Non-Fiction

Group 1

Jaozi - The First Paper Money

Carmel Elementary School, Turner, Adi – 8

Before paper money existed, people used items such as rocks and seashells to trade for houses and horses. The earliest currency was born in ancient Mesopotamia 5000 years ago, and since then, currencies have evolved from commodity money to metallic coinage and paper money. Nowadays, digitized currencies run the global economy, partaking in billions of transactions every minute. However, the history of money is far more complex.

The foundation for the development of paper money was laid by two inventions: the paper and ink technologies, both of which are part of the 'big 4' Chinese historical inventions. The paper was invented during the Han dynasty around 100 BCE. Beforehand, materials such as bamboo strips, silk, and animal skin were used as surfaces for writing, but they were relatively expensive, not accessible, and not reliable. The ink technology was developed more or less simultaneously with the paper. The traditional ink, mostly known as 'carbon ink,' was made by grinding inkstick (a mixture of soot from burned pine wood and glue) on an inkstone with water. These two innovative technologies allowed the invention of the first paper money, the 'Jiaozi', and opened the door to a new era of global trade.

Jiaozi was the first paper note born in the Northern Song Dynasty in Chengdu, the Sichuan district capital of China, and it was first issued on April 1st, 1024. Before the Jiaozi, the traders had to use expensive metal coinage that suffered a few significant disadvantages. Firstly, the metal coins were hefty, and therefore difficult to carry around, resulting in divisibility and inefficiency issues. Moreover, they were easy to counterfeit and fast to wear and tear.

The Jiaozi was revolutionary, solving all of the prominent issues of the metal coinage system. The portability of money increased due to the paper bills being lightweight and easy to carry. Durability also improved with the outstanding quality of the Chinese paper, due to the evolving paper technology. Divisibility stopped being an issue, and counterfeiting became much more difficult.

The impact of the Jiaozi was enormous, not only on the Chinese economy but on the whole world. Local and foreign traders distributed this new form of money all over the world, allowing improvements in financial intermediation, enabling merchants to conduct business more efficiently, and encouraging economic growth.

Today, Jiaozi is displayed in the Chinese Finance Museum of Chengdu. It is an incredible milestone in global finance and is the first of many paper notes developed and printed over the years, which still serve as a crucial part of our daily lives.

The Chinese invention of Jiaozi is an excellent example of using leading technologies to invent a "game changer" in globalization. By improving trade efficiency, this Chinese revolutionary invention helped to make the world smaller, better, and more united than ever.

New Tales of China's Inventions

ESF Beacon Hill School, Wu, Ava – 7

Do you have an idol? Well, my dad does. That was a famous statesman, strategist, and engineer that I know in ancient China called Zhu Ge Liang. He was born in the year 181 and died in the year 234. He lived in the Three-Kingdoms period which was quite chaotic, and invented a lot of things like Mantou, landmines, Kongming Lantern, and repeating crossbows.

To my surprise, some inventions are still in use, for example, Kongming Lanterns. Although the others are not, outdated inventions give us ideas to upgrade them into newer and better ones.

One of his best inventions is the wooden ox and flowing horse (or Mu Niu Liu Ma in Chinese), which he created at 49 years old. He made it because his country went to war and the army was carrying heavy rice on the move. After he made a wooden ox and flowing horse, the army could just put the rice in its body which was actually an empty container so that the self-walking carrier could save people's energy!

Almost a month ago my dad bought a toy of the wooden ox and flowing horse for my brother and me. It was a pack of pieces, and we had to connect the body and the legs with bolts and nuts. Amazingly this hand-made animal walks with the right front leg and the left back leg stepping out at the same time, and so are the other two legs moving - It worked perfectly! It is of a baby puppy's size and my lower arm's length. All parts including its head and horns are wooden so it is light brown. As long as you softly pull the long rope in its nose, it starts to walk easily, unlike a box container.

It has no facial expression but I can still imagine that it is a happy ox, or a curious one.

Nowadays, people replace it with bags, wheel suitcases, and even newer driverless cars. In case you don't know, a driverless car can drive by itself when you are seated inside. You don't have to worry if it bumps into other cars because there are a lot of sensors all around it. There is also a map navigator inside the car so that it knows where to go as soon as we type in the destination. Unlike Mu Niu Liu Ma, there is a supercomputer inside the car that functions like the brain of a human. It can understand and respond to all the information from many sensors at the same time. I'm excited not only because it is cool but also because it can help people. Even blind people can have their cars in the future. And I don't need a driver's license anymore.

Recently when my family took a plane to South Korea for a skiing holiday, my uncle gave me a ride on his new Tesla. I was really surprised when I saw his hands off the steering wheel but the car did not bump into anything. The steering wheel was slowly and slightly turning by itself as if someone I couldn't see was steering it instead of my uncle. Sitting in the car, my family felt they were on the road to the future.

I feel curious about what Zhu Ge Liang would invent if he were here, but I'm sure that he would at least be as inspired as I am now by so many new inventions in the modern world.

What Do You Think?

German Swiss International School, Luan, Zavier – 7

Chapter 1: Introduction

Many kids want to be a scientist to calculate and to make their own inventions. I would think you will become one when you grow up. But I guess your inventions might be like a train, bottle or boat. I would like to invent something like a robot friend or magical medicine. Oh, and one more fun fact! Did you know that the wires we use for electronic devices, like the ones that connect your computer or TV, were inspired by Star Wars?

After Many centuries, China might even invent a machine that can help your parents with chores. If I'm wrong with what you might invent, what would you invent? Even if you don't want to be a scientist, it's okay too. Not being a scientist, you can also invent! You can use your imagination and create amazing things with paper, toys, or anything you can think of. And who knows, maybe one day you'll come up with an invention that changes the world!

Chapter 2: Old inventions

China has invented many things including paper making, moveable type printing, gunpowder, compass, mechanical clock, silk, umbrella, alcohol, acupuncture, tea production, iron smelting, porcelain, earthquake detector, racket, bronze, kite, seed drill, raw crop farming, toothbrush and paper money, and much more!

Chapter 3: Future Inventions

Now that we've learned about all the amazing things that China has invented, let's dive into the exciting world of future inventions! There are so many cool ideas and possibilities waiting for us. Are you ready?

Flying Cars: Imagine zooming through the sky in a car! In the future, we might have cars that can fly. How awesome would it be to soar above the clouds and go on adventures in the air?

Talking Animals: Wouldn't it be amazing if we could talk to animals and understand what they're saying? In the future, we might have devices that can translate animal language, so we can have conversations with our furry and feathery friends.

Magic Food Machines: Hungry? In the future, we might have machines that can instantly make any food you want. Imagine pressing a button and getting a delicious pizza or a yummy ice cream cone. It would be like having a magical kitchen!

Chapter 4: Dream big

Isn't it exciting to think about all the incredible inventions that might be waiting for us in the future? Remember, you don't have to be a scientist to invent things. So, keep dreaming, keep imagining, and always believe in the power of your ideas. The future is full of possibilities, and you can be a part of making it even more amazing. Have fun exploring and inventing, my friend!

Creative Writing

Non-Fiction

Group 1

The Seismoscope: One of Life-saving Inventions

Po Leung Kuk Choi Kai Yau School, Chan, Ching Yuet Bella – 8

Long, long time ago, there was a Chinese scholar named Zhang Heng. He was talented and diligent from childhood. He was so keen on discovering something which could help people in the world. Driven by his curiosity and perseverance, he really made many great inventions. One of them was the seismoscope.

When he was 17 years old, he left home and pursued his study in Changan and Libyang. Not only could Zhang Heng write excellent essays and draw, he also studied and learned about calendars, mathematics and mechanics. One day, he was heartbroken to see people suffer from many earthquakes across the country. He thought, "It takes a lot of time to convey messages so as to save people from earthquakes. What if we could detect the occurrence of earthquakes earlier, we would be able to reduce the harm and help people in danger!" He was determined to make use of his mathematics and mechanics knowledge. Working endless days and nights, finally he invented a seismoscope. He was delighted and went to show it to the emperor. "Your Majesty, I have an important invention to show you." "I invented a seismoscope. It detected the location of the earthquake that occurred last night in the northwestern area and you could prepare and transport the supplies to the victims there." The emperor felt shocked with the big instrument in front of him. In a blink of an eye, a copper ball facing northwest had fallen from one of the eight directional dragons. It implied that another earthquake was coming in the northwest. The emperor was doubtful at first but he trusted Zhang Heng's integrity and talents. He transported relief and supplies to the stricken areas immediately. Zhang Heng was proven to be right. The next day, a man came in and reported about earthquakes in Luoyang. The early news rescued a lot of victims. The emperor made Zhang Heng a Grand Scribe in the Imperial Court.

The emperor felt so grateful to Zhang Heng's invention. People could evacuate earlier and escape from the earthquake disaster. With the emperor's recognition of contribution, Zhang Heng felt motivated to keep inventing something to change the world. He soon afterwards built the first water-powered armillary sphere in the world. He employed a waterwheel and clepsydra to rotate the water-powered armillary sphere. He even invented a wind gauge to help measure the wind directions. Though they are not named as the Four Great Inventions which made us become civilised today, still the technology left by Zhang Heng saved a lot of people from unavoidable earthquakes nowadays. How beautiful it was to invent something for kindness instead of your own fame?

China's Great Four Inventions

The International School of Macao, Chen, Kelsie – 8

Long time ago Chinese people lived in a small village, there's a person called Mǎ Liáng. He is poor and he lives in a small wooden house. Mǎ Liáng's parents passed away for many years. So Mǎ Liáng live by all himself.

He likes to draw but he doesn't have lots of money since Mǎ Liáng parents died so nobody could provide enough money for Mǎ Liáng to buy a pencil or paper. Therefore, sometimes he will get a stick and he will go outside to draw on the sand. One day he finds a hole under his bed. He was very curious so he crawled inside. Magically he found a pencil and a notebook on a wooden table. He took the pencil and notebook from the table. He was very happy and excited about that. He crawled back to his bedroom with the pencil and the notebook. He saw a picture on the back side of the black notebook. But he didn't care about it so he started to draw and draw on the notebook. After he puts the pencil and notebook on the floor, and goes back to bed. But then he wakes up because it's so hot as if his in an oven so Mǎ Liáng went outside and…

He saw ten sun on the night sky. "Ahhhh……," his shout.

He even saw Nián but he wasn't scared at all because everyone put up fireworks and red stuff on Nián. Nián run away because it is scared of the color red and fireworks. But still there have ten sun, and also all the water evaporated so, some animals has died from thirsty and even some people died as well. Mǎ Liáng sits and think. He thinks and thinks one minute goes two minutes goes three minutes goes, and he thinks hardly then he got a idea Mǎ Liáng jumped out of the tiny bench and started to draw. Mǎ Liáng draws and draw and draws Hòu Yì and Cháng É, then the drawing was gone! Then… POOF!

Hòu Yì and Cháng É is alive! After Mǎ Liáng tells Hòu Yì about the ten suns.

Hòu Yì told to Mǎ Liáng, "Outside is very dangerous. You have to stay on the beach and don't go outside until I am done killing the suns."

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Hou Yi wanted to shoot the last sun, but Mǎ Liáng took the last arrow and said, "Hòu Yì if you shoot the last sun then everywhere is dark how could we live."

"Oh, fine. I will not shoot the last sun, and I need to go back to the notebook and bye bye,"Hou yi said.

Poom!!!!

Hòu Yì and Cháng É disappeared in the wooden house. After Mǎ Liáng used the pencil and the notebook to help the village to return peace. Later on Mǎ Liáng keep using the magic pencil and notebook to help the village and his life.

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Non-Fiction

Group 2

The Modern Uses of Porcelain

German Swiss International School, Song, Shawn – 11

Beginning in around 1600 BC, the Chinese developed a special ceramic that was durable, non-porous, heat resistant and was light compared to metals. This material reigned supreme above all other ceramics for many thousands of years, being highly valued all across the globe from Japan to Britain. It fetched massive prices and was regarded as a miracle material, it was porcelain.

Many people think of porcelain as the material that is used to make teapots, or the material that they use to make their vases or bowls. A few metallurgists may even think of it as the material for their crucibles, but the uses of porcelain are much more expansive nowadays, ranging from rocket nozzles to heat shields and jet engines.

How are these materials in modern industries even connected to porcelain? Well, the answer is simple. They are all built up on porcelain's natural anti-corrosive and heat resistant properties. All in all, porcelain is the ancestor of a slew of modern day ceramics. Two typical examples are ceramic matrix composites (CMCs) and ultra high temperature ceramics (UHTCs).

First of all, how are these curious materials manufactured? CMCs are essentially just layer upon layer of thin materials, such as ceramic fibers stacked together. That's why they are classified as composite and matrix. The thin fibers are then stacked into thin sheets and cut according to the required dimensions, lastly, they are fused together in an autoclave. The end result is a light,and heat resistant material that can bear temperatures up to 2000°C. This allows them to be used in many places, such as jet engines! The following qualities provide even more evidence:

- They are ⅔ lighter than other metals,
- They can withstand 20% more heat than regular alloys,
- They rank at a level 9 on the Mohs scale - same as tungsten but substantially lighter.

To better understand the advantages of CMCs over alloys, we must use a comparative. Take porcelain and tungsten as an example. 1 cubic meter of porcelain weighs 2,403 kilograms, while 1 cubic meter of tungsten weighs 19,280 kilograms. Even though porcelain rates in at only 7 on the mohs scale, it serves as a useful comparison. The practicality of ceramics is also shown through a slew of engine models. Take the General Electric Adaptive Cycle Engine as an example, it features 25% better fuel consumption than earlier aircraft, and above that it has reached 65°C above the target temperature, all because it featured the most expansive use of ceramics ever in aviation history. Also, for the new Gen 90 GE engines, they were to feature 325.12cm turbine blades, but there was a problem, titanium was too heavy and would damage the engine. The solution was to turn to ceramic blades. Consequently, this innovation gave the engine the Guiness World Record with over 57,000 kilograms of thrust! All this makes CMCs the most promising material for the future of jet engines. But why stick to earth when UHTCs can take you to space!

Since UHTCs can withstand even higher temperatures than CMCs, often upwards of 2000°C, they are widely used in the space industry. They protect important scientific equipment and moreover the astronauts' lives. Ceramics in the space industry have 2 primary uses, the first being in rocket engine chambers and nozzles, with the second being in the heat shield area. With rocket engines having temperatures that reach up to 3300°C , cooling

systems are a must no matter what material you use, but with lighter and more heat resistant material, the overall weight would be reduced and the cooling systems would not have to be so sophisticated, also resulting in less weight. This overall causes overall costs to be lowered. This in turn would cause prices to be lowered and more importantly, the extra space could be used to add more fuel, increasing the range of rockets.

The other, arguably more important reason is heat protection during atmospheric reentry, as the temperatures during re-entry can reach up to more than 2700°C. The primary heat protection material in almost all spacecraft is various types of lightweight UHTCs, as they can withstand temperatures of up to 3958°C (Hafnium Carbide). UHTCs are a great choice for this as they are durable, lightweight, can withstand great amounts of heat and melt away slowly, ensuring that the astronauts and scientific equipment and data remain safe and sound. Another surprising reason is that UHTCs are corrosion resistant, that may not sound like much, but a single error can mess up the whole project. Take SpaceX's reusable rockets, just because 1 metal bolt corroded because of the salty sea air, the whole rocket blew up. UHTCs can also form non-ablative heat shields, such as those used in NASA's space shuttle program. Specifically, NASA used borosilicate glass (a glass ceramic) as a high temperature insulator on the bottom side of the space shuttles which withstood temperatures up to 650°C to 1260°C. The highest temperatures in the space shuttle are again absorbed with ceramics, this time with a reinforced carbon alloy that withstood temperatures up to a whopping 1650°C!

We can draw from this that ceramics are a very potent and useful new resource, just waiting to be explored. We can use ceramics for vastly different uses, and ceramics all excel in those scenes. Using ceramics as teapots and bowls is like making Albert Einstein do your math homework, it just is a waste of a massive innovative new material. Ceramics is the iron of the stone age, the computer to pre - cold war mathematicians, the telescope to medieval astronomers, ceramics are a new, vast frontier just waiting to be utilized and explored.

Ancient Chinese Inventors

Harrow International School Hong Kong, Lee, Arthur – 9

China is one of the countries in Asia with a high population of 1.402 billion people. It is a developed country that is the center of many production companies and the development of agricultural practices.

China has very many learned and intelligent people who play important roles in shaping the current world order from different fields of expertise.

Chinese developments and inventions began in the CE years with very many inventors inventing new and different things.

Some of these inventors were mathematicians, Geographers who came up with the idea of the moon reflecting the sun, astronomers who studied the stars, physicists who knew how to use magnets to identify compass directions, chemists who facilitated the development of medicine, not forgetting new technology engineers.

Efficient machines are known to have developed from this country including portable ones that are easy to learn and use. China was one of the developers of clocks that have been evolving time after time.

Those years had very little technology all over the world, unlike the current situation where technology is very much developed and it is been used for production and other purposes.

As per the current statistics conducted to identify the most technological country in the world, China was ranked third. The following are the top ten most famous Chinese inventors.

1. Cai Lun:

Cai Lun was a Chinese eunuch court official of the eastern Hun dynasty. He was born in 57 CE in Leiyang Hengyang, China. He joined the service of the imperial palace in 75 CE. In the year 105, he came up with the idea of making paper.

History has it that on the 11th day of March year 105, Cai Lun presented his paper to the emperor of the ruling Han Dynasty, Han Ho Ti. He died in the year 121 CE.

2. Zhang Heng:

Zhang Heng was a polymath scientist, astronomer, inventor, and statesman. He was born in 78 CE in Nanyang, China.

He was the chief astronomer in the Chinese emperor court. He managed to map the stars and planets.

Also, he was the one that discovered that the moon was not a source of light but reflected the sun. He invented Zhang's Seismoscope. He died in the year 139 CE.

3. Su Song:

Su Song was a polymath scientist who was also conversant in mathematics, geography, astronomy, cartography, horology, mineralogy, among others. He was born in the year 1020.

Astronomical clock tower in medieval,Kaifeng was his development. He used hydro-mechanical engineering knowledge to develop it. This employed the use of an early escarpment mechanism.

He used a chain-drive mechanism added to a water-powered clock. This clock showed the time of the day, day of the month, and phases of the moon. He died in the year 1101 in Kaifeng, China.

4. Ma Jun Dehung:
Man Jun was a mechanical engineer, politician, and inventor. He was born in the year 200 CE in Fufeng county Baoji, China.

South-pointing chariot was invented by him and this was used during the war to alert soldiers of incoming enemies. The chariot had an idol man with one of its arms pointing to the south no matter the direction taken by the chariot. The chariot also had gear-driven wheels, Man Jun also chain pump. He died in the year 265 CE.

5. Shen Kuo:
Shen was a Chinese mathematician, scientist, and statesman. He was born in the year 1031 in Hangzhou, China.

He discovered the True North concept in terms of magnetic declination towards the North Pole. He used suspended magnetic needles and his determined meridian which he improved. He died in the year 1095 in Zhenjiang China.

6. Wan Laiming:
Wan Laiming was a cinematographer, author, and producer. His area of expertise was animations. He was born on the 18th of January, 1900 in Nanjing, China. Chinese Animation Industry was developed by Wan Laiming together with his twin brother Wan Guchan.

In 1956, they developed the first colored animation. One of his animations is entitled 'the monkey finished the moon'. He died on the 7th of October, 1997 in Shanghai China.

7. Yi Sing
Yi Sing was an astronomer, mathematician, mechanical engineer, philosopher, Buddhist monk. He was born in the year 683 CE.

He developed an astronomical instrument in 725 CE which incidentally worked like a clock. It was, later on, named the Astronomical Clock. He died in the year 727 CE in Zhejiang, China.

8. Tu Youyou
Tu Youyou was born on the 30th of December, 1930. She is a pharmaceutical chemist and a Malariologist.

She invented a drug therapy for malaria, Artemisinin. For this invention, she has rewarded awards like the Nobel Prize in Physiology/medicine awarded in 2015. She studied at the Peking University of Beijing.

She works at The China Academy of Traditional Chinese Medicine from 1965 to date, where she is currently the chief scientist.

9. Yuan Longping
Yuan Longping was born on the 13th day of August 1929 in Beijing, China.

He was known for being an agronomist and a member of the Chinese Academy of engineering. He is the man behind the invention of the hybrid rice varieties in the 1970s.

This invention was part of the Green Revolution in Agriculture. This hybrid rice is currently grown in many African, American, and Asian countries. Yuan Longping died on the 22nd of May, 2021 in Xiangya hospital in Central South University.

10. Sir Charles Kuen Kao

Fiber optics inventor, Sir Kuen Charles Kao was born on the 4th of November, 1933 in Shanghai, China. He was an electrical engineer and a physicist too.

He was pioneer the development of fiber optics which he did from the physics properties of a glass and later the discovery laid the groundwork for high-speed data. This brought to life his famous invention of fiber optics in telecommunication in the 1960s.

He was awarded the Nobel Prize in physics and the Grand Bauhinia Medal among other awards. He died on the 23rd of September, 2018 in Shatin, Hongkong.

The little detailed inventors from China have played a great role as far as development I concerned. Under their fields of discovery and innovation more so engineering, we can agree to the fact that they brought about a lot of what is seen today around the world. Their countless developments range from agriculture (the hybrid rice), medicine (artemisinin), telecommunication engineering, writing paper sheets, geographical development (true North), amongst others.

Their time-sensitivity led to the development of clocks which have been evolving day in day out and being developed further to the best. To date, China still holds top positions in as far as development and product making is concerned.

World Class Inventions

Hong Kong Baptist University Affiliated School Wong Kam Fai Secondary and Primary School, Lam, Chun Wai Milton – 10

Most people are familiar with the four inventions of ancient China: papermaking, gunpowder, printing, and the compass, but fewer people are aware that there are world class inventions in Traditional Chinese Medicine (TCM) as well. TCM is a medical system used to treat, diagnose, and prevent illnesses over thousands of years. It includes cupping, acupressure, moxibustion, tui na, and much more. Let's explore the magnificent and honourable contributions of China within the realm of TCM, specifically the inventions of artemisinin and acupuncture.

Artemisinin

Achievement
The 2015 Nobel Prize in Physiology or Medicine was awarded to Professor Youyou Tu for her key contributions to the discovery of artemisinin and the qinghao extract, which have saved millions of lives and represent one of China's influential contributions to global health.

History
Artemisinin, the active substance of the qinghao extract for preventing malaria, was discovered during the Chinese 'Cultural Revolution' in the 1970s. Malaria has been an extensive and damaging disease with global influence since ancient times. The first use of artemisia, also known as qinghao, with its active ingredient as artemisinin, was first used in the Eastern Jin Dynasty (317-420 AD), but people didn't know it could defend against malaria. As malaria became more severe from the late 1960s to the early 1970s, over 380 extracts sourced from approximately 200 herbs were collected and tested with unsatisfactory results. Despite many failures, the qinghao extract, having artemisinin as its active substance, had promising results in one of the most important breakthroughs in the process to prevent malaria.

How it works
Once the juice of Artemisia annua, the source of the antimalarial drug artemisinin, is consumed, artemisinin spreads throughout our body, killing malaria parasites and viruses that are common worldwide, including SARS-CoV-2 and common cancers such as breast cancer and lung cancer.

Risks
Although there are many benefits, artemisinin has multiple risks, including skin rash, nausea, vomiting, tremors, and liver issues. However, the chance of experiencing minor side effects is around 0.9%, which means that less than one in a million people will suffer from its risks.

Conclusion
Artemisinin, a drug-resistant medicine recommended as malaria's first line of defence by the World Health Organization, has saved millions of lives around the world, especially in Africa.

In fact, this notable invention is considered to be one of the most important breakthroughs in medicine in the 20th century, and because of it, 12 countries, including China, are now malaria-free as confirmed by the World Health Organization. Research is also continually conducted by scientists to enhance artemisinin production.

Acupuncture

History
Acupuncture, one of the oldest practices of treatment in traditional Chinese medicine, is believed to have begun in China. In the first half of the 1st century AD, people began discussing that acupuncture's effectiveness depended on the time, the lunar cycle, and the season. Other beliefs stated that the human body had a rhythm, and acupuncture had to be applied at the right place to be effective. Sometimes, the imbalance between Yin and Yang was believed to be the cause of diseases. In the mid-7th century, Sun Simiao created charts and diagrams that provided more standardised methods for finding acupuncture sites. He also categorised acupuncture sites in a set of modules. Acupuncture became more popular in China as improvements in paper led to the publication of more acupuncture books. The public also learned stories about royal members having their diseases cured by acupuncturists. By the time the Great Compendium of Acupuncture and Moxibustion was published in the late 7th Century, most acupuncture practices currently used had been established.

How it works
Acupuncture involves inserting thin needles into the body to balance a life force called Qi, which can help with chronic pain and various other health issues. Inserting needles at the right place and penetrating through 361 points can allow energy to flow in balance, while the activity of sensory neurons, also known as receptive fields, can also be affected. It can also increase blood flow to different parts of the body, resulting in various pain relief.

What happens during a session?
During a typical acupuncture session, multiple activities are conducted. Firstly, the acupuncturist will assess the individual's medical condition before inviting them to sit or lie down for the treatment. Secondly, five to twenty single-use and disposable needles are inserted typically at the back of the individual's body. In this stage, the individual may experience a number of aches. After twenty to sixty minutes, the needles will be removed and disposed of, and the procedure ends. After around eight to twelve sessions, minor health issues typically improve.

Life-changing success
A woman who had struggled for twenty-two years trying multiple therapies and learning that she might not be able to walk for the rest of her life experienced a life-changing transformation when she met an acupuncturist. The acupuncturist conducted weekly acupuncture sessions with her for a few years, and as a result, she could now walk with a walking aid, which is nothing short of a great miracle.

Risks
While acupuncture offers numerous benefits, it does come with potential risks such as bleeding, bruising, soreness, infection and imbalances in blood flow. However, a prospective,

observational study indicates that only approximately 10% of patients encounter mild and temporary adverse effects after acupuncture.

Conclusion
Acupuncture, as a supplemental therapy, has transformed the lives of many in recent years. This notable invention is considered to be an ancient Chinese medical treatment for relieving pain, curing diseases, and improving health. Ongoing research by scientists continues to enhance the understanding and practice of acupuncture.

World class invention
Traditional Chinese Medicine boasts world class inventions that have made significant contributions to healthcare. It has a deep history and is still popular around the world. It encompasses various traditions and has evolved into a comprehensive medical system that is not only popular in China but also in other parts of Asia and the Americas.

New Tales of China's Inventions

Hong Kong Baptist University Affiliated School Wong Kam Fai Secondary and Primary School, Lee, Cheuk Ying – 11

Most people know the famous four inventions of China, but they don't realize that so were many other things we use today, from noodles and ketchup. The Chinese tried out different economic systems and invented the first paper money more than 1000 years ago, and the compass was developed over many centuries!

In the past few years, with the pandemic going on, China still invented mind blowing things! From the fastest speed car, to glasses that help blind people "see"! Now, let's talk about the short history of the smart glasses giving audible information of visual data to the blind ones. Unlike Google glasses, Angeles - the smart glasses, is a pair of extraordinary wearable tech that allows blind people to navigate their world through the use of AI and sensors, pretty similar to that used in autonomous car. It is also the most versatile and advanced all-in-one device for people with visual impairment. Designed to move seamlessly with the wearer through daily life, it offers best visual acuity whether sitting reading, commuting to work, or exploring a new place. In 2016, China rolled out its first model of "Smart glasses" for the visually impaired. The technology was the first of its kind to combine both navigation and recognition functions. While most people who are visually impaired rely on guide dogs and guide sticks to assist them in their daily routine and travel, but these state-of-the-art glasses are providing a new option for the blind ones!

Besides the smart glasses, China still wasn't satisfied, so they invented a 3D printer that can print 10 full sized houses in a day. Later in 2016, construction company Hua Shang Tengda build the 3D printing machine and printed a 400-square-meter, two story house in a mere month and a half! The study also shows that the house will at least last 100 years! Although some people think that the house might be unstable, the study shows that the main pros of a 3D printed home are the opportunities for new designs, reduced costs, and fewer construction errors! On the other hand, next 3D printing company in China called Winson used their 3D printer and printed "Office of the future" in Dubai, and many other 3D printed houses in China. All in all, this leads to a more efficient construction industry, and to improve the technical skills of future engineers.

After inventing Angeleye the smart glasses, and the 3D printer, China still didn't think it's enough, so they again invented high-speed rail technology! The high speed rail (HSR) network in the People's Republic of China (PRC) is the world's longest and most extensively used, with a total length of 42000 km (26000 mi) by the end of 2022! The HSR network encompasses newly built rail lines with a design speed of 200-350 km/hour! China's HSR accounts for two-thirds of the world's total high-speed railway network! Let's talk about the history of this HSR network. This high-speed railway network planning started in the early 1990s under the leadership of Deng Xiaoping. In December 1994, the state council commissioned a feasibility study for the line. After that, high-speed rail has developed rapidly in China since the mid-2000s. China Railway High-speed was later on introduced in April 2007 and the Beijing-Tianjin intercity rail, which opened in August 2008, was the first passenger dedicated to high-speed rail lines. Currently, the high-speed railway extended to all provincial-level administrative divisions and Hong Kong SAR, with the exception of Macau SAR.

Now, let us share more interesting facts about the HSR line. The Beijing-Kunming high-speed railway which at 2760 km (1710 mi) is the world's longest high-speed railway line in operation, and the Beijing-Shanghai high-speed railway with the world's fastest operating conventional train services. The Shanghai Maglev is the world's first high-speed commercial magnetic levitation line, whose trains run on non-conventional track and reach a top speed of 430 km/hour (267 mph). In 2020, China started testing a maglev prototype train that runs at 600 km per hour (373 mph) and planned a 2025 launch date.

Talking about Chinese inventions, we have to mention the recently announced one - the world's The first unmanned air taxi flew commercially in Anhui, China. The air taxi uses the world's first EHang intelligent EH216-S unmanned aircraft that has obtained an airworthiness certificate. It can fly continuously for about 30 minutes, with a maximum flight altitude of 120 metres and a flight speed of 10 metres per second. The air taxi can carry up to 2 people and flies using 16 propellers powered by pure electricity. The biggest feature is that it can achieve unmanned driving. The entire process is connected to the ground command centre via a 4G or 5G network, and ground personnel perform various operations on the aircraft. In order to carry more passengers and have a wider range of applications, many countries are actively developing unmanned air taxis, and China is the first country in the world to launch commercial flights of "air taxis" with unmanned aircraft. The unmanned aircraft is reported to cost more than 2 million yuan. It is currently mainly used for aerial tours of Logang Park in Hefei. In the future, it can realise straight-line air transportation, such as transportation to airports, train stations or important areas. Air taxis do not require a driver or safety officer, and there is no need for passengers to do anything. The flight routes are all set in advance. As long as you select the destination and execute the takeoff command, the aircraft will automatically fly to the destination. Its aircraft have more than 42,000 safety test flight records in 14 countries around the world, which fully guarantees its comfort and safety.

Overall, China is a very popular country, and their inventions are mind-blowing. From high-speed railway technology to give the visually impaired ones the chance to open their world! It's just amazing! I hope that a future China will invent more stuff for the disabled ones with a better chance in life.

New Chinese Inventions in Technology

Maryknoll Convent School (Primary Section), Wan, Hei Yi Hayze – 11

China is very famous for its innovation and technological advancement. In the past few years, China has invented a lot of things in different areas, such as space exploration, technology, cultural development, and many more. These inventions help us in our daily lives a lot. Do you know what they are?

China has emerged as a global leader in 5G technology, changing the technological world once and for all. With its rapid speed and astounding connectivity, 5G has the potential to transform many different zones, such as transportation, manufacturing, or even the aviation industry.

According to Rcwireless, China's three main telecom operators have announced their subscriber totals for the month of November 2023, including a combined net increase of approximately 26 million 5G package subscribers, boosting their combined 5G package subscriber base to nearly 1.348 billion. At the end of December, 5G package subscribers accounted for 78.6% and 77.3% of China Mobile's and China Telecom's total subscriber.

"5G will overtake 4G in 2024 to become the dominant mobile technology in China," according to the report. "4G and 5G dominance in China means legacy networks are being phased out. While some users have changed to 4G and 5G, legacy networks continue to support many different services. Still, some estimates suggest that legacy networks could be almost entirely shut down in China by 2025," the study reads.

According to the GSMA report, 5G will account for 88% of mobile connections in China by 2030, while 4G technology will account for the remaining 12%.

Apart from 5G technology, China has also made some outstanding progress in artificial intelligence. China is at the forefront of AI development. AI today is highly dependent on data, and China has more human data than any other country thanks to its well-educated 1.4 billion people.

According to a blog of Top 10 China's AI Stories in 2023: A Year-End Review and the website of Amazon, on 31-8-2023, eight Chinese LLMs, including ERNIE Bot, ChatGLM and some more, cleared the filings to offer services to the public.

By November, over 20 LLMs had been approved, a list that includes Alibaba's Tongyi Qianwen, Tencent's Hunyuan, iFlytek's Spark, NetEase's Ziyue, Ant Group's Bailing, Moonshot, and WPS AI, among others. With full access, Chinese chatbots can now analyse more data than it has ever before.

The majority of Chinese ChatGPT alternatives use Reinforcement Learning with Human Feedback (RLHF), a machine learning (ML) technique that uses human feedback to optimise ML models to self-learn more efficiently. Reinforcement learning (RL) techniques train software to make decisions that maximise rewards, making their outcomes more accurate. Public access allows them to evolve more rapidly beyond their beta testing. Chinese chatbots are also different from Western chatbots like ChatGPT or Poe. Improved for new users, these chatbots have set up an answer for every question beforehand. Features like voice dialogue and text-to-image generation are also commonly included to let users use them more conveniently.

Another great invention from China is AngelEye. Unlike Google Glass, Angeleye is a pair of extraordinary wearable tech that allows blind people to navigate their world through the use of AI and sensors, similar to that used in autonomous cars. Not only can the smart glasses detect objects, but they can also recognize money bank notes, assist in text reading, recognize colours, and distinguish different levels of light intensity. It uses binocular stereo cameras to pretend to be human eyes and convert visual information into audible signals. As a sensory extension for the visually impaired, the AngelEye smart glasses help the blind see the world safely. All you have to do is to press the button on the bottom, and the glasses will activate.

Before this invention, many would assume that getting this type of tech and AI system to fit into a plain glass would be unimaginable. However, Feng Xin Peng, the founder of Next CPU has proven the world wrong. The fact that some genius can fit this amount of power and a whole system of AI into a mobile phone and these glasses is an impressive phenomenon. This kind of deep learning would have been impossible a few years ago, especially when it came to having such technology fit in your pocket.

If you are interested in inventions, are you interested in cars? If you are, this invention will shock you.

According to a blog of Top 10 China's AI Stories in 2023: A Year-End Review, Alibaba is one of the biggest e-commerce companies in the world and has had a huge success in bringing everything online. Today, a startup founded by Alibaba, Banma, is also bridging cars to the Internet. The car is built with 4G and Wi-Fi. It can do anything, for example flying a drone. It can even talk to other cars, find a gas station, or even find a restaurant without needing to use Google map.

In the first year that it was launched, 5,000 cars were sold. Now, they're selling 20,000 a month, while also expecting 6 million cars to adopt its operating system by 2023.

As you can see, everything in China will go online, even cars – this marks the beginning of digital transformation across the automotive industry. China has had many achievements in inventions and technology over the past few years. China has created many useful inventions that may change our lives forever and open a door for us to the technological world.

From Amazing Genes to Amazing Grains

St. Joseph's Primary School, Tam, Ching Yuk Eason – 11

《憫農》唐·李紳
鋤禾日當午，汗滴禾下土。誰知盤中餐，粒粒皆辛苦。

"Compassion For Farmers" by Li Shen (Tang Dynasty)
At high noon, the farmer is wielding his hoe,
Sweat dripping, falling onto the rice paddy below.
Who knows, as we dine,
Each grain in your bowl bears labours' sign.

Over the past 35 years, China has been working relentlessly on hunger and poverty reduction. According to the World Food Programme, since 2015, China has met its Millennium Development Goal of halving the number of hungry population and brought down the global hunger rate by two-thirds. However, there are still 150.8 million people who are malnourished. Obviously, it should come as no surprise that there are wide gaps in nutritional status between urban and rural areas—especially in remote and mountainous areas. Given the size of China's population, rates of 9.4 percent for stunting in children and 19.6 percent for anemia illustrate significant national and global burdens. In 2022, three Chinese scientists timely discovered a genetic strategy for improving crop yields which will probably bring our world a strong food security in the future.

On March 25th, 2022, Chinese scientists Professors Jian Sheng Li and Xiao Hong Yang from China Agriculture University and Professor Jian Bing Yan from Huazhong Agriculture University published their discovery on how to increase the production of maize and rice. Their paper "Convergent selection of a WD 40 protein that enhances grain yield in rice and maize" was published in the "Science" magazine after eighteen years of hard work. Their results not only can help increase the production of maize and rice but also can solve the problem of malnourishment and poverty. They identified two critical genes called KRN2 and OsKRN2 in maize and rice respectively. By editing the two genes, they can control the number of maize and rice produced. They further found that knockout of genes KRN2 in maize and OsKRN2 in rice can increase grain yield by increasing kernel rows and secondary panicle branches respectively. As a result, the grain production can be raised by ten and eight percent without an apparent negative impact on other agronomic characteristics. Besides, Professor Yan explained that their next step would be focusing on the gene KRN2 and building innovation teams for gene breeding. Eventually, the new breed can be promoted, released, and sold on the market.

How would this discovery make an impact on all of us? According to the United Nation's Food and Agriculture Organisation (FAO) indicated that more than 50% of all human calories come from just three plants and they are rice, maize, and wheat. At this point, the Professors' discovery not only finds out the mechanism of increasing yields of maize and rice but also provides a theoretical foundation for enhancements of other economically important

crops, such as wheat, barley, and sorghum. After that, the production of these main cereals may also be raised by the same method. Unbelievably, these staple crops are feeding more than 7 billion of the world's population now confirms that this discovery from the three Chinese scientists will impact every one of us on the planet ultimately. Other than the main crops, vegetables could also be unexpectedly benefited too. "This morning, a scientist researching vegetables messaged me and thanked us for the inspiration from our research findings," said Professor Yan excitedly to a reporter.

Furthermore, the ever-growing world population is escalating the food security crisis. On the word of a new report by the World Resources Institute, the World Bank, and the United Nations, the trajectory for crop yields is inadequate to nourish the world's population by 2050, which is a whopping 9.7 billion people. But currently, cultivatable land is simply not evenly distributed amongst all the countries over the world, so many places still have poverty. If food trends remain unchanged, then 593 million hectares of land, equivalent to two Indias, would have to be cleared and turned into crop and livestock production to feed all the people in poverty, which is talking about more than 828 million people. Moreover, there are other upcoming threats to crop yields such as heat waves, precipitation, and other extreme weather. This research can help enhance sustainable crop production and the high yields of the staple crops are vital to feed a growing population.

The three scientists' discovery was the most inspiring and meaningful breakthrough for me from China's Top Ten Breakthroughs in Science and Technology in 2022, which were selected by the members of the Chinese Academy of Sciences and the Chinese Academy of Engineering, among the 4 entries in space exploration and observation, 2 entries in biotechnology related to agriculture, 2 entries in earth and environmental sciences, and 2 entries in fundamental physics because it not only can solve the hunger problem in China, but it can also prevent 828 million people in the world from starvation. The 18 years of persistent pursuit of the three scientists strikes me like lightning. Genome technology will bring big changes to us and I am inspired to become a genome scientist to support the farmers to develop new and better breeds that produce more yields and require no pesticides or herbicides. Hopefully, the world is free of hunger and poverty out of poor crop yields.

The poem I quoted at the beginning "Compassion For Farmers" was the poem my teacher taught us when I was studying Primary Two in Beijing. The first time I heard this poem was when I was having lunch, everyone swallowed down the meat and vegetables hungrily, but we all ate the rice reluctantly. Then, my class teacher retold us a story from her grandfather's own experience. Her grandfather lived during the Second Sino-Japanese War, while there was starvation everywhere, and even a little food was an amazing gift to him and his family. It was hard to imagine how they could only survive on eating leaves or tree bark. Survival was almost impossible! All of us felt very ashamed after hearing this story. Since then, I learned to cherish food and natural resources, and respect farmers by finishing every single amazing grain in my bowl.

New Tales of China's Inventions: The Compass and the Beidou Navigation System

St. Joseph's Primary School, Chan, Yau Ka Enzo – 11

Imagine yourself on a boat without a compass trying to transport from Ancient China to Ancient India at noon. How would you find where to go without GPS working on our phone? Would we even have phones without the invention of the compass? You would be worried about being blown away by the screaming wind during your voyage which lasts for several months or even a whole year with a map but it has no compass or GPS!

"It was easy to get lost due to poor orientation, which is why kings in ancient times invented an instrument that points south and so shows in which direction West and East lie." These are the words of the Third Century B.C. thinker, Han Fei. The instrument he is speaking about here is the South-Pointing Chariot, which was an early version of what we now call the 'compass'. Historically the compass has been the world's most important navigational invention, and it was created by the Ancient Chinese. It is the mother of all navigational technology we rely on today. Without it, the development of the BeiDou Navigation Satellite System would not exist today. In this essay, we will explore these two significant inventions from China — The compass and BeiDou Navigation Satellite System — and how they have forever changed the way of human travel.

In 1620, the British philosopher Francis Bacon wrote in his book the Novum Organum, "Printing, gunpowder and the compass... have changed the whole face and state of things throughout the world, ... whence have followed innumerable changes, in so much that no empire, no sect, no star seems to have exerted greater power and influence in human affairs than these mechanical discoveries." We can see from this the world-changing importance of the compass but first let's understand what a compass is and how it works. A compass is a device that shows the cardinal directions used for navigation and geographic orientation. To put it more simply, it is for finding directions and it works by pointing which way is north and to help us especially when we get lost. While the compasses we use today point north, the Ancient Chinese compasses originally pointed south. This included the south-pointing fish, the 'spoon', or the Sinan, and the south-pointing chariot (指南車). The so-called "south-pointing fish" was a wooden fish with a magnetized iron needle within it, that floated in a bowl of water. The Sinan has been magnetized, and when you put it on the plate, it reacts by pointing to where south is. The south-pointing chariot's figure always points to the south whichever way you turn it, allowing people living at that time to find their sense of direction. Imagine you're the figure and the chair is the chariot. Before people had a compass, they used to navigate using the Sun, the Moon and the stars, but all of them are unreliable due to some unexpected weather conditions. They were not useful on rainy or cloudy days, but people could now navigate anywhere thanks to the ancient compass which was invented in the year 206 BC.

The true example of the impact of the compass came during the time of the Chinese explorer Zheng He (1371-1433). He commanded seven expeditionary treasure voyages to Southeast Asia, South Asia, West Asia, and East Africa from 1405 to 1433. In those days, there

were no satellites or Google Maps to help them navigate. Numerous ships would travel for days out of sight of any land. But Captain Zheng wasn't afraid as he knew how to monitor stars in the sky and also taught his men how to use the "South-Pointing Needle", which we now call the compass. For them, the compass was not just an invention but a means to explore and discover, and led them to far-off places such as India, Siam (now Thailand), the Horn of Africa and Arabia.

Transitioning to the present day, the BeiDou Navigation Satellite System (BDS; 北斗衛星導航系統) was invented in China in the year 2000. It is a satellite-based radio navigation system which has been independently constructed and operated by the China National Space Administration. The first idea of a Chinese satellite navigation system was come up with Chen Fangyun and his colleagues in the 1980s. The BeiDou system consists of 30 satellites in three different orbits. It provides global positioning, navigation, and timing services, even more accurate than GPS. BDS has been widely used in transportation, communication, meteorological forecasting, disaster relief and public security. The BeiDou-3 Navigation Satellite System provides full global coverage for timing and navigation, along with Russia's GLONASS, the European Galileo positioning system, and the United States's GPS. Beidou, which means 'Big Dipper' in Chinese, literally means 'Northern Dipper'. We can see the connection of the Big Dipper and the Beidou Navigation System because the Big Dipper can help you find the North Star. Several companies such as AutoNavi (also known as Amap) are using Beidou in their services, providing accurate and real-time navigation information to users. AutoNavi also provides mapping data of China and Taiwan for Apple Maps and Google. Its own map application was the top mobile map app in China in 2012, with over 100 million users.

The impact of the Beidou Navigation System has paved the way for high technology development in China, particularly in the daily use of driverless taxis in the cities such as Beijing, Shanghai and Guangzhou. According to ChinaDaily on 10th July 2023, Dai Wanli, a 35-year-old Beijing resident, said she and her family took a ride in a driverless taxi in May at Shougang Park.

"We booked a ride using a mobile phone app and followed instructions to the closest stop to board a self-driving taxi. We scanned the code, the door opened on its own and we hopped in," Dai said, pointing out that driverless taxi was a very smooth and accurate ride.

"My son absolutely loved the ride. We've seen other special projects in the industrial park, but this one is by far the most impressive," she said, adding that they planned to book another ride soon.

Beidou Navigation system helps driverless taxis reach their destinations efficiently. It minimizes the accidents caused by human error, reduces traffic congestion, and minimizes carbon emissions. BNS contributes to a sustainable transportation system.

Confucius says, "Study the past if you would define the future". In conclusion, the compass and the Beidou Navigation System are interconnected inventions that were invented in China. They are both important and commonly used for navigation. The compass is one of China's four great inventions and the BeiDou Navigation System is taking a new height of China's advanced technology. These tales of China's inventions are truly remarkable that continue to shape our world.

Sir Charles Kao Kuen

St. Paul's Co-educational College Primary School, Chan, Hylia – 11

Ever since the four great inventions of China, China has become one of the world leaders in inventing, nurturing many great inventors. Among them all, Sir Charles Kao Kuen stands out.

Sir Charles Kao Kuen was a respectable and selfless Chinese inventor, and up to this day, people still praise him for his discovery, telecommunication using optical fibres.

Charles was born on 4th November, 1933 in Shanghai. His father, Kao Chun Hsin studied law and married a poet.

When the Japanese invaded China in the1930s, Charles and his family were shielded from the terror that reigned outside. Sadly, the end of war with Japan didn't bring peace. Soon, the Red Army was prepared to attack the city. In 1948, the family decided to leave Shanghai for safety. On that dreadful day, it was the last time they'd see their homeland for many years.

A short sojourn in Taipei convinced Charles' father that Hong Kong would be a better refuge. So, the family settled in a modest apartment there and the boys were enrolled into St. Joseph's College.

Charles did well academically and mostly got A's in the school matriculation exams, which granted him entry to the University of Hong Kong. However, the University was still in some confusion after the war. Some faculties, including the Electrical Engineering which Charles wanted to study at, were not functioning. Therefore, he went to Woolwich Polytechnic in London to sit for the A-level exams which he passed effortlessly. He graduated in 1957 with a Bachelor of Science in Electrical Engineering.

To relieve his father from the heavy financial burden, Charles started working immediately after graduation. He joined Standard Telephones & Cables (STC), a British subsidiary of International Telephone & Telegraph Co (ITT) in North Woolwich. Charles had gone around to different sections until he decided to stay in the microwave division. During his three years at STC, he married a fellow engineer named Gwen.

Three years passed, and Charles thought it was time to move on and applied for a lectureship at Loughborough Polytechnic. However, seeing Charles' potential, STC thought that the company shouldn't lose him. They offered Charles a chance to transfer to the research lab, STL in Harlow. To make sure Charles stayed, STC even found a job for Gwen at the new place. The offer was too good to refuse. As a result, he stayed with ITT Corp for the next thirty years, working at different locations. Everything seemed perfect, with Charles' parents emigrating to join him and delighted with two grandchildren.

In 1970, The Chinese University of Hong Kong, CUHK, asked Charles to come to the institution to set up an electronics department. STL granted him a two-year leave of absence, which later became four years. Charles could see the first batch of students graduate, and established a graduate program too. During this time, he took annual summer leaves to return to STL to keep alongside developments in optical fibers research.

By 1974, the project Charles had started had advanced to the pre-production development stage. It had gained attention and an industry had formed around it, trying to transform global telecommunications systems and ITT wanted him to rejoin the team for this project.

So, Charles' family moved to the ITT plant in Roanoke, Virginia. He became Chief Scientist and later Vice-President and Director of Engineering in charge of the electro-optical

products division. Despite being in the U.S., he continued to travel to research labs worldwide to stay updated on developments.

In the 1980s, the optical fibre industry grew, increasing communication capacity. He became an Executive Scientist at ITT and led the Terabit Optoelectronics Technology Project, which aimed to explore technologies that could transmit capacities of terabits per second. The project involved a chain of universities and institutions. In 1985, he became the Director of Corporate Research at ITT, and during this time, modifications were made to utilize the increased communication capacity, and the internet was born.

Charles was promoted to the President of CUHK in 1986, so he moved to Hong Kong. This move clashed with ITT Corp selling its technical divisions to Alcatel, so Charles parted ways with his colleagues. He was the Vice-Chancellor of CUHK for nine years, during which time Hong Kong was preparing for the resumption of authority by China and the higher education part grew.

Charles' role at CUHK was to create an environment that encouraged people to take on responsibilities and contribute to the University. By creating this space, he allowed the University to develop and let people perform at their best, leading to a new level of development.

After a year of lecture tours around S. E. Asia, Charles stayed in Hong Kong, setting up his own company. He was appointed to miscellaneous companies as non-executive director. In 2009, he moved to California to be closer to his children.

In the past, light transmission through glass was used for various purposes. However, it was not possible to transmit light over long distances before Charles' work, as glass fibres were thought to be unsuitable as a conductor of information because of high signal loss from light scattering. Many research laboratories tried to find a solution, as the public had high expectations. Charles experimented with the failure of light to penetrate glass and discovered a solution. By cautiously purifying the glass, bundles of thin fibres could be produced that could carry lots of information over long distances with low signal diminution and that such fibres could replace copper wires for telecommunication. He had discovered telecommunication using fibre optics!

His revolutionary discovery shocked everyone, but instead of selling his invention at a high price, he generously shared it to the world. In 2009, he won the Nobel Prize in Physics and in 2010, he was knighted by the Queen!

Unfortunately, he was later diagnosed with Alzheimer's disease and passed away on September 23, 2018. Even so, he still has a place in everyone's hearts- not just as a physicist, but as a selfless hero who shared his invention with the whole world.

New Tales of China's Inventions

St. Stephen's College Preparatory School, Cho, Tsz Long Tristan – 10

China has been one of the greatest inventors in the world to create significant inventions which have a profound impact on people's lives. Influencing areas include medicine, science, technology, society and more. In the past, China had four famous inventions: Papermaking, printing, compass, and gunpowder. Recently, there have been important advancements in high-speed rail technology and E-commerce platforms such as Alibaba and Taobao. All these inventions represent the great revolution and improvement in our lives. Not only do these inventions make remarkable contributions to China, but they also exert a global influence on people worldwide.

China has a rich history of innovation and one of its most fascinating inventions is gunpowder. It has an interesting story on its path of discovery. While it was controversial to define who was the first to find the formula of gunpowder, it was believed to be discovered accidentally by Taoist alchemists during their quest for a life-extending elixir in the Tang Dynasty. Through the persistent practices and experiments, alchemists found out that there would be an explosion when saltpetre, sulphur, and charcoal were mixed together. The pharmacologist and alchemist Sun Simiao in the Tang Dynasty recorded these important ingredients and usages of gunpowder in his written work "Dan Jing Nei Fu Liu Huang Fa" (Method of Embedded Sulphur in the Alchemy). This is regarded as the earliest known formula for gunpowder in Chinese literature.

The Chinese gradually summarized their experience in the use of firearms, which led to the compilation "Wujing Zongyao", a comprehensive military publication written around 1040 to 1044 in the Northern Song Dynasty by Zeng Gongliang, Ding Du and Yang Weide. It is the first official military techniques book in China that describes the use of gunpowder weapons. It meticulously records the manufacturing and usage of firearms at that time, promoting the development of firearms in later generations and even serving as a manual for ancient Chinese. Subsequently, during the Song and Yuan Dynasties, gunpowder was found widespread in military applications, leading to the emergence of various gunpowder-based weapons like cannons, rockets, and fire lances.

The invention of gunpowder had a revolutionary impact on military technology and warfare, not only within China but also on a global scale. Its explosive properties brought about important changes in military tactics and weaponry in the world. For instance, the introduction of firearms in Japan during the Warring States Period (Sengoku Period), which lasted from the late 15th century to the early 17th century, brought a significant shift in warfare from Bow and Arrow to matchlock guns. Matchlock guns, known as Teppo, were introduced by Portuguese traders in the 16th century. These early firearms utilized a matchlock mechanism to ignite gunpowder and propel projectiles. The Teppo allowed for more powerful and long-range attacks compared to traditional weapons like bows and swords. The battle of Nagashino in 1575 was a famous one which marked the success of firearms. Oda Nobunaga used the three-stage shooting tactic to create chaos to the enemies. It was believed that over 70 percent of the Takeda clan's samurai were killed by the matchlock guns.

Apart from the application of gunpowder in the military sphere, it extended to the development of firecrackers and fireworks, adding to the cultural and festive traditions

of various societies. For example, setting off firecrackers was believed to be able to keep villagers safe from the beast "Nian" in ancient China. This custom spread to every corner of China and developed into one of the most important customs during the Lunar New Year. There is a well-known saying "With the sound of firecrackers, the old year is swept away". Firecrackers have long been a symbol of driving away evil spirits and bad luck. The loud noise they produce is believed to scare away negative energy and clear the path for a new start. Fireworks in China also play a significant role in celebrations such as Lunar New Year and National Day. These colorful and explosive displays have become integral parts of festivals, symbolizing joy and good fortune.

The application of fireworks (Hanabi) in Japan is another good example. Fireworks first became popular during the Edo period. It was a symbol of spiritual beauty. Fireworks have been historically used to ward off evil spirits and have become celebrations in summer festivals, musical events, and the New Year. Large-scale Hanabi Festivals take place during the summer holidays in July and August every year. They are regarded as huge events and traditions in Japan. These firework shows attract many spectators from local people to overseas tourists to watch.

Overall, the invention of gunpowder from ancient China showcases its enduring importance in shaping human history. From its accidental discovery by alchemists to its widespread military applications, gunpowder revolutionized warfare and led to the development of powerful weapons. The impact of gunpowder extended beyond the military realm, as it also influenced cultural traditions with the creation of firecrackers and fireworks, symbolizing joy and adding colour to festive celebrations. The invention of gunpowder remains a proof to China's great contributions to technology and its lasting global influence.

Creative Writing

Non-Fiction

Group 2

Hong Kong – Zhuhai – Macao – Mega Structural Bridge

Shanghai Singapore International School, Chabbi, Pranavi Mayur – 11

Can we think of a situation where there were no bridges and people had only boats and barges to cross rivers and oceans? It would affect the commuting of people. China is a pioneer in bridge construction; in fact, there are records of bridges built by Chinese emperors dating back to the 12th century. These bridges were built across the rivers in mainland China, which demonstrates the outstanding skill of Chinese people.

My father recently narrated to me his experience of crossing a unique bridge called Hong Kong – Zhuhai – Macao bridge (HZM bridge for short). I was fascinated by his narration of the bridge, and hence started researching more about this on various platforms, especially on the internet. The Hong Kong–Zhuhai–Macao bridge is the longest cross-sea bridge in the world. It is situated in the southernmost part of China, connecting various parts of the Pearl River delta. Before the HZM bridge was built, it used to take about four hours by road to travel from Hong Kong to Macau, covering a distance of 200 kilometres. With the construction of HZM bridge, the travel time is reduced to only 40 minutes. The bridge has transformed local trade, business, and tourism. The HZM bridge is an icon, demonstrating the capability and expertise of the modern engineering in China. When I was watching a documentary, I was wonderstruck by the continuous improvement of skill and technology of Chinese engineers over several decades.

The HZM bridge was conceptualised in 1983. Engineers spent years, planning, designing, and implementing this project. The construction work began in 2009 and took about nine years to complete. The bridge is designed to last for 120 years, and nowhere in the world bridges are designed for such a long life. This bridge can withstand typhoons, earthquakes, and fires of very high intensity.

This mega structure is an engineering marvel where many unique and novel construction technologies have been used. The structure is 55 km long from start to end; it consists of three parts: a steel bridge spanning 23.9 km, four man-made islands, and a sea tunnel of 6.7 km. The steel spans are above the sea; the tunnels are underwater, and the islands serve as transitions from over the sea to under the sea. Below, we will explore the different aspects of this remarkable bridge.

The steel bridge:
Generally, long bridges are made by joining several smaller segments, each segment standing on pillars. For the HZM bridge, however, the longest span is 460 metres, and each segment is made entirely from steel instead of concrete. Steel makes the structure lighter and easier to build. The engineers built the steel from a special quality alloy to protect it from rusting. Long spans of the steel structure allow large ships to sail freely under the bridge. The documentary helped me to understand how strong pillars are built on the ocean bed.

Man-made Islands:
Despite the long steel spans, there are limits to its length. This Pearl River Estuary has very busy ship traffic; almost 5000 ships cross this area of the sea each day. In order to facilitate the movement of ships, the engineers came up with a brilliant solution to submerge parts of the bridge under the sea as a tunnel. Two artificial islands, covering an area of 200,00 square metres helped to create smooth transition between bridge sections and tunnel.

Engineers drilled large, long steel cylinders into the seabed to create artificial islands, which expedited the construction. I can recollect many airports are built on a reclaimed land near to the mainland, but building islands in the middle of the sea to connect the parts of the bridge is incredible.

Underwater tunnel:
The tunnel is 40 metres below the sea level. Constructing the underwater tunnel was challenging because of the deep-water undercurrents and unpredictable tides. Engineers used special technology to drill the tunnel. 13 heavy-duty ships and 300 skilled workmen moved segments under the sea. In fact, one worker said it was like playing chess with people, equipment, and ships. Most of the workmen used to stay on ships and didn't visit their homes for years. Such hard work and commitment of engineers made this project successful. I was spellbound by divers' dedication who regularly went underwater to check the quality of construction.

The project was carried out on four principles: scale, factory production, standardisation, and assembly. The quantity of steel plates used is equivalent of 60 Eiffel Towers, and the quantity of concrete used is equivalent to eight Burj Khalifa's. Large factory space was built for manufacturing all of the segments using special robots. These steps ensured meeting modern standards and avoiding human error in construction. In the year 2021, I had visited the Silk Road in China and visited many monuments built by Chinese emperors. If I compare modern bridges with old monuments, one thing that remains in common is the spirit, bravery, and perseverance of Chinese people.

Safety was the highest priority in the bridge construction. The bridge was built to sustain fire hazards and traffic collisions. The engineers and marine biologists paid utmost attention to protect the environment. This reduced the disturbance to the 2000 white dolphins in that area. High-capacity barges were used during the bridge construction. Yet, another feature of this construction is the use of local technology, resources, manpower, and equipment.

The HMZ bridge is a testimony of modern engineering and the pride of the nation. This bridge is not just a physical link between various places, but is a connection between people and culture. The HMK bridge demonstrates the exceptional feat a nation can achieve with teamwork, sacrifice, and commitment of its people. I am truly inspired by this engineering marvel, and I would love to soon travel on this bridge.

Amazing Inventions of China's Technology

S.K.H. St. Peter's Primary School, Lam, Chung Hong – 9

Last week, my father suggested going on a vacation in Shanghai during summer holiday when he knew that I got the highest marks in my Math exams. My eyes glittered with tears of joy because I had never been to China before. We planned to go there by plane because it is faster though more expensive than high-speed rail.

On the first day, my parents and I arrived at the airport early. I saw the airport was packed with passengers so we dashed towards the check-in counter to check in our luggage. After a while, we got on the plane. I found there were many in-flight entertainments such as a full selection of TV series and the latest films and video games for me to select while I was on board. It was great fun to me.

The flight took around three hours from Hong Kong International Airport to Shanghai Pudong International Airport (PVG). After we had lunch, I saw one of the articles from the flight magazine about the Maglev train museum in Shanghai. It was opened on 16 August 2007. 'Can I go to the train museum tomorrow as it displays many old models of the Shanghai maglev train?' I asked. 'Yes, you can,' my father replied. Then, 'How fast is the Maglev train?' I enquired. Dad told me that China's new maglev train was designed to reach the speeds of 600 kilometers per hour. The high-speed rail aims at connecting more large cities by train in order to reduce the time and expenses required to travel around the world's most populous country. This was the first Maglev line in China and the first and the fastest operational commercial Maglev Train in the world.'

'How is magnetic levitation used for transportation?' I enquired. 'Maglev is a system of train transportation that uses two sets of electromagnets: one set to repel and push the train up off the track, and another set to move the elevated train ahead, taking advantage of the lack of friction,' my father explained patiently. 'Can I take the maglev train from PVG airport to the hotel,' I requested. He nodded with a big smile.

After three hours of flight, the aircraft landed at PVG around one o'clock in the afternoon. My heart began to pound when I was exhilarating to ride on the Shanghai Maglev from the airport to the central station. The journey lasted for around seven minutes, and I could not believe the speed displayed on the monitor peaked at an impressive 301 kilometers per hour. It was really fast.

On the second day, one of my father's colleagues, John, who worked in Shanghai Commercial Aircraft Corporation (COMAC) met up with us. He invited us to visit a hangar near the PVG after we had a scrumptious meal in the Chinese restaurant. When we got in the hangar, I saw different models of aircraft in the spacious hangar. It was amazing. I also spotted that the C919 aircraft was installing the landing gear (LG) by mechanics. I knew that the C919 was the first plane produced by a Chinese manufacturer, Commercial Aircraft Corporation (COMAC). My father told me that the C919 represented an important step in China's economy moving beyond low-cost manufacturing. The C919 is more fuel efficient than the latest than the Airbus A321 aircraft and Boeing B737 aircraft when flying. The design team of COMAC adopted a large number of advanced designs to save fuel consumption and technologies to make it more cost-friendly.

'Can we turn sand into a giant battery in the future?' I asked John politely. 'This may happen in future. Sand heated up by using wind and solar energy and the heat can be distributed by a local energy company to provide warmth to buildings in nearby areas. Energy can be stored this way for long periods of time. All of this occurs through a concept known as resistive heating. This is where a material is heated by the friction of electrical currents. Sand and any other non-super conductor are warmed by the electricity passing through them. It then generates heat which can be used for energy.

On the third day, John showed us to several visiting spots. I like the glamorous Oriental Pearl TV Tower, which was the sixth tallest tower in the world and the second tallest television in China. We watched the stunning sunset and enjoyed the breath-taking night view of Shanghai from the observation deck. I was completely mesmerized by the night view before me. I snapped many photos of the historic buildings with my powerful camera. At night, we went to a famous Chinese restaurant near the Oriental Pearl Tower. We tried many of the signature dishes. The dumplings were juicier than those in Taiwan. I really enjoyed the delectable meal and spectacular views at the same time. I think it was one of the best meals I have ever had.

I woke up and looked at the clock drowsily on my last day of my vacation. I felt puzzled because the clock was not ringing. 'It's getting late! Wake up, everyone!' I shouted frantically. It was already 10 o'clock. My mother's heart sank and she jumped out of her skin when she realized that we had overslept and missed the flight. A few moments later, my father had a brilliant idea. He told us to grab our luggage and dashed out of the hotel immediately. First, we took a taxi to the Longyang Road train station. Then, we took the high-speed train at Shanghai train station to go back to Hong Kong.

On our way home, I was exhausted but satisfied. It was an unforgettable trip in Shanghai. Although we missed the flight, we all enjoyed ourselves. I was glad to go home by high-speed rail with comfortable seats and big windows. In addition, the best news is: I am going to Beijing in my trip next year!

Steeped in History, Blended for Tomorrow: The Ever-Evolving World of Tea

The International School of Macao, Chan, Austin – 11

"Tea is the taste of my land: it is bitter and warm, strong and sharp with memory. It tastes of longing. It tastes of the distance between where you are and where you come from."
– Eavan Boland

People all over the world are usually stuck in between making decisions about their choices of drinks. With a myriad of options, tea is one of the top three that is chosen. Tea is not only healthy but it has a lot of benefits and it has played a big role in shaping not only people's culture, tradition, and celebration but also their manner of life. Surprisingly, the roots of tea stretch as far back as the time of the great pyramids, woven into a legend that spans over six thousand years. In this essay, we will discover the fascinating attributes that tea has to offer.

Our journey through the story of tea begins in ancient China with Shen Nung. While resting beneath a tree, his servant boiled water, inadvertently introducing leaves from the tree into the mix. Curiosity led Shen Nung to taste the concoction, revealing a surprising and delightful difference. Seizing the opportunity, the emperor explored the accidental blend, marking the birth of tea. The emperor found the flavor to be enjoyable and had begun exploring the flavor. However, tea was originally enjoyed by others for medicinal benefits. From then on towards the coming centuries, the popularity of tea in China has grown into different reliefs such as pleasure and refreshment.

Fast forward to a monk's visit to China, carrying tea seeds to Japan. This marked the beginning of a unique Japanese tradition: Matcha. Through the use of a stone grinder to shred the tencha leaves into fine powder, liquid, either water or milk is added, creating a ceremonial beveraging that became integral to Japanese culture. This ceremony is a ritual of intention, quiet reflection, harmony and inner peace, which are important factors of Japanese culture. First, the host will invite people to the ceremony, then, the host will prepare the matcha and use the bamboo whisk and scoop; finally, the host will bring out the matcha for the guest to drink with wagashi, a Japanese traditional sweet.

Matcha has played an important role in traditional Japanese ceremonies which is a vital part of their culture and heritage. It is a way of celebrating hospitality, respect, and consciousness.

While the Japanese were crafting matcha, the Indians made milk tea, traditionally they used milk from the water buffalo to make their tea. The idea of pouring milk into tea reached India because of the Silk Road, which was an ancient 7,000-kilometer trade route spanning from China to the Mediterranean Sea that lasted from about 100 B.C. until the Middle Ages. People used camels for transporting a plant called Camellia Sinensis, which was the origin of black, oolong, green, and white tea, during this journey. The popularity of milk tea eventually reached the United Kingdom. The British, captivated by milk tea, adopted it as an everyday beverage, eventually coining the term "English breakfast tea," served in mugs with milk and sugar.

Furthermore, the difference between Matcha and Milk Tea is that Indians adapted the recipes and added spices to their tea. The spice mixture, Karha, is made out of ground ginger and green cardamom pods. Cinnamon, star anise, fennel seeds, peppercorn, nutmeg, cloves, cardamom seeds, ginger root, honey, and vanilla are a few of the other ingredients they have in their milk tea. Masala Chai, originating in western India which often excludes cloves and black peppercorn, became a global favorite.

As we explore the diverse evolution of tea, a glance into the future reveals exciting possibilities. For instance in Malaysia, there is this drink called Crème Brûlée Milk Tea, which took the milk tea dessert to a whole new level, combining two different sweets in one item. Another interesting combination is found in Taiwan, the idea of mixing oatmeal and milk tea together took the country by surprise. Who would have thought grains could add an interesting flavor and texture with tea. On the other hand in Singapore, there is this unique drink that people invented with a flower called Asian Pigeonwings which possesses a large range of healthy elements that includes antibiotics and muscle relaxing properties which was used long before for several diseases. It also changes color when you add hot water which turns your drink into a light blue color, adding not just health but also aesthetic appeal.

There is no end to tea's experimentation nor will it ever stop brewing, from different innovations and techniques. Tea has become a lifestyle choice that is earning strength from impactful growing trends such as yoga, fitness tracking or even a simple aesthetic instagram post for their feed.

Therefore, this makes me think that anything can be added into drinks, especially tea. It is an ingredient that is versatile and adaptable. It is also a healthy drink but if you would like to satisfy your sweet cravings, you can also find something mixed with tea. There may be some other things you can find tea in like medicine and perfume. But I enjoy consuming it the most! Which is why there is more than just drinking tea, there is a whole world to explore about it. So go ahead, see for yourself how something that came from mother nature could be so special and impactful that even to this day it is being celebrated, used, invented, and added into almost everything that makes us who we are and everything we need.