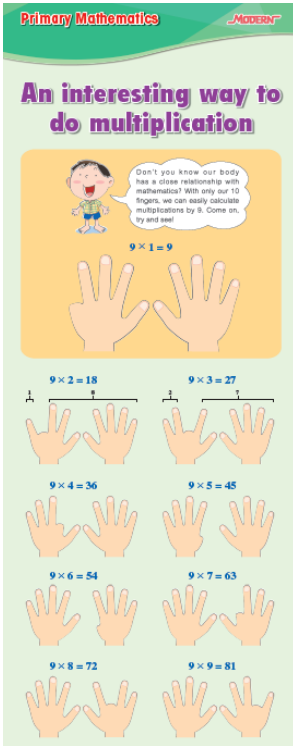


小學數學科 易拉架簡介

1. An interesting way to do multiplication
EMS02



※ 60(w) x 160(h)cm

2. Different ways to record numbers
EMS03



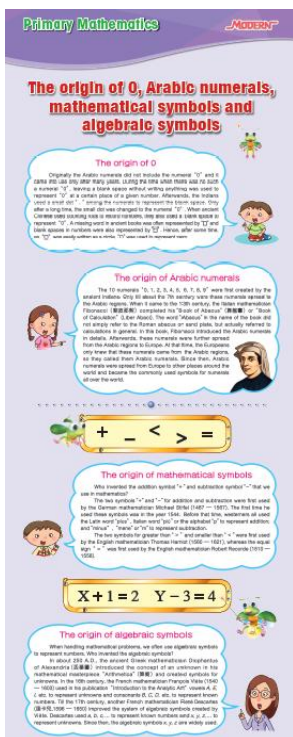
※ 60(w) x 160(h)cm

3. A big search on mathematicians
EMS04



※ 60(w) x 160(h)cm

4. The origin of 0, Arabic numerals, mathematical symbols and algebraic symbols
EMS05



※ 60(w) x 160(h)cm

小學數學科 國家安全教育 易拉架簡介

1. Chinese Numerals EMS12

Chinese Numerals

Mathematics has a very long history in China. Thousands of years ago, people used knots on ropes to show numbers. Later, in the 14th and 15th centuries, they wrote large numbers on turtle shells (甲骨文). For more than 10,000 years, people also used counting rods and the abacus to help them calculate. These tools helped develop the base-10 number system we use today.

Counting rods

During the Spring and Autumn period (春秋), people in China used bamboo sticks to record numbers and do calculations. This method was used until the Yuan Dynasty (元朝). These tools are called counting rods (算籌). The counting rods had two forms of arrangement: vertical and horizontal.

Number	1	2	3	4	5	6	7	8	9
Vertical form									
Horizontal form	一	二	三	四	五	六	七	八	九

When representing a number, the vertical and horizontal forms are used alternately. The ones, hundreds and ten thousands are in vertical form, and the tens and thousands are in horizontal form.

Examples

||||| represents 241.
 ||| represents 23.
 ||| ||| represents 2241.
 |||| ||| represents 27402.

A simple abacus

The traditional Chinese numerals

The use of counting rods gradually changed to the use of traditional Chinese numerals (中國傳統數字) for recording numbers.

Number	0	1	2	3	4	5	6	7	8	9	100	1000	10,000
Traditional Chinese numeral	〇	一	二	三	四	五	六	七	八	九	百	千	萬

Examples

二四六 represents 246.
 一三三三 represents 1333.
 一〇四六 represents 1046.

Even today, some people still use traditional Chinese numerals when writing amounts of money.

The simple and elaborate forms of Chinese numerals

The simple form of Chinese numerals we use today first appeared in the Han Dynasty (漢朝).

Number	0	1	2	3	4	5	6	7	8	9	10	100	1000	10,000
Simple numeral	〇	一	二	三	四	五	六	七	八	九	十	百	千	萬
Elaborate numeral	〇	一	二	三	四	五	六	七	八	九	十	百	千	萬

The elaborate form of Chinese numerals is often used when the amount is large or important.

※ 60(w) x 160(h)cm

2. Telling Time in Ancient China EMS13

Telling Time in Ancient China

Do you know how people could tell time before the first clock was made?

The ancient Chinese used the 'water level dipper' (水漏) to measure time. It was made up of a set of vessels. The base vessel of the set contained a wooden pole with scales on it. Water flowed from the top vessel through a small hole in the bottom into the vessel below. Finally filling the base vessel. The wooden pole then rose up with the water. By reading the scales on the pole, people could tell the time.

Later on, clocks and watches were introduced to China. When the clepsydra was measured directly, people found that one division on the pole represented slightly more than 14 minutes. Therefore, starting from the Qing Dynasty (清朝), one tick (滴) was set to 15 minutes.

The ancient Chinese also used a different way to tell time. A day was not divided into 24 hours, but into 12 periods (時辰). These periods were Zi (子), Chou (丑), Yin (寅), Mao (卯), Chen (辰), Si (巳), Wu (午), Ku (未), Shen (申), You (酉), Xu (戌), and Hai (亥).

Zi	23:00 - 01:00	Wu	11:00 - 13:00
Chou	01:00 - 03:00	Wei	13:00 - 15:00
Yin	03:00 - 05:00	Shen	15:00 - 17:00
Mao	05:00 - 07:00	You	17:00 - 19:00
Chen	07:00 - 09:00	Xu	19:00 - 21:00
Si	09:00 - 11:00	Hai	21:00 - 23:00

Each period is about 2 hours long.

※ 60(w) x 160(h)cm

3. The Origins of Our Calendar Systems EMS14

The Origins of Our Calendar Systems

A calendar tells us today's date and day of the week. It is made based on a calendar system. A calendar system (曆法) is a way to count days and divide time into years, months, and weeks. The most common calendar systems today are the solar calendar and lunar calendar (農曆).

Solar Calendar

The solar calendar is used by many countries around the world. It counts one year as the time the Earth takes to go around the Sun. This takes 365 days, 5 hours, 48 minutes and 46 seconds. If we only count 365 days in each year, we become one day behind every 4 years. To fix this, we add 1 extra day every 4 years. This year is called a leap year, and it has 366 days. The Moon goes around the Earth in about 29 days, so we use this time as one month.

Lunar Calendar

The lunar calendar uses the time from one new moon to the next as one month. This takes about 29 and a half days. A lunar year has only about 354 days, so the lunar calendar cannot show the seasons correctly.

The Chinese Calendar System

The Chinese calendar is still used by many Chinese people today. The Chinese calendar is a combination of the lunar and solar calendars, called a lunisolar calendar (陰陽曆). Each month is a lunar month, so some months have 29 days, and some have 30 days. An extra leap month is also added every few years to make the Chinese calendar match the solar year, so it can show the seasons properly.

※ 60(w) x 160(h)cm

4. How Interesting the District Council Logos are! EMS15

How Interesting the District Council Logos are!

Hong Kong is divided into 18 districts. Each district has its own council to handle the local affairs, and each district council has its own logo. For example, the logo of the Kwun Tong district council is shown on the right. Do you know what is special about the logo?

If we add 4 dotted lines to the logo as shown, and fold the logo along any of the dotted lines, we can see that the two parts always fit exactly.

We say that the Kwun Tong district logo is an **axially symmetric shape** and the four dotted lines are the **axes of symmetry** of the logo. Other axially symmetric district logos include:

- Tsuen Wan
- Yuen Long
- North
- Central and Western
- Sai Kung
- Kwai Tsing

Furthermore, if we rotate the Kwun Tong district logo about the fixed point as shown, the logo can fit exactly onto itself without completing one turn.

After completing $\frac{1}{2}$ of a turn

We say that the Kwun Tong district logo is a **rotationally symmetric shape** and the fixed point is the **centre of rotation** of the logo. Other rotationally symmetric district logos include:

- Kowloon
- You Tin Mong
- Sha Tin

※ 60(w) x 160(h)cm

5. The origin of Tangram EMS16

The origin of Tangram

Tangram (七巧板) is a classic Chinese puzzle game. It is formed by cutting a square into 7 pieces: 5 triangles and 2 quadrilaterals. We can use them to form many different shapes.

The history of Tangram

It has been said that Tangram evolved from the 'Yanjifu' (燕几圖) of the Song Dynasty (宋朝). Huang Bo (黃伯生), a scholar in the Northern Song Dynasty (北宋), designed six different-sized rectangular low tables that can be used separately or put together to form different shapes. And so, in a path, he could rearrange the tables to suit the number of guests. Later, another table was added to the original set, making it a seven-table set named 'Seven Tables' (七寶).

The gameplay of Tangram

The gameplay of a tangram is very simple. We just use the 7 tangram pieces to form a variety of shapes.

Try to use the tangram pieces to form interesting shapes!

※ 60(w) x 160(h)cm

6. The origin of Magic Squares EMS17

The origin of Magic Squares

What is a Magic Square?

It is said that in ancient times, people once found a huge turtle in the Luo River (洛水) in Henan (河南) that had a special diagram on its shell. The diagram was composed of patterns of entire black dots or white dots in three groups and was called 'Lo Shu Square' (洛書). People thought that it was a sign of good fortune.

Use a number to represent the number of dots in each group:

4	9	2
3	5	7
8	1	6

The diagram of numbers is called a Magic Square (幻方).

What is special about a Magic Square?

In the above Magic Square, the sum of the three numbers in each row, column, or diagonal is the same.

Row	Column	Diagonal
4 + 9 + 2 = 15 3 + 5 + 7 = 15 8 + 1 + 6 = 15	4 + 3 + 8 = 15 9 + 5 + 1 = 15 2 + 7 + 6 = 15	4 + 5 + 6 = 15 9 + 5 + 1 = 15 8 + 3 + 2 = 15

How to make a Magic Square?

- Arrange the numbers 1 to 9 in order as shown on the right.
- Move the numbers outside the large square 3 squares upwards or downwards, or to the left or right, so that they all go inside the large square. A Magic Square is made.

The sum of the three numbers of each row, column, or diagonal is 15.

※ 60(w) x 160(h)cm

