

	<b>Lesson Plans for Nestle Collection</b>
	<b>Germ and Disease (Level 2, 3-5)</b>
	<b>Reading Is Fundamental</b>
	<b>Books Supported:</b> <ul style="list-style-type: none"> <li>• <i>Achoo! The Most Interesting Book You'll Ever Read About Germs</i> by Trudee Romanek</li> <li>• <i>The Magic School Bus: The Giant Germ</i> by Joanna Cole and Anne Capeci</li> <li>• <i>You Can't Eat Your Chicken Pox, Amber Brown</i> by Paula Danziger</li> <li>• <i>Killing Germs, Saving Lives</i> by Glen Phelan</li> </ul>

## INTRODUCTION

This collection introduces students to concepts such as how germs and disease make us sick and how our bodies protect us from illness. Students will also learn how scientists and doctors throughout history have treated germs and disease and how germs and disease can affect our lives in practical ways.

Here are some examples of activities to support students' learning:

- Set up a Germs and Disease Literacy Center in your classroom. Include books from this collection, other books on germs and disease, and posters and handouts from the CDC or your local pediatrician's office about cold and flu season, vaccines, and other related topics.
- Bring in models of various types of germs to show the difference in size between viruses and bacteria.
- Invite your school nurse or a community helper like a doctor or nurse to visit your class, talk about germs and disease, and answer any questions students have.
- Make connections across the curriculum. Germs and disease topics can be studied in science, health, history/social studies, reading, and writing.

## Materials List

- books, posters, and handouts about germs, disease, and vaccines
- models of various types of microbes

## General Objectives for Germs and Disease Lessons

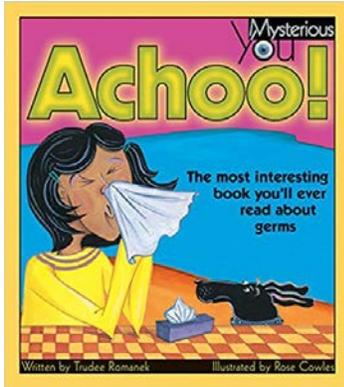
Students will:

- understand how microbes help and harm us
- understand key vocabulary
- understand how bacteria and viruses differ

- understand some of the practical effects of germs and disease
- understand how vaccines work and how they are developed

## BOOK-SPECIFIC LESSON PLAN 1

### Using *Achoo! The Most Interesting Book You'll Ever Read About Germs* by Trudee Romanek with the Germs and Disease Level II Lesson Plan



*Achoo! The Most Interesting Book You'll Ever Read About Germs* by Trudee Romanek (Kids Can Press, 2003) provides a survey of how various kinds of microbes affect the body, including case studies of real people with various diseases. It also contains a short history of how humans have learned about germs and disease and how we use that knowledge today to keep healthy people well and to heal sick people. Several experiments kids can do on their own are included.

#### Objectives

Students will:

- demonstrate understanding of how germs make us sick, giving specific steps and details
- demonstrate understanding of the difference between viruses and bacteria
- understand key vocabulary
- demonstrate understanding of our bodies' natural defenses against germs
- demonstrate understanding of medical defenses against germs

#### CCSS Alignment

RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.

RI.3.10 By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 2-3 text complexity band independently and proficiently.

RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.4.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

RI.4.5 Describe the overall structure (e.g. chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

RI.4.10 By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4-5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

RI.5.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

RI.5.10 By the end of the year, read and comprehend informational text, including history/social studies, science, and technical texts, at the high end of the grades 4-5 text complexity band independently and proficiently.

### **NGSS Alignment (None)**

**Pre-Reading Activities:** Introduce the book to students by showing the cover and reading the title. Show students how to use the table of contents, sidebar and section headings, and the index to find information in the book.

**Reading:** Make the book available to students in the Germs and Disease Literacy Center or to check out from your classroom library. Provide students with a list of questions to answer as they read.

Identify the four main types of germs. (bacteria, viruses, fungi, and protozoa)

Identify some common illnesses caused by bacteria. (strep throat, ear infections, whooping cough)

Explain how bacteria make you sick. (Some bacteria give off toxins which poison and kill the cells around them, but the main way bacteria make you sick is by multiplying rapidly until your body has millions to deal with.)

Identify some common illnesses caused by viruses. (mumps, common cold, influenza, measles)

Explain how viruses make you sick. (Once a virus gets into your body, it finds a cell it can use its specific chemicals to attach to. Then it burrows inside the cell. Inside the cell, the virus makes copies of itself until finally the cell bursts open. All the viruses pour out, attach themselves to new cells, and repeat the process.)

Identify and explain several ways the human body defends itself from germs. (The human body keeps many germs out. The skin "surrounds almost your whole body and is thick enough to keep germs out." (p. 16) Tiny hairs around your eyes (eyebrows and eyelashes), in your nose, and in your ears keep germs out. Mucus in your nose and throat and earwax in your ears trap germs before they can get too far inside.)

Identify and explain several ways the human body kills germs once they have already made you sick. (Your immune system is the primary way your body fights back. Your spleen "filters your blood to remove bacteria," (p.21) while "natural killer cells" (p. 21) like macrophages, dendritic cells, T helper, B cells, and T killer cells in your blood identify and kill germs. Your body may also produce a fever to fight an infection.)

How can a viral infection lead to a bacterial infection? (First, your body produces extra fluid or mucus to fight the virus. With your nose and other passages congested, bacteria can get stuck inside, which can lead to a bacterial infection. An infection like this is harder to fight because your body is already weaker from fighting the virus.)

How does vaccination work? ("A vaccination gives your body a head start." (p. 37) The doctor injects a vaccine that contains killed or weakened versions of a virus into your body—not enough to make you sick. The immune system identifies the virus and makes antibodies against it, so that if a healthy version of the virus ever shows up, your body fights it immediately, before you get sick.)

**Post-Reading:** Go over the answers to the Reading questions, then answer these as a class.

Post-Reading Comprehension Questions:

Explain the key differences between viruses and bacteria. (Bacteria and viruses can both make you sick, but they are very different. Bacteria are much larger than viruses. Bacteria are tiny animals that can move and reproduce. Viruses can't move on their own or reproduce, but they are so small they can even make bacteria sick by getting inside them. Your doctor can prescribe an antibiotic drug to fight bacteria, but the only way to avoid a virus is by getting a vaccine before you get the virus.)

Explain what you can do to stay healthy. (You can wash your hands properly, eat well, and get your recommended vaccinations.)

Explain what you can do to get better if you are sick. (You can take medicine if prescribed. You can rest and let your body fight back.)

Class Activity: Using the instructions in "You Try It" on page 33, grow *Penicillium* mold. Let each student monitor their own slice of bread and record their results.

<b>ABOUT THIS TITLE</b>
<b>Lexile:</b> 990L
<b>Interest Level:</b> 9-14 years
<b>Reading Level:</b> 4 <sup>th</sup> -9 <sup>th</sup>
<b>Themes</b> Nonfiction, Informational Text, Germs and Disease, Bacteria, Viruses, History, Vaccines, Fungi, Protozoa, Microbes, Contagion

**Word List:****Category Vocabulary:**

Microbes	Some of these tiny organisms make us sick, but some are beneficial.
Germs	The common name for microbes that make us sick.
Bacteria	A type of germ that is alive and acts like a tiny animal, dividing and reproducing
Viruses	A type of germ that may or may not be alive and forces cells to make copies of itself
Fungi	A type of germ that most often grows on our skin or on food
Microscope	A tool that allows us to see microbes too small to be seen by the eye
Immune system	The system in your body that fights germs and diseases
Antibiotic	A type of drug that kills bacteria
Vaccine	An injection that introduces killed or weakened viruses into your body so your immune system can get a head start on fighting them

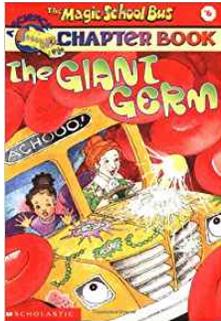
**Book-Specific Vocabulary:**

Cerumen	Ear wax
Infection	When bacteria get into your body and make you sick
Mucus	The sticky liquid that lines your nose and throat
Influenza	A viral illness, the full name of "the flu"
Spleen	The organ that filters your blood to remove bacteria
Macrophages	Blood cells that spot and kill germs
Dendritic cells	Blood cells that spot germs

Lymphocytes	Include T helpers, B cells, and T killer cells
B cells	A lymphocyte that produces an antibody that sticks to and identifies germs as "bad"
T killer cells	Kill germs identified as "bad", produced in the lymph nodes
T helper cells	Signal T killer cells to multiply to kill more "bad" germs
Lymph nodes	Swell when you are sick because they're producing more T killer cells
Fever	A rise in body temperature as the body fights germs
Thermometer	A tool used to measure body temperature
Tonsils	Large lymph nodes in your throat
Tonsillectomy	Surgical removal of the tonsils
Lysosome	A weak antibiotic in your tears and saliva
Penicillium	The mold that led to the development of penicillin
Antiseptics	Antibiotic liquid you can pour on a break in the skin
Disinfectants	Used to kill germs on surfaces
Viricides	Disinfectants that can kill viruses
Vaccinia	Cowpox, and the source of the word "vaccine"

## BOOK-SPECIFIC LESSON PLAN 2

### Using *The Magic School Bus: The Giant Germ* by Joanna Cole and Anne Capeci with the Germs and Disease Level II Lesson Plan



*The Magic School Bus: The Giant Germ* by Joanna Cole and Anne Capeci (Scholastic, 2000) is a chapter book in *The Magic School Bus Science Chapter Book* series. In this story, Ms. Frizzle takes her class on a journey through the world of microbes.

#### Objectives

Students will:

- distinguish between the fictional frame story and the informational text in the book
- understand how microbes help and hurt humans and all life on earth
- understand key vocabulary
- understand the basic idea of compost and the role microbes play in decomposition
- understand how microbes spread and how we can prevent illness
- understand the role microbes play in keeping us healthy and healing disease

#### CCSS Alignment

RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.

RI.3.10 By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 2-3 text complexity band independently and proficiently.

RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.4.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

RI.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

RI.4.5 Describe the overall structure (e.g. chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

RI.5.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

RL.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

RL.3.5 Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as chapter, scene, and stanza; describe how each successive part builds on earlier sections.

RL.3.10 By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 2-3 complexity band independently and proficiently.

RL.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

RL.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RL.5.6 Describe how a narrator's or speaker's point of view influences how events are described.

### **NGSS Alignment**

3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

**Pre-Reading Activities:** Introduce the book to students by showing them the cover and reading the Introduction aloud.

**Reading:** Do a close reading of Chapter 1. Show students how the sidebars pull the factual information out of the fictional story and make it easy to find. Then make the book available in the Germs and Disease Literacy Center or to check out from your classroom library.

Provide students with a list of questions to answer as they read.

Who is the narrator? (Keesha, one of Ms. Frizzle's students)

What are microbes? (Tiny living creatures, too small to be seen without a microscope.)

What are germs? (Microbes that can make you sick.)

What conditions do microbes need to live and thrive? (Most microbes like moist, dark areas. They can't survive where it's too cold or too hot. Sugar helps microbes grow, while acid slows them down.)

How are microbes involved in decomposition?(Microbes break down food and other organic matter by releasing enzymes, a type of chemical, that make organic material rot so the microbes can absorb it. As the organic matter breaks down, it turns into humus, a rich brown soil full of nutrients plants can use to grow. The plants then turn into food for animals and humans.)

Draw a diagram of a compost heap. (Look on page 24.)

Why does Jimmy have to go home from school? (He has the common cold. He doesn't feel well because his body is fighting the virus, and he needs to stay away from others because he could give them a cold.)

Where does the title "The Giant Germ" come from? Quote the line and give the page number. Why does Ms. Frizzle call the tiny virus "giant"? ("The giant germ is certainly hard at work," said Ms. Frizzle." (p. 62) Ms. Frizzle calls the germ "giant" because a lot of tiny germs can make "giant" changes in your body.)

**Post-Reading:** Go over the answers to the Reading questions, then answer these as a class.

Post-Reading Comprehension Questions:

How do microbes help and hurt life on earth? (Most microbes don't hurt us. In fact, they help by decomposing matter to create new soil and by producing oxygen for us to breathe. Microbes are involved in making many medicines, and they help us make cheese and bread. They can also clean nuclear waste. Some microbes, called germs, can make us sick, though.)

How do microbes spread? (Microbes spread from place to place by hitching a ride—on our hands or on the feet of animals like flies. Some microbes send out spores into the air. Microbes can also be spread when we sneeze or cough.)

What actions can we take to prevent illness? (wash our hands and clothes, eat healthy food, get enough sleep)

How can microbes keep us healthy? (Antibiotics are actually made from microbes. Many beneficial microbes are found in our bodies already. They provide us with protein and vitamins and fight off the bad microbes.)

Class Activity: As a class, summarize each chapter in one or two sentences. Include what happens to the students on the Magic School Bus and what they learn about microbes.

<b>ABOUT THIS TITLE</b>
<b>Lexile:</b> 660L
<b>Interest Level:</b> 7-10 years
<b>Reading Level:</b> 2 <sup>nd</sup> -5 <sup>th</sup>
<b>Themes</b> Informational Text, The Human Body, The Magic School Bus, Microbes, Germs and Disease, Baking, Viruses, Bacteria, Fungi, Compost, Sick Days

**Word List:****Category Vocabulary:**

Microbes	Some of these tiny organisms make us sick, but some are beneficial.
Germs	The common name for microbes that make us sick.
Bacteria	A type of germ that is alive and acts like a tiny animal, dividing and reproducing
Viruses	A type of germ that may or may not be alive and forces cells to make copies of itself
Fungi	A type of germ that most often grows on our skin or on food
Microscope	A tool that allows us to see microbes too small to be seen by the eye
Immune system	The system in your body that fights germs and diseases
Antibiotic	A type of drug that kills bacteria
Vaccine	An injection that introduces killed or weakened viruses into your body so your immune system can get a head start on fighting them

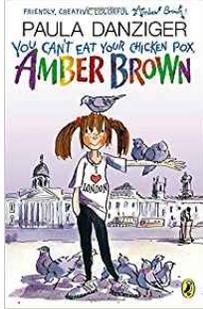
**Book-Specific Vocabulary:**

Cell	The smallest unit of a living organism
Enzymes	Substances released by microbes that help them break down living matter
Spores	Small particles like seeds fungi release to spread themselves
Compost	A mixture of plants, foods, and other organic matter that is in the process of decaying
Humus	A rich, brown soil made of completely decomposed compost
Decomposition	The process by which microbes break down organic matter
Fermentation	The process by which microbes break down

	sugars
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## BOOK-SPECIFIC LESSON PLAN 3

### Using *You Can't Eat Your Chicken Pox, Amber Brown* by Paula Danziger with the Germs and Disease Level II Lesson Plan



*You Can't Eat Your Chicken Pox, Amber Brown* by Paula Danziger (Penguin-Puffin, 1995) is a fictional chapter book in the *Amber Brown* series. During the summer between third and fourth grade, Amber Brown visits London with her aunt, processes her parents' divorce, and gets chicken pox.

#### Objectives

Students will:

- summarize the text
- identify important details
- describe characters' thoughts and feelings
- discuss how point of view influences the story
- identify the major theme and provide evidence for why it is the major theme

#### CCSS Alignment

RL.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

RL.3.3 Describe characters in a story (e.g. their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events.

RL.3.5 Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as chapter, scene, and stanza; describe how each successive part builds on earlier sections.

RL.3.10 By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 2-3 complexity band independently and proficiently.

RL.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

RL.4.2 Determine a theme of a story, drama, or poem from details in the text; summarize the text.

RL.4.3 Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character's thoughts, words, or actions).

RL.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RL.5.2 Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to the challenges or how the speaker in a poem reflects upon a topic; summarize the text.

RL.5.6 Describe how a narrator's or speaker's point of view influences how events are described.

### **NGSS Alignment (None)**

**Pre-Reading Activities:** Introduce the book to students by showing them the cover and reading the title. Chicken pox is not a common childhood illness since the introduction of the vaccine, so students may not be familiar with it. Make sure they know that it's a highly contagious virus that causes itchy bumps and that almost every child used to get it. This is a good opportunity to connect to the other books in this collection by discussing viruses and the effects of vaccines.

**Reading:** The short chapters and simple narrative make this a good choice to read aloud to your class. You can read each chapter aloud in 5-10 minutes. Provide students with a list of questions to follow along and answer as you read. This is a good opportunity to model empathy and socio-emotional skills.

Who is the main character and narrator of this story? (Amber Brown)

What are two big challenges Amber Brown is facing? (Her best friend moved away, and her parents are getting divorced.)

Where is Amber Brown going for the summer? (London and Paris)

Who takes care of Amber Brown when she gets the chicken pox? (Aunt Pam)

What does the doctor do? (Dr. Kelly comes to Aunt Pam's flat and diagnoses Amber with chicken pox. She prescribes calamine lotion and rest and says, "Don't scratch," and "You'll live." (p. 61))

How does getting the chicken pox affect Amber Brown's vacation? (She has to stay in Aunt Pam's flat because she's sick and tired, so she can't sightsee. She doesn't get to go to Paris at all.)

How does Amber Brown feel when she gets chicken pox (besides sick)? (She's stuck in Aunt Pam's flat for a week, so she's bored. She's disappointed that she doesn't get to go to Paris and sad that she has to wait to see her dad.)

How are Amber's parents feeling about their relationship with Amber because of the divorce? How do you know? (Both of them are feeling nervous. Amber's mom writes to remind her that she has to come back home—she can't stay in Paris with her dad. Amber's dad is afraid that Aunt Pam was lying about the chicken pox to keep him from seeing Amber.)

### **Post-Reading:**

Post-Reading Comprehension Questions:

Where does the title come from? Quote and provide the page number. (In one of Justin's letters, he reminds Amber of a kid in kindergarten who thought his chicken pox scabs looked like button candy. Justin writes, "Well...just remember...you can't eat your chicken pox, Amber Brown." (p. 72))

Taking a journey is a major theme in this book. Where does that theme appear? (In the first chapter, Mr. Cohen gives his class their pretend passports and says, "I want you to have these to always remember the journeys we have taken...to visit other countries...and the 'journey' each of you has take to grow, to learn, to change." (p.8). In the rest of the book, Amber takes a literal journey to London, but she also takes a journey through her feelings about her parents' divorce, from believing that maybe it won't really happen, through her grief about it, to a final acceptance.)

Because Amber Brown is the narrator, we see everything from her point of view. Choose a different character and write about how the story might be different from that person's point of view. (Answers will vary.)

Class Activity: London is the major setting of this book. Amber and Aunt Pam explore many popular landmarks. Make copies of a simple map of London and label the landmarks as a class. Show pictures of the landmarks to your class. Talk about some ways Amber Brown says London and New Jersey are different. Use the vocabulary words below.

<b>ABOUT THIS TITLE</b>
<b>Lexile:</b> 590L
<b>Interest Level:</b> 7-10 years
<b>Reading Level:</b> 2 <sup>nd</sup> -5 <sup>th</sup>
<b>Themes</b> Literary Text, Chapter Book, London, Vacation, Divorce, Family Relationships, Chicken Pox, Tourism, Illness, Friends, Amber Brown

**Word List:****Category Vocabulary:**

Microbes	Some of these tiny organisms make us sick, but some are beneficial.
Germs	The common name for microbes that make us sick.
Bacteria	A type of germ that is alive and acts like a tiny animal, dividing and reproducing
Viruses	A type of germ that may or may not be alive and forces cells to make copies of itself
Fungi	A type of germ that most often grows on our skin or on food
Microscope	A tool that allows us to see microbes too small to be seen by the eye
Immune system	The system in your body that fights germs and diseases
Antibiotic	A type of drug that kills bacteria
Vaccine	An injection that introduces killed or weakened viruses into your body so your immune system can get a head start on fighting them

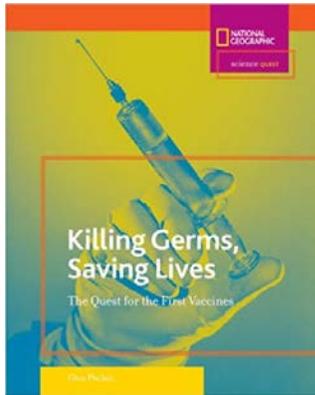
**Book-Specific Vocabulary:**

Flat	Apartment
Queue	Line
Circus	Circle
Lift	Elevator
Jet lag	Tiredness caused by changing time zones
Calamine lotion	Cream used to treat itching from chicken pox
Pounds and Pence	British currency
Knickers	Underwear
Tube, Underground	Subway
Zoetrope	A movie-making machine

Loo	Bathroom
Chips	Fries
Crisps	Potato chips

## BOOK-SPECIFIC LESSON PLAN 4

### Using *Killing Germs, Saving Lives: The Quest for the First Vaccines* by Glen Phelan with the Germs and Disease Level II Lesson Plan



*Killing Germs, Saving Lives: The Quest for the First Vaccines* by Glen Phelan (National Geographic-Science Quest, 2006) is a historical survey of the development of germ theory and vaccines. General topics of vaccines, germ theory, and the important scientists who contributed to each are all explored.

#### Objectives

Students will:

- understand the general history of vaccines
- understand the importance of vaccines and germ theory
- name significant scientists and list their contributions
- understand key vocabulary

#### CCSS Alignment

RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

RI.3.5 Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.

RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.4.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

RI.4.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 4 topic or subject area.

RI.4.5 Describe the overall structure (e.g. chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

RI.4.10 By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4-5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

RI.5.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

RI.5.10 By the end of the year, read and comprehend informational text, including history/social studies, science, and technical texts, at the high end of the grades 4-5 text complexity band independently and proficiently.

### **NGSS Alignment (None)**

**Pre-Reading Activities:** Introduce students to the book by examining the main topics (vaccines and germ theory). Look at the table of contents, the glossary, and the index and discuss how to find information.

**Reading:** Make the book available for students to read in your Germs and Disease Literacy Center or to check out from your classroom library. Provide students with a list of questions to answer as they read.

Who developed the first vaccine? What was it for? (Edward Jenner developed the first vaccine, which was for smallpox.)

What is pasteurization? What does it do? Who is it named for? (Pasteurization makes food safe to eat by killing "the harmful germs by heating the liquid to certain temperatures." (p.18) It was developed by Louis Pasteur, who discovered that "wee germs" (p.18) in foods could make people sick.)

How did Joseph Lister protect surgical patients from germs? (He washed his hands and surgical instruments with carbolic acid, which kills germs, and dressed the wound with bandages soaked in carbolic acid. He also sprayed the patient with a fine mist of carbolic acid during the operation.)

How did Florence Nightingale contribute to safer hospitals? (She founded the profession of trained nursing and advocated for keeping hospitals—which were often dirty—clean and full of fresh air. She also thought hospital rooms should provide plenty of space for patients. Her ideas kept germs from spreading as easily.)

How did Robert Koch contribute to the germ theory of disease? (He figured out how to show that a specific germ causes a specific disease.)

Name some vaccines Pasteur developed. (cholera, anthrax, rabies)

Name some vaccines developed in the 20<sup>th</sup> century. (polio, measles, tetanus).

Who developed the polio vaccine? (Jonas Salk)

What are some vaccines scientists are working on today? (vaccines for certain cancers and AIDS, allergies, and malaria)

**Post-Reading:** Examine the last chapter of the book with students and discuss the fact that vaccines have developed further since this book was published in 2006. (For example, while the book says a vaccine for cervical cancer is in development, students in upper elementary grades are likely aware that the HPV vaccine already exists, and some may already have received it.) This is an opportunity to reinforce the idea that knowledge is expanding all the time.

Go over the answers to the Reading questions and then do the Post-Reading Comprehension Questions together.

Post-Reading Comprehension Questions:

What two health innovations greatly reduced death from disease in the late 19<sup>th</sup> and 20<sup>th</sup> centuries? How did they do this? (Vaccines prevented many diseases. Germ theory—the understanding that germs cause disease and specific germs cause specific diseases—enabled doctors and hospitals to take actions such as sterilizing instruments and washing their hands to protect patients from germs.)

What experiences motivated Louis Pasteur to study disease? (Observations of disease as a child and the loss of three of his children as an adult)

In what different areas did Louis Pasteur contribute to saving lives? (He developed many vaccines, developed pasteurization, and helped develop the germ theory of disease.)

What two scientists were major influences on Pasteur's development of vaccines for specific diseases? (Edward Jenner, who developed the first vaccine, and Robert Koch, who showed that specific germs cause specific diseases.)

Class Activity: Make a timeline of significant moments in the development of germ theory and vaccines.

<b>ABOUT THIS TITLE</b>
<b>Lexile:</b> Not Leveled
<b>Interest Level:</b> 10 and up
<b>Reading Level:</b> 5 <sup>th</sup> -6 <sup>th</sup>
<b>Themes</b> Nonfiction, Informational Text, Vaccines, Germs, Scientists, History, Edward Jenner, Louis Pasteur, Joseph Lister, Florence Nightingale, Robert Koch

**Word List:****Category Vocabulary:**

Microbes	Some of these tiny organisms make us sick, but some are beneficial.
Germs	The common name for microbes that make us sick.
Bacteria	A type of germ that is alive and acts like a tiny animal, dividing and reproducing
Viruses	A type of germ that may or may not be alive and forces cells to make copies of itself
Fungi	A type of germ that most often grows on our skin or on food
Microscope	A tool that allows us to see microbes too small to be seen by the eye
Immune system	The system in your body that fights germs and diseases
Antibiotic	A type of drug that kills bacteria
Vaccine	An injection that introduces killed or weakened viruses into your body so your immune system can get a head start on fighting them

**Book-Specific Vocabulary (taken from the glossary, p. 55)**

Antigen	A weakened version of a disease that creates an immune response
Antiseptic	Substance that kills germs and prevents infection
Cultures	Living material grown in laboratory dishes
Germ theory of disease	Idea that infections and other diseases result from the action of microorganisms
Immunity	Ability of the body to defend itself against disease
Infectious disease	Disease that can spread rapidly from one organism to another

Pasteurization	Process of destroying unwanted organisms using heat
Polio	Disease, cause by a virus, that leads to fever and paralysis
Rabies	Disease, caused by a virus, that leads to paralysis and death
Smallpox	Disease, caused by a virus, that leads to fever, skin sores, and often death