards. It doesn’t matter what numbers you assign to the remaining foods.

**Teacher Note:** *Feel free to alter these numbers. Just make sure that your contaminated food uniquely has the highest attack rate. Changing the numbers will help facilitate replay value because of kids who have solved the game based on a singular attack rate.*

	Number Who Ate Food & Got Sick	Number Who Ate Food	Attack Rate (%)
<b>Contaminated Food</b>	37	39	95%
<b>Everything Else</b>	26	28	93%
	38	41	93%
	21	24	88%
	29	33	88%
	40	44	91%
	32	38	84%
	21	26	81%
	16	19	84%
	21	37	57%
	36	42	86%
	22	27	81%
	15	19	79%
	20	22	91%
	40	43	93%
	31	36	86%
	16	18	89%
	28	31	90%
	22	29	76%
	32	35	91%
	19	25	76%
	18	21	86%
	24	34	71%
	15	23	65%
	39	42	93%
	16	18	89%
	22	24	92%
	27	32	84%
	20	26	77%
	9	19	47%
	36	44	82%
	31	38	82%
	15	19	79%
	17	20	85%
	30	36	83%
	31	34	91%
	29	31	94%
	19	29	66%
	24	30	80%
	30	33	91%
	22	25	88%
	18	24	75%

## Lab-Test Pathogen Chart

**Instructions:** Use the following chart to mark the Lab-Test Cards that correspond to the pathogen assigned to each group. If Norovirus is the chosen pathogen, omit the “Selective Culture Media” card from the game.

		Campylobacter jejuni	Listeria monocytogenes	Norovirus	Salmonella	Staphylococcus aureus
<b>Shape Viewed Under Microscope</b>	icosahedral			x		
	rod		x		x	
	spherical					x
	spiral	x				
<b>Microbes Grow on This Agar</b>	antibiotics					x
	blood	hemolysis	hemolysis			hemolysis
	chromogenic		blue-green			pink
	egg yolk	x				
	mannitol salt					red to yellow
	XLD				x	
<b>Antibodies detect</b>	adhesion proteins	x				
	capsid proteins			x		
	invasion proteins		x			
	flagella proteins	x				
	lipopolysaccharides				x	
<b>PCR detects</b>	alpha toxin gene	x				
	capsid gene			x		
	flagella gene				x	
	oxacillin resistance gene					
	virulence gene		x			
<b>Staining</b>	fluorescent capsid			x		
	fluorescent flagella					
	fluorescent ribosomes		x			
	Gram negative (pink/red)				x	
	Gram positive (purple/blue)	x	x			
<b>Symptoms</b>	abdominal cramping	x		x	x	x
	diarrhea	x	x	x	x	x
	fever		x	x	x	x
	headache			x		
	muscle aches		x			
	nausea		x	x		x
	vomiting			x	x	x

## Medical File-Pathogen Table

Name on Medical File	Pathogen
Mira Scope	Campylobacter jejuni
Petyr Dish	Listeria monocytogenes
Perry Stalsis	Salmonella
Pam Kreyiss	Staphylococcus aureus
Sal Ivary	Norovirus

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