

Your Body, Your Health: Teacher's Guide

Grade Level: 6-8

Curriculum Focus: Health

Lesson Duration: Three class periods

Program Description

Breaking Down Digestion – Examines how food is broken down in the body's digestive tract. *Sickle Cell: The Forgotten Disease* – Examines sickle-cell anemia and how it affects those who suffer from it. *Saying No to Addiction* – Explores how the human body becomes addicted to a substance and efforts worth taking to prevent addiction. *Preventing and Treating AIDS* – Examines how AIDS affects cells within the body and student-based prevention efforts.

- I. Breaking Down Digestion (3 min.)
 - II. Sickle Cell: The Forgotten Disease (37 min.)
 - III. Saying No to Addiction (3 min.)
 - IV. Preventing and Treating AIDS (5 min.)
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Onscreen Questions

Segments I & II

- What are some of the specialized tasks performed by cells in your body?
- What can happen when cells in your body do not function properly?

Segments III and IV

- What is an addiction?
 - How do viruses attack cells in the body?
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Lesson Plan

Student Objectives

- Review facts about sickle-cell anemia.
- Learn about other genetic disorders.
- Create a poster presentation that informs about a disorder.

Materials

- *Your Body, Your Health* video and VCR, or DVD and DVD player
- Computer with Internet access
- Print resources about genetic disorders
- Poster board, markers, paint, colored pencils, glue, scissors
- Color printer

Procedures

1. Review with students what they learned about sickle-cell disease from the video. To guide the discussion, ask:
 - How does this disease affect the body? (It destroys the ability of red blood cells to carry oxygen throughout the body, so the body's organs don't receive adequate oxygen.)
 - What are some of the effects? (exhaustion, debilitating pain, strokes, inability to move)
 - How common is this disease? (In the United States, about 1,000 babies are born with sickle-cell disease each year.)
 - How is it diagnosed? (blood test)
 - What are some ways that the disease is treated? (hydroxyurea, a drug to reduce the effects of the disease; transfusions and blood exchanges)
 - What treatment did Infinity receive? (bone marrow transplant) Why was her story significant? (She received one of the first unrelated donor transplants for this disease.)
 - Why is sickle-cell disease considered a genetic disease? (It is passed down from parents.) Explain how it is inherited. If you have a gene for sickle-cell, does this mean you will automatically get it? (No, a person must receive two copies of the defective gene.)
2. Ask students to name other genetic disorders or conditions. Record their responses. Examples may include Down's syndrome, cystic fibrosis, and muscular dystrophy. If necessary, explain that cerebral palsy is caused by damage to the brain before or during birth.
3. Tell students that they will work in small groups to research a genetic disorder. Using what they have learned, they will make a poster presentation to teach classmates about the disease.
4. Have students choose a partner or divide the class into small groups. Assign to each team one of these genetic disorder:
 - Down's syndrome
 - Cystic fibrosis
 - Diabetes
 - Muscular dystrophy
 - Tay-Sachs disease



- Hemophilia
 - Turner's syndrome
 - Marfan syndrome
 - Huntington's disease
 - Canavan disease
5. Ask students to research the assigned genetic disorder and answer the questions below. Encourage them to print out or sketch pictures, graphs, or charts to include in their poster.
- How does this genetic disorder affect the body?
 - What are symptoms or effects of the disorder?
 - How common is this disorder?
 - How is it diagnosed?
 - How is it treated?
6. Have students use print and Web resources in their research. The following Web sites may be helpful:
- Your Genes, Your Health
<http://www.yourgenesyourhealth.org>
 - Chronic Illness: Directory
<http://www.pbs.org/fredfriendly/whocares/awareness/directory.html>
 - TeensHealth: Diseases and Conditions (see Genetic Conditions)
http://websrv01.kidshealth.org/teen/diseases_conditions/
 - KidsHealth: Health Problems (see Birth Defects and Genetic Problems)
http://www.kidshealth.org/kid/health_problems/
 - Yahoo Genetic Disorders
http://dir.yahoo.com/Health/Diseases_and_Conditions/Genetic_Disorders/
 - Canavan Foundation
<http://www.canavanfoundation.org/canavan.php>
7. After students have completed their initial research, give them a full class period to make a poster that highlights facts about the disease. Encourage them to include at least two images on their posters.
8. Have teams present their posters to the class. After each presentation, give students a chance to ask questions and share personal perspectives, stories, or comments.

Assessment

Use the following three-point rubric to evaluate students' work during this lesson.

- **3 points:** Students actively engaged in class discussions, thoroughly researched their assigned disease, created a thoughtful and imaginative poster with answers to all of the assigned questions and two or more appropriate images.
- **2 points:** Students participated in class discussions, researched their assigned disease, created a satisfactory poster with answers to most of the assigned questions and two appropriate images.
- **1 point:** Students participated minimally in class discussions, did not adequately research their assigned disease, created a simplistic poster that answered few or none of the assigned questions and included one or no appropriate images.

Vocabulary

anemia

Definition: A blood condition involving the red blood cells

Context: An anemic person has a low number of red blood cells, or the body's red blood cells are damaged or deficient in iron.

genetic

Definition: Inherited; relating to genes passed down from parents

Context: Sickle-cell anemia is a genetic disease because it is inherited from parent.

hemophilia

Definition: A rare genetic bleeding disorder that occurs most often in boys

Context: People with hemophilia have blood that does not clot properly.

sickle-cell anemia

Definition: A disease that destroys the ability of red blood cells to carry oxygen throughout the body

Context: People with sickle-cell anemia inherited a recessive disease gene from each parent.

Academic Standards

National Academy of Sciences

The National Science Education Standards provide guidelines for teaching science as well as a coherent vision of what it means to be scientifically literate for students in grades K-12. To view the standards, visit <http://books.nap.edu>.

This lesson plan addresses the following science standards:

- Life Science: Reproduction and heredity



- Science in Personal and Social Perspectives: Personal health; Populations, resources, and environments; Risks and benefits

Mid-continent Research for Education and Learning (McREL)

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit link:

<http://www.mcrel.org/compendium/browse.asp>

This lesson plan addresses the following national standards:

- Health – Understands the relationship of family health to individual health
- Language Arts – Viewing: Uses viewing skills and strategies to understand and interpret visual media; Uses reading skills and strategies to understand and interpret a variety of informational texts
- Science – Life Sciences: Understands the principles of heredity and related concepts

Support Materials

Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the Discoveryschool.com Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit

- <http://school.discovery.com/teachingtools/teachingtools.html>

DVD Content

This program is available in an interactive DVD format. The following information and activities are specific to the DVD version.

How To Use the DVD

The DVD starting screen has the following options:

Play Video – This plays the video from start to finish. There are no programmed stops, except by using a remote control. With a computer, depending on the particular software player, a pause button is included with the other video controls.

Video Index – Here the video is divided into four parts (see below), indicated by video thumbnail icons. Watching all parts in sequence is similar to watching the video from start to finish. Brief descriptions and total running times are noted for each part. To play a particular segment, press Enter on the remote for TV playback; on a computer, click once to highlight a thumbnail and read the accompanying text description and click again to start the video.



Curriculum Units – These are specially edited video segments pulled from different sections of the video (see below). These nonlinear segments align with key ideas in the unit of instruction. They include onscreen pre- and post-viewing questions, reproduced below in this Teacher's Guide. Total running times for these segments are noted. To play a particular segment, press Enter on the TV remote or click once on the Curriculum Unit title on a computer.

Standards Link – Selecting this option displays a single screen that lists the national academic standards the video addresses.

Teacher Resources – This screen gives the technical support number and Web site address.

Video Index

I. Breaking Down Digestion (3 min.)

Our food gets broken down into usable energy through the complex process of digestion. Learn about the human digestive system and how the process works.

II. Sickle Cell: The Forgotten Disease (37 min.)

Learn about the debilitating genetic sickle-cell disease from the people who live with it and the doctors who are working towards finding a lasting cure.

III. Saying No to Addiction (3 min.)

More than 50 million Americans are addicted to nicotine, the chemical found in cigarettes. Conquering this and other addictions takes determination, perseverance, and a willingness to get help.

IV. Preventing and Treating AIDS (5 min.)

The HIV virus infects people from all walks of life. Although scientists are not optimistic about a cure, there are ways in which we can help prevent HIV from spreading.

Curriculum Units

1. Human Digestion

Pre-viewing question

Q: How does your body tell you when you have overeaten?

A: Answers will vary.

Post-viewing question

Q: What are mechanical and chemical digestion?

A: Mechanical digestion, or chewing, is the first step in the digestive process. Swallowed food travels to the stomach through the esophagus, where smooth muscle helps push the food down to the stomach. Once there, it goes through chemical digestion, which occurs when chemicals break food proteins into smaller pieces.



2. Sickle-Cell Patients

Pre-viewing question

Q: What genetic traits are you worried about passing along to future generations?

A: Answers will vary.

Post-viewing question

Q: What is sickle-cell disease?

A: A genetic disorder that destroys red blood cells' ability to carry oxygen throughout the body.

3. About Sickle-Cell Disease

Pre-viewing question

Q: What would be the benefits of finding out about sickle-cell disease at birth?

A: Answers will vary.

Post-viewing question

Q: How do red blood cells affected by sickle-cell differ from normal red blood cells?

A: Sickle cells are stiff and pointed so they clog blood vessels and block oxygen from reaching nearby organs and tissues. Normal red blood cells are soft and round so they can easily squeeze through tiny blood vessel.

4. Passing Along the Trait

Pre-viewing question

Q: How do you think having sickle-cell disease would affect your life?

A: Answers will vary.

Post-viewing question

Q: Why is there is no easy fix for genetic diseases?

A: Answers will vary.

5. Finding a Cure

Pre-viewing question

Q: Why do some diseases get more research funding and attention than others?

A: Answers will vary.

Post-viewing question

Q: What does hydroxyurea do for sickle-cell patients?

A: The drug hydroxyurea helps alleviate the pain and symptoms of the disease. It is not a cure, but people taking it have fewer crises because the drug increases the level of fetal hemoglobin in the body.

6. Preparing for Infinity's Surgery

Pre-viewing question

Q: Would you take the chance to rid yourself of a disease through an experimental procedure?

A: Answers will vary.



Post-viewing question

Q: How did Infinity's bone marrow-transplant surgery differ from conventional transplants?

A: Infinity was given lower doses of chemotherapy to destroy the diseased bone marrow because the high doses used in conventional transplants are too toxic for sickle-cell patients. Also, the bone marrow cells used in the transplant surgery were not a perfect match because they did not come from a close relative.

7. Transplants for Sickle-Cell Children

Pre-viewing question

Q: Should children be allowed to take part in experimental medical procedures?

A: Answers will vary.

Post-viewing question

Q: What are the risks of an operation like Infinity's?

A: Infinity could experience seizures, infection, or a potentially life-threatening condition called graft versus host disease, where the new cells would attack and destroy her organs and tissues.

8. Infinity's Transplant

Pre-viewing question

Q: Who do you think has made the most important contributions to modern medicine?

A: Answers will vary.

Post-viewing question

Q: What is engraftment?

A: Engraftment is a medical process in which cells received through blood transfusion migrate to treated bone marrow, replace it, and produce healthy blood cells.

9. Research and Testing

Pre-viewing question

Q: Do you think finding a cure for sickle-cell disease will help create advancements in other conditions?

A: Answers will vary.

Post-viewing question

Q: Would you try a second transplant if the first one had failed?

A: Answers will vary.

10. Death by Inhaling

Pre-viewing question

Q: Why do people try cigarettes and other addictive drugs?

A: Answers will vary.

Post-viewing question

Q: What is nicotine?

A: Nicotine is a highly addictive drug—as addictive as heroin—that speeds up the heart and the central nervous system.



11. The HIV Virus

Pre-viewing question

Q: What do you know about the HIV virus?

A: Answers will vary.

Post-viewing question

Q: How does HIV spread?

A: HIV, or human immunodeficiency virus, can spread through an exchange of body fluids, including vaginal fluids, semen, and blood. A nursing mother can also transmit HIV to her child through breast milk.

12. Searching for the Cure

Pre-viewing question

Q: Why do people with HIV become more susceptible to other infections?

A: People with HIV have compromised, or weakened, immune systems, which makes their bodies more susceptible to infections. A minor infection could become serious for a person with a compromised immune system.

Post-viewing question

Q: Do you think education is an effective way to stop the spread of HIV?

A: Answers will vary.