Learning Target: I can read passages about beneficial vs. harmful microorganisms and use the information gathered to answer multiple choice comprehension questions.

FSI 5th Grade Science Reading for Meaning – Beneficial vs. Harmful Microorganisms

When you think of living things, you might picture animals, plants, or even insects. But some of the most important living things are so small you need a microscope to see them. These are **microorganisms**, and they are found **everywhere**…in soil, water, air, and even inside your body!

Not all microorganisms are bad. In fact, many are **beneficial**, meaning they help living things and the environment. For example, certain **bacteria in your digestive system** help break down food so your body can absorb nutrients. Other microorganisms called **probiotics** are found in foods like yogurt and help keep your digestive system healthy. In nature, **decomposer microorganisms** such as fungi and bacteria break down dead plants and animals. This process returns nutrients to the soil, allowing new plants to grow. Without them, waste and dead matter would pile up, and the soil would lose nutrients.

However, not all microorganisms are helpful. Some are **harmful** because they cause diseases. For example, **Salmonella** and **E. coli** are types of bacteria that can cause food poisoning if food isn't cooked properly or if hands and cooking surfaces aren't washed. **Viruses**, another type of microorganism, can make people sick with colds, the flu, or other illnesses. Harmful microorganisms are called **pathogens** because they cause disease.

Interestingly, scientists use some microorganisms to **fight others**. Certain bacteria produce chemicals that kill harmful bacteria. These chemicals are called **antibiotics**, and they help people recover from infections. In this way, beneficial microorganisms can protect us from the harmful ones.

Microorganisms also play a role in technology and the environment. Some are used to make **biofuels**, which are renewable energy sources made from living materials. Others help clean up oil spills by breaking down dangerous chemicals in the ocean. This process, called **bioremediation**, uses microorganisms to restore ecosystems.

Although microorganisms are too small to see, they have a **big impact**, both good and bad. The key to staying healthy is understanding how to protect ourselves from harmful microorganisms while using beneficial ones to improve our lives and our planet.

Multiple-Choice and Multi-Select Questions (DOK 3–4)

1. (DOK 3)
Which statement best explains why decomposer microorganisms are beneficial to ecosystems?
A. They feed on living animals to get energy.
B. They recycle nutrients that allow new plants to grow.
C. They store energy in soil for later use by animals.
D. They increase the number of pathogens in the environment.

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2. (DOK 3 – Multi-Select)
Which TWO processes show how microorganisms support human health?
A. Producing oxygen through photosynthesis
B. Helping digest food in the intestines
C. Making antibiotics to fight disease
D. Spreading viruses that cause illness

3. (DOK 3)
A farmer adds a type of bacteria to her soil to help crops grow. Based on the passage, which best describes how the bacteria help?
A. They prevent plants from making food through photosynthesis.
B. They add nutrients to the soil by breaking down dead matter.
C. They make the soil sterile so no other microorganisms survive.
D. They block sunlight to keep the soil cool.

4. (DOK 4)
Compare and contrast how humans use microorganisms in food production and medicine.
A. Both use harmful pathogens to destroy nutrients.
B. Food production uses bacteria for digestion, while medicine uses fungi to cause illness.
C. Both rely on beneficial microorganisms—some to aid digestion and others to create antibiotics.
D. Both depend on viruses to increase cell growth.

5. (DOK 3 – Multi-Select)
Which statements describe harmful effects of microorganisms?
A. E. coli can contaminate food and cause sickness.
B. Fungi decompose dead matter in forests.
C. Viruses can spread through coughing and sneezing.
D. Probiotics help balance bacteria in the intestines.

6. (DOK 3)
How does bioremediation demonstrate that microorganisms can be used to solve environmental problems?
A. Microorganisms are used to slow the growth of plants.
B. Microorganisms are used to clean pollutants such as oil spills.
C. Microorganisms are used to make pathogens reproduce faster.
D. Microorganisms are used to spread diseases in wildlife.

7. (DOK 4)
A scientist develops a new yogurt that contains special bacteria. Based on your understanding of microorganisms, predict two possible benefits of this product for consumers.
A. Improved digestion and stronger immune systems
B. Increased risk of foodborne illness
C. Reduced ability to absorb nutrients
D. Higher levels of harmful pathogens

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8. (DOK 4 – Multi-Select)
A community near a river experiences frequent sickness due to contaminated water. What two actions based on the passage would best reduce the problem?
A. Use microorganisms that break down waste in the water.
B. Boil or purify drinking water to kill harmful bacteria.
C. Release more decomposers into the river to increase disease spread.
D. Avoid washing hands to preserve good bacteria.

9. (DOK 3)
Why might the discovery of antibiotics be considered one of the most important uses of microorganisms?
A. Antibiotics allow harmful bacteria to reproduce faster.
B. Antibiotics help humans fight diseases caused by harmful microorganisms.
C. Antibiotics stop fungi from decomposing dead material.
D. Antibiotics increase food spoilage.

10. (DOK 4 – Reasoning)
If a scientist removed all microorganisms from Earth, which would most likely happen first?
A. Soil would lose nutrients because decomposition would stop.
B. Air temperature would rise because there would be no bacteria.
C. Plants would stop growing because oxygen levels would increase.
D. Animals would immediately become healthier without bacteria.