Who Steers Science?

How social choices shape a medical technology

FSL.1.4 "Enrichment: Research, analyze, explain, and communicate the influence of society, including cultural components, on the direction and progress of science and technology (e.g., medical treatments, antibiotic resistance…"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline three social choices or pressures in the passage. Circle an outcome each one influences, then number the matching cause-and-effect pairs.

Antibiotics Beyond the Lab

1 In the 1940s, penicillin transformed treatment for many bacterial infections, but its story did not end in the laboratory. During World War II, governments funded mass production because infected wounds threatened soldiers' lives. Factories learned to make the drug at a scale that earlier researchers could not achieve alone. After the war, wider access changed medical care, yet access was uneven across countries and communities. This history shows that a discovery becomes a useful technology through choices about funding, manufacturing, and distribution. Those choices determine who benefits first and which problems receive urgent attention.

2 Antibiotics also entered daily life through clinics and farms. Some patients expect a prescription when they feel sick, even though antibiotics do not treat viral illnesses such as colds. When clinicians prescribe antibiotics unnecessarily, bacteria with resistance are more likely to survive and multiply. Farmers have also used antibiotics to prevent disease in crowded animal operations, creating another setting in which resistance can spread. Resistant bacteria can move among animals, people, and the environment. Public expectations, farming practices, and regulations therefore influence how quickly a medical tool loses effectiveness, not just how often it is invented.

3 Responses to resistance also depend on social conditions. Some hospitals track antibiotic use and ask clinicians to explain prescriptions for certain drugs. These policies can reduce unnecessary use, but a rule that simply limits prescriptions may harm patients who need prompt treatment. In places without reliable diagnostic tests, clinicians may have to make decisions with incomplete information. Researchers can develop faster tests, while health systems can improve access to them. To judge whether a policy works, communities need evidence about both resistant infections and patients who miss treatment. The goal is not fewer prescriptions at any cost; it is better care that preserves effective drugs.

2 ANSWER WITH EVIDENCE

Use the passage

1. How did a wartime need change the progress of penicillin as a medical technology?

2. How can patients' expectations affect antibiotic resistance, according to the passage?

3. Why can farming practices affect whether antibiotics remain useful for people?

4. How might access to diagnostic tests change the effects of a hospital policy that limits antibiotic prescriptions?

3 YOUR TURN

Your own words

Your school district plans to replace diesel buses with electric buses. Routes are long, winters are cold, and the district has a limited budget. In four sentences, explain how two community needs could shape the technology or its rollout, name one question you would research, and say how you would share your findings with residents.

ANSWER KEY

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HIGH SCHOOL · FSL.1.4

PART 1 · READ AND MARK

Underline three social choices or pressures in the passage. Circle an outcome each one influences, then number the matching cause-and-effect pairs. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How did a wartime need change the progress of penicillin as a medical technology?	**The need to treat infected soldiers' wounds led governments to fund mass production, allowing factories to make penicillin at a much larger scale.**
2	How can patients' expectations affect antibiotic resistance, according to the passage?	**Expectations can contribute to unnecessary prescriptions. That antibiotic use gives resistant bacteria a better chance to survive and multiply.**
3	Why can farming practices affect whether antibiotics remain useful for people?	**Antibiotic use on farms can favor resistant bacteria, which can move among animals, people, and the environment.**
4	How might access to diagnostic tests change the effects of a hospital policy that limits antibiotic prescriptions?	**Without reliable tests, clinicians may struggle to tell who needs treatment, so a strict limit could harm patients. Faster tests and wider access could help them avoid unnecessary prescriptions while treating patients who need antibiotics.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Long routes could push the district to choose buses with batteries that can cover each route with a winter safety margin. A limited budget could lead to installing chargers in phases rather than replacing every bus at once. I would research how far candidate buses travel on a full charge in local winter conditions. I would share the range data and costs in a short, plain-language handout at a public meeting.

Accept other passage-supported cause-and-effect links in Part 1. For Part 3, look for two distinct community needs, a plausible effect of each on technology or rollout, a relevant research question, and a way to communicate findings.