Sidereal And Synodic Time - Educator's Guide (Ages 16-18)

At the end of these Night Sky activities students will understand:

- A given star will not rise over the horizon at exactly the same time each day
- A day based on Earth's rotation with respect to the Sun is called a synodic day
- A day based on Earth's rotation with respect to distant stars is called a sidereal day
- A sidereal day is four minutes shorter than a synodic day

Astronomy background information

The Earth rotates on its axis, giving us the day-night cycle. The rotation period is measured relative to the stars. A **sidereal** day is the time taken for the stars to appear in the same place in the night sky. The word sidereal comes from the Latin for "star". This corresponds to one full rotation of the Earth.

A day can also be defined in terms how long it takes for the Sun to return to a specific part of the sky from a given location. This is called a **synodic** day and is the basis of the standard calendar. However, the length of a synodic day is not the same as a sidereal day. This is because the Earth is also moving in orbit around the Sun. As a result, the Earth has to make very slightly more than a complete turn to bring the Sun back to the same point in the sky. This slight extra rotation lasts 4 minutes every day.

A sidereal day is 23 hours 56 minutes and 4 seconds long. This is shorter than a synodic 24 hour day.

As a consequence of this, a given star will rise over the horizon 4 minutes earlier each day. This activity will demonstrate the difference between sidereal and synodic time to your students.

Night Sky App Essential Settings

Go to Night Sky Settings and make sure the following Preferences are set.

Turn Off these Effects:

Show Satellites
Environment Based Horizon
Show Trajectories and Orbits
Show Ecliptic Line
Show Glass Mythology
Show Constellation Lines

Accessible Learning:

- Text size can be increased in the Preferences section
- Star numbers can be reduced by sliding two fingers down the screen