

c. 270 BCE – 2022

History of Astronomy Timeline

The history of astronomy is the story of how humans figured out what the universe actually is — from ancient Greeks who proposed the Earth moves around the Sun, to telescopes that see to the edge of time itself.

c. 270 BCE — Aristarchus Proposes Heliocentrism

The Greek astronomer Aristarchus of Samos proposes that the Earth orbits the Sun — not the other way around — nearly 1,800 years before the idea would be widely accepted.

> **Why it mattered:** *Aristarchus was right, but most ancient thinkers rejected his model in favor of an Earth-centered universe; his idea had to wait nearly two millennia to be vindicated, showing how long it can take for a correct scientific idea to overcome accepted belief.*

1543 — Copernicus Publishes His Heliocentric Model

Nicolaus Copernicus publishes De Revolutionibus, his mathematical proof that the Earth and planets orbit the Sun — reviving and refining Aristarchus's ancient idea with detailed calculations.

> **Why it mattered:** *Copernicus's publication launched the Scientific Revolution — it directly inspired Galileo, Kepler, and Newton, and fundamentally changed how humans understood their place in the universe.*

1609–10

Galileo Turns the Telescope on the Sky

Galileo Galilei improves the newly invented telescope and turns it skyward — discovering that Jupiter has four moons, that Venus has phases like the Moon, and that the Milky Way is made of countless individual stars.

> **Why it mattered:** *Galileo's observations provided the first direct evidence that not everything orbits the Earth — moons orbit Jupiter, just as Copernicus said the planets orbit the Sun. His conflict with the Catholic Church over these findings became history's defining story of science versus authority.*

1687

Newton's Law of Universal Gravitation

Isaac Newton publishes Principia Mathematica, showing that the same force — gravity — that makes an apple fall also governs the orbits of planets and moons, following a precise mathematical law.

> **Why it mattered:** *Newton's law unified earthly and celestial mechanics for the first time, giving scientists a mathematical tool to predict planetary motion precisely and showing that the universe operates by knowable, universal laws.*

1781

Uranus Discovered

William Herschel discovers Uranus — the first planet found with a telescope, and the first planet unknown to the ancient world — instantly doubling the known size of the solar system.

> **Why it mattered:** *Uranus's discovery proved that the solar system was larger than anyone had thought, and demonstrated that the telescope could reveal objects invisible to the naked eye; it triggered a search for even more distant planets.*

1915–16

Einstein's General Relativity

Albert Einstein publishes his theory of general relativity, describing gravity not as a force but as the curvature of space-time — predicting phenomena like black holes, gravitational waves, and the bending of light around massive objects.

> **Why it mattered:** *General relativity replaced Newton's model for extreme conditions and predicted phenomena — black holes, gravitational waves, the expanding universe — that astronomers are still confirming more than a century later.*

1924–29

Hubble Discovers Galaxies and the Expanding Universe

Edwin Hubble proves that the Andromeda 'nebula' is actually a separate galaxy far beyond the Milky Way; by 1929 he shows that the universe is expanding in all directions.

> **Why it mattered:** *Hubble's discoveries instantly expanded the known universe from a single galaxy to something almost incomprehensibly vast — and the expanding universe implied it had a beginning, leading directly to the Big Bang theory.*

1977

Voyager Launches

NASA launches Voyager 1 and 2; over the following decade they fly past Jupiter, Saturn, Uranus, and Neptune, returning the first detailed close-up images of the outer planets and their moons.

> **Why it mattered:** *The Voyager missions gave humanity its first detailed look at the outer solar system — revealing volcanic moons, complex ring systems, and dozens of new moons — and Voyager 1 eventually became the first human-made object to leave the solar system.*

1990–95

Hubble Space Telescope and the Deep Field

The Hubble Space Telescope is launched in 1990; in 1995 it photographs the Hubble Deep Field — pointing at an apparently empty patch of sky and revealing over 3,000 galaxies in a single image.

> **Why it mattered:** *The Hubble Deep Field changed how humans see the universe — a patch of sky that seemed empty contained thousands of galaxies, implying the observable universe holds an estimated two trillion galaxies. Hubble also helped confirm that the expansion of the universe is accelerating.*

2019–22

First Black Hole Image and James Webb Space Telescope

In 2019 the Event Horizon Telescope produces the first image of a black hole; in 2022 the James Webb Space Telescope returns images of galaxies from less than 500 million years after the Big Bang.

> **Why it mattered:** *These breakthroughs confirmed what had seemed almost philosophical — that black holes truly exist as Einstein described, and that we can now see nearly to the beginning of the universe, observing galaxies that formed when the cosmos was less than 4% of its current age.*