Immunity

**Immunity** is the ability to resist the pathogens that cause a particular disease. Healthy mothers pass immunity to their babies during pregnancy and through breastfeeding after birth. These immunities last for a few months. At that time, the baby's immune system can begin fighting pathogens on its own.

Your body also builds immunity when it responds to pathogens and when you get certain diseases. When your body encounters an antigen, it produces memory B cells and T cells. Scientists learned many years ago how to help the immune system prepare memory cells for specific diseases without making a person sick. A **vaccine** (vak-SEEHN) is a preparation of dead or weakened pathogens that is introduced into the body to cause an immune response. This process is called immunization.

Immunization works because dead or weakened pathogens have the same antigens as live or active pathogens. However, they can't make you sick. Your immune system "learns" what a harmless pathogen looks like. It creates memory cells in response to the vaccine. If your body should meet the harmful version of the pathogen, the memory cells attack it. There are vaccines for many diseases, such as polio, measles, chicken pox, and tetanus.

**Health Online**
Visit health.glencoe.com and complete the Interactive Study Guide for Lesson 2.

**Lesson 2 Review**

**After You Read**
Review this lesson for new terms, major headings, and Reading Checks.

**What I Learned**

1. **Vocabulary** Define immune system. Name three kinds of blood cells that are part of the immune system.
2. **Restate** What is immunity?
3. **Describe** Briefly explain the steps of the immune system's specific response to infection.
4. **Apply** How can a fever help fight infection?

5. **Explain** How are antigens and antibodies like a lock and key?

6. **Analyze** Why is stomach acid considered a barrier to foreign objects?

**Applying Health Skills**

7. **Accessing Information** Research the two kinds of polio vaccines. Find out who developed each kind, when each became available, and how they differ.

**Colds**

A communicable disease that strikes just about everyone is the common cold. You've probably had one and know the symptoms: a runny nose, a sore throat, and sneezing. Colds spread by both direct and indirect contact.

Why can't your doctor give you a vaccine to protect you against a cold? There are too many viruses, hundreds of them, that cause colds. In fact, every cold you have had was probably caused by a different strain of virus. Developing vaccines for many different viruses is very difficult. Besides, scientists believe that almost half of the viruses that cause colds have not yet even been identified. So it looks like the common cold will be common for years to come!

**Reading Check** Explain Why is it difficult to create a vaccine against the common cold?

In Japan, people who are ill wear masks to prevent spreading germs. How can you help prevent spreading cold viruses to other people?
The Flu

Another common communicable disease is influenza, or the flu. *Influenza* is a communicable disease characterized by fever, chills, fatigue, headache, muscle aches, and respiratory symptoms. Flu symptoms usually affect you more quickly and more seriously than cold symptoms do. The flu can be spread through both direct and indirect contact. Most cases of the flu are reported from December through March, which is why that time is called “the flu season.”

Flu viruses differ from the ones that cause colds. Each year, certain strains of the flu virus spread faster and are stronger than previous years. Scientists meet every year to figure out which strains will spread fastest during the next flu season. This planning allows them to make vaccines for the upcoming flu season. Some types of flu can be dangerous. Just after World War I, an outbreak of the flu killed about 20 million people throughout the world, including over 600,000 people in the United States. Scientists today worry that new strains of the flu virus, such as the avian flu, could also be deadly to large numbers of people.

**Reading Check**

Define What is influenza?

Chicken Pox, Measles, and Mumps

Chicken pox, measles, and mumps are all contagious diseases caused by viruses. Every contagious disease has a contagious period. The *contagious period* is the length of time that a particular disease can be spread from person to person. Often, the contagious period includes a length of time before the infected person begins to show symptoms. Chicken pox, measles, and mumps all have well-defined contagious periods.

- **Chicken pox** is contagious for about a week before symptoms appear. Common symptoms of chicken pox include a rash, fever, and aching muscles. The rash shows up as small, red, itchy bumps on the skin. It may even appear inside the mouth and throat. The bumps develop into blisters. When the blisters dry up, chicken pox is not contagious anymore. The vaccine for chicken pox became available in 1995. Before then, almost all children got chicken pox. Now, about 80 percent of all U.S. children are vaccinated against chicken pox. The disease is much less common.

- **Measles** involves a rash, fever, and head and body aches. The contagious period starts a few days before symptoms
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- Measles involves a rash, fever, and head and body aches. The contagious period starts a few days before symptoms begin. It lasts until about five days after that. Measles is a very dangerous disease. Around the world, over 1 million children die each year from measles. Over 90 percent of the children in the United States are vaccinated against measles, so fewer people get the disease now.

- Mumps causes a fever, headache, and swollen salivary glands. The contagious period for mumps starts about a week before symptoms begin. It lasts for about nine days after that point. Over 90 percent of the children in the United States are vaccinated against mumps. As a result, mumps is much less common than it used to be.

Fortunately, chicken pox, measles, and mumps are under control in the United States. Children routinely get vaccinated for each of these diseases. This protects them against these diseases.

Reading Check Explain Why are measles, mumps, and chicken pox much less common in the United States than they used to be?

Other Communicable Diseases

Many other communicable diseases are common around the world. The United States has good medical care and clean living conditions. As a result, people here are better protected from many of these diseases. However, some communicable diseases are still quite common here. Mononucleosis, hepatitis, tuberculosis, pneumonia, and strep throat are some of the communicable diseases that are common in the United States.

Mononucleosis

Mononucleosis (MAH-noh-NOOK-lee-oh-SIS), or mono, is a viral disease characterized by a severe sore throat and swelling of the lymph glands in the neck and around the throat area. Symptoms may also include fatigue, loss of appetite, fever, and headache. Often called “the kissing disease,” mono is spread when a person comes in contact with the saliva of an infected person. Contaminated eating utensils and drinking glasses can also spread the disease.

Hepatitis

Hepatitis (hep-uh-TY-tis) is a viral disease characterized by an inflammation of the liver and yellowing of the skin and the whites of the eyes. Other symptoms include
weakness, fatigue, loss of appetite, fever, headaches, and sore throat. There are three common strains of hepatitis: A, B, and C. A different virus causes each strain.

Hepatitis A is common in areas with poor sanitation. It spreads among people when infected human wastes contaminate the food or water. When someone eats or drinks food or water that is contaminated, that person can become infected. People can also become infected if they have open wounds exposed to contaminated water.

Hepatitis B and C can permanently damage the liver and can lead to cirrhosis and liver cancer. They are most commonly spread through contact with contaminated blood or other contaminated body fluids. For example, hepatitis B and C can be spread when drug users share needles or through sexual contact. There are vaccines for hepatitis A and B. There are medications that can help treat hepatitis C.

**Tuberculosis**

*Tuberculosis* (too·ber·kyuh·LOH·sis), or TB, is *a bacterial disease that usually affects the lungs*. Symptoms include cough, fatigue, night sweats, fever, and weight loss. TB is spread through the air. When a person with TB coughs or sneezes, he or she sends infected droplets into the air. Another person then breathes them in. It is possible for a person to carry the bacteria that cause TB without showing symptoms. Even though these infected people do not get sick, they can spread the disease. Because of this, health care providers often test people to be sure they do not carry TB.

**Pneumonia**

*Pneumonia* is *a serious inflammation of the lungs*. Symptoms include fever, cough, chills, and difficulty breathing. Either a virus or bacterium can cause pneumonia. Pneumonia can be spread through direct or indirect contact with an infected person. Bacterial pneumonia can be treated with antibiotics. People with pneumonia need rest and plenty of fluids. People who already have other diseases or who have weakened immune systems are at greater risk of getting pneumonia.

**Strep Throat**

*Strep throat* is *a sore throat caused by streptococcal bacteria*. Symptoms of strep throat include a red and painful throat, fever, and swollen lymph nodes in the neck. People who have strep
Connect To... Social Studies

Diseases and History
Many diseases have shaped the course of history. For example, when early explorers arrived in North and South America, they brought European diseases such as smallpox and measles. The native people had no resistance to these new diseases. The pathogens spread quickly and killed many of them.

Research a disease that changed the course of history. Write a brief report on your findings.

Chapter 13: Communicable Diseases

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Lesson 3 Review

After You Read
Review this lesson for new terms, major headings, and Reading Checks.

What I Learned
1. **Vocabulary** Define contagious period.
2. **Give Examples** Name three childhood diseases that used to be common but are now under control in the United States.
3. **List** What are the symptoms of influenza?
4. **List** What are the symptoms of tuberculosis?
5. **Analyze** Why is it important to get treatment for communicable diseases like strep throat?

Applying Health Skills
8. **Practicing Healthful Behaviors** Write a short article about the importance of covering your mouth when you sneeze or cough and washing your hands frequently with soap. How can positive health behaviors like these help control the spread of disease?

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Lesson 3: Common Communicable Diseases