The Islamic Golden Age

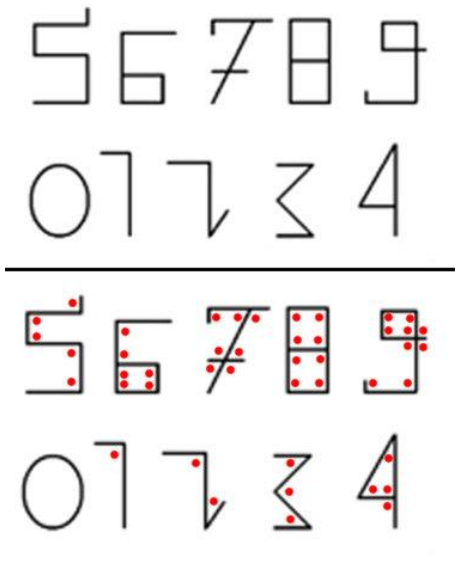
During the Postclassical Era (600-1450), Muslim cities such as Baghdad, Istanbul, Cairo, Tripoli and Cordoba became cultural and intellectual centers where theologians, scholars, scientists, artists, writers, philosophers, mathematicians and others convened for scholarship, experimentation, and discovery.

The significant achievements made by Muslims from approximately 750 to 1500 led to the naming of this period as the Islamic Renaissance, or the Islamic Golden Age. Muslims were at the forefront of discoveries in ophthalmology (study of the human eye), anatomy (study of the human body), physiology (study of the ways in which the bodies of living things work), pathology (the study and diagnosis of disease), surgery, chemistry and pharmaceuticals during the Islamic Renaissance. Great advances were also made in astronomy and mathematics, as well as in architecture, art, and literature. Muslims translated most of the scientific works of antiquity (from ancient Greece, Rome, and Egypt) into Arabic in universities called madrasas. Many of the ancient works were destroyed after the fall of the Roman Empire, and because of these translations, the great works of Plato, Aristotle, and Socrates were saved, and Europeans, due to these translations, regained them after the Crusades.

The Decline of the Golden Age: As the empire grew, it became more and more difficult to control. Eventually the government could no longer protect all the reaches of land of the Islamic Caliphate. During this same period, the European Crusades (1097-1291) weakened the power of the Islamic Caliphates. Cordoba fell to Spanish Christians in 1236. When the Mongols sacked Baghdad in 1256 the Islamic Empire never recovered. Trade routes became unsafe. Urban life broke down.

Directions: read through the advancements below, and answer the corresponding questions.

Arabic Numerals (numbers)



Comparing Number Systems	
Roman Numerals	Arabic Numerals
I	1
II	2
III	3
IV	4
V	5
VI	6
VII	7
VIII	8
IX	9
X	10
XI	11
XII	12
XIII	13
XIV	14
XV	15
XVI	16
XVII	17
XVIII	18
XIX	19
XX	20

One of the greatest advances was the introduction of "Arabic" numerals. The "Arabic" numerals were influenced by India's mathematics. It is a system based on place values and a decimal system of tens. These numbers were much easier to use for calculation than the Roman system, which used numbers, like I, V, X, L, C, M, etc. Addition, subtraction, multiplication and division now became easy. With Arabic numerals, simple fractions and decimal fractions were also possible. Fractions and decimal fractions were also described by Muslim mathematicians during the Middle Ages.

How did this advancement contribute to the Islamic golden age? What could they now do easier with Arabic numerals than with Roman numerals, for example?

Famous Doctors

1) One of the greatest names in medieval medicine is that of Abu Bakr Muhammad ibn Zakariya' al-Razi, who was born in the Iranian City of Rayy in 865 CE and died in the same town about 925 CE. A physician learned in philosophy as well as music and alchemy, he served at the Samanid court in Central Asia and headed hospitals in Rayy and Baghdad. Al-Razi made the first major Muslim contribution to medicine when he developed treatments for smallpox and measles. He also made significant observations about hay fever, kidney stones, and scabies, and first used opium as an anesthetic (pain killer).

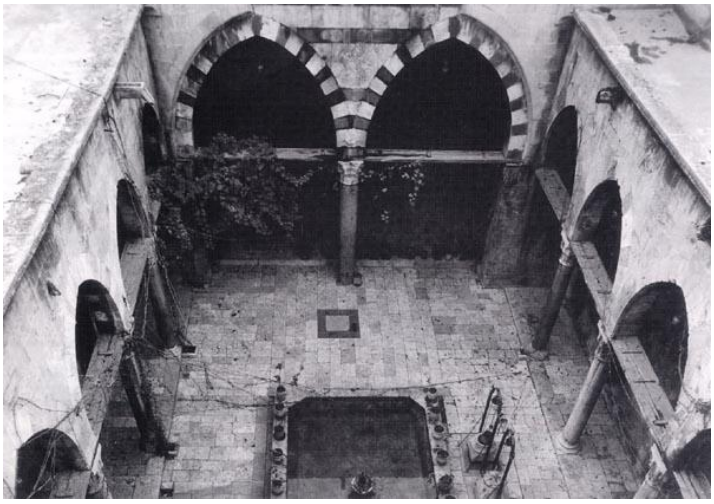
2) Ibn Sina was one of the greatest physicians in the world, with his most famous book used in European medical schools for centuries. He is credited with discovering the contagious nature of diseases like tuberculosis, which he correctly concluded could be transmitted through the air, and led to the introduction of quarantine (separating sick people from the healthy) as a means of limiting the spread of such infectious diseases.

3) Abu al-Qasim al-Zahrawi (936–1013 CE), was the "father of modern surgery". He invented and documented more than two hundred surgical instruments. There are approximately 200 drawings of surgical instruments ranging from a tongue depressor and a tooth extractor to a catheter (a small tube for fluids). He wrote extensively about injuries to bones and joints, even mentioning fractures of the nasal (nose) bones and of the vertebrae (spinal bones). In fact, the modern method for fixing a dislocated shoulder was described in At-Tasrif long before it was used by modern doctors! El Zahrawi fully described tonsillectomy (the removal of the tonsils), tracheotomy (creating a breathing hole in the throat) and craniotomy (brain surgery). He performed these operations on corpses (dead bodies). He was also a pioneer in the use of anesthesia (medicine for operations without pain).

Out of these three doctors, which do you think is most influential and important? Why? Support with evidence.

Medicine, Education, and Scientific Advancements

The world's first observatories (places to watch the skies and stars), public hospitals, psychiatric institutions, and universities emerged in the medieval Islamic world.



Hospitals: While European "hospitals" at this time were usually simply monasteries where the sick were told they would live or die according to God's will, not human intervention, Muslim hospitals pioneered the practices of diagnosis, cure, and future prevention. The first hospital in the Islamic world was built in Damascus in 707 CE, and soon most major Islamic cities had hospitals, in which hygiene was emphasized and healing was a priority. Hospitals were open 24 hours a day, and many doctors did not charge for their services. Later, a central hospital was established in Baghdad by order of the Abbasid ruler, the first of thirty-four hospitals throughout the Muslim world, many of them with special wards for women. Traveling clinics with adequate supplies of drugs toured the countryside, and others paid regular visits to the jails.

Pharmacies: Muslims also made advancements in the field of pharmacology (the study of drugs and medicines). They experimented with the medical effects of various herbs and other drugs, and familiarized themselves with anesthetics (pain reliever) used in India. The Arabs established the first drugstores and wrote the first encyclopedias of drugs and medicines. The first pharmacies were established in Baghdad in the 8th century. Baghdad had at one time as many as eight hundred sixty two registered pharmacists, all of whom had passed formal examinations.

Scientific Inventions Agriculture/Irrigation: For centuries, the dry and harsh environment of much of the Muslim lands made the collection, transportation, and storage of water important. It is hardly surprising that the most important progress in medieval Muslim technology and engineering was achieved in relation to water. In the tenth century al-Kindi proposed a plan to dam the Nile. A dam is a structure that blocks the flow of water in a river. Dams block water from flowing down the river and can be used to make lakes of extra water so that a town will never run out of water. Many of the dams, reservoirs, and aqueducts constructed at this time throughout the Islamic world still survive.

Map of Europe as the Muslim explorers/cartographers mapped it in the 16th century versus its actual borders.

At Hama in Syria, antique wooden wheels still lift the waters of the Orontes to gardens, baths, and fountains. Muslim engineers also perfected the waterwheel and built underground water channels some fifty feet underground. The underground channels had manholes (openings from the street) so that they could be cleaned and repaired.

During this time period, Europe is in its "dark ages." Learning declined, common language was lost, and few advancements were made. The Islamic world is experiencing its golden age! Out of these three advancements, which do you think is most influential and important? Why? Support with evidence.

Above: Work in the observatorium of Taqi al-Din. *note: Muslims are forbidden from drawing human form – whom do you think created this? Look at the artistic stylings and take a guess. To the right: an astrolabe

Education: The world's oldest degree-issuing university, Al-Karaouine, was established in Fez (modern-day Morocco) in 859 CE and the first full university, Al Azhar, opened in Cairo in 975 CE. The medical school at the University of Jundishapur, once the capital of Sassanid Persia, became the largest in the Islamic world by the 9th century. Its location in Central Asia allowed it to incorporate medical practices from Greece, China, and India, as well as developing new techniques and theories.

Astronomy: Muslims built the first observatory as a scientific institution in the 13th century. They used these to study the movements of the stars and other heavenly bodies. The astrolabe, pictured, allowed people to find their precise latitude by using the position of the stars. The astrolabe was later modified to be used on ships. This innovation allowed Europeans to begin exploring the seas more safely. This lead to the Europeans finding faster trade routes to Asia by sea and Christopher Columbus's "discovery" of the New World.

Closure: Which of the above achievements and advancements contributed the most to society during the Postclassical Era (600-1450)? Explain in at least 6 sentences, and support your claim with evidence. For an extra point, include an articulated counterclaim (the one that contributed the 2nd most, for example).