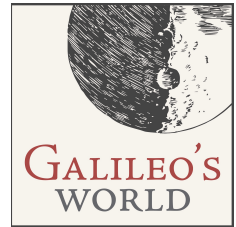


Introduction to Diurnal Motion

EXHIBIT: *Galileo's World*

GALLERY: Music of the Spheres, The Sky at Night

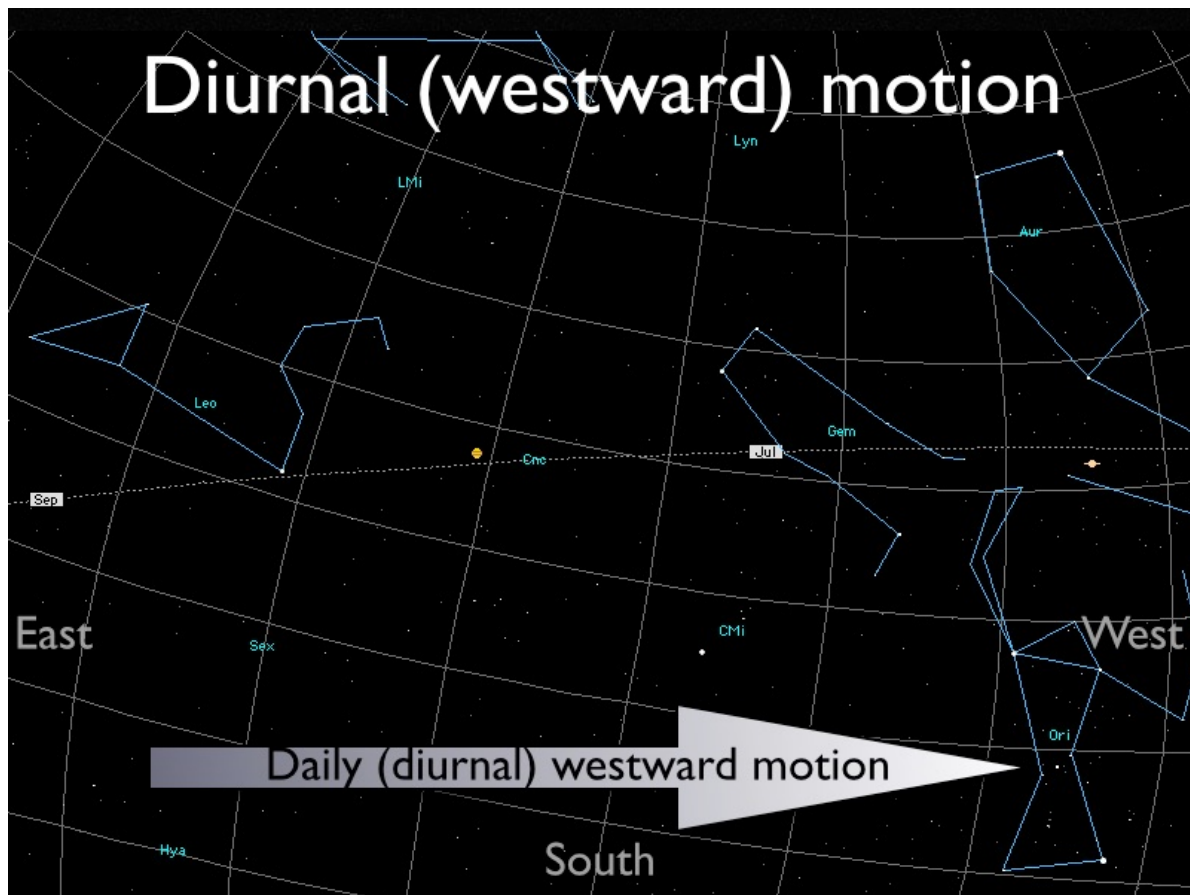


Each day and night, the fixed stars appear to rotate around the earth like a giant celestial sphere. Just like the Sun, they rise in the east and set in the west.

Circumpolar stars (stars which remain above the horizon in the north) turn in circles around the north celestial pole (Polaris, the north star).

Perpendicular to the north celestial pole is the celestial equator, which lies directly above any observer located on the equator of the Earth. In their daily or diurnal motion, stars located on the celestial equator rise due east and set due west as seen from anywhere on Earth.

The daily motion of the entire starry sky, rising from the east, setting in the west, rotating around the north pole, is called the **diurnal** motion. Diurnal motion is **daily** motion **from east to west**. The Sun, stars, planets and all heavenly objects display this westward, diurnal motion every 24 hours, which is why it is possible to tell time with a star clock or nocturnal dial.



Model the diurnal motion of the stars using a celestial globe.

1. Model circumpolar diurnal motion:

1. Find the North Star, Polaris, which is the tip of the Little Dipper, or the end of the tail of Ursa Minor, the Little Bear.
2. Hold the globe so that Polaris is on the side of the globe directly away from you.
3. Turn the globe counterclockwise and observe the circumpolar stars as they rotate around the North Star.



2. Model diurnal motion around the celestial equator:

1. Find the “great circle” of the **celestial equator** on a celestial globe.
2. Find the constellation of Orion the Hunter.
 1. Find the three stars that make up Orion’s belt.
 2. Identify the star Mintaka, the top star of Orion’s belt, which lies almost directly on the celestial equator.
3. Hold the celestial globe so that Orion is held in your left hand (east) and the celestial equator is also held in your right hand (west). You are **facing south**. Somewhere near you, and higher up, will be the north star, Polaris. The bright star Mintaka is now rising in the east.
4. **Rotate the globe from left to right.** Stars and planets will appear to rise in the east and set in the west. Rotate the globe one full turn, until Mintaka in Orion is rising on the eastern horizon once again.
(Keep your hands on the equator at equal distances away from you.)

Now you are ready to tell time by the diurnal motion of the stars using a nocturnal dial.

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(Ask about the *Galileo’s World* iPad Exhibit Guide)

