

Astronomy 100

Tuesday, Thursday 2:30 - 3:45 pm

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It looks like everybody who wants to get
in the class can get in the class

- If you have given me your name and ID number, I have forwarded it to the Astronomy secretary
- You then need to add yourself to the class in **SPIRE**

Course Material

- **Course Website:** www.xanga.com/astronomy100
- **Textbook:** Stars, Galaxies, and Cosmology, The Cosmic Perspective, 3rd Edition by Bennett, Donahue, Schneider, and Voit
- **PRS:** You need to have an InterWrite PRS transmitter.

Grading

- 4 in-class exams and a cumulative final
- I will drop the lowest test score
- The average of the 4 highest scores will be 80% of your grade
- 10% of your grade will be your homework score
- 10% of your grade will be from PRS

1st HW assignment

- You need to find an article on astronomy (web, newspaper, magazine)
- Print it, copy it, or cut it out
- Read it
- Write one paragraph on why it is important or why you found it interesting
- Staple them together
- Write your name and ID number on front page
- Write the first three letters of your last name in big letters on front page
- Hand it in during next class
- You will then get 1 Homework credit!!

OWL website is now running

- <http://owl.oit.umass.edu>
- Go to Astronomy
- LOGIN: ID number
- Password: Last Name
- To register PRS: Go to Clicker registraion
- If you were not originally registered for the course, you will have to go to follow instructions on the site to be able to log on

Tutorial (2nd HW assignment)

- Tutorial to learn how to do HW in OWL
- Needs to be done by 11:59 pm on Feb. 3
- You need to get perfect score to get 1 HW credit!
- No partial credit

What did we learn last time?

- Universe is big
- We will use the metric system
- We will use scientific notation
- We are moving through space

Constellations

What are they?

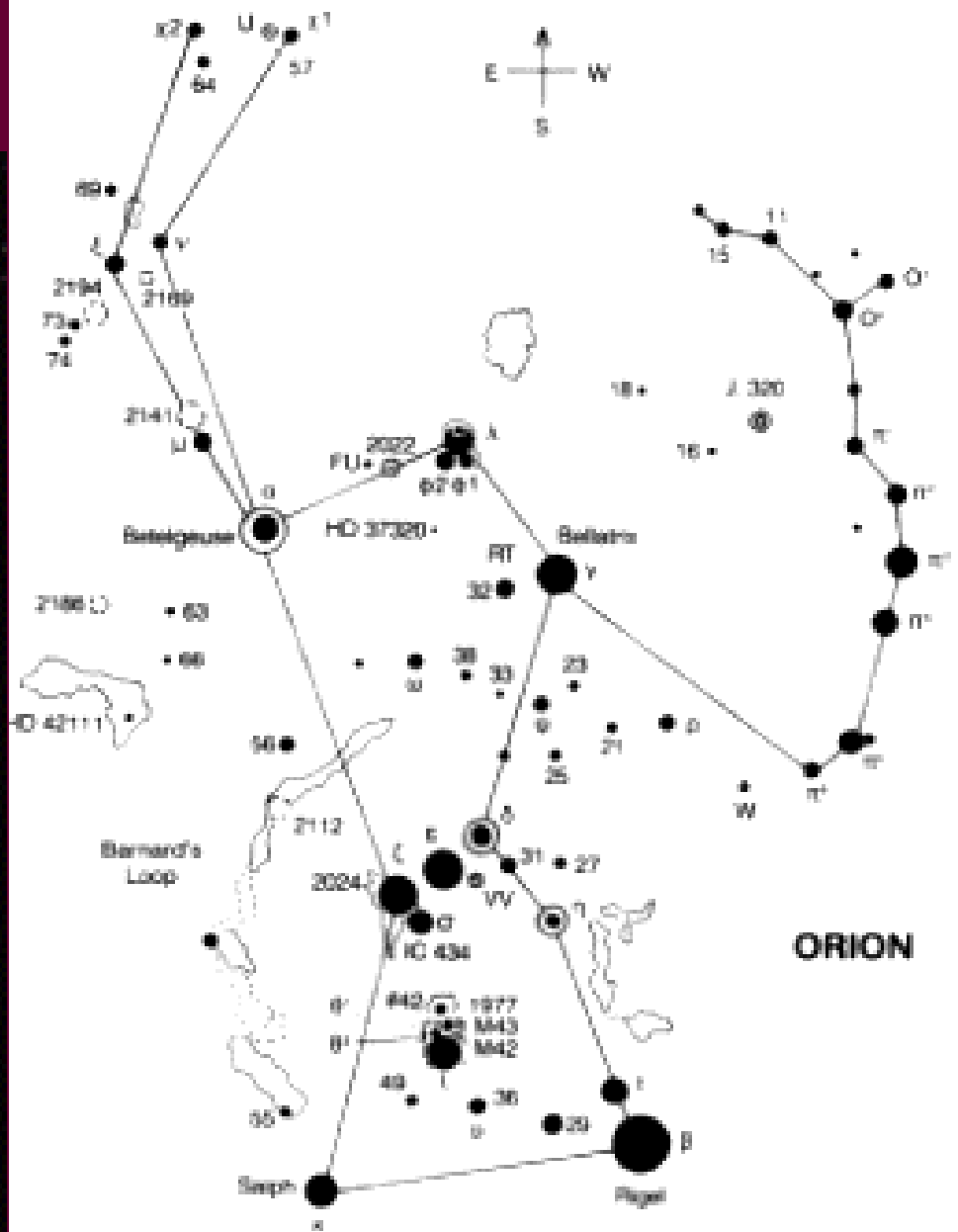
Constellations

- People refer to constellations as a pattern of stars
- Astronomers refer to constellations as specific regions of the sky
- In 1928, the IAU (International Astronomical Union) decided there were 88 constellations
- But many of the constellation names go back thousands of years

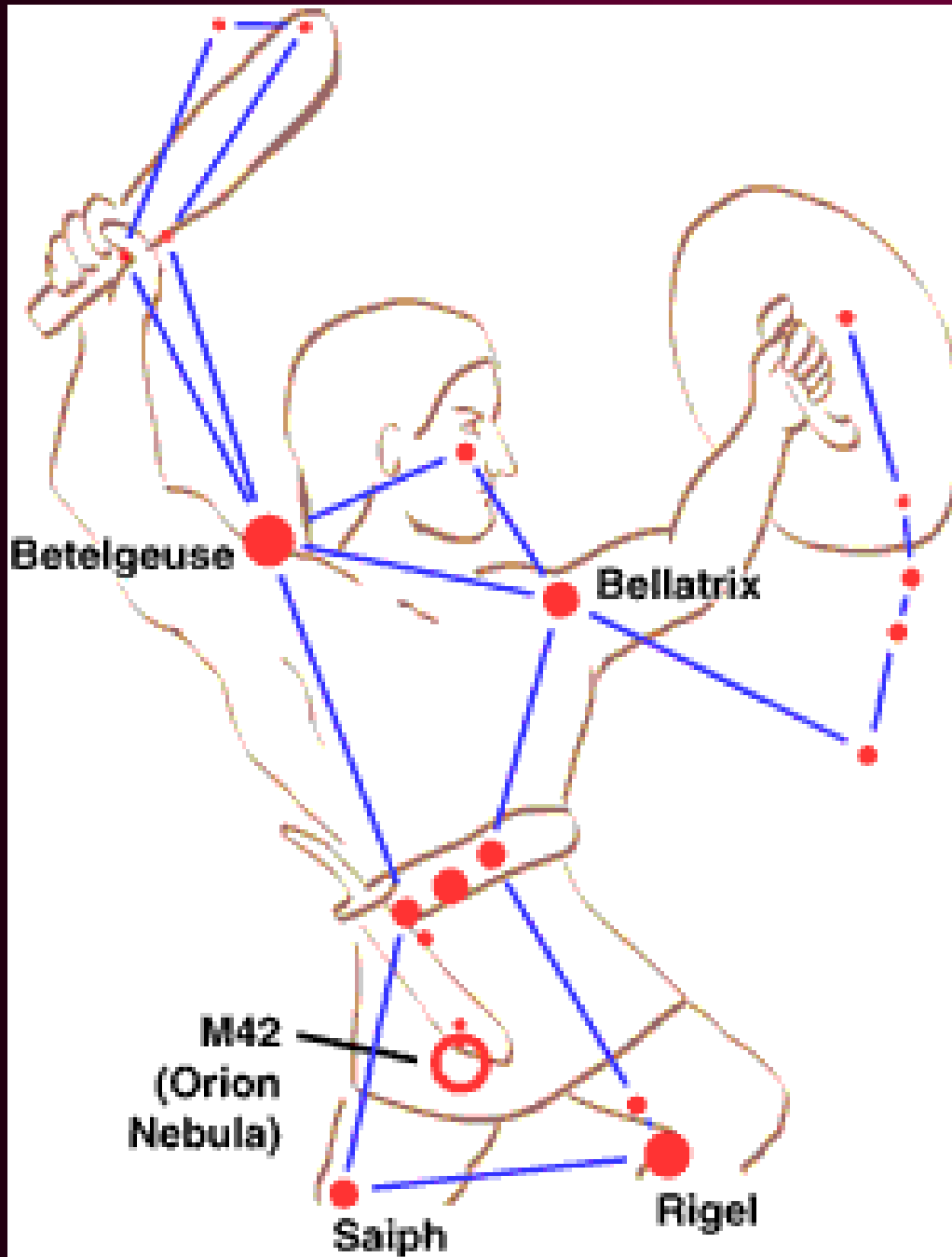


What is this
constellation?

Orion



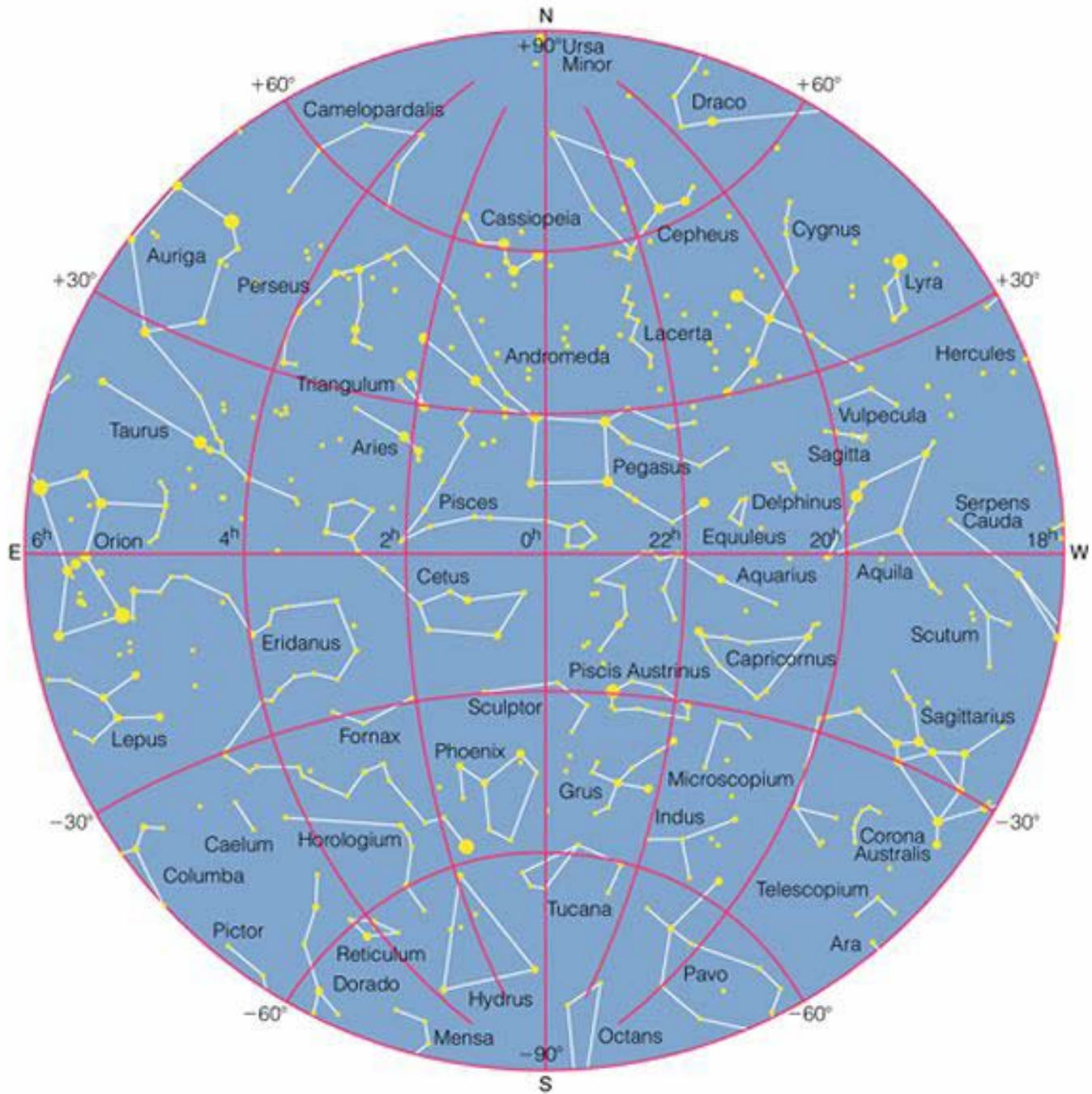
Bigger the star, the brighter it is

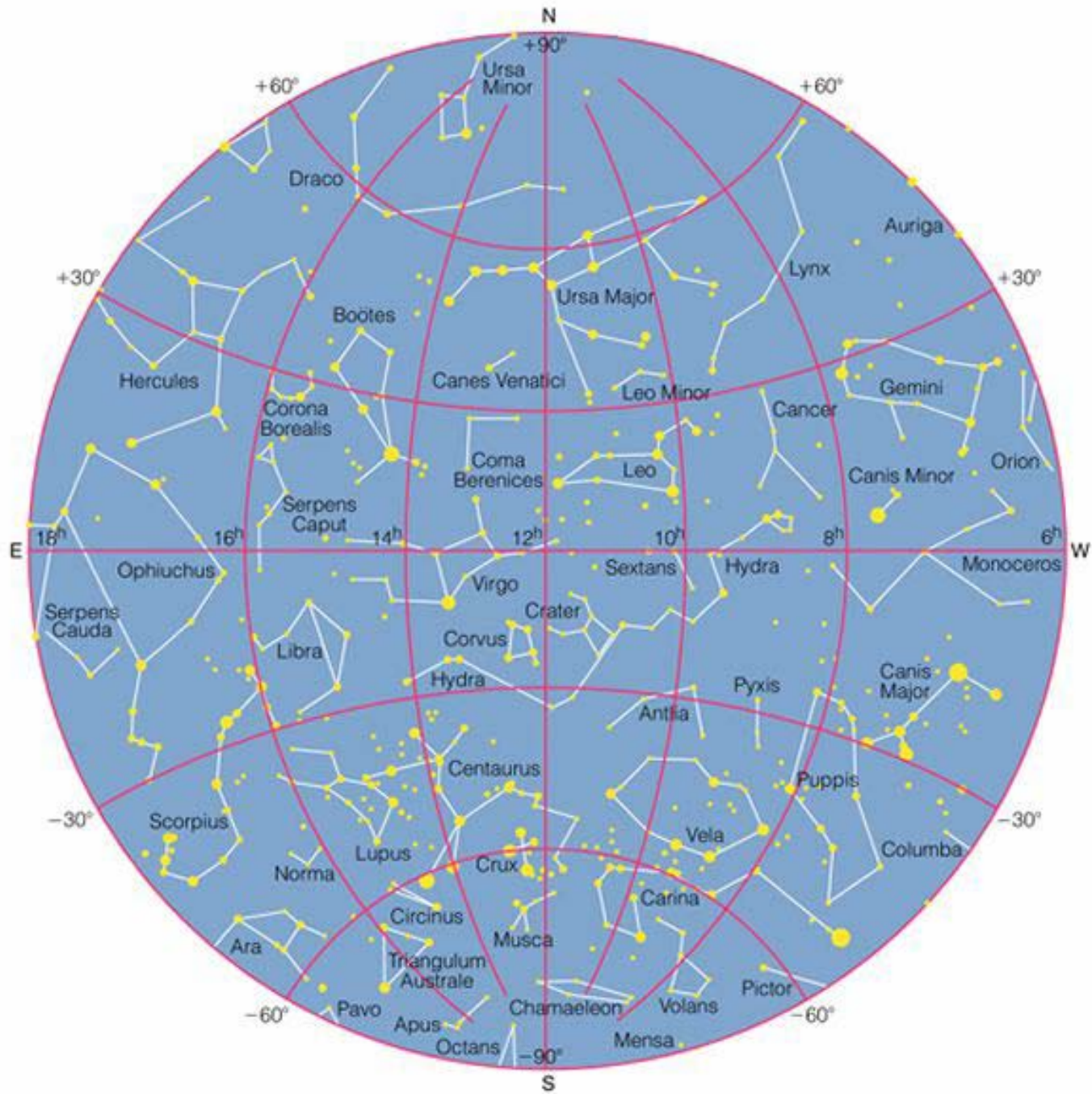


Orion was the son of the god of the sea, Poseidon and a great hunter. One story is that he made an enemy of Hera who sent a scorpion to sting him.

Orion was restored to health by Ophiuchus, the first doctor of medicine.

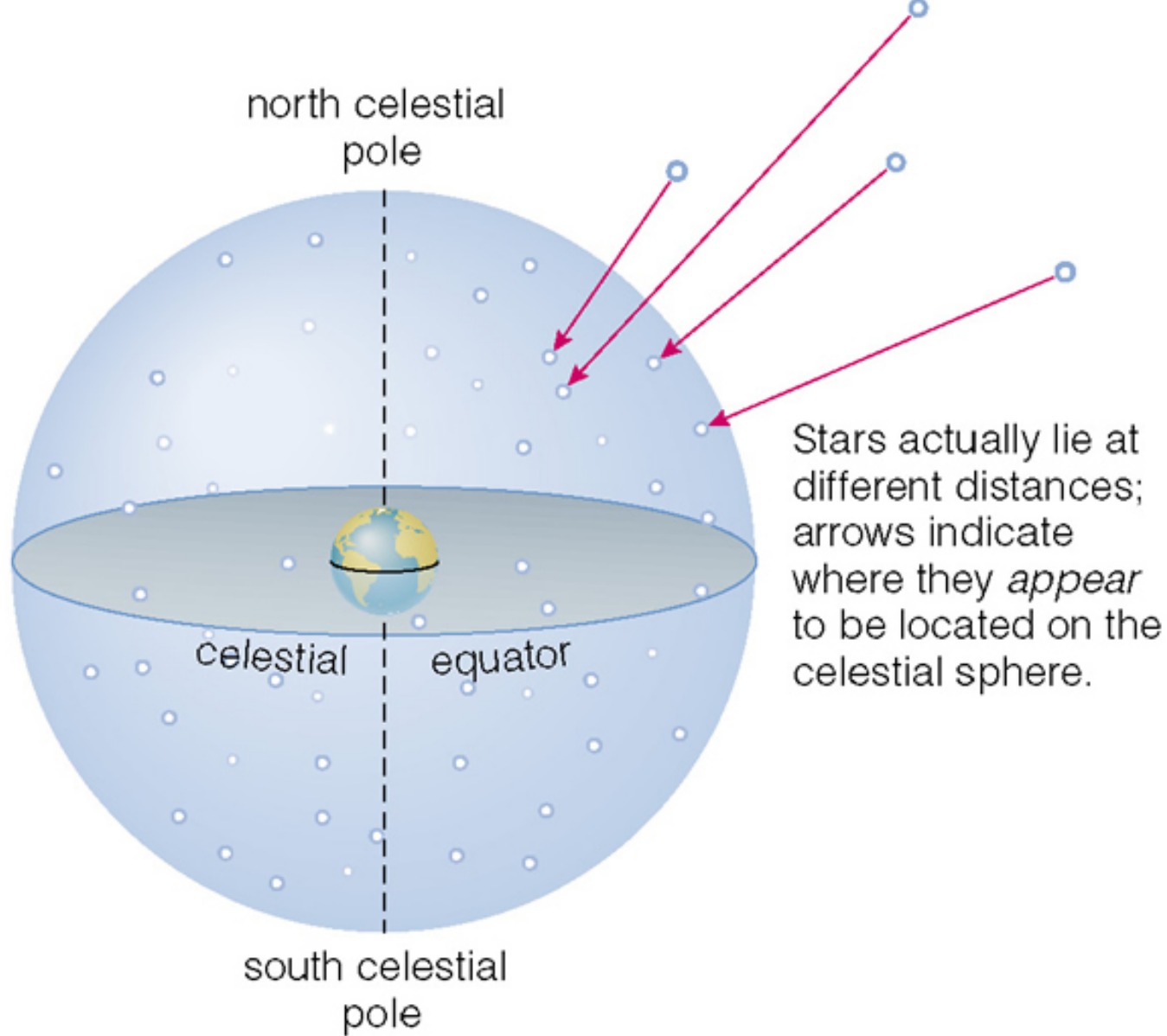
Another story is that Artemis was tricked by Apollo to shoot an arrow at Orion. When he died, Poseidon asked Zeus to put him among the stars.





What are the constellations named after

- 14 men and women
- 9 birds
- 2 insects
- 19 land animals
- 10 water creatures
- 2 centaurs
- one head of hair
- a serpent
- a dragon
- a flying horse
- a river
- 29 inanimate objects

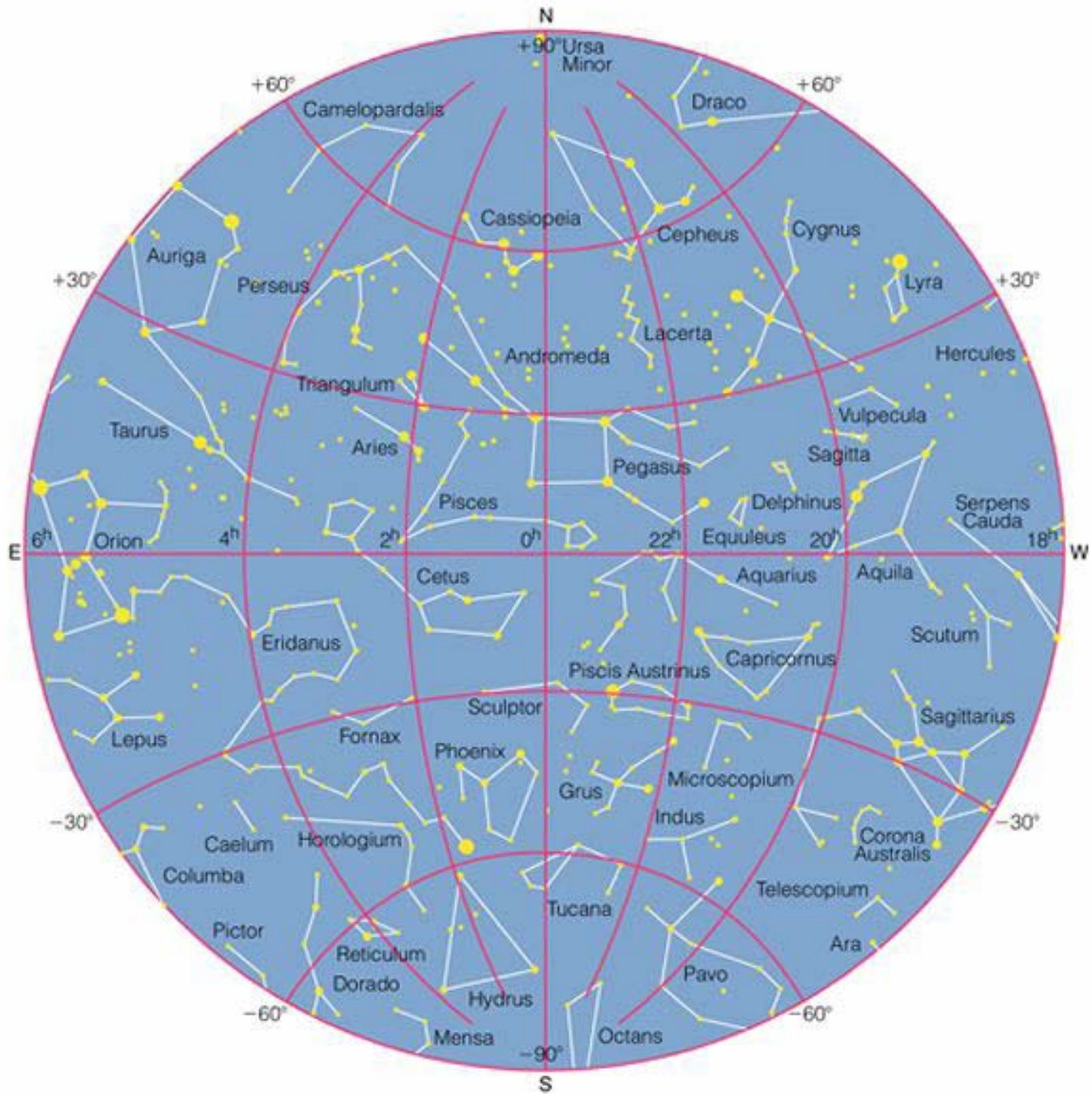


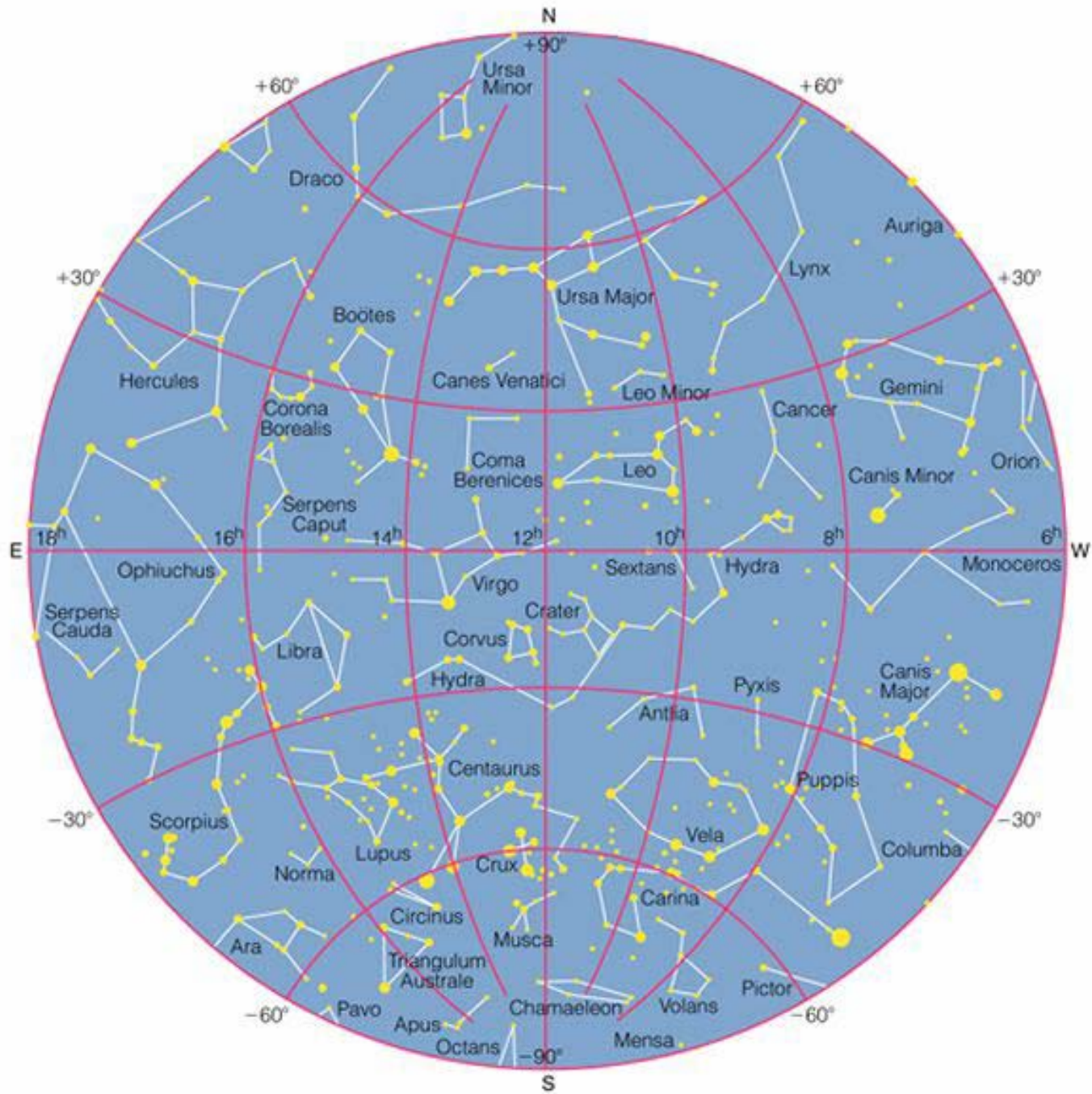
Celestial Sphere

Stars actually lie at different distances; arrows indicate where they *appear* to be located on the celestial sphere.

Zodiac

- The **zodiac** is an imaginary belt in the heavens extending approximately 8 degrees on either side of the Sun's apparent path (the ecliptic), that includes the apparent paths of the Moon and the planets Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune.





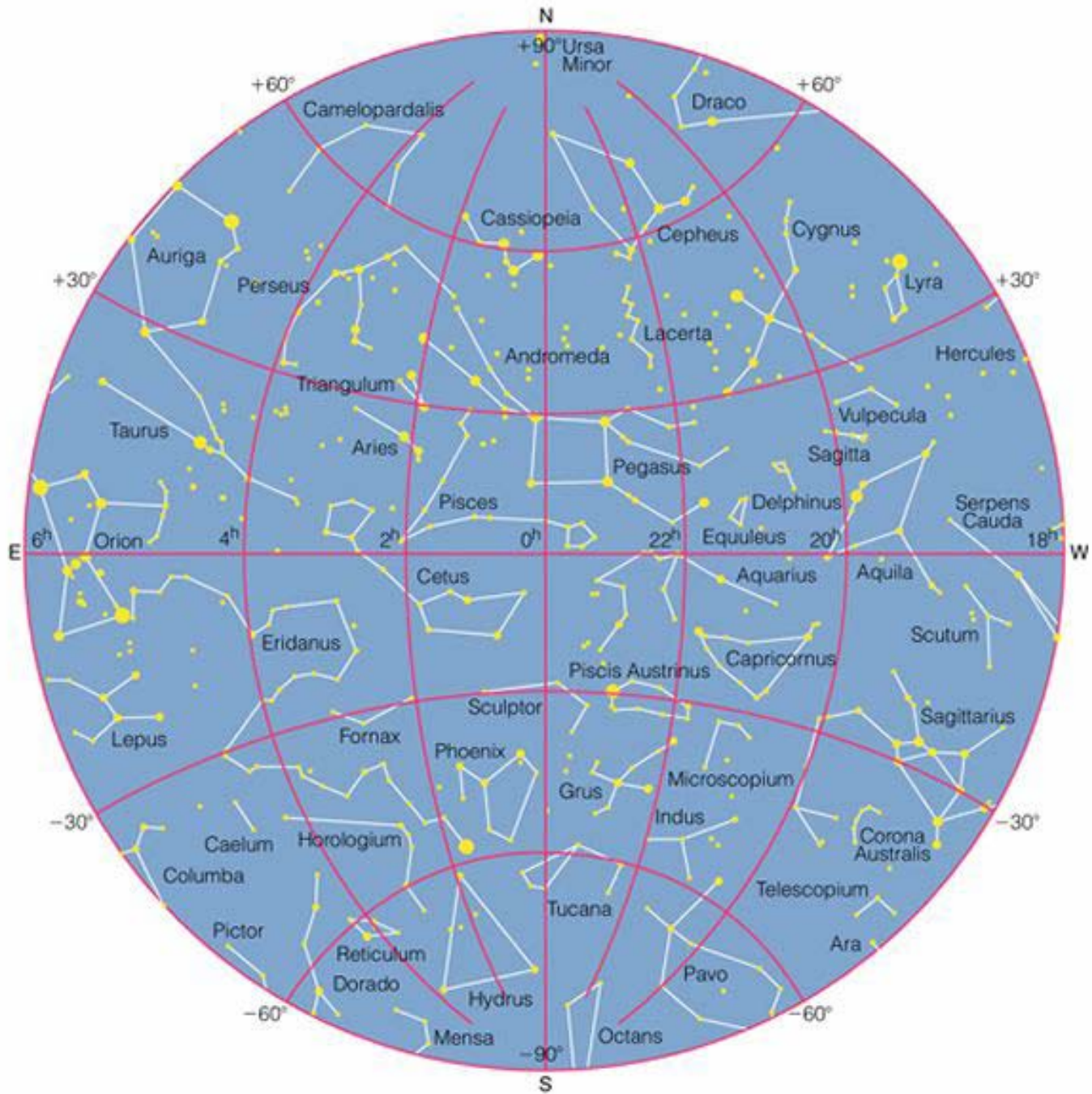
Question:

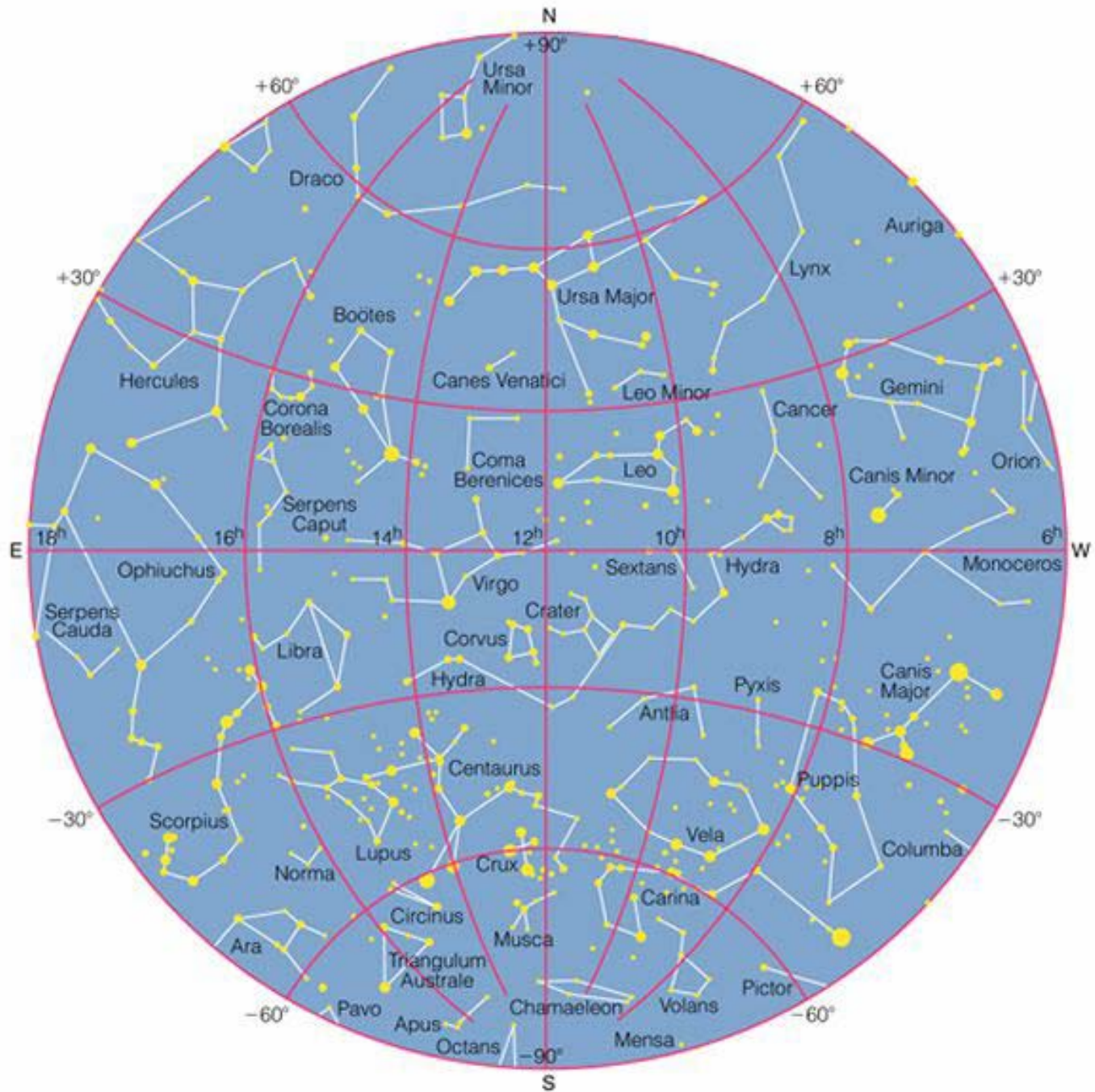
- Why do all the planets seem to follow the same path?

Answer:

- The planets, the Earth, and the Sun all tend to fall in the same plane called the **ecliptic**





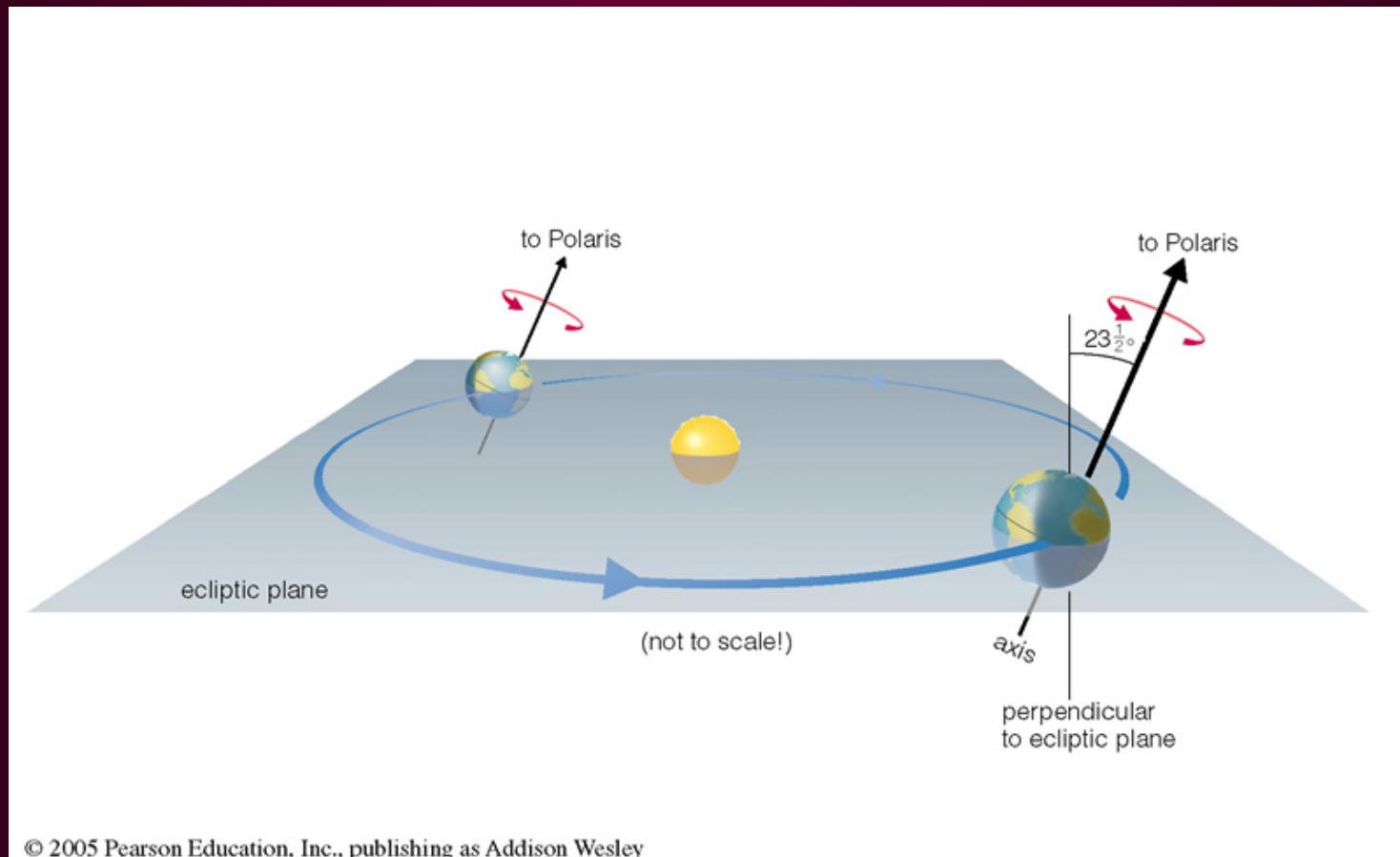


Question:

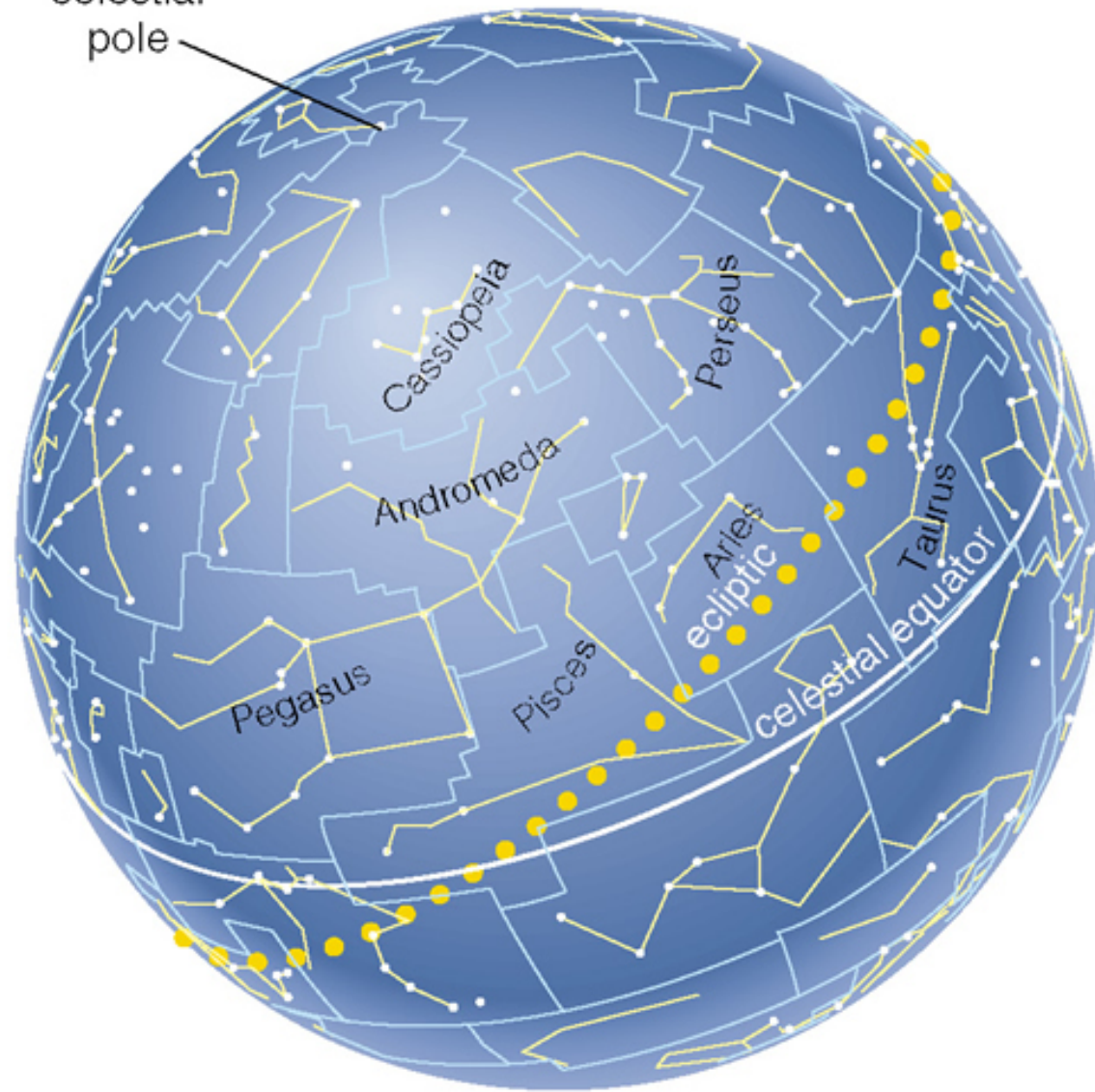
- Why is the path of the constellations on the zodiac not on the celestial equator?

Answer:

- The rotation axis of the Earth is inclined with respect to the ecliptic



north
celestial
pole



Motion of the Sun through the Zodiac

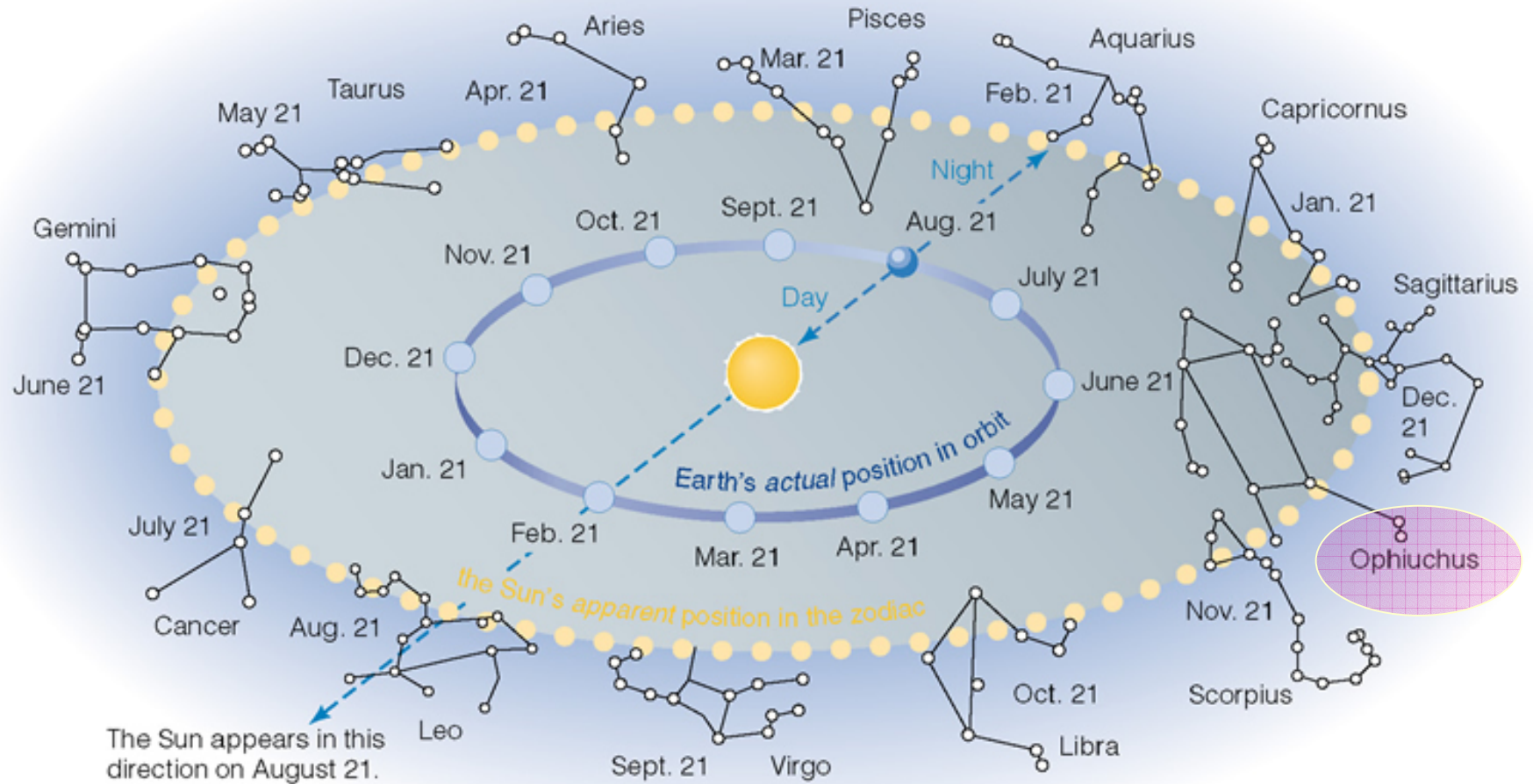
Show movie

Question:

- How can we know that the sun is travelling along the zodiac since you can't see stars during the day?

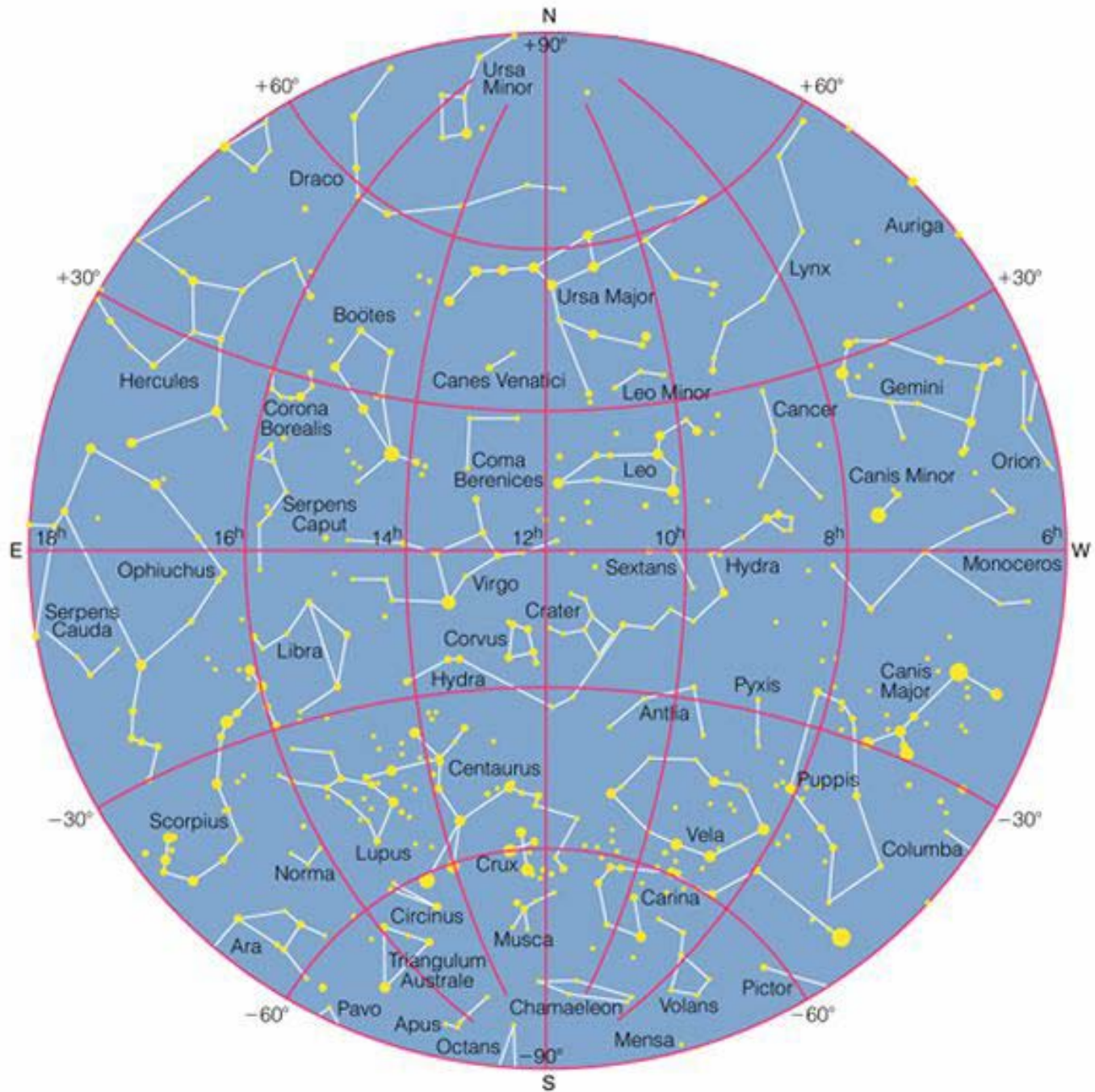
Answer:

- One can however figure out where the sun is on the zodiac by noting which is the last constellation of the zodiac to rise ahead of the Sun or the first to set after it.



Now there are 13 constellations in the zodiac

- Why?
- Originally the zodiac was divided into 12 equally spaced “signs”
- However, some constellations are big, some are small
- When the astronomers redid the boundaries, a 13th constellation was added to the zodiac

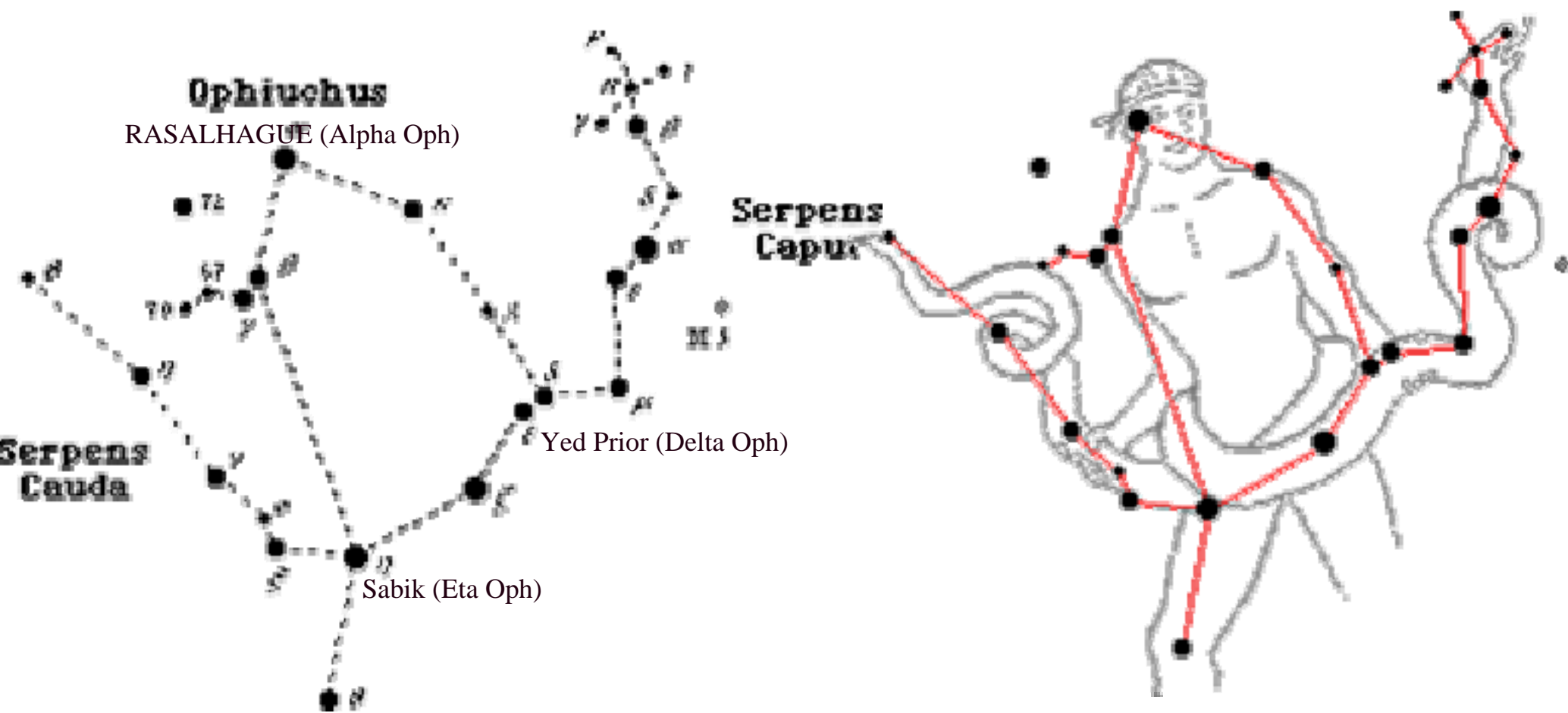


3rd HW assignment

- I want you to find information on the constellation that represents your zodiacal sign
- I want you to hand in a picture of the constellation (can be hand drawn) labeled with three star names and a short paragraph on what the constellation is named after
- Write your name and ID number on front page
- Write the first three letters of your last name in big letters on front page
- Hand it in during next class
- You will then get 1 Homework credit!!

For example, Ophiuchus

- Major stars:
- RASALHAGUE (Alpha Oph)
- Cebalrai (Beta Oph)
- Yed Prior (Delta Oph)
- Yed Posterior (Epsilon Oph)
- Sabik (Eta Oph)
- Marfic (Lambda Oph)



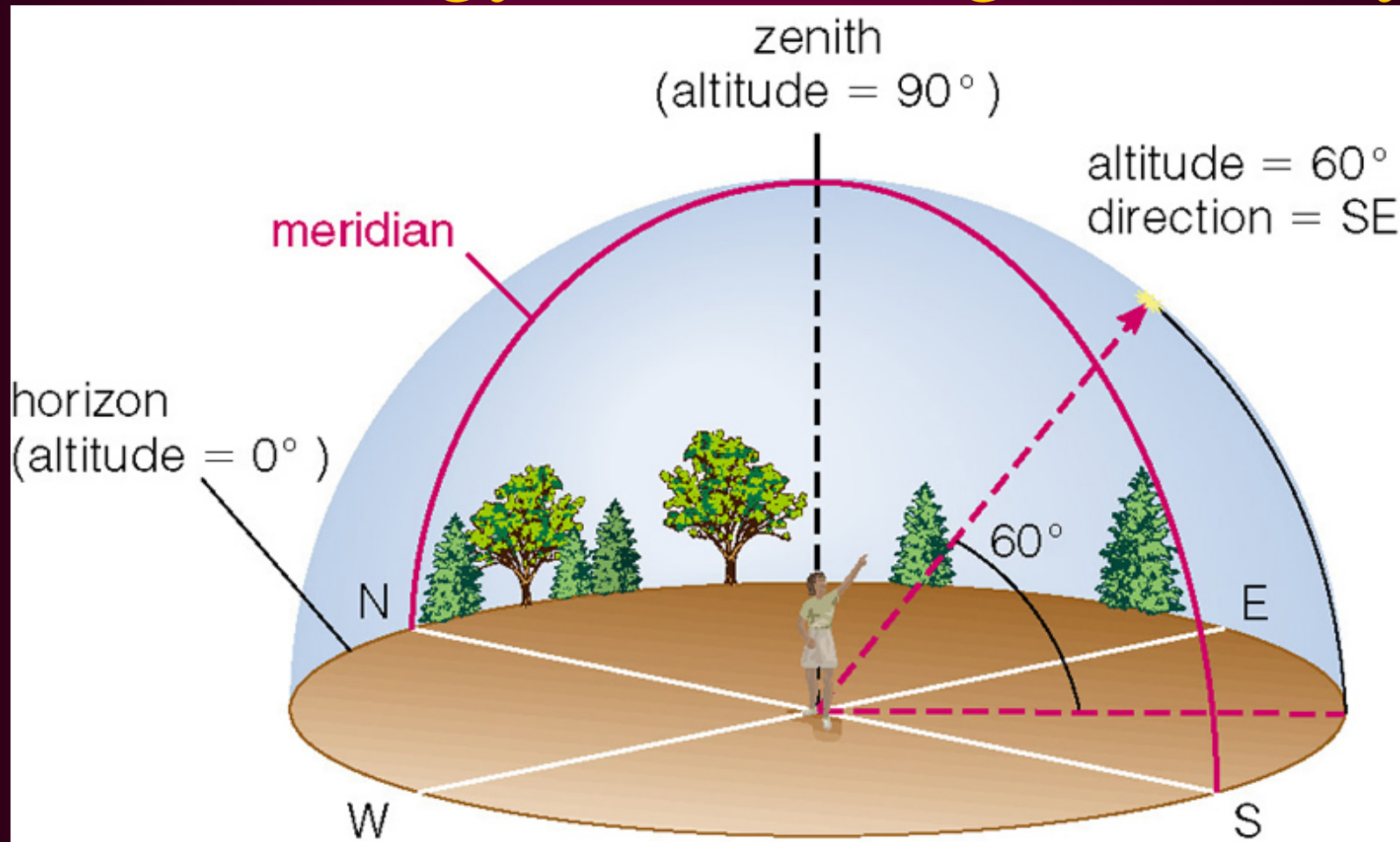
What to write

- In Greek myth, Ophiuchus represents the god of medicine, Asclepius. Asclepius was the son of Apollo and was taught by Chiron, the Centaur. He learned how to bring people back from the dead, which worried Hades. The god of the underworld asked his brother Zeus to kill the medicine god. Zeus did strike him dead, but then put the figure of Asclepius in the sky to honor him.

Where to look for information

- Encyclopedia
- Google.com
- Wikipedia.com
- Astronomy book at the library

Terminology for looking at the sky



Finding Celestial Poles

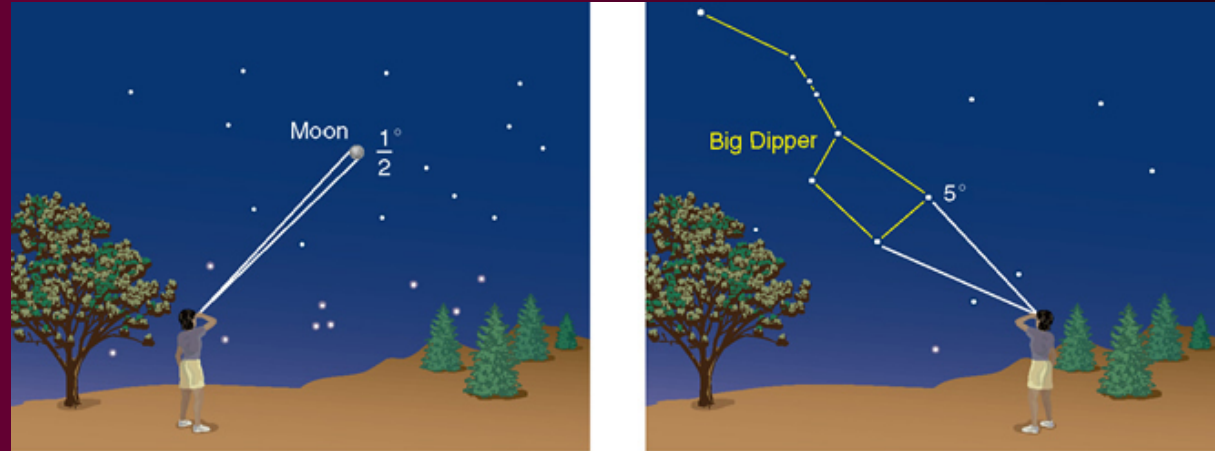
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Celestial Poles

- The altitude of the celestial pole is equal to your latitude
- If the altitude of the celestial pole is 50 degrees, you latitude is 50 degrees

Angular size

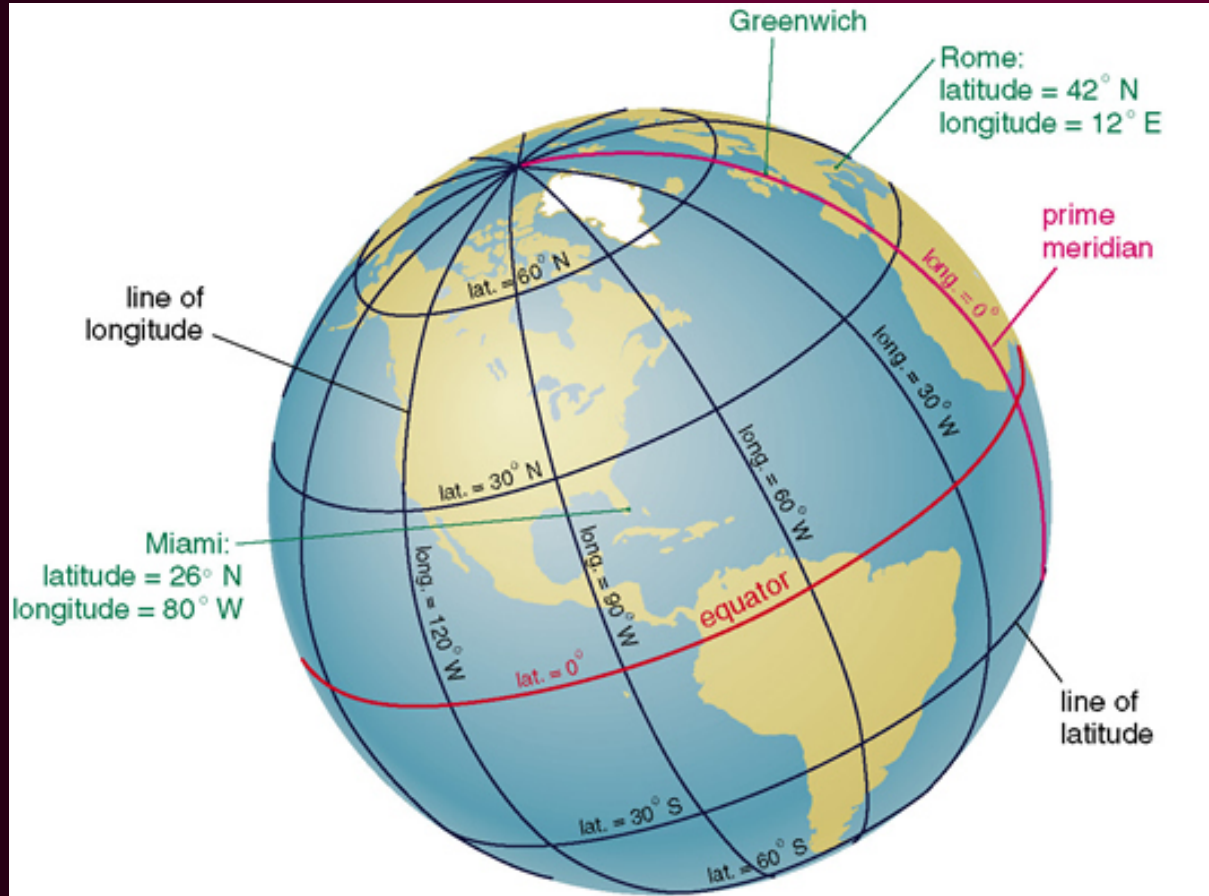
- We measure distances in the sky using angles
- 180° in the observable sky



More precise distances

- 1 degree = 60 arcminutes (symbol $'$)
- 1 arcminute = 60 arcseconds (symbol $''$)
- So something that is 2 degrees, 10 arcminutes, 22 arcseconds would be written as
- $2^{\circ} 10' 22''$

Star positions change versus latitude





Circumpolar Stars

- Stars near the north celestial pole remain above the horizon and circle counterclockwise
- In the southern hemisphere, the stars circle clockwise
- In the Northern hemisphere, you never see the southern celestial pole and stars near it
- In the Southern hemisphere, you never see the northern celestial pole and stars near it