Foundations of Technology

History of Technology

Foundations of Technology – ITEA 7

eLearning, Montgomery County Public Schools

You will learn…

- Most technological developments have been evolutionary, the result of a series of refinements to a basic invention. (ITEA 7-G)
- The evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. (ITEA 7-H)
- Throughout history, technology has been a powerful force in reshaping the social, cultural, political, and economic landscape. (ITEA 7-I)
- Early in the history of technology, the development of many tools and machines was based not on scientific knowledge, but on technological know-how. (ITEA 7-J)

> "However far modern science and technics have fallen short of their inherent possibilities, they have taught mankind at least one lesson: Nothing is impossible."
>
> - Lewis Mumford

- The Iron Age was defined by the use of iron and steel as the primary materials for tools. (ITEA 7-K)
- The Middle Ages saw the development of many technological devices that produced long-lasting effects on technology and society. (ITEA 7-L)
- The Renaissance, a time of rebirth of the arts and humanities, was also an important development period in the history of technology. (ITEA 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. (ITEA 7-N)
- The Information Age places emphasis on the processing and exchange of information. (ITEA 7-O)

Refining An Idea

Most technological developments have been evolutionary, the result of a series of refinements to a basic invention. (ITEA 7-G)

In this lesson, **refining an idea** is discussed. Inventors and teams of people take an idea, which is the mental image of how a person thinks something should be, and they process the idea to improve on the original invention.

What do we mean by "*Refining An Idea*?" In the simplest terms it means improving something or adding value to a product that already exists.

Many inventions and innovations have evolved by using slow and methodical processes of tests and refinements. From the black and white televisions of 50 years ago, through the refinement of color television, to the development of high definition, mobile, and web-based television, the process has involved a series of refinements to the basic invention.

Basic Television Design is Refined

Example: Refining the Light Bulb…

During the development of the incandescent light bulb, Thomas Edison, and a team of 20 highly skilled technical personnel, performed more than 1000 tests before they narrowed their ideas to the one that worked.

Since that first light bulb burned for 13 hours in 1879, there have been many innovations and design changes that we call refinements to the original design.

Most technological development has been evolutionary, the result of a series of refinements to a basic invention.

Light Bulbs Evolve

Technology Shapes Our World

Rising Gas Prices

Our world, our history, society, political process, and our economy are all shaped by technology.

We depend on our cars for transportation; our cars will not run without fuel. Gas prices keep going up creating hardships on everyone. Fuel prices impact how much we drive and how far we drive, as well as bigger issues like the cost of food and national security.

Our way of life depends upon transportation systems that run on cheap and available oil supplies. As that dynamic changes, new technologies will be developed and our society, as well as our way of life, will change shaped by the impact of our technologies and our dependence upon them.

Technology of the Times

Historical periods have been defined and named in terms of the dominant products or systems of the time. For instance, the *Stone Age* began with the development of chipped-stone tools, which later evolved into hand axes, blade tools, spears, and the bow and arrow. Fire was also harnessed at this time.

Other historical periods have been characterized by technological developments — the wheel, the printing press, mass production, and the computer for example.

Fire

The Wheel

Mechanical Clock

Without question, key developments in technology have pushed civilization forward and laid the foundation for the present high-technology era.

Over the past 200 years, technological and scientific growth has become closely linked with the idea of progress. As you compare the various eras and understand the history of technology you are also studying the process of change.

The study of the history of technology helps determine possible scenarios for the future. For example, the development of the mechanical clock in the fourteenth century changed how people regarded their use of time.

History of Technology

Over time, humanity has invented objects and methods for accomplishing tasks which fulfill some purpose in a new or different manner. Usually, the objective of realizing that purpose is a faster, more efficient, easier, or cheaper way to accomplish the task.

Technological changes may be abrupt and obvious while at other times, they are evolutionary and subtle. The effects of technological advancements throughout history are very powerful, irreversible, and global.

The **history of technology** is the history of the invention of tools and techniques for doing practical things. To understand where we are in today's world we must first understand how we got here, so let's examine the following periods of time.

The Stone Age

The Bronze Age

The Iron Age

The Renaissance

The Industrial Revolution

The Information Age

The Stone Age

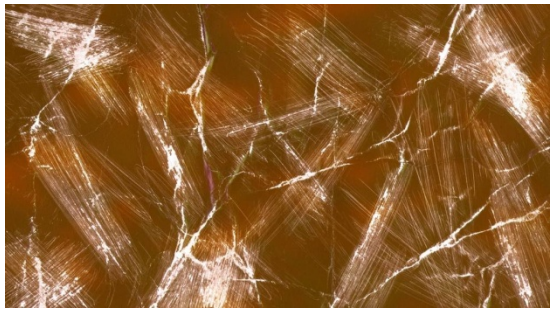
The **Stone Age** started with the development of stone tools used for hunting, cutting, and pounding vegetables and meat. It progressed to the harnessing of fire for heating, cooking, and protection.

Early in the history of technology, the development of many tools and machines was based, not on scientific knowledge, but on technological know-how.

The first major technologies, then, were tied to survival, hunting, and food preparation in this environment. Fire, stone tools and weapons, and clothing were technological developments of major importance during this period.

During the Stone Age**,** all humans were hunter-gatherers, a lifestyle which involved limited use of tools and few, if any, permanent settlements.

The Bronze Age



WORN TORN COPPERY BRONZE - With white scratch marks

The **Bronze Age** began with the discovery of copper and copper-based metals. Agricultural techniques were developed to improve the cultivation of food and its supply.

The Bronze Age also involved the development of better ways to communicate through the development of paper, ink, and the alphabet. It brought about the ability to navigate with boats made of timbers, and to understand human anatomy with the aid of an embalming process.

The Iron Age

The <u>Iron Age</u> was defined by the use of iron and steel as the primary materials for tools. During this period, sustained technological development caused many people to migrate from farms to developing towns and cities.

Other influential developments during the Iron Age included weaving machines and the spinning wheel, which advanced the making of cloth and gunpowder and guns, which were an improvement over previous weapons for both hunting and protection.

The wide application of new agricultural technologies, such as the sickle, the plow, the windmill, and irrigation, enabled farmers to grow more food.

The Middle Ages

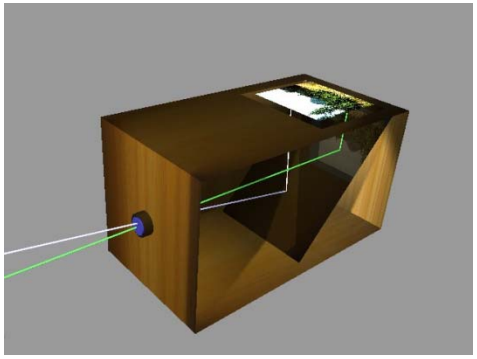
Magnetic Compass

Waterwheel

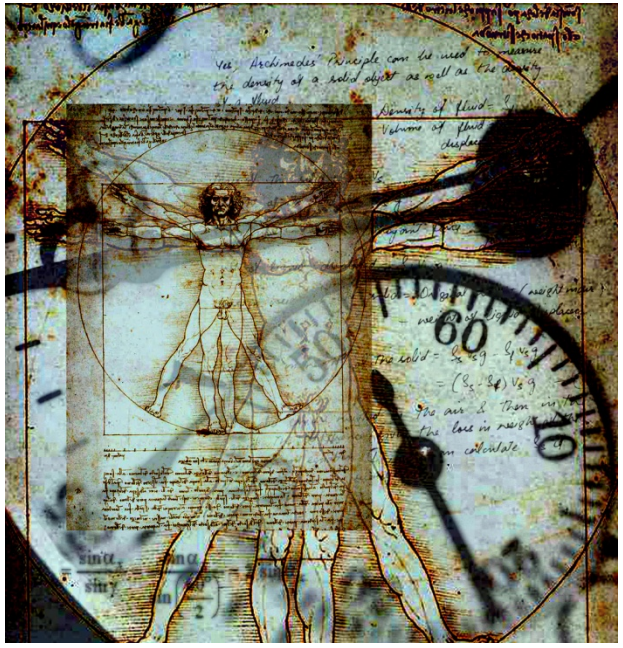
The <u>Middle Ages</u> saw the development of many technological devices that produced long-lasting effects on technology and society. This period saw the development of the waterwheel, the block printing process, paper money, the magnetic compass, and the printing press.

In many ways, all of these devices are still being used today, although they have been greatly modified from their earlier designs.

The Renaissance



Camera Obscura



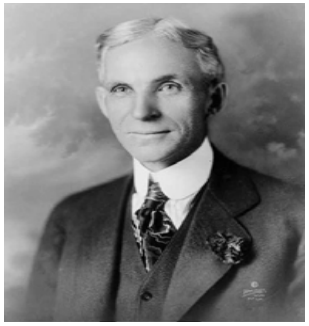
DaVinci Designs

The Renaissance, a time of rebirth of the arts and humanities, was also an important development in the history of technology. Leonardo DaVinci, an Italian painter, architect, and engineer, created drawings and written descriptions of the human flying machine, parachutes, diving bell suit, articulated chains, a giant crossbow, and circular armored vehicles. Gunsmiths, while seeking a means to adjust their gun mechanisms, invented the first screwdriver.

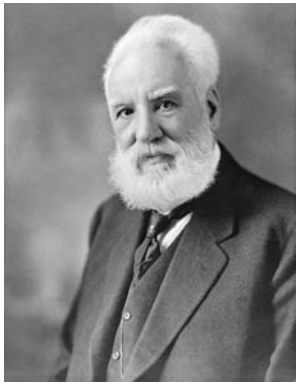
The camera obscura, silk knitting machines, the telescope, the submarine, the hydraulic press, and the calculating machine were developed during this time period.

The Industrial Revolution

Eli Whitney



Henry Ford



Alexander Graham Bell

The **Industrial Revolution** saw the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time.

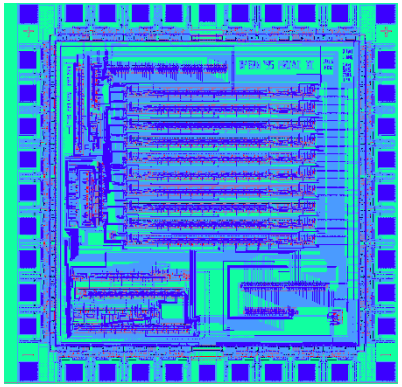
Major developments of the Industrial Revolution included the continuous-process flourmill, power loom and pattern-weaving loom, steam engine, electric motor, gasoline and diesel engines, vulcanized rubber, airplane, telegraph, telephone, radio, and television.

The concepts of Eli Whitney's interchangeable parts and Henry Ford's movable conveyor added to the advances made in the production of goods.

The Information Age

The binary language

Personal Computer



Eniac-on-a-Chip Project

The **Information Age** places emphasis on the processing and exchange of information. The development of binary language, microchips, and an electronic numerical integrator and calculator (ENIAC) led to an explosion of computers, calculators, and communication processes to move information from place to place.

Holography, cybernetics, xerographic copying, the hydrogen bomb, the lunar landing ship, communication satellites, prefabrication, biotechnology, and freeze-drying have all been major developments during this time period.

Technology and Time

Traditional Hourglass

Digital Hourglass

You have just read about the major inventions and innovations from various times in history, you can draw conclusions of your own about how society and culture influence technological development and vice versa.

Reading about the history of technological developments in the broader context of human history has shown how the impact of technology products and systems on humankind has changed over time.

Summary

- Most technological development has been evolutionary, the result of a series of refinements to a basic invention.
- Over time, refinement of inventions and innovative products has impacted humankind.
- The evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials.
- Throughout history, technology has been a powerful force in reshaping the social, cultural, political, and economic landscape.
- Early in the history of technology, the development of many tools and machines was based, not on scientific knowledge but, on technological know-how.
- The history of technology is the history of the invention of tools and techniques for doing practical things.
- Technological changes may be abrupt and obvious, but at other times they may be evolutionary and subtle.
- Historical periods have been defined and named in terms of the dominant products or systems of the time.
- Time periods include the Stone Age, Bronze Age, Iron Age, The Renaissance Period, Industrial Revolution, and the Information Age.
- The Stone Age started with the development of stone tools.
- The Bronze Age began with the discovery of copper and copper-based metals.
- The Iron Age was defined by the use of iron and steel as the primary materials for tools.
- The Renaissance, a time of rebirth of the arts and humanities, was also an important development period in the history of technology.
- The Industrial Revolution saw the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time.
- The Information Age places emphasis on the processing and exchange of information.

This has been a presentation on…

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History of Technology

Glossary

Stone Age	Fire, stone tools and weapons, and clothing were technological developments of major importance during this period.
Bronze Age	involved the development of better ways to communicate through the development of paper, ink, and the alphabet - It brought about the ability to navigate with boats made of timbers, and to understand human anatomy with the aid of an embalming process
Iron Age	defined by the use of iron and steel as the primary materials for tools - During this period, sustained technological development caused many people to migrate from farms to developing towns and cities.
Middle Ages	the development of many technological devices that produced long-lasting effects on technology and society - This period saw the development of the waterwheel, the block printing process, paper money, the magnetic compass, and the printing press.

Glossary

Industrial Revolution	the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time
Information Age	places emphasis on the processing and exchange of information - The development of binary language, microchips, and an electronic numerical integrator and calculator (ENIAC) led to an explosion of computers, calculators, and communication processes to move information from place to place.