

5

The Spread of Hellenistic Culture

TERMS & NAMES

- Hellenistic
- Alexandria
- Euclid
- Archimedes
- Colossus of Rhodes

MAIN IDEA

Hellenistic culture, a blend of Greek and other influences, flourished throughout Greece, Egypt, and Asia.

WHY IT MATTERS NOW

Western civilization today continues to be influenced by diverse cultures.

SETTING THE STAGE Alexander the Great's ambitions were cultural as well as military and political. He started new cities as outposts of Greek culture. These cities, from Egyptian Alexandria in the south to the Asian Alexandrias in the east, adopted many Greek patterns and customs. After Alexander's death, trade, a shared Greek culture, and the Greek language continued to link these cities together. But each region had its own traditional ways of life, religion, and government that no ruler could afford to overlook. Alexander's successors gradually began dynasties in each of these lands. They encouraged local traditions while transplanting Greek culture.

Hellenistic Culture in Alexandria

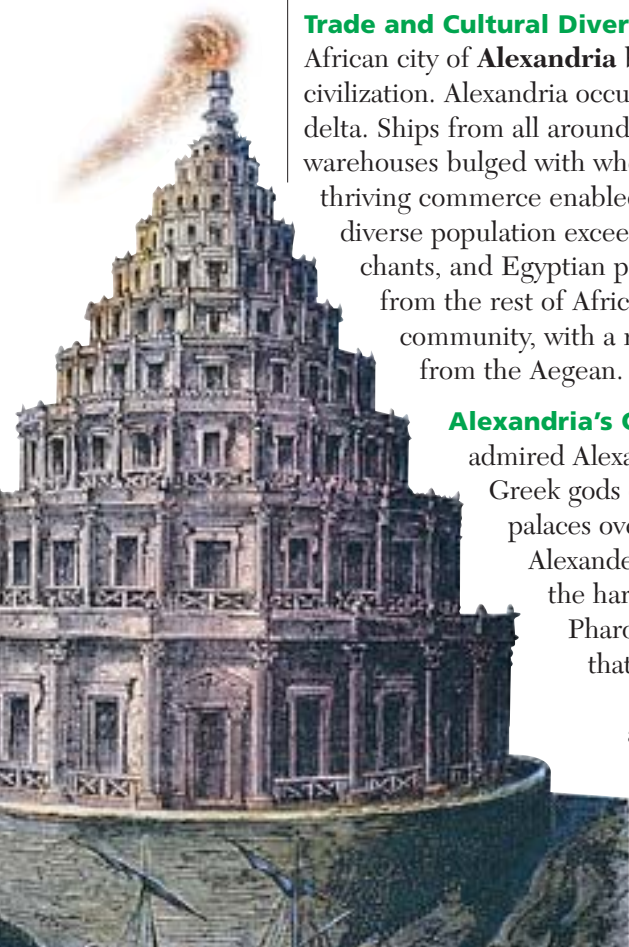
After Alexander's death, a vibrant new culture emerged. Greek (Hellenic) culture blended with Egyptian, Persian, and Indian influences. This blending became known as **Hellenistic** culture. Koine (koy·NAY), the popular spoken language used in Hellenistic cities such as Alexandria, was the direct result of cultural blending. The word *koine* came from the Greek word for common. The language was a dialect of Greek. This language enabled educated people and traders from diverse backgrounds to communicate in cities throughout the Hellenistic world.

Trade and Cultural Diversity Among the many cities of the Hellenistic world, the African city of **Alexandria** became the foremost center of commerce and Hellenistic civilization. Alexandria occupied a strategic site on the western edge of the Nile delta. Ships from all around the Mediterranean docked in its spacious harbor. Its warehouses bulged with wheat and other products from the Nile Valley. Alexandria's thriving commerce enabled it to grow and prosper. By the third century B.C., its diverse population exceeded half a million people. Greek officials, Jewish merchants, and Egyptian priests mingled in crowded marketplaces with visitors from the rest of Africa, Persia, and India. Alexandria became an international community, with a rich mixture of customs and traditions from Egypt and from the Aegean.

Alexandria's Greatest Attractions Both residents and visitors admired Alexandria's great beauty. Broad avenues lined with statues of Greek gods divided the city into blocks. Rulers built magnificent royal palaces overlooking the harbor. A much visited tomb contained Alexander's elaborate glass coffin. Soaring more than 400 feet over the harbor stood an enormous stone lighthouse called the Pharos. This lighthouse contained a polished bronze mirror that reflected the light from a blazing fire.

Alexandria's greatest attractions were its famous museum and library. The museum was a temple dedicated to the Muses, the Greek goddesses of arts and sciences. (The word *museum* comes from muse.) It contained art

This is a 19th-century illustration of the great Lighthouse of Alexandria. A fire at the top of the over 400-foot building guided ships into the Egyptian harbor.



THINK THROUGH HISTORY

A. Recognizing Causes Why was the culture of the Hellenistic period so different from that of classical Greece?



galleries, a zoo, botanical gardens, and even a dining hall. The museum was an institute of advanced study.

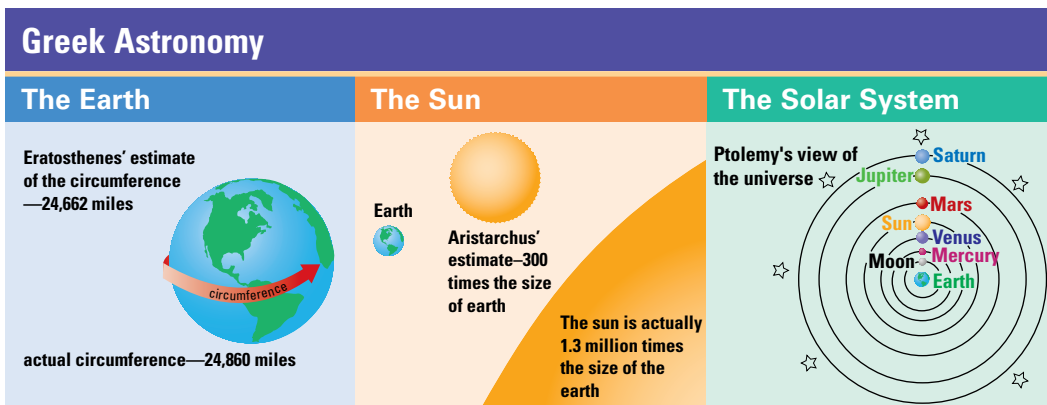
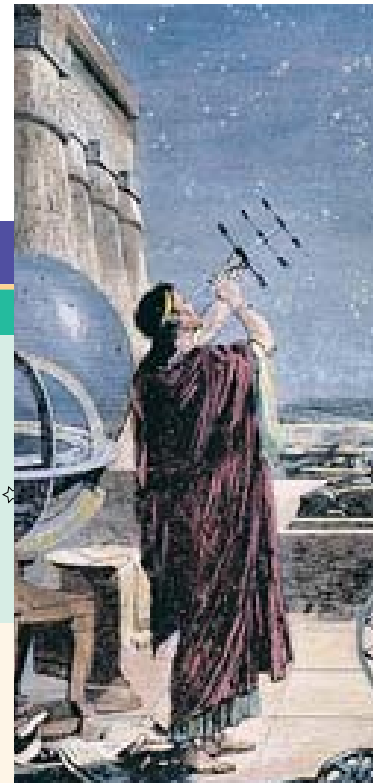
Teachers and students were only a short distance from the nearby Alexandrian Library. Its collection of half a million papyrus scrolls included many of the masterpieces of ancient literature. As the first true research library in the world, it helped promote the work of a gifted group of scholars. These scholars greatly respected the earlier works of classical literature and learning. They produced commentaries that explained these works.

Science and Technology

During the Hellenistic period, the center of scholarship gradually shifted away from Athens. Hellenistic scholars, particularly in Alexandria, succeeded brilliantly in preserving Greek and Egyptian learning in the sciences. Until the scientific advances of the 16th and 17th centuries, scholars in Alexandria provided most of the scientific knowledge available to the West.

Astronomy Alexandria's museum contained a small observatory in which astronomers could study the planets and stars. One astronomer, Aristarchus (AR-ih-STAHHR-kuhs) of Samos, reached two significant scientific conclusions. In one conclusion, he estimated that the sun was at least 300 times larger than the earth. Although he greatly underestimated the sun's true size, Aristarchus disproved the widely held belief that the sun was smaller than Greece. In another conclusion, Aristarchus proposed that the earth and other planets revolve around the sun. Unfortunately for science, other astronomers refused to support Aristarchus' theories. By the second century A.D., Alexandria's last renowned astronomer, Ptolemy, incorrectly placed the earth at the center of the solar system. Astronomers accepted this view for the next 14 centuries.

Hipparchus invented the system of longitude and latitude used on maps and sky charts. Here he is shown marking the position of a star.



SKILLBUILDER: Interpreting Charts

The foundations of modern scientific thought were laid during the Hellenistic period.

1. Where were Greek astronomers' ideas most incorrect compared with modern concepts?
2. Which estimate is closest to modern measurements? How could the Hellenists be so accurate?

While Hellenistic astronomers debated the earth's position in the solar system, a scholar named Eratosthenes (EHR-uh-TAHS-thuh-NEEZ) closely calculated the earth's true size. Eratosthenes was the director of the Alexandrian Library. He was also a highly regarded astronomer, poet, historian, and mathematician. He skillfully used geometry to compute the earth's circumference at 24,662 miles. Today, we compute the earth's circumference at 24,860 miles. His estimate was within 1 percent of our modern calculations.



Global Impact

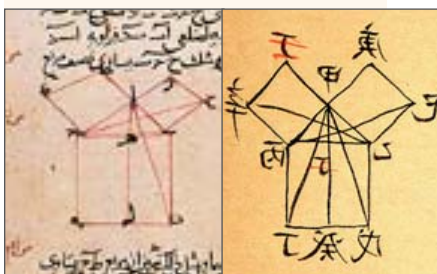


Greece, A.D. 800

Pythagorean Theorem

Geometry students remember Pythagoras for his theorem on the triangle but its principles were known earlier. This formula states that the square of a right triangle's hypotenuse equals the sum of the squared lengths of the two remaining sides. Chinese mathematicians knew this theory perhaps as early as 1100 B.C. Egyptian surveyors put it to practical use even earlier.

However, the work of the school Pythagoras founded caught the interest of later mathematicians. Shown is Euclid's proof in Greek along with a Chinese and an Arabic translation. The Arabs who conquered much of Alexander's empire spread Greek mathematical learning to the West. The formula became known as the Pythagorean theorem throughout the world.



Arabic, A.D. 1250

Chinese, A.D. 1607

Mathematics and Physics Both Eratosthenes and Aristarchus used a geometry text compiled by **Euclid** (YOO-klihd). Euclid was a highly regarded mathematician who opened a school of geometry in Alexandria. His best-known book, the *Elements*, contained 465 carefully presented geometry propositions and proofs. Muslim and European universities used the *Elements* until well into the 1900s. It is sometimes said that only the Bible has been more widely used and studied. Euclid's work is still the basis for courses in geometry.

Another important Hellenistic scientist, **Archimedes** (AHR-kuh-MEE-deez) of Syracuse, studied at Alexandria. He accurately estimated the value of pi (π)—the ratio of the circumference of a circle to its diameter. He showed its value to be between $3\frac{1}{71}$ and $3\frac{1}{7}$. Archimedes also explained the law of the lever and invented the compound pulley to lift heavy objects. The writer Plutarch described how Archimedes demonstrated to an audience of curious onlookers how something heavy can be moved by a small force:

A VOICE FROM THE PAST

Archimedes took a . . . ship . . . which had just been dragged up on land with great labor and many men; in this he placed her usual complement of men and cargo, and then sitting at some distance, without any trouble, by gently pulling with his hand the end of a system of pulleys, he dragged it towards him with as smooth and even a motion as if it were passing over the sea.

PLUTARCH, *Parallel Lives: Marcellus*

Gifted in both geometry and physics, Archimedes also put his genius to practical use. He invented the Archimedes screw, a device that raised water from the ground, and a catapult or missile-throwing machine. Building on the knowledge of Archimedes, Hellenistic scientists later built a force pump, pneumatic machines, and even a steam engine.

THINK THROUGH HISTORY

B. Summarizing
What were some of the main achievements of the scientists of the Hellenistic period?

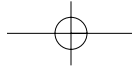
Philosophy and Art

Like earlier Greek philosophers, Hellenistic scholars believed that the universe followed rational principles. They felt that philosophy offered the best way to understand these principles. The teachings of Plato and Aristotle continued to be very influential in Hellenistic philosophy. In the third century B.C., however, new schools of philosophy were concerned with how people should live their lives. Two major philosophies developed during the Hellenistic period—Stoicism and Epicureanism.

Stoicism and Epicureanism A Greek philosopher named Zeno (335–263 B.C.) founded the school of philosophy called Stoicism (STOH-ih-SIHZ-uhm). Stoics believed in a divine power who controlled the universe. They proposed that people should live a virtuous life in harmony with natural law. Stoics also preached that vices such as human desires, power, and wealth were dangerous distractions that should be controlled. Stoicism explained nature and provided an ethical approach to life. The philosophy also promoted social unity and encouraged its followers to focus on things they could control. Its ethical doctrine appealed to people of many different races, cultures, and economic backgrounds.

Background

A *stoic* has come to mean someone who is indifferent to or unaffected by pain.



Epicurus (EHP-uh-KYUR-uhs) founded the school of thought called Epicureanism. He taught that the universe was composed of atoms and ruled by gods who had no interest in humans. Epicurus believed that the only real objects were those that the five senses perceived. He taught that the greatest good and the highest pleasure came from virtuous conduct and the absence of pain. Epicureans proposed that the main goal of humans was to achieve harmony of body and mind. Today, the word *epicurean* means one devoted to pursuing human pleasures. However, during his lifetime, Epicurus advocated moderation in all things.

Realism in Sculpture Like science, sculpture flourished during the Hellenistic age. Rulers, wealthy merchants, and cities all purchased statues to honor the gods, commemorate heroes, and portray ordinary people in everyday situations. The largest known Hellenistic statue was created on the island of Rhodes. Known as the **Colossus of Rhodes**, this bronze statue stood more than 100 feet high. The colossal statue could not have stood with its feet straddling the harbor entrance, as legend suggests.

One of the seven wonders of the ancient world, the Colossus of Rhodes was toppled by an earthquake about 225 B.C. Later, the bronze was sold for scrap. Another great Hellenistic statue was discovered by archaeologists in 1863, the famous Winged Victory of Samothrace. It commemorates a naval victory by the Greeks against foes who would have enslaved them.

Hellenistic sculpture moved away from the harmonic balance and idealized forms of the classical age. Sculptors created more realistic and emotional works. Instead of the serene face and perfect body of an idealized man or woman, Hellenistic sculptors created more natural works. They felt free to explore new subjects, carving ordinary people such as an old, wrinkled peasant woman.

By 150 B.C., the Hellenistic world was in decline. A new city, Rome, was growing and gaining strength. Through Rome, Greek-style drama, architecture, sculpture, religion, and philosophy were preserved and eventually became the core of Western civilization.



Winged Victory of Samothrace is one of the few surviving examples of Hellenistic art. The dramatic statue is now in the Louvre in Paris. It shows a winged figure standing on the bow of a ship. Notice how the deep relief makes the wind appear to ripple through her gown.

Section 5 Assessment

1. TERMS & NAMES

Identify

- Hellenistic
- Alexandria
- Euclid
- Archimedes
- Colossus of Rhodes

2. TAKING NOTES

Using a chart like the one below, list Hellenistic achievements in each of the following categories.

Category	Achievements
astronomy	
geometry	
philosophy	
art	

Select one category from the chart and make a poster highlighting Hellenistic achievements in that area.

3. SYNTHESIZING

Describe how the growth of Alexander's empire spread Greek culture.

THINK ABOUT

- public vs. private art
- realistic vs. ideal representations
- the decline of the polis

4. ANALYZING THEMES

Cultural Interaction The Hellenistic culture brought together Egyptian, Greek, Persian, and Indian influences. How is American culture a combination of different influences? Give examples of those influences.

THINK ABOUT

- American immigration
- geographic regions/influences
- your own cultural background