

# Cross-Curricular Connections: The Black Death

ELA RI.7.5, ELD PI.7.6

**Background** Many of us associate bubonic plague with the Black Death, which killed 25 million Europeans in the 14th century. However, bubonic plague lives on today in fleas that bite rodents in national parks. The author discusses how park rangers manage the problem.

## Setting a Purpose

Read the following article to find out how scientists and rangers are keeping our national parks safe.

7th  
ELA / History  
Day 2

## Flea Patrol Keeping National Parks Safe from Plague by Jessica Cohn

BLANDING, UTAH, January 10—Park rangers are hunting fleas to stop the spread of disease. They are on alert to fight a rodent-borne plague in some national parks.

Bubonic plague is found in rodents and the fleas that feed on them in several areas of the United States, including some national parks. To keep the disease under control, rangers spray insecticide. They hope to kill the fleas, which can spread the disease to humans. But before you scratch an overnight park visit off your list of things to do, you should know something else. No humans are known to have become infected with plague at national park campgrounds. Through this course of action, officials are trying to keep it that way.

At least a third of Europeans died from the plague during the Middle Ages. That deadly drama, known as the Black Death, is kept alive in history, literature, and imagination. "As soon as people hear 'Black Death' or 'plague,' they freak out," says Ralph Jones, chief ranger of Natural Bridges National Park in Utah. "But that's not the way it is anymore. It's just a naturally occurring disease. It's just part of the world."

In spring 2006, rangers discovered more dead field mice and chipmunks at Natural Bridges than was normal. Curious about the reason, the rangers had the animals tested at the Centers for Disease Control and Prevention (CDC), a federal agency responsible for protecting the health and safety of the population. The bacterium that causes plague was uncovered.

Natural Bridges closed its campground until the disease could be contained. Sites reopened that May. The same year, plague was found in creatures living in Mesa Verde National Park and Colorado National Monument, reported the U.S. Public Health Service.

"Bubonic plague goes in cycles," says Jones, "depending on the population of the rodents."

People get sick when bitten by fleas that have fed on the blood of rodents carrying the bacterium. The disease can also be **transmitted** through contact

**transmitted** (trāns-mīt')  
v. something is *transmitted*  
when it is caused to pass  
from one thing to another.

with infected sores or by breathing infected matter in the air. Plague can be cured as long as humans seek medical help and are treated with antibiotics. But every year, countless rodents die from the disease.

Officials concentrate on killing off fleas when rodents are found to be carrying plague. An **application** of insecticide at rodent holes is recommended when dead animals are identified as plague carriers.

The disease is regularly found in creatures throughout the western United States, especially in the area known as Four Corners, where the states of Arizona, Colorado, New Mexico, and Utah meet. The trick is keeping the disease contained to wild animals, which is usually easy enough. Most people avoid contact with these creatures.

About ten to fifteen plague cases are reported in humans yearly in the United States, mostly in **rural** areas, says the CDC. One in seven cases is fatal. The southwestern United States is especially affected. Africa, Asia, and South America have hot spots as well. In 2006, a Los Angeles woman was treated for the disease, that area's first case in more than twenty years.

Researchers at the University of Oslo recently studied data on creatures known as great gerbils, along with related weather records. Plague increased more than 50 percent among the animals with temperature increases of fewer than two degrees.

**application** (ăp'li-kă'shən)  
*n.* the act of putting something to use is called an *application*.

**rural** (rōōr'əl) *adj.* *Rural* means of or relating to the countryside.

**Collaborative Discussion**

What is the most important idea in this newspaper article? Work with a partner to state the author's most important idea in a single sentence.

## Structure and Purpose of a Newspaper Article

The **purpose** of a newspaper article is to provide factual information about current events. A good informational article in a newspaper provides detailed answers to the questions *who? what? when? where? why?* and *how?*

Many newspaper articles are structured in what is called an **inverted pyramid** style. (*Inverted* means “upside-down.”) The article begins with a **summary lead**, a sentence or paragraph that gives the **main idea** of the story—usually the most important idea or detail in the article. The lead is followed by the less important details of the article. Some articles begin with a lead that grabs your interest in a topic. This type of lead does not summarize but instead describes an interesting situation or fact related to the story. Here are some additional elements in the **structure** of a newspaper article. You saw examples of these elements in “Flea Patrol.”

- **Headline:** the catchy, boldface words that tell you the subject of the article
- **Subhead:** the words in smaller type under the headline that add details about the article
- **Byline:** the name of the reporter who wrote the article
- **Dateline:** the location where and the date when the information was reported
- **Lead:** the sentence or paragraph that begins the news article
- **Tone:** the choice of words and point of view that meet the interests of the newspaper’s audience. Tone often depends on the subject of the article and the author’s word choice. Some articles are light and humorous. Others are serious.

## Analyzing the Text

**Practice and Apply** Answer the following questions.

1. The structure of a **newspaper article** is said to be similar to an
  - A. inverted octagon
  - B. inverted pyramid
  - C. oval with a circle in the center
  - D. upside-down T
2. The **byline** of the news article shows it was written by
  - A. Ralph Jones.
  - B. the Centers for Disease Control and Prevention.
  - C. Jessica Cohn.
  - D. park rangers at Natural Bridges National Park.
3. The **subhead** of the article tells you that
  - A. the Black Death killed huge numbers of people.
  - B. a national park closed its campsites for a time.
  - C. fleas spread plague to rats and humans.
  - D. national parks are protected from plague.
4. The **lead** of this article
  - A. is an attention-grabber.
  - B. makes a serious statement about dangerous rodents.
  - C. answers *who? what? where? when?* and *how?*
  - D. presents the article's main idea.
5. Summarize this article in a paragraph that answers the questions *who? what? when? where? why?* and *how?*

**Background** This instructional manual illustrates the methods of treatment and prevention that people should follow to control the plague today.

**Setting a Purpose**

Read this instructional manual to learn how to prevent and treat plague, a life-threatening disease that can be controlled with antibiotics.

**Stopping Plague in Its Tracks**  
**A COMMUNITY HEALTH CENTER PROJECT**

**CONTENTS**

**Types of Plague and their Symptoms**

1. Bubonic
2. Pneumonic
3. Septicemic

**Understanding Plague**

1. What Is Plague?
2. Where Is Plague Found?
3. How Is Plague Transmitted?
4. How Do I Recognize the Symptoms of Plague?
5. Seeking Medical Help: Can Plague Be Treated?
6. How Can Plague Be Prevented?

When you hear the word *plague*, you might think of it as a particularly nasty and devastating disease of the past, something you read about in history books when you studied Europe in the Middle Ages. Many people think that the plague was conquered and wiped out long ago. Yet, as recently as the early twentieth century, a plague pandemic in Asia claimed thousands of lives. Plague is still a potential danger to people everywhere, even in the twenty-first century—and even here in the United States. Following is the information you need to steer clear of plague.

<b>SYMPTOMS OF PLAGUE</b> Seek medical assistance if you suspect that you may have any of the types of plague.		
<p><b>Bubonic</b> (bōō-bŏn'ĭk, byōō-) Caused by the bite of an infected flea. Look for:</p> <ul style="list-style-type: none"> <li>• swollen, painful lymph nodes called buboes</li> <li>• chills and fever</li> <li>• headache</li> </ul>	<p><b>Pneumonic</b> (nōō-mŏn'ĭk, nyōō-) Spread by breathing in droplets from an infected human or animal. Can be a complication of bubonic or septicemic plague if the bacteria has spread to the lungs. Look for:</p> <ul style="list-style-type: none"> <li>• bloody cough</li> <li>• chest pain</li> <li>• difficulty breathing</li> <li>• high fever</li> <li>• nausea and vomiting</li> <li>• weakness</li> </ul>	<p><b>Septicemic</b> (sĕp'tĭ-sĕ'mĕ-ə) Caused when bacteria multiply in the bloodstream. Can be a complication of bubonic or pneumonic plague. Look for:</p> <ul style="list-style-type: none"> <li>• abdominal pain</li> <li>• decayed body tissue (gangrene), especially fingers, nose, or toes</li> <li>• bleeding under the skin or from mouth or other body cavity</li> <li>• chills and fever</li> <li>• diarrhea and vomiting</li> </ul>

## UNDERSTANDING PLAGUE

### 1. What Is Plague?

Plague is a highly infectious, life-threatening disease caused by a bacterium called *Yersinia pestis*, which lives in fleas. Plague is part of a natural cycle, regularly passed among members of the rodent family, such as gophers, ground squirrels, prairie dogs, and rats. Plague can take several forms—bubonic, pneumonic, and septicemic. Each form is distinguished by its symptoms and by how it spreads.

### 2. Where Is Plague Found?

Plague is found in many countries, including the United States. The majority of U.S. cases have been reported in the rural and urban west. Because it is spread by fleas, plague outbreaks are most common from April to November following mild winters and wet springs—conditions favorable for flea reproduction.

### 3. How Is Plague Transmitted?

**Bubonic plague**, the most common type, is usually caused by the bite of an infected flea. It can also come from contact with body fluids and tissues from infected animals. Bubonic plague cannot be transmitted from person to person without the bite of a flea or rodent.

**Pneumonic plague**, on the other hand, is the most infectious form of plague because it can pass directly from person to person if a person breathes in infected droplets from someone with the disease. This form of plague, which attacks the lungs, can also result from letting bubonic or septicemic plague go untreated.

**Septicemic plague**, the least common but most quickly lethal type, results when a person's blood is overrun with lethal *Yersinia pestis* bacteria. This form of plague can start with a flea bite or contact with infected fluids or tissues, but it also often results as a complication of untreated bubonic or pneumonic plague.

#### 4. How Do I Recognize the Symptoms of Plague?

See the symptoms of plague outlined in the "Symptoms of Plague" glossary on the first page of this manual. Seek medical attention if you experience any combination of the symptoms. Be especially alert within a week of exposure to a sick or dead animal, an insect bite, close contact with a person or animal with plague, or travel to an area of the world with high risk rates.

#### 5. Seeking Medical Help: Can Plague Be Treated?

In the past, bubonic plague killed about half of the people it infected. (Septicemic and pneumonic plague killed virtually all victims.) Today, with public health care systems in place and the availability of powerful antibiotics and other medical interventions, fewer than 15 percent of plague victims succumb to the disease. Of these, the vast majority are victims of septicemic or pneumonic plague. Those exposed to bubonic plague who get treatment seldom die from the disease today. There is as yet no effective vaccine for the plague.

- **Screening and Diagnosis**

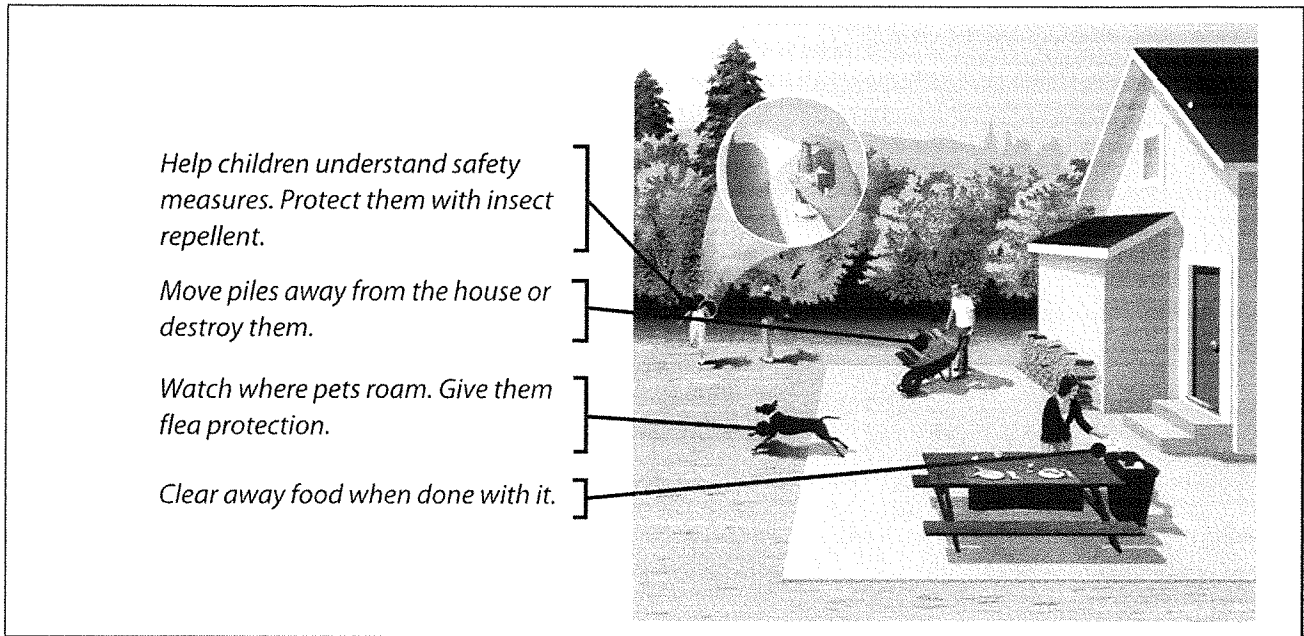
A doctor can assess plague risks and symptoms best and can confirm the diagnosis with a microscopic examination of fluid from buboes (painfully swollen lymph nodes), airways, or from a blood test.

- **Treatment**

Certain antibiotics are highly effective in treating plague. If you have been exposed to plague but have no symptoms, your doctor may prescribe preventive antibiotics, taken orally. If a doctor determines that you do have plague, you will likely be sent to a hospital and be put into isolation. You will be given antibiotics intravenously (through the veins) or intramuscularly (into the muscles) for at least ten days.

- **Complications**

Untreated bubonic plague can lead to the extremely deadly form known as septicemic plague, in which the bloodstream is overrun with the bacteria that cause plague. Other complications can include decay in fingers and toes (gangrene), inflammation of brain and spinal cord membranes and fluid (meningitis), lung failure, and shock, leading to death.



## 6. How Can Plague Be Prevented?

Ask your doctor about preventive treatment if you have had close contact with an infected person or animal, have been bitten by an insect while in an area with a recent plague outbreak, or plan to spend time in an area with a recent outbreak. If you live in an area known to have outbreaks, use these precautions:

- While outdoors, protect yourself from fleas by wearing long-sleeved shirts and long pants tucked into socks or boots. Dress children appropriately, and use insect repellent. Never allow children to go barefoot outdoors.
- Do not touch dead or sick animals. Wear gloves or use a tool, such as a shovel, to remove dead animals.
- Don't feed or touch rodents, such as squirrels and field mice.
- Discourage rodents from nesting near or entering your home. Remove outdoor piles, such as woodpiles, where mice and other rodents tend to nest. Do not leave food outdoors.
- Watch where your pets wander, and use flea-protection products consistently. Ask your veterinarian for product recommendations. Both dogs and cats can bring home infected fleas, but cats in particular can transmit bubonic plague to their owners. The best precaution for cats is to keep them indoors.



## Structure and Purpose of an Instructional Manual

Instructional manuals usually explain a process, such as how to use a tablet or present information to educate the reader about important information, such as what to do in case of a flood. The purpose of an instructional manual is to guide you through a task or through information that may be new to you. A well-written instructional manual should include easy-to-follow steps, and it should be organized so that the user can quickly identify and locate needed information. Many instructional manuals contain diagrams and step-by-step instructions.

Most instructional manuals follow a simple structure you can use to your advantage. Use the following features when reading an instructional manual. Think about how they helped you understand the information “Stopping Plague in Its Tracks.”

- First, scan the **table of contents** to preview the topics to be covered.
- Read all the information carefully. Look at headings, bulleted or numbered lists, and any special side notes or features. Take note of any **steps** you must take.
- Study all the **graphics** and **diagrams**, and make sure you understand them.
- If there is a **glossary**—an alphabetical list of special terms and their definitions—check your understanding of terms and symbols.
- When you’re reading more complex instructional manuals, check the back for an **index**—a list of covered topics that is in alphabetical order. It is much more detailed than a table of contents, so you can use it to find the specific information you need.

## Analyzing the Text

**Practice and Apply** Answer the following questions.

1. In which part of the instructional manual would you look *first* to find the section that discusses plague prevention?
  - A. table of contents
  - B. the diagram
  - C. "Symptoms of Plague"
  - D. "Seeking Medical Help"
2. Which of the following is *not* included in the instructional manual?
  - A. a table of contents
  - B. diagrams
  - C. lists
  - D. an index
3. In which part of the manual would you look for a simple visual of how better to protect the area you live in from plague?
  - A. table of contents
  - B. "How Can Plague Be Prevented?"
  - C. "Seeking Medical Help"
  - D. "What Is Plague?"
4. If you had a question about whether you should contact your doctor regarding plague, under what heading would you look?
  - A. "How Is Plague Transmitted?"
  - B. "Seeking Medical Help"
  - C. "How Can Plague Be Prevented?"
  - D. "Where Is Plague Found?"
5. Which information does *not* appear in the section headed "Seeking Medical Help: Can Plague Be Treated?"
  - A. treatment of plague
  - B. diagnosis of plague
  - C. complications from plague
  - D. prevention of plague
6. Which of the following illustrations would be *most* helpful to you if included in the section headed "How Do I Recognize the Symptoms of Plague?"
  - A. a photograph of various common rodents that carry plague
  - B. a photograph of swollen buboes on a person infected by plague
  - C. a photograph of doctors and nurses around a hospital bed
  - D. a photograph of *Yersinia pestis* bacteria as seen through a microscope
7. Think about a task or activity you know how to do that involves safety concerns, such as skating, carving a pumpkin, or using gardening or cleaning equipment. Write a set of step-by-step instructions that clearly show how to perform the task or activity and that include necessary safety warnings.

**Cell Structure and Function** ▪ Chapter 3 Key Terms

Science 7  
Day 2

**Key Terms**

Match each definition on the left with the correct term on the right. Then write the number of each term in the appropriate box below. When you have filled in all the boxes, add up the numbers in each column, row, and two diagonals. The sums should be the same. Some terms may not be used.

- |   |  |
|---|--|
| <p><b>A.</b> Acts as the cell's control center</p> <p><b>B.</b> Area between the cell membrane and the nucleus</p> <p><b>C.</b> The movement of materials through a cell membrane without using cellular energy</p> <p><b>D.</b> An energy-rich compound such as sugar</p> <p><b>E.</b> Basic unit of structure and function in living things</p> <p><b>F.</b> Process by which molecules move from an area of higher concentration to one of lower concentration</p> <p><b>G.</b> Instrument that makes small objects look larger</p> <p><b>H.</b> Storage area of the cell</p> <p><b>I.</b> Protein that speeds up chemical reactions</p> | <p>1. cytoplasm</p> <p>2. active transport</p> <p>3. microscope</p> <p>4. enzyme</p> <p>5. diffusion</p> <p>6. cell</p> <p>7. carbohydrate</p> <p>8. nucleus</p> <p>9. passive transport</p> <p>10. mitochondria</p> <p>11. vacuole</p> <p>12. lipid</p> |
|---|--|

<b>A</b>	<b>B</b>	<b>C</b>	=
—	—	—	=
<b>D</b>	<b>E</b>	<b>F</b>	=
—	—	—	=
<b>G</b>	<b>H</b>	<b>I</b>	=
—	—	—	=
=	=	=	=
—	—	—	—

Cell Structure and Function

**SKILL 11: Practice****7<sup>th</sup> Snow Packet Math Day 2**

Multiply. Simplify each product.

1.  $10 \times \frac{3}{8} =$  \_\_\_\_\_

2.  $12 \times \frac{1}{2} =$  \_\_\_\_\_

3.  $4 \times \frac{2}{5} =$  \_\_\_\_\_

4.  $\frac{4}{5} \times 15 =$  \_\_\_\_\_

5.  $3 \times \frac{11}{12} =$  \_\_\_\_\_

6.  $7 \times \frac{4}{5} =$  \_\_\_\_\_

7.  $\frac{2}{7} \times 6 =$  \_\_\_\_\_

8.  $\frac{2}{3} \times 9 =$  \_\_\_\_\_

9.  $\frac{7}{10} \times 5 =$  \_\_\_\_\_

10.  $9 \times \frac{5}{6} =$  \_\_\_\_\_

11.  $8 \times \frac{2}{3} =$  \_\_\_\_\_

12.  $\frac{1}{4} \times 16 =$  \_\_\_\_\_

13.  $12 \times \frac{3}{8} =$  \_\_\_\_\_

14.  $\frac{3}{4} \times 6 =$  \_\_\_\_\_

15.  $\frac{3}{8} \times 8 =$  \_\_\_\_\_

16.  $\frac{2}{3} \times 12 =$  \_\_\_\_\_

17.  $2 \times \frac{5}{12} =$  \_\_\_\_\_

18.  $4 \times \frac{5}{8} =$  \_\_\_\_\_

19.  $3 \times \frac{8}{9} =$  \_\_\_\_\_

20.  $\frac{3}{10} \times 5 =$  \_\_\_\_\_

21.  $8 \times \frac{5}{12} =$  \_\_\_\_\_

22.  $\frac{1}{6} \times 9 =$  \_\_\_\_\_

23.  $6 \times \frac{4}{6} =$  \_\_\_\_\_

24.  $12 \times \frac{5}{8} =$  \_\_\_\_\_

Solve.

25. Amal's bones make up about  $\frac{1}{5}$  of his body weight. He weighs 140 pounds. How many pounds do his bones weigh?  
\_\_\_\_\_

26. Jessica bought a 5-gallon can of paint. After painting her room,  $\frac{2}{5}$  of the paint was left. How many gallons of paint did she use?  
\_\_\_\_\_

**TEST PREP**

27. What is  $2 \times \frac{7}{10}$ ?

A  $\frac{9}{10}$

C  $1\frac{4}{5}$

B  $1\frac{2}{5}$

D  $2\frac{7}{10}$

Skill 11

28. Find  $8\frac{1}{4} + 3\frac{7}{8}$  in lowest terms.

F  $11\frac{1}{8}$

H  $12\frac{1}{8}$

G  $1\frac{2}{3}$

J  $12\frac{8}{9}$

Skill 4