

# **LESSON GUIDE**

## **GRADE 4**

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# What Causes Disease? How Does the Immune System Protect the Body from Disease?

## Performance Objective

Students will be able to describe a chain of infection.

## Motivation

Ask students to guess what the phrase “chain of infection” means. Record their answers on the newsprint.

## Procedure/Development

- Distribute Activity Sheet 1, “Vocabulary,” for use in addressing vocabulary words as they come up in the lesson.
- Distribute and discuss Activity Sheet 2, “Chain of Infection for Measles.” Explain that some infections are transmitted (passed from one person to another) through airborne viruses (e.g., measles). Transmission of HIV, a virus that is not airborne, will be discussed in Lesson 3.
- Distribute and discuss Activity Sheet 3, “How Immunization Affects the Chain of Infection for Measles.” Explain that vaccines are available for some viruses (e.g., measles) but not for all. Researchers are trying to develop vaccines for a variety of viruses, including HIV.
- Discuss the vocabulary words that appear on Activity Sheet 3. Have students relate the vocabulary to the chain of infection for measles.
- Have students use each of the vocabulary terms in a sentence. (Recording selected students’ sentences on newsprint for review is another strategy for developing and reinforcing the vocabulary.)

**Teacher Note:** While the measles virus can live in the air for two hours, HIV can only survive for a few minutes outside the body except in special laboratory conditions or in body fluids such as a pool of blood. HIV can also be transmitted by sharing needles and syringes with someone who is infected. No cases of HIV transmission through contact with a non-living surface (such as a toilet seat) have been reported.

## Homework

Have students write a story about what happens to their bodies when they get sick, and then when they get well. Students should refer to the “Chain of Infection for Measles” handout.

## GRADE 4 Lesson 1

### NEW YORK STATE LEARNING STANDARDS 1

#### SKILLS

Self-Management

#### MATERIALS

##### Activity Sheets 1, 2, 3:

*Vocabulary;*  
*Chain of Infection for Measles;*  
*How Immunization Affects the*  
*Chain of Infection for Measles*

Newsprint

#### VOCABULARY

Chain of Infection

Host

Immunization

Method of Entry

Mode of Transmission

Organism

Activity Sheet 1

Vocabulary

**Directions:** Read each definition. Then use each vocabulary term in a sentence.

**Antibody**

A substance produced by the immune system in response to an antigen (a microorganism such as a virus or bacteria) that enters the body. The body produces a unique antibody for every antigen. Antibodies help the immune system protect us from getting sick.

**Antigen**

A foreign substance, such as a virus or bacteria, that enters the body and stimulates the production of antibodies.

**Host**

Any living organism (usually a person or animal) in which an infectious agent can live and multiply.

**Immune System**

The bodily system, made up of organs (like the skin) and cells (like T-cells) that protects us from foreign substances.

**Immunity**

The body's ability to resist disease. Immunity can be enhanced by previous exposure and vaccines.

**Immunization**

Method of producing resistance to an infectious disease, usually by vaccination (or inoculation), which leads to the production of antibodies by the immune system.

**Infectious Agent**

An organism (virus, bacterium, etc.) that is capable of producing infection or infectious disease.

**Method of Entry**

The way or place in which organisms, including infectious agents, enter the host's body.

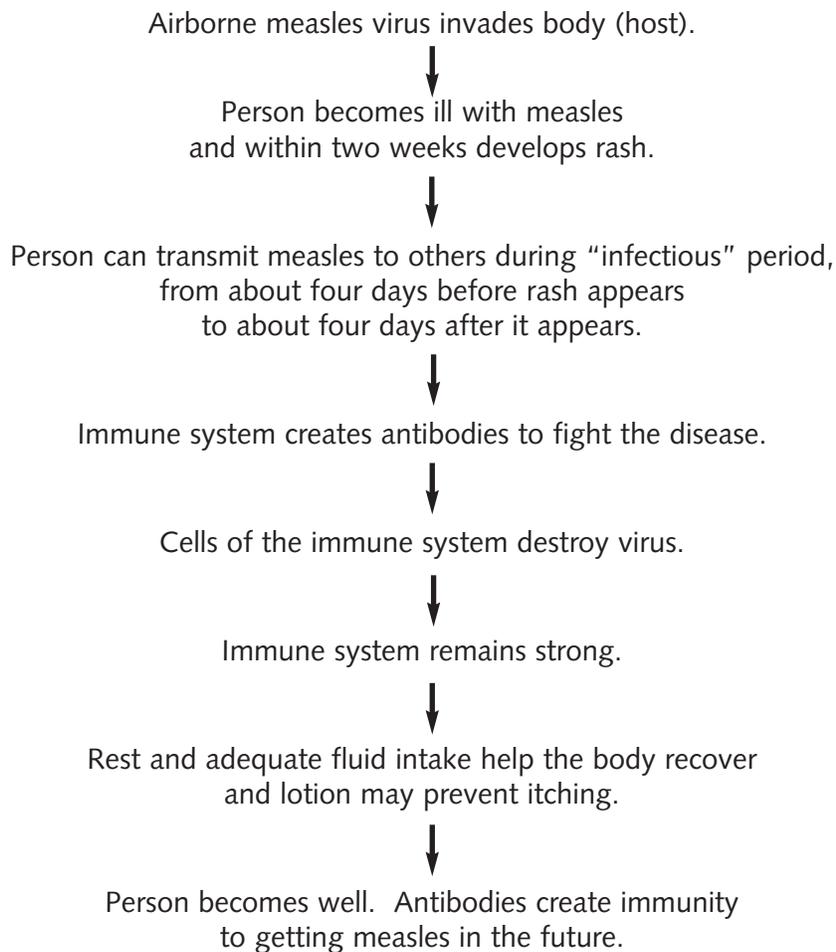
**Mode of Transmission**

Manner in which an infectious agent is transmitted from one person to another. For measles, the measles virus can live in airborne droplets for about two hours. People can get measles by breathing in air that has the droplets.

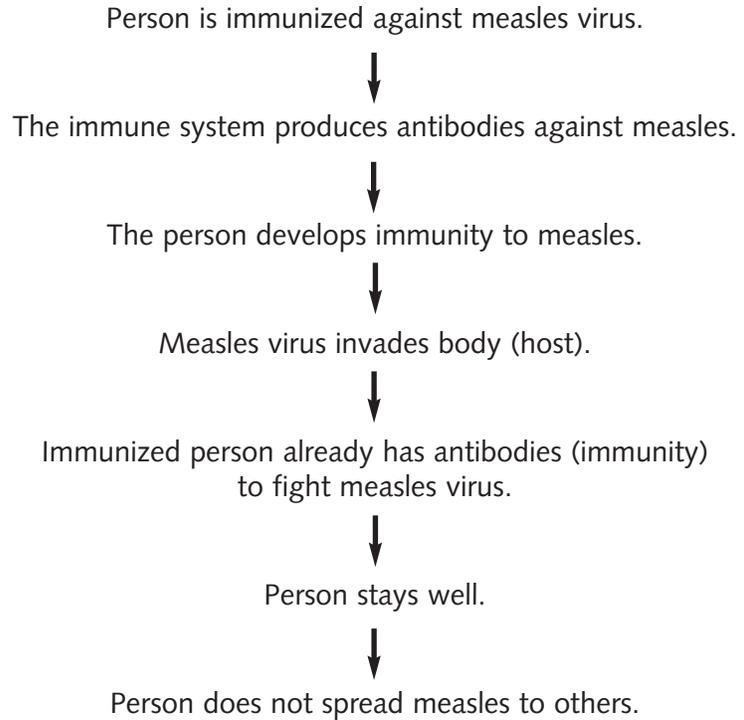
**Organism**

Any living thing, including germs such as viruses and bacteria.

## Chain of Infection for Measles



## How Immunization Affects the Chain of Infection for Measles



# How Does the Body Fight Disease? How Does HIV Affect the Immune System?

## Performance Objective

Students will be able to explain the immune system and how HIV affects it.

## Motivation

Say, “The immune system is a bodily system that fights diseases in our bodies. The immune system is made up of cells, tissues, chemicals, and organs working together to keep us healthy. HIV is a virus that weakens the immune system so that it cannot do its job properly.”

## Procedure/Development

- Distribute and discuss vocabulary words. Explain how the immune system functions: “The biggest organ in the immune system is your skin. Healthy, unbroken skin protects your body from infection. But sometimes foreign organisms (or invaders) get inside your body. Some examples of invaders are bacteria and viruses. One way these can get into your body is through a cut or scrape.

“If an invader gets into your body, white blood cells from your bloodstream surround the invader and work to destroy it. The white blood cells create millions of antibodies, which capture the invader. Once an antibody has caught an invader, a message is sent to other white blood cells, called Killer T-cells, to kill the invader. Many different cells and chemicals must work together for the immune system to function at its best. Some white blood cells have a memory, so that if the same virus enters the body again, they will send out already made antibodies to help identify it and help cells of the immune system destroy it.”

- Optional: Distribute diagram, “How the Immune System Reacts to Infection.” Explain how HIV affects the immune system.
- Write on the newsprint:

**HIV = Human Immunodeficiency Virus**

**AIDS = Acquired Immune Deficiency Syndrome**

– Have students define each word.

- Explain that the course of HIV—without treatment—is as follows:
  - HIV gets past the body’s defenses.
  - The virus makes copies of itself before the body’s disease fighting cells (part of the immune system) can respond.

## GRADE 4 Lesson 2

### NEW YORK STATE LEARNING STANDARDS 1

#### SKILLS

Self-Management

#### MATERIALS

##### Activity Sheets 1, 2:

*Vocabulary;*

*How The Immune System  
Reacts to Infection*

Newsprint

#### VOCABULARY

AIDS (Acquired Immune  
Deficiency Syndrome)

Antibodies

B-Cells

HIV (Human Immunodeficiency  
Virus)

Immune System

Opportunistic Infection

T-Cells

Virus

White Blood Cells

- Within the first few weeks after infection, some people with HIV show flu-like symptoms. This occurs during the body’s initial response against the virus. During this time, a person may show symptoms such as headaches, body aches, fevers, and fatigue. The symptoms last for a week or so, then go away by themselves. Not everyone who gets HIV has these symptoms.
- The body’s immune system begins to fight against the infection and starts to create antibodies (3 to 12 weeks after initial infection) to kill the virus.
- The antibodies kill some of the virus, but HIV is not eliminated from the body.
- Since HIV destroys immune system cells (e.g., T-cells), the body has fewer disease fighting cells and the person gets sick more easily. The person gets illnesses that people who do not have HIV are usually able to fight off, such as certain kinds of cancer, tuberculosis, pneumonia, and other disorders. This is called AIDS (Acquired Immune Deficiency Syndrome). AIDS begins, on average, 10 years after infection.

Also:

- People with HIV/AIDS are vulnerable to infections that would not be serious or fatal in a person with an intact immune system.
- While there is currently no cure for HIV, there are treatments that help people with HIV/AIDS manage their illness and live healthy, full and productive lives.

## Assessment/Homework

Have students:

- Write a fact sheet on how HIV/AIDS affects the immune system.
- Look in newspapers, magazines, the library, and/or the Internet to find articles about HIV/AIDS to bring to class for sharing and discussion. Give examples of kinds of articles (news, research, personal stories, etc.). Allow for follow-up time to reflect and process homework.

## **Vocabulary**

### **AIDS**

The initials for Acquired Immune Deficiency Syndrome, the most severe manifestation of infection with the Human Immunodeficiency Virus (HIV). HIV weakens the body's immune system, making it vulnerable to opportunistic illnesses, including infections. People who have HIV and who are very sick have AIDS. Some opportunistic illnesses associated with AIDS are certain kinds of cancer, tuberculosis, pneumonia, and other disorders. Besides making it easier to get opportunistic infections, HIV causes other symptoms as well (e.g., fatigue, weight loss) that become more severe with AIDS.

### **Antibody**

A substance produced by the immune system in response to an antigen (a microorganism such as a virus or bacteria) that enters the body. The body produces a unique antibody for every antigen. Antibodies help the immune system protect us from getting sick.

### **HIV**

The initials for Human Immunodeficiency Virus. HIV may eventually lead to AIDS by weakening the body's immune system, leaving the body less protected against infections, some kinds of cancer, and other disorders. A person who has HIV in his/her blood is said to be "HIV-positive," or "HIV+."

### **Immune System**

The immune system is a complex system of cells, tissues, chemicals, and organs. Its mission is to protect against foreign organisms and substances.

### **Lymphocytes**

White blood cells made in the bone marrow. Some of these cells move to the thymus, develop as T-cells, and play a major role in carrying out the activities of the immune system. Some T-cells are called Helper T-cells. Other lymphocytes, called B-cells, make antibodies. T-cells guide the immune system response of the body, and some T-cells directly attack the germs that have invaded the body. In healthy people, about 20-40 percent of circulating lymphocytes are T-cells. In a person who has AIDS, only about two percent are T-cells. A T-cell percentage below 14 percent indicates serious immune damage and is a sign of AIDS in people with HIV infection. With fewer T-cells, the body is unable to recognize and stop organisms that can cause disease.

### **Opportunistic Infection**

An infection that is generally not a serious threat to a healthy immune system, but causes serious illness when the immune system is weakened.

### **Syndrome**

A set of related health problems, bodily signs or symptoms with one underlying cause.

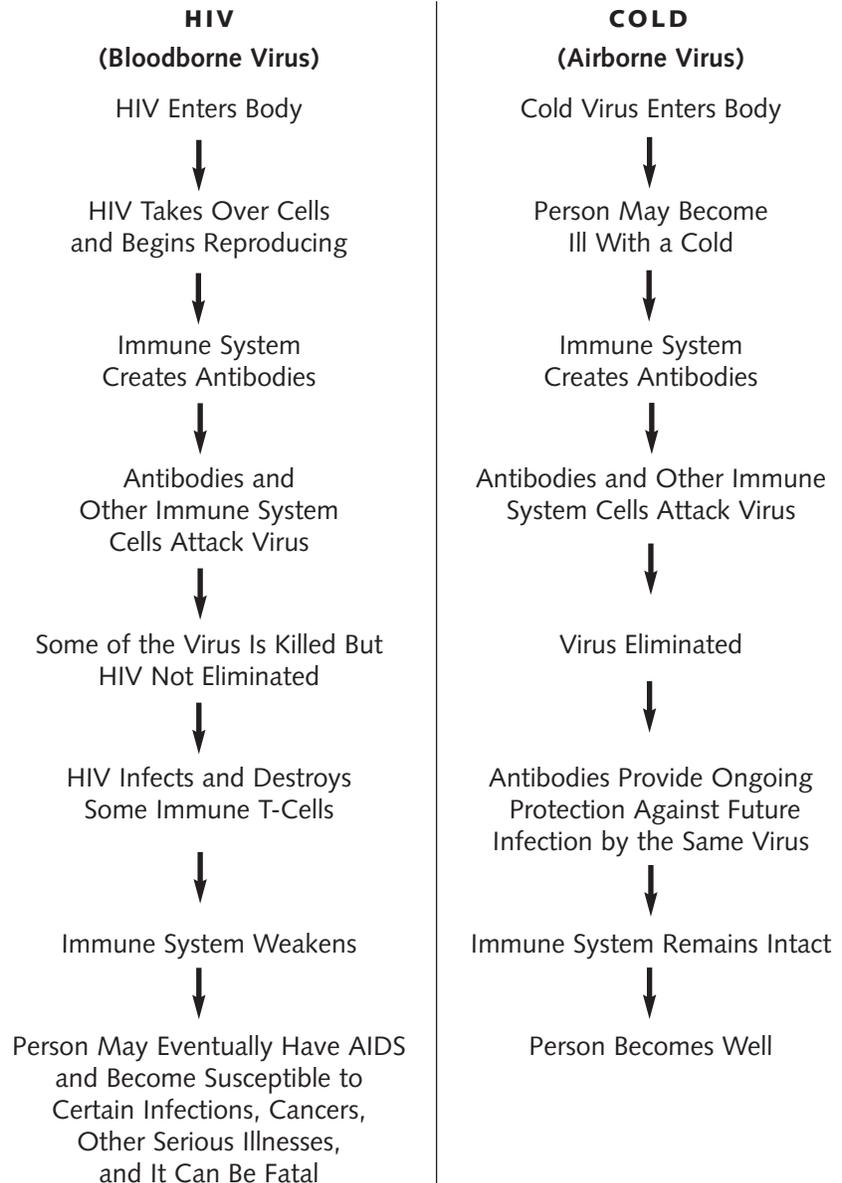
### **Virus**

A microscopic organism that can cause infection.

Activity Sheet 2

## How the Immune System Reacts to Infection

### The Course of Two Infections Without Treatment



# How Is HIV Transmitted? How Have Myths About HIV Transmission Affected Our Society?

## Performance Objectives

Students will be able to:

- Identify how HIV is and is not transmitted.
- Understand how myths about HIV transmission can be harmful.

## Motivation

Distribute the “HIV/AIDS Myth or Fact Sheet.” Have students write TRUE next to those statements that are true, and FALSE next to those statements that are false.\*

## Procedure/Development

- Say, “With each addition of an ingredient in a recipe, the mixture changes. Sugar makes cake batter sweet; chocolate makes it brown, and so on. If you add in a cup of salt by mistake, the batter would get very salty. You can remove some of the salt if you haven’t stirred it in yet, but you cannot remove all the salt. When HIV, the virus that may lead to AIDS, enters a person’s body, the ‘mixture’ that is the person’s body cells changes. Just as the salt in the cake batter cannot all be removed, neither can all of the virus in the body’s cells be removed. There are some effective treatments that slow the way HIV reproduces or enters cells and thus slow progress from HIV infection to AIDS. There are also treatments for HIV- and AIDS-related illnesses. But there currently is no way to rid the body completely of HIV. That is why we all need to know how HIV is transmitted—so we can know how to avoid getting it.”
- Review the answers to the “HIV/AIDS Myth or Fact Sheet.” \* Explain that HIV is hard to contract. It is not an easy disease to transmit, like measles or the flu. HIV is in some bodily fluids, like blood, and not in others, like sweat, tears, and saliva. Only through contact with one of these infected bodily fluids can HIV be transmitted, although even then it might not be.
- Review with students the chain of infection. (See Grade 4, Lesson 1, Activity Sheet 2, “Chain of Infection for Measles”)
- Explain that it is impossible to tell by looking at someone whether that person has HIV. An HIV-positive person may not feel or look ill. Untreated, HIV has early phases where people have few or hardly any noticeable symptoms, and these symptoms can also appear in people without HIV (e.g., swollen glands).

\* Answers to HIV/AIDS Myth or Fact Sheet: 1. False; 2. False; 3. False; 4. False; 5. True; 6. False; 7. True; 8. True; 9. True; 10. True; 11. True; 12. True; 13. True.

## GRADE 4 Lesson 3

### NEW YORK STATE LEARNING STANDARDS 1, 2

### SKILLS

Relationship Management  
Self-Management

### MATERIALS

**Activity Sheet 1:**  
*HIV/AIDS Myth or Fact Sheet*

Newsprint

### VOCABULARY

Breast Milk  
Contract  
Myth  
Transmit

- Explain that these early phases can last about 10 years before progression to AIDS. Now many treatments slow progression to AIDS. HIV is an unusual disease because a person is infectious (can transmit HIV) throughout the course of HIV and AIDS. As of 2004, many people in the United States with HIV (about one in four) didn't even know they had it, because they hadn't been tested for it.
- Explain that HIV can be transmitted:
  - By using needles and other injection equipment that an infected person has used. (Note that some people need to inject medicine, such as insulin for diabetics. They always need to use sterile needles and equipment and never share them.)
  - From an infected mother to her baby before or during birth, or through breastfeeding.
  - By sexual contact with an infected person. Say, "When you are older you will learn more about how sexual contact can transmit HIV."
- Note that drugs interfere with a person's ability to make responsible decisions and avoid risk behavior.
- On the newsprint, list myths about how HIV is transmitted. Make sure students understand the word "myth."
  - Myths about methods of transmission include: touching, hugging, kissing, sneezing, sharing food, using public toilets, using public swimming pools, sitting next to an HIV-positive person, going to school with someone who has HIV/AIDS.
- List ways to express affection that are safe (e.g., hugging, holding hands, kissing).
- Ask students how myths can harm others. Explain that such myths have made people needlessly afraid, and caused discrimination and hysteria, isolating some people with HIV/AIDS because people were afraid to associate with them. Emphasize the need for compassion, love, support, and acceptance of people living with HIV/AIDS.

### Assessment/Homework

Imagine that a friend tells you that she is upset because she ate dinner with her uncle who is HIV-positive, and now she is afraid that she might be HIV-positive, too. Make a list for your friend of the ways that HIV is transmitted, and write the reasons that she can't become HIV-positive from having dinner with her uncle.

## **HIV/AIDS Myth or Fact Sheet**

**Directions:** Write **TRUE** next to those statements that are true, and **FALSE** next to those statements that are false.

### **TRUE OR FALSE?**

1. People can get HIV by being in the same room with a person who has AIDS.
2. There is a vaccine to prevent AIDS.
3. HIV is transmitted by sneezing.
4. A person can get HIV by giving blood.
5. HIV is a transmissible disease.
6. People can get HIV from sharing a soda.
7. Community resources are available to help people with HIV/AIDS.
8. AIDS is caused by a virus.
9. HIV affects the body's immune system.
10. People who inject drugs should protect themselves and others by never sharing needles or other items used to prepare and inject drugs. Sharing these could get blood from an infected person into another person's body and infect that person with HIV.
11. AIDS is an advanced or later phase of HIV.
12. One reason drinking alcohol and using other drugs should be avoided is that they make us forget what we have learned about HIV/AIDS.
13. Abstaining from sexual contact is the best way to avoid sexual transmission of HIV.

## Prevention

NEW YORK STATE  
LEARNING STANDARDS  
1

### SKILLS

Advocacy  
Communication  
Decision Making  
Relationship Management  
Self-Management

### MATERIALS

Index Cards Printed  
with Skit Situations  
(on Following Page)

Newsprint

### VOCABULARY

Abstain  
Consequences  
Long-Term  
Negative Peer Pressure  
Positive Peer Pressure  
Risk Behaviors  
Short-Term

# How Can We Help Each Other Make Healthy Choices?

## Performance Objectives

Students will be able to:

- Identify ways to give support to one another about healthy choices.
- Say “no” to negative peer pressure.

## Motivation

Elicit class discussion by saying, “In the morning, when you decide what to wear to school, are you considering only what you like, or what children in the class will think of what you wear?”

Ask the class to list:

1. Decisions children make according to their own opinion only.
2. Decisions they make according to both their own opinions and those of their friends.

Write their answers on the newsprint (e.g., in which list would they put choice of friends, whether to attend a party, whether to join a school club, whether to befriend a new student in school, what shampoo to use, what hairstyle to wear, etc.).

## Procedure/Development

- Say, “All students in this room are peers.” Define “peer.”
- Ask students to define the term “peer pressure.”
- Ask students to provide examples of negative and positive peer pressure.
- Define “healthy behaviors” and ask students to identify some, e.g., getting enough rest, getting enough exercise, eating fruits and vegetables, riding in a car with a seat belt, riding a bicycle or motorcycle with a helmet.
- Discuss why someone might do these things, and what might be the short-term and long-term consequences. Define these terms.
- Define “risk behaviors” and ask students to identify some, e.g., smoking cigarettes, drinking alcoholic beverages, using other drugs, riding in a car without a seat belt, climbing over sharp fences, riding a bicycle or motorcycle without a helmet.
- Discuss why someone might do these things, and what might be short-term and long-term consequences.
- Divide students into small groups. Give each group an index card describing one of the following situations. Have groups discuss and dramatize the situation for the class.

1. Jennifer and Juan are good friends. Lately Jennifer has started smoking cigarettes and wants Juan to join her. He doesn't want to, but Jennifer pressures him and says he is not being a good friend if he doesn't. How can Juan keep Jennifer as a friend but not start smoking cigarettes himself?
  2. Jacina and Ramon have been good friends since kindergarten, but lately Ramon has been using swear words a lot, and Jacina doesn't like it. What should she do?
  3. Lucinda's family is vegetarian. For lunch she packs only vegetarian food, including tofu and vegetable salad. Stefan and Luis tease her and tell her to eat "normal" food. What should Lucinda do?
  4. Reggie's mother has set a 9:00 P.M. curfew for him, but several of his friends—Tomas, Christopher, and Rita—hang out together until 11:00 P.M. or 12:00 midnight. They make fun of him because of the early curfew. What should Reggie do?
  5. At a party, Jose urges Maria to drink beer with him. She knows it is illegal for people their age and that it is not good for them. But Maria doesn't want to reject Jose. What should she do?
  6. Kim's friend Andrew has started smoking marijuana. He seems to be doing it more and more lately, and Kim is concerned about him. When she tells him she is concerned, Andrew says he has it under control, but Kim is still worried. What should she do?
- After each skit, discuss assertiveness techniques used in the skit that children can use to encourage friends or themselves to make healthy choices and discourage negative choices. Say, "Which ones were not as effective?" (Speak in "I" phrases; use broken record technique, i.e., repeat position over and over; stay calm; enlist others to help support your position.)
  - Have students list ways children can encourage each other to do healthy things. (Read selected lists to class.) Develop a class "contract," e.g., "Some ways to build good physical and emotional health are: abstain from alcohol and other drugs, including cigarettes; eat well; get enough rest; learn to cope with stress; keep a sense of humor, etc."

## Assessment/Homework

- Discuss how people can avoid unwise or dangerous choices. (Plan to abstain from behaviors that could risk our health. Set goals for our future. Stay healthy and drug-free so we can create the kinds of lives we want for ourselves.)
- Discuss how parents or guardians can help children attain these health goals and how children can ask parents or guardians for their help.

**SKILLS**

Advocacy  
Communication  
Decision Making  
Planning and Goal Setting  
Self-Management

**MATERIALS**

**Activity Sheet 1:**  
*Resources: Where Do We Go  
to Get Information and Help?*

Newsprint

**VOCABULARY**

Community  
Resources

# How Can We Find Information and Help in the Community?

## Performance Objectives

Students will be able to:

- Identify resources for information and help.
- Identify barriers to accessing resources and ways to overcome these barriers.

## Motivation

Say, "When you want information about something, what do you do?" List responses on newsprint.

## Procedure/Development

- Say, "You have listed several excellent ways to get information. It is often easiest simply to ask someone you think will know what you need to know. But information is communicated in many ways. Here are some other options."
- Distribute Activity Sheet 1, "Resources: Where Do We Go to Get Information and Help?" Discuss with children the resources described in the activity sheet.
- Say, "The good news is that there are many places we can go for help. The sad news is that people sometimes need information, but do not use these resources. Why?" (They don't know about them, they're shy; they have no one to go with; they're nervous about trying something new; they cannot read...)
- It is important to address the issue of "quality of information." It is important that the information that students receive is scientifically accurate. This is particularly problematic with regard to the Internet and the health myths created by it. Stress the importance of using **reliable** sources of information (governmental Web sites, Department of Health and Mental Hygiene, major medical centers, universities, etc.).
- Say, "There are many resources for information and help, both for people who have HIV/AIDS and for their families and friends. Write a story in which a friend needs information about HIV/AIDS." Have the children identify three community resources from the activity sheet. (Explain that people often need information from more than one source.)

## Assessment/Homework

Assign students different health topics or questions to find an answer so that they can experience the process firsthand. Allow time for follow-up. (Give examples of topics: tuberculosis (TB), cancer, HIV medications, HIV treatments, etc.)

## **Resources: Where Do We Go to Get Information and Help?**

- Ask a parent, guardian, caregiver, teacher, or another adult with whom you are close and whom you trust.
- Ask a doctor, nurse, school counselor, or social worker.
- Call 311, New York City's Helpline for government resources, such as the NYC Department of Health and Mental Hygiene (NYC DOHMH).
- Go to the library. Ask the librarian for help.
- Call a hotline or a library information line.
- Use the Internet. Make sure you are using a reliable source, such as a government Web site. Helpful Web sites are maintained by the NYC DOHMH ([www.nyc.gov/html/doh/html/ah/ahbasic.shtml](http://www.nyc.gov/html/doh/html/ah/ahbasic.shtml)) and the U.S. Centers for Disease Control and Prevention ([www.cdc.gov](http://www.cdc.gov)).
- Read a book.
- Read a newspaper or magazine.
- Look at signs or posters.
- Read bulletin boards.
- Attend a school assembly program.
- Watch a television program (check listings).
- Listen to radio programs that discuss health issues.
- Call, visit, or write to a public service agency.

