A population of bacteria live in the soil on a farm. The farmer begins using antibiotics to fatten the animals, gradually exposing the soil bacteria to them through runoff and animal waste. Which statement about how the bacteria cope with their changing environment is most accurate? Why do you think so?

a. The bacteria mutate in response to the antibiotic exposure. Through mutation, some individuals develop the ability to survive at higher antibiotic concentrations. These individuals reproduce while the other bacteria die. Because their offspring inherit the ability to survive at higher antibiotic concentrations, the entire population evolves to be more tolerant of antibiotics.

b. Because of genetic variation, there are already individuals in the population of bacteria that can tolerate increased exposure to antibiotics. These individuals survive better than their peers and produce more offspring. Because their offspring inherit the ability to survive at higher antibiotic concentrations, the entire population evolves to be more tolerant of antibiotics.

c. All the bacteria adjust their cell machinery so that they can survive exposure to antibiotics. When the bacteria reproduce, their offspring inherit this adjustment and the entire population evolves to be more tolerant of antibiotics.

Writing about Models Template

Merits and limitations of the model	A way this model showed how _____ really works is _____. A limitation of this model is _____. A way this model is unlike _____ is_____.
Use model to illustrate or predict relationships	The components of the model (____, ____, and ____) represent the components of the _____ because _____. The model helps to predict _____ because _____.
Compare two models to see which is most useful for a given situation	The _____ model allows us to _____ because _____, whereas the _____ model allows us to _____ because _____.

A Model of Antibiotic Resistance

1. Transfer from your "bank" to your "body"
   a. 13 green beads
   b. 6 yellow beads
   c. 1 red bead

This represents your body and the bacteria currently infecting it. You are taking antibiotics to fight the infection.

2. Roll the die and record the number of the roll in your table.
   a. Rolling a 1, 3, 5, or 6 means you remembered to take your antibiotics so you get to remove 5 bacteria from the body. Least resistant bacteria die most easily, so green ones are removed first. Once there are no more green ones, yellow ones can be removed. Red die last and can only be removed when there are no more green or yellow.
   b. Rolling a 2 or 4 means you forgot to take your antibiotics, so no bacteria are removed.
3. Bacteria reproduce quickly through replication. You will model this by adding <u>one</u> more of each color bead that has survived in the body. Only add a color bead if some of those colors survived. For example, if you still have three green beads in your body, you will add one more green bead. If you have no green beads, but still have yellow and red, you will not add a green bead, but will add a yellow and a red. Record your reproduction numbers and totals on your table.
4. Repeat the steps for at least 10 rolls of the die, recording information on the data table for each roll and reproduction.

Round	Roll of Die	Took or Forgot dose	Action taken (number of each color removed or added)	# of least resistant bacteria (green)	# of resistant bacteria (yellow)	# of most resistant bacteria (red)	Total # of bacteria in body
1				13	6	1	20
	Reproduction						
2							
	Reproduction						
3							
	Reproduction						
4							
	Reproduction						
5							
	Reproduction						
6							
	Reproduction						
7							
	Reproduction						
8							
	Reproduction						
9							
	Reproduction						
10							
	Reproduction						

Close Reading Plan

Text: What is Antibiotic Resistance?

All answers should be backed up with text evidence.

1st Read - What does it say?

Focus Skill:

Notice Key Details

Set a purpose

Get ready to talk about

Listen for

Pay attention to

Mark places where

You find a cause or an effect for antibiotic resistance.

Level of support: Students Read

Text Dependent Q.:

What is the text mostly about?

What are the most important parts?

What are some causes, according to the author, of antibiotic resistance?

2nd Read - How does the text work?

Focus Skill:

Context Clues for Vocab

Set a purpose for reading:

Get ready to talk about

Listen for

Pay attention to

Mark places where

You find unfamiliar words.

Level of support: Students Read

Text Dependent Question:

Knowing the structure, what can we expect next?

How does this feature help us understand the text?

How does the word choice affect the meaning of the text?

How does the author help us understand new vocabulary?

Why did the author write this?

Who is telling the story?

or type your own question here

3rd Read - What does it mean?

Focus Skill:

Make a Connection

Set a purpose:

Get ready to talk about

Listen for

Pay attention to

Mark places where

Mark places that help explain what was happening in the models.

Level of support: Students Read

Text Dependent Q.:

What can you infer about

...

What does this text remind you of?

How is this the same as/different than what you noticed in the different models we used

Do you agree with the author? Why?

?

?

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