Diseases

Summary

This lesson plan integrates Standard 4 of the 6th Grade Health Core (HIV and viruses) with Standard 5 of the 6th Grade Science Core (microorganisms). It introduces the concept of diseases their causes. The lesson consists of some notes, a reinforcing activity, and an assessment.

Main Core Tie

Health Education - 6th Grade

Strand 3: SAFETY AND DISEASE PREVENTION (SDP) Standard 6.SDP.5:

Time Frame

3 class periods of 45 minutes each

Group Size

Large Groups

Life Skills

Thinking & Reasoning, Communication, Social & Civic Responsibility

Materials

- Colored copy paper
- Colored pencils, crayons, markers, etc.
- Cup of water for each student (clear, plastic cups work well and can be reused)
- Sodium hydroxide (baking soda) or liquid ammonia cleaner
- Phenolphthalein indicator solution(this is a chemical that can be purchased from Flinn Scientific for about $4.00 at www.flinnsci.com.)
- Eye dropper

Background for Teachers

Microorganisms have both positive and negative effects on our health.
Some microorganisms, including bacteria, protists, fungi and viruses, can cause disease. These types of microorganisms are called pathogens or germs.
Bacteria are one-celled microscopic organisms that live almost everywhere on Earth. Most of them are harmless. However, bacteria cause strep throat, tuberculosis, whooping cough, tetanus, and many other communicable disesases.
Protists are microscopic, one-celled organisms that are much larger than bacteria. They cause diseases including malaria and sleeping sickness and are often carried by mosquitos.
Fungi are groups of tiny living organisms like yeast, mushrooms, and molds. They cannot make their own food and feed off other organisms. Disease-producing fungi can cause athletes foot or ringworm.
Viruses are tiny, non-living microscopic particles that can cause disease. They can not grow, respond, or eat like living organisms. Yet, they can reproduce inside a living cell or host. Viruses cause diseases including the common cold, cold sores, mumps, measles, chicken pox, polio, smallpox, the flu, and HIV.
AIDS (acquired immunodeficiency syndrome) is a deadly disease caused by the HIV (human immunodeficiency virus) virus. The HIV virus is transmitted through certain body fluids or from infected mothers to their newborns. Once the HIV virus is inside the body, it attacks the white blood

cells (T-cells). The attack on the white blood cells can result in damage to the immune system and destruction to the body's capability to ward off other microbes. When HIV enters the blood stream, antibodies are produced by the body. However, they are ineffective in slowing the progression of the disease. Once the blood has been infected with HIV, the virus replicates wildly inside the cells, mutating often and destroying many cells of the immune system. From this point, one of two things may occur:

1. The defense system will no longer keep up with the virus, and the person may develop the AIDS disease. In this case, the persons's immune system is destroyed. The virus can then attack the nervous system causing brain damage. When the immune system is compromised, a person can contract an opportunistic disease like pneumonia, tuberculosis, or Kaposi's sarcoma which rarely affect healthy individuals. All of these can eventually result in death.
2. The patient will stay relatively well, but can infect others with the HIV virus. In this case, the virus is "latent". Latent viruses may appear to "hide" inside host cells for many years. At any time the virus can become active. A person can be infected with HIV without knowing it. In fact, an infected person may have no symptoms for several years. During this time a person can look and feel healthy. The only way to find out if someone is infected with HIV is through a blood or saliva test. For a period of 2 weeks to 6 months after a person becomes infected with HIV, there aren't enough antibodies for the test to find, so the test can come out negative when in fact, the person is carrying the virus and can infect others.

Student Prior Knowledge

The student needs to have learned about microorganisms in his/her science class. He/she should be familiar with the characteristics of living things.

Instructional Procedures

Day 1

1. Review what the class has already learned about the positive effects of microorganisms. Check for students' background knowledge on the negative aspects of microbes with a class discussion. This discussion usually leads to the comment, "Microorganisms cause disease." (If this is not the case, ask students, "What causes diseases?")
2. Based on their prior knowledge, decide what new information is needed to accomplish the objectives. Have the students create a type of notebook or journal using colored copy paper on which to take notes. Title the booklet "Diseases". Each page of the booklet should correspond to a section of the notes. For example:

Page 1 - Kinds of Diseases (Communicable and Non-Communicable with definitions and examples)
Page 2 - Microorganisms That Cause Disease (bacteria, protists, fungi, virus with definitions, examples, and perhaps, pictures)
Page 3 - How Microbes spread (direct contact, indirect contact, through the air, animals, other)
Page 4 - Your Immune System (Its parts and how they work to keep you healthy)
Page 5 - HIV and AIDS (Progression of disease, How a symptom free person can infect others)
Page 6 - How Can I Protect Myself Against Disease (Cleanliness, immunizations, lifestyle)

Have the students color and decorate as you go through the notes, encouraging them to add a personal touch the their booklet. Try to get through all of the information except HIV/AIDS on Day 1.

Day 2

1. Give the rest of the notes on HIV and AIDS. There are usually a lot of questions on this topic. Be sensitive to student questions. Following the state guidelines, give factual answers and refer the student to a trusted adult for further questions.
2. To demonstrate how a healthy looking, symptom-free person who is carrying the HIV virus can

infect others, do the following activity:
Distribute the prepared cups of liquid to each member of the class. Prior to class time, add 1/8 tsp of sodium hydroxide or the ammonia solution to two of the cups of water.
CAUTION: Warn students to not taste any of the samples.
Each student should have a cup of liquid. Instruct them to exchange the fluid from their cups with other people for three minutes. The procedure is to allow someone to pour some water from their cup into yours. For each amount added, each individual must pour the same amount back into the other person's cup.
After the fluid exchange, indicate that two of the cups contained the HIV virus (the ammonia or sodium hydroxide). Discuss the ways
AIDS and other Sexually Transmitted Infections (STI's) are transmitted (optional). Speculate on how many of the students became infected in the mock activity.
Add a few drops of phenolphthalein to each glass. If the HIV virus (ammonia or sodium hydroxide) is present, the water will change color. Those with colored water will have become infected.
Discuss the results.

Day 3

Allow students time to ask questions about the unit. Give 10-15 minutes to partner practice and review their notes. Play a review game or have students quiz each other. Assess knowledge gained by creating your own assessment tool or use the rubric provided.

Extensions

Students do research on a certain disease and report on it
Students design their own disease causing bacteria or virus

Rubrics

Standard 4 - Diseases

Bibliography

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