

## Overview

This handbook presents key developments in science and technology. It consists mainly of four timelines. Be sure students see that each of the timelines runs across all four pages of the handbook. The timelines cover developments in science and technology, medicine, communication, and transportation. Together they reveal a story of progress in understanding the natural world and applying that knowledge in practical ways.

## Test Preparation

Divide the class into groups and assign each group a period of years from the timelines. Have each group choose three different developments in science and technology from their period and do more research on them. They should determine the following: the inventor, if any, the society in which the development occurred, what life was like in that society at the time, what major historical events were taking place there and elsewhere around that time, and what effect the development had on the world. Have each group, in chronological order, present its findings to the class.

## Analyzing the Visuals

Have students study one particular period across all four timelines to get an idea of the level of advancement of human beings at that time. Write the date *3000 B.C.* on the board. Ask **How did some civilizations communicate at this time?** (*through pictogram writing*) **How did they travel over water?** (*by dugout canoe or square-sailed ship*) **If one civilization had access to all the developments in science and technology available in 3000 B.C., what might their day-to-day lives have been like?** (*Students should describe how people acquired food, made tools, communicated, and traveled.*)

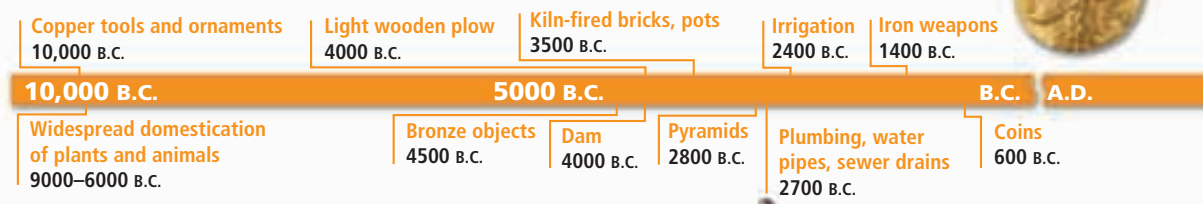


▲ Egyptian A-frame and plumb line

Science is knowledge systematically acquired through observation, experimentation, and theoretical explanation. Technology is the practical application of science. Science and technology are often paired, and for good reason. They work together, each one promoting progress in the other field. Inventors use the latest science to develop cutting-edge technology that, in turn, helps scientists gather new information. That new information often leads to further advances in technology.

### Key Developments in Science and Technology

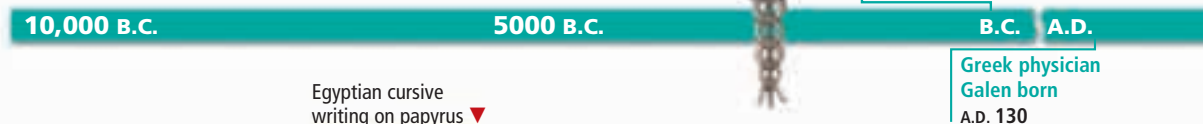
#### Science and Technology



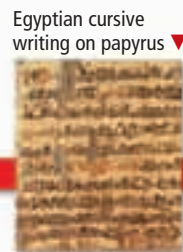
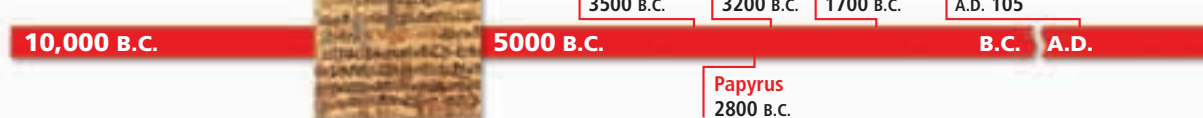
Coin showing Alexander the Great ▶



#### Medicine



#### Communication



▼ Egyptian cursive writing on papyrus

#### Transportation



## Bibliography

### For the Teacher

- Boorstin, Daniel. *The Discoverers*. Random House, 1983.
- McClellan, James E., et al. *Science and Technology in World History: An Introduction*. Johns Hopkins University Press, 1998.
- Trefil, James S., ed. *The Encyclopedia of Science and Technology*. Routledge, 2001.

### For the Student

- Bridgman, Roger. *1000 Inventions and Discoveries*. Dorling Kindersley, 2003.
- McGowen, Tom. *The Beginnings of Science*. Twenty-First Century, 1998.
- Reid, Struan. *Inventions and Trade*. Silver Burdett, 1994.



◀ Italian compass

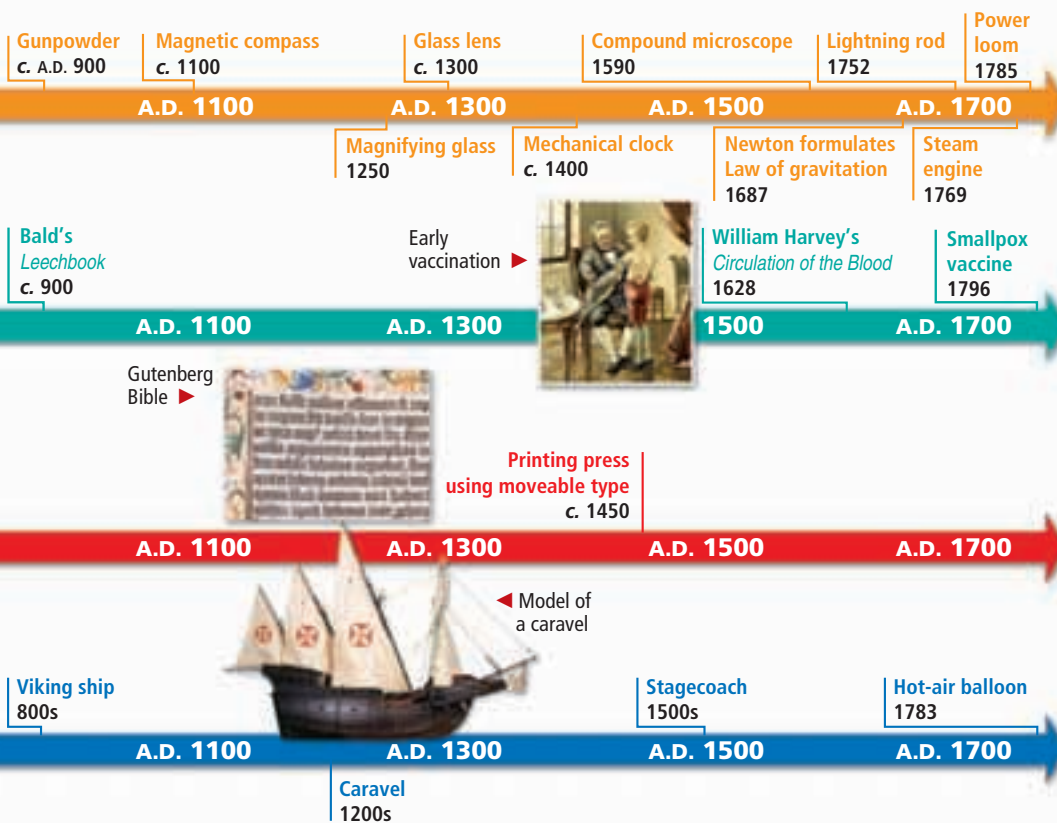


▼ Seed drill

## Analyzing the Visuals

Point out the compass and the ship on this page. Ask **When was the magnetic compass invented? (around A.D. 1100)** **When did Christopher Columbus sail to the Americas? (1492)** **What effect do you think the invention of the magnetic compass had on European exploration of the Americas? (The compass greatly helped mariners stay on course as they traveled across the open ocean.)**

concept connector science and technology



### Differentiated

#### Instruction

Solutions for All Learners

#### L1 Special Needs L2 Less Proficient Readers

Discuss with students the difference between science and technology, as explained in the introduction to this handbook. Ask **What technological innovation occurred in 1590? (invention of the compound microscope)** **How did that invention help advance science? (help scientists gather new information)**

#### L2 English Language Learners

Point out that scientists used the compound microscope to improve their ability to view organisms that were too small to be seen by the naked eye. This opened up a whole new world to scientists. For example, it advanced their understanding of how certain organisms can cause disease.

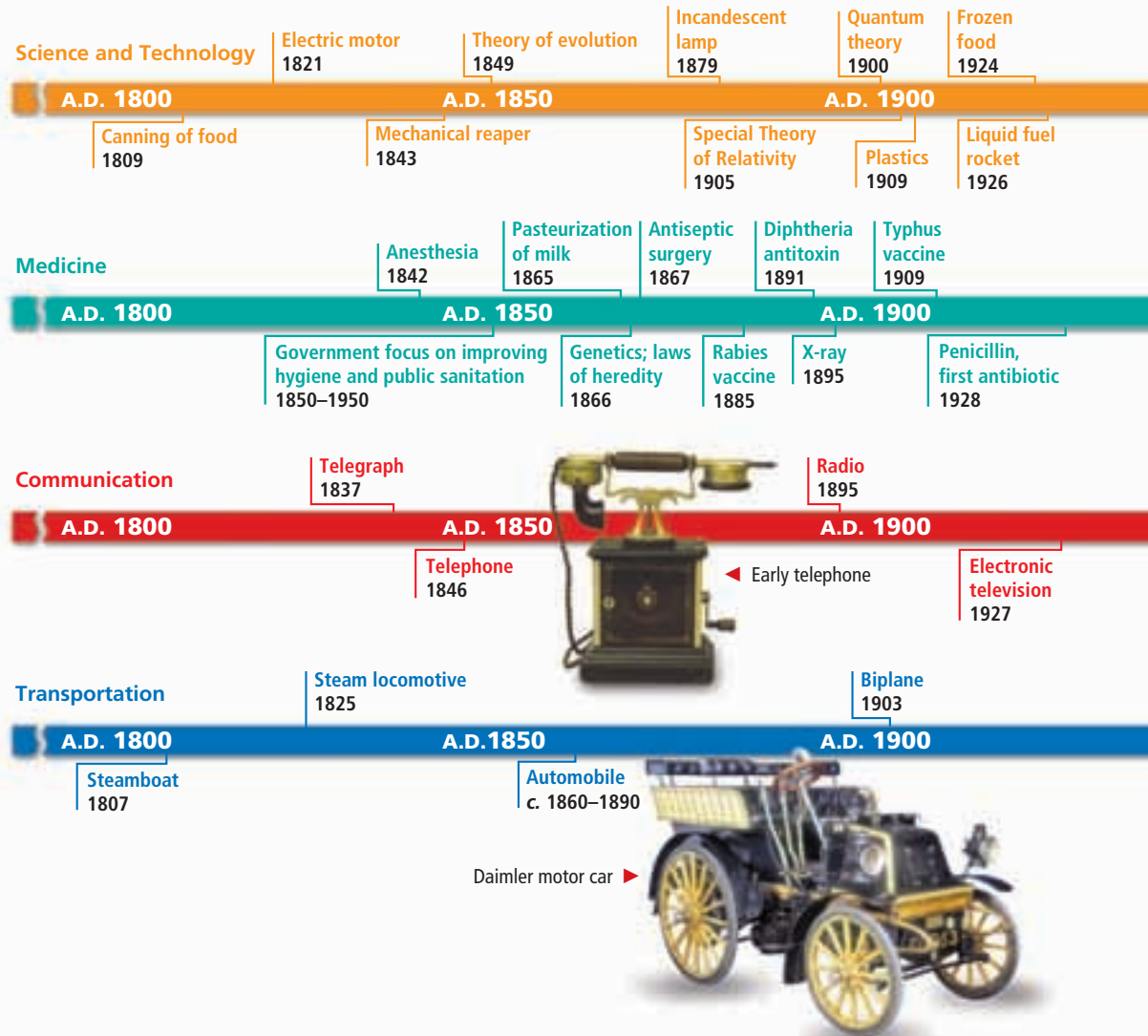
## Analyzing the Visuals

Point out the picture of Albert Einstein, whose theory of relativity revolutionized the science of physics. Ask **When did Einstein present his theory of relativity? (1905) Did Einstein's theory come before or after the theory of evolution? (46 years after)** What development shown on these two pages do you think has had the greatest impact on the modern world? Use student responses to initiate a discussion of the importance of science and technology.

## Science and Technology



Thomas Edison's lightbulb (left) and Albert Einstein (right)



### Differentiated Instruction

Solutions for All Learners

#### L4 Advanced Readers L4 Gifted and Talented

Have students look at the medical innovations shown on the timeline. Tell them that some people think that the greatest medical advance in the last 200 years is the development of antibiotics. Others think it is the development of vaccines. Ask students to research

both of these subjects and draw their own conclusions. Students should also explore the ongoing controversy surrounding each of these medical advances (overuse of antibiotics; potential dangers of vaccines). Have them present their findings to the class.



▲ DNA sequence

◀ Sign for fallout shelter

Nuclear reactor  
1942

Laser  
1960

A.D. 1950

A.D. 2000

A.D. 2050

Apollo moon  
landing  
1969

Cloning of a mammal  
1996

Polio vaccine  
1952

Human heart  
transplant  
1967

Smallpox eradicated  
worldwide  
1979

A.D. 1950

A.D. 2000

A.D. 2050

Founding of World  
Health Organization  
1948

DNA  
structure  
1953

Measles  
vaccine  
1963

Chicken pox  
vaccine  
1974

Electronic computer  
1944

Portable typewriter  
1950

Personal digital assistant  
2000

A.D. 1950

A.D. 2000

A.D. 2050

Transistor  
1948

Color television  
1960s



◀ The Earth from space

Space shuttle  
1981

A.D. 1950

A.D. 2000

A.D. 2050

First commercial jet airliner  
1949

Queen Mary 2 ocean liner  
2005



◀ Jet airplanes

## History Background

**Telescope** Improvements in a single tool can help in the advancement of science over centuries. In the early 1600s, Galileo used a homemade refracting telescope to map landforms on Earth's moon, discover four of Jupiter's moons, and study nearby stars. Steady improvements since then have resulted in sophisticated modern telescopes that are helping scientists look back at the early universe to see how stars, galaxies, and planetary systems evolved.

However, these telescopes have a problem: Earth's atmosphere distorts the images they receive. In 1990, space-shuttle technology allowed NASA to place the Hubble Space Telescope into orbit above the distorting atmosphere. Since then, its amazingly sharp images have helped scientists measure the rate of expansion of the universe, prove the existence of black holes, and observe in greater detail the birth and death of stars.