

GLOSSARY

Artificial – An imitation made to substitute for something natural.

Atom – A small, dense, positively charged nucleus, made up of neutrons and protons, with electrons in a cloud around the nucleus.

Bionic – Having anatomical structures that are replaced or enhanced by electronic or mechanical parts.

Molecule – A very small particle.

Organ Donors – Persons or animals giving blood, tissue or an organ for use in a transfusion or transplant to another.

Remote – Operated or controlled from a distance.

Sensors – Devices that receive and respond to a signal or stimulus.

Synthetic – Prepared or made artificially.

Transplants – Replacements for a damaged organ or body part with healthy organs from another person or animal.

Virtual Reality – A computer simulation of a real imaginary system that enables a user to perform operations on the simulated system and shows the effects in real time.

Virtual Surgery – The use of pictures from video cameras, computer body scans and robots to perform precision surgery, sometimes from distance places.

May be reproduced for use in the classroom.

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Show Me Science

The Wonders of Physiology

Advances in Technology & Science

K4593DVD

Advanced Teachers Guide

SYNOPSIS:

In the next hundred years, medicine will change dramatically because of advances in technology and science. The new millennium is expected to bring in an age of less suffering, better health and longer life. Some scientists are predicting cures for cancer, heart disease and other diseases. Advances in engineering, chemistry and physics could change the way illnesses are diagnosed, treated and prevented. Students will learn about cloning a sheep, how scientists hope to rearrange atoms and molecules, one by one, to make atom-sized surgical robots that patients could swallow. This program examines what lies ahead for medicine and health in the new millennium.

CURRICULUM UNITS:

- Biology
- Chemistry
- Computer Science
- Engineering
- Medicine
- Physics

CAREER OPPORTUNITIES:

- Doctor
- Engineer
- Geneticist
- Medical Researcher
- Nurse
- Prosthetic Designer

PROGRAM OVERVIEW:

New technology is expected to dramatically change emergency medicine and increase the chances of survival. This program traces how animals including dolphins are used in medicine and therapy, then explains that pigs make good organ donors because they have the same blood type as humans. We also see how programmable robots will be built into prosthetic devices, such as arms and legs and how robots may eventually be used in operating rooms during surgery where precision is critical. Students will learn about cloning a sheep and how scientists hope to rearrange atoms and molecules one by one, to make atom-sized surgical robots that patients can swallow.

ISSUES & CRITICAL THINKING:

- After showing the program, ask the class the following:
1. Name some animals that might be useful to humans in medical treatment and research.
 2. What are some ways that doctors might be able to diagnose and treat patients at long distance.
 3. What are some examples of how robots might be used in medicine.
 4. Name some plants and animals that have been used by various cultures for medicinal purposes.
 5. Discuss the potential use of robots in medicine, particularly surgery. Start by asking students to make lists of the benefits and drawbacks of robots in medicine and the operating room. Then ask students to draw a picture of a robot caring for a patient in a doctor's office or operating room.