

Four Great Inventions

Four inventions—gunpowder, the compass, paper, and the printing press—played key roles in human history and development. Learn how each of these was invented and discover how they changed the world.

China Showcase Library Learn about China, through its history, people, places, and culture. Supported by original material developed by National Geographic Learning and People's Education Press, the China Showcase Library presents non-fiction reading selections on a variety of fascinating topics.

The audio for this reader is available for download at ELTNGL.com/csl

Intermediate
1600 headwords

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Four Great Inventions



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For Review Only

Before You Read

This story is about China and some of its great historical inventions. It involves the whole country, but specific places in the story include the city of Chongqing in Southwest China; Xinjiang, and the city of Dunhuang, Gansu Province¹ in far Northwest China; Hubei and Shaanxi Provinces in Central China; and Anhui Province in East China.



Chongqing, China

A. The Four Great Inventions. Read the paragraph. Then match each word with the correct definition.

For hundreds of years, four great inventions were behind much of the world's scientific, technological, and cultural advances. These inventions were **gunpowder**,² the **compass**,³ printing, and paper. With gunpowder, the first modern wars were fought. With the compass, the seas became wide roads for trade and exploration. With printing, knowledge finally came within reach of ordinary people and scientific discoveries could be shared. And finally, what is printing without paper? Without paper, printing would not have been possible. While in the past it was thought by many people in the West that these were European inventions, 19th and 20th century research showed that these world-changing inventions were all created in China.

- | | | |
|------------------|-------|--|
| 1. create | _____ | a. a careful study of a subject |
| 2. cultural | _____ | b. something useful created by someone |
| 3. exploration | _____ | c. to make something new |
| 4. invention | _____ | d. a journey of discovery; a search |
| 5. research | _____ | e. related to engineering; used for practical purposes |
| 6. technological | _____ | f. related to a society and its way of life |

¹ **province**: one of the districts that some countries are divided into with its own local government

² **gunpowder**: a mixture of chemicals that explodes and is used in weapons

³ **compass**: a device for finding directions by means of magnetic needle

B. A Delightful Invention. Read the email and look at the photos in this reader. Then answer the questions below.

SEND MAIL ✖

TO:

SUBJECT:

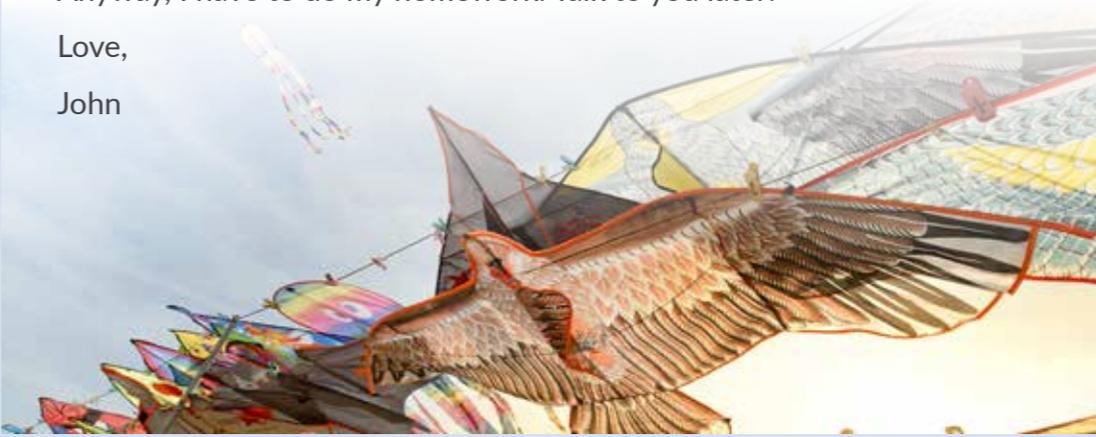
Hi Sis,

Today the weather was wonderful, so I went out to the local park with some friends to fly kites. It seemed like half the city had joined us—the sky was full of brightly colored kites, and we had trouble finding a good place to stand. It was such a simple and peaceful pleasure seeing our kites fly high in the air. I felt so relaxed when we were done.

Then over lunch, Jun told me that kites were invented by a man named Mozi (468–376 BCE). Like Confucius, Mozi was something of a philosopher, except that he taught we should love everyone the same way. He also worked hard to bring peace between warring countries. Anyway, Mozi created many clever inventions from wood, and one of these was a wooden kite that looked like a bird. I think it is so wonderful that Mozi could invent something that would bring relaxation and happiness to so many people. We never think to ourselves that something like kites needed an inventor, and that there was once a time when we did not have them.

Anyway, I have to do my homework. Talk to you later!

Love,
John



🔍 🌐 📧 🗑Send

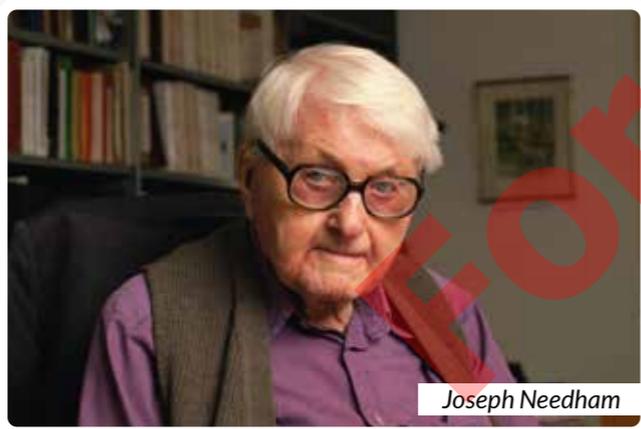
1. What do you know about Chinese historical inventions?
2. In what ways has gunpowder, the compass, printing, and paper impacted your life today?
3. In what ways do you think these four inventions may have changed history?

Gunpowder, the compass, printing, and paper. These are the Four Great Inventions that changed the world. That these inventions were the key to modern advancement and society is not a new idea. People had been talking about this idea for hundreds of years. However, in the beginning they talked of Three Great Inventions—gunpowder, printing, and the compass. Paper was added later. And for centuries all these inventions were thought of as European.

It was not until the 19th century that a few Westerners quietly began noting that the Three Great Inventions were actually Chinese. Then in 1925 Thomas Carter (1882–1925), in his book *The Invention of Printing in China and Its Spread Westward*, added *paper* to the list so that it became Four Great Inventions instead of just three. However, it was the British scientist Joseph Needham (1900–1995) who began to popularize the idea of China's Four Great Inventions in the middle of the 20th century.

Needham was a professor at Cambridge in 1937 when three Chinese scientists went there to study. Through one of these scientists, Lu Guizhen (1904–1991), Needham became interested in the history of Chinese science and technology. In 1942, Needham was sent to Chongqing, China, as the director of the Sino-British Science Co-operation Office. Needham used his time in China to travel to remote provinces for research and to collect Chinese historical documents on science and technology.

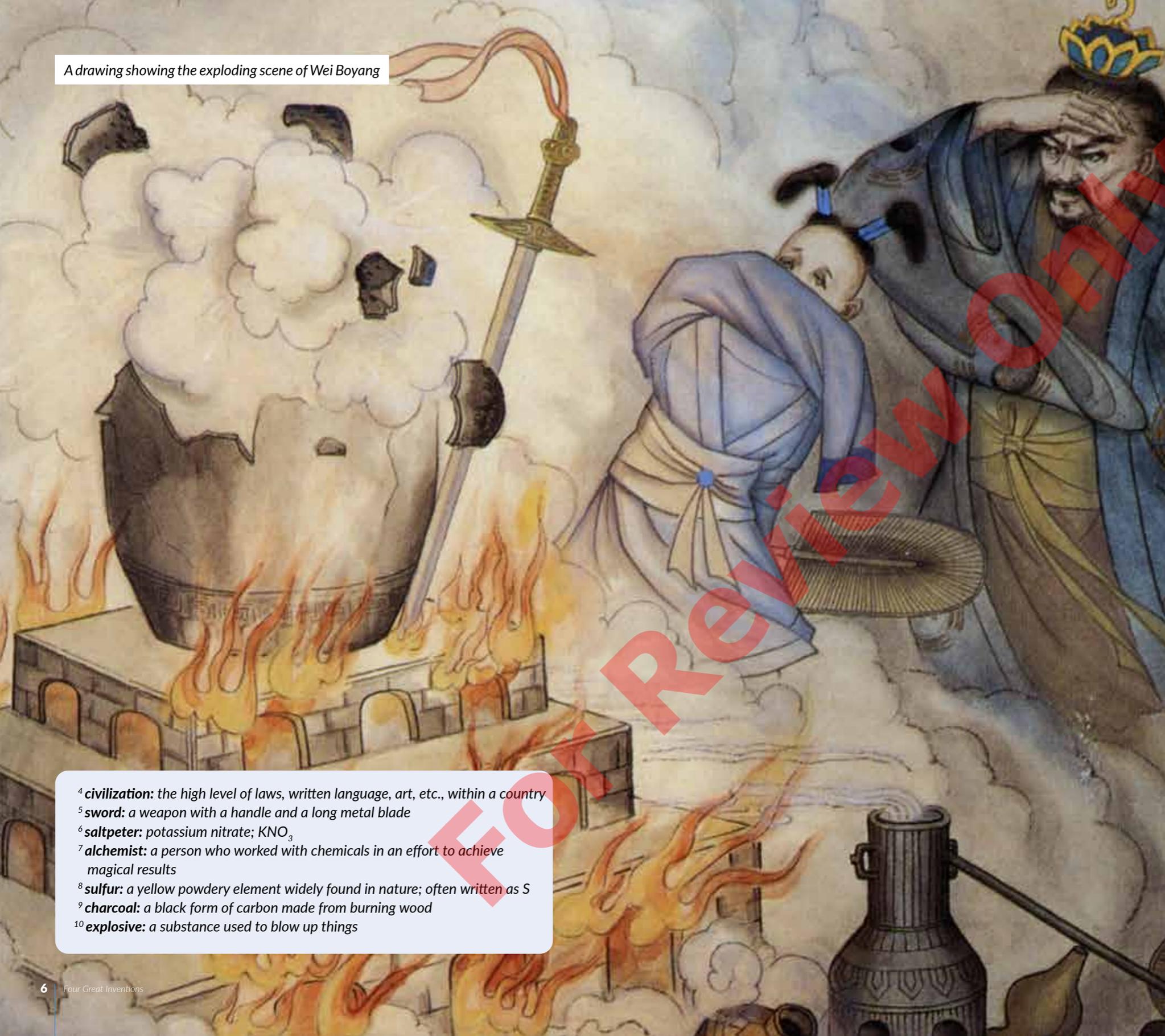
 Track 1



Joseph Needham



A drawing showing the exploding scene of Wei Boyang



⁴ **civilization**: the high level of laws, written language, art, etc., within a country

⁵ **sword**: a weapon with a handle and a long metal blade

⁶ **saltpeter**: potassium nitrate; KNO_3

⁷ **alchemist**: a person who worked with chemicals in an effort to achieve magical results

⁸ **sulfur**: a yellow powdery element widely found in nature; often written as S

⁹ **charcoal**: a black form of carbon made from burning wood

¹⁰ **explosive**: a substance used to blow up things

When Needham got back to Cambridge in 1948, he began work on *Science and Civilization*⁴ in China. Here, Needham pointed out numerous Chinese discoveries and inventions, of which the Four Great Inventions were thought of as the most important. When the first book of this series came out in 1954, it resulted in a rethinking of China's role in the development of science and technology around the world. Without this work, the idea of China's Four Great Inventions might be almost unknown in the West.

It is hard to imagine the impact that a gun must have had on soldiers in the 15th century. These old guns sounded like thunder. The sound alone would have made the soldiers with **swords**⁵—and their horses—run away in fear. However, it did not matter how fast the soldiers ran away, because these guns could kill at a distance. Before this time, war was often a matter of who had the most soldiers. Now, war became a matter of technological might: Those who had gunpowder, and knew how to use it, usually defeated those who did not.

But where did guns and gunpowder come from? The story begins with Chinese experiments with **saltpeter**⁶—a white mineral first found near animal waste. Saltpeter can be used to help mix other minerals in water. This made it useful for Chinese **alchemists**⁷ in their experiments, as they looked for a medicine to make people live longer. It was just a matter of time before two other ingredients commonly found in an alchemist's laboratory—**sulfur**⁸ and **charcoal**⁹—found themselves mixed together with saltpeter, resulting in **explosive**¹⁰ results. An alchemist named Wei Boyang of the Eastern Han Dynasty noted that by mixing certain ingredients together one could get a material that “flies and dances.” In the centuries that followed, other alchemists may have written about gunpowder. However, the first recorded recipe for gunpowder appeared in 1044.

From the beginning, gunpowder had a variety of uses, including fireworks and guns. The Chinese had developed an early form of gun using gunpowder, but these guns were not very easy, or safe, to use. Given how dangerous guns were, the Chinese ultimately preferred to use gunpowder for a more peaceful and beautiful purpose: fireworks.

We so often take for granted yesterday's inventions. For example, today in China the compass is most often thought of as just a cheap toy used by children. However, for centuries the compass was the most important **navigational**¹¹ **device**¹² in use. With the compass, people ruled the seas. No longer were we afraid to enter the open water, for now it became great roads to parts unknown.

It is not known exactly when the first compass was created, but it was first described in a book written during the Warring States period (475–221 BCE), and it was called the *sinan*. The *sinan* was usually made of a metal or wooden plate with a small, metal, **magnetic**¹³ spoon placed in its middle. This spoon would then be **spun**¹⁴ around. When the spoon finished spinning, the handle would always point south. A *sinan* would have words written on it which could be used to help with feng shui. For example, the device could be used to tell the best place to build a house, or which direction a street should be laid.



¹¹ **navigation:** the science of finding the correct path for a ship, airplane, etc.

¹² **device:** a machine or tool

¹³ **magnetic:** of magnets and their forces; magnets are materials that attract or drive away certain other materials because of their electrical charges

¹⁴ **spin:** to turn something very quickly and easily

A. Multiple Choice. Answer the questions below by choosing **A, B, C,** or **D.**

- 1. Why is Cai Lun usually called the father of paper?**

 - A. He created the first recorded recipe for paper.
 - B. He invented paper.
 - C. He was the first person to use paper.
 - D. The earliest examples of paper still in existence were made by him.
- 2. Wei Boyang might not be the inventor of gunpowder because _____.**

 - A. he did not use it in a gun
 - B. his material did not explode
 - C. he may have used different materials from saltpeter, sulfur, and charcoal
 - D. he may not have used the right amounts of saltpeter, sulfur, and charcoal
- 3. What made it possible for the compass to be used for navigation?**

 - A. The use of a magnetized needle instead of a spoon.
 - B. The use of a metal “fish” instead of a needle.
 - C. The use of a needle that pointed north instead of south.
 - D. The development of the wet compass.
- 4. What is movable type?**

 - A. The use of one piece of porcelain for each Chinese character.
 - B. The use of one piece of wood, porcelain, or metal for each Chinese character or letter.
 - C. The use of boxes to store Chinese characters in.
 - D. The use of a printing frame.
- 5. In the first paragraph on page 19, what does the phrase *sea change* mean?**

 - A. a change in sea conditions
 - B. a small change
 - C. a major, important change
 - D. a change for the better

B. Complete the Notes. Complete the notes below with words from the passage.

The Four Great Inventions	
Gunpowder	<ul style="list-style-type: none"> • Chinese alchemists found that (1) _____ • 1044: first recorded recipe • Used for (2) _____
Compass	<ul style="list-style-type: none"> • <i>Sinan</i>: a metal or wooden plate with a small (3) _____ which was spun around; the Warring States Period (475–221 BCE) • Northern Song Dynasty (960–1127): (4) _____ used instead of spoon • (5) _____ used by soldiers by 1044; used on ships by 1190
Paper	<ul style="list-style-type: none"> • Oldest paper: found in Gansu Province, dates around 180–141 BCE; probably a map. • First recipe for making paper: by Cai Lun in 105; he is usually called (6) _____ • Early uses: (7) _____ • First commonly used as writing material in the 3rd century
Printing	<ul style="list-style-type: none"> • Earliest (8) _____: Buddhist texts printed before 700 • Earliest printed scroll which can be accurately dated: <i>Diamond Sutra</i> printed in 868 • (9) _____: invented around 1041–1048 in Hubei Province, China by Bi Sheng using porcelain Chinese characters • Improved system: Wang Zhen created (10) _____; found a better way to organize them • Printing press: around 1440 by Johannes Gutenberg

C. Answer the Questions. Use information from the passage to answer the questions below.

- How were some of these inventions used differently by the Europeans than by the Chinese?
- What might these differences in use tell us about the difference between the European and Chinese cultures?
- Of all the modern inventions, what do you think are the new Four Great Inventions? How will they change life in the future?

A Chinese Invention We Use Every Day



on the same string, which could be very heavy to carry around. Since even 1,000 coins were not really worth that much, business deals of any importance could require many strings of coins—even whole rooms of them.

To solve this problem, beginning around the late 8th and early 9th centuries (Tang Dynasty), merchants would deposit their coins with someone, and for a receipt that person would give them a piece of paper called *fei qian*, or “flying money.” Then when the merchant did business, he could use that paper instead of having to carry a truckload of coins around.

In 812, three departments in the Tang government began using paper receipts for large deals where a lot of coins would normally have to be carried over a long distance. This was not money in the modern sense, as it could only be used to pick up coins at the end of the trip. This finally led to the printing of paper money as we know it today by the early 11th century. Depending upon the era, paper money may have been worth quite a lot or may have been nearly worthless. At times, the government even had to stop using paper money because no one wanted it. However, paper money was simply too convenient to give up on, and so in the end it replaced coins for all but very small business deals.

Track 2

All these pieces of paper are issued ... as if they were of pure gold or silver ... and the Khan causes every year to be made such a vast quantity of this money, which costs him nothing, that it must equal in amount all the treasure in the world.

The Travels of Marco Polo

With these words, Marco Polo (1254–1324) wrote about one of the most wonderful inventions he had seen in China: paper money. To 13th century Europeans, this was an amazing idea, and in time they began printing their own money. Today most of the world’s money is made up of paper, though payments are often made with plastic cards or by other technologies, and virtual money seems to be the next big thing.

The idea of paper money started in China. For much of Chinese history, what most people thought of as money were small coins with holes in the middle. These coins were put on a piece of string, 100 coins to a bunch. Normally, ten bunches were kept



Word Count: 413
Time: _____