

"But I Need Something because I'm Sick"

People often use antibiotics for conditions that they cannot treat. For example, people sometimes take an antibiotic for a viral infection like a cold. To add to this problem, doctors sometimes prescribe antibiotics "just in case." Or they prescribe antibiotics that target many types of bacteria when an antibiotic that only targets the bacteria causing the infection would be more suitable.

Use the model we developed to explain why the unnecessary use of antibiotics can increase everyone's risk for developing an antibiotic-resistant infection.

Can you **construct and support an explanation** for how unnecessary use of antibiotics could contribute to the antibiotic-resistance problem?

- Refer to the Class Consensus Model to help you organize your thinking.
- Use your science notebook and Model Tracker as a source of evidence and science ideas.

Question

Clarify what we want to answer.

Question:

How could unnecessary use of antibiotics contribute to the antibiotic-resistance problem?

Argument

Make and support a claim.

Claim (answers the question with a *how* or *why* explanation):

When we use antibiotics, we expose bacterial populations to a change in environment that makes resistant traits advantageous. Given that some populations have individuals with resistant traits, any time we use antibiotics, we give those individuals a chance to outcompete the others, leading to a large antibiotic-resistant population. Because of this we should only use antibiotics when we absolutely need to.

Support (relevant evidence and how the evidence links to science ideas):

When we look at a population of bacteria, it is made up of individuals that are not all exactly the same. Data from Lesson 12 showed that antibiotics alone do not usually kill each individual bacterium. When we used the card simulation in Lesson 13 we saw that in addition to luck, bacteria could have certain traits that prevented the antibiotic from harming them, and they were more likely to survive even when the person took antibiotics. In Lesson 14 we used another simulation to see what would happen over time when bacteria with resistant traits were more likely to survive than susceptible bacteria in an environment where they are exposed to antibiotics. The simulation showed that over time more and more of the overall population would be resistant. If they hadn't been exposed to antibiotics, bacteria with each trait would be equally likely to survive, so there would be no reason for there to be more and more resistant ones. This means that every time we use antibiotics, we risk developing a resistant population.

Check:

- ✓ The claim answers the question
- ✓ The support includes evidence from labs, readings, videos, or other sources
- ✓ The support includes science ideas that we agree on
- ✓ Each piece of evidence is linked to a science idea