



High School Science Virtual Learning

Applied Biological Science

Antibiotic Resistance

April 16, 2020



High School Applied Biological Science

Lesson: April 16, 2020

Objective/Learning Target:

Students will be able to apply concepts of natural selection to bacteria developing antibiotic resistance.



Let's Get Started:

1. What is required in order for natural selection to occur in a species?
2. Where do new traits of a species come from?



Let's Get Started: **Answers**

1. Bell ringer 1 Answer:
 - a. variation in the initial population,
 - b. change in environment,
 - c. best suited organisms survive better than others,
 - d. best suited organisms are able to reproduce better than others
2. New traits arise through mutations in a species' DNA. Mutations can cause traits to arise that are beneficial, harmful, or have no effect at all on the organism's ability to survive.



Lesson Activity:

Directions: Watch the videos linked below. As you watch, take notes to keep track of how bacteria are becoming resistant to certain antibiotics.

Link 1: [Video 1](#)

Link 2: [Video 2](#)



Practice

You will use the information from the video and your notes to help you answer the following question. Additional information can be found on the following links.

[Article 1](#)

[Article 2](#)



Practice Questions

Answer questions 1-4, using the key components of natural selection from the “Let’s get started” questions.

1. For bacteria and antibiotic resistance, what would be the variation among the bacteria’s traits be?
2. For bacteria and antibiotic resistance, what would be the change in the bacteria’s’ environment?
3. Which ‘version’ of the bacteria would be able to survive and reproduce best?
4. What traits will the offspring of these bacteria have that help them survive?



Answer Key

1. For bacteria and antibiotic resistance, what would be the variation among the bacteria's traits be? **Some bacteria have traits that make it so antibiotics no longer are able to kill them, some bacteria do not have these genes. There are a few different types of genes that bacteria can use to "fight off" various antibiotics and chemicals.**
2. For bacteria and antibiotic resistance, what would be the change in the bacteria's' environment? **The presence of antibiotics is the change in the environment in this situation. When an infection is occurring, the harmful bacteria are thriving in an antibiotic-free situation. To treat that, doctors give antibiotics to the individual to combat the bacteria causing the infection, thus changing the bacteria's environment.**
3. Which 'version' of the bacteria would be able to survive and reproduce best? **Any bacteria that has a gene that is resistant to the antibiotics has a much better chance to survive and reproduce in this situation.**
4. What traits will the offspring of these bacteria have that help them survive? **The offspring of these antibiotic resistant bacteria will also have antibiotic resistant characteristics, making it very difficult to kill and treat an infection.**



More Practice



More Practice

Follow the link below. The WHO quiz provides explanations and answers to several antibiotic resistance quiz questions

[WHO article](#)

The CDC has a similar quiz here...

[CDC article](#)



Additional Learning: TED TALKS

The coming crisis in antibiotics.

[Ted Talk 1](#)

How can we solve the antibiotic resistance crisis?

[Ted Talk 2](#)

What do we do when antibiotics don't work anymore?

[Ted Talk 3](#)