

GLOSSARY

Analyze - to examine by separating into parts and studying relationships

Animation - the creation of artificial moving images

Antagonistic - a muscle that counteracts the action of another muscle

Artificial - made to imitate nature

Athlete - someone with natural or trained ability for physical exercises or sports

Capture - to gain possession of; to attract and hold

Compact - solid; dense

Constantly - seemingly uninterrupted

Dedication - devotion; commitment

Flexible - capable of being bent or stretched

Forcea - push or pull that causes physical change

Honeycombed - full of cavities like a bee's honeycomb

Imitate - to copy; to try to be like

Mineral - a naturally occurring substance usually obtained from the ground

Porous - full of pores or small openings

Reaction - a response to a stimulus or a chemical change

Rigid - stiff; firm; unbending

Structure - arrangement of parts organized in a definite pattern

Tissues - a mass of cells forming elements of a plant or animal body

May be reproduced for use in the classroom.

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TMW MEDIA GROUP, INC.

2321 Abbot Kinney Blvd., Venice, CA 90291

(310) 577-8581 Fax (310) 574-0886

Email: sale@tmwmedia.com

Web: www.tmwmedia.com

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Show Me Science

The Wonders of Physiology

Movement of the Human Body

K4585DVD

Advanced Teachers Guide

SYNOPSIS:

The relationship between our skeletal and muscular systems allows our body to stand and move. This program looks at the human body in motion. It explains the composition of our muscles and bones and it illustrates how they interact to create movement. Discover how researchers use this knowledge to improve athletic performance and to develop new and improved technologies by adapting elements of the body's mechanics.

CURRICULUM UNITS:

- Anatomy
 - Biology
 - Engineering
 - Health
 - Physiology
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CAREER OPPORTUNITIES:

- Biologist
- Chiropractor
- Materials engineer
- Medical doctor
- Orthopedist
- Physiologist
- Physical therapist
- Robotic engineer
- Sport scientist

PROGRAM OVERVIEW:

The skeleton not only provides the frame that holds our body in shape, it also works with the body's six hundred and fifty muscles to allow movement to occur. This program looks at the skeleton and the bones themselves, exploring how they are composed and how they work in the body. We see experiments that measure the amount of pressure a bone can take before breaking, and the results of calcium loss when a bone is immersed in acid. The program also demonstrates how muscles are attached to bones, how muscles are made to contract, and how they make us move. Illustrations show muscle fibers close up.

Animations also portray how antagonistic muscle pairs work together as a gymnast performs, and how the bicep muscle contracts while the tricep relaxes. Simple animations used to improve athletic performance have been utilized to develop highly complex and lifelike computer games. Engineers are using artificial muscles to move robots, and scientists have already developed some artificial limbs that will enable incapacitated people to regain day-to-day functioning. But, this is just the beginning of what might be achieved by studying the skeletal and muscular systems and how they work together to create movement.

ISSUES & CRITICAL THINKING:

- 1) After showing the video, ask your students the following:
 - a| Why do we need to have a skeleton?
 - b| How do muscles work?
 - c| How can we show that bones are strong?
 - d| What is it about bones that makes them so strong?
 - e| What are antagonistic muscle pairs and how do they work?
2. Discuss how scientists study athletic performance.
3. Discuss how muscles and bones work together to produce motion.
4. Discuss calcium and why it's necessary for healthy bones.
5. Discuss what it takes for an athlete to perform at his or her best, and compare to performance in other fields.
6. Arrange a tour of a gym and see how athletes train their muscles.