

LESSON GUIDE

GRADE 4

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 board/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.
- Record selected students’ sentences on the board/newsprint for review as 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” Activity Sheet.

GRADE 4

Lesson

1

NEW YORK STATE
LEARNING STANDARDS

1

SKILLS

Self-Management

MATERIALS

Activity Sheet 1:
Vocabulary

Activity Sheet 2:
Chain of Infection for Measles

Activity Sheet 3:
How Immunization Affects the Chain of Infection for Measles

Board/Newsprint

VOCABULARY

Antibody

Antigen

Chain of Infection

Host

Immune System

Immunity

Immunization

Infectious Agent

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.

Activity Sheet 2

Chain of Infection for Measles

Airborne measles virus invades body (host).



Person becomes ill with measles
and within two weeks develops rash.



Person can transmit measles to others during "infectious" period,
from about four days before rash appears
to about four days after it appears.



Immune system creates antibodies to fight the disease.
Cells of the immune system destroy virus.
Immune system remains strong.



Rest and adequate fluid intake help the body recover
and lotion may prevent itching.



Person becomes well. Antibodies create immunity
to getting measles in the future.

Activity Sheet 3**How Immunization Affects
the Chain of Infection for Measles**

Person is immunized against measles virus.



The immune system produces antibodies against measles.



The person develops immunity to measles.



Measles virus invades body (host).



Immunized person already has antibodies (immunity)
to fight measles virus.



Person stays well.



Person does not spread measles to others.

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. The virus HIV 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 largest 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 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 board/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

Handout 1:
Vocabulary

Handout 2:
*How The Immune System
Reacts to Infection*

Board/Newsprint

VOCABULARY

AIDS (Acquired Immune
Deficiency Syndrome)

Antibodies

B-Cells

HIV
(Human Immunodeficiency Virus)

Immune System

Lymphocytes

Opportunistic Infection

Syndrome

T-Cells

Tissues

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 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.

Teacher Note: Antiretroviral medications have virtually transformed HIV infection from what was once a life-threatening condition into a chronic disease that, with successful adherence to a medication regimen, can keep a person healthy and grant a lifespan similar to that of a person who does not have HIV.

Assessment/Homework

Have students:

- Write a fact sheet on how HIV 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.

Handout 1

Vocabulary

AIDS

The initials for Acquired Immune Deficiency Syndrome, the most advanced phase 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.

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 is a retrovirus that attacks the body's immune system, making an infected person potentially vulnerable to other infections and diseases. A person who has HIV in his/her blood is said to be "HIV-positive," or "HIV+." 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.

Immune System

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

Lymphocytes

White blood cells made in the bone marrow. Some of these cells develop as T-cells, and play a major role in carrying out the activities of the immune system by recognizing and stopping 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.

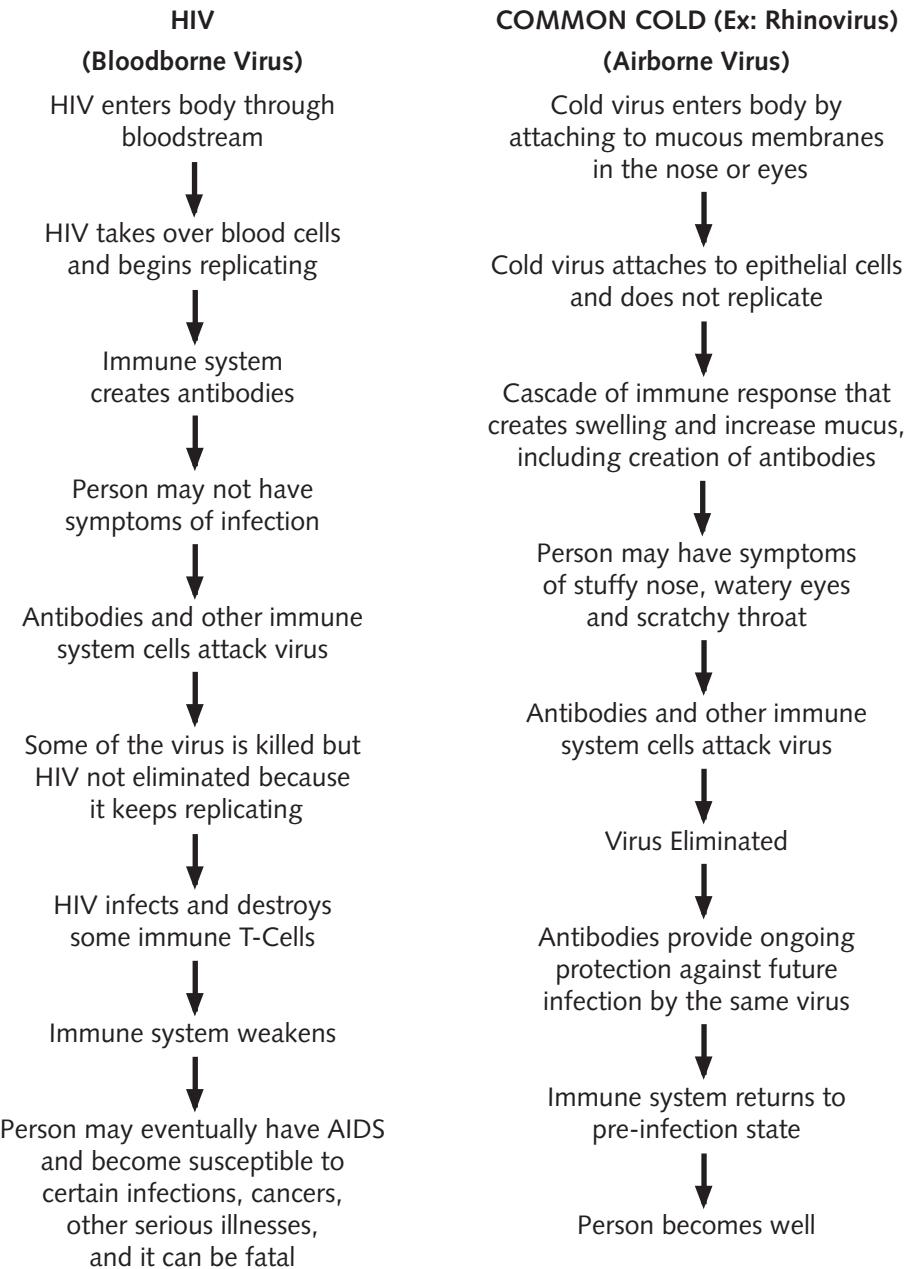
Virus

A microscopic organism that can cause infection.

Handout 2

How the Immune System Reacts to Infection

The Course of Two Infections Without Treatment



What Are Common Myths and Facts About HIV Transmission?

Performance Objective

Students will be able to:

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

Motivation

Teacher Note: Teachers be advised that the “Myth or Fact” sheet contains the first reference to sexual contact in the curriculum. Fourth grade teachers are encouraged to teach puberty lessons prior to teaching about the potential risks associated with sexual contact.

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 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 get. It also 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. HIV can only be transmitted through contact with one of these infected bodily fluids, although even then there may not be 100 percent chance of transmission.
- 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. When first infected with the virus, most people have 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:

HIV/AIDS Myth or Fact Sheet

Board/Newsprint

VOCABULARY

Breast Milk

Contract

Myth

Transmit

- Explain that this early phase of HIV infection can last 10 years or more. Now many treatments slow or prevent progression to AIDS. HIV is an unusual disease because a person is infectious (can transmit HIV) throughout the course of HIV and AIDS. Currently in the United States, 21 percent or about one in five people who are infected with HIV do not know it because they have not 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.)
 - An infected mother passing it to her baby before or during birth, or through breastfeeding. Now, most women are tested during their pregnancy and if they are HIV positive, they are placed on medication so that there is a very good chance that their baby will not be infected with HIV.
 - Sexual contact with an infected person. Say, “When you are older you will learn more about how sexual contact can transmit HIV.”
- Note that alcohol and other drugs interfere with a person’s ability to make responsible decisions and avoid risk behavior.
- On the board/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.

IMPORTANT NOTE: Teachers are mandated reporters of child abuse, including sexual abuse. If you suspect that a student is experiencing abuse or neglect, report it immediately to your guidance counselor, social worker, or principal, who is required to report the suspected abuse to the New York Statewide Central Register Child Abuse and Maltreatment Hotline (1-800-342-3720).

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. Write down how you would explain to your friend how HIV is transmitted, and why she can’t become HIV-positive from having dinner with her uncle.

Activity 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 HIV.
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

MATERIALSIndex Cards Printed with
Skit Situations

Board/Newsprint

VOCABULARY

Abstain

Consequences

Long-Term

Negative Peer Pressure

Peer

Positive Peer Pressure

Risk Behaviors

Short-Term

How Can We Help Each Other Make Healthy Choices?

Performance Objective

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 board/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 skateboard or motorcycle with a helmet, studying and doing homework
- Discuss why someone might do these things, and what might be the short-term and long-term consequences. Define these terms.
- Define “positive risk behaviors” – those that may make a person nervous or scared, but could lead to good outcomes, e.g., trying out for a play or sports team, cooking a new food, initiating a new friendship, or telling a teacher that you are confused about something you are studying and need help. Define these terms.
- Define “negative 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 skateboard or motorcycle without a helmet, dropping out of school..
- 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.

Skit Situations

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 an 8:00 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 that he brought from home. 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. 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?
 7. Lekeisha's friend Kenia found her grandmother's pain medication that she was prescribed after her surgery, Kenia told Lakeisha that her older brother Kevin said that the medicine "makes you feel really good" and that she should try some. Kenia is hesitant but wants to try it and wants Lakeisha to take some too. What should Lakeisha 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; do homework in a timely manner and get assignments done early; 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.

NEW YORK STATE
LEARNING STANDARDS**1, 3****SKILLS**

- Advocacy
- Communication
- Decision Making
- Planning/Goal Setting
- Self-Management

MATERIALS

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

Board/Newsprint

VOCABULARY

- Community
- Resources

How Can We Find Information and Help in the Community?

Performance Objective

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 board/newsprint.

Procedure/Development

- Say, "You have listed several excellent ways to get information. Examples may be: ask a parent/guardian, ask a friend, go to a library, ask a librarian, search the Internet. 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 the Handout "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 well and have not gotten the help they need to read better...)
- 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 websites, NYC Department of Health and Mental Hygiene, major medical centers, universities, etc.).
- Emphasize that librarians (in school or public libraries) are well informed about how to identify reliable sources of information. Encourage students to go to librarians for help. Also mention library phone information lines and homework hotlines as a source of help.
- 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.)

Handout

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 (NYCDOHMH).
- Go to the school or public 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 website. Helpful websites are maintained by the NYC DOHMH (www.nyc.gov/html/doh/html/ah/ahbasic.shtml) and the U.S. Centers for Disease Control and Prevention (www.cdc.gov). Ask a librarian for assistance.
- Read a book; ask a librarian or teacher for recommendations.
- Read a newspaper or magazine; ask a librarian or teacher for recommendations.
- Look at signs or posters, such as subway ads from the NYC Department of Health and Mental Hygiene.
- Read bulletin boards in school, at health clinics, and at libraries.
- Attend a school assembly program.
- Watch a high quality television program (check listings).
- Listen to radio programs that discuss health issues.
- Call, visit, or write to a public service agency.