Looking at the Night Sky

How to find your way around:

• Position -> where is that object?
• Distance -> how much space between these two things?
• Motion -> where will that object be later tonight?
• Bright/faint objects -> magnitude!

Using Angles

Distances on the sky are measured in _____, ___-_______, and ___-_______

• 1 degree = ___ arc-min
• 1 arc-min = ___ arc-sec

• Width of index finger = ___º
• Width of three fingers = ___º
• Width of entire hand = ___º

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

Rising and Setting Stars

• The Earth’s eastward rotation causes stars to appear to move westward.
• Stars near the _____ _____ move in small circles, and are called ________
• Stars far from the pole move in long arcs

Nightly Motion of the Stars

• Imagine looking toward the North. What do stars appear to do over the course of an evening?
• What about stars in the South? East? West? Directly overhead?

Nightly Motion of the Stars

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

- Looking North: Stars appear to move counterclockwise around the stationary North Star (______) - we call these __________ stars.

Looking North: Circumpolar Stars

- Circumpolar stars seem to move counterclockwise around the stationary ________.
- 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

How long did it take to get this picture?

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- Work with a partner!
- Read the instructions and questions carefully.
- Discuss the concepts and your answers with one another.
- 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 Lecture Tutorial is asking, ask me for help.

Measuring Stars: Magnitudes

Constellations help us find our way in the sky, but we want to know more...

- Ancient people classified stars into 6 groups:
  - "_____ Magnitude" stars were the brightest
  - "_____ Magnitude" stars were the faintest
- A modified version of this system is still used

Magnitudes System

- Way to group stars by intensity/brightness
- Brighter star = ______ magnitude
- Fainter star = ______ magnitude
- Difference of 1 in magnitude < -- > factor of 2.5 in brightness
- EX: Mag. 3 star vs. mag. 6 star :
  - Mag. 6 star is
  - $2.5 \times 2.5 \times 2.5$ times fainter = _____ times fainter
What can you see?

What we can see in the sky (constellations) at any given time is determined by three factors:
- Time of night/day
- __________________
- __________________

Review: Coordinates on the Earth

• _______: position north or south of equator
• _______: position east or west of prime meridian (runs through Greenwich, England)

Altitude of the celestial pole =

Why do the constellations we see depend on latitude and time of year?

• They depend on latitude because your position on Earth determines ________________.
• They depend on the time of year because Earth’s __________________________.
Why can’t we see the same constellations all year round?

The sky varies as Earth orbits the Sun

- As the Earth orbits the Sun, the Sun appears to move _____ along the ecliptic.
- At midnight, the stars high in the sky are _____ the Sun in the sky.