



High School Science Virtual Learning

Applied Biological Science

Microbes and Climate Change

May 21, 2020



High School Applied Biological Science

Lesson: May 21, 2020

Objective/Learning Target:

Describe the relationship between microbes and climate and explain how climate change can impact microbes.



Let's Get Started:

1. Read this [article](#) and watch this [video](#) on research into microbes and climate change.
2. What is missing from the models predicting future atmospheric carbon dioxide?



Let's Get Started: Answers

1. Read this [article](#) and watch this [video](#) on research into microbes and climate change.
2. What is missing from the models predicting future atmospheric carbon dioxide?
 - a. The role that microorganisms play in releasing greenhouse gases



Lesson Activity:

Read through the [Microbes and Climate Change](#) and answer the following questions:

1. What is the relationship between microbes and climate?
2. How might climate change affect microbial growth and survival?
3. Can microbes help save the planet? How?
4. What are some ways in which microbes are being used for biofuels?

Lesson Activity: Answers

1. What is the relationship between microbes and climate?
 - a. Microbes play a role in regulating and maintaining the climate
2. How might climate change affect microbial growth and survival?
 - a. microbes responsible for the breakdown of carbon-based materials in the soil will speed up, increased methanogens, Favors pathogenic microbes over others, etc.
3. Can microbes help save the planet? How?
 - a. harness photosynthetic power could slow down increases in levels of carbon dioxide and other greenhouse gases and eventually reduce global climate change
4. What are some ways in which microbes are being used for biofuels?
 - a. investigating the use of microbes that produce cellulose to make ethanol



Practice Questions

Explain why each of the following is likely to happen with the effects of [climate change](#).

1. Increasing Methane (greenhouse gas) in the atmosphere.
2. Increase in the growth and activity of nitrogen-cycling microbes
3. Decline in photosynthesizing marine microbes such as cyanobacteria and algae
4. Increase in the risk of water-borne diseases as well as increases certain disease vectors

Practice Questions - Answers

Explain why each of the following is likely to happen with the effects of climate change.

1. Increasing Methane (greenhouse gas) in the atmosphere.
 - a. landfill sites, rice paddies and guts of ruminants provide ideal environments for methanogens, melting tundra exposes more of these bacteria
2. Increase in the growth and activity of nitrogen-cycling microbes
 - a. Frequent use of fertilizers and increased growth of nitrogen-fixing crops in agriculture has resulted in higher soil concentrations of nitrogen-containing compounds. This has led to an increase in the growth and activity of nitrogen-cycling microbes. Microbial decomposers such as soil bacteria and fungi release carbon dioxide back into the atmosphere when they break down organic material.
3. Decline in photosynthesizing marine microbes such as cyanobacteria and algae
 - a. increasing levels of atmospheric carbon dioxide are causing oceans to become more acidic combined with warmer temperatures
4. Increase in the risk of water-borne diseases as well as increases certain disease vectors
 - a. Increased flooding and higher temperatures favor pathogenic microbes

Additional Practice

1. Check your understanding by going through each of [these statements](#) and draw up a table listing the arguments both for and against the statement. Then research and present your argument either for or against each statement.
2. For more practice, research one of [these microbes](#) and explain how they are linked to the global climate.
3. Read about how we may be seeing more pandemics like [COVID-19](#) as a consequence of climate change.