

The daily motion of the sky

Astronomy 101
Syracuse University, Fall 2019
Walter Freeman

September 1, 2020

Some announcements

- People just now joining the class: everything you need is on the course website, walterfreeman.github.io/ast101/
- Labs start next week
- First project posted:
 - See the course website for details
 - Problems with your group? Email Suman at skundu@syr.edu
- If you have a Wednesday lab, you'll go this Saturday
- I am still behind on email (sorry!)

Opportunities for me to help you

- AST101 help sessions: tomorrow 9:30-11 AM (Zoom) and 11 AM-12:30 PM (steps of Hendricks Chapel)
- Post questions to Piazza; we watch this always
- If you want to meet with a coach on Zoom, post a request on Piazza and someone might be able to fire up a Zoom room and help you right then

Opportunities for you to help me

I'm overwhelmed by email right now. I will go as fast as I can through it, but there is so much. You can help me:

- If you have an issue with your *groups*, email Suman at skundu@syr.edu. Make sure you give him all the information he needs to fix your problem:
 - What time you want to go to lab
 - If there are people at that time you want to be in a group with
 - Whether you want to do lab in person or online

If you didn't fill out the lab time survey, you weren't assigned a group and aren't on the list for Project 1. This means that you will need to:

- Write to Suman with the above information
- If he is able to assign you to a group this week, then do Project 1 with them
- If he is not able to assign you to a group this week, then you'll make up Project 1 next week

It is possible that some groups will shift around a bit this week as the last people contact Suman with their info. Your groups will be completely set next week.

Opportunities for you to help me

I'm overwhelmed by email right now. I will go as fast as I can through it, but there is so much. You can help me:

If you have a question, especially one other people can help with, consider posting it to Piazza. That way you will get a quicker response and other people can benefit.

If you send me email, please use a subject line that tells me what it is about and what you are asking me to help with. Don't put:

- "Astronomy 101" (that doesn't help)
- "Lab" or "Lab Group"
- Your name (I see that anyway)

This week we will look at...

Today: consequences of the Earth's **rotation**:

- Review the celestial-sphere model from last time
- Look in more detail at its consequences

Thursday: consequences of the Earth's **revolution**:

- What about the Sun?
- What causes the seasons?
- What does the Sun do to the Earth?

The celestial sphere model: summary

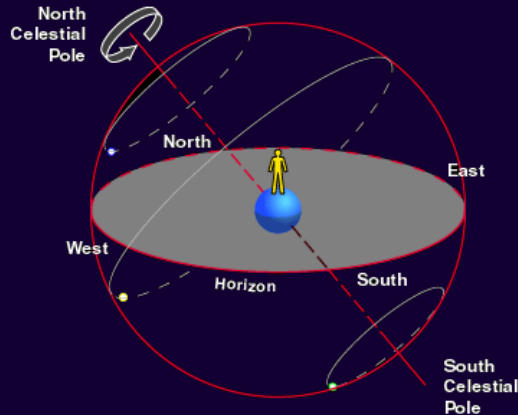
Let's fire up Stellarium and remind ourselves what we saw last time.

The celestial sphere model: summary

- We can pretend that everything on the sky is attached to a sphere that rotates around us.
- The axis of the sphere runs from the North Celestial Pole to the South Celestial Pole.
- This is the same as the rotation axis of the Earth:
 - The NCP and North Star are above the North Pole
 - The SCP and South Star (if there was one) would be “below“ the South Pole
- The sphere rotates counterclockwise, while looking at the NCP

Summary

- We can treat the stars as all rotating together, on an invisible sphere far away
- The axis of rotation is the same as the Earth's, and it rotates once per day
- Only half of the sphere is visible, because the Earth is in the way



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What do things look like from Syracuse?

- Are there stars we can always see?
- Are there stars that we can *never* see?
- When a star rises in the East, where does it go after that?
 - Straight up?
 - North and up?
 - South and up?

Drawing diagrams

How do things look from different places on Earth? Let's draw some diagrams and figure it out. (We can't always cheat with a GoPro!)

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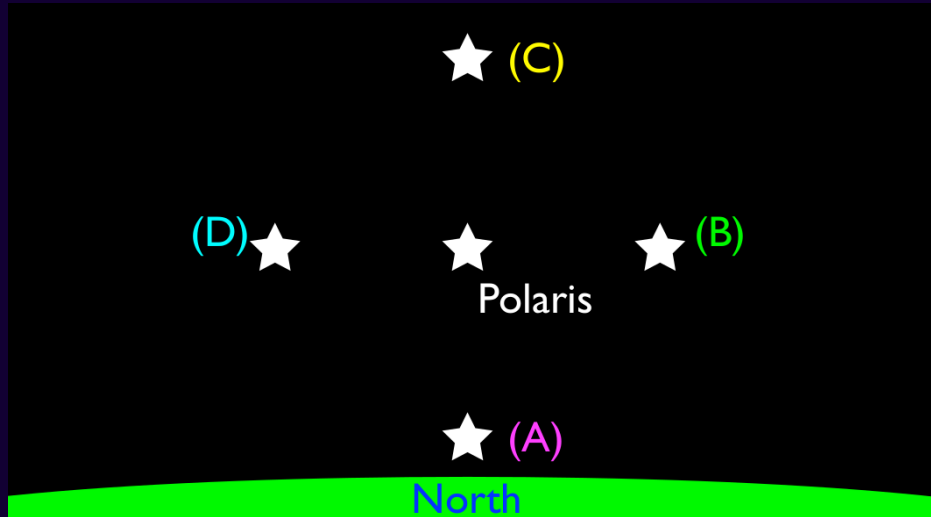
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This picture was taken in Australia. Which way is the photographer looking?

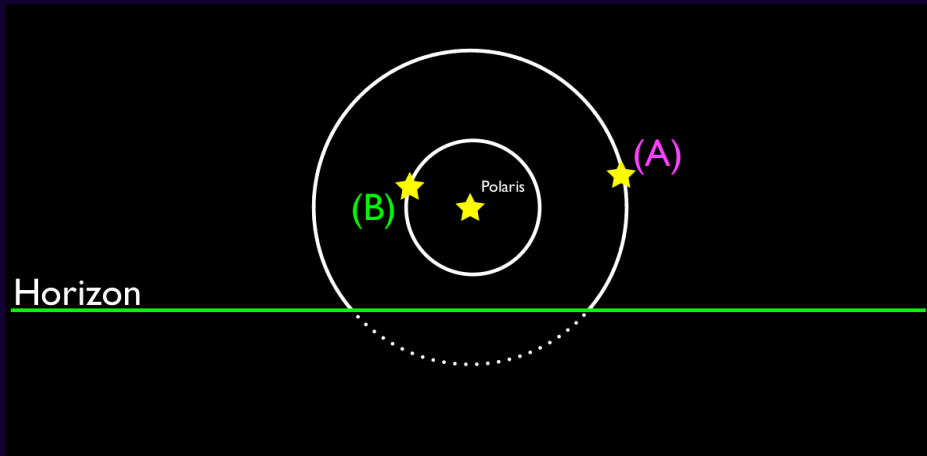
- A: North
- B: South
- C: East
- D: West



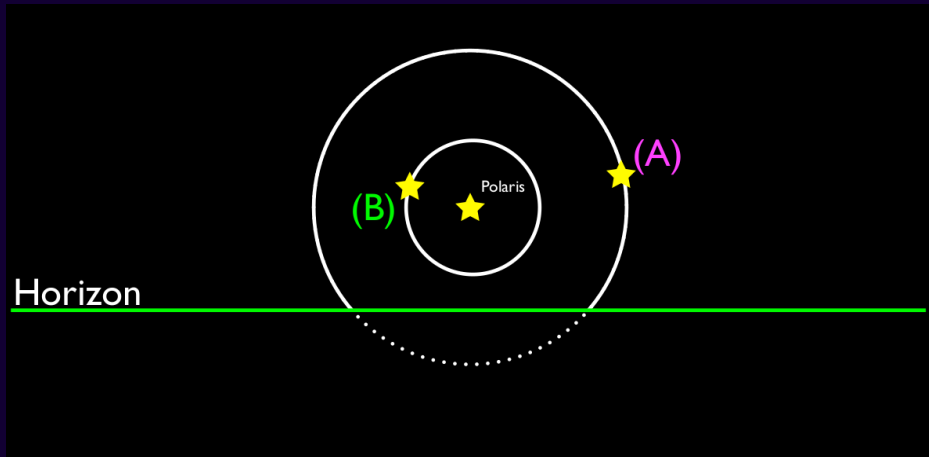
In Syracuse, you see this star at (A). Where will it be six hours later?



Which star is visible longer?



Which star is visible longer?



We call a star that is always above the horizon **circumpolar**.

Where in the sky should I look to find circumpolar stars?

What about the Sun?

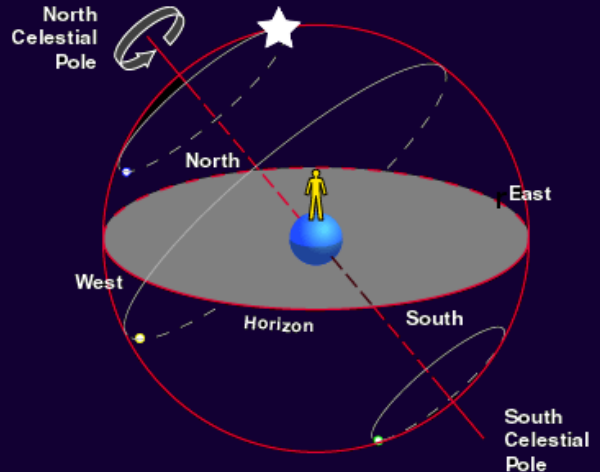
Over the course of one day, the Sun doesn't move very much.

This means the celestial sphere model can show us how the Sun moves **each day**.

It rises in the East and sets in the West, just like all the other stars.

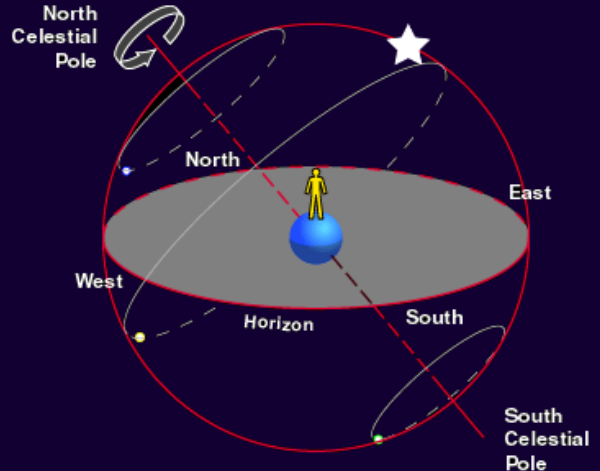
How long is this star visible in the sky each day?

- A: All the time
- B: More than 12 hours
- C: Less than 12 hours
- D: It's never visible



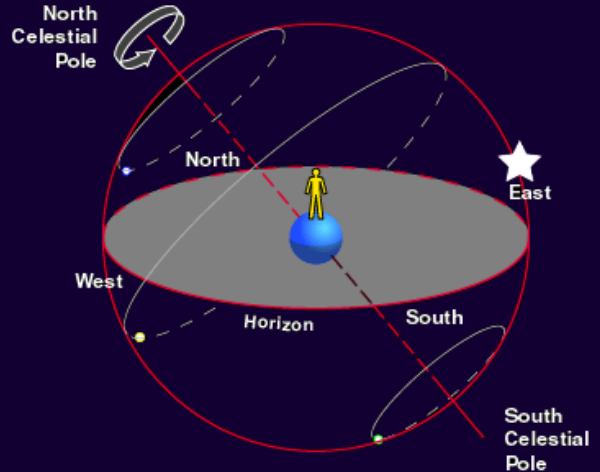
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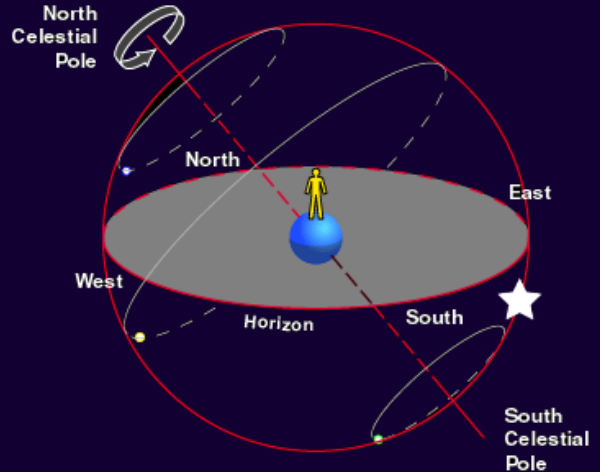
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What does one star matter?

The visibility of one star in our sky isn't that big of a deal...

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The visibility of one star in our sky isn't that big of a deal...

... unless that star is the Sun! We'll talk about this Thursday.