Georgia Performance Standard: S5L4. Students will relate how microorganisms benefit or harm larger organisms.

a. Identify beneficial microorganisms and explain why they are beneficial.

b. Identify harmful microorganisms and explain why they are harmful.
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Microorganisms can be both beneficial (helpful) or harmful to us as humans.

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a. Identify beneficial microorganisms and explain why they are beneficial. b. Identify harmful microorganisms and explain why they are harmful.

Task: You’ve been selected by DC Comics to come up with a brand new comic book series that teaches kids about the benefits and dangers of microorganisms. Directions: Choose two (one helpful and one harmful) from the attached list and create a comic book superhero (helpful microorganism) and villain (harmful microorganism). You should include a picture demonstrating the hero doing his or her good deed and the villain doing damage or harm. Make sure you write a caption in complete sentences explaining what’s happening in your picture, or have dialogue bubbles (like in comics) that provide clear meaning of what’s happening.

The space below is for you to do a rough sketch before making your final copy.

<table>
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<th>Superhero Name:</th>
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Students will relate how microorganisms benefit or harm larger organisms.

Heroes

Villains
**Student Examples**

1. **Bacteria can cause food poisoning!**
   - *Morgue Fatal Fred*
   - *Fred is going to make this world sick!*

2. **Fungi can be harmful but some fungi can actually be helpful. Some fungi are used to make penicillin which can cure infections. Fungi can also be used to make food products.*
   - *Funguy*
   - *Funguy saved the day by curing Jane's" butt. His cure with his helpful word will save everyone.*

3. **Doom Bloom**
   - *Doom Bloom*
   - *This type of fungus makes people ill and turn into red liquids! I will kill all the fungus! It will release a gas very fast that I will poison everyone with.*

4. **Polio**
   - *Polio is a virus that can lead to paralysis and even death. Jonas Salk developed a vaccine against Polio in the 1950s.*
   - *Jonas Salk will put an end to your career.*
Bacteria are involved in the production of fuel, food, and medication.

Bacteria are used in environmental recycling and clean up.

Methane is a gas produced by bacteria that live in oxygen-free environments like the bottom of swamps and lakes. Methane makes up approximately 20% of Earth's natural gas deposits.

The next time you eat cheese or yogurt, thank bacteria. Bacteria that grow in milk are responsible for the production of products like cheese, sour cream, and yogurt.
Some bacteria are decomposers. That is, they feed on decaying matter and break it down. If it wasn't for bacteria that act as decomposers, the world would be overrun by environmental wastes such as dead animal and plant materials.

Some bacteria are able to eat harmful substances like oil. These bacteria are used to clean up oil spills or gasoline leaks.

The human body is full of helpful bacteria. In fact, if it wasn't for certain bacteria in your body, you would become ill. The human digestive tract is full of these bacteria. Essentially, they serve two purposes — they help prevent other harmful bacteria from growing and they help humans digest their food.

Bacteria cause cholera, an often fatal (deadly) disease.
Dill pickles are cucumbers that have been fermented by bacteria.

Some fungi kill crops and rot wood.

Some fungi cause several skin diseases including athlete’s foot.

A virus causes Polio, which sometimes leads to paralysis. Franklin D. Roosevelt was a U.S. president who suffered from Polio which often caused him to use a wheelchair.
Fungi and bacteria are used to produce antibiotics like penicillin which cure infections.

Yeast is used to make dough rise in the bread making process.

Microbes can cause food to spoil.

A fungus is used to make riboflavin, an important vitamin.
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Phytoplankton is made of bacteria and protists that live near the surface of water. These organisms use photosynthesis to make their own food. They also release oxygen. Phytoplankton produce at least half of the oxygen in the air you breathe.
Microorganisms: Beneficial or Harmful

When we read or hear the word “bacteria” we often think of getting sick. However, not all bacteria are harmful. Some bacteria are very beneficial to humans. In fact, without certain bacteria, human life would be a lot more difficult.

Directions: Read each statement below. Decide if the microorganism is beneficial (B) or harmful (H). Highlight or underline key words in the text that helped you make your decision.

1. ______ Bacteria are involved in the production of fuel, food, and medications.
2. ______ Bacteria are also used in environmental recycling and clean-up.
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26. ______ Otitis Media, a bacteria, builds up in the ear and causes an infection.
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<td><strong>An Amazing or Unusual Fact:</strong> Using an amazing or unusual fact is a great way to capture the reader’s attention and draw them into your writing.</td>
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<td><strong>A Question:</strong> Posing a question about the topic can be a way to engage the reader in the topic and make them feel the need to read more.</td>
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<td><strong>A Descriptive Segment:</strong> A good writer may use description with lots of adjectives, details, and figurative language to paint a picture with words.</td>
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<td><strong>A Statistic:</strong> A statistic is a numerical fact (a percent, fraction, decimal, etc.). Numbers can be powerful and illustrate a point.</td>
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<td><strong>A Quote:</strong> A quote from an expert such as a doctor, scientist, teacher, or any other professional or expert on a topic makes the reader want to read further.</td>
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<td><strong>An Anecdote:</strong> The writer creates a short “story” or presents a simple “situation” that helps illustrate the topic.</td>
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Which lead was used in each example below? After examining how these authors wrote their introductory paragraphs, practice writing your own.

Sick in bed. We’ve all been there. A fever gives us chills and night sweats; we spend a good portion of our day hunched over a toilet; we sniffle and sneeze until our heads are throbbing and we’re buried under a snowy mountain of tissues. It isn’t long before we wash down an antibiotic prescribed by our doctor to help ease the pain. Microorganisms like bacteria can be harmful to us, but they can also be helpful in many ways.

Most people have given microorganisms like bacteria – many of which make us sick – a bad reputation. But did you know that although many microorganisms like bacteria can be harmful to us, they can also be helpful in many ways?

According to the Center for Disease Control, 25% of Americans — that’s one in every four — suffer from food poisoning each year. Even though microorganisms have a bad reputation for being harmful to us, they can also be helpful in many ways.
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<td>Introductory Paragraph Topic Sentence: Microorganisms can be both harmful and beneficial.</td>
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<tr>
<td>Paragraph One Topic Sentence: Microorganisms can be harmful.</td>
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<tr>
<td>Detail 1:</td>
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<td>Detail 3:</td>
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<td>Paragraph Two Topic Sentence: Microorganisms can also be beneficial.</td>
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<td>Conclusion Paragraph: Restate the introductory paragraph in a different way.</td>
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**Introductory Paragraph Topic Sentence:** Microorganisms can be both harmful and beneficial.

**Paragraph One Topic Sentence:** Microorganisms can be harmful.

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<th>Detail 2: Destroy the Environment</th>
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<td>Detail 3: Affect Food</td>
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**Paragraph Two Topic Sentence:** Microorganisms can also be beneficial.

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<th>Detail 2: Food Benefits</th>
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**Conclusion Paragraph:** Restate the introductory paragraph in a different way.
Credits

Clip Art by Monster
Wrangler Mike