

Body Systems: Teacher's Guide

Grade Level: 3-5

Curriculum Focus: Human Body

Lesson Duration: 1-2 class periods

Program Description

Explore the mechanisms that power the body to gurgle, burp, gasp, and giggle. Human body systems work in harmony to connect us with the outer world, while keeping our inner one attuned to the rhythmic beat of life.

Onscreen Activities

Segment 1, Nervous System

- Activity: How good is your memory? Choose a partner and study his or her appearance for ten seconds. Then quickly turn away and describe what your partner is wearing. How many details can you remember?

Segment 2, Digestive System

- Activity: What you eat and how much you eat are important for maintaining good health. Use the food pyramid to design a menu for one day. Make sure you follow the serving guide and include a variety of foods.

Segment 3, Respiratory System

- Activity: Measure your lung capacity. First, inhale deeply and exhale into a balloon. Then tie the balloon and submerge it completely in water. The amount of water displaced by the balloon represents your lung capacity.

Segment 4, Musculoskeletal System

- Activity: Design a series of exercises that work at least three muscle groups, for example, your arms, legs, and abdomen. Draw a diagram of the exercises and include detailed step-by-step instructions on how to complete them.
-

Lesson Plan

Student Objectives

- Act as a team of personal trainers to design, present, and justify an exercise and nutrition plan for an imaginary client.

- Discover how knowledge of the body's systems can help people reach personal health and fitness goals.

Materials

- *Body Systems* video and VCR, or DVD and DVD player
- Computer with Internet access
- Library references on diet, nutrition, and exercise

Procedures

1. After watching the video, have students summarize the function or job of each body system: nervous, digestive, respiratory, and musculoskeletal.
2. Ask students how knowing about even one system could help an athlete in training or a person who wants to tone muscles or stay healthy. For example, the video shows how a competitive swimmer increases his oxygen intake because he knows how the respiratory system works.
3. Tell students that they will use their knowledge of body systems and do additional research to act on a team of personal trainers for a client below:
 - A 17-year-old high school soccer player wants to maintain a high energy level during soccer games.
 - A 35-year-old woman wants to tone the muscles in her stomach.
 - A 65-year-old man wants to keep his heart healthy.
4. Ask students if they know what a personal trainer does. This background information may be helpful: A personal trainer helps design an exercise and nutrition program that helps a person meet goals. Such trainers use their knowledge about how the body works to design individual plans and help their clients put them to use. People may hire a personal trainer for help in losing weight, becoming fit, getting stronger, staying healthy, increasing endurance, or improving athletic performance.
5. As a member of a personal training team, students must develop and present an exercise and nutrition plan that helps their client reach goals. A real training plan would involve an ongoing exercise program and long-term diet, but the students' plans should include three or four exercises and a suggested diet for one day. In addition to exercises and menu, training teams must show how their exercises and menu relate to least three facts about how the body systems work. Once a team has developed its plan, it will present it to the class.
6. Break students into teams. Have each team select a client from the list above. Then teams should consider the following questions:
 - What is the client's goal? Is it to lose weight, gain endurance or strength, get fit, tone muscles, or improve speed, athletic performance, or flexibility? The team members must identify this goal when they present their exercise plan and diet.

- Given the goals of the client, how can eating certain foods help? For example, if the client wants more energy, which foods can help? If the client wants to maintain a healthy heart, which foods are low in cholesterol and saturated fat?
7. To create a client's diet, have students refer to the Food Guide Pyramid, established by the United States Department of Agriculture. It is based on daily nutritional requirements established by the government. You may visit the Web sites below and print the appropriate material, or have the students visit the sites themselves. You may want to make available books and magazines about nutrition and healthful eating, exercise, and fitness.
- To learn about the food pyramid:
<http://www.health.gov/dietaryguidelines/dga2000/document/frontcover.htm>
 - For more information about different types of foods:
<http://www.nal.usda.gov/fnic/>
 - To learn about foods that are good for the heart:
<http://www.americanheart.com>
 - For information about exercise, consult these Web sites:
http://kidshealth.org/kid/stay_healthy/fit/work_it_out.html
<http://www.key2fitness.com/index.html>
<http://www.fitness.gov/activelife/pepup/pepup.html>
<http://www.americanheart.com>
8. Once students have finished their research, they should develop the plan for their client. It should include the client's goals, a recommended diet, three or four exercises, and three facts about the body's systems.
9. Have students present their plans to the class. You may want to have other students, teachers, or parents act as clients and ask questions and provide input.

Assessment

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

- 3 points: Students worked cooperatively in groups; used the Internet as a research tool well; completed the plan using valid information; and supported it with three accurate facts about body systems.
- 2 points: Students worked somewhat cooperatively in groups; used the Internet somewhat as a research tool; completed the plan with mostly valid information; and supported it with at least two facts that were mostly accurate about body systems.
- 1 point: Students participated little, if at all, in class discussions; had difficulty completing their research; presented a plan with inaccurate or unclear information; and supported it with one or no facts about body systems.

Vocabulary

cardiovascular

Definition: Relating to the heart and blood vessels



Context: Most people who have heart disease try to do exercises that improve their cardiovascular conditioning.

cholesterol

Definition: A type of fat found in animal products; too much can be bad for the heart.

Context: To reduce the risk of heart disease, he limited the amount of cholesterol in his diet.

diet

Definition: The usual food and drink of a person or animal

Context: Eating a healthful diet helps us feel good and stay healthy.

endurance

Definition: The ability to sustain stressful effort or activity

Context: Soccer players must have endurance to run up and down the field for the entire game.

exercise

Definition: Activity that is formed to develop or maintain fitness

Context: I feel really good on the days I exercise.

nutrient

Definition: A source of nourishment, especially a nourishing ingredient in a food.

Context: Carbohydrates are a nutrient that supplies the body with energy.

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:

- Science in Personal and Social Perspectives: Personal health
- Science in Personal and Social Perspectives: 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 <http://www.mcrel.org/>.

This lesson plan addresses the following national standards:

- Health: Understands the fundamental concepts of growth and development
-

