



Food Safety and Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

Consumer Food Safety Research

Dr. Benjamin Chapman

Professor

Food Safety Extension Specialist

North Carolina State University



NC STATE UNIVERSITY College of Agriculture and Life Sciences

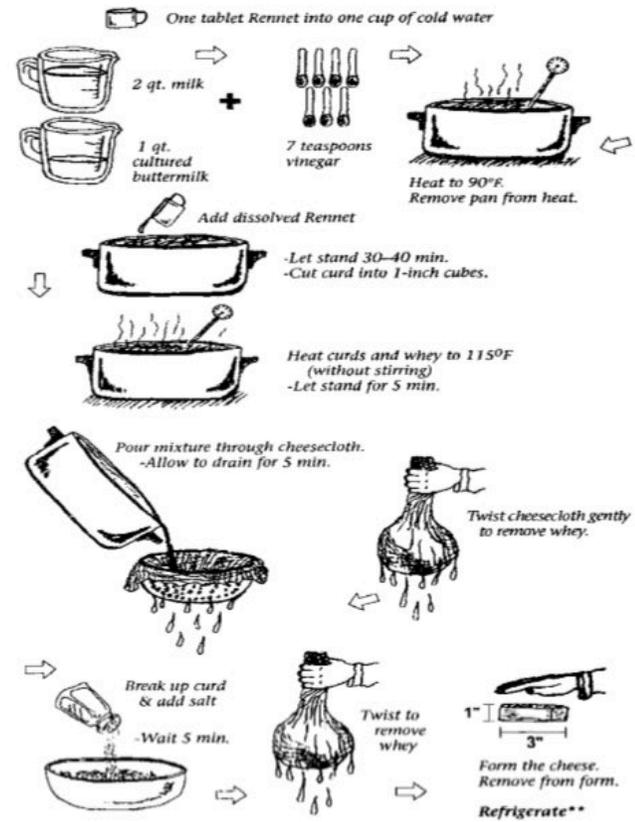
Consumer Food Safety Research
Ben Chapman, PhD
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Department of Agricultural and Human Sciences



safe plates

Three semi-circular icons arranged horizontally: a black one on the left, a grey one in the middle, and a red one on the right.







DeDonder, S., Jacob, C.J., Surgeoner, B.V., Chapman, B., Phebus, R. and Powell, D.A. 2009. Self-reported and observed behavior of primary meal preparers and adolescents during preparation of frozen, uncooked, breaded chicken products. *British Food Journal*, 111(9): 915-929.





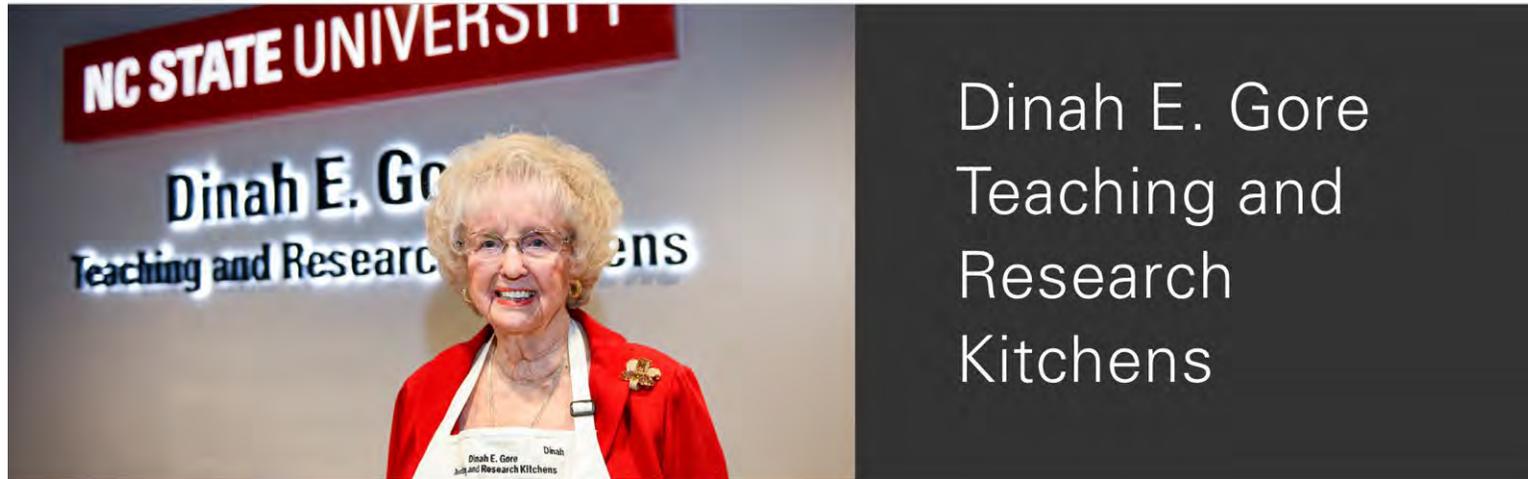
160° IS GOOD

LEARN MORE GOOD AT
160isGood.com

brought to you by the STEC CAP grant

The graphic features a stylized burger with a digital thermometer probe inserted into the center. The thermometer displays '160° F'. The burger is set against a semi-circular arc of small squares, with the right side of the arc transitioning from light grey to red.





With the support of [generous donors](#) and our faculty and staff, the Department of Agricultural and Human Sciences designed the Dinah E. Gore Teaching and Research Kitchens, a state-of-the-art kitchen complex that will enhance and extend our work in teaching, research and extension.







Food Safety and Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

Educational Food Safety Materials for Consumers

Dr. Barbara Chamberlin

Professor and Consumer & Environmental Sciences Specialist
New Mexico Cooperative Extension
New Mexico State University



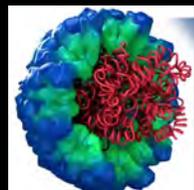
Educational

Food Safety

Materials for Consumers



Barbara Chamberlin, PhD • bchamber@nmsu.edu •  [@bchamber](https://twitter.com/bchamber)



learninggameslab.org

Learning Games Lab at New Mexico State University



learninggameslab.org

Show the next page

NM STATE BE BOLD. Shape the Future.
New Mexico State University
College of Agricultural, Consumer, and Environmental Sciences

Type a Keyword

Home Impact Stories Academics Research Extension & Outreach 4-H Alumni & Giving Quick Links

NMSU > College of Agricultural, Consumer and Environmental Sciences (ACES) > Innovative Media Research and Extension

Innovative Media Research and Extension

Innovative Media Research and Extension

We research and produce animations, games, interactive modules and apps. We conduct research in our Learning Games Lab

See our work at YouTube:

- Learning Games Lab: Educational animations for K-12, college students, and agricultural producers nationwide.
- College of ACES: Educational videos and animations focused on agricultural topics relevant to New Mexico.
- NMStateU: NMSU's channel, including faculty presentations and other professional activities.

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Animations, games, interactive modules and apps produced by our team.

NMSU Innovative Media Research and Extension is part of the Cooperative Extension Service and Agricultural Experiment Station. Our

learninggameslab.org

Meaningful
change

in students

DON'T BE GROSS



About Don't Be Gross

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[Vomit Girl](#)

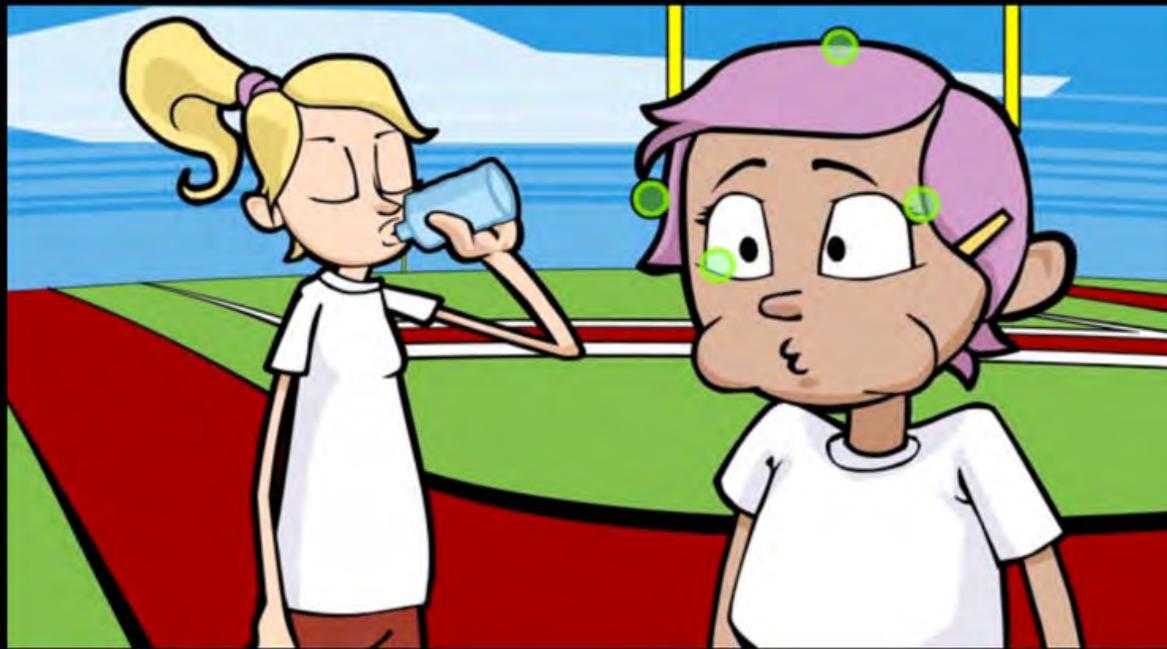
[10 Minutes Earlier](#)

[Suds of War](#)

[Sticky Situations](#)

[HandCam](#)

[5 Second Invasion](#)



dontbegross.com

Version 1.6

Ninja Kitchen



United States
Department of
Agriculture

National Institute
of Food and
Agriculture

This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under Agreement No. 2007-51110-03813.

Open

\$0

武道



First, click on the sink to wash your hands.



Level 1



\$2000



Level 3



\$2004

Game running slowly?
Type "Q" to toggle quality.



Level 7



Open

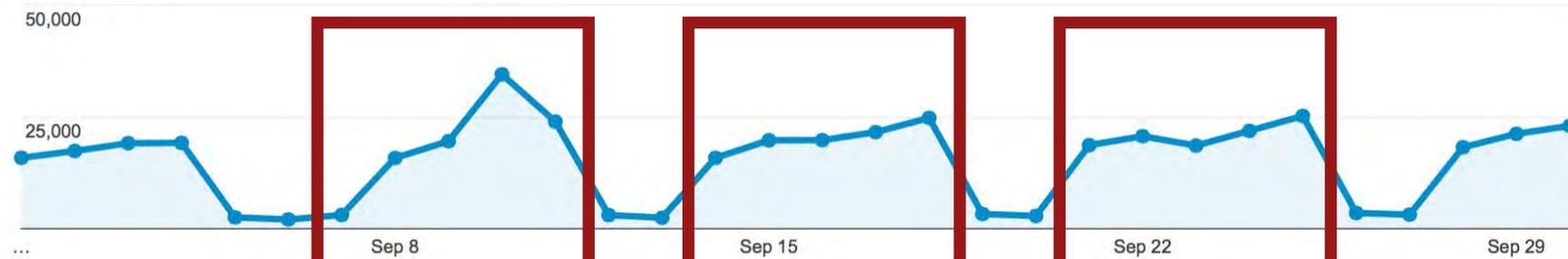
\$2004



Level 9



● Pageviews



OutbreakSquad.org



United States
Department of
Agriculture

National Institute
of Food and
Agriculture

This material is based upon work supported by the SPECA Challenge Grant, National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2015-38414-24223

Infected

Sick

Very Sick

Dead

Low Risk



6

High Risk



2



GROCE

??/??



SQUAD Attacks!



Event

No new cooldowns on abilities this round.

Points

10

GO!

Infected

Sick

Very Sick

Dead

LEVEL 3



Low Risk

High Risk

Consumer Complaint Response

Deal 2 damage to each outbreak.

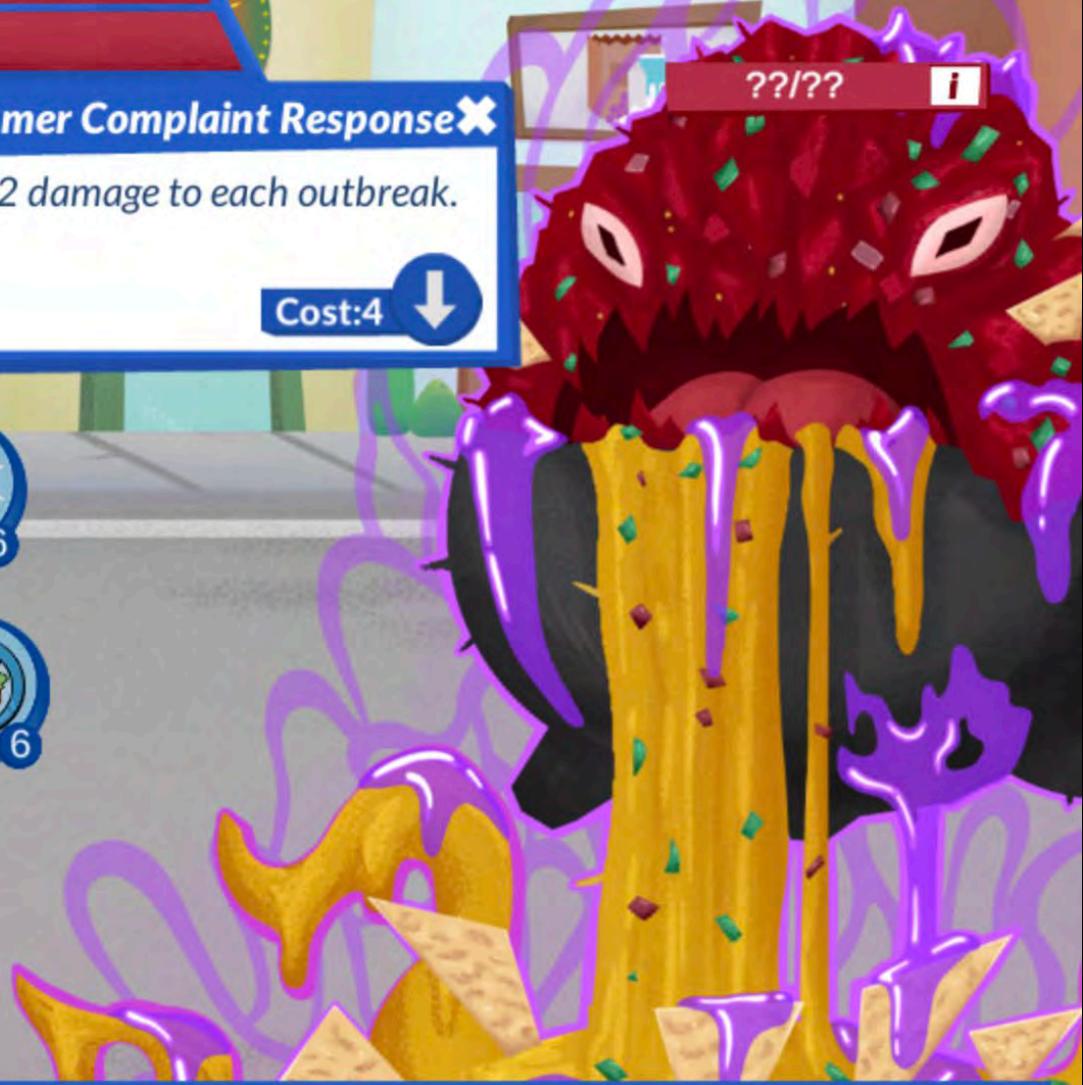
Cost:4



??/??



Enforcement



POINTS

10

GO!

Infected

Sick

Very Sick

Dead

LEVEL 3



Low Risk

High Risk

Federal Inspection

Deal 4 damage.

Cooldown: 1 turn

Cost:3

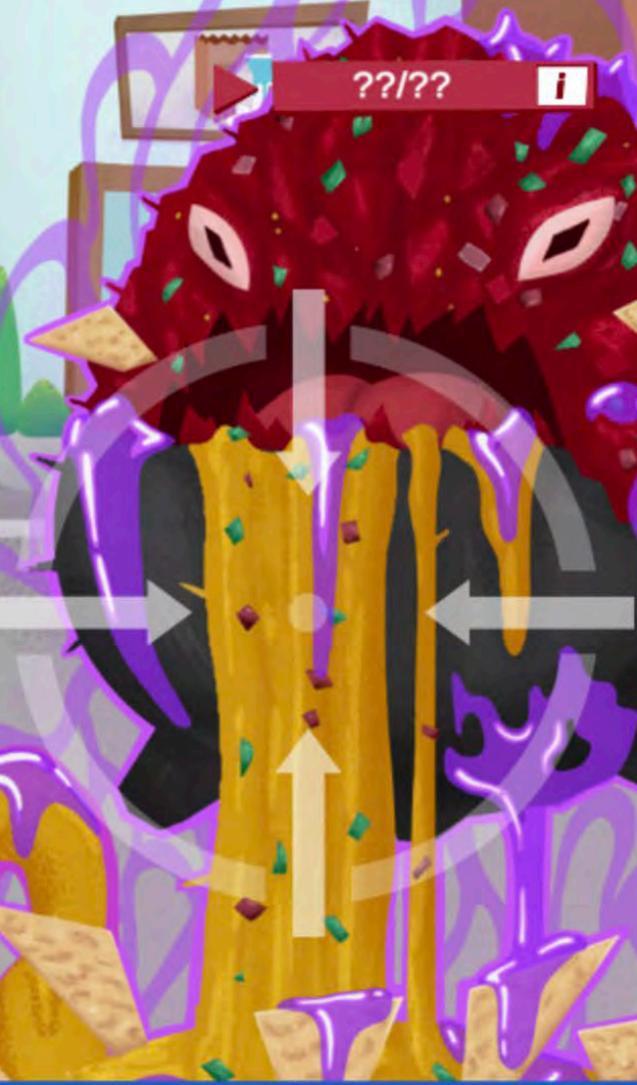


Enforcement

POINTS

10

GO!



Infected 🦠

Sick 🤒

Very Sick 🤒

Dead ☠️

LEVEL 3



Low Risk 🔑

High Risk 🔑

??/??



Enforcement

Food Product Recall



Prevents new outbreaks this round.

Cooldown: 2 turns

Cost: 6



POINTS

10

GO!

Infected

Sick

Very Sick

Dead

LEVEL 3



Low Risk

High Risk

??/??



Community Outreach

Protect the next 3 low-risk people from infection.

Cost:1



Education

POINTS

10

GO!



Infected

Sick

Very Sick

Dead

LEVEL 3



Low Risk

High Risk

Food Safety Guidelines

Protect all people from new infection this round.

Cooldown: 4 turns

Cost: 5



Education

??/??



POINTS

10

GO!

Infected

Sick

Very Sick

Dead

LEVEL 3



Low Risk

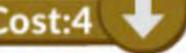
High Risk

Risk Training

High-risk people protected from new infections this round.

Cooldown: 3 turns

Cost: 4



Education

??/??



POINTS

10

GO!

Infected 🦠

Sick 🤒

Very Sick 🤒

Dead ☠️

LEVEL 3



Low Risk 🔑

High Risk 🔑

??/??



Research

Preventative Measures



Prevent Uncommon/Rare Attacks.

Cooldown: 1 turn

Cost:3



POINTS

10

GO!

Infected

Sick

Very Sick

Dead

LEVEL 3



Low Risk

High Risk

??/??



Published Research



Education abilities protect twice as many people this round.

Cooldown: 1 turn

Cost: 3



POINTS

10

GO!

Infected

Sick

Very Sick

Dead

LEVEL 3



Low Risk

High Risk

Hazard Analysis

All enforcer attacks inflict +2 Damage this round.

Cooldown: 1 turn

Cost:4



Research

POINTS
10

GO!



??/??



Infected

Sick

Very Sick

Dead

LEVEL 3

Low Risk

High Risk

??/??

Quarantine

All infected people stay in place.

Cooldown: 1 turn

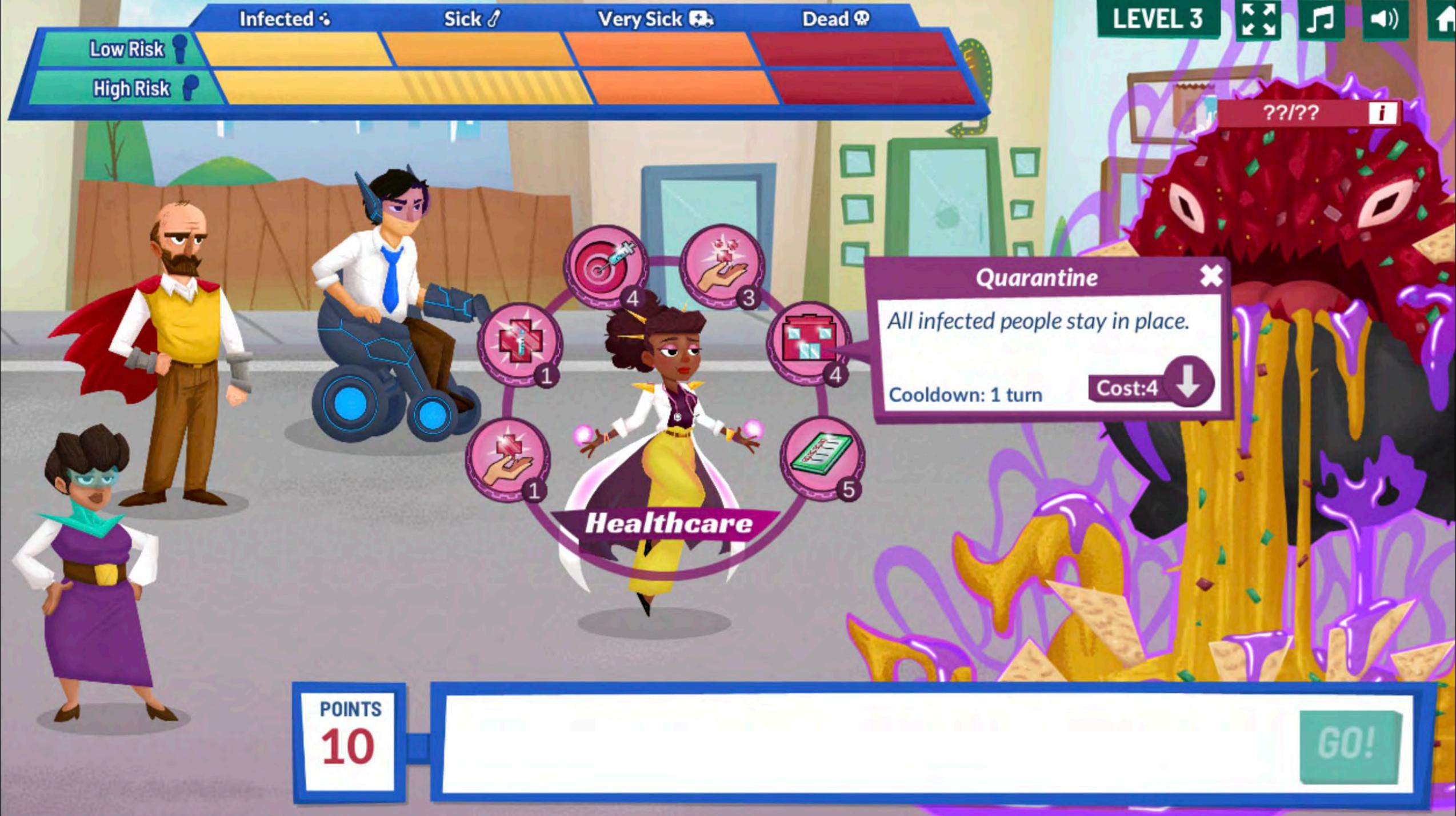
Cost: 4

Healthcare

POINTS

10

GO!



Infected

Sick

Very Sick

Dead

LEVEL 3



Low Risk

High Risk

??/??



Treatment (Low Risk)



Treat 2 low-risk people.

Cost:1



Healthcare

POINTS

10

GO!

Infected

Sick

Very Sick

Dead

Low Risk



6

High Risk



4



2



GROCE

34/50



??/??



Event: Public Outcry

They need more help out there! Treatment effects doubled this round.

CONTINUE



Infected 🦠

Sick 🤒

Very Sick 🏥

Dead 💀

3 Low Risk 🧑

High Risk 🧑

3

🏠🏠🏠

5

💀

2



GROCERY

Outbreak Defeated!

Level Summary

	🧑 Low Risk	🧑 High Risk	🧑 Total
Infected	0	0	0
Sick	0	0	0
Very Sick	3	0	3
Deaths	5	2	7

CONTINUE

REAL OUTBREAK!



In 1993, an outbreak occurred where 732 became ill from consuming contaminated beef patties in the Northwest United States. The majority of the victims were under the age of 10.

Enter for uses of how limit



These Virtual Labs help students learn basic laboratory techniques and practice methods used by lab technicians and researchers in a variety of careers, using specific food science lab processes.

It is easy for consumers to take safe food for granted: as most people don't understand the rigorous testing, research and assessment food and food processing requires. Healthy, safe food is of extreme importance and vital to human survival. Expert lab technicians help make sure that the food we eat and feed to our animals will not harm us or our livestock.



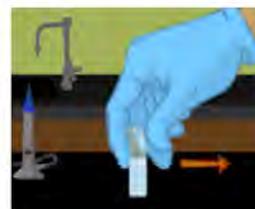
Testing for Corn Mold

The process of testing corn for the presence of aflatoxin.



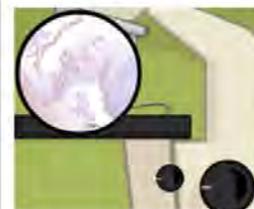
Bacteria Sampling

Testing milk samples for bacterial contamination with various disposable lab equipment.



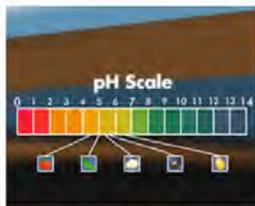
Gram Staining

Using gram staining to test the yogurt sample for bacterial contamination.



Using the Microscope

Learning to use the microscope to view what type of bacteria is contaminating the yogurt sample.



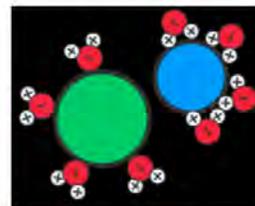
The pH Scale & Meter Calibration

Learn about the pH scale and calibrating a pH meter.



Testing and Adjusting pH

The process of preventing *Clostridium botulinum* growth in salsa.



Understanding Water Activity

Explore how water acts inside food and how this affects spoilage.



Controlling Water Activity in Food

Test the water activity of corn dried using traditional methods.

This work was supported by USDA CSREES and USDA National Institute of Food and Agriculture under two Higher Education Challenge Grant projects: 2008-38411-19055 and 2011-38411-30625. © 2008-2014 NMSU Board of Regents. Collaborating universities South Dakota State University, North Dakota State University and New Mexico State University are all equal opportunity/affirmative action employers and educators.

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Introduction

Setting Up

Low Magnification

High Magnification

Oil Immersion

Discussing Results

Clean Up

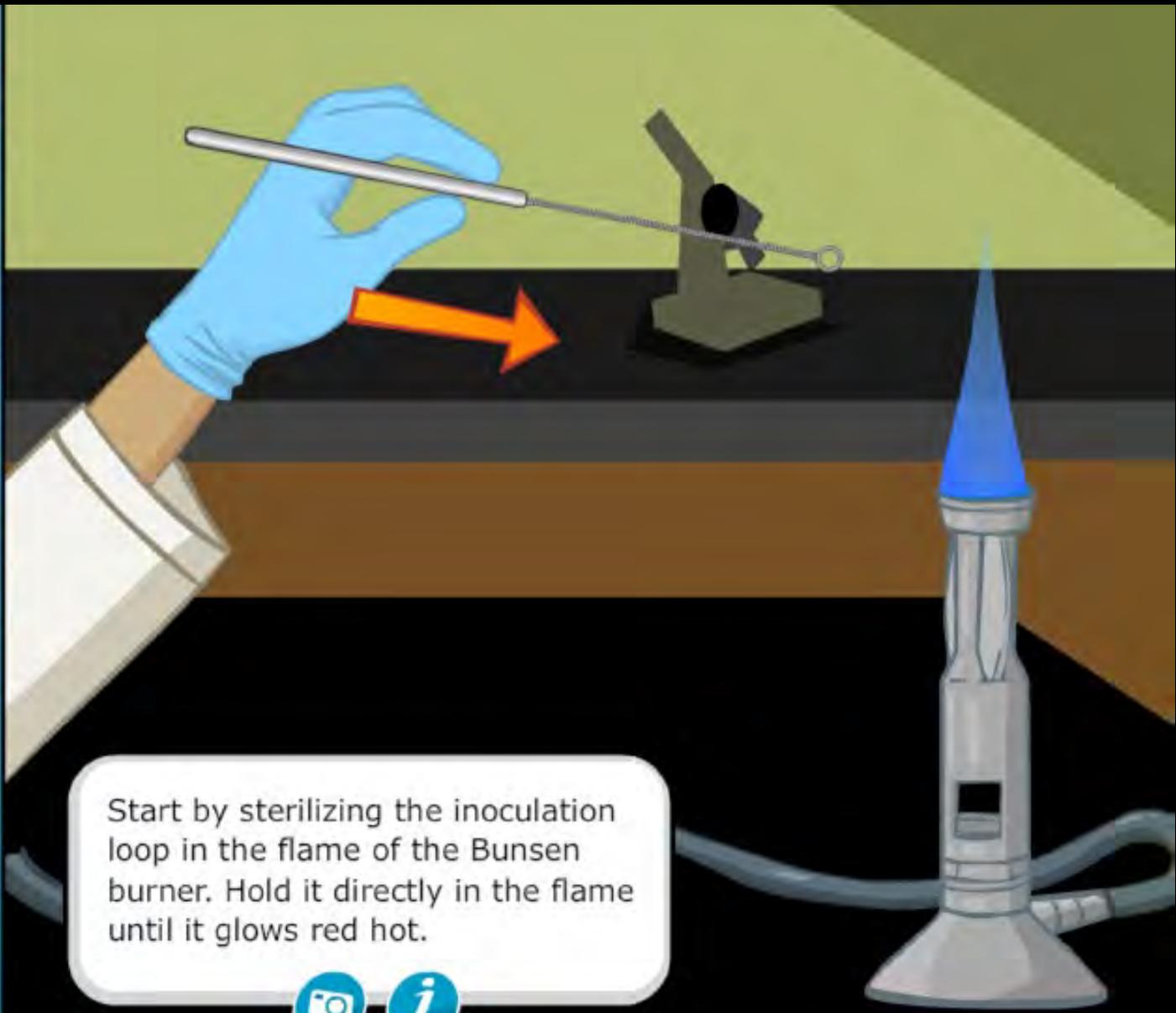
Conclusion

Hello, lab assistant. Today, we'll view the Gram stained yogurt sample with a microscope to get an idea of the kind of bacteria contaminating it. To learn more about the purpose and techniques of Gram staining, please take a look at the Gram staining virtual lab.



NEXT ➔

- Laboratory Info
- Gram Stain Info
- Slide Prep
- Gram Staining
- On Your Own
- Test Results



Start by sterilizing the inoculation loop in the flame of the Bunsen burner. Hold it directly in the flame until it glows red hot.



Credits



Wastewater Treatment Plant

MID-ATLANTIC 45°F



2.0 – Measure the water's physical properties.

Now, click the spigot to turn it off.

This way, we won't be sampling whatever has been sitting in the pipes.





Stream

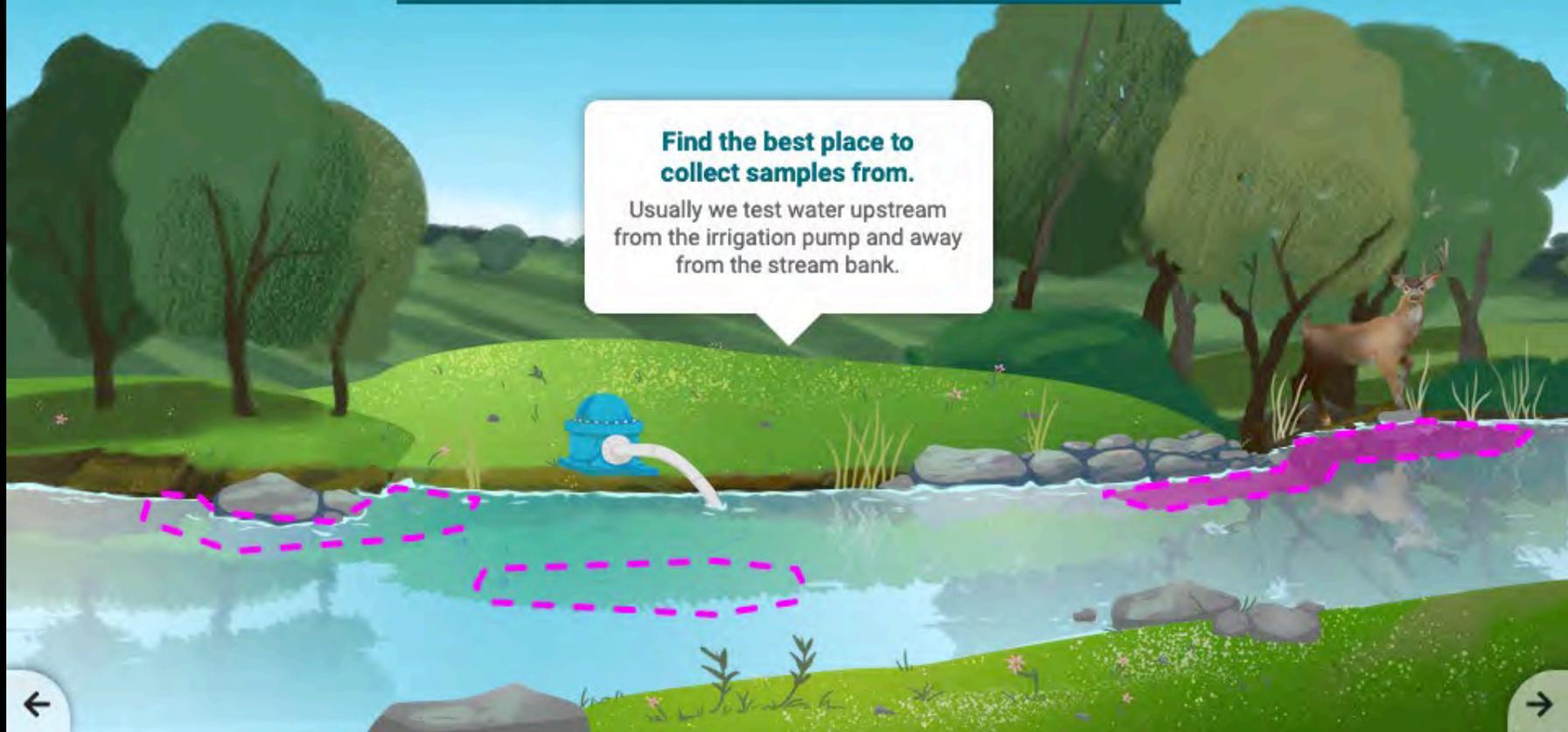
MID-ATLANTIC 84°F



1.0 – Prepare the location for sampling.

Find the best place to collect samples from.

Usually we test water upstream from the irrigation pump and away from the stream bank.





1

2

3

4

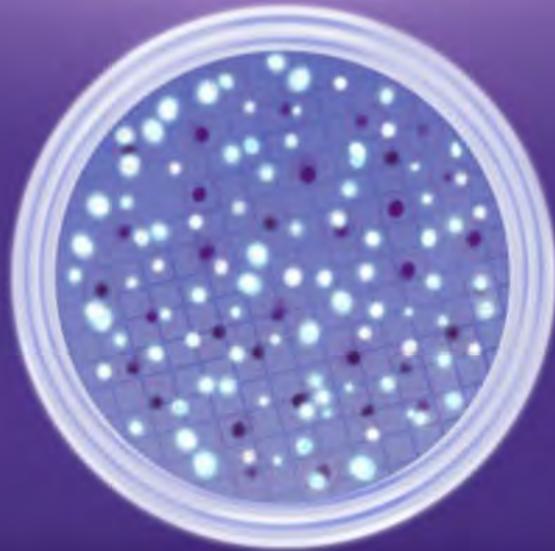
5

6

3 Count Fluorescent Colonies

Now, mark the fluorescent colonies with the sharpie.

Fluorescent colonies are coliform bacteria other than *E. coli*. These must be counted and added to the number of total coliforms



● Blue

35



GLOSSARY: Coliforms





DAY 1 Preparation Overview



1 Make dilutions



2 Place a filter into the funnel



3 Add dilutions to the funnels



4 Filter dilutions



5 Place filters on the agar plates



6 Incubate the agar plates

Today, we're taking the first steps for analyzing samples from a **pond**, creating dilutions and filtering the water.

CONTINUE





SKIP 

Method 1604
Total Coliforms and E. Coli.



potluckpanic.nmsu.edu

u



Meaningful change

for *adults*

DON'T WASH YOUR CHICKEN!

Chicken Mole (Nutty Chocolate Sauce)

Mini Drama | Chicken Mole



Cooking Demo | Chicken Mole



Not Foldable - Fotonovela and Recipe (PDF) - Chicken Mole



Not Foldable - Fotonovela and Recipe (PDF Spanish) - Chicken Mole

Don't Wash Your Chicken



DON'T WASH YOUR CHICKEN!



Stir-Fry Chicken
Recipe Inside!



SO, I TOLD MY BOSS, "I ALREADY WORKED TWO WEEKENDS," AND...



WAIT, WHAT ARE YOU ABOUT TO DO?



I'M GOING TO WASH THE CHICKEN, THEN CHOP IT FOR OUR STIR FRY.

I READ THAT RAW CHICKEN CAN HAVE BACTERIA ON IT.



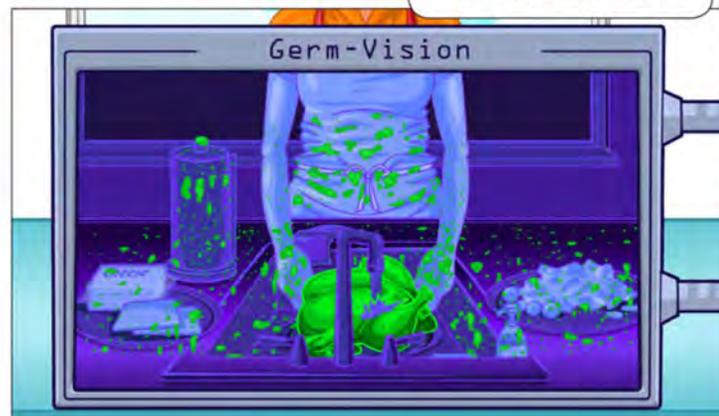
SURE, CHICKEN DOES HAVE BACTERIA ON IT SOMETIMES...

BUT THE WATER IS NOT HOT ENOUGH TO KILL THE BACTERIA.

www.drexel.edu/dontwashyourchicken



IF YOU COULD SEE GERMS, YOU WOULD SEE THAT WASHING POULTRY JUST SPLASHES BACTERIA ALL OVER YOU, THE KITCHEN, AND OTHER FOODS.



IF I CAN'T WASH THE CHICKEN...

HOW DO I GET RID OF THE BACTERIA?

BRING THE CHICKEN BACK TO THE STOVE.

www.drexel.edu/dontwashyourchicken



Site Home ▾

Search...



DON'T WASH YOUR CHICKEN!

VIDEOS & PHOTO NOVELLAS

RESOURCES

CONTACT US

DON'T WASH YOUR CHICKEN

Although raw chicken and turkey can carry bacteria on their surfaces, research has shown that washing raw poultry under running water in your kitchen sink is a bad idea.

If germs were visible to the naked eye, you would see that washing poultry just splashes bacteria all over you, your kitchen towels, your countertops, and any other food you have nearby, such as raw foods or salads. This can make people sick, especially young children, pregnant women, older adults and the immunocompromised.

Instead, just take raw poultry straight from the package into the cooking pan. The heat from the cooking process will kill any bacteria that are present. Then simply clean up any splashes and wash your hands with soap and hot water.

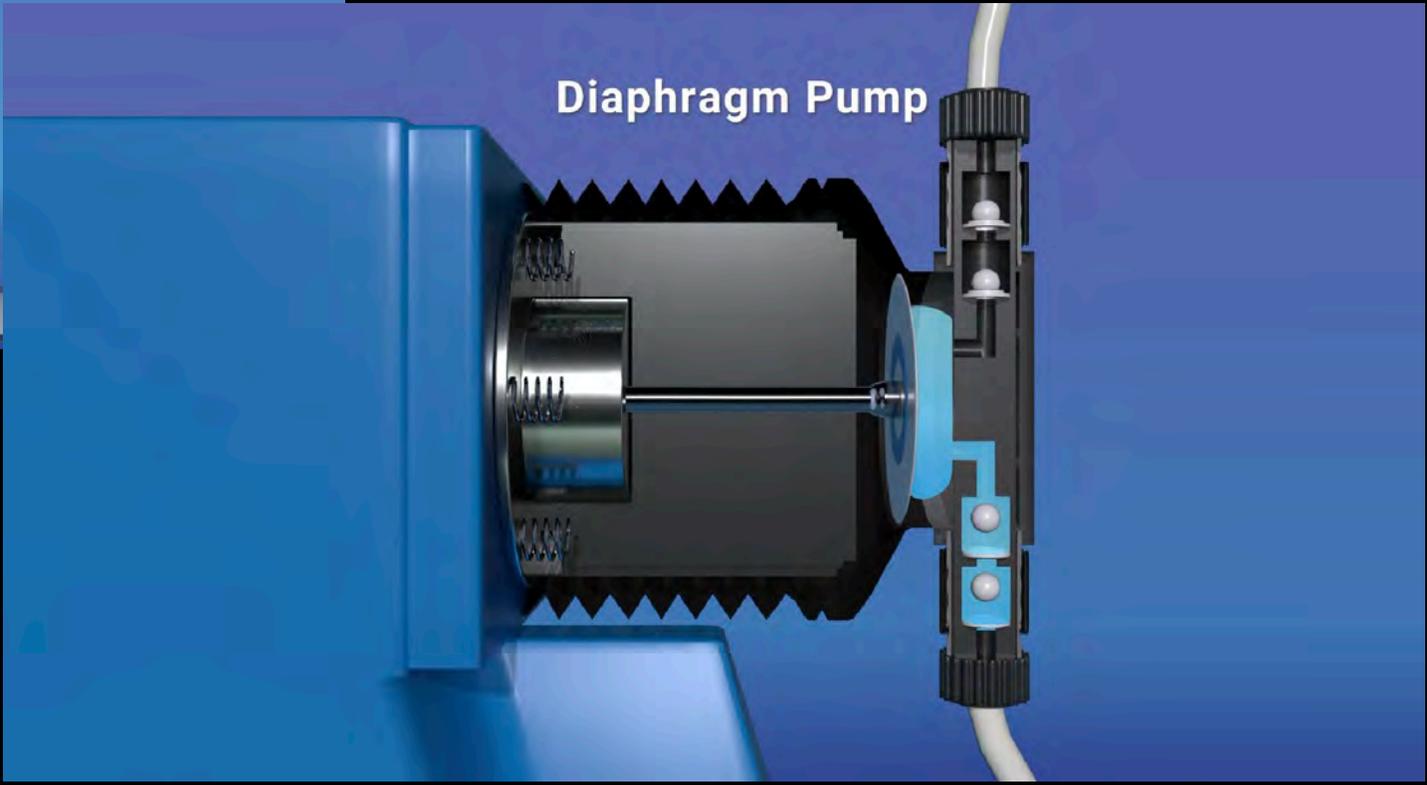
To learn more, explore the four [mini dramas](#) or [the photonovellas](#).

English
Spanish
Amharic
Hmong
Oromo
Somali
Vietnamese

Meaningful change

for *systems*

MUD Trailer



CHLORINE LEVEL TARGET: 1 to 2 ppm



Follow the directions

STEP 3:
Wait 30 seconds, then match to the color chart

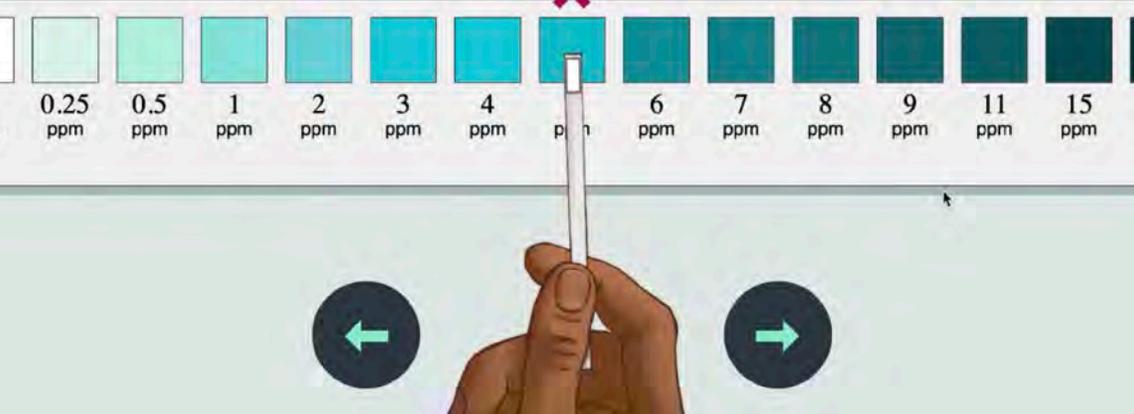
Color Chart →

If there's a timing error ↗

CHLORINE LEVEL TARGET: 1 to 2 ppm

Match the test strip to the color chart

The strip is **far lighter** than this color chip. There must be far less than 5 ppm. Try moving it left a few steps.



0.25 ppm	0.5 ppm	1 ppm	2 ppm	3 ppm	4 ppm	5 ppm	6 ppm	7 ppm	8 ppm	9 ppm	11 ppm	15 ppm
----------	---------	-------	-------	-------	-------	-------	-------	-------	-------	-------	--------	--------

CHLORINE LEVEL TARGET: 1 to 2 ppm

Your testing worked, but corrective action is needed

Your testing worked. It showed that your system is not working properly, and that the chlorine levels in your water are too low. You'll need to document your findings and implement corrective actions for your system.

Did you follow directions? ✓

Did you use the correct test kit? ✓





ProduceSafetyMatters.org



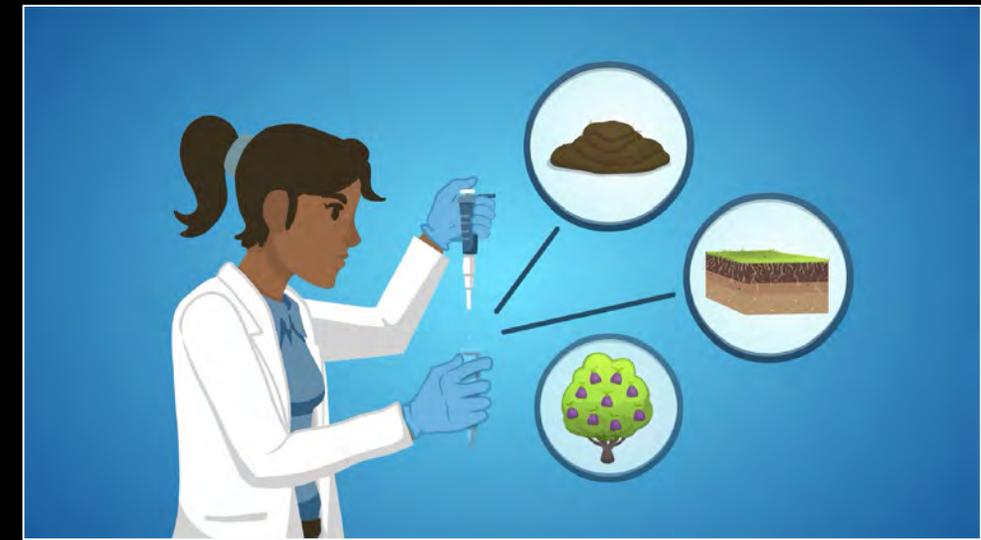
Produce Safety Matters: Pack Shed



A collaborative project supported by North Carolina Cooperative Extension The Ohio State University Extension, and a 2012 Florida Specialty Crop Block Grant as part of the Multi-State Project "A systems approach to improving the safety of cantaloupe."

Reducing Antibiotic Resistance

From Farm to Fork X



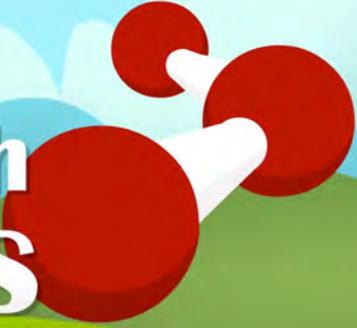
A diagram showing a pipette on the left, a DNA double helix in the center, and a sequencing machine on the right. A box titled "Gene Sequences" contains a list of DNA sequences.

Gene Sequences

ATGGGT	ATGGGT
AGACTG	AGACTG
ATGTTG	ATGTTG
ATTGCG	ATTGCG
TAACTG	TAACTG
TACAGG	TACAGG
TAACTG	TAACTG
ATTGCG	ATTGCG
TAACTG	TAACTG

The sequencing machine's display shows the following sequences: TAACTG, TAACTG, TACAGG, TACAGG, TAACTG, TAACTG, ATTGCG, ATTGCG, TAACTG, TAACTG.





Penetrating
Crevices with
**Gaseous
Sanitizers**



How Dirt
Impacts the
Sanitizing Process

**Liquid
Sanitizing
Plus
Gaseous
Sanitizing**



Leafy Greens Sanitization

Based on work funded by the National Integrated Food Safety Initiative (NIFSI), United States Department of Agriculture (USDA), under agreement No. 2009-51110-05902 "Pathogen Inactivation in Fresh Produce by Incorporation of Sanitizers into Existing Operations within the Produce Chain" with The Ohio State University, Iowa State University and NMSU Cooperating.

Meaningful change

Commitment

Research

Collaboration

Outreach

Communication

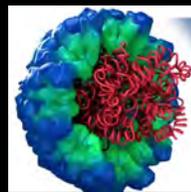
Educational

Food Safety

Materials for Consumers



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