

Name _____



Why Did the Medicine Fail?

Read about two teens who got sick and went to see their doctors. Then come up with a hypothesis for what might have happened.

Scenario 1 Tyler woke up with stomach cramps and felt like he might throw up. He shuffled into the kitchen and told his mom he was sick. At first she was skeptical, and asked if maybe he was just nervous about his big math test that day. But when she took his temperature and saw he had a high fever, she took him to an urgent-care clinic. A doctor examined him and prescribed a five-day course of antibiotics. After five days, Tyler still felt terrible.

Scenario 2 Natasha had a scratchy throat and a headache for three days. She didn't want to tell anyone because she had a big track meet coming up. She attended practices and ran her race. The next day she felt worse than ever: Her throat felt like it was on fire and her head was pounding. Her doctor checked her out and gave her an antibiotic to take for five days. After two days of taking the medication, Natasha felt great and stopped taking the medicine. But five days later her symptoms came back.

1. Why is it important for a doctor to determine the type of pathogen (or type of germ) causing the symptoms before writing a prescription?

2. If someone is prescribed a medication, why is it important to take the medication for the number of days your doctor instructs?

3. Develop a hypothesis about why each of the scenarios above ended the way they did. Use your understanding about viruses, bacteria, and drug resistance to defend your conclusion.

4. What might happen in the coming years if people don't take action to stop the spread of drug-resistant germs?

Name _____

Spread the Word About Superbugs

Educate the public—other students, your family, or your community—about bacteria and viruses that can't be treated with drugs by creating an informational presentation.

STEP 1

CHOOSE Your Presentation Type

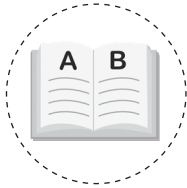
Pick from this list or make up your own (then clear it with your teacher).



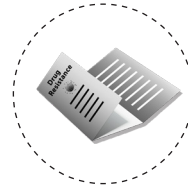
Write an **op-ed** for the school newspaper



Prepare a **poster** or **slide presentation** for the local library or PTA



Write a **children's book** for primary-grade students



Create a **graphic pamphlet** to distribute at school



Produce a **podcast** or **webpage** and include an interview with a doctor

STEP 2

PLAN Your Presentation Structure

On a separate sheet or document, organize what you will include in each section.

1 Hook Grab the audience's attention with a question or anecdote. Make sure your tone is appropriate for your audience (little kids, classmates, adults, etc.).

2 Problem Explain why some bacteria and viruses can't be treated with drugs and why this is a problem. Decide which concepts are important to present and how you will explain them. What vocabulary and level of detail will help your audience?

- Definition of infectious diseases
- Causes of infectious diseases
- Differences between viruses and bacteria
- How antibiotics and antiviral drugs work
- Specificity of medications
- How use of the drugs may cause resistance (mutation, natural selection)
- Molecular basis of drug resistance

3 Call to Action Your presentation should persuade your audience to take action, so make sure you explain clearly what steps they can take to tackle the problem.



VOCABULARY LIST

KNOW YOUR MICROORGANISMS

Microbe (*noun*): a microscopic organism, such as a bacterium, virus, fungus, and amoeba.

Pathogen (*noun*): a medical term for any type of microbe that can cause disease, such as a bacterium or virus. In everyday language, pathogens are also known as germs or bugs.

Superbug (*noun*): an informal term for types of pathogens that can't be treated with medicine, such as bacteria that have mutated to be resistant to antibiotics or viruses for which we haven't found an effective vaccine.

antibiotic (*noun, adjective*): medicine used against bacteria (not for viruses).

gene (*noun*): a small section of DNA that contains the instructions for making a specific protein. Proteins control the processes that occur in the body's cells.

host (*noun*): an organism that another organism lives in or on (which can be helpful or harmful or the host).

► **For example**, the human gut hosts "good" bacteria that help humans with digestion. Cells in

which disease-causing viruses live also act as hosts.

mutation (*noun*): a change in an organism's genes, which gives the organism a new trait, such as the ability to resist a medicine.

► **Note**: A mutation can be positive, negative, or neutral for an organism's survival.

natural selection (*noun*): a process through which species change and survive over time; the main process of evolution. Natural selection occurs when organisms develop new traits (through mutations) that better

help them survive in their environment and reproduce (pass on a new trait to new generations). Since organisms with the new trait survive better than those without the trait, the species changes over time.

replicate (*verb*): to make an exact copy.

specificity (*noun*): when medicines are only effective against a particular, specific organism or group of organisms (for example, antibiotics don't work against viruses).

vaccine (*noun*): a substance that helps protect against certain diseases by helping the immune system recognize and destroy specific microbes.

TAKE IT FURTHER

Choose five vocabulary words that you think will be hardest to remember, then write a paragraph with them (nonfiction or fiction).