Chinese Agricultural Calendar: ancient people combined lunar and solar years to know when to plant, harvest crops

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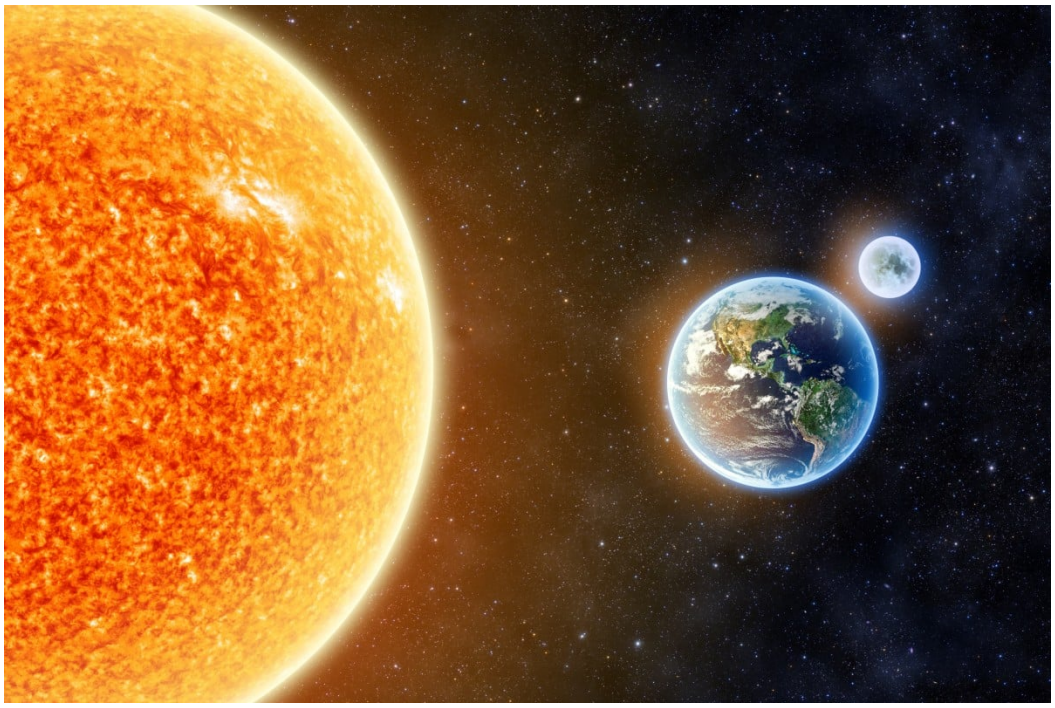
By Doris Wai

Doris worked in educational publishing, including the BBC and Cengage prior to joining the Post in 2018.She specialises in creating graphics and digital learning content, and has a particular interest in issues related to mental health and wellness.



Twelve lunar months are equal to about 354 days. But the solar year follows the time it takes for the Earth to go around the sun, so it has about 365 days. Photo: Shutterstock

Lunar New Year is one of Hong Kong's biggest celebrations with a flurry of cultural festivities.

This year's holiday begins on January 22 and marks the start of the year of the rabbit. But it began on February 1 last year and February 12 in 2021. Have you ever wondered why the festival falls on a different date every year?

The reason for the changing date is that Chinese New Year's timing is based on the lunar year used for the Chinese calendar, which is sometimes called the Chinese Agricultural Calendar. This is different from the calendar most of us use today, called the Gregorian calendar, based on the solar year.

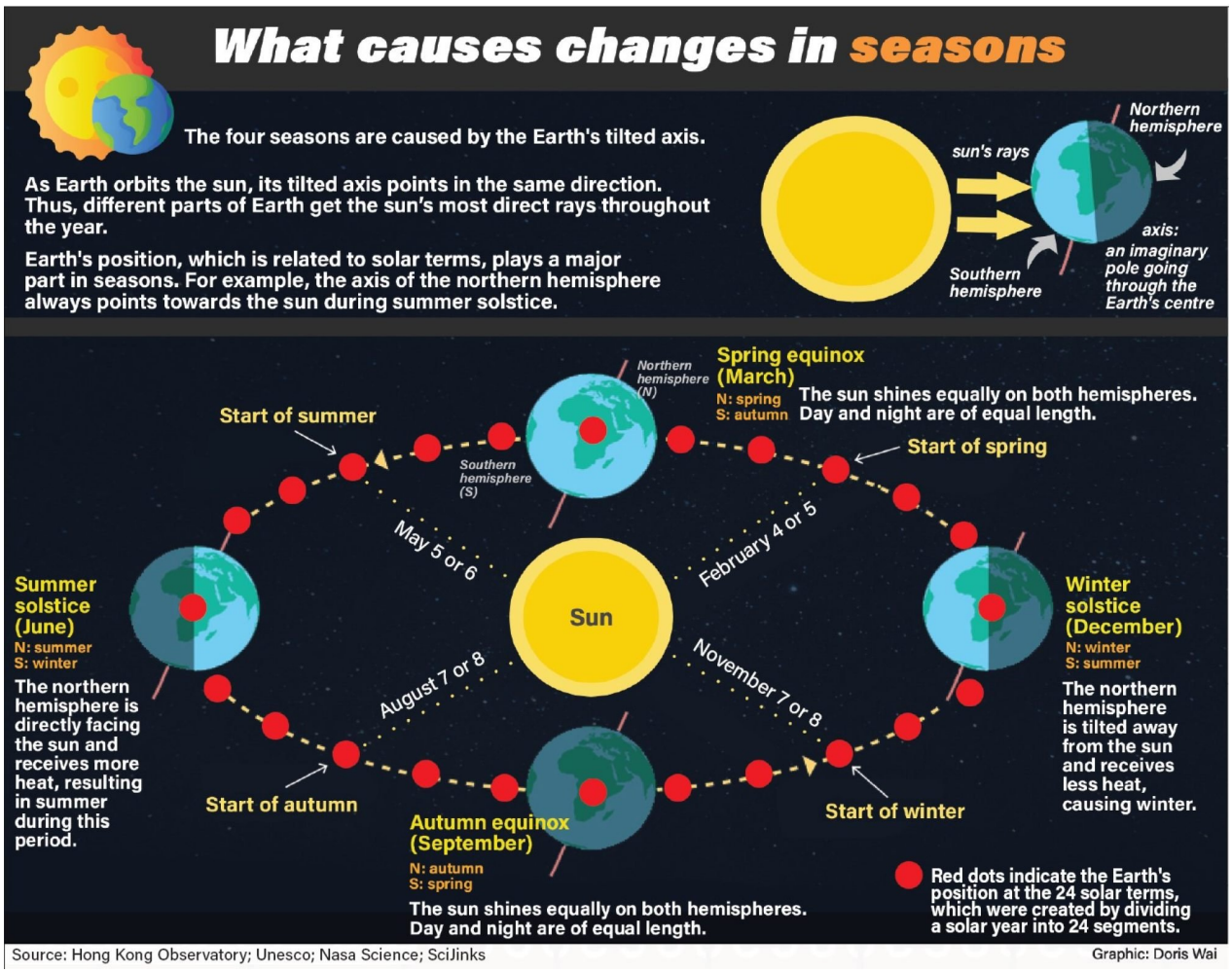
A lunar year contains 12 lunar months, which are based on the time it takes the moon to go around the Earth. Twelve lunar months are equal to about 354 days. But the solar year follows the time it takes for the Earth to go around the sun, so it has about 365 days.

This difference explains why Lunar New Year never falls on the same day on the Gregorian calendar.

What is the Chinese Agricultural Calendar?

While most people are familiar with lunar months, not many are aware that the Chinese Agricultural Calendar integrates the lunar and solar calendars because it tracks the movement of the moon and the sun.

The Chinese Agricultural Calendar uses lunar months to determine its dates, but it also has “solar terms” which are based on the solar year. These solar terms helped the ancient Chinese people plant and harvest their crops at the right time – this was crucial knowledge for their survival.



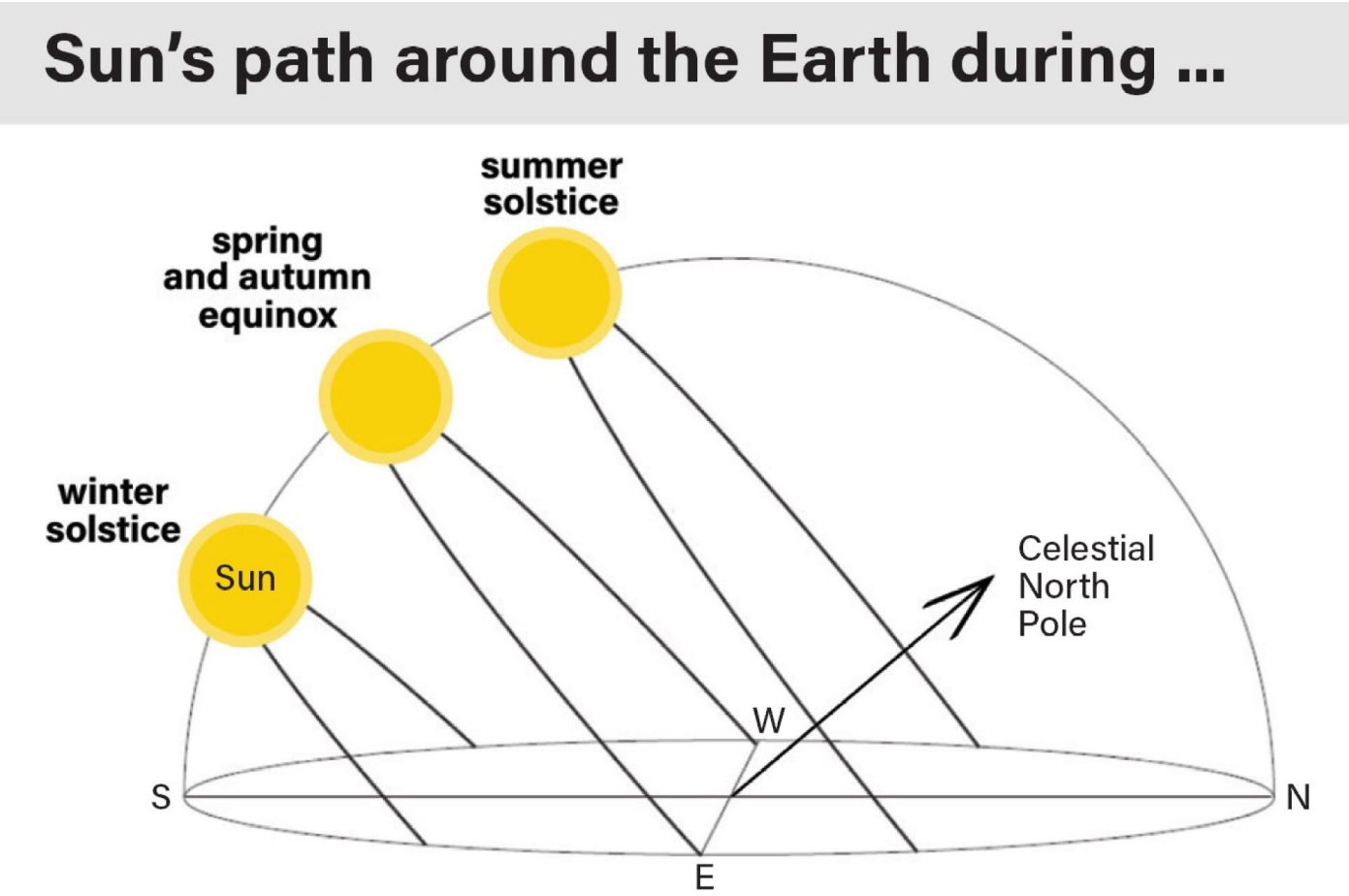
How did solar terms guide the ancient Chinese?

Solar terms are related to the Earth’s positions with respect to the sun, and hence they are also related to the seasons (see graphic above). This guided the ancient Chinese on when to perform various agricultural activities.

But how did people back then determine the dates for these 24 solar terms? Well, they did so by observing how the sun’s path in the sky would change during different seasons.

By observing changes in the sun's shadow over extended periods of time, the ancient Chinese were able to determine the length of a solar year. They then divided the solar year into 24 parts (see graphic above) and came up with 24 solar terms which were essential for their schedule of planting crops.

The diagram below represents a location at a latitude of 40 degrees north. The three tilted arcs illustrate the different paths that the sun takes during four of the solar terms – winter solstice, summer solstice, spring equinox and autumn equinox.



Other solar terms describe the weather, for example, grain rain, white dew, frost's descent, bright and clear, minor and major heat, and minor and major snow. There are also solar terms such as grain buds, grain in ear and awakening of insects that are related to crop growth and animal activities.

By referring to the chart below, the ancient Chinese predicted changes in seasons and figured out the best times to sow and gather their crops every year.

24 solar terms

Spring

Term / When it falls on solar calendar	Meaning
Start of spring February 4, 2023	Spring begins
Rain water February 19, 2023	Amount of rainfall increases
Awakening of insects March 6, 2023	Animals awake from hibernation
Spring equinox March 21, 2023	Mid-point of spring; day and night are equally long
Bright and clear April 5, 2023	Warm and bright; time to tend to graves
Grain rain April 20, 2023	Increase in rainfall

Summmer

Term / When it falls on solar calendar	Meaning
Start of summer May 6, 2023	Summer begins
Grain buds May 21, 2023	Grains are getting plump
Grain in ear June 6, 2023	Wheat ripens; beginning of farming season
Summer solstice June 21, 2023	Longest daytime of the year
Minor heat July 7, 2023	Hottest days are yet to come
Major heat July 23, 2023	Hottest time of the year

Autumn

Start of autumn August 8, 2023	Autumn begins
End of heat August 23, 2023	Hot summer coming to an end
White dew September 8, 2023	Weather getting cooler; dew drops appear on grass and trees in the morning
Autumn equinox September 23, 2023	Mid-point of autumn; temperature begins to drop
Cold dew October 8, 2023	Dew drops begin to turn into frost
Frost's descent October 24, 2023	Frost appears; temperature drops further

Winter

Start of winter November 8, 2023	Winter begins
Minor snow November 22, 2023	It begins to snow
Major snow December 7, 2023	Snow intensifies
Winter solstice December 22, 2023	Shortest daytime of the year
Minor cold January 6, 2024	Temperature continues to drop
Major cold January 20, 2024	Coldest time of the year

Source: Hong Kong Observatory; UNESCO

Now that you know more about the Chinese Agricultural Calendar, do you think there is a relationship between the solar terms and the Gregorian calendar? Can you identify which Chinese festivals always appear around the same Gregorian calendar dates, and why?

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