



High School Science Virtual Learning

**Applied Biological Science**

**Decomposition**

May 22, 2020



# High School Applied Biological Science

## Lesson: May 22nd, 2020

### **Objective/Learning Target:**

Students will be able to identify Decomposition and how it relates to microbiology.

## Let's Get Started:

1. Define decomposition
2. List the types of decomposers that are also microorganisms.





## Let's Get Started: **Answers**

1. The process of breakdown of complex organic matter into inorganic substances like carbon dioxide, water, and nutrients.
  
2. Bacteria, Fungi, and Protozoans



# Lesson Activity:

**Directions:** Watch the video below and take notes over how microbes are useful in the process of decomposition.

**Link(s):** [Necrobiome and Decomposition](#)



# Practice

You will use the information from the activity on slide 3 to answer the following questions.

# Practice Questions

1. Death is a major event not only for the person who dies but also for the microbes that inhabit their body. Which of the following statements best describes why?
  - a. All the microbes that were living inside the person's body die when the person dies.
  - b. Microbial populations grow and spread to different areas of the body after the person dies.
  - c. Microbes in the body have fewer resources after the person dies, which increases competition.
2. Which of the following statements about cadavers (dead bodies) is most likely to be true?
  - a. Microbial communities in and around a cadaver change over time.
  - b. Samples taken from different cadavers always contain the same microbes.
  - c. The microbial community found in a cadaver is very similar to the one found in a living body.
3. After death, gases build up inside the body and cause the skin to rupture (break open). Rupture is a significant event because microbes from outside the body can now access the inside. Which of the following can be a source of the microbes that enter the body after it ruptures? Select all that apply.
  - a. Skin
  - b. Air
  - c. soil
  - d. Insects
4. Describe how the scientists in the video are using microbes to create a tool to estimate the time since death. Different specific microbial communities are consistently associated with different stages of body decomposition.



# Answer Key

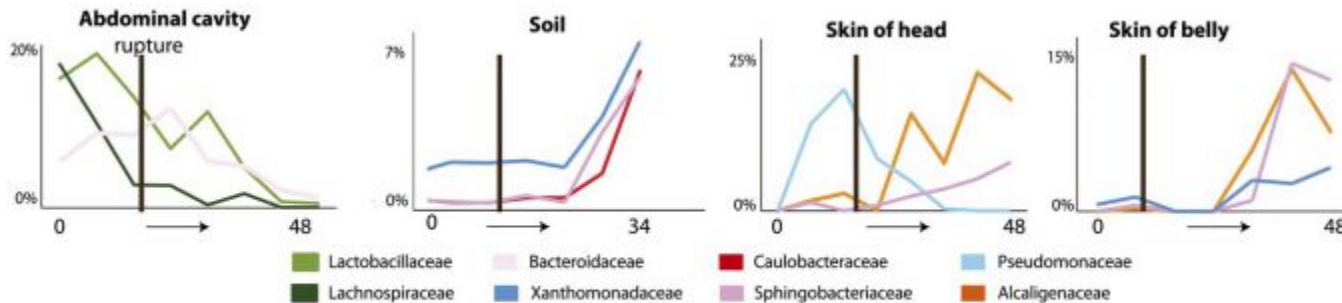
Once you have completed the practice questions check with the work.

1. b. Microbial populations grow and spread to different areas of the body after the person dies.
- 2.a. Microbial communities in and around a cadaver change over time.
3. a. Skin  
b. Air  
c. soil  
d. insects
4. Scientists can sample the body and surrounding soil at multiple time intervals after death and identify the microbes in the samples. Based on the types and abundances of microbes they find, they can then determine how long the person has been dead.



# More Practice

You will use the video from the lesson activity and the graphs below to answer the following questions.



**Figure 2.** Abundances of different bacterial groups in and around the cadavers over time. In each graph, the x-axis represents the time since death in days, the y-axis represents the relative abundances of the bacterial groups, and the thick vertical line represents when the body ruptured. Figure from [Metcalf et al. \(2013\)](#).



## More Practice Questions

For each of the claims below, use evidence from the graphs to either support or refute it. If you are supporting the claim, summarize a second experiment that would help to confirm it. If you are refuting the claim, summarize a second experiment that would help to rule it out.

**Claim A:** The rupture of the body during decomposition is associated with changes in the bacterial communities in the abdominal cavity, on the skin of the head, on the skin of the belly, and in the surrounding soil.

**Claim B:** The changes in bacteria in the abdominal cavity caused the observed changes in bacterial abundance on the head.



# Answer Key

Once you have completed the practice questions check with the work.

## Claim A

**Sample Answer 1 (Support):** The graphs show that different groups of bacteria change in abundance in these locations after rupture occurs. For example, the relative abundances of several bacterial groups decrease inside the abdominal cavity, and the relative abundances of several bacterial groups on the skin and in the soil increase.

**Sample Answer 2 (Refute):** The graphs show that the soil and belly bacteria do not increase for many hours after rupture. Some of the abdominal cavity bacteria were also decreasing long before rupture occurred. Since the timing of these changes do not match the timing of rupture, these changes could be associated with environmental factors or other decomposition events going on in the body.

**Potential Experiment:** You could monitor changes in the bacterial groups in and on decomposing bodies in a sterile vs. outdoor environment. This would allow you to see whether the changes are still associated with rupture under Solving Crimes with the Necrobiome [www.BioInteractive.org](http://www.BioInteractive.org) Published April 2020 Page 8 of 8 Film Activity Educator Materials different environmental conditions. Students may also propose ways to stop rupture from happening altogether, to see if the changes in bacterial abundance still occur or not.



# Answer Key

Once you have completed the practice questions check with the work.

## Claim B

**Sample Answer 1 (Support):** The graphs show that changes in the abundance of certain bacteria in the abdominal cavity precede changes in bacterial abundance on the head. This is consistent with what might happen if the claim were true. (Since the bacteria in the abdominal cavity changed earlier, they could have caused the changes in the bacteria on the head, once given enough time to replicate and spread.)

**Sample Answer 2 (Refute):** Although the changes in bacterial populations in the two locations are correlated, we cannot say if the changes in the abdominal cavity directly caused the changes on the head. Both of the changes may have been caused by rupture, or there may be other causes that are not measured here.

**Potential Experiment:** You could remove the head from the body of a decomposing corpse, then measure changes in bacterial abundance on the head when it is separate from the abdominal rupture.



## Additional Resources

[Microbiology of Death](#)

[Microbiology of Decomposition](#)

[Recycling The Dead](#)