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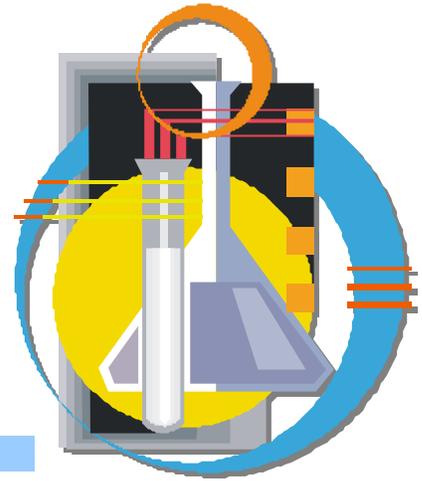
MEDICINE IN THE NEW MILLENNIUM

ALLEGRO PRODUCTIONS

2000

Grade Levels: 6-12

15 minutes



DESCRIPTION

Features probable medical advances that are on the horizon. Reports on animals as organ donors, plants as natural medicines, artificial limbs run by computer chips, robots doing surgery, medical imaging, nanotechnology, and genetic engineering. The potential is both enormous and exciting.

ACADEMIC STANDARDS

Subject Area: Technology

- Standard: Understands the nature and uses of different forms of technology
 - Benchmark: Understands ways in which medical technology improves the quality of health care (e.g., advanced diagnosing equipment, increased hospital sanitation)
 - Benchmark: Knows that genetic engineering is the process by which controlled changes in a genetic structure can be made and that this process is used to research and diagnose disease and create pharmaceuticals

INSTRUCTIONAL GOALS

1. To illustrate how 21st-century technology is expected to dramatically change emergency medicine and increase the chances of survival for crash victims.
2. To trace how animals are used in medicine and therapy.
3. To explain that pigs make good organ donors because they have the same blood type as humans.
4. To introduce how robots may eventually be used in operating rooms during surgery where precision is critical.
5. To illustrate that long-distance medicine is also expected to reach right into our homes.
6. To demonstrate cloning a sheep.

BACKGROUND INFORMATION

The program begins at the scene of a car accident to illustrate how 21st-century technology is expected to dramatically change emergency medicine and increase the chances of survival for crash victims.

The program traces how other 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, and that one day pigs might provide humans with replacement organs. 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. Futurists predict that in the 21st century, robots, computers, and television will enable leading surgeons to perform operations anywhere in the world while they sit in their own offices.

Long-distance medicine is also expected to reach right into our homes. The house of the future will be filled with electronic devices that will monitor our well-being. For example, while we sleep, sensors in the mattress will monitor our vital signs. Telephone lines will send information about us from the bed's sensors to a nearby hospital where it can be examined by doctors and nurses.

Students 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.

VOCABULARY

- | | |
|--------------------|---------------------|
| 1. artificial | 12. pistons |
| 2. atom | 13. precision |
| 3. bionic | 14. programmable |
| 4. breed | 15. remedies |
| 5. fertilized | 16. remote |
| 6. genetic | 17. sensors |
| 7. microprocessors | 18. synthetic |
| 8. molecule | 19. transplants |
| 9. monitor | 20. virtual reality |
| 10. nanotechnology | 21. virtual surgery |
| 11. organ donors | |

AFTER SHOWING

Discussion Items and Questions

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. Name some plants and animals that have been used by various cultures for medicinal purposes.
4. Use a model of the human body to discuss what organs and transplants or synthetic materials might replace body parts.
5. Discuss what students do not enjoy about visits to the doctor or hospital and ask them to brainstorm ways that science and medicine could eliminate those unpleasant experiences.
6. Discuss the potential use of robots in medicine, particularly in surgery. Start by asking students to make lists of the benefits and drawbacks of robots in medicine and the operating room.

Applications and Activities

1. Draw pictures of bionic people; that is, people with various body parts made of electronic parts or synthetic materials.
2. Build a bionic doll using parts from old dolls, watches, clocks, and scrap electronic equipment.
3. Draw a picture of a robot caring for a patient in a doctor's office or operating room.
4. Ask students to write a short story that puts them into the role of a doctor in the 21st century. The story must include some of the possible scientific and medical developments mentioned in the program.
5. Contact a neighborhood doctor or nurse to visit the class and talk about how medicine might change in the 21st century. How do hospitals expect their services to change during the next 5 to 10 years?

RELATED RESOURCES



Captioned Media Program

- Emerging Careers: Biotechnology Occupations #8636
- Nature's Pharmacy #8834



World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **NEW SCIENTIST**

<http://www.newscientist.com>

Contains many up-to-date and archival articles on cloning.

- **DOCTOR OVER TIME**

<http://www.pbs.org/wgbh/aso/tryit/doctor/>

This activity shows how doctors over the 20th century would have handled the same afflictions. Complain to the doctor, then see the responses and its consequences.

- **YORICK: A CLOSER LOOK!**

http://www.fda.gov/oc/opacom/kids/html/yorick_parts.htm

From the U.S. Food and Drug Administration site, click on Yorick the Skeleton's bionic parts to read about that particular part and its function.