WILL OUR EARTH DAYS AND YEARS GET LONGER WITH TIME?

In my teenage years, I often wondered about the rotation of our planet Earth, how that condition was initiated, why we were rotating around the Sun and where did the Moon come from and why it is in orbit around Earth.

In later years, I was subjected scientifically to perpetual motion and the fact that that action is always a challenge due to friction and other facts that affect motion.

Just to put all this into perspective, hear are some facts that we need to review to try and understand this article:

1. We know that it takes an Earth Day for our planet to rotate but how fast is it spinning? Google states 1bout 1,000 miles per hour at the equator. That is why we feel spiny?
2. We know it takes an Earth year to rotate around the Sun but how fast is it going? Google says 67,000 miles per hour.
3. We know that the Moon has a monthly cycle but just how fast is it going? Google states that the moon orbits Earth at 2,288 miles per hour.

Perhaps these facts are mind-boggling but are these facts constant or is there a gradual change with time?

These articles provide some explanation:

A) Earth's relationship with our Sun

"…….Story by Harriet Brewis

Our days could get longer thanks to a phenomenon in the Earth's core

What lies within the Earth's innards remains an enigma to even the most learned of experts, although, they're at least confident there are layers and a dense inner core.

And yet, many of us laymen will be unaware that this core is spinning, and that this could have a strange impact on our daily lives.

The inner core is understood to be a moon-sized chunk of solid iron and nickel that sits more than 4,800 kilometres (3,000 miles) beneath our feet.

It is surrounded by the outer core – a liquid mix of metals, silicon and oxygen – which is then cloaked in the mantle – a 2,900 kilometre (1,802 miles)-thick layer of rock, and finally the crust – the world's outermost rocky layer.

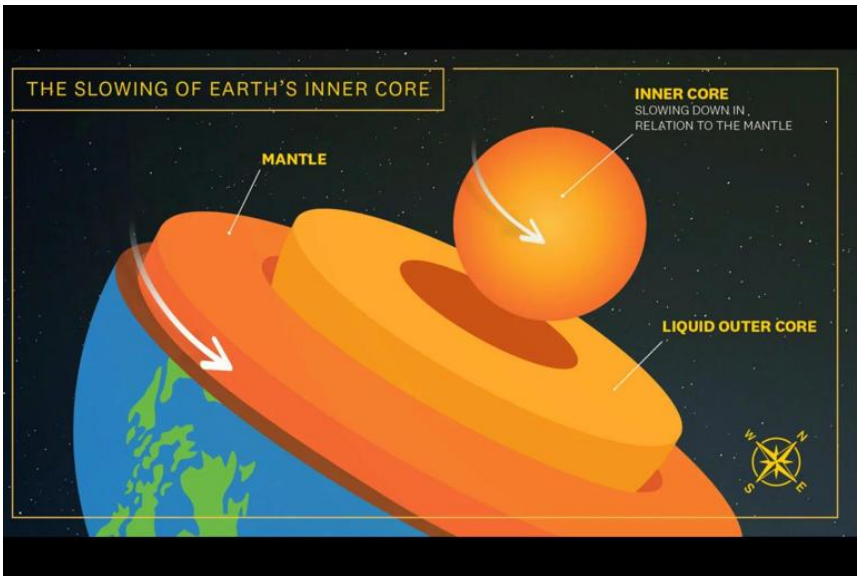
And although the entire planet is constantly rotating, the inner core is known to turn at a slightly different speed to the mantle and crust, as *Live Science* notes.

When scientists first started mapping the heart of the Earth, using seismic activity records, some 40 years ago, the inner core was rotating slightly faster than the two outer layers.

But now, a new paper, published in the journal *Nature*, reveals that the inner core's movements have been slowing down since 2010, and it is now rotating more slowly than the mantle and crust.

"When I first saw the seismograms that hinted at this change, I was stumped," John Vidale, a seismologist at the University of Southern California, Dornsife, said in a statement.

"But when we found two dozen more observations signaling the same pattern, the result was inescapable."



The inner core began to slow down in 2010, moving slower than the Earth's two surface layers ((USC Graphic/Edward Sotelo))© Provided by Indy 100

If the rotation of the inner core continues to decelerate, its gravitational pull could eventually cause the outer layers to also turn more slowly.

The knock-on effect of this would be a lengthening of our days.

However, any such change would amount to thousandths of a second, which would be "very hard to notice," Vidale confirmed reassuringly.

In other words, we won't need to change our clocks and calendars just yet.

Still, this isn't the first time scientists have concluded that Earth's inner core is slowing down.

This phenomenon, known as "backtracking," has been debated for about a decade but, so far, it has been very hard to prove, *Live Science* reports.

In the new study, researchers analysed data from more than 100 repeating earthquakes (tremors that occur repeatedly at the same location) along a tectonic plate boundary in the South Sandwich Islands in the South Atlantic Ocean between 1991 and 2023.

Each quake enabled experts to map the core's position relative to the mantle. And by comparing these measurements, they could see how the inner core's rate of rotation changed over time.

The new study offers the "most convincing" evidence so far that backtracking has, indeed, been taking place, Vidale said.

Yet, the question remains as to why the inner core is slowing down at all.

And whilst this remains unclear, Vidale and his colleagues suggest that it is most likely caused either by "the churning of the liquid iron outer core that surrounds it" or by "gravitational tugs from the dense regions of the overlying rocky mantle".

It is also unclear how regularly backtracking occurs.

It is possible that the inner core goes through constant periods of rotational acceleration and deceleration without us even noticing.

But these changes, if they do regularly occur, probably happen over decades or longer, meaning we need wider-ranging data sets if we are to learn anything about the core's long-term patterns.

The inner core remains a source of great intrigue, despite new technologies offering researchers clearer insights into its strange composition and behaviours.

The study's authors say they will continue to analyse seismic data to uncover more of the secrets buried within our planet's hearts.

"The dance of the inner core might be even more lively than we know," Vidale said……."

So, it appears we are in "constant change".

I might as well start a discussion on our Moon and its affect on our Earth.

B) How our Moon is changing with time and its affect on our Earth

Will Earth ever lose its moon?

News

By Charles Q. Choi

published April 22, 2023

The moon is slowly creeping away from Earth, but will we actually lose the moon before the sun turns into a red giant and destroys us both?

The moon's orbit around Earth appears so regular that civilizations have based the month on lunar motion for thousands of years. However, the moon is actually creeping slowly away from Earth. So will Earth lose its moon at some point?

Scientists determined the rate at which the moon is drifting away from Earth with help from reflective panels that NASA placed there during the Apollo missions. For more than 50 years, researchers have fired laser beams from Earth at these mirrors and measured how long it took to detect the reflected pulses. Using the speed of light, scientists estimated that the moon is straying away from Earth by about 1.5 inches (3.8 centimeters) per year, roughly the rate at which fingernails grow, according to NASA.

The moon is moving away from Earth because of the gravitational effects that each has on the other. The moon's gravitational pull forces Earth's oceans to bulge toward it, resulting in the lunar tides, NASA said. Earth's gravity causes similar tidal effects on the moon, making our natural satellite slightly football-shaped.

The gravitational pull from Earth's tidal bulge drags on the moon. Meanwhile, the oceans shift because of the lunar tides, exerting friction on Earth's surface and thus slowing the planet's rotation, Madelyn Broome, an astrophysicist at the University of California, Santa Cruz, told Live Science. About 4.5 billion years ago, "when the moon was first formed, the rotation rate of the Earth would have been significantly faster, with a day length of about five hours," Broome said.

All of these forces work to sling the moon farther away from Earth.

"Since the Earth and the moon are part of the same gravitationally interacting system, total angular momentum must be conserved — stay the same — between the two," Broome explained. "Angular momentum describes the energy contained by something that is

spinning. The faster you spin, the more angular momentum you have. The slower you spin, the less."

Well, there is the Scientific opinion that the Moon is changing its orbit constantly.

That is all for now as Marilyn is calling me for breakfast but I will not try and explain all this to her today.

Have a great day!

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