

Meet the Microbes

Germs are all around us. They're in the soil, in the air, and in the water. Germs are even found on us and in us! They live on your hair, skin, teeth, and in your stomach. But even if you look carefully, you can't see them. Germs are so tiny that they can only be seen with the help of a microscope. This is why germs are sometimes called *microorganisms* or *microbes*.

Friends Or Enemies?

Germs have a bad name because they can cause disease. But most of them are harmless. Some germs actually help us. Germs in our throats protect us by making substances that keep other, more harmful germs from invading our bodies. And there are germs in our stomachs that help us digest our food.

But some germs do cause disease, and sometimes even death. Here are four of the common types of disease-producing germs.

1. Viruses

Viruses are the smallest of germs.

You need a special microscope called an electron microscope to see them. Viruses cause many mild illnesses such as the common cold. But they also cause more serious, even deadly, diseases, such as AIDS and SARS (severe acute respiratory syndrome).

Viruses make you sick by invading the cells of your body. They attach to your cells and *replicate* (REH-plih-kate; make more virus cells). The new virus cells in turn attack more of your body cells. Eventually, there are enough virus cells floating around in your body to make you feel ill. You may have symptoms such as a fever, sore throat, runny nose, or a cough.

2. Bacteria

Bacteria are larger than viruses. Unlike viruses, bacteria do not need to attach to cells to replicate. They can multiply on their own.

Bacteria were one of the first life forms to appear on the earth billions of years ago. They are very tough germs. Some can live in boiling hot

temperatures or freezing cold temperatures. But most like it best where it is pleasantly warm and moist. This is why they love to live on and in your body. In fact, every surface of your body has bacteria living there. The harmless bacteria that live on and in our bodies are called *normal flora*.

There are many other bacteria that cause disease. Strep throat is caused by bacteria. Eating food that has harmful bacteria growing in it may cause food poisoning.

3. Fungi

When you think of fungus, you may think of mushrooms. Mushrooms are one of thousands of different types of *fungi* (FUN-jigh). Most fungi do not cause disease. In fact, many of them are helpful to us. One kind of fungus, yeast, is used to make some soft drinks and candy. Yeast is also used in breads, rolls, and pizza crust. One of the most important uses of fungi is in making antibiotics such as penicillin. Antibiotics are medicines that kill harmful bacteria.

Some types of fungi can cause infections, though. Ringworm and athlete's foot are caused by fungi that grow on the skin. Molds are a kind of fungus that can cause allergies and asthma complications.

4. Protozoa

Protozoa are germs that live in almost all soil, including the hot desert sand. They live in all water too. But most of the protozoa that live in water do not cause disease.

Sometimes water becomes contaminated with protozoa that do cause disease. The protozoa get into the water through the waste of sick people or the droppings of animals. Then those people who drink the contaminated water can get sick too. One kind of protozoan disease spread through water is *amoebic dysentery* (uh-ME-bik DIS-un-tair-ee), which causes diarrhea.

The Invaders

In order to cause disease, harmful germs must first find a way to get into the body. Most often, they enter through the eyes, nose, or mouth. Germs can enter your body when you touch a sick person's hands or something they have just touched, like a doorknob or a faucet handle. Then when you touch your eyes, nose, or mouth, the germs can get into your body. If someone has a cold and sneezes or coughs into the air around you, you can

breathe cold germs into your nose or mouth. Germs can also enter through a cut in your skin.

Germ Busters

With all of the germs living on and around us, it is a wonder we don't get sick more often! One of the reasons most people stay healthy is their immune system. Your immune system is on duty all of the time to protect you against invading germs. It does this by killing harmful germs as soon as they enter your body.

But sometimes the immune system is not strong enough. It may not be able to kill all of the germs. Then you may become ill. If the disease is due to bacteria, the doctor may give you antibiotics to help you get better. Antibiotics don't work against viruses.

In Your Hands

You will not be able to prevent all illnesses caused by germs. But there are some things that you can do to reduce your chances of getting sick. Paul McHenry, M.D., works with people who have diseases or infections caused by harmful germs. Dr. McHenry says, "The most important thing you can do to avoid infections is to wash your hands."

This may sound too easy. But if you think about it, it makes sense. Washing your hands often will wash away many of the harmful germs that you pick up from touching other people or objects. Then you will not be able to transfer the germs to your eyes, nose, mouth, or to other people.

When should you wash your hands? Here are the most important times:

- Before and after preparing food
- Before you eat
- After you use the bathroom
- After handling animals or animal waste
- When your hands are dirty

Of course, you should wash your hands more often when someone in your family is sick.

Added Protection

Here are some other things you can do to help prevent disease caused by germs:

Get immunized. Nobody likes shots. But getting the recommended shots can keep you from catching some diseases caused by germs. Some of the diseases that can be prevented by immunization are measles, mumps, rubella (German measles), tetanus, whooping cough, and hepatitis.

Avoid sharing. Sharing can be good. But sharing germs is not! Avoid sharing utensils, drinking glasses or bottles, and toothbrushes.

Develop good health habits. Keep your immune system healthy and ready to fight invading germs by practicing good health habits. Get enough sleep, eat lots of healthy foods such as fruits and vegetables, and exercise.

Name: _____ Date: _____

1. Which two pieces of evidence best support the statement: "Germs do not always cause disease"?

- A (1) Most germs do not cause disease; (2) once germs enter your body, the immune system can usually fight them off.
- B (1) Most germs are too small to cause disease; (2) germs cannot enter your body.
- C (1) Viruses do not cause disease; (2) once germs enter the body, the immune system can usually fight them off.
- D (1) Most germs do not cause disease; (2) only people who drink contaminated water can get sick from germs.

2. How is the purpose of the last two sections—"In Your Hands" and "Added Protection"—different from the purpose of the first seven sections?

- A The first seven sections provide evidence that germs are negative; the last two sections provide evidence that germs can be positive.
- B The first seven sections describe germs and their processes; the last two sections provide reader recommendations to protect against germs.
- C The first seven sections explain differences between the major germ types; the last two sections explain similarities among major germ types.
- D The first seven sections illustrate a problem; the last two sections provide a solution.

3. In the section describing protozoa, the author states: "Protozoa are germs that live in almost all soil, including the hot desert sand. They live in all water too." The reader can infer that protozoa can be found where?

- A only in oceans and on beaches
- B never in bodies
- C all water and most soil
- D mostly in warm climates

4. Read the sentence: "Sometimes water becomes contaminated with protozoa that do cause disease."

What does **contaminated** most likely mean?

- A cleansed or restored
- B polluted or made unclean
- C held or restrained
- D structured or organized

5. The main idea of this article is

- A all germs – not just viruses, bacteria, fungi, and protozoa — can be deadly
- B scientists are working to protect germs humans from invasions of germs
- C though some germs can be harmful, many germs are harmless
- D it is important to wear a mask over your mouth, clean your hands regularly, and never drink unfiltered water to protect against germs

6. Identify and explain two positive uses of fungus.

7. Why does the author warn that “you should wash your hands more often when someone in your family is sick”?

8. The question below is an incomplete sentence. Choose the answer that best completes the sentence.

Most germs _____ do not cause a disease, as most germs are harmless and the immune system kills many harmful germs.

- A initially
- B ultimately
- C consequently
- D currently

9. Answer the following questions based on the sentence below.

Your immune system is on duty all of the time to protect you against invading germs.

What? your immune system

(is) What? _____

Why? _____

10. **Vocabulary Word:** invade (*verb*): to take over by force.

Use the vocabulary word in a sentence: _____

Teacher Guide & Answers

Passage Reading Level: Lexile 850

Featured Text Structure: Descriptive – the writer explains, defines, or illustrates a concept or topic

Passage Summary: In “Meet the Microbes,” the author describes the four most common disease-producing germs and explains how they invade the body, how the body’s immune system protects against the invading germs, and how to protect yourself from illness caused by germs. The four most common disease-producing germs (viruses, bacteria, fungi, and protozoa) are explained separately in a numbered list.

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- A all germs – not just viruses, bacteria, fungi, and protozoa — can be deadly
- B scientists are working to protect germs humans from invasions of germs
- C **though some germs can be harmful, many germs are harmless**
- D it is important to wear a mask over your mouth, clean your hands regularly, and never drink unfiltered water to protect against germs

6. Identify and explain two positive uses of fungus.

Suggested answer: One kind of fungus, yeast, is used to make many types of food and drink: soft drinks, candy, and breads. Additionally, fungus can be used in making antibiotics, which are medicines that kill harmful bacteria. One such antibiotic is penicillin.

7. Why does the author warn that “you should wash your hands more often when someone in your family is sick”?

Suggested answer: The author means that when someone in your family is sick, you are at a greater risk of getting sick. Germs have most likely made the family member sick, meaning that harmful germs are present in their bodies. Germs can be transferred when you touch other people or objects that have germs, and then touch your own eyes, nose, or mouth. So, if someone in your family is sick, it is even more important to wash your hands because of your close proximity to a body that is likely carrying disease-producing germs.

8. The question below is an incomplete sentence. Choose the answer that best completes the sentence.

Most germs _____ do not cause a disease, as most germs are harmless and the immune system kills many harmful germs.

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- B **ultimately**
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10. **Vocabulary Word:** invade (*verb*): to take over by force.

Use the vocabulary word in a sentence: answers may vary.