

词汇: *astronomy* 天文学

2020 is a leap year, and as we all know leap years happen every four years, right? Wrong. That extra day in February is designed to keep the Earth **in sync** with the **astrological** or **seasonal year**. But, what you might not realise is that the maths isn't that simple and occasionally we have to wait eight years.

The method behind **calculating** when leap years occur might be a bit more complicated than you think. Way back in 1582 the **calendar** we now use was first implemented. The Gregorian calendar was named after the pope at the time, Gregory X1V. The people who created it realised it wasn't perfect to just add an extra day *every* four years.

Here's where the maths comes in. A day, of course, is **measured** by the amount of time it takes for the Earth to complete one full **rotation** on its **axis**. A year is the number of days it takes the Earth to **orbit** the Sun, which most people assume is 365. However, the Earth actually takes just under 365 and a *quarter days* to complete one full **revolution** around the Sun.

So, every four years we get an extra day, which falls on the 29th February. However, as mentioned earlier, it is in fact just under a quarter of a day. So, by **rounding it up**, we put the calendar **out of sync** again – which means that after a while we have too many days.

That **imbalance** has to be readdressed, otherwise after 400 years you'd end up with three extra days. So back in 1582, they realised that every **turn of a century** should skip their extra day to subtract those three extra days. This is why the years 1700, 1800, and 1900 weren't leap years.

But wait, there's more. The year 2000, the **millennium**, *was* a leap year. That's because over a period of four hundred years we only need to remove three days. So, every 400 years the turn of the century is a leap year. This means the next time you hear someone saying 'leap years happen every four years' you can tell them why they're wrong.

词汇表

in sync	同步的
astrological	占星学的
seasonal year	一年四季
calculate	计算
calendar	日历
measure	测量
rotation	旋转一圈
axis	轴线, 中心线
orbit	轨道
revolution	旋转
round up	把数字调高成为整数
out of sync	不同步
imbalance	不均衡
turn of a century	世纪之交
millennium	千禧年

测验与练习

1. 阅读课文并回答问题。

1. True or False? *Pope Gregory XII created the Gregorian calendar in 1582.*
2. How do we measure a day?
3. True or False? *The Earth takes 365 and a quarter days to orbit the Sun.*
4. If every four years was a leap year, how many days would the calendar be out of sync by after 400 years?
5. When is the next leap year that falls in the first year of a new century?

2. 选择意思恰当的单词或词组来完成下列句子。

1. The _____ to work out the number of days in a year is based on the amount of time it takes the Earth to go round the Sun.

calculate	calculating	calculation	calculate
-----------	-------------	-------------	-----------

2. We must _____ the changes to the schedule.

take	takes	took	taken
------	-------	------	-------

3. It takes the Earth around 365 and a quarter days to _____ around the Sun.

revolve	revolution	revolutionise	revolted
---------	------------	---------------	----------

4. We _____ up the bill so that the waiting staff got some extra money.

rounding	rounds	round	rounded
----------	--------	-------	---------

5. I'm not sure if it has been _____ properly. The numbers seem off.

measure	measured	measurement	measures
---------	----------	-------------	----------

答案

1. 阅读课文并回答问题。

1. True or False? *Pope Gregory XII created the Gregorian calendar in 1582.*

False. While the calendar was named after him, it wasn't him who created it.

2. How do we measure a day?

A day is measured by the amount of time it takes for the Earth to complete one full rotation on its axis.

3. True or False? *The Earth takes 365 and a quarter days to orbit the Sun.*

False. The exact number is not a quarter. This is why extra calculations are needed.

4. If every four years was a leap year, how many days would the calendar be out of sync by after 400 years?

After 400 years, there would be three extra days if every four years was a leap year.

5. When is the next leap year that falls in the first year of a new century?

2400. 2100, 2200, and 2300 will all skip leap years.

2. 选择意思恰当的单词或词组来完成下列句子。

1. The **calculation** to work out the number of days in a year is based on the amount of time it takes the Earth to go round the Sun.

2. We must **implement** the changes to the schedule.

3. It takes the Earth around 365 and a quarter days to **revolve** around the Sun.

4. We **rounded** up the bill so that the waiting staff got some extra money.

5. I'm not sure if it has been **measured** properly. The numbers seem off.