



Chronology

A chronology of events related to the history of scientific thought.

BC

c.4600000000 BC

Origin of Earth: 4,600 billion years ago.

c.50000 BC

Homo sapiens sapiens emerges as a conscious observer of nature.

c.30000 BC

Stone Age cultures use pigments to color various artifacts.

c.10000 BC

Neolithic Revolution: transition from a hunting and gathering mode of food production to farming and animal husbandry, that is, the domestication of plants and animals.

c.9000 BC

The Mayan tribes in Central America make astronomical inscriptions and constructions. These Indian people (now Yucatan, northern Guatemala, and British Honduras) prepare planetary tables and pay special attention to Venus, upon whose movements their system of timekeeping is based.

c.8000 BC

Pebbles are painted with geometric symbols in area near present day Mas d'Azil in France.

c.8000 BC

The first forms of fired clay are used by Neolithic people to keep track of agricultural products. They are unmarked and have geometric shapes.

c.6500 BC

Bones with markings are used near present day Zaire to record months in terms of phases of the moon.

c.6000 BC

The rise of the great ancient civilizations, beginning 6,000 years ago in Mesopotamia, begat institutions and persons devoted to the collection and teaching of agricultural science and technology to support infrastructure.

c.6000 BC

Earliest example of a notched or tally stick is the Ishango bone found on the shore of Lake Edward in Zaire (Congo) and dated to this time. It is believed that this small, notched bone with a piece of quartz stuck in one end is a possible record of some activity based on the lunar cycle.

c.6000 BC

Wine-making begins in northern Mesopotamia and in the Levant (along the eastern Mediterranean shore).

c.4700 BC

Astronomical calendar stones are used on the Nabta plateau in Egypt. Megaliths mark the position of star locations (e.g. where stars “rise” on the horizon) at the solstice.

c.4000 BC

The Egyptian calendar based on 365 days is established. Because the Egyptian economy depends on the annual flooding of the Nile River, it is essential to know the onset of flooding season. When the priests see Sirius, the brightest star in the sky, rising in line with the sun in the morning, they know that this date usually coincides with the yearly flood.

c.4000 BC

Early applied chemistry begins with the extraction and working of metals and the manufacture of pottery. Objects made of cast copper appear with the early tribes and civilizations of Egypt and Mesopotamia.

c.3500 BC

Early sundials are employed by the Egyptians, who use some sort of pillar to cast a shadow but do not use it with a dial that has markings.

c.3500 BC

The Egyptian number system reaches the point where large numbers can be recorded by introducing new symbols.

c.3500 BC

The Sumerians develop a type of pictographic writing that will eventually evolve into cuneiform. The pictographs are marked in horizontal strips on baked clay tablets.

c.3500 BC

Earliest illustration of a sail dates from this period. It is painted on the outside of a funerary vase found near Luxor, Egypt. The sail is fixed to a single mast, and there is a shelter aft or toward the rear.

c.3500 BC

Jugs crafted by ancient civilizations to hold beer and wine are used. Alcohol is used as disinfectant, medicinal remedy, and to reward soldiers.

c.3400 BC

Bronze, an alloy of copper and tin, first appears in abundance in Sumeria. The

Sumerians become expert in the working of gold, silver, copper, lead, and antimony.

c.3100 BC

Traders in the Mesopotamian city of Uruk begin to use symbols for abstract numbers.

c.3000 BC

Assyrians develop sewer network to carry waste water.

c.3000 BC

Papyrus is used in Egypt for writing.

c.3000 BC

Sumerian clay tokens become standardized and begin to represent different numerals.

c.3000 BC

The construction of the Egyptian pyramids at Giza begins. The fact that they are oriented to the cardinal points of the compass and that their interiors have inclined passages that point to the pole star of the period are strong evidence that the Egyptians possessed precise sighting or astronomical instruments.

c.3000 BC

The Sumerians in the lower Euphrates valleys build dams, canals, statues, and pyramids, demonstrating a working knowledge of the lever and other basic tools.

c.3000 BC

Egyptian papyri contain references to inflammation, pus, and abscesses.

c.2950 BC

Imhotep, Egyptian scholar, is the architect of the “step pyramid” at the ancient site of Memphis. As the first of the pyramids, it is 200 feet (61 m) high with a base 388 feet (118 m) by 411 feet (125 m). Its successful completion evidences the ability of ancient engineers and their familiarity with the basics of mechanics.

c.2900 BC

Chinese Emperor Fu-Hsi (the first of China’s mythical emperors) invents the principles of yin and yang, which become the basis of ancient Chinese medicine.

c.2900 BC

Stonehenge is begun on the Salisbury Plain in England. This early version consists of an earthen bank and a ditch along 56 holes.

- c.2700 BC*
Acupuncture is invented by the Chinese Emperor Shen-Nung (the second of China's mythical emperors) who also writes the *Pen-Tsao*, considered the first medical herbal text.
- c.2700 BC*
Cuneiform signs and numerals on Sumerian tablets use a slanted double wedge as a placeholder between number symbols to indicate the absence of a number, or zero, in a specific place.
- c.2637 BC*
Earliest recorded reference to the use of magnetic influence is made in China during the reign of emperor Hoang-ti. Reference is made to the use of a directional needle during wartime.
- c.2600 BC*
What is later known as the Smith papyrus records medical diagnosis and treatment of the era.
- c.2600 BC*
The Chinese make a primitive sundial and estimate the time of day by using a rod placed in the ground to project the sun's shadow.
- c.2600 BC*
The Great Pyramid at Giza near present-day Cairo, Egypt, is erected. Covering 13 acres and containing over 2 million stone blocks, it is a testament to the impressive mathematical and engineering skills of the Egyptians.
- c.2600 BC*
Chinese Emperor Huang-ti (the third of China's mythical emperors) writes the *Neiching*, a standard Chinese text on internal diseases.
- c.2500 BC*
Chinese astronomers record a grouping of bright planets that occurs around this time.
- c.2500 BC*
Surgical operations are depicted on the tomb of the Pharaohs at Saqqarah (part of the ancient city of Memphis, southwest of Cairo, Egypt).
- c.2400 BC*
Positional notation comes into use in Mesopotamia by the Sumerians. It has a base of 60 instead of 10 and uses cuneiform symbols.
- c.2300 BC*
The oldest surviving map of a city is a carved stone map of the Mesopotamian city of Lagash.
- c.2300 BC*
Proto-Indian writing is used in the Indus Valley.
- 2296 BC*
Earliest recorded sighting of a comet is made by Chinese astronomers.
- c.2200 BC*
Many mathematical tablets found at Nippur, a city of ancient Sumer in Babylonia, are dated to this time.
- c.2100 BC*
The Babylonians modify their calendar to allow for the movement of the stars. They add an extra month to compensate for the revolutions of the heavenly bodies.
- c.2000 BC*
Physicians organize into scholarly and professional groups in the Middle East.
- c.2000 BC*
Babylonians regularly use the rules of mensuration or measuring.
- c.2000 BC*
Mathematicians in Mesopotamia learn to solve quadratic equations or equations in which the highest power is two.
- c.1850 BC*
The Moscow or Golenishev papyrus, dated to this period, shows that the Egyptians know cipherization and possess a considerable knowledge of geometry. Along with the Rhind papyrus, this becomes a major source of information about Egyptian mathematics.
- c.1800 BC*
By this time, a well developed additive number system was in use in Egypt.
- c.1800 BC*
Medical practice in the Babylonian Empire is governed by the Code of Hammurabi.
- c.1800 BC*
Male flower of the date plant is mentioned in a Babylonian document. Even though scientists did not experimentally

demonstrate plant sexuality until the seventeenth century, in ancient Mesopotamia, the date palm was cross-pollinated and the ratio of male to female trees was regulated in order to secure good crops.

c.1800 BC

Egyptian papyrus lists many diagnoses of head and neck trauma and remedial therapies. The papyrus is also significant because it is one of the first indicators that ancient physicians understood that the brain played a fundamental role in controlling the body.

c.1775 BC

Babylonian astronomers, under their king Hammurabi, compile star catalogs, planetary records, and the famous Venus Tablet.

c.1700 BC

Rhind papyrus shows use of mathematical formula including pi.

c.1700 BC

The peoples of Syria-Palestine develop the first real alphabet, which is later transmitted by the Phoenicians to the Greeks in the tenth century BC.

c.1600 BC

Chaldean astrologers identify the zodiac or constellation patterns. They are a Semitic tribe that live in an area near the Euphrates River and Persian Gulf.

c.1580 BC

The oldest surviving papyrus of any length, the Egyptian “Book of the Dead,” is dated to this time. This collection of mortuary texts is composed of spells and magic formulas and is placed in tombs to protect the dead. This is considered by some scholars to be the first “book.”

c.1500 BC

Between 1500 BC and 1200 BC Greece’s many wars with its regional rivals led to the development of new military technology.

c.1500 BC

Rig-Veda in the Indian Vedas, a collection of religious, philosophical, and educational writings, states that Earth is a globe.

c.1500 BC

Yajur-Veda in the Indian Vedas, a collection of religious, philosophical, and educational writings, states that Earth circles the sun.

c.1500 BC

Vedic medicine in India first begins.

c.1500 BC

Stone tablets found at Nippur (Iraq) in the 1930s by Otto Neugebauer (1899–1990) suggest that the Babylonians are using the abacus at this time—some of the pictographs are reminiscent of the form of an abacus.

c.1500 BC

Babylonian mathematicians demonstrate use of the determination of the diagonal of a square using a method later known in the Pythagorean theorem.

c.1475 BC

Thutmose III (c.1501–c.1425 BC), Egyptian pharaoh, erects the obelisk called “Cleopatra’s Needle” in Heliopolis (modern Cairo). Its shadow is used to calculate time, seasons, and solstices. It eventually is transported to London in the nineteenth century.

c.1400 BC

The Olmec people on the east coast of Mexico develop a numeration system and calendar as well as the beginnings of a written language. These are eventually adopted by the Mayans and the Zapotec.

c.1400 BC

Ugaritic tablets contain first known alphabetic writing, utilizing thirty cuneiform signs.

1352 BC

When Egyptian King Tutankhamen dies this year, he is buried with his chariots. When the intact tomb is discovered in 1922 by English archaeologist Howard Carter (1873–1939), working parts of dismantled wooden chariots are found. The chariot was introduced to Egypt around 1600 BC by Asiatic invaders, the Hyksos.

c.1350 BC

The Chinese use decimal numerals.

c.1200 BC

Iron smelting is performed in West Africa.

c.1200 BC

Mohammed Ben Mansur classifies stones according to their hardness and specific gravity.

1110 BC

Reference is made to ambassadors from Cochinchina (Vietnam) being given a compass on their departure from China.

c.1105 BC

The *Chou-pei* is written and is the oldest extant Chinese mathematical work. It indicates that the Chinese know of the Pythagorean theorem of the right triangle.

c.1100 BC

The rotary or true quern for grinding grain appears in the Mediterranean area. It uses a handle that rotates one stone atop a stationary stone. It is the precursor of the heavy querns used later by the Greeks and Romans that are operated by slaves or donkeys.

c.1000 BC

Hindu physicians exhibit broad clinical knowledge of tuberculosis. In India, the Laws of Manu consider it to be an unclean, incurable disease and an impediment to marriage.

c.1000 BC

Beginning of Greek metallurgy; the Greeks use iron.

c.900 BC

Homer, Greek epic poet, refers to the use of a lodestone for navigation purposes during the siege of Troy.

c.763 BC

Earliest recorded solar eclipse is observed by Babylonian astronomers.

c.720 BC

An eclipse of the moon is observed at Babylon and is later recorded by Greek astronomer Ptolemy (AD c.91–c.168).

c.720 BC

Chinese record-keeping of solar eclipses begins this year.

c.700 BC

Atharva-Veda, the famous Indian medical text, is written.

c.700 BC

Greek soldiers wear plate armor made of bronze and iron to protect the torso.

c.700 BC

Sennacherib, king of Assyria, builds aqueducts to carry water into the city of

Ninevah, as does Hezekiah, king of Judah, to supply Jerusalem with water.

c.700 BC

The Persians adopt the cuneiform system of writing and adapt it to their Indo-European language. They begin to approach the development of an alphabet.

c.700 BC

The use of anatomical models is established in India.

c.700 BC

Greeks demonstrate force of electric attraction produced by rubbing amber.

c.630 BC

Mimnermus of Colophon, Greek elegiac poet, records the myth that the sun, after setting, is carried around Earth in a golden bowl until it is brought into view again the next morning in the east.

c.609 BC

First circumnavigation of Africa is begun by the order of Egyptian Pharaoh Necho II. He commissions a Phoenician fleet and orders its captains to sail from Suez indefinitely, always keeping land within sight on the starboard (right) side. Four years later, the fleet arrives in Alexandria, having gone completely around Africa and returned to the Mediterranean via the Straits of Gibraltar.

c.604 BC

Nebuchadnezzar, king of Babylon, erects a seven-story tower in Borsippa, a suburb of Babylon, as some sort of astronomical monument. It is believed to symbolize the seven celestial bodies then known.

c.600 BC

Thales of Miletus (624–546 BC), Greek philosopher, writes one of the earliest treatises on physics and proposes that water is the fundamental element from which everything is made. He also writes the first known geological observation, describing the effect of streams. He is also the first to systematically study magnetism.

c.600 BC

The abacus is known to be in use in Greece at this time. Referred to as a sand tray, this early mechanical computing device uses vertical columns and counters.