Mastering Astronomy Assignment 2

- Due Feb 10, 11 am
- Read Chapter 1

Constellations – the 88 semi-rectangular regions that make up the sky

- Northern constellations have Latinized Greek-mythology names:
  - Orion, Cygnus, Leo, Ursa Major, Canis Major, Canis Minor
- Southern constellations have Latin names:
  - Telescopium, Sextans, Pyxis

What do you think?

- Do the stars stay in the same position in the sky all day/night long?
- Do we see the same stars all year round every night?
What do you think?

- What causes the stars to move?
- Do the stars actually move in the way they appear from Earth?
- Is the daily motion of the Sun different from the stars?

Earth’s daily rotation and yearly orbit

- Earth’s axis remains pointed in the same direction (toward Polaris) throughout the year.
- The average Earth-Sun distance is 1 AU, or about 150 million km.
- Earth takes 1 year to orbit the Sun at an average speed of 107,000 km/hr.

The Celestial Sphere

- The north celestial pole (NCP)
- The south celestial pole (SCP)
- The celestial equator
- The ecliptic
- Right ascension – like longitude
- Declination – like latitude
The Celestial Sphere

The 88 official constellations cover the celestial sphere.

The Milky Way

A band of light making a circle around the celestial sphere.

What is it?
Our view into the plane of our galaxy.

Our view from Earth:

- Stars near the north celestial pole are circumpolar and never set.
- We cannot see stars near the south celestial pole.
- All other stars (and Sun, Moon, planets) rise in east and set in west.
The Local Sky

An object’s **altitude** (above horizon) and **direction** (along horizon) specifies its location in your local sky.

Celestial Sphere

- **Meridian**
- **Horizon**
- **Altitude** (above horizon)
- **Direction** (along horizon)
- **Zenith** (altitude = 90°)

In-class Activities: Position

- Work with a partner!
- Read the instructions and questions carefully.
- Discuss the concepts and your answers with one another. **Take time to understand it now!!!**
- Come to a consensus answer you both agree on.
- If you get stuck or are not sure of your answer, ask another group.
- If you get really stuck or don’t understand what the question is asking, ask me.
Is the horizon shown a real physical horizon or an imaginary plane that extends from your observing location and Earth out to the stars?

Can the observer shown see a star when it is located below the horizon? Why or why not?

Is there a star that is in an unobservable position?

When a star travels from a position below the observer’s horizon to a position above the horizon, is that star rising or setting?

In what direction is the observer facing?

a) toward the South
b) toward the North
c) toward the East
d) toward the West

Imagine that from your current location you observe a star rising directly in the east. When this star reaches its highest position above the horizon, where will it be?

A. high in the northern sky
B. high in the southern sky
C. high in the western sky
D. directly overhead
Where would the observer look to see the star indicated by the arrow?

A. High in the Northeast
B. High in the Southeast
C. High in the Northwest
D. High in the Southwest

Earth’s rotation causes the Sun, Planets, Moon and stars to appear to move when viewed from Earth.

Nightly Motion of the Stars

- Imagine looking toward the East as a star rises above your horizon - what does it do after that?
Nightly Motion of the Stars

- For stars (the Moon and planets) that appear in the southern sky: Stars first rise near the eastern horizon, move upward and toward the south, and then move down and set near the western horizon.

What direction is the observer facing in this picture?

A. North
B. South
C. East
D. West

Nightly Motion of the Stars

- Imagine looking toward the North. What do stars appear to do over the course of an evening?
Nightly Motion of the Stars

- **Looking North:** Stars appear to move counter-clockwise around the stationary North Star (Polaris) – we call these circumpolar stars.

Looking North: Circumpolar Stars

- Circumpolar stars seem to move counter-clockwise around the stationary North Star.
- These constellations and stars are visible any night of the year in the NORTHERN sky because they never rise or set!
- Examples: Ursa Major, Ursa Minor, Draco, Cepheus, and Cassiopeia
What happens over time in the Northern Sky?

How long did it take to get this picture?

Take out a piece of paper and put your name on it along with your answer!!

In-class Activities: Motion

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