

Chapter 3

The Science of Astronomy

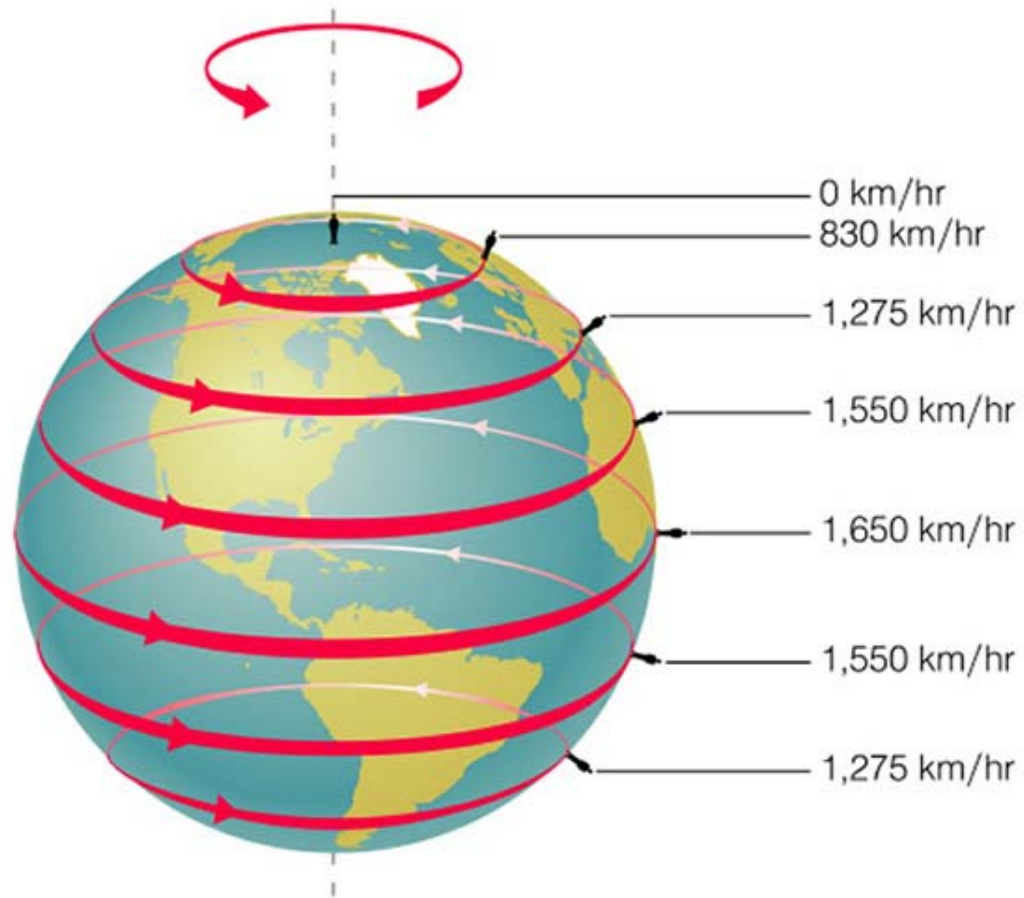
Clocks and Calendars: Astronomy's Imprint on our Lives

- **Day:** time for Earth to *rotate* once on its axis
- **Week:** seven days in honor of seven ancient celestial bodies: *Sun, Moon, Mars, Mercury, Jupiter, Venus & Saturn*
- **Month:** time for Moon to *revolve* once around the Earth
- **Year:** time for Earth to *revolve* once around the Sun

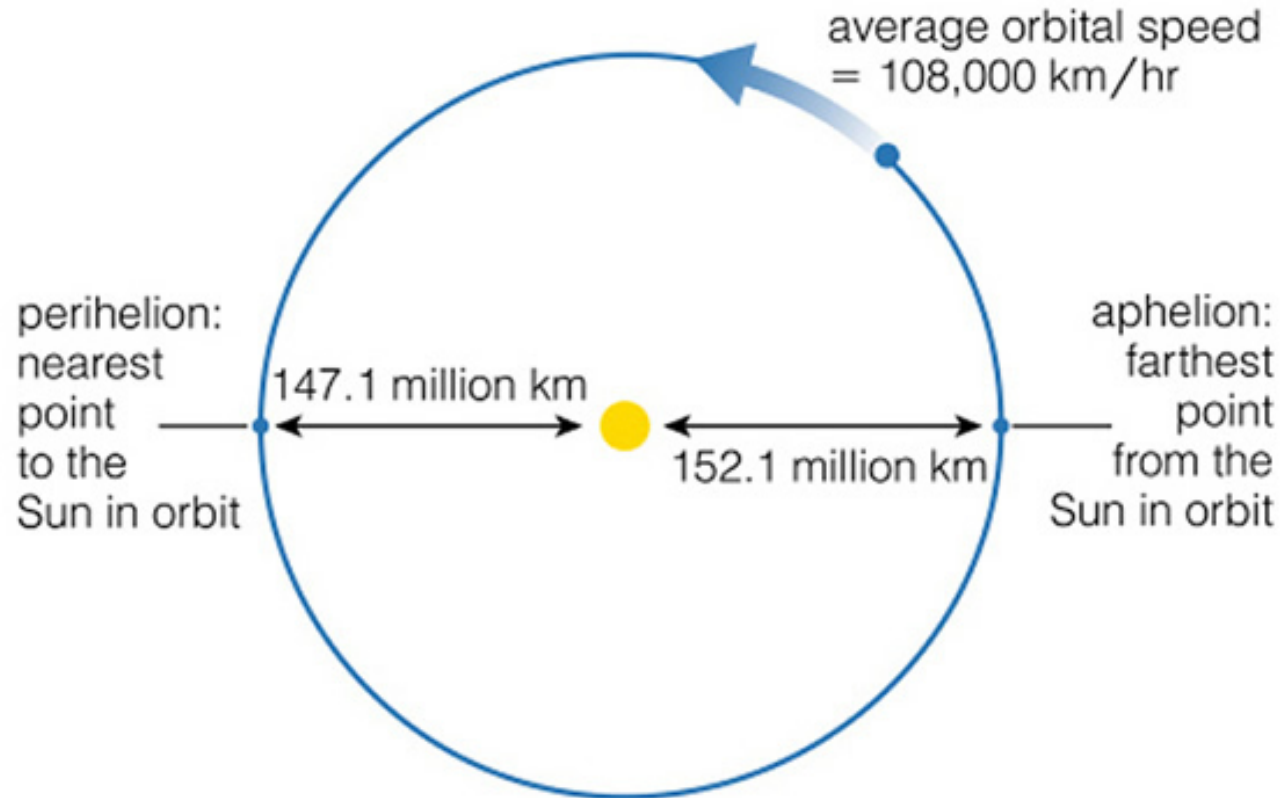
Outline

- Spaceship Earth
- Seasons Tutorial
- Phases of the Moon Tutorial
- Ancient Astronomers

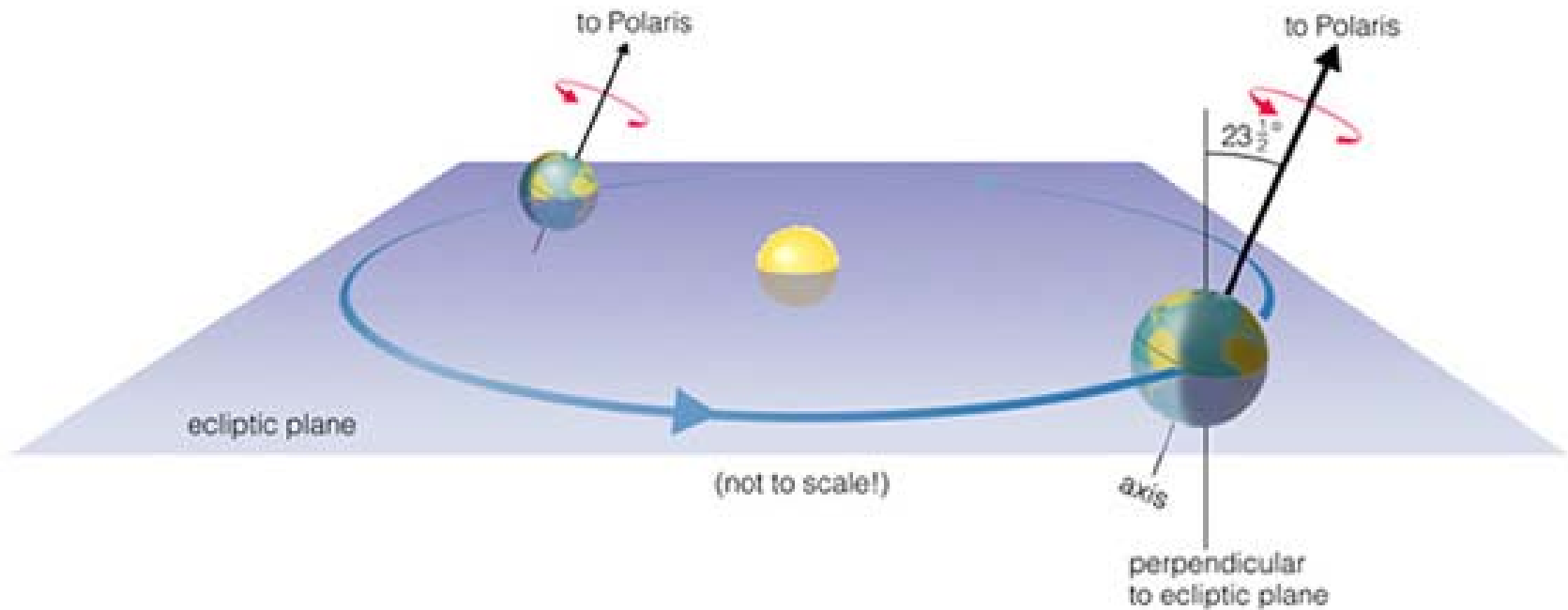
Earth Rotation



Earth Revolution

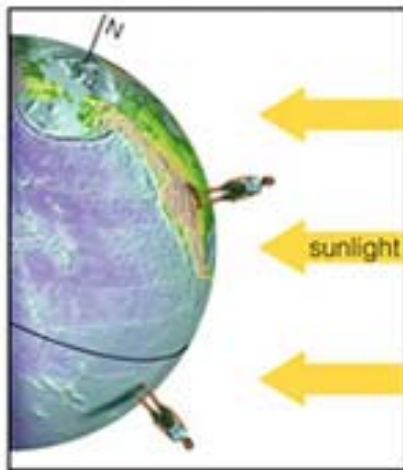


Axis Tilt

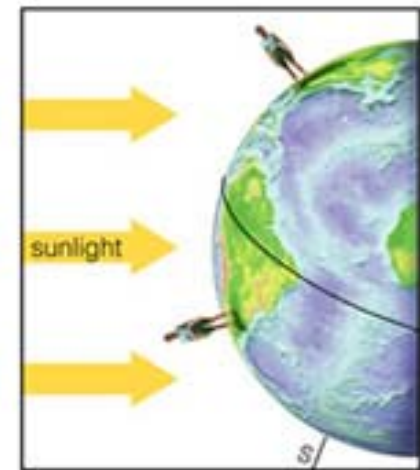


Tilt and Origin of Seasons

Sunlight striking the Northern Hemisphere is concentrated in a smaller area (note the smaller shadow) than the same amount of sunlight striking the Southern Hemisphere.

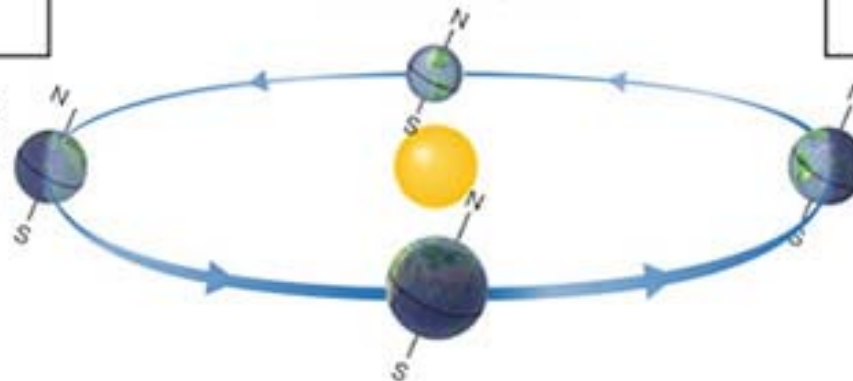


The situation is reversed from the summer solstice, with sunlight striking a smaller area in the Southern Hemisphere (note the smaller shadow) than in the Northern Hemisphere.



1. Spring Equinox
Spring begins in the Northern Hemisphere, fall in the Southern Hemisphere.

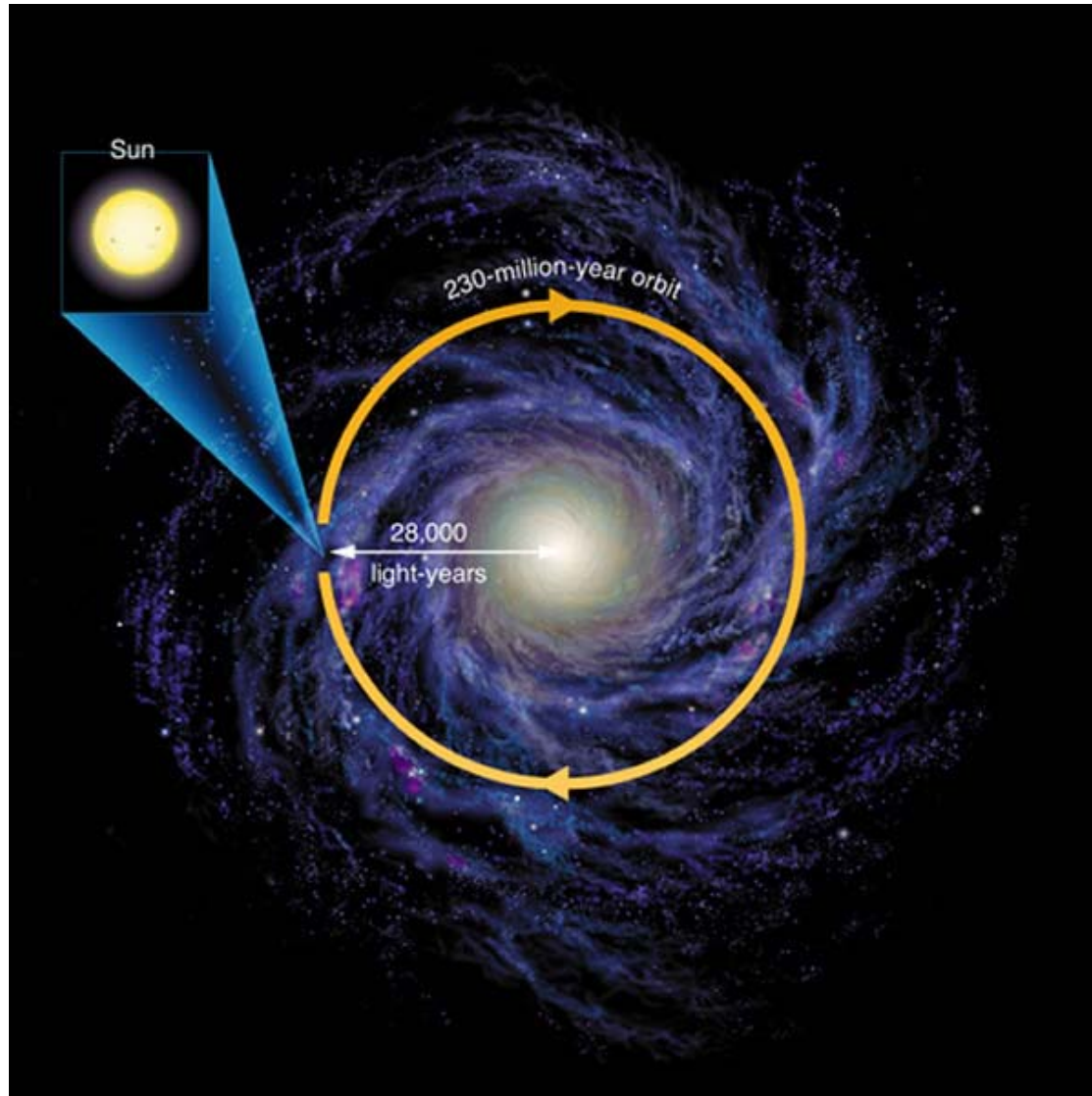
2. Summer Solstice
Summer begins in the Northern Hemisphere, winter in the Southern Hemisphere.



4. Winter Solstice
Winter begins in the Northern Hemisphere, summer in the Southern Hemisphere.

3. Fall Equinox
Fall begins in the Northern Hemisphere, spring in the Southern Hemisphere.

Solar System Motion in the Galaxy

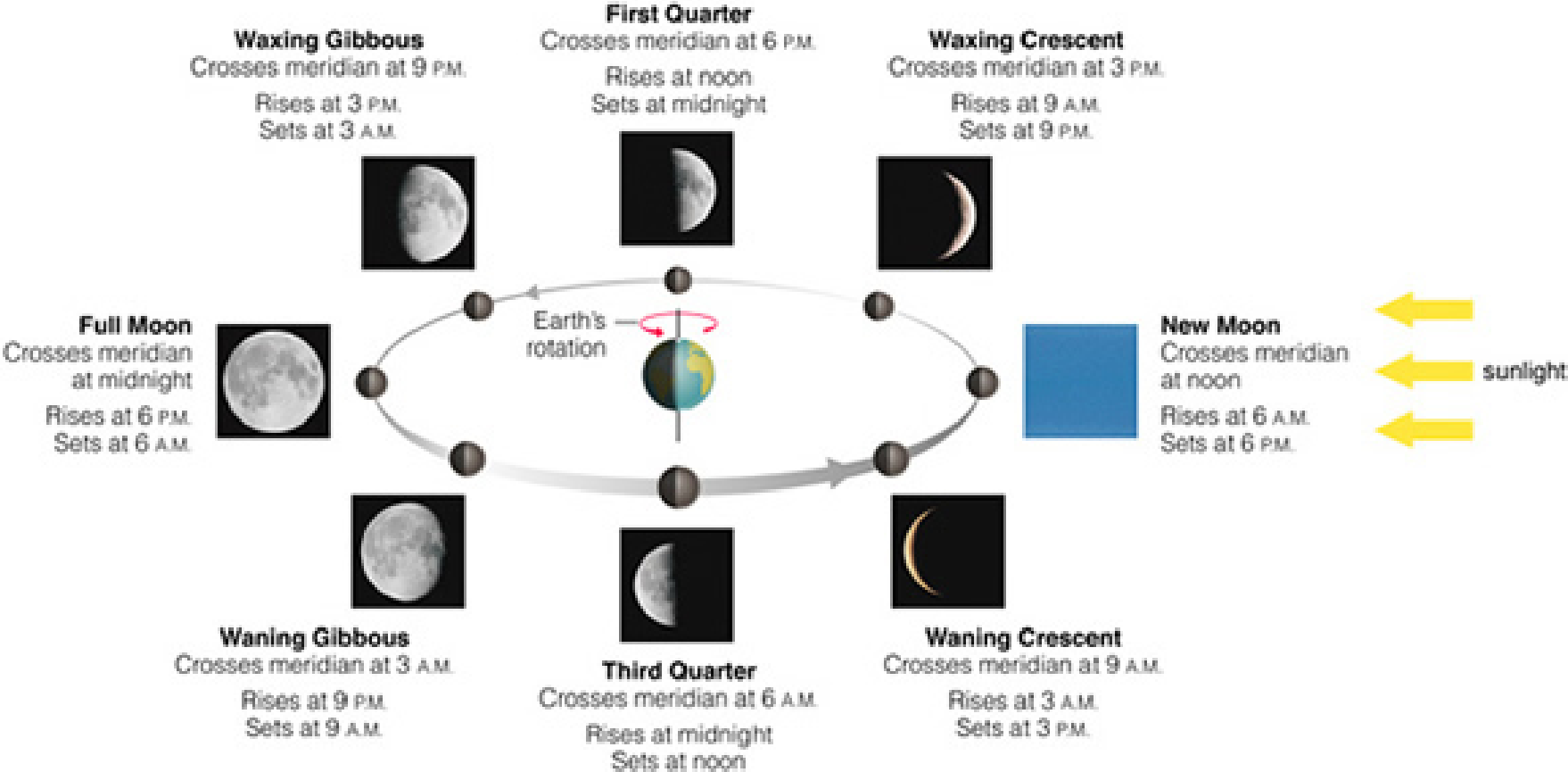


Seasons Tutorial

- Interactive self-paced tutorial
- On www.astronomyplace.com
- Register
- Select Textbook “Cosmic Perspective”
- Select Tutorials from menu

Every student should work their way through tutorial and be able to answer every question correctly in the Exercises portion of the tutorial

Phases of the Moon Tutorial



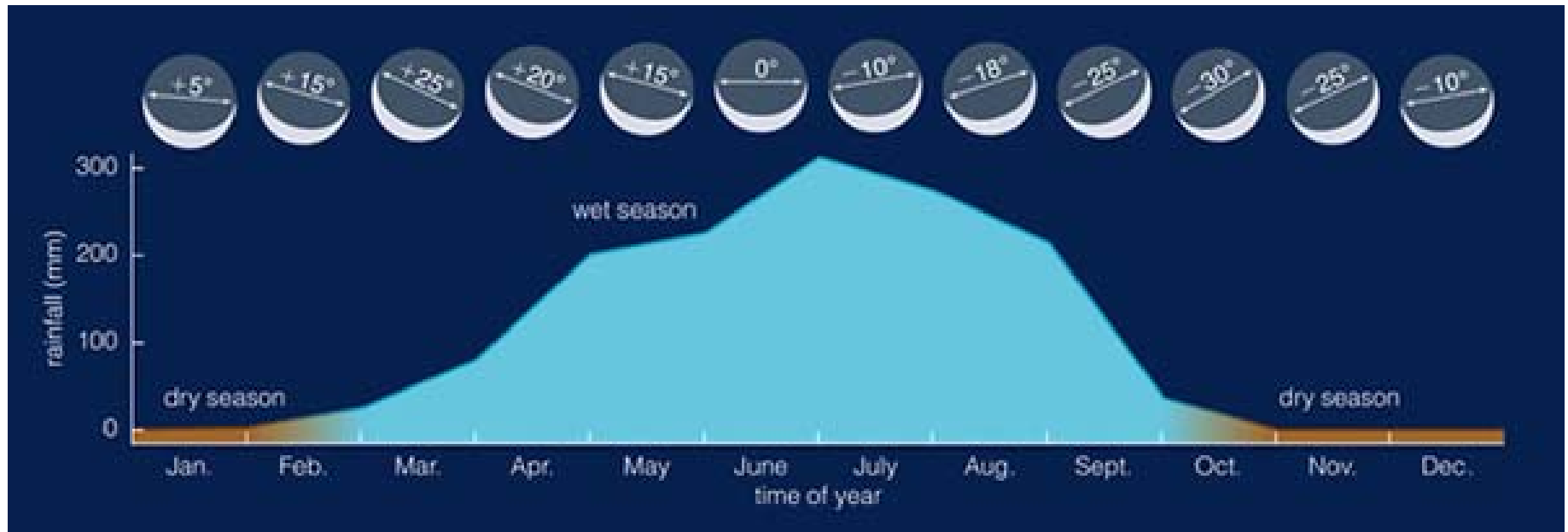
Ancient Astronomers

- Africans (6000 BC): used tilt of crescent moon to predict rainy season
- Egyptians (2000 BC): introduced 12 hour day/night; invented sundials and water clocks
- Druids (2700-1500 BC): built Stonehenge to mark summer solstice, seasons
- Greeks (500-100 BC): measured diameter of Earth, proposed geocentric model of SS, library in Alexandria

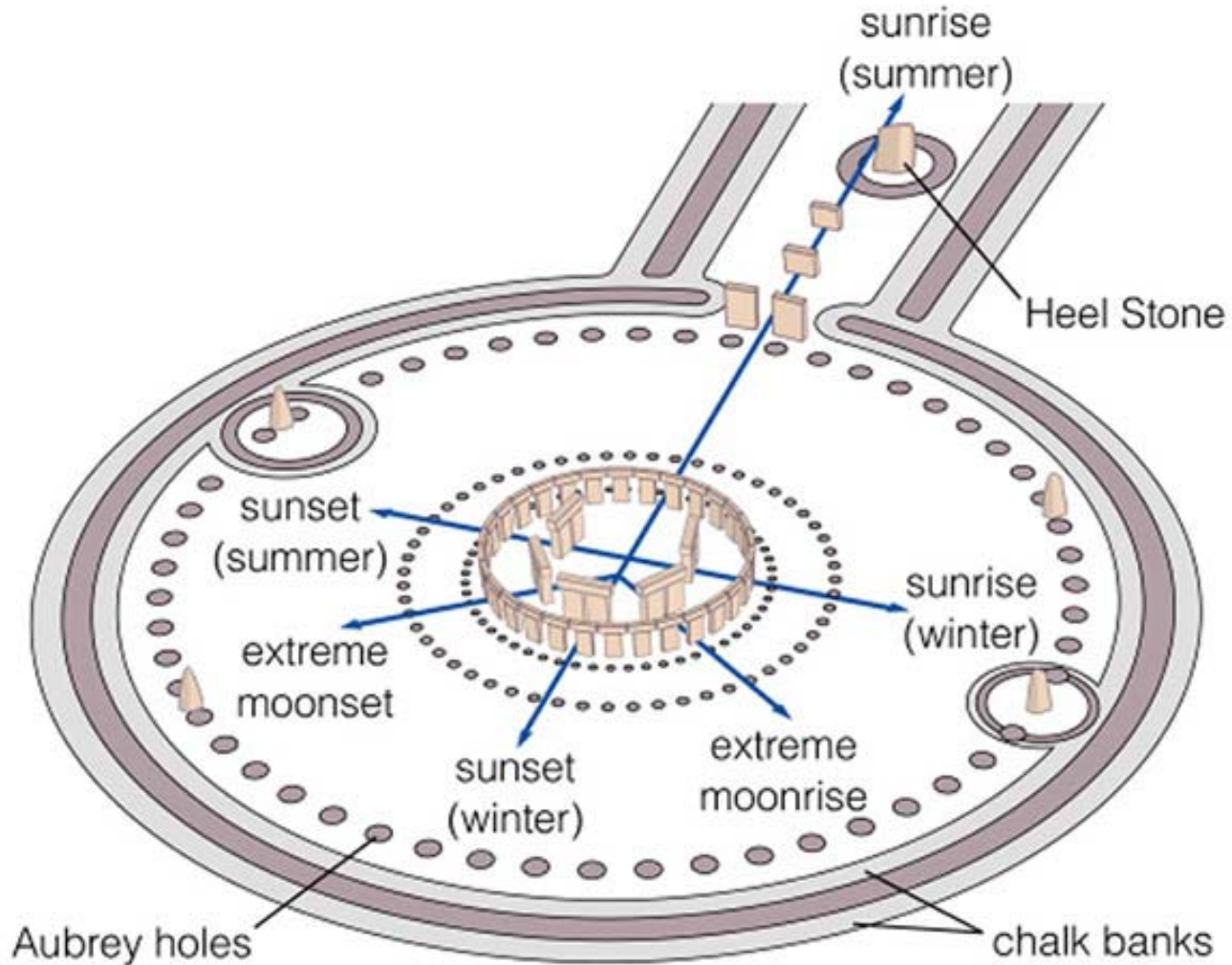
Ancient Astronomers [2]

- Chinese and Koreans (100-1000 AD): observatories and records of celestial events
- Arabics (500-1400 AD): named stars, algebra, “House of Wisdom” in Bagdad
- Central Americans (500-1500 AD): built large temples for Sun, Moon, and record seasons

African Astronomy: Seasons



Stonehenge: Ancient Observatory



Anasazi Indians (N.M.)

