The NASA SCI Files™

The Case of the Physical Fitness Challenge

Segment 1

In *The Case of the Physical Fitness Challenge*, the tree house detectives are excited about their school's participation in the upcoming President's Challenge. All the detectives are hoping to be physically fit in time for the competition so they can win the Presidential Physical Fitness Award. Therefore, when RJ has difficulty keeping up with the fitness routine, they go into action to help him get back on track. The detectives do some research and discover that researchers at NASA Johnson Space Center in Houston, Texas are also interested in good health and nutrition. Tony heads over to speak with Mr. William Amonette, an Astronaut Strength and Conditioning Specialist. Mr. Amonette explains the importance of physical activity and tells Tony how astronauts must exercise before, during, and after space flight. While talking with Mr. Amonette, Tony learns that physical activity is not possible without muscles, so he goes to see Dr. Don Hagan, who explains what muscles are and the various types of muscles in the body. After reading Tony's reports, the detectives are not sure what to do next. They decide to stop by to talk with Dr. D. As Dr. D works on his car, he explains how the body is similar to a car because it has many systems. Thinking of systems, the tree house detectives decide that they might need to learn a little more about the skeletal system.

Objectives

Students will

- determine the importance of physical activity to a healthy lifestyle.
- discover how the heart pumps blood throughout the body.
- locate their pulse points and calculate their heart rates.
- prove that the more active a person is, the more the heart works to supply blood to the body.
- confirm that muscle strength and endurance increase over time with good stress.
- discover the relationship between muscles and bones.
- learn about the different kinds of body joints and how they move.

Vocabulary

aerobic activities – activities designed to increase the amount of oxygen in the blood

cardiac muscles – a special kind of involuntary muscle found in the heart (which works without a person's thinking about it)

exercise – any physical activity that raises your heart rate or makes you work hard to lift or pull an object, including your own body

joint – a place where two or more bones meet

muscles – soft, but strong tissue made of long fibers that contract or become shorter to move bones; muscles can only pull in one direction so they must work in pairs

resistive exercise – an activity that strengthens bone and muscle by generating force against resistance

skeletal muscles – a group of voluntary muscles (muscles that you can control), which are attached to bones or other muscles to help you move

smooth muscles – a group of involuntary muscles (muscles that work without conscious thought), which make up most of the body organs such as the stomach, insides of blood vessels, intestines, and others

stress – emotional tension or physical force; physical stress is created when bones and muscles work against a force