

# Science Fair

By:



# A Matter of Time

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# Problem

Which method of timekeeping is the most accurate, Solar time or Sidereal (Sai-dee-ree-uhl) time?



# Question

# Hypothesis

I think Solar time is the most accurate, because we follow the sun. As it sets, we go to sleep, and as it rises, we wake up.



## Background Info

Solar time is measured by Earth's rotation relative to the Sun. Apparent solar time is measured by direct observation of the Sun or by a sundial. (1).

The primary measurement unit of solar time is 1 second.



## Definitions

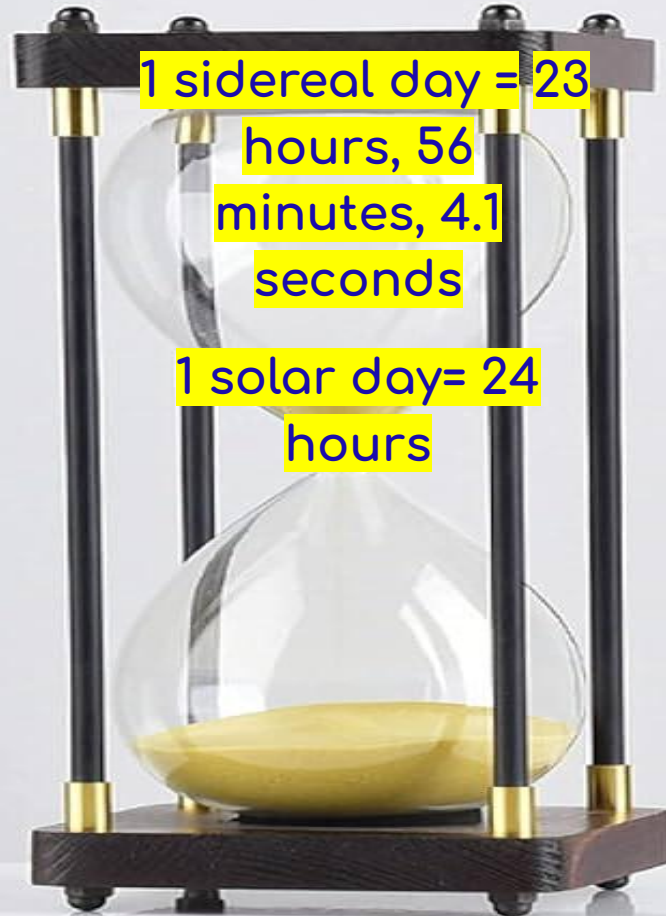
Sidereal time is measured by the apparent motion about the Earth of the distant stars (2).

The primary measurement unit of sidereal time is 1 sidereal day.

# Discussion

A solar day is the time it takes for the Sun to return to the highest point in the sky from the day before. A sidereal day is how long it takes Earth to rotate so that distant stars appear in the same location from the night before.

Therefore, a solar day is about 4 minutes longer than a sidereal day.



Given the tools available to me, I find solar time measurement as more practical than the sidereal time. The latter requiring complicated and sophisticated calculations and measurements requiring far more advanced knowledge in astronomy and mathematics.

# Principles

Kepler's law of  
planetary motion.

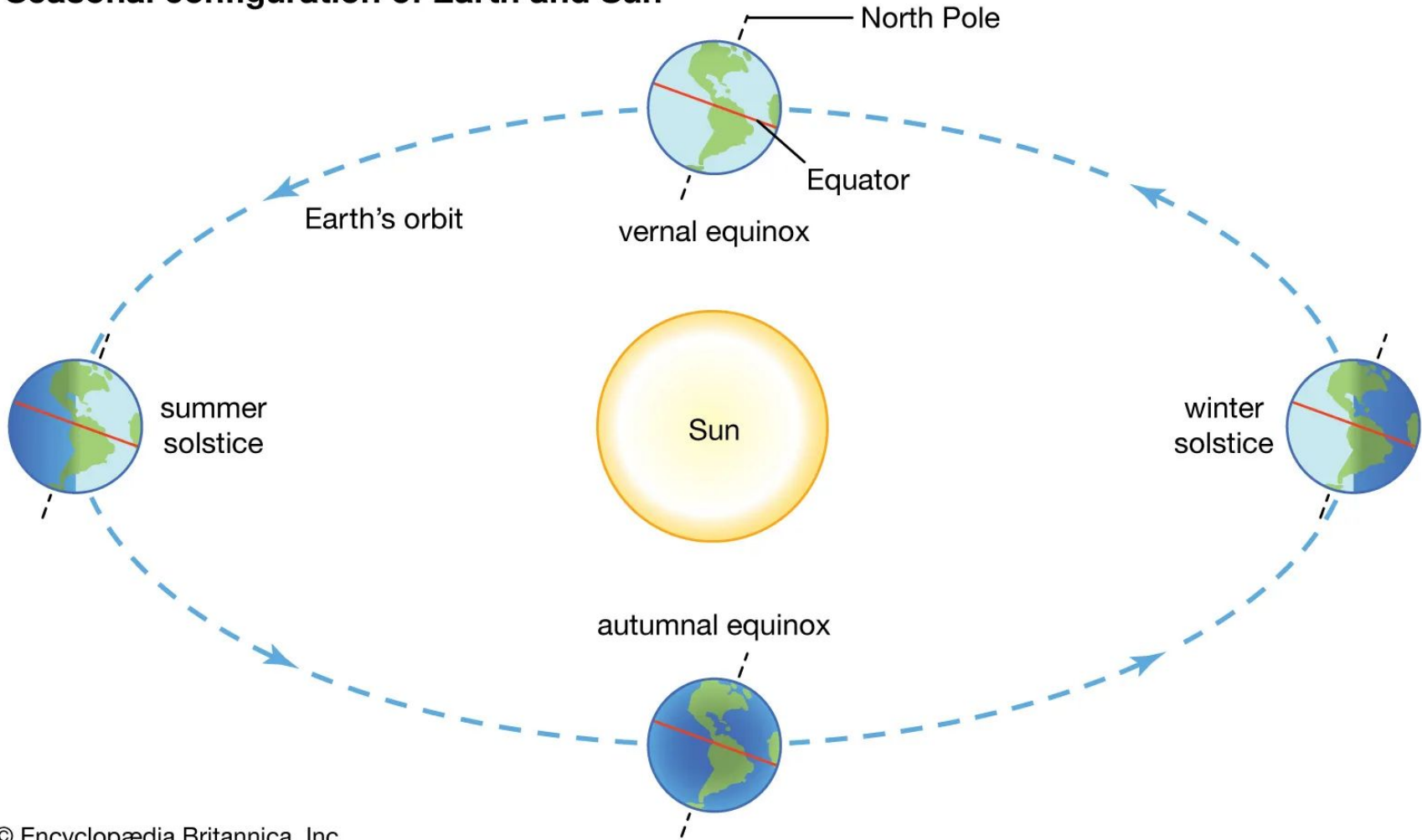


# Concepts

- ❑ How the Earth rotates around the Sun
- ❑ How this rotation affects the changes to Earth
- ❑ The time change that takes place because of the rotation



# Seasonal configuration of Earth and Sun





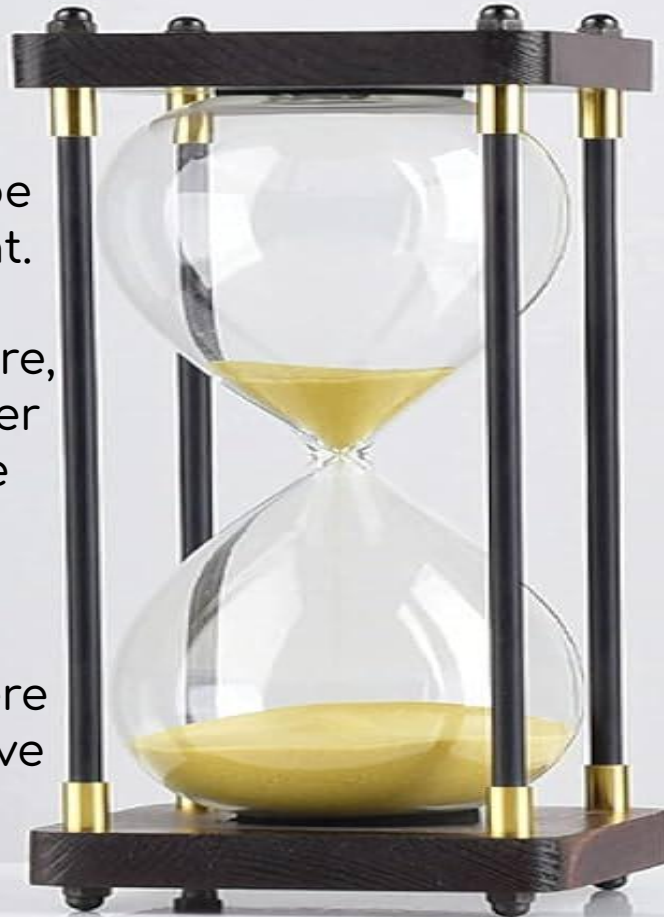
# Conclusion

I have determined that solar time is more accurate than sidereal time. A sidereal year is rarely the same length, as it depends on the distance (angle) from the Vernal Equinox (two moments in the year when the Sun is exactly above the Equator and day and night are of equal length).



# What Next?

This project can also be a long-term experiment. It would be 4 months long (or it could be more, but the average number of months is 4) and the experiment would include specific times and real-time observations. If you were to do this, it would prove my hypothesis correct.



To do this experiment, you would have to make a chart, and every month you would calculate the solar and sidereal time. Why do some of the methods vary throughout the year? What can this tell you about the yearly movements of the sun and earth?

# Credits

1. Sidereal time - Britannica
2. Solar time | Equation of Time, Sundial & Clocks - Britannica
3. A Matter of Time | Science Project

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