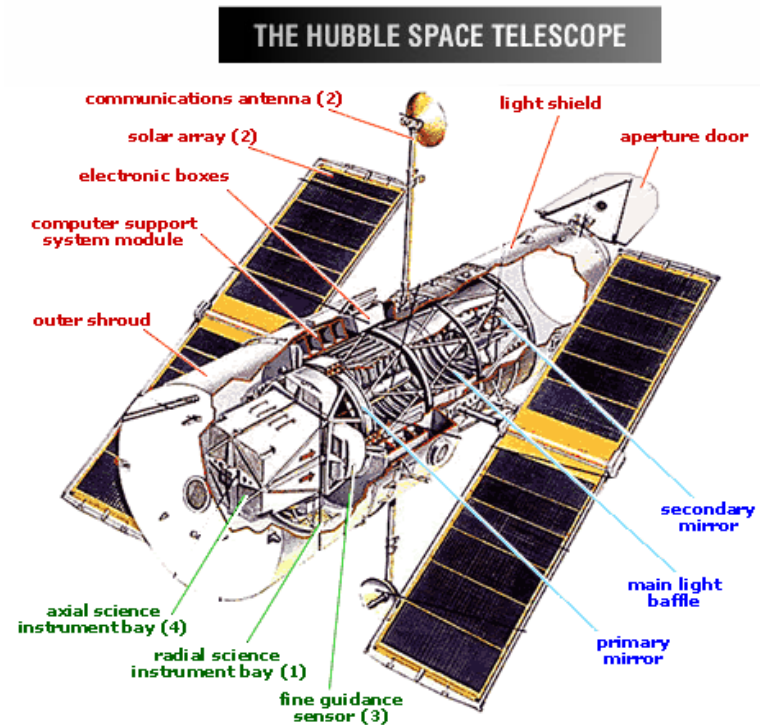


Astronomy 100 Sections 8 – 10

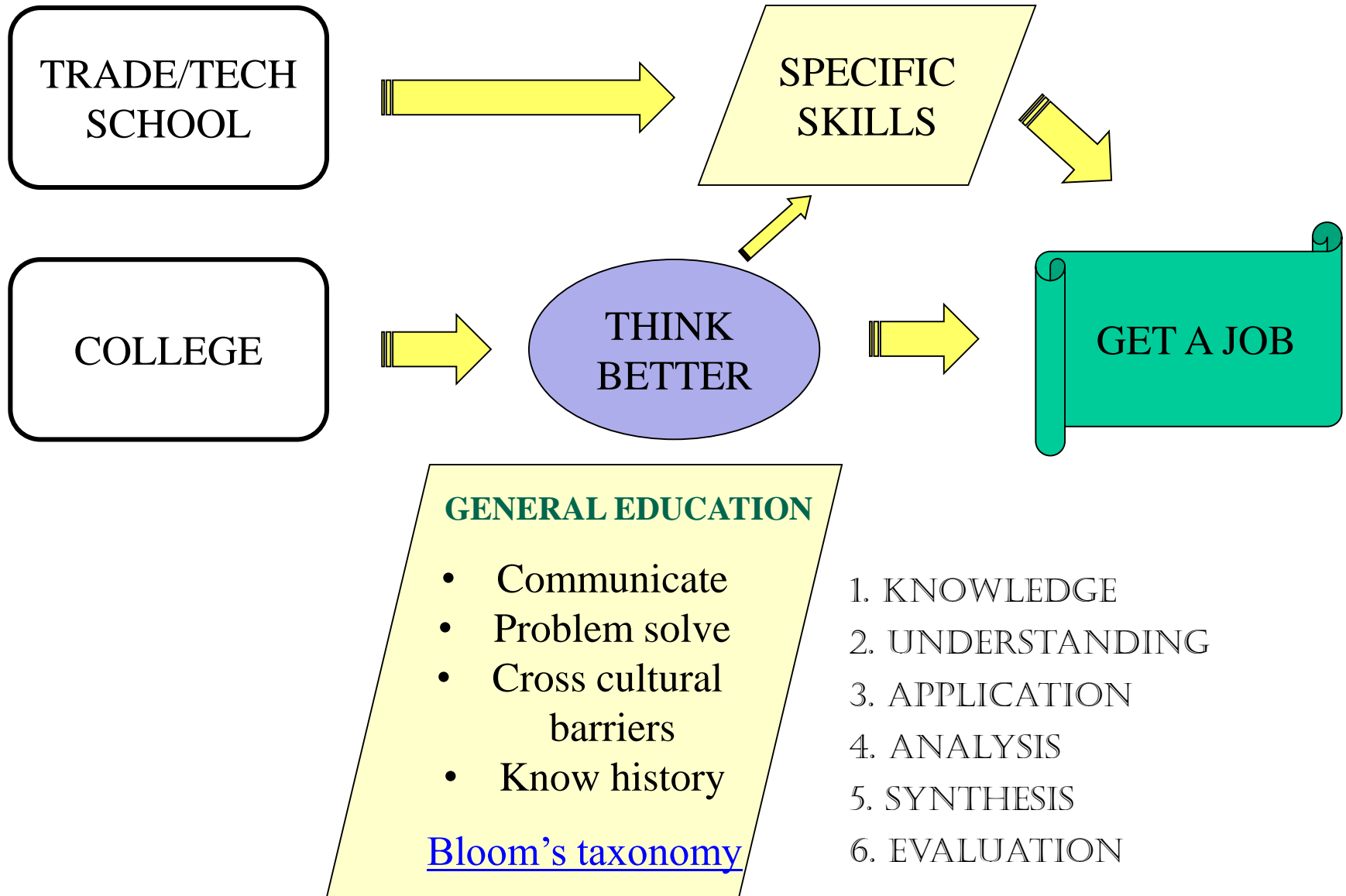
Professor Menningen

September 5, 2018

- Syllabus overview
 - books & supplies
 - course goals
 - assignments & grading
 - clickers
 - Desire2Learn
- About the professor



The Purpose of College



How to Learn Astronomy

- Stay curious
- Interact with the same material several times
- Work together with someone
- Try extra homework questions
- Attend class and especially labs

How to Fail in College

- Hold beliefs that make you stupid
- Adopt shallow thinking strategies
- Never stop to ask questions
- Maintain poor study and note-taking habits
- Give up after any setback

Videos by Dr. Stephen Chew, cognitive psychologist,
Samford University

How to Succeed in College

- Set a GPA goal
- Treat college like an 8 to 5 job
- Attend class, keep up
- Sleep
- Relate to your professors
- Be a "well-rounded square"

A Well-Rounded Square



About those mobile devices

- They distract you
- They distract your neighbor
- They distract me
- They affect your professional reputation
- Self control, not external control



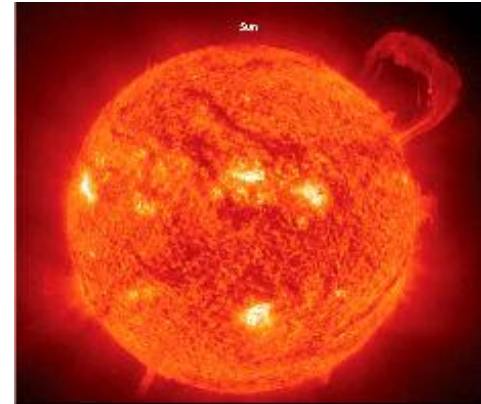
The Essential Cosmic Perspective

Lecture 1
Introduction &
The Night Sky
September 5, 2018

Bennett
Donahue
Schneider
Voit

What is Astronomy?

- Study of all things outside of the atmosphere of the Earth.
 - Planets
 - Stars
 - Galaxies
 - Structure and Evolution of the Universe (Cosmology)



The Scientific Method

- Make observations
- Create an hypothesis
- Create and perform experiments to test your hypothesis
- Formulate a theory

The Constellations

- Groupings of prominent stars which appear nearby in the sky
- Includes the whole area in the sky, not just the stars
- 88 constellations

Constellation of Orion



b

Stars are at different distances

LOOKING UP AT ORION

Orion is easy to identify because of the three bright stars of his "belt." You can see Orion in the evening sky from November to April, and before dawn from August through September.

Betelgeuse
Betelgeuse is a Red Giant star that has swelled to a size that is as large as our Solar System out to Mars. Its red color indicates that it is relatively cool for a star, 3400 degrees Kelvin.

Horsehead Nebula
The Horsehead Nebula is an active star-forming region rich with dust and gas.

Orion Nebula
The Orion Nebula is an active star-forming region rich with dust and gas.

Rigel

A protoplanetary disk
This is the beginning of a star; our early Solar System may have looked like this!

Orion in 3-D

Star	Distance (ly)
Betelgeuse	450 ly
Rigel	240 ly
1500 ly	1500 ly
1000 ly	1000 ly
770 ly	770 ly
720 ly	720 ly
430 ly	430 ly
136 ly	136 ly

1 light year (ly) = ~6 trillion miles

SOUTH

Astronomers do NOT study

- A. life outcomes based on birth day
- B. galaxies
- C. moons
- D. The Sun



**Response
Counter**

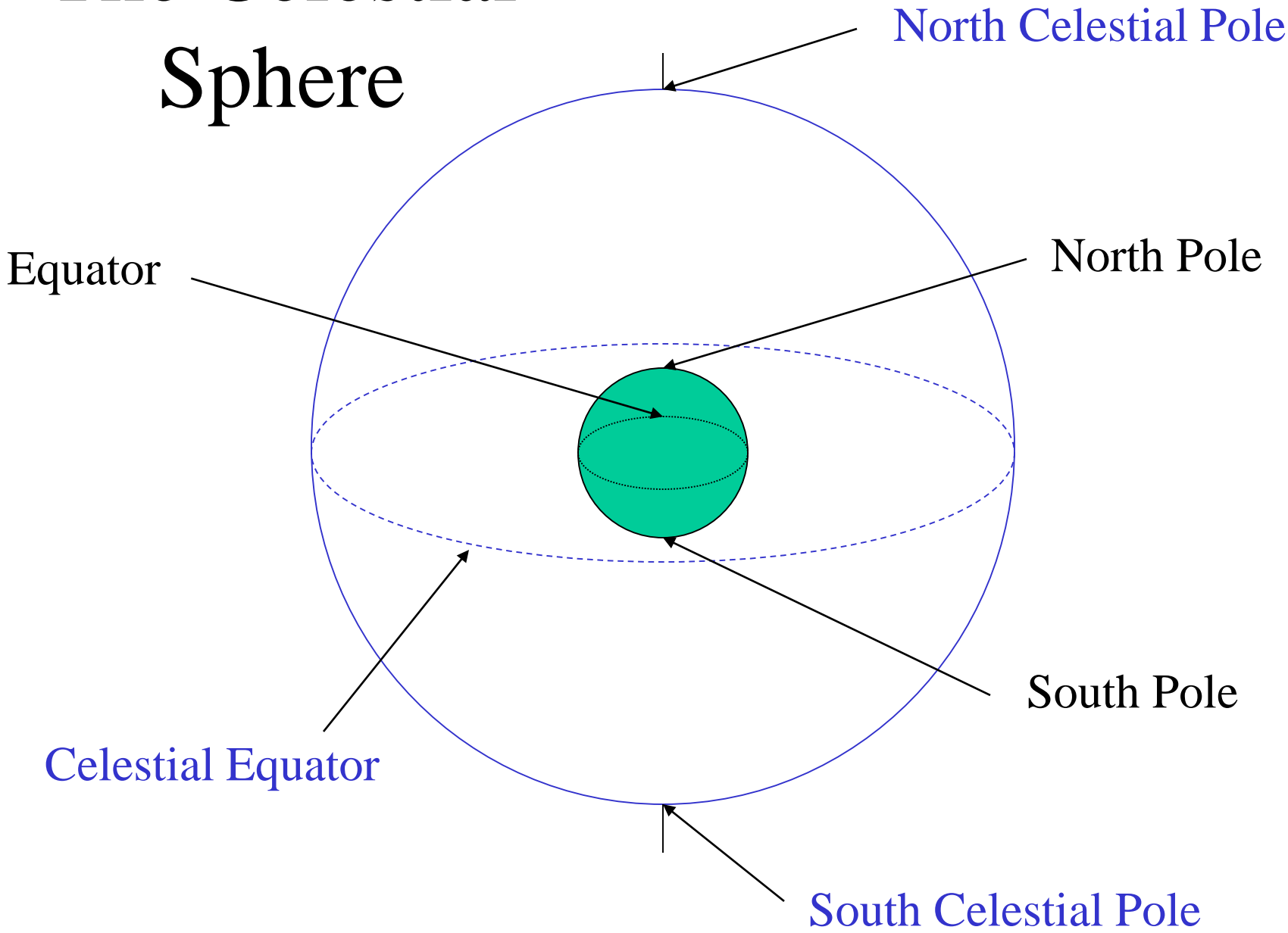
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The Celestial Sphere

- Need a coordinate system in the sky (like latitude and longitude).
- Locations of the stars, sun and planets can be specified on the celestial sphere.
- Stars appear fixed with respect to each other
- Sun and planets move on the sphere throughout the year.

The Celestial Sphere

★ ← Polaris, the North Star



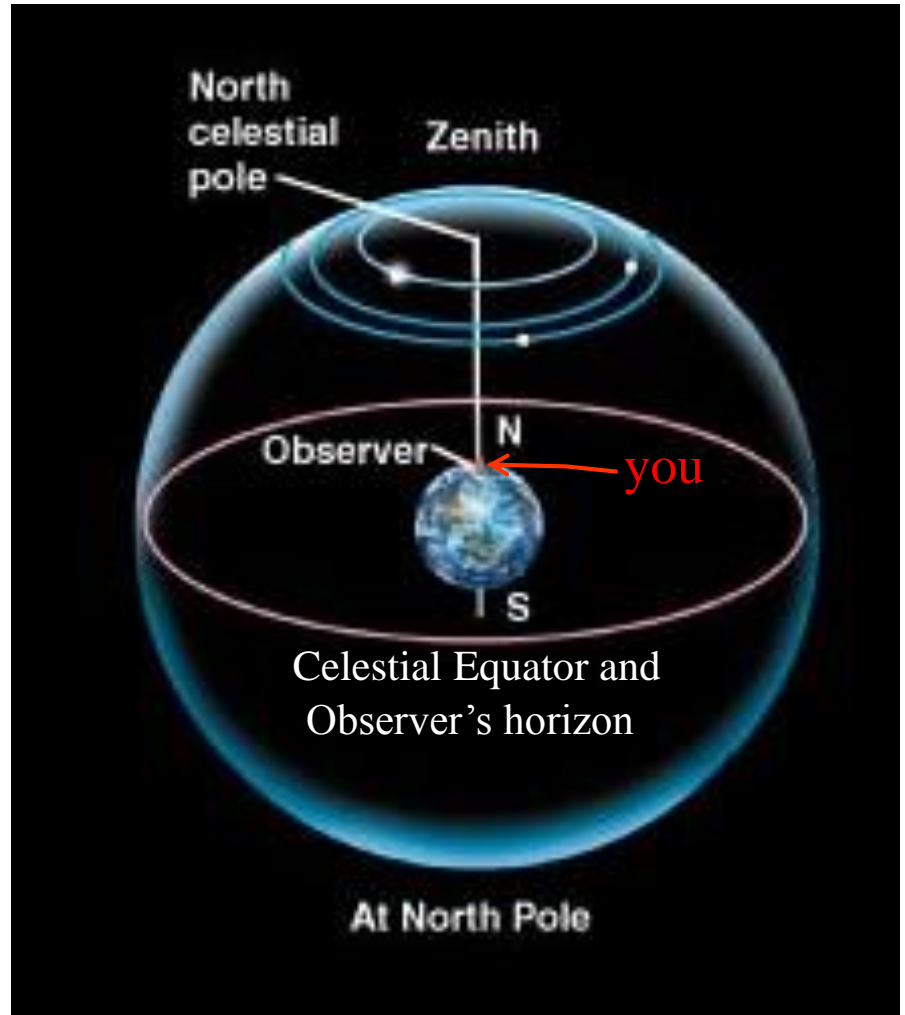
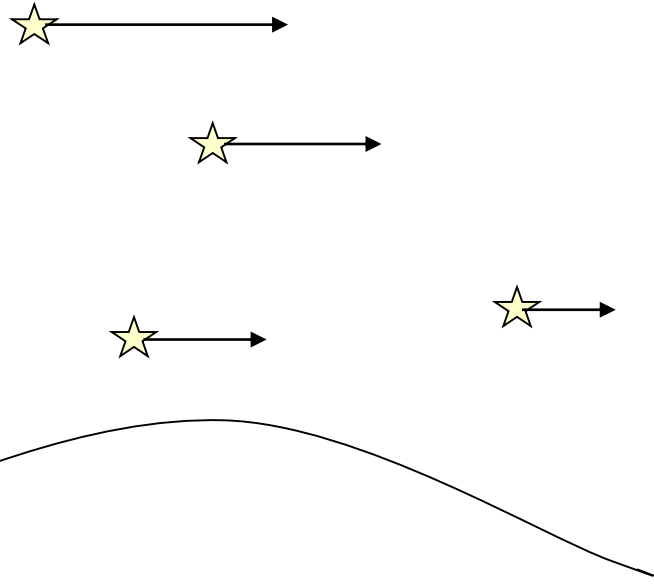
Daily Motions

- The Earth spins on its axis one time every day.
 - Causes day and night.
 - The Sun, Moon, and stars all move from **east to west** across the sky during the course of a day.
 - The North Star, Polaris, does not move. Its angle above the northern horizon is equal to the observer's latitude on the Earth's surface.
 - The stars that we can see depend on our latitude on Earth.

View from North Pole

Observers can only see stars that are North of the Celestial Equator.

The North Star is directly overhead

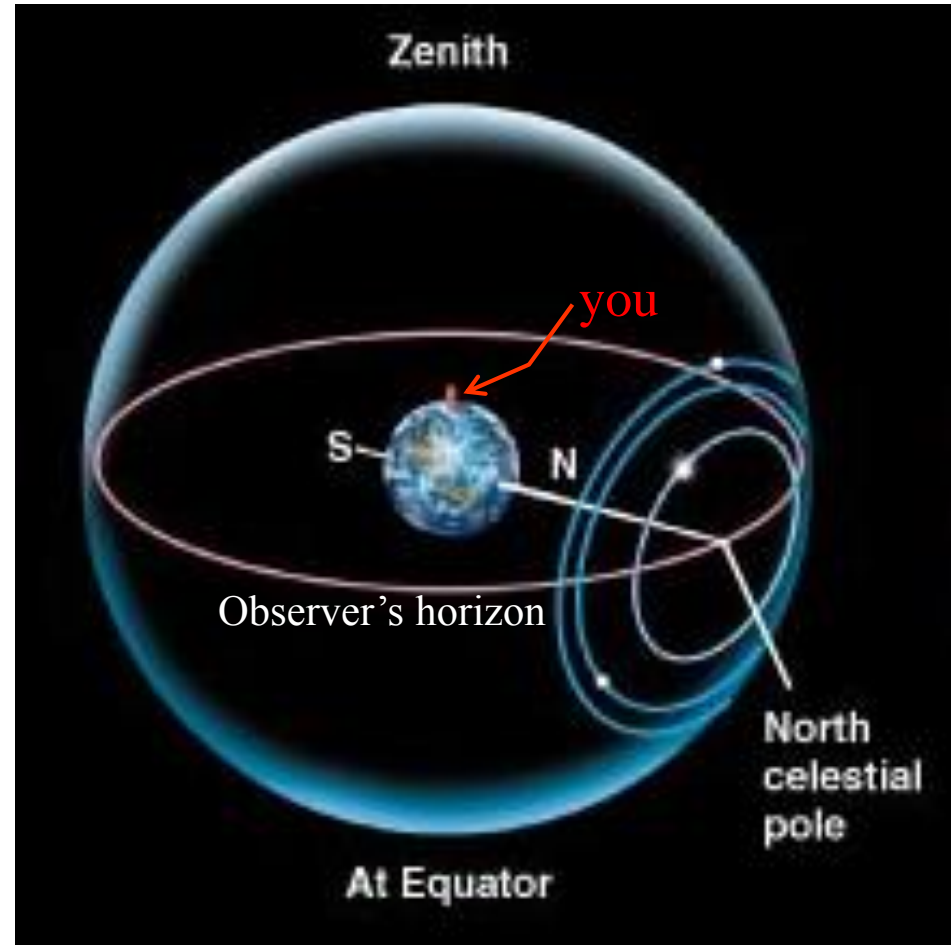
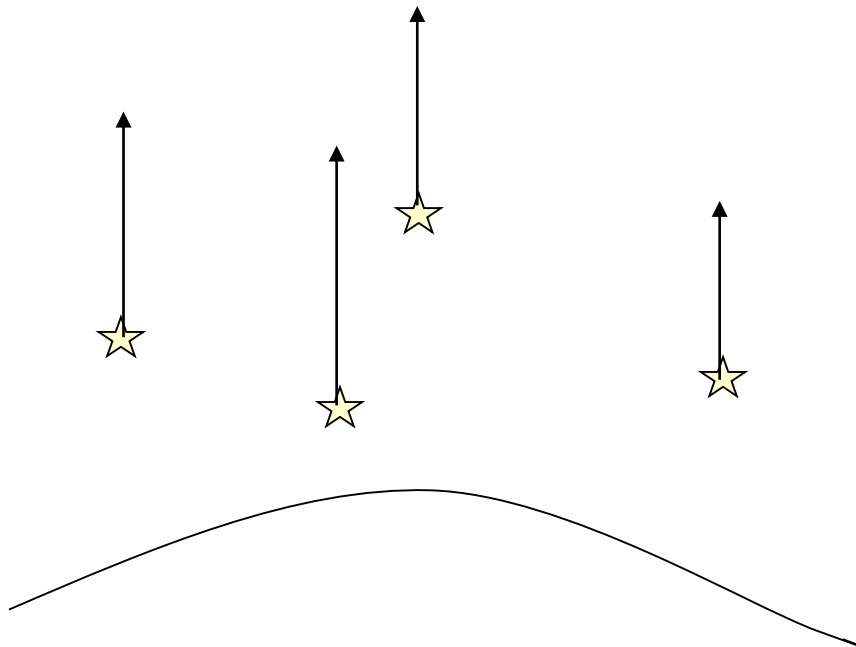


Stars will never rise or set (the stars are circumpolar). They appear to circle the North Star.

View from the Equator

Observers can see all of the stars during the course of a year.

The North and South Celestial Poles are on the horizon.

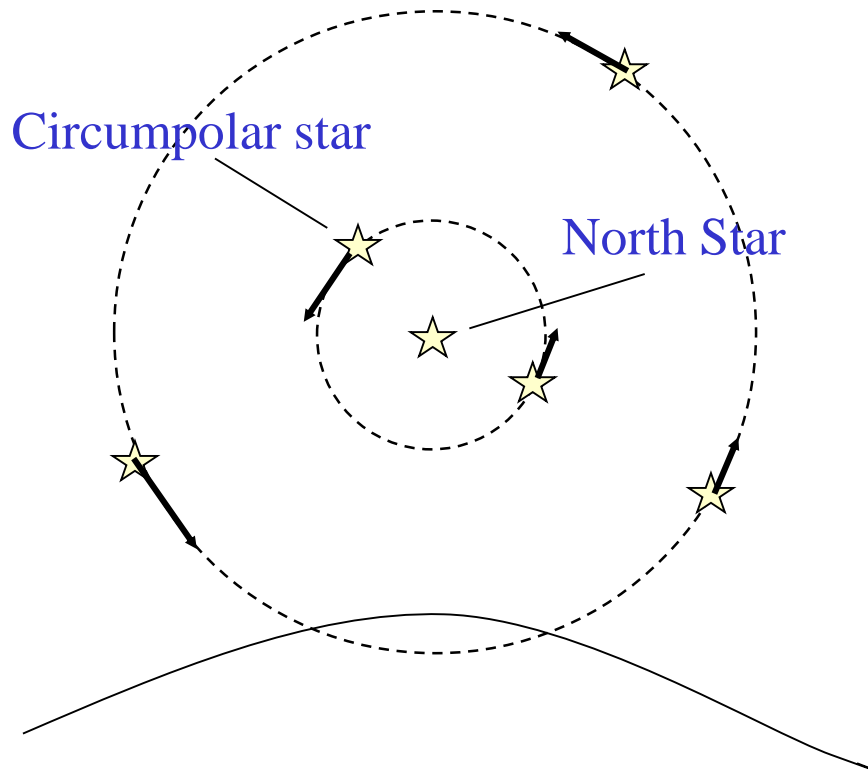


All stars appear to rise and set straight up from the horizon.

None are circumpolar.

View from Northern Hemisphere

We cannot see the most southern stars on the Celestial Sphere.



Some stars will rise and set. The most northern stars will never set (they are **circumpolar**).

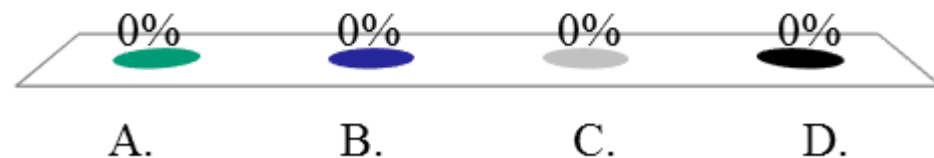
Star trails in the Northern Hemisphere



Motions of stars for part of a night. Center star is Polaris, the North Star. [Computer Animation](#)

Where must you stand in order to see the south celestial pole on your horizon?

- A. At the south pole
- B. At the north pole
- C. On the equator
- D. At 66.5 degrees south latitude



**Response
Counter**

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