

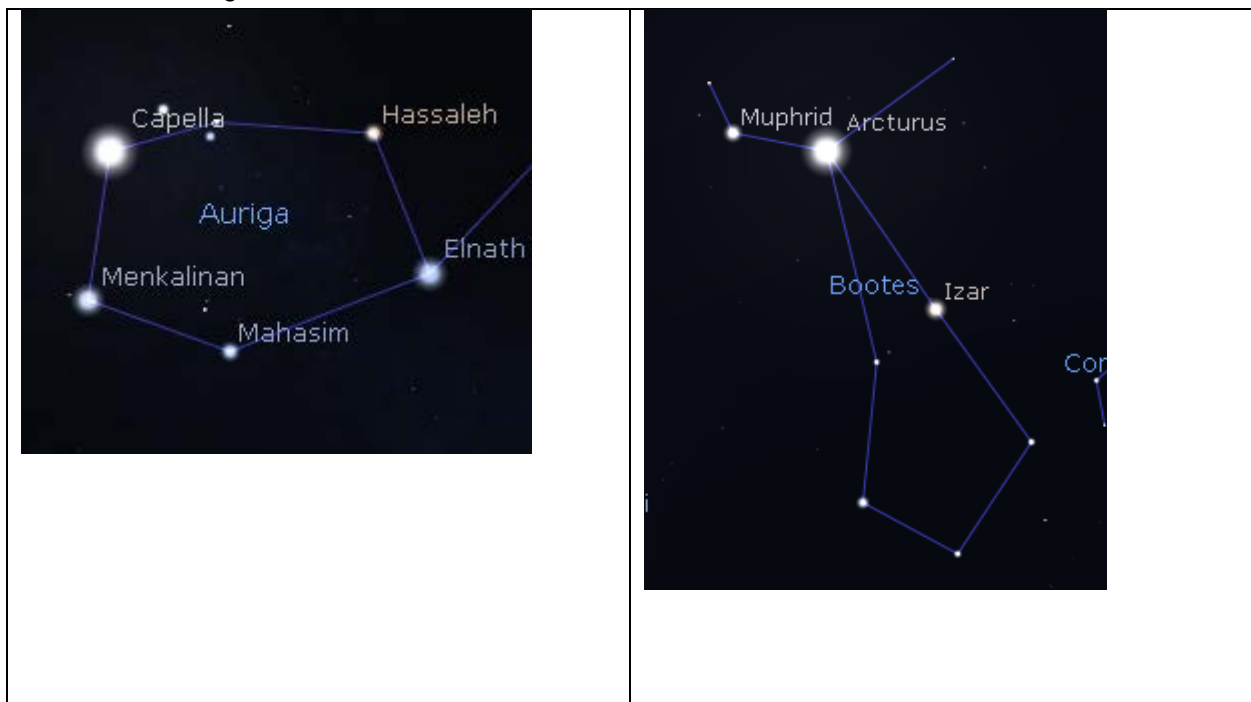
## Planetarium Based Laboratory Activity Constellations

**Instructions: You can work in a group of 2 or 3 students.**

### Part 1: Using the Charts in the Planetarium

Table 1 has a list of constellations showing its stick figure. Your Instructor will show you the night sky for each season. Determine which season is best for viewing each of the constellations in the evening from Stephenville, TX, between 6 PM and midnight. Record the season for each constellation in Table 1, by writing down Sp for spring, Su for summer, F for fall, W for winter that start on March 21, June 21, September 21, and December 21, respectively, the general direction to look for, like North West, South etc. Also note down the name of the brightest star in that constellation. Keep in mind the orientation of the stick figure might be different in the planetarium for what you see in the table. Also, the exact shape may not match but should be close. Also read the questions so you can collect the information needed to answer those questions.

**Table 1** Source: Images are made in Stellarium



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

Name

Class

Section

 <p>Cepheus Alderamin</p>	 <p>Coma Berenices Procyon</p>
 <p>Corona Borealis Alphecca</p>	 <p>Cygnus Deneb Polaris Polaris II</p>
 <p>Gemini Castor Pollux Alhena Tejat</p>	 <p>Hercules Vega ζ Her</p>



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

Name

Class

Section



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

Name

Class

Section

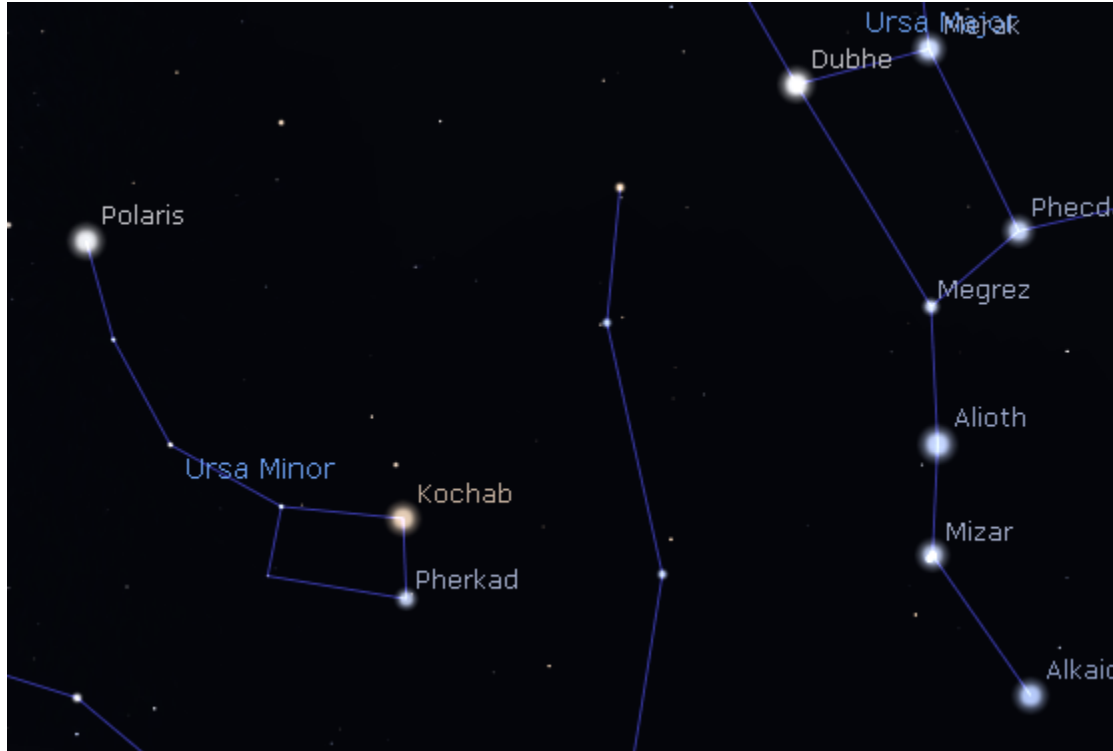


This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

## Part 2 Observing the Milky Way and Ursa Majoris

The Instructor will now show you the four seasons again. Look at how the Milky way appears and the orientation of Ursa Majoris (big dipper) with respect to the star Polaris.

Source: Image is made form Stellarium



### Questions:

1. Is the Milky Way prominent in each season?
2. From the orientation of Ursa Major over the course of a year, what can you infer as to the rotation of the sky around earth?



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

### Part 3 Asterisms

Asterism is a pattern of Stars that may be part of a constellation and have a common historical name. For example, Big Dipper is part of the constellation Ursa Major and the pattern of stars forms shape of a spoon as shown above. The northern cross is part of the constellation Cygnus shown below (images are taken from various sources on the internet).



Source: Image is made from Stellarium

### Question

Your Instructor will show you the night sky for each season with star and constellation names turned on. One or more of these Asterisms given below in table 2 are visible in each season. Identify in which season each of these asterisms can be seen and state the general direction (North, South, North-West etc.) to look into the night sky to view that asterism.

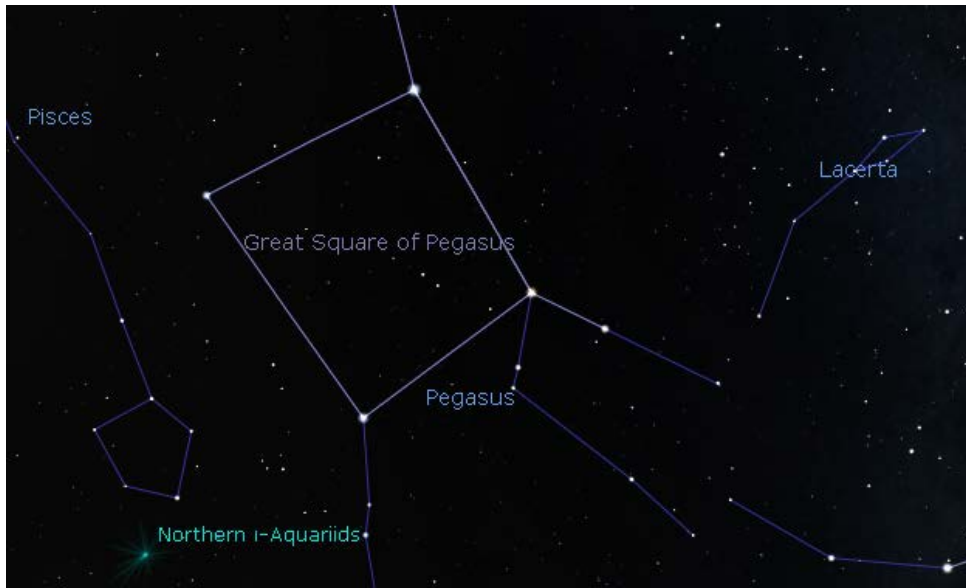


This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

Name

Class

Section



Source: Image is made from Stellarium



Source: Image is made from Stellarium



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

Name

Class

Section



Source: Image is made from Stellarium



Source: Image is made from Stellarium



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).





Source: Image is made from Stellarium



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

**Part 4 Star Rise**

The Instructor will show you the Meridian and the altitude circle in the planetarium dome. She/he will then show you a star on the Meridian and the date and time. Note its altitude and direction (in the planetarium the seats are facing south and the altitude is measured from 0 degrees starting at the bottom of the dome to 90 over your head), date and time. She/he will then show you the same star one day later on the Meridian.

Record your data here:

Day	Date	Time	Altitude
1			
2			

**Questions:**

1. Based on your data did the star rise earlier or later from previous day.
2. By how much in minutes.
3. At what time will this star be on the Meridian 3 days later?
4. If you chose a different star in another part of the night sky, would you find the same results.
5. It takes 12 hours for a star to rise in the east and set in the west and 6 hours for it to be on the Meridian after rising. Knowing the date and time for the star to be on the Meridian today, when was it rising in the east. When will it set.



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

### Part 5 Magnitude and Brightness

The charts below show the magnitude of stars in big dipper (Ursa Major) and little dipper (Ursa Minor). Answer the following questions. Assume that the lower the number the brighter the star is and the astronomical names ( $\alpha$ ,  $\beta$ ,  $\gamma$  etc.) also follow the same sequence.



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).



Source: Images made from Stellarium and modified by Shaukat Goderya

1. What is the astronomical name of the first and second brightest stars in big dipper?

2. What are the magnitudes of alpha UMi and gamma UMi?

3. How much brighter is alpha UMi compared to gamma UMi? Hint  $\frac{I_A}{I_B} = (2.512)^{(m_B - m_A)}$



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).