

Foundations of Technology

Unit I The History of Technology

Unit 1: The History of Technology

Overview

Standards

- Students will develop an understanding of the influence of technology on history. (ITEA-STL 7) (International Technology Education Association-*Standards for Technological Literacy*)
- Students will develop abilities to assess the impacts of products and systems. (ITEA-STL 13)
- Students will develop an understanding of and be able to select and use information and communications technologies. (ITEA-STL 17)
- Students will develop an understanding of the nature of science. (AAAS-BSL) (American Association for the Advancement of Science-*Benchmarks for Science Literacy*)
- Students will develop an understanding of the designed world. (AAAS-BSL)
- Students will use mathematical models to represent and understand quantitative relationships. (NCTM) (National Council of Teachers of Mathematics)
- Students will analyze change in various contexts. (NCTM)
- Students will develop an understanding of mathematics processes. (Communications) (NCTM)

Benchmarks

ITEA – Benchmarks for Technological Literacy	AAAS - Benchmarks for Science	NCTM – Benchmarks for Mathematics
<ul style="list-style-type: none"> • Most technological development has been evolutionary, the result of a series of refinements to a basic invention. (7-G) • The evolution of civilization has been directly affected by, and has in turn affected the development of tools and materials. (7-H) • Throughout history, technology has been a powerful force in reshaping the social, cultural, political, and economic landscape. (7-I) • Early in the history of technology, the development of many tools and machines was not based on scientific knowledge but on technological know-how. (7-J) • The Iron Age was defined by the use of iron and steel as the primary materials for tools. (7-K) • The Middle Ages saw the development of many technological devices that produced long-lasting effects on technology and society. (7-L) 	<ul style="list-style-type: none"> • Modern science is based on traditions of thought that came together in Europe about 500 years ago. • The Industrial Revolution happened first in Great Britain because that country made practical use of science, had access by sea to world resources and markets, and had an excess of farm workers willing to become factory workers. • The Industrial Revolution increased the productivity of each worker, but it also increased child labor and unhealthy working conditions, and it gradually destroyed the craft tradition. • The Industrial Revolution is still underway as electric, electronic, and computer technologies change patterns of work and bring with them economic and social consequences. 	<ul style="list-style-type: none"> • Model and solve contextualized problems using various representations, such as graphs, tables, and equations. • Use the language of mathematics to express ideas precisely. • Draw reasonable conclusions about a situation being modeled. • Use graphs to analyze the nature of changes in quantities in linear relationships. • Approximate and interpret rates of change from graphical and numerical data • Identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships.

Benchmarks, continued

ITEA – Benchmarks for Technological Literacy	AAAS - Benchmarks for Science	NCTM – Benchmarks for Mathematics
<ul style="list-style-type: none"> • The Renaissance, a time of re-birth of the arts and humanities, was also an important period in the history of technology. (7-M) • The Industrial Revolution saw the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. (7-N) • The Information Age places emphasis on the processing and exchange of information. • Collect information and evaluate its quality. (13-J) • There are many ways to communicate information, such as graphic and electronic means. (17-P) 		

Big Idea:

Knowledge of the history of technology helps people understand the world around them by seeing how people of all times and places have increased their capability by using their unique skills to innovate, improvise, and invent.

Adapted from STL and J. Hammond, Chancellor Emeritus, State College System, Massachusetts

Unit 1 Objectives**At the completion of this unit, students will:**

1. Explain why, early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how.
2. Explain that most technological development has been evolutionary, the result of a series of refinements to a basic invention.
3. Describe how the evolution of civilization has been directly affected by, and has in turn affected the development of tools and materials.
4. Identify the periods of human history associated with the evolution of technology.
5. Categorize inventions and innovations based on technological time periods.
6. Compare and contrast inventions or innovations based on how they evolved.
7. Describe anticipated positive and negative impacts as well as the unanticipated positive and negative impacts of technological innovations.
8. Compare and contrast life in periods of technological development.
9. Explain how the way people live and work has changed throughout history because of technology.
10. Identify and describe social, cultural, political, and economic significance of historical technological advancements.
11. Conduct effective and focused research.
12. Use computers and calculators to access, retrieve, organize, and evaluate data and information in order to communicate.
13. Organize and present data effectively.
14. Use mathematical modeling techniques for making predictions about the future applications of technology.
15. Present research findings effectively using instructional technology.
16. Conduct self-assessment of work performance.
17. Assess peers' work performance.
18. Explain mathematical functions (linear, quadratic, or exponential) and how they may represent an aspect of technological change.
19. Address open-ended questions in verbal and written form.
20. Contribute to a group endeavor by offering useful ideas, supporting the efforts of others, and focusing on the task.
21. Work safely and accurately with a variety of tools, machines, and materials.
22. Actively participate in group discussions, ideation exercises, and debates.
23. Demonstrate curiosity, exhibit motivation for learning, and use class time effectively.
24. Exhibit and refine inherent personal qualities such as creativity and resourcefulness.

Unit I – The History of Technology Pre-Test

Directions: Circle the T or F in the column to the left of each true (T) or false (F) statement.

- T F 1. Most technological development has been evolutionary, the result of a series of refinements to a basic invention.
- T F 2. The evolution of civilization has not been directly affected by the development of tools and materials.
- T F 3. Throughout history, technology has been a minor force in reshaping the social, cultural, political, and economic landscape.
- T F 4. Early in the history of technology, the development of many tools and machines was not based on scientific knowledge, but on technological know-how.
- T F 5. The Iron Age was defined by the use of iron and steel as the primary materials for tools.
- T F 6. The Middle Ages saw the development of few technological devices that produced long-lasting effects on technology and society.
- T F 7. The Renaissance, a time of rebirth of the arts and humanities, was also an important period in the history of technology.
- T F 8. The Dark Ages saw the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time.
- T F 9. The Information Age places little emphasis on the processing and exchange of information.
- T F 10. The development and use of technology poses ethical issues.

Place the letter of the correct answer in the box at left of statement.

11.		Involves considering how every part relates to others. A. science B. technology C. systems thinking D. feedback
12.		Human innovation that involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities. A. computers B. optimization C. technology D. management
13.		The parameters placed on the development of a product or system. A. requirements B. knowledge C. standardization D. trade-offs
14.		The use of _____ affects humans' comfort and safety. A. trade-offs B. technology C. trend analysis D. constraints
15.		Technological _____ is the ability to use, manage, understand, and assess technology. A. mobility B. optimization C. literacy D. forecasting

Unit I – The History of Technology Unit Test

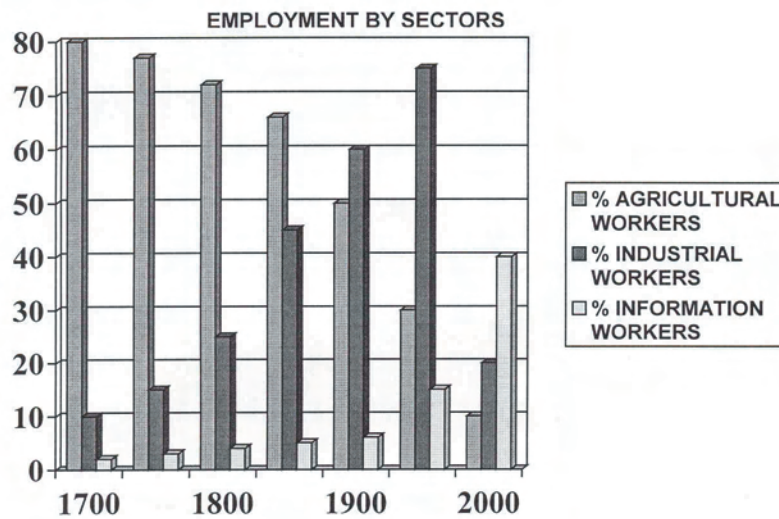
Use the terms in Column II to complete the sentences in Column I.

	Column I	Column II
1.	The evolution of civilization has been directly affected by the development of tools and _____.	Industrial Revolution
2.	Throughout history, _____ has been a major force in reshaping the social, cultural, political, and economic landscape.	Information Age
3.	The _____ was defined by the use of iron and steel as the primary materials for tools.	invention
4.	The Middle Ages saw the development of many technological devices that produced long-lasting effects on technology and _____.	Iron Age
5.	The _____, a time of rebirth of the arts and humanities, was also an important period in the history of technology.	materials
6.	The _____ saw the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time.	Renaissance
7.	The _____ places great emphasis on the processing and exchange of information.	society
8.	The _____ has been at the heart of many technological improvements.	specialization of function
		technology

Place the letter of the correct answer in the box at left of statement.

9.	Most technological development has been _____, the result of a series of refinements to a basic invention. A. evolutionary B. obsolete C. negative D. instantaneous
10.	Early in the history of technology, the development of many tools and machines was not based on scientific knowledge, but on _____. A. technological know-how B. mathematics C. social science D. philosophy
11.	There are different traditions in science about what is investigated and how, but they all have in common certain basic beliefs about the value of evidence, _____, and good arguments. A. the earth B. technology C. logic D. safety
12.	The early Egyptian, Greek, Chinese, Hindu, and Arabic cultures are responsible for many _____ and technological inventions. A. resources B. relationships among fields of study C. scientific and mathematical ideas D. transformations

13.	<p>Modern science is based on traditions of thought that came together in Europe about _____ years ago.</p> <p>A. 50 B. 500 C. 5,000 D. 50,000</p>
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Briefly answer the following questions.

14. Based on the graph above, in approximately what year did industrial employment reach its peak?
15. Based on the graph above, what has been the general trend in employment in the information sector?
16. Based on the graph above, did the rate of change for agricultural employment increase or decrease between 1700 and 2000?
17. In general terms, explain how the way people live and work has changed throughout history because of technology.