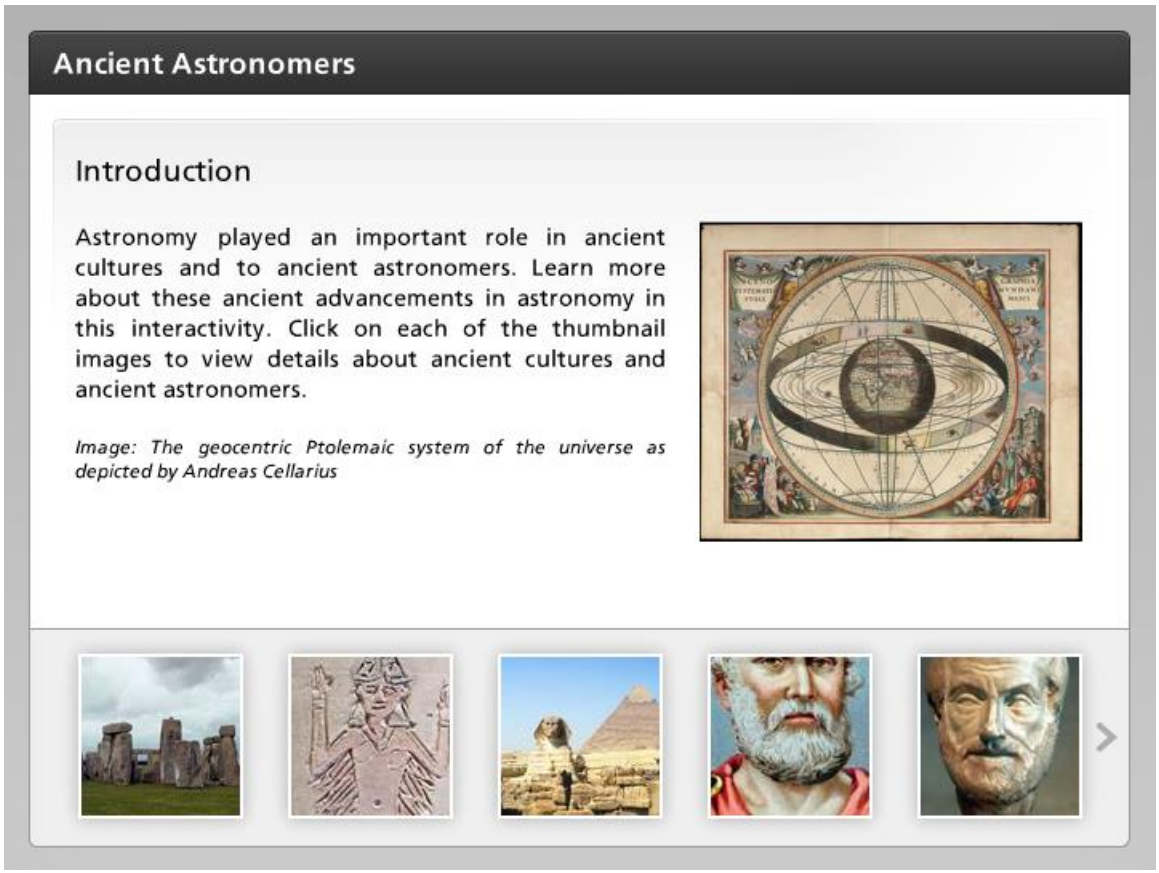
Module 3: Astronomy – The Universe
Topic 6 Content: Ancient Astronomers Notes

Introduction



Astronomy played an important role in ancient cultures and to ancient astronomers. Learn more about these ancient advancements in astronomy in this interactivity. Click on each of the thumbnail images to view details about ancient cultures and ancient astronomers.

Image: The geocentric Ptolemaic system of the universe as depicted by Andreas Cellarius

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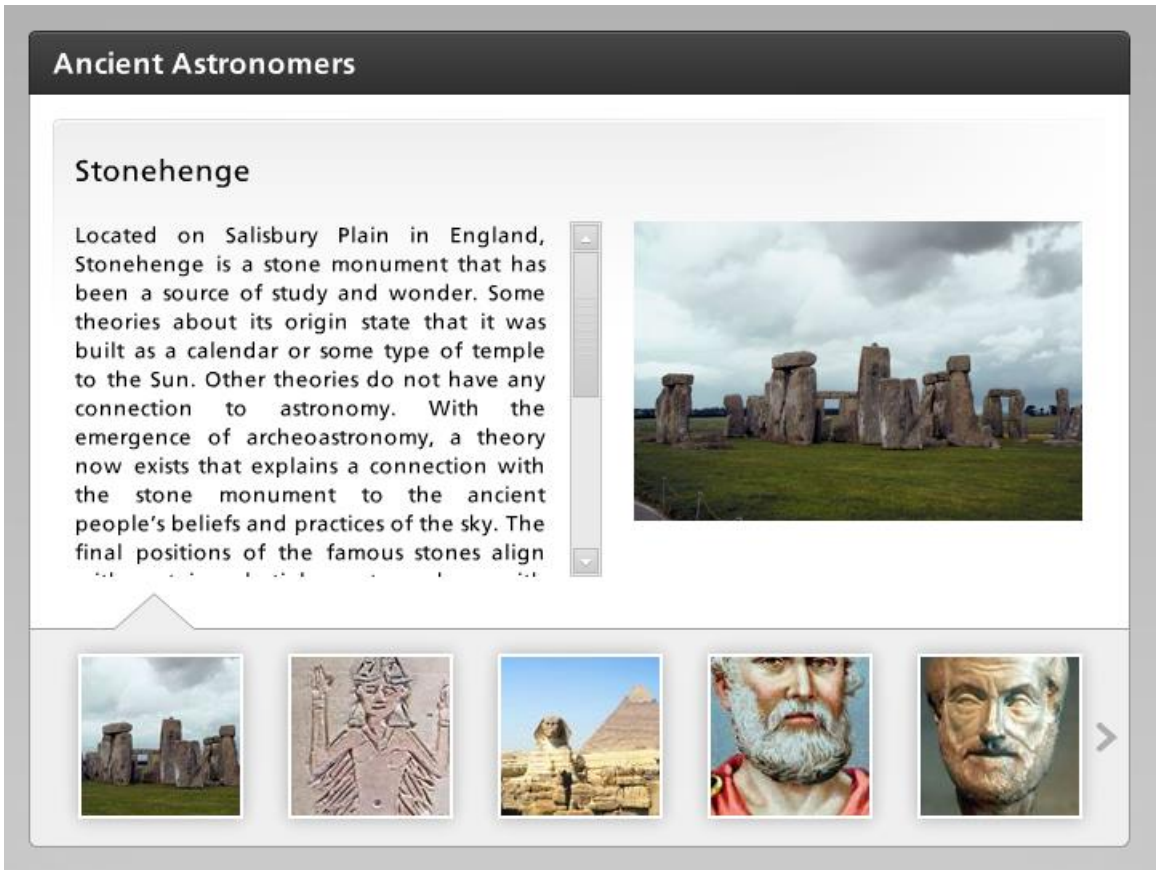
Stonehenge



Located on Salisbury Plain in England, Stonehenge is a stone monument that has been a source of study and wonder. Some theories about its origin state that it was built as a calendar or some type of temple to the Sun. Other theories do not have any connection to astronomy. With the emergence of archeoastronomy, a theory now exists that explains a connection with the stone monument to the ancient people's beliefs and practices of the sky. The final positions of the famous stones align with certain celestial events, such as with the rising of the Sun on the longest day of the year - the summer solstice. The Sun at dawn rises and shines through two pillars, which direct light to the center of the monument. During the midwinter sunset, sunlight also shines through stones called the altar stone. Some archeologists point to evidence that Stonehenge's Station Stone rectangle aligns with the southern rise of the Moon.

Image: The Stonehenge monument in England

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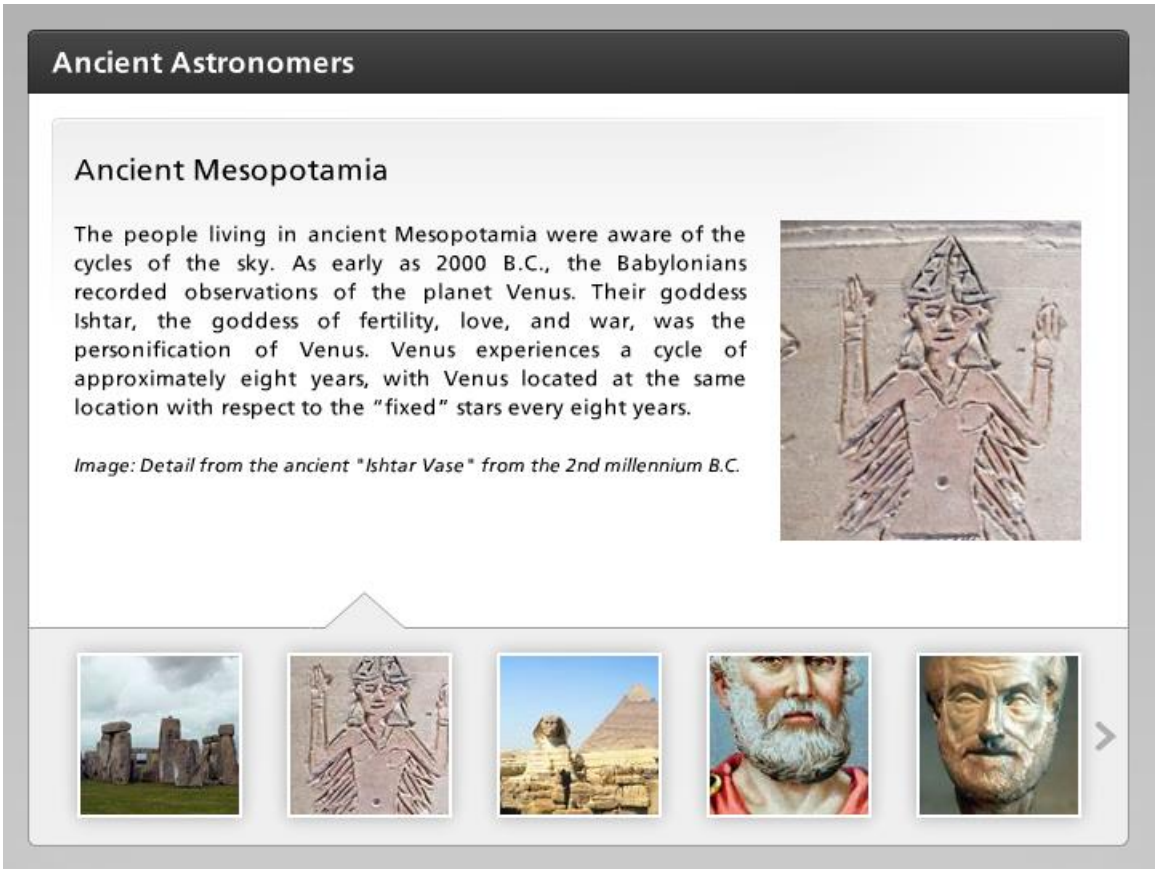
Ancient Mesopotamia



The people living in ancient Mesopotamia were aware of the cycles of the sky. As early as 2000 B.C., the Babylonians recorded observations of the planet Venus. Their goddess Ishtar, the goddess of fertility, love, and war, was the personification of Venus. Venus experiences a cycle of approximately eight years, with Venus located at the same location with respect to the "fixed" stars every eight years.

Image: Detail from the ancient "Ishtar Vase" from the 2nd millennium B.C.

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Pyramids of the Egyptians

The cultures of the earliest people created temples and monuments to show that the skies had a role in their lives. The Egyptians built pyramids that were arranged in an east-and-west origination and were each built aligned with the rising of Scorpii B, which is a star in the Scorpius constellation. Sections of the Temple of Amen-Ra at Karnack were built perfectly with the setting of the sun during the winter solstice. This alignment allowed historians to predict the time period in which the temple was built.

Image: The pyramids and sphinx in Giza, Egypt

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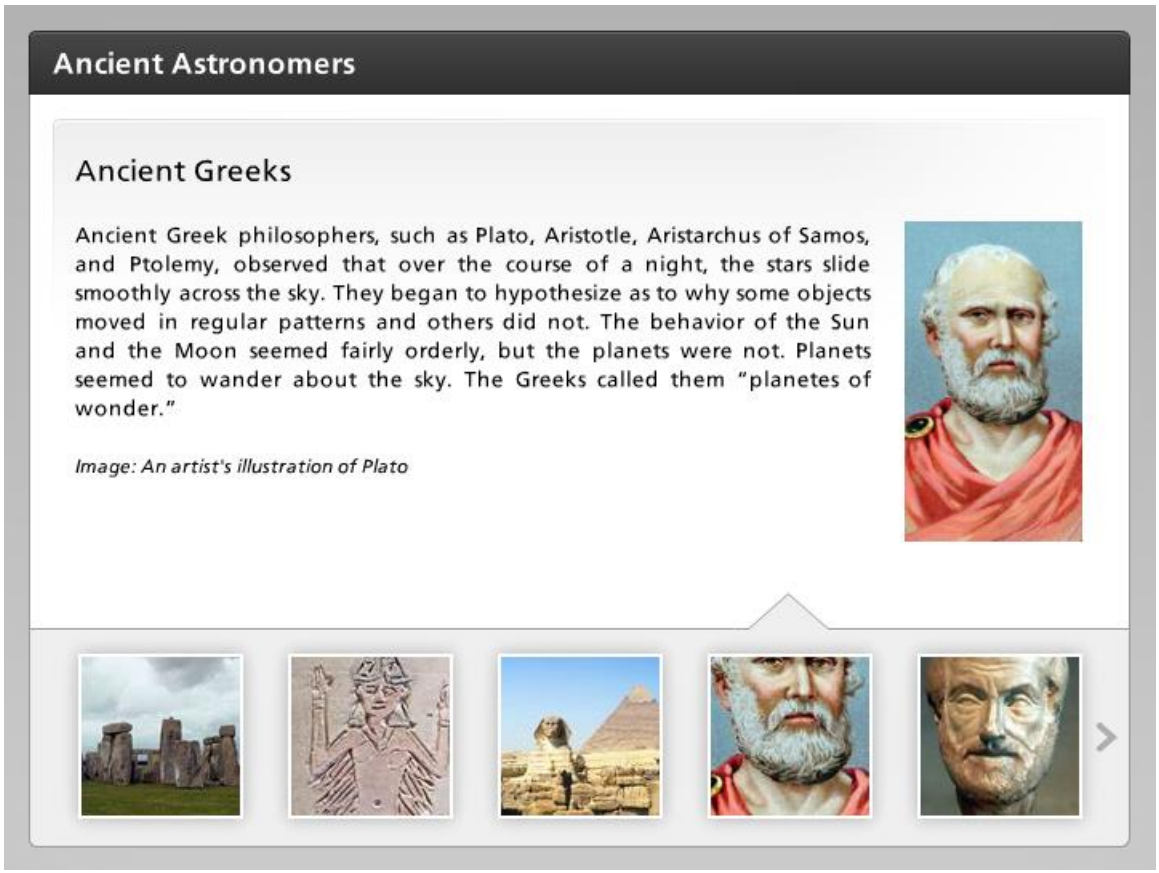
Ancient Greeks



Ancient Greek philosophers, such as Plato, Aristotle, Aristarchus of Samos, and Ptolemy, observed that over the course of a night, the stars slide smoothly across the sky. They began to hypothesize as to why some objects moved in regular patterns and others did not. The behavior of the Sun and the Moon seemed fairly orderly, but the planets were not. Planets seemed to wander about the sky. The Greeks called them "planetes of wonder."

Image: An artist's illustration of Plato

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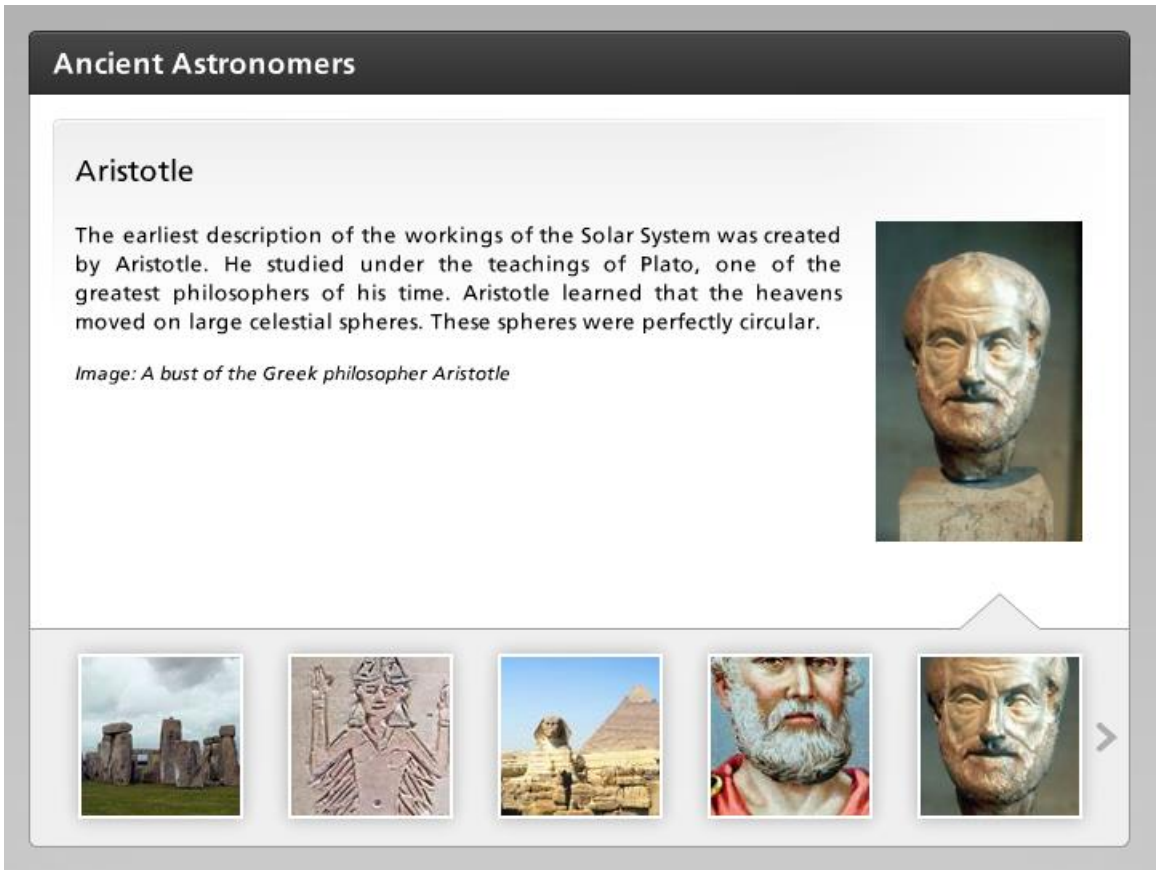
Aristotle



The earliest description of the workings of the Solar System was created by Aristotle. He studied under the teachings of Plato, one of the greatest philosophers of his time. Aristotle learned that the heavens moved on large celestial spheres. These spheres were perfectly circular.

Image: A bust of the Greek philosopher Aristotle

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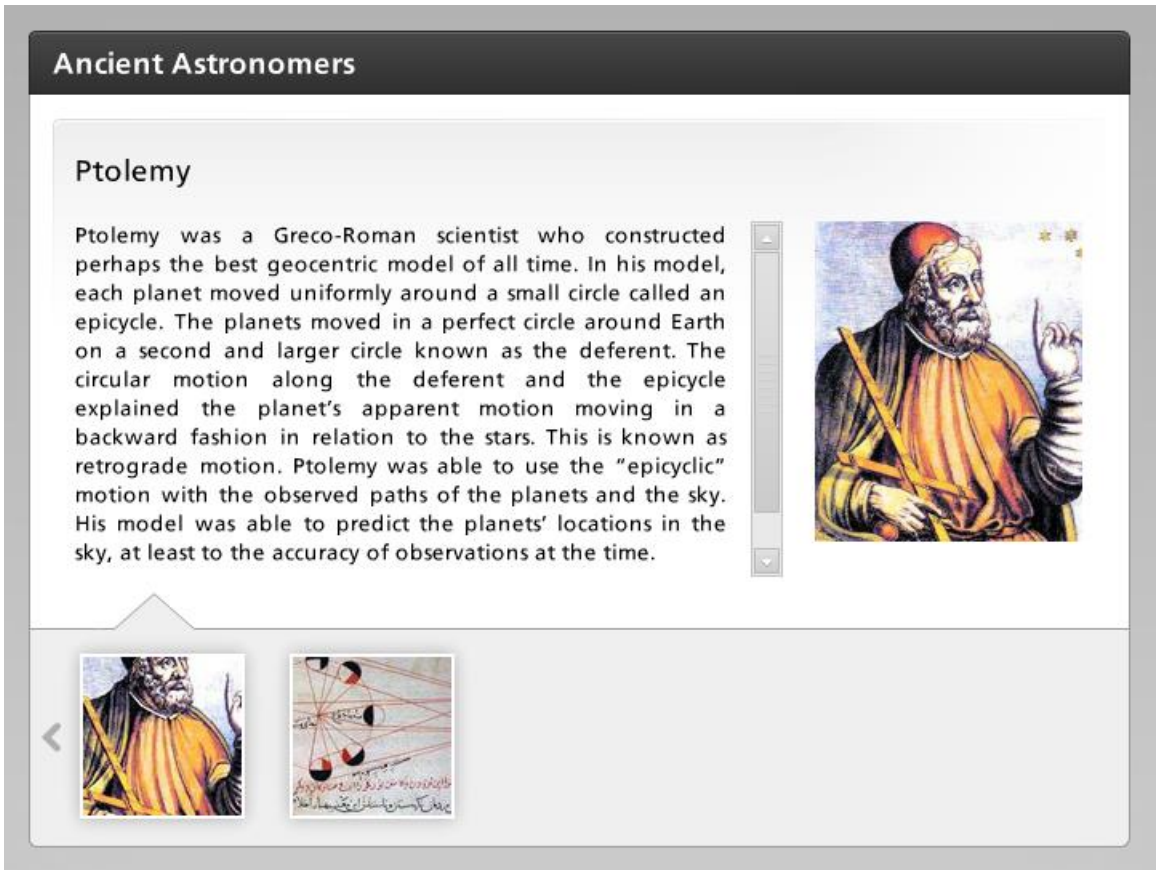
Ptolemy



Ptolemy was a Greco-Roman scientist who constructed perhaps the best geocentric model of all time. In his model, each planet moved uniformly around a small circle called an epicycle. The planets moved in a perfect circle around Earth on a second and larger circle known as the deferent. The circular motion along the deferent and the epicycle explained the planet's apparent motion moving in a backward fashion in relation to the stars. This is known as retrograde motion. Ptolemy was able to use the "epicyclic" motion with the observed paths of the planets and the sky. His model was able to predict the planets' locations in the sky, at least to the accuracy of observations at the time.

Image: An artist's depiction of Ptolemy

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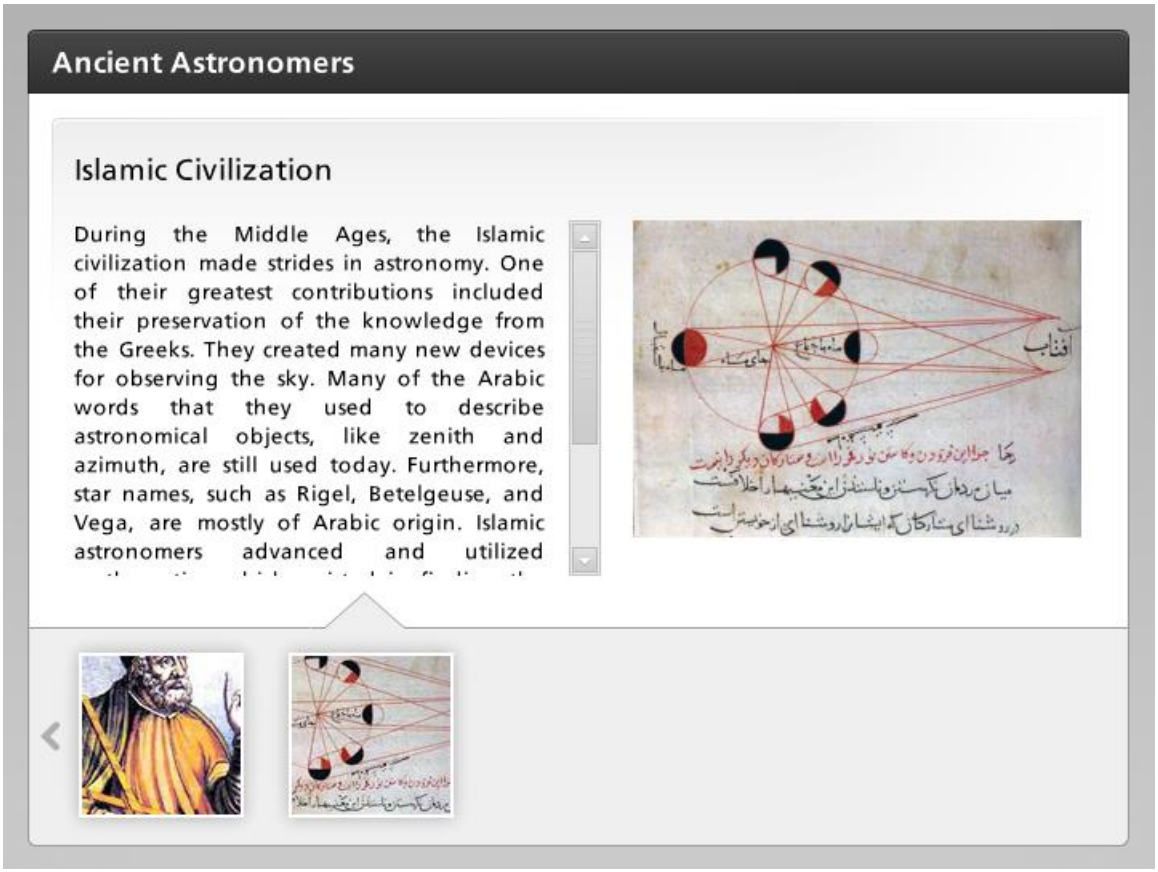
Islamic Civilization



During the Middle Ages, the Islamic civilization made strides in astronomy. One of their greatest contributions included their preservation of the knowledge from the Greeks. They created many new devices for observing the sky. Many of the Arabic words that they used to describe astronomical objects, like zenith and azimuth, are still used today. Furthermore, star names, such as Rigel, Betelgeuse, and Vega, are mostly of Arabic origin. Islamic astronomers advanced and utilized mathematics, which assisted in finding the positions of heavenly objects. This allowed the Islamic astronomers to more precisely predict positions of stars and planets.

Image: An illustration by Al-Biruni (973-1048) of different lunar phases