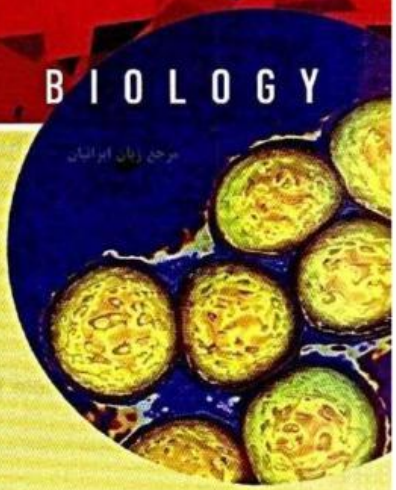
UNIT 3

BIOLOGY

# Living with Bacteria



## In this unit, you will

- read about harmful and helpful bacteria.
- review pronoun references.
- increase your understanding of target vocabulary words.

**READING SKILL** Identifying Definitions

## Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have...

| TARGET WORDS | never seen the word before | seen the word but am not sure what it means | seen the word and understand what it means | used the word, but am not sure if correctly | used the word confidently in *either* speaking *or* writing | used the word confidently in *both* speaking *and* writing |
|---|---|---|---|---|---|---|
| cause | | | | | | |
| effect | | | | | | |
| AWL environment | | | | | | |
| exist | | | | | | |
| harm | | | | | | |
| infect | | | | | | |
| prevent | | | | | | |
| AWL proceed | | | | | | |
| react | | | | | | |
| transfer | | | | | | |

AWL Academic Word List
Oxford 3000™ keywords



LIVEWORKSHEETS

## READING 1

### Before You Read

**In small groups or with the whole class, discuss the following questions.**

1. Why should people wash their hands before eating?
2. Have you ever eaten food that later made your stomach sick?
3. Have you ever looked through a microscope? What did you see?

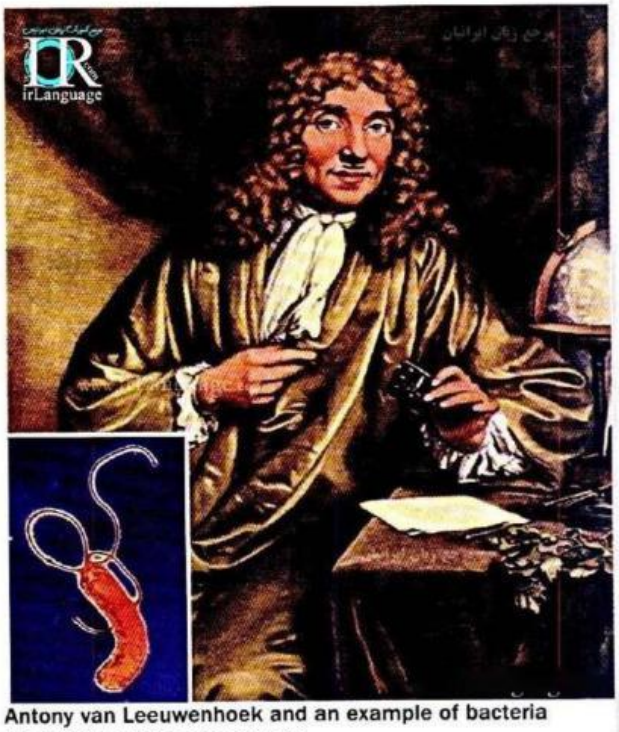
### Read

**Information in this article is from a science textbook.**

# Harmful and Helpful Bacteria[1]

One day in 1676, a Dutch scientist named Antony van Leeuwenhoek looked through a microscope. He **reacted** with surprise. Something appeared that no one had ever seen before. He saw bacteria. As he **proceeded** to watch, the things moved. They were so tiny that he could see them only through a microscope. He did not know what they were. He did not know where they came from. Today, over 350 years later, scientists know that the world is filled with bacteria. Scientists know that bacteria can **harm** and can help humans.

Bacteria—tiny living things—**exist** everywhere in the **environment**. They **exist** deep under the ground. They **exist** in oceans and lakes. They **exist** inside of plants and animals. They **exist** on people's hands and in their noses. People cannot see them. Yet bacteria have many **effects** on humans.




**Antony van Leeuwenhoek and an example of bacteria viewed through a microscope.**

[1] Note: The word *bacteria* is a plural word. The singular form is *bacterium*.



LIVEWORKSHEETS

There are many kinds of bacteria. Some are **harmful** and others are **harmless**. Many bacteria actually help us.

## PROBLEMS WITH BACTERIA

Sometimes the word *germs* is used to describe harmful bacteria. Germs can **cause** terrible diseases such as cholera and tuberculosis. Cholera bacteria live in dirty water. If a person drinks the dirty water, the bacteria will **infect** his digestive system. He will suffer terrible stomach pains. Some diseases easily **transfer** from one person to another. For example, someone who has tuberculosis bacteria in her lungs can **transfer** the disease if she coughs or sneezes. The bacteria come out of her mouth or nose and **proceed** into the surrounding air. People who breathe the air will breathe in the **harmful** bacteria.

Often foods have germs growing on them or inside of them. Eating the food could make people sick. However, there are ways to **prevent** getting sick. For instance, washing fruits before eating them will wash away many **harmful** germs. Heat is another way to destroy **harmful** bacteria. Cooking meat for a long time will make it safe to eat.

## BENEFITS OF BACTERIA

Not all bacteria are **harmful**. Some bacteria help humans in many ways. For example, millions of good bacteria **exist** in the body's digestive system. They help change the food we eat, so our bodies can use the vitamins in the food. Also, good bacteria are needed to make certain foods, such as cheeses and yogurts.

Many bacteria also help the **environment**. For example, bacteria help break down dead plant material, such as fallen leaves, so it can mix with the soil. Bacteria that **exist** in the oceans help in several ways. For example, they become food that is eaten by tiny fish. Then the tiny fish become food for big fish. When you catch a big fish, it becomes food for your dinner. Another way that bacteria help is by cleaning up oil spills from ships. Also, they help clean up human waste that rain carries into the oceans.

Our world is filled with bacteria, but not all are **harmful**. In fact, some help us. ■

| Bacteria can help | Bacteria can harm |
|---|---|
| Digestion of foods | Cause infections |
| Making cheese & yogurt | Cause diseases |
| Decay dead plants | |
| Provide food for fish | |
| Clean ocean oil spills | |
| Clean ocean wastes | |

Bacteria can both help and harm us.



LIVEWORKSHEETS

## Reading Comprehension

**Mark each statement *T* (True) or *F* (False) according to Reading 1.**

___ 1. Coughing can transfer tuberculosis germs to others and infect them.

___ 2. Helpful bacteria can cause diseases.

___ 3. Bacteria exist only in cold environments.

___ 4. Heating food to a high temperature can destroy harmful bacteria.

___ 5. People can prevent illness by not eating fruits.

___ 6. Bacteria have many effects on our lives and on our environment.

___ 7. People may react to cholera bacteria by getting sick.

___ 8. The bacteria Leeuwenhoek saw proceeded to grow as he watched.

## READING SKILL Identifying Definitions

### LEARN

Sometimes a text will include a word that readers may not know. The writer may help the reader by giving a definition of the word in the text. Below are some examples of how definitions can be included in the text.

*The scientist saw bacteria through a microscope (an instrument that magnifies small objects).*

*The scientist saw bacteria through a microscope. This instrument magnifies small objects.*

*The scientist used a microscope—an instrument that magnifies small objects—to see the bacteria.*

*The scientist saw bacteria through a microscope, which is an instrument that magnifies small objects.*

### APPLY

Find the definitions of these words in Reading 1. Write the definitions.

1. bacteria _____
2. germs _____

### REVIEW A SKILL **Pronoun References** (See p. 20)

**In the sentences below, circle the pronouns and write the noun that each refers to. Check Reading 1 if necessary.**

1. Paragraph 1

   They were so tiny that he could see them only through a microscope.

   _____ _____ _____



LIVEWORKSHEETS

2. Paragraph 3

He will suffer terrible stomach pains.

_____

3. Paragraph 4

Often foods have germs growing on them or inside of them.

_____ _____

4. Paragraph 4

Cooking meat a long time will make it safe to eat.

_____

5. Paragraph 6

Bacteria help change dead plant material so it can mix with the soil.

_____

## Vocabulary Activities STEP I: Word Level

*To transfer* something means "to move it from one place to another." The noun form is also *transfer*.

*Some diseases can be **transferred** from animals to humans.*

*This kind of **transfer** often occurs on farms.*

*My company **transferred** me to another office.*

*I asked for the **transfer**.*

*(See Oxford American Dictionary for learners of English, pp. 774–775)*

CORPUS

**A.** **Work with a partner. Match the item on the left to where it will be transferred. Then take turns making sentences with the information.**

1. the ice cream — 1 a. to the freezer.

*I will **transfer** the ice cream to the freezer.*

2. the leftover food — ___ b. to another bank.
3. my daughter — ___ c. to another building.
4. my furniture — ___ d. to your computer.
5. my account — ___ e. to a small bowl.
6. my office — ___ f. to a new school.
7. the email message — ___ g. to my new apartment.



LIVEWORKSHEETS

*To prevent something* means "to stop something from happening." *To prevent a person from doing something* means "to stop a person from doing something."

*Brushing your teeth can **prevent** tooth decay.*

*My brother tried **to prevent** me from buying my own car.*

Certain words are often used with *prevent*, such as prevent diseases, prevent accidents, prevent damage, prevent crime, and prevent fires.

*(See Oxford American Dictionary for learners of English, p. 552)*

CORPUS

**B.** **Work with a partner. The phrases on the left tell how to prevent something. Match each one with the thing it will prevent. Take turns making sentences with the information.**

1. Brush your teeth — 1 a. to prevent tooth decay.

   *Brush your teeth to **prevent** tooth decay.*

2. Drive carefully — ___ b. to prevent spreading germs.
3. Wash all fruits and vegetables — ___ c. to prevent a fire.
4. Cover your mouth when you cough — ___ d. to prevent accidents.
5. Do not hang towels by a hot stove — ___ e. to prevent a sick stomach.

**Which of these might be signs on the wall of a restaurant kitchen?**

The *environment* refers to the natural world in which we live. It includes the land, oceans, rivers, and lakes, and all of the plants and animals.

*Bacteria exist everywhere in our **environment**.*

The adjective form is *environmental*.

*Climate change could cause **environmental** problems.*

*Environment* can also refer to the conditions in a particular place, such as at work, at home, or at school.

*My work **environment** is very unfriendly.*

*(See Oxford American Dictionary for learners of English, pp. 242–243)*

CORPUS

**C.** **Below are some imaginary newspaper headlines. Work with a partner. Write an E in front of the headlines that are about an *environmental* problem.**

- E Fires Destroy Forests in Asia
- ___ African City Chosen for Olympics
- ___ Water Shortage Exists in Brazil
- ___ Disease Infects Desert Animals
- ___ Beaches Sunny for Holiday
- ___ Rain Causes Floods in Canada
- ___ Harmful Bacteria Spreads to Whales
- ___ Earthquake Damages River System
- ___ Truck Causes Highway Accident
- ___ Bird Museum Opens Today



LIVEWORKSHEETS

*To harm something* means "to hurt or damage it." The noun form is *harm*.

*Smoking can **harm** your lungs. The **harm** might be permanent.*

*Poor grades could **harm** your chances of graduating.*

There are two adjective forms: *harmful* and *harmless*. They are opposite in meaning. *Harmful* describes something that can damage or hurt someone or something. Something *harmless* cannot hurt or damage someone or something.

*Snakes often frighten people, but most of them are **harmless**.*

*"Why are you angry? I made a **harmless** comment about your work."*

*Is watching television **harmful** for babies?*

*(See Oxford American Dictionary for learners of English, p. 332)*




**D. Imagine you are teaching your friends about the forest. Rewrite each of these sentences in your notebook with the given form of *harm*.**

1. That snake can't hurt you. (harmless)
   *That snake is **harmless**.*
2. We have to be careful not to damage the environment. (harm)
3. That insect is very pretty, but its sting is bad. (harmful)
4. No, snow doesn't hurt the animals. (harm)
5. That's not a lion. It's just a nice rabbit. (harmless)
6. Don't eat that berry. It could make you sick. (harm)

*To proceed* means "to continue on to the next action or the next place."

*The forest fire started here and **proceeded** to destroy over 500 trees.*

*The guide asked us to **proceed** to the next room.*

The noun *procedure* refers to the actions that are necessary to do something correctly.

*Nurses are trained in life-saving **procedures**.*

*(See Oxford American Dictionary for learners of English, p. 556)*






LIVEWORKSHEETS

**E.** **Complete each sentence with a form of *proceed*. Take turns reading your sentences with a partner.**

1. Firefighters are trained in the correct ___procedures___ for rescuing people.
2. They are trained to _____ carefully in a burning building.
3. One _____ they learn is how to carry a person down a ladder.
4. By following the _____ exactly, they can save a life.
5. They might tell someone in a burning building, "Please _____ to a window."
6. Then they will _____ to set up ladders to help the person down.
7. Firefighters may receive an award for how they _____ in an emergency.

**F.** **Use the following words to complete this paragraph.**

| | | | | |
|---|---|---|---|---|
| cause | environment | harmful | prevent | reaction |
| effects | existed | infected | proceeded | transferred |

The *E. coli* bacteria can (1) _____ great harm to people. In 2011, many people were (2) _____ by *E. coli* bacteria. They developed food poisoning. This is a serious disease with many bad (3) _____. One (4) _____ is terrible stomach pain. The infection started in Germany. Soon it (5) _____ to infect people in other countries. Health authorities believed that vegetables were the source of the infection. They searched the (6) _____ where the vegetables came from. They thought the (7) _____ bacteria (8) _____ in the soil. Water (9) _____ the bacteria from the soil to the vegetables. People who ate the vegetables got sick. Many tons of vegetables were destroyed to (10) _____ other people from getting sick.



LIVEWORKSHEETS

## READING 2

### Before You Read

**In small groups or with the whole class, discuss these questions.**

1. When you are sick, what kinds of medicines help you?
2. Does your family have special cures to help sick people get well?
3. What are some things that you do to prevent getting sick?

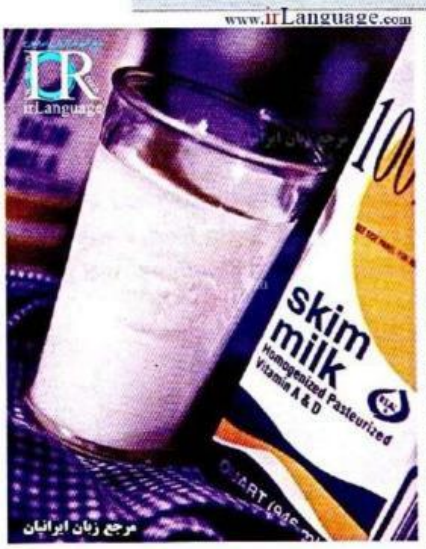
### Read

**The information in this article is from an online medical guide.**

# FIGHTING BACTERIA

Long ago, people did not understand **infection**. They did not understand illness. They did not know that illnesses could be **transferred** from one person to another. They believed that bad air **caused infections** and illnesses. People tried using plants and animals from their **environment** to cure **infections** and illnesses. Usually they did not help. People did not know that bacteria **caused infections** and diseases. They did not know that bacteria **existed**.

www.IrLanguage.com




Pasteurization makes milk safe to drink.

### THE DISCOVERY OF BACTERIA

Antony van Leeuwenhoek first observed bacteria in 1676. Nearly 200 years later, scientists learned that bacteria were linked to many of the terrible diseases that humans suffered from. However, they did not know how to cure these diseases. Instead, scientists tried to develop ways to **prevent** many of these diseases.

### PASTEURIZATION

In 1859, Louis Pasteur developed a **procedure** to make milk from farm animals safe to drink. He found that bacteria in the milk could be destroyed whenever the milk was heated to a high temperature. This heating process was called *pasteurization*. Pasteur had ideas for destroying bacteria in other situations. For instance, he found that one **reaction** of carbolic acid (a strong chemical) was to destroy bacteria on laboratory equipment.



LIVEWORKSHEETS

## CARBOLIC ACID

Joseph Lister was a surgeon. He lived around the same time as Pasteur. He knew that surgery was dangerous. Patients often developed **infections** where their skin was cut. Many patients died from these **infections**. Lister analyzed Pasteur's ideas. He wondered if chemicals could **prevent infections** in surgery patients. He tried the carbolic acid. Before each surgery, he sprayed a weak mix of the acid on the surgery tools. He sprayed it on a patient's skin. And he sprayed it on the bandages that the patient would wear after the surgery. He saw that the acid spray was very **effective** in **preventing infections**. The acid spray made surgery safer for patients. His patients **reacted** very well to the treatment.

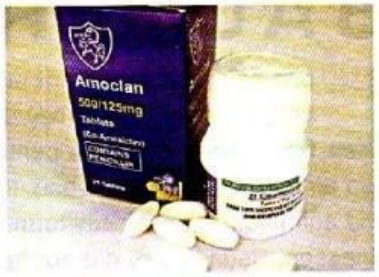
## PENICILLIN

Scientists had developed several **effective** ways to **prevent** bacteria from causing **harmful** diseases. But they had not yet found ways to cure people who were already ill from a disease. They knew that high heat and chemicals would destroy bacteria. But they knew doctors could not heat a patient's body to a high temperature. Doctors could not spray a person's lungs with acid. These acts might kill the bacteria, but they would also kill the patient.

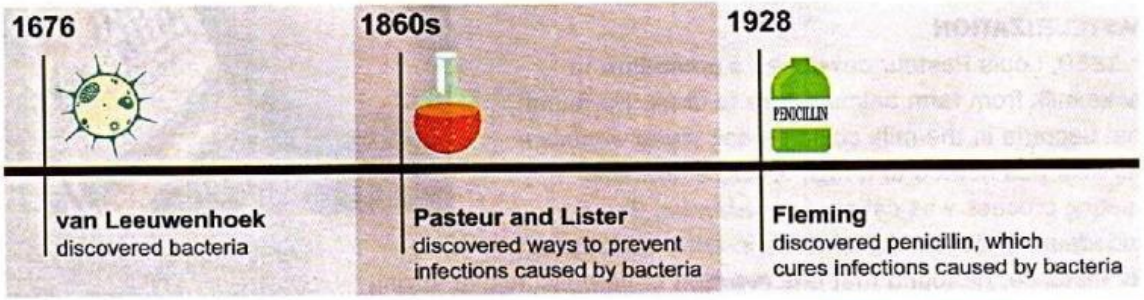
In 1928, scientist Alexander Fleming noticed a **reaction** when bacteria touched a certain fungus (a plant-like growth). The bacteria were destroyed. Just as important, the fungus was **harmless** to humans. This fungus was penicillin. Soon penicillin was put into medicines for patients to swallow.

Penicillin could cure many diseases. The penicillin helped the patient's body destroy **harmful** bacteria. This kind of medicine was called an *antibiotic*. In the following years, many other antibiotics were created.

First, scientists discovered bacteria. Then they developed ways to **prevent** bacteria from causing harm. Finally they found cures for many of the illnesses and **infections caused** by bacteria. ■




**Penicillin helps fight harmful bacteria.**






LIVEWORKSHEETS

## Reading Comprehension

**Mark each statement *T* (True) or *F* (False) according to Reading 2.**

___ 1. Long ago, people did not understand that bacteria caused diseases.

___ 2. Long ago, people did not know that bacteria existed in the environment.

___ 3. Two hundred years after van Leeuwenhoek first saw bacteria, scientists learned how to transfer diseases.

___ 4. Pasteur created a procedure to develop harmful bacteria in the milk of farm animals.

___ 5. Lister wanted to prevent infections in patients who needed surgery.

___ 6. The acid that Lister sprayed was effective, and his patients reacted well.

## READING SKILL Identifying Definitions

### APPLY

Find the meaning of each of these words from Reading 2. Write the definition in blank space.

1. fungus _____
2. antibiotic _____
3. pasteurization _____
4. carbolic acid _____
5. penicillin _____

### REVIEW A SKILL **Pronoun References** (See p. 20)

**The sentences below are from Reading 2. A pronoun in each sentence is underlined. Circle the noun that the pronoun refers back to.**

1. People used plants and animals in the environment to cure infections. Usually <u>they</u> did not help.
   a. infections b. people c. plants and animals
2. Scientists learned that bacteria were linked to many terrible diseases. However, <u>they</u> did not know how to cure them.
   a. bacteria b. scientists c. diseases
3. Patients often developed infections where <u>their</u> skin was cut.
   a. skin b. infections c. patients
4. Scientists found ways to prevent bacteria from causing harm. Then <u>they</u> found ways to cure illnesses caused by bacteria.
   a. bacteria b. illnesses c. scientists



LIVEWORKSHEETS

## Vocabulary Activities STEP I: Word Level

*To react* means "to have or show a feeling about something a person has seen, heard, touched, etc." It also means "to respond to a situation." The noun form is *reaction*.

*What was Ylia's **reaction** when she opened your gift?*

*She **reacted** with a big smile.*

*People **reacted** quickly when they saw the accident.*

A *reaction* also refers to the body's response to something.

*Yuko had a bad **reaction** to the medicine.*

A *reaction* can also refer to an opinion about something.

*What was your **reaction** to the president's speech?*

*People **reacted** favorably to questions about the new airport.*

*(See Oxford American Dictionary for learners of English, p. 581)*

CORPUS

**A. Work with a partner. Match the situation on the left with how someone might react. Then take turns making sentences with the information.**

1. The artist saw her ruined painting — 1 — a. with tears.
   *The artist saw her ruined painting and **reacted** with tears.*
2. The firefighters saw the danger and — ___ — b. with screams of fear.
3. I waved hello and my neighbor — ___ c. angrily.
4. All the lights went out and people — ___ d. with applause.
5. When I asked her for money, she — ___ e. quickly.
6. When the film ended, the audience — ___ f. with a smile.

*To exist* means "to be" or "to occur for a long time."

*Traffic laws **exist** so people will be safe.*

*Hunger **exists** in many parts of the world.*

For living beings, *to exist* also means the same as "to live."

*Humans cannot **exist** without oxygen.*

*Dinosaurs **existed** millions of years ago.*

(Note: The verb isn't normally used in the continuous *–ing* form.)

The noun form is *existence*.

*Antibiotics came into **existence** during the last century.*

*This microscope from 1635 is the oldest one in **existence**.*

*(See Oxford American Dictionary for learners of English, p. 253)*

CORPUS



LIVEWORKSHEETS

**B.** **Work with a partner. Circle the item in parentheses that matches the function on the right. Then take turns making sentences with the information, using the word *exist*.**

1. (Microscopes / Computers): to help scientists see small things.

   *Microscopes **exist** to help scientists see small things.*

2. (Traffic laws / Service laws): to keep drivers safe.
3. (Restaurants / Hospitals): to care for sick people.
4. (Schools / Shopping centers): to educate children.
5. (Clocks / Thermometers): to measure time.

**C.** **Work with a partner. Match the scientists on the left to what they studied. Then take turns making sentences with *the existence of*. (Check your dictionary for new words.)**

1. Astronomers wondered about 1 a. distant solar systems.

   *Astronomers wondered about the **existence** of distant solar systems.*

2. Anthropologists studied ___ b. odd underwater creatures.
3. Geologists searched for ___ c. a new type of lion in Kenya.
4. Marine biologists described ___ d. oil under the North Pole.
5. Zoologists discovered ___ e. an ancient society in Brazil.

*To cause* something means "to make something happen."

*High winds **caused** the fire to spread.*

*Bad air does not **cause** illness.*

The noun form is also *cause*. It is a person or thing that makes something happen.

*Falling asleep while driving is the **cause** of many accidents.*

*(See Oxford American Dictionary for Learners of English, p. 111)*

CORPUS

**D.** **Work with a partner. In each pair of sentences, one sentence describes the *cause* of something happening. The other sentence describes what happened. Write C in front of each *cause*. Write R in front of the result.**

1. C A man at work had a cold. R He was coughing and sneezing.
2. ___ He was coughing and sneezing. ___ He was spreading germs in the office.
3. ___ I caught his cold. ___ I was breathing in the germs.
4. ___ I visited my doctor. ___ I had a sore throat and a fever.
5. ___ I feel better today. ___ The doctor gave me medicine.
6. ___ I am still sneezing a lot. ___ I'm going to stay home from work.



LIVEWORKSHEETS

## Vocabulary Activities STEP II: Sentence Level

The noun *effect* has the same meaning as *result*. It refers to a change or action that is caused by something.

*Being thirsty is one **effect** of eating too much salt.*

*The thunder had a strange **effect** on the animals.*

The adjective *effective* means that the change or action that happens is the result that was hoped for. The adverb form is *effectively*.

*The poison was **effective** in getting rid of the rats.*

*The poison **effectively** got rid of the rats.*

*(See Oxford American Dictionary for learners of English, p. 232)*

CORPUS

**E. Rewrite each sentence to include the given form of *effect*. The first sentence is done for you.**

1. Scientists have found a good way to prevent infections from germs. (effective)
   *Scientists have found an **effective** way to prevent infections from germs.*
2. They have developed a hand cleaner that can destroy germs on people's hands very well. (effectively)
3. Rubbing the hand cleaner on your hands helps in destroying germs. (effective)
4. The result of using a hand cleaner before eating is germ-free hands. (effect)
5. Hand cleaners have been useful in reducing the spread of germs. (effective)




Hand cleaners can prevent infections.



LIVEWORKSHEETS

An *infection* is a disease or illness that is caused by bacteria or other very small living things.

*She cut her arm last week. An* ***infection*** *developed in the cut.*

The verb *to infect* is to cause an illness or infection.

*The tuberculosis bacteria* ***infected*** *his lungs.*

There are two adjective forms. *Infected* describes a body part or a person that is ill from an infection.

*Her lungs became badly* ***infected.***

The adjective *infectious* describes a disease or illness that can easily spread from one person to another.

*The flu is an* ***infectious*** *disease.*

*The ordinary cold is an* ***infectious*** *illness that I get almost every year.*

*(See Oxford American Dictionary for learners of English, p. 373)*

CORPUS

**F. Complete the sentences by using a form of *infect* in each blank.**

1. The Black Death was an _____ disease that spread through Europe in the 14th century.
2. The _____ was caused by bacteria that rats transferred to humans.
3. The Black Death _____ many people in Europe.
4. About 25% to 50% of the _____ people died from the disease.



LIVEWORKSHEETS