

# Leap Second

Did you know that this month is going to be slightly longer than it usually is? At the end of June one extra second will be added to the day. It's called a leap second and it's designed to make sure the world's clocks are in sync with the turning of the Earth. Amelia found out more about it and had a brief look at the history of time.

We spend all day watching it, losing it, spending it and finding as much of it as we can. But how much time do you spend thinking about what time actually is?

Well a really, really, really long time ago people realised there are patterns in our world, like the changing of the seasons, the phases of the moon and day turning into night as the planet spins on its axis. They became the basis of how we told time.

Eventually our ancestors split the day into 24 hours; made up of 60 minutes each. But we still needed an accurate way to keep track of those hours and minutes.

People started with sun dials, which show the time of day by shadows - but they don't work when the sun's not shining. So people started tinkering away with other ways of keeping time, like candles and dripping water. Hour glasses were pretty effective time-keepers, which were used a lot by sailors. Except, you have to keep turning them over.

“Oh gosh darn it, how long have we been going north again?”

Then centuries later, the mechanical clock changed the world.

“Hmm not bad.”

As time went on, our clocks got smaller and way better so we could tell time to the second, even split second. We even found a way to measure time using the energy in atoms.

Atomic clocks are the most consistently accurate time-keepers humans have ever come up with. In fact they're even more reliable than the spinning of the earth which is gradually slowing down. That means 24 hours by an atomic clock is ever so slightly less than one spin of the earth. They're only different by micro seconds, but that adds up. So to keep everything in sync, scientists came up with the leap second.

At the end of this month, clocks all around the world will have one second added to them. It's something that's been done every few years since the 1970s, but there could be some side effects.

There are worries the extra second will confuse some computer programs and make them crash. That's what happened to sites like Qantas and Reddit last time a leap second was added.

Some scientists reckon the whole thing is a waste of time and we should just stick to atomic clocks to tell the time of day.

Countries are going to vote on it at a big meeting later this year. But in the meantime, you might want to spend that extra second sparing a thought for time.

### **What are Leap Seconds?**

A leap second is a second which is added to Coordinated Universal Time (UTC) in order to synchronize atomic clocks with astronomical time to within 0.9 seconds.

### **Why Do We Need Leap Seconds?**

The reason we have to add a second every now and then, is that Earth's rotation around its own axis, is gradually slowing down, although very slowly.

Atomic clocks however, are programmed to tick away at pretty much the same speed over millions of years. Compared to the Earth's rotation – which determines the length of a day – the atomic clocks are simply too accurate.

### **How Often Are Leap Seconds Added?**

Since 1972, a total of 25 seconds have been added. This means that the Earth has slowed down 25 seconds compared to atomic time since then.

However, it doesn't mean that the days are 25 seconds longer nowadays. The only difference is that the days a leap second has been added had 86,401 seconds instead of the usual 86,400 seconds.

**Did you notice?** The last leap second was added at 23:59:60 UTC on June 30, 2012.

### **36 Seconds' Difference**

The difference between UTC and the International Atomic Time (UTC-TAI) after the next leap second has been added on June 30, 2015, will be 36 sec.

### **Who decides when to add leap seconds?**

The International Earth Rotation and Reference System Service (IERS) in Paris, France observes the Earth's rotation and compares it to atomic time. When the difference between the two approaches 0.9 seconds, they order a leap second to be added worldwide.