

Understand the Impact of Technology on History

Unit. Technology

Problem Area. History of Technology

Lesson. Understand the Impact of Technology on History

- **Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

- 1 Define technology and its impact on civilization.**
- 2 Identify the periods of human history associated with the evolution of technology.**

- **List of Resources.** The following resources may be useful in teaching this lesson:

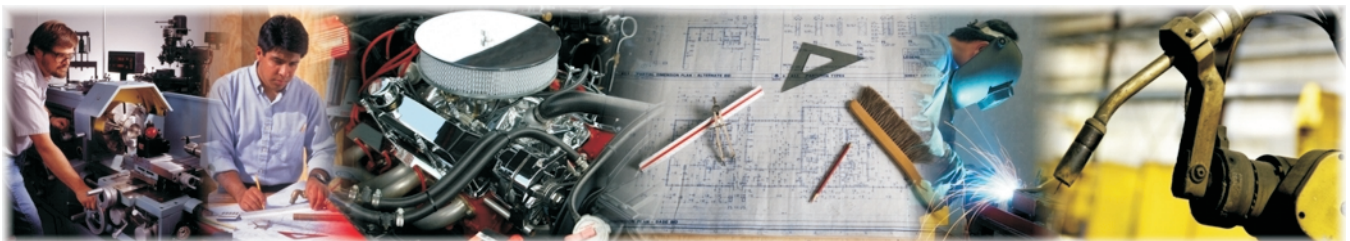
Basalla, George. *The Evolution of Technology*. New York: Cambridge University Press, 1989.

Hellems, Alexander. *The History of Science and Technology*. Boston: Houghton Mifflin, 2004.

History of Technology and Science. Carnegie Mellon University Library.
<<http://www.library.cmu.edu/Research/Humanities/History/hots.html>>

Pacey, Arnold. *Technology in World Civilization: A Thousand-Year History*. Reprint ed. Cambridge, MA: MIT Press, 1991.

Timelines of Invention and Technology. The New York Times Company.
<http://inventors.about.com/od/timelines/Timelines_of_Invention_and_Technology.htm>



■ **List of Equipment, Tools, Supplies, and Facilities**

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

■ **Terms.** The following terms are presented in this lesson (shown in bold italics):

- ▶ Bronze Age
- ▶ history
- ▶ Industrial Age
- ▶ Industrial Revolution
- ▶ Information Age
- ▶ Iron Age
- ▶ Mesolithic Age
- ▶ metallurgy
- ▶ microliths
- ▶ Middle Ages
- ▶ Neolithic Age
- ▶ Paleolithic Age
- ▶ Renaissance/Reformation/Enlightenment
- ▶ technology

■ **Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situation. A possible approach is included here.

Students probably already have some understanding of technology's role in determining the way we live, work, and produce things. Present students with an actual technological artifact (e.g., clock, light bulb, book) and ask how the artifact influenced the lives of those who first used it. Then ask the students to think about how the artifact may have influenced history. Did using the artifact create a "turning point" in history?

SUMMARY OF CONTENT AND TEACHING STRATEGIES

Objective 1: Define technology and its impact on civilization.

Anticipated Problem: What does technology mean and how does it affect civilization?

- I. **Technology**—Human innovation in action that involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities
 - A. Most technological development has been evolutionary, the result of a series of refinements to a basic invention.
 - B. The evolution of civilization has been directly affected by, and has in turn affected, the development of tools and materials.
 - C. Throughout history, technology has been a powerful force in reshaping the social, cultural, political, and economic landscape.
 - D. Early in the history of technology, the development of many tools and machines was not based on scientific knowledge but on technological know-how.

Many techniques can be used to help students master this objective. Use LS–A to compare and contrast technological innovations based on how they evolved and LS–B to show timelines of certain technological advancements.

Objective 2: Identify the periods of human history associated with the evolution of technology.

Anticipated Problem: What are the periods of human history associated with the evolution of technology?

- II. Periods of human **history** (a chronological record of significant events, often including an explanation of their causes)
 - A. **Paleolithic Age** (500,000–10,000 BC)
 1. Characterized by the earliest known stone tool manufacture
 2. Artifacts
 - a. Stone axes
 - b. Bone needles
 - c. Hearth sites
 3. Impact: Improved diet and enhanced security enabled early humans to increase their numbers.

B. **Mesolithic Age** (10,000–4000 BC)

1. Associated with the rise to dominance of **microliths** (very small geometric-form tools commonly used in composite tools)
2. Artifacts
 - a. Leatherwork
 - b. Basketry
 - c. Fishing tackle
 - d. Stone adzes
 - e. Wooden objects (e.g., canoes, bows)
 - f. Stone circles
3. Impact: The gradual domestication of plants and animals led to the beginnings of settled communities.

C. **Neolithic Age** (4000–2300 BC)

1. Characterized by the development of agriculture and, therefore, an increasing emphasis on year-round settlements
2. Artifacts
 - a. Pottery
 - b. Polished stone tools
 - c. Spinning and weaving tools
 - d. Wooden and stone plows
 - e. Sickles
3. Impact: Dependable year-round food supply enabled division of labor and specialization that spurred invention and innovation.

D. **Bronze Age** (2300–700 BC)

1. Included the earliest civilizations and the development of **metallurgy** (extracting metals from ores), mainly the combining of copper and tin to make bronze
2. Artifacts
 - a. Bronze jewelry
 - b. Bronze tools
 - c. Bronze weapons
3. Impact: The use of bronze was a great technological step, eventually changing the course of everyday life as stone tools gradually were replaced by metal ones that enabled humans to alter their environment at a rapid rate.

E. **Iron Age** (700 BC–AD 450)

1. Characterized by the use of iron as the main metal
2. Artifacts
 - a. Iron dagger
 - b. Iron chisels
 - c. Small figurines
 - d. Ornamental jewelry
 - e. Swords

- f. Axes
 - g. Spearheads
3. Impact: Iron weapons allowed for greater military dominance and the use of iron-bladed plows enabled humans to cultivate heavier soils and increase food production.
- F. **Middle Ages** (AD 450–1400)
- 1. Period of European history between the fall of Rome and the Renaissance, often dated from AD 476 to 1453
 - 2. Artifacts
 - a. Wheeled plow
 - b. Improved harness for horses
 - c. Horseshoes
 - d. Windmill
 - e. Cast iron
 - f. Cannons
 - g. Mechanical clock
 - h. Compass
 - i. Ocean-going ships
 - 3. Impact: Everyday life was changed dramatically by the rise and decline of serfdom and feudalism, the rise of the money economy and capitalism, and the beginnings of urbanization and industrialization.
- G. **Renaissance/Reformation/Enlightenment** (AD 1400–1750)
- 1. Transitional movement in Europe between the Middle Ages and modern times, marked by a humanistic revival of classical influence
 - 2. Artifacts
 - a. Telescope
 - b. Microscope
 - c. Thermometer
 - d. Clocks
 - e. Barometer
 - 3. Impact: Instrumentation enabled early scientists to observe and quantify natural phenomena.
- H. **Industrial Age** (AD 1750–1950)
- 1. Characterized by the first use of complex machinery, factories, urbanization, and a gradual shift away from strictly agricultural societies
 - 2. Artifacts
 - a. Steam engine
 - b. Electricity
 - c. Automobile
 - d. Airplane
 - e. Radio

- f. Television
 - g. Telephone
 - h. Rocket
3. Impact: The **Industrial Revolution** gave rise to urban centers requiring vast municipal services, created a specialized and interdependent economic life, and provided the economic base for the rise of the professions, population expansion, and improvement in living standards.
- I. **Information Age** (AD 1950–present)
- 1. Gathering, manipulation, classification, storage, and retrieval of information is central to the workings of society
 - 2. Artifacts
 - a. Transistor
 - b. Integrated circuit
 - c. Computer
 - d. Communication satellite
 - e. Artificial heart
 - f. Nuclear power plant
 - g. Space shuttle
 - 3. Impact: As information becomes more widely available, increasing numbers of individuals and organizations will be able to make decisions that only “experts” could make in the past, decentralizing decision-making and empowering more people.

Many techniques can be used to help students master this objective. As an example, use VM–A to illustrate the nine periods of human history associated with the evolution of technology.

- **Review/Summary.** Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at the ends of chapters in the textbook may also be used in the review/summary.
- **Application.** Use the included visual master and lab sheets to apply the information presented in the lesson.
- **Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

■ **Answers to Sample Test:**

Part One: Matching

1. i
2. e
3. b
4. f
5. c
6. a
7. j
8. g
9. d
10. h

Part Two: Completion

1. Technology
2. Mesolithic
3. metallurgy
4. Industrial

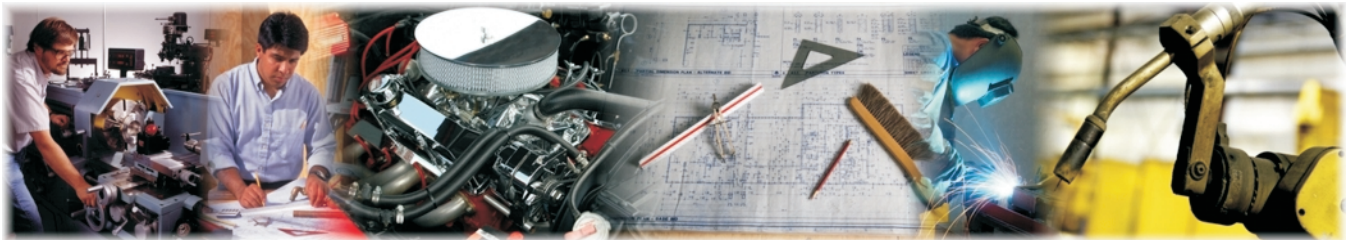
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► Part One: Matching

Instructions: Match the term with the correct definition.

- | | |
|--------------------------|--|
| a. Industrial Revolution | f. Bronze Age |
| b. Information Age | g. Renaissance/Reformation/Enlightenment |
| c. Middle Ages | h. history |
| d. Paleolithic Age | i. Iron Age |
| e. microliths | j. Neolithic Age |

- ___ 1. Characterized by the use of iron as the main metal.
- ___ 2. Very small geometric-form tools commonly used in composite tools.
- ___ 3. Artifacts from this period include the computer, transistor, and communication satellite.
- ___ 4. Stone tools were gradually replaced by metal ones during this period.
- ___ 5. Period between the fall of Rome and the Renaissance, often dated AD 476 to 1453.
- ___ 6. Characterized by the rise of the professions, population expansion, and improved living conditions.
- ___ 7. Associated with the development of agriculture.
- ___ 8. Transitional period between the Middle Ages and modern times in which the telescope and microscope were invented.
- ___ 9. Characterized by the earliest stone manufacture.
- ___ 10. A chronological record of events.



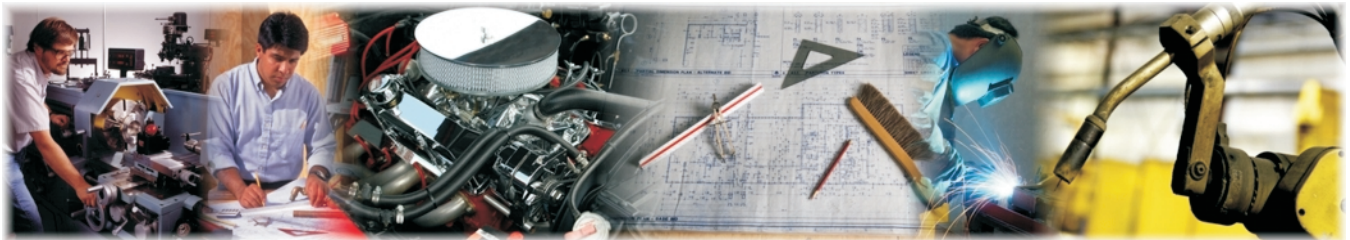
► **Part Two: Completion**

Instructions: Provide the word or words to complete the following statements.

1. _____ is human innovation in action that involves the generation of knowledge and processes to solve problems and extend human capabilities.
2. The gradual domestication of plants and animals led to the beginnings of settled communities during the _____ Age.
3. The process of extracting metals from ores is known as _____.
4. The _____ Age was characterized by the first use of complex machinery such as the steam engine and the automobile.

PERIODS OF HUMAN HISTORY

- ◆ Paleolithic Age (500,000–10,000 BC)
- ◆ Mesolithic Age (10,000–4000 BC)
- ◆ Neolithic Age (4000–2300 BC)
- ◆ Bronze Age (2300–700 BC)
- ◆ Iron Age (700 BC–AD 450)
- ◆ Middle Ages (AD 450–1400)
- ◆ Renaissance/Reformation/Enlightenment (AD 1400–1750)
- ◆ Industrial Age (AD 1750–1950)
- ◆ Information Age (AD 1950–present)



Technological Evolution

Purpose

The purpose of this activity is to allow students to compare and contrast inventions or innovations based on how they evolved.

Objectives

1. Compare and contrast specific inventions or innovations based on how they have evolved.
2. Present this information to the class in a logical and well-organized manner.

Materials

- ◆ paper
- ◆ writing utensil

Procedure

1. Have students get together in groups of two.
2. Assign two inventions or innovations to each group.
3. Each student should select one of the inventions or innovations assigned to his or her group and compare and contrast it with the other assigned to his or her group, based on how the two inventions or innovations have evolved over time.
4. Each group should then present its findings to the class.

Timeline

Purpose

The purpose of this activity is to allow students to develop a timeline for a given technological advancement that affected history.

Objectives

1. Develop a timeline for a given technological advancement, including innovations that preceded and followed it.
2. Display and describe the timeline to the class.

Materials

- ◆ poster board
- ◆ markers

Procedure

1. Have students get together in groups of two or three.
2. Give each group some poster board and markers.
3. Assign a technological advancement that affected history to each group.
4. Using the poster board and markers, each group should create a timeline for its advancement, including innovations that preceded and followed it (i.e., “What was used before to meet the need?” and “What was used later to meet the need?”).
5. Each group should then display and describe its timeline to the class.