

## Intellectual Achievements Jigsaw

### India Fact Sheet

**Directions:** Study the following information about intellectual achievements in India. After you have read over this individually, you will have the opportunity to work in an expert group to discuss intellectual achievements in world history. Afterward you will be responsible for teaching another group about the intellectual achievements in India. Your group will take notes on the Jigsaw Organizer.

As you study the following think about this question:

1. In what ways did India contribute to the science, mathematical, and technological achievements of the pre-modern world?

India was the birthplace of many inventions and discoveries. In the 4<sup>th</sup> century BCE, Indians created a number system based upon the value of 10. They used this system to create the decimal system.

Western numerals also originated in India. These numerals, such as 1, 2, and 3 began in India and then were spread throughout the rest of the world by Arab explorers. Indians also discovered the formulas for sine and cosine. These concepts are important in the study of trigonometry.

Many medical discoveries originated in India. In the 8<sup>th</sup> century, Indians used a form of vaccination against

smallpox. In addition, some of the earliest accounts of surgery can also be traced to India. Surgeries for cataracts (eye surgery) and reconstructive (plastic) surgeries to fix nose and ear disfigurements were common medical procedures. Indians also practiced some of the first scientific study of animal diseases and illnesses. This led to the foundation of modern veterinary medicine. Just like the spread of the numerals, the Arabs also spread many of the Indian discoveries to other parts of the world.



$$\sin \theta \equiv \cos \left( \frac{\pi}{2} - \theta \right) \equiv \frac{1}{\csc \theta}$$

$$\cos \theta \equiv \sin \left( \frac{\pi}{2} - \theta \right) \equiv \frac{1}{\sec \theta}$$

1 2 3 4 5

Image Source: <http://upload.wikimedia.org/wikipedia/commons/0/08/SAARC.PNG>

## China Fact Sheet

**Directions:** Study the following information about intellectual achievements in China. After you have read over this individually, you will have the opportunity to work in an expert group to discuss intellectual achievements in select world history. Afterward you will be responsible for teaching another group about the intellectual achievements in China. Your group will take notes on the Jigsaw Organizer.

As you study the following think about this question:

1. In what ways did China contribute to the science, mathematical, and technological achievements of the pre-modern world?

There are several major Chinese inventions that changed the world. The first was the invention of papermaking. Other civilizations had materials that were written on, but they were normally too expensive to mass produce. The Chinese invention of paper from pulp was the forerunner of the paper we use today.



Since the Chinese created the first mass produced system of paper, it makes sense that they also were the first to create a long-lasting system for printing on paper. They first perfected a woodblock form of printing that originated in Korea. In the 11<sup>th</sup> century they developed a system of movable type which allowed for the mass printing of books. The European printing press developed independently of the Chinese printing press.

During the 10<sup>th</sup> century, the Chinese created fireworks. These were powered by gunpowder which the Chinese created several formulas for. Gunpowder weaponry emerged and dramatically changed the world. This invention led to bombs, guns, and other explosive devices.

Another significant invention from the Chinese was the compass. The compass allowed the Chinese to determine cardinal directions (north, south, east, and west). This invention was vital in Chinese trade and travel.

The Chinese developed a very distinct type of medical practice, called acupuncture, that is still used today. Their use of acupuncture can be traced to the 3<sup>rd</sup> century BCE. This process involves inserting needles into specific points in the body to relieve pain and alleviate other maladies. They also used specific herbs to treat malaria and in the 7<sup>th</sup> century determined necessary dietary and exercise changes to treat those with diabetes.

Image Sources:

[http://commons.wikimedia.org/wiki/File:People%27s\\_Republic\\_of\\_China\\_\(orthographic\\_projection\).svg](http://commons.wikimedia.org/wiki/File:People%27s_Republic_of_China_(orthographic_projection).svg) and  
<http://en.wikipedia.org/wiki/File:Jinggangjing.jpg>

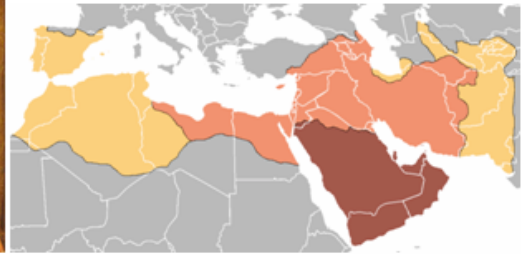
## Islamic World Fact Sheet

**Directions:** Study the following information about intellectual achievements in the Islamic World. After you have read over this individually, you will have the opportunity to work in an expert group to discuss intellectual achievements in select world history. Afterward you will be responsible for teaching another group about the intellectual achievements in the Islamic World. Your group will take notes on the Jigsaw Organizer.

As you study the following think about this question:

1. In what ways did the Islamic World contribute to the science, mathematical, and technological achievements of the pre-modern world?

Many everyday items can be traced back to the Islamic world. Items such as coffee, bars of soap, tooth paste, croissants, and shampoo are all believed to have originated in the Islamic world.



In addition to everyday items, other Islamic discoveries are still used today. One of these discoveries was the systematic study of chemical compounds.

$$f(x) = 3x - 10$$

Scientists studied what happened when different chemicals were mixed together. In addition, algebra also originated in the Islamic world. Algebra, and later geometry, were used for the Arabs and other groups to engineer large buildings.

Many major medical advances can be traced to the Islamic world. During the 11<sup>th</sup> century, physicians determined that some diseases, such as scabies, were caused by parasites. They also concluded that bleeding patients was not an effective treatment for diseases. Their understanding of contagious diseases led them to use the practice of quarantine to stop the spread of contagious diseases.

The world's first hospitals and psychiatric clinics were found in the Islamic world. Surgeons performed surgery with anesthesia. They also developed the first effective drugs used to treat illnesses during the 11<sup>th</sup> century. Islamic physicians were considered the most advanced in the medieval world.

In addition to the inventions of the Islamic world, many other Asian discoveries and achievements were transported by Islamic merchants from Asia to the rest of the known world. The transport of these ideas help to ensure that fundamental inventions spread to different civilizations.

Image Source: <http://en.wikipedia.org/wiki/File:Al-RaziInGerardusCremonensis1250.JPG> and <http://en.wikipedia.org/wiki/File:Age-of-caliphs.png>