**Expert Pack:** Bacteria and Viruses

Lexile Range: 930-1290

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| **Topic/Subject:** Fighting for Survival: Germs, Pestilence, and Your Body |
| **Texts/Resources**  Book 1. *What Are Germs?*  2. *Microbes: Friend or Foe?*  Articles  1. “Bacteria”  2. “Why Some People Evade Colds and Others Don’t”  Videos  1. “Ask Smithsonian: What’s the Difference Between Bacteria and Viruses?” |
| **Rationale and Suggested Sequence for Reading**  Students begin this text set with a book, *What Are Germs*, a nonfiction book that will provide an understanding of what germs are. This book also outlines how to control exposure to germs as well as an introduction to some dangerous diseases and how we have managed to live alongside them. Next, students will watch “Ask Smithsonian: What’s the Difference Between Bacteria and Viruses?” Then students will read, “Microbes: Friend or Foe?” which will introduce microbes and describe the four different types: bacteria, viruses, fungi and protozoa. Following that, from World Book, the next article is “Bacteria” which will go more into what bacteria is and how there can be good and bad bacteria. Finally, students will then read and listen to, “Why Some People Evade Colds and Others Don’t” which reinforces how germs spread, expands student knowledge about immunity and introduces the process genes may play in illness. |
| **The Common Core Shifts for ELA/Literacy**   1. Regular practice with *complex text* and its academic language 2. Reading, writing and speaking grounded in *evidence* from text, both literary and informational 3. Building *knowledge* throughcontent-rich nonfiction |
| **College and Career Readiness Anchor Standards for Reading Literary and/or Informational Texts**   1. *Read closely to determine what the text says explicitly and to make logical inferences from it*; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. 2. *Determine central ideas or themes of a text* and analyze their development; summarize the key supporting details and ideas. 3. *Read and comprehend complex literary and informational texts independently and proficiently.* |
| **Annotated Bibliography**  **930L *What Are Germs?***  Author: Jim Ollhoff  Genre: Nonfiction book  Length: 32 pages  Synopsis: This brief overview of germs discusses the different kinds of germs and examines how they spread, deadly diseases, germ-fighting organizations and contemporary concerns. Citation: Ollhoff, J. (2010). *What are germs?* Edina, MN: ABDO Pub. Co. Recommended Student Activities: Picture of Knowledge  **N/A “What’s the Difference Between Bacteria and Viruses?”**  Author: Smithsonian  Genre: Informational video  Length: 1:18 minutes  Synopsis: This short video highlights the difference between bacteria and viruses.  Citation: What’s the Difference Between Bacteria and Viruses? [Video file]. Retrieved February 27, 2015, from <http://www.smithsonianmag.com/videos/category/science/ask-smithsonian-whats-the-difference-betwe/?no-ist>  Recommended Student Activities: Quiz maker  **940L “Microbes: Friends or Foe?”**  Author: Lisa Ing  Genre: Informational book  Length: 6 pages  Synopsis: The excerpt from the book will introduce students to what microbes are and the four different types. Students will read about bacteria, viruses, fungi and protozoa. Citation: Microbes: Friends or Foe? Reading A-Z. Retrieved from <https://www.raz-plus.com/books/leveled-books/book/?id=1263&lang=English>  Recommended Student Activities: Wonderings  **1060L “Bacteria**  Author: World Book  Genre: Informational article  Length: 821 words  Synopsis: This article discusses the importance of bacteria and the difference between good and bad bacteria.  Citation: Bacteria. World Book. Retrieved from <http://www.worldbookonline.com/student/article?id=ar041420&st=bacteria#tab=homepage>  Recommended Student Activities: Wonderings  **1290L “Why Some People Evade Colds and Others Don’t”**  Author: NPR - Morning Edition  Genre: Informational Text/Interview Transcript  Length: 828 words  Synopsis: This news article explores immunity and why some people get sick and others do not.  Citation: Why Some People Evade Colds and Other’s Don’t [Video file]. NPR. Retrieved February 27, 2015, from  <http://www.npr.org/2011/02/07/133500558/why-some-people-evade-colds-and-others-dont>  Recommended Student Activities: Quiz Maker |

**Supports for Struggling Students**

By design, the **gradation of complexity** within each Expert Pack is a technique that provides struggling readers the opportunity to read more complex texts. Listed below are other measures of support that can be used when necessary.

* Provide a brief **student-friendly glossary** of some of the academic vocabulary (tier 2) and domain vocabulary (tier 3) essential to understanding the text
* Download the Wordsmyth widget to classroom computers/tablets for students to access student-friendly definitions for unknown words. <http://www.wordsmyth.net/?mode=widget>
* Provide brief **student friendly explanations** of necessary background knowledge
* Include **pictures or videos** related to the topic within and in addition to the set of resources in the pack
* Select a small number of texts to **read aloud** with some discussion about vocabulary work and background knowledge
* Provide **audio recordings** of the texts being read by a strong reader (teacher, parent, etc.)
* **Chunk the text** and provide brief questions for each chunk of text to be answered *before* students go on to the next chunk of text
* Pre-reading activities that focus on the **structure and graphic elements** of the text
* Provide **volunteer helpers** from the school community during independent reading time.

Why Text Sets Support English Language Learners

Those acquiring English as a second language have to learn many words in English to catch up with their English-only peers. Vocabulary builds at a much quicker pace when reading a set of connected texts. Text sets are an adaptable resource perfect for building knowledge and vocabulary. Student use of text sets can vary in terms of independence or teacher supports based on the individual needs of the students in the room. Activities found within the text set resources reflect several best practices for English Language Learner instruction including:

* Providing brief, engaging texts that provide a high volume of reading on a topic.
* Providing web-based resources and/or videos that are tied to the content of the texts students are reading.
* Providing opportunities for students to learn new vocabulary through the use of student-friendly definitions in resource-specific glossaries.
* Allowing for options to reinforce newly learned vocabulary and/or content through graphic organizers.
* Providing opportunities for students to reinforce new vocabulary through multi-modal activities including written work, group discussion, viewing visual content, and reading texts that feature the vocabulary.

Teachers of ELLs may use the protocols on the following pages to provide additional support to students who are struggling to access the content within text sets because they are new to English.

ELL Text Set Protocol Grades 3-12

The goal of text sets is to help students build knowledge through a volume of independent reading, and it is important that educators provide scaffolds to allow English Language Learners to be successful in engaging meaningfully with the texts, even as students are still developing English language skills. The protocol below can be used for teaching with text set resources as a full class. Students can also be trained on the protocol so that they can utilize text sets in small groups or partnerships as a resource for independent or reciprocal reading and study.

Please note that this protocol includes options for teachers. Individual decisions should be made considering the needs of the students and the demands of the content, keeping in mind that the goal of each scaffold is to allow students to meaningfully access the text and move toward independent, knowledge-building reading.

**Step one: Build knowledge and vocabulary.**

Introduce students to the overall topic/content of the text set, including knowledge demands needed to engage in the content, and domain-specific vocabulary necessary for comprehension. This should be done prior to engaging with the texts themselves; time allotted to this activity should reflect student needs (anywhere from 5 minutes prior to reading, to a full day’s lesson is appropriate).

*Options for this step include:*

* Engage students in reading and discussing auxiliary texts (of lesser complexity) and resources (illustrations, photographs, video clips) on the topic of the text set.
* Pre-teach a few key content-specific terms prior to students engaging with a text set. (Ideas for text-focused vocabulary instruction can be found [here](https://achievethecore.org/content/upload/Selecting%20and%20Using%20Academic%20Vocabulary%20in%20Instruction.pdf).)
* Provide the student-friendly glossary included in the text set prior to reading each text.
* When possible, allow students to read texts in their home language about the topic under study.

**Step two: Read text orally.**

Focusing on one resource at a time, allow students to listen to a fluent read of the resource, while following along with their own copy of the text.

*Options for this step include:*

* Have a fluent reader model the first read of a text or resource.
* Have students engage in a buddy/partner read.
* Use recordings of the text to provide additional opportunities to hear expert reading.

**Step three: Engage in group discussion about the content.**

Allow students time in partnerships or small groups to discuss the content of the resource.

*Options for this step include:*

* + Allow for discussion/conversation (in the students’ home language if possible) with a small group of students reading the same text set prior to writing or provide heterogeneous language groupings to talk about content and discuss what students are learning.
  + Have students refer to the student-friendly glossary included with each text set to identify meanings for new vocabulary necessary for comprehension.

**Step four: Write about what was read.**

*Options for this step include:*

* Use the “Rolling Knowledge Journal” and/or “Rolling Vocabulary Journal” as a shared writing routine/ graphic organizer to help to scaffold the writing process and capture student knowledge over time.
* Provide students with several supports to help students engage in writing/drawing about what they read:
  + Use mentor texts about which students can pattern their writing.
  + Allow them to write collaboratively.
  + Show students visual resources as prompts, etc.
  + Provide language supports such as strategically chosen sentence starters.

## Repeat steps one through four with each resource in the text set as appropriate.

**Expert Pack: Bacteria and Viruses**

**Learning Worth Remembering**

**Cumulative Activities** – The following activities should be completed and updated after reading each resource in the set. The purpose of these activities is to capture knowledge building from one resource to the next, and to provide a holistic snapshot of central ideas of the content covered in the expert pack. *It is recommended that students are* ***required*** *to complete one of the Cumulative Activities (Rolling Knowledge Journal or Rolling Vocabulary) for this Expert Pack.*

1. **Rolling Knowledge Journal**

* Read each selection in the set, one at a time.
* After you read *each* resource, stop and think what the big learning was. What did you learn that was new *and important* about the topic from *this* resource? Write or list what you learned from the text about (topic).
* Then write or list how this new resource added to what you learned from the last resource(s).

**Sample Student Response**

|  |  |  |
| --- | --- | --- |
| **Title** | **Write or List** | |
|  | **New and important learning about the topic** | **How does this resource add to what I learned already?** |
| 1*. What Are Germs* | Examines what germs are, how we live with them and what we can do to control their spread. |  |
| 2. “What’s the Difference Between Bacteria and Viruses?” | Focuses on specific differences between bacteria and viruses. | This video shows more examples of what bacteria and viruses look like under a microscope. |
| 3. *Microbes: Friend or Foe?* | Introduces microbes and the different types. | In addition to going into bacteria and viruses again, students will learn about fungi and protozoa. |
| 4. Bacteria | Students will learn about how bacteria can be good and bad. | Shows how not all bacteria is bad. |
| 5. “Why Some People Evade Colds and Others Don’t” | Discusses building immunity, why some people get sick; how our environment can contribute to the spread. | Explains how easy it is to spread bacteria and germs. |

**2. Rolling Vocabulary: “Sensational Six”**

* Read each resource then determine the 6 words from each text that most exemplify the central idea of the text.
* Next use your 6 words to write about the most important idea of the text. You should have as many sentences as you do words.
* Continue this activity with EACH selection in the Expert Pack.
* After reading all the selections in the Expert Pack, go back and review your words.
* Now select the “Sensational Six” words from ALL the word lists.
* Use the “Sensational Six” words to summarize the most important learning from this Expert Pack.

|  |  |
| --- | --- |
| **Title** | **Six Vocabulary Words & Sentences** |
| 1*. What Are Germs* | Words: dormant, cleanliness, quarantine, transfer, curable, eradicated   1. If something is dormant, it isn’t active. It’s almost like it is sleeping. 2. The cleanliness of the hospital was questioned after the patient got an infection. 3. Someone who is in quarantine, can’t see other people in order to stop the spread of a disease. 4. We transferred or moved the dirty Kleenex into the trash. 5. Thankfully, the disease was curable and she got better after taking the medicine. 6. We have eradicated some diseases from the planet, meaning they no longer exist anywhere on Earth. |
| 2. “What’s the Difference Between Bacteria and Viruses?” | Words: microscopic, beneficial, parasitic, AIDS, pathogens, invade   1. Bacteria and viruses are microscopic and cannot be seen with the human eye. 2. Some bacteria are good or beneficial, like the ones that help us digest our food. 3. Parasitic organisms prey on others while offering no benefit (or help) in return. 4. AIDS is caused by HIV or Human Immunodeficiency Virus. 5. A pathogen is anything that causes disease, like a virus or bacteria. 6. Bacteria invade the bodies of humans because it’s a good place for them to live. |
| 3. *Microbes: Friend or Foe?* | Words: microbe, mutate, fungi, protozoa, malaria, glands   1. Microbes transmit diseases. 2. Viruses can mutate and go unseen. 3. Athlete’s foot is caused by a kind of fungi that causes an itchy red rash between your toes. 4. Protozoa are a one-celled organism that can spread sicknesses that can cause an upset stomach or diarrhea. 5. Mosquitos spread malaria to humans and can have symptoms like fever and chills. 6. We have many glands in our body, when they swell it can cause health problems. |
| 4. Bacteria | Words: bacteria, antibodies, toxins, virus, intestine, fermentation   1. Bacteria can be given to someone else through cuts or contaminated food, which can harm you. 2. Your body develops antibodies to weaken bacteria. 3. Toxins are poisonous to your body. 4. A virus can be resistant to antibiotics and you can get it from coughs or sneezes. 5. Some bacteria can live in the intestines, part of our digestion system, of a human or animal. 6. Bacteria causes a breakdown in chemicals called fermentation. |
| 5. “Why Some People Evade Colds and Others Don’t” | Words: susceptible, illustrate, environment, vulnerability, immunity, airborne   1. Almost anyone is susceptible to the common cold. 2. When the woman got a cold and her mother did not, it illustrated that   sometimes it is surprising who gets sick and who does not.   1. The environment that someone is living in can be part of the reason they catch a cold or illness. 2. We are vulnerable to getting sick partly because of our genes. 3. When we have already gotten one kind of cold, our bodies create immunity to that certain cold, so we can’t get it again. 4. Cold germs can be airborne, so they travel through the air when someone sneezes. |
| **Sensational Six** | Words: bacteria, viruses, microscopic, immunity, susceptible, disinfectant  **Bacteria** and **viruses** are all around us, however we cannot see them because they are **microscopic** and are invisible to the naked eye. Bacteria are much larger than a virus and can be good or bad for humans. Some people have a high **immunity** to getting colds and the flu while other people are **susceptible** and get sick very often. You can use something like **disinfectant** wipes to prevent illnesses and make sure to take your vitamins every day. |

**Student Copy**

**1. Rolling Knowledge Journal**

* Read each selection in the set, one at a time.
* After you read *each* resource, stop and think what the big learning was. What did you learn that was new *and important* about the topic from *this* resource? Write or list what you learned from the text.
* Then write or list how this new resource added to what you learned from the last resource(s).

**Sample Response**

|  |  |  |
| --- | --- | --- |
| **Title** | **Write or List** | |
| **New and important learning about the topic** | **How does this resource add to what I learned already?** |
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**2. Rolling Vocabulary: “Sensational Six”**

* Read each resource then determine the 6 words from each text that most exemplify the central idea of the text.
* Next use your 6 words to write about the most important idea of the text. You should have as many sentences as you do words.
* Continue this activity with EACH selection in the Expert Pack.
* After reading all the selections in the Expert Pack, go back and review your words.
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* Use the “Sensational Six” words to summarize the most important learning from this Expert Pack.

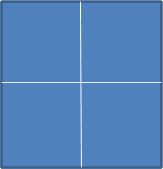
**Sample Response**

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| --- | --- |
| **Title:** | **Six Vocabulary Words & Sentences** |
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| **Sensational Six** | Words: |

**Learning Worth Remembering**

**Singular Activities** – the following activities can be assigned for each resource in the set. The purpose of these activities is to check for understanding, capture knowledge gained, and provide variety of ways for students to interact with each individual resource. Students may complete some or none of the suggested singular activities for each text. Singular activities are assigned at the discretion of the teacher.

1. **A Picture of Knowledge** (Recommended for *What Are Germs?*)

* Take a piece of paper and fold it two times: once across and once top to bottom so that it is divided into 4 quadrants.
* Draw these shapes in the corner of each quadrant: 1. Square, 2. Triangle, 3. Circle, 4. Question Mark







* Write!

Square: What one thing did you read that was interesting to you?

Triangle: What one thing did you read that taught you something new?

Circle: What did you read that made you want to learn more?

Question Mark: What is still confusing to you? What do you still wonder about?

* Find at least one classmate who has read [selection] and talk to each other about what you put in each quadrant.

1. **Quiz Maker** (Recommended for “What’s the Difference Between Bacteria and Viruses”; “Why Some People Evade Colds and Others Don’t”)

* Make a list of # questions that would make sure another student understood the information.
* Your classmates should be able to find the answer to the question from the resource.
* Include answers for each question.
* Include the where you can find the answer in the resource.

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| --- | --- |
| **Question** | **Answer** |
| 1. |  |
| 2. |  |
| 3. |  |

1. **Wonderings** (Recommended for “Bacteria” and “Microbes: Friend or Foe?”)

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| --- | --- |
| I’m a little confused about: | This made me wonder: |
| On the left, track things you don’t understand from the video and the article.  **I am confused about or do not understand….** | On the right side, list some things you still wonder (or wonder now) about this topic.  **I wonder or would like to learn more about….** |

**Expert Pack: Bacteria and Viruses**

Expert Pack Glossary

***What Are Germs?***

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| *Word* | *Student-Friendly Definition* |
| airborne | If something is airborne, it can be carried through the air  *Some allergens are airborne and can move around in the air.* |
| antivirals | Antivirals are a type of medicine that helps to slow or stop the progress of viruses in the body  *The antiviral medicine helped him feel better longer due to his condition.* |
| cleanliness | How clean something is  *The cleanliness of my room was questioned by my mom after she saw the candy wrapper on the floor.* |
| curable | If something is curable, it can be fixed with medicine  *His illness was curable, so he was healthy again after taking some medicine.* |
| dormant | Being dormant is like sleeping  *In the winter, the plant was dormant.* |
| epidemic | An epidemic is when a disease spreads across a wide area  *Very contagious (or catchy) diseases can turn into an epidemic because they are easily spread from person to person.* |
| eradicated | To eradicate something is to completely end it  *There have been some illnesses that have been eradicated from the planet.* |
| quarantine | To isolate or keep someone alone in order to stop the spread of a disease *He was in quarantine so he wouldn’t get his family members sick.* |
| transfer | To move from place to place  *He was going to transfer his books from his locker to his desk during study hall.* |

***What’s the Difference Between Bacteria and Viruses?***

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| --- | --- |
| *Word* | *Student-Friendly Definition* |
| virus | The cause of a disease or illness  *The virus caused Sam to feel sick.* |
| bacteria | Organisms that are involved in fermentation and carry infectious diseases  *There is good bacteria found in yogurt.* |
| radioactive | Giving off of rays of energy or particles by the breaking apart of atoms  *Radioactive material from X-rays can be harmful.* |
| parasitic | A living thing which lives in or on another living thing  *Parasitic organisms prey on others while offering no benefit in return.* |
| AIDS | A serious disease of the human immune system marked by destruction of a large proportion of the helper cells in the body  *AIDS is caused by HIV or Human Immunodeficiency Virus.* |
| ebola | A serious often deadly disease that is caused by a virus with symptoms like fever, muscle aches, and bleeding inside the body  *Ebola is a virus that usually found in Africa.* |

**“Microbes: Friend or Foe?”**

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| --- | --- |
| *Word* | *Student-Friendly Definition* |
| barren | Not producing results  *The land was barren and didn’t grow corn this year.* |
| fungi | Living things that are parasitic  *Athlete’s foot is caused by a kind of fungi that causes an itchy red rash between your toes.* |
| protozoa | Any of a large group of one-celled organisms that live in water or as parasites  *Protozoa can spread sicknesses that can cause an upset stomach or diarrhea.* |
| lactose | A sugar present in milk  *Some people are lactose intolerant and should not have dairy.* |
| lactic acid | An acid, especially in muscle tissue, that forms as a result of the breakdown of carbohydrates  *Runners can develop lactic acid in their muscles.* |
| influenza | Also known as the flu, contagious with symptoms like with fever, exhaustion, severe aches and pains  *John had to stay home from school because he had influenza.* |
| ringworm | A contagious skin disease caused by fungi  *Ringworm forms as red patches.* |

**“Bacteria”**

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| --- | --- |
| *Word* | *Student-Friendly Definition* |
| membrane | A thin soft flexible sheet or layer especially of a plant or animal part  *The membrane lines and protects the digestive system.* |
| antiseptics | Something that kills or prevents the growth of germs  *Rubbing alcohol is a popular antiseptic to kill germs.* |
| disinfectants | Something that is able to destroy germs  *You can use a disinfectant wipe to clean a surface someone sneezed on.* |
| antibodies | Recruited by the immune system to protect against bacteria and viruses.  *Your body develops antibodies to weaken bacteria.* |
| toxins | A substance produced by a living organism that is very poisonous  *Toxins are poisonous to your body.* |

**“Why Some People Evade Colds and Others Don’t”**

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| --- | --- |
| *Word* | *Student-Friendly Definition* |
| etiquette | Good etiquette means good manners  *It is good etiquette to excuse yourself after you burp.* |
| genes | Genes are what make you unique: they hold your DNA  *My genes gave me blue eyes while my sister’s genes gave her brown eyes.* |
| remedy | A remedy is something that cures a sickness  *When we get cough syrup for a cold, we are getting a remedy.* |
| respiratory | The respiratory system is one of your body’s systems that have to do with breathing  *My respiratory system was tired after the five-mile run.* |
| susceptible | To be susceptible means that it can harm you  *If you touch a doorknob that someone who has a cold has sneezed on, then you may be susceptible to that cold.* |
| vulnerable/  vulnerability | If you are vulnerable, you are easily targeted or hurt  *Superman’s vulnerability was kryptonite.* |