

## Technology at Work 1: Teacher's Guide

**Grade Level:** 3-5

**Curriculum Focus:** Technology

**Lesson Duration:** Two class periods

### Program Description

From the ones and zeroes of the digital revolution to the ability to predict hurricanes, tornadoes, and floods, computers have given humankind a new way to manage its environment. Whether it's the instantaneous knowledge and communication of the Internet or new robots that move just like humans, this four-segment video shows your students how computers underlie every new technological step we take. (Video 1 of *Technology at Work* 2-pack.)

### Video Comprehension Questions

#### Segment 1, Computers

- Which presidential election was first counted by a computer? (*The 1952 election of Dwight D. Eisenhower was the first presidential election to be counted by a computer. Prior to that time, election results took days to count in order to determine winners.*)
- How does the computer store its information? (*The information is stored in numbers made up of combinations of 1s and 0s. Pictures are made of tiny blocks of light, and each block has a number.*)
- What is the difference between RAM and ROM? (*RAM, or Random Access Memory, is temporary memory, used to process data. It disappears when computer is turned off. ROM, or Read-Only Memory, is permanent memory. It comes from information on a disk drive.*)
- Why is Douglas Englebart important to the history of the computer? (*Douglas Englebart invented the mouse.*)

#### Segment 2, Internet

- What is a network? (*A network is a group of computers connected to each other; lots of networks connected into one large system is called the Internet.*)
- What is the Internet? (*The Internet is a collection of millions of computers around the world that are connected to each other. It allows people to send information back and forth quickly.*)
- What is e-mail? (*E-mail is actually a text file that is sent from one person to another through the Internet.*)
- What are Web sites and who has them? (*Web sites are places where groups of people share information and resources on the Internet. Organizations, big universities, elementary schools, and individual people have Web sites.*)

- How does a link work? (A link is a word or a picture that you can click on that will take you to another Web page.)

### Segment 3, Computerized Weather Forecasting

- How do meteorologists find out if there is going to be a storm? (Meteorologists collect and analyze information on air and sea temperature, wind speed, and how much rain is falling.)
- How far does a weather balloon rise and what does it measure? (A weather balloon rises 10 miles and records wind speed, humidity and temperature in different layers of the atmosphere.)
- What devices do weather stations have to read every hour on the hour to help meteorologists make accurate predications? (Weather stations record information from a rain gauge, anemometer, and weather vanes every hour.)
- Where do meteorologists get their information to make predictions about the weather? (Meteorologists get information from weather balloons, satellites, and weather stations.)

### Segment 4, Fantastic Robots

- What is the center of gravity? (Our center of gravity is the point on our bodies that we use to balance ourselves. Any object's center of gravity is the center of its mass.)
  - What is the most important feature of a robot that is well balanced? (The most important feature of a well balanced robot is a hip attachment located close to the center of gravity or point of balance.)
  - How does a robot run? (Robots that run have springs in their legs for bouncing along. Running robots are also well balanced. When robots run, they fly through the air and put one foot out in front. Next, their bodies travel over the foot until they spring into the air again and put out the other foot. This process is repeated constantly as robots run.)
  - How is a catching robot similar to a human? (A robot designed to catch objects has a built-in camera, that sees any object coming toward it, like the human eye. A computer in the robot acts like a human brain, making adjustments and corrections based on the changing position of the object. The "hand" of the robot can adjust its hold depending on the heaviness of the object it catches; just like a human can change his/her grip.)
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## Lesson Plan

### Student Objectives

Students will understand:

- Technology is defined as "any invention, including tools, machines, materials, techniques, and sources of power, that makes people's work easier."
- The history of technology really begins in prehistoric times.

### Materials

- *Technology at Work 1* video and VCR, or DVD and DVD player



- Research materials on the history of technology
- Computer with Internet access
- Long strips of paper

### *Procedures*

1. Ask your students what they think of when they hear the word *technology*. Ask them when they think technology began. Their answers are likely to center on modern technology, especially computer-related technology.
2. Let students know that technology is defined as “any invention, including tools, machines, materials, and sources of power, that makes people’s work easier.” Then ask them to reconsider their ideas about when technology began. They should realize that technology began the first time a human, or even a pre-human, used a stick or a rock as a tool or a weapon. Such advances as the ability to make fire, the development of agriculture, and the use of simple machines such as the lever or the inclined plane count as technology, as do electricity, nuclear power, and the computer.
3. Divide your class into groups, and have each group meet to brainstorm a list of at least 10 technological advances they think should be included on a time line of the most important technological advances in human history.
4. Next, have students do research to find the dates for the technological advances they plan to include on their time lines. (Prehistoric technology can be dated simply by the word “prehistoric.”)
5. Students can make their time lines on long strips of paper they cut out and tape together or on brown paper that comes in rolls. Time lines should include illustrations of the technological advances students wish to highlight.
6. When all groups have completed their time lines, display them around the classroom. Invite students to compare the time lines to see which technological advances were included on most of them.

### *Discussion Questions*

1. Debate the issue of computers that think on their own. What would be the advantages of this level of computer intelligence? What would be the disadvantages?
2. How would your school be different if there were no computers? Survey the different parts of your school (office, cafeteria, etc.) to find out where computers are used. Discuss how work would be done without computers to help us.
3. Describe how your class might use e-mail.
4. What information might your class want to share on a Web site? Remember this information could be text, photographs, drawings, sound, or video. Explain your design for a Web site.



## Assessment

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

- 3 points: Student's time line includes more than 10 items; dates accurate; illustrations included; time line carefully prepared
- 2 points: Student's time line includes at least 10 items; most dates accurate; illustrations included; time line satisfactorily prepared.
- 1 point: Student's time line includes less than 10 items; several inaccurate dates; few or no illustrations; time line carelessly prepared.

## Vocabulary

### central processing unit (CPU)

*Definition:* The part of a computer that interprets and executes instructions.

*Context:* The bits are sent to the computer's brain, the CPU, where they are translated back into words and pictures and symbols on the screen.

### e-mail

*Definition:* Messages sent and received electronically via telecommunications links.

*Context:* You can send an e-mail message from the U.S. to almost anywhere in the world in just seconds.

### modem

*Definition:* A device that converts information from your computer into signals that can travel through telephone lines.

*Context:* A modem takes information from your computer and turns it into a signal that can travel through the telephone lines.

### scanner

*Definition:* A device that allows one to convert pictures into images on the computer.

*Context:* You can also use a scanner to turn pictures into images on the computer that you can put on your Web site.

### Uniform Resource Locator

*Definition:* The address of a Web page, which allows people to find the page on the Internet.

*Context:* A Web page address is called a URL; that is an acronym that stands for uniform resource locator.

## *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: Science and technology in society

### **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:

- Technology: Understands the nature of technological design.
- Technology: Understands the relationships among science, technology, society, and the individual.

### **The National Council for the Social Studies (NCSS)**

NCSS has developed national guidelines for teaching social studies. To become a member of NCSS, or to view the standards online, go to <http://www.socialstudies.org>

This lesson plan addresses the following thematic standards:

- Science, Technology, and Society
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## **Support Materials**

Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the Discoveryschool.com Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit

- <http://school.discovery.com/teachingtools/teachingtools.html>
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