



# ASTRONOMY MISCONCEPTIONS- BUSTED!

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# 6 Basic Astronomy Concepts:

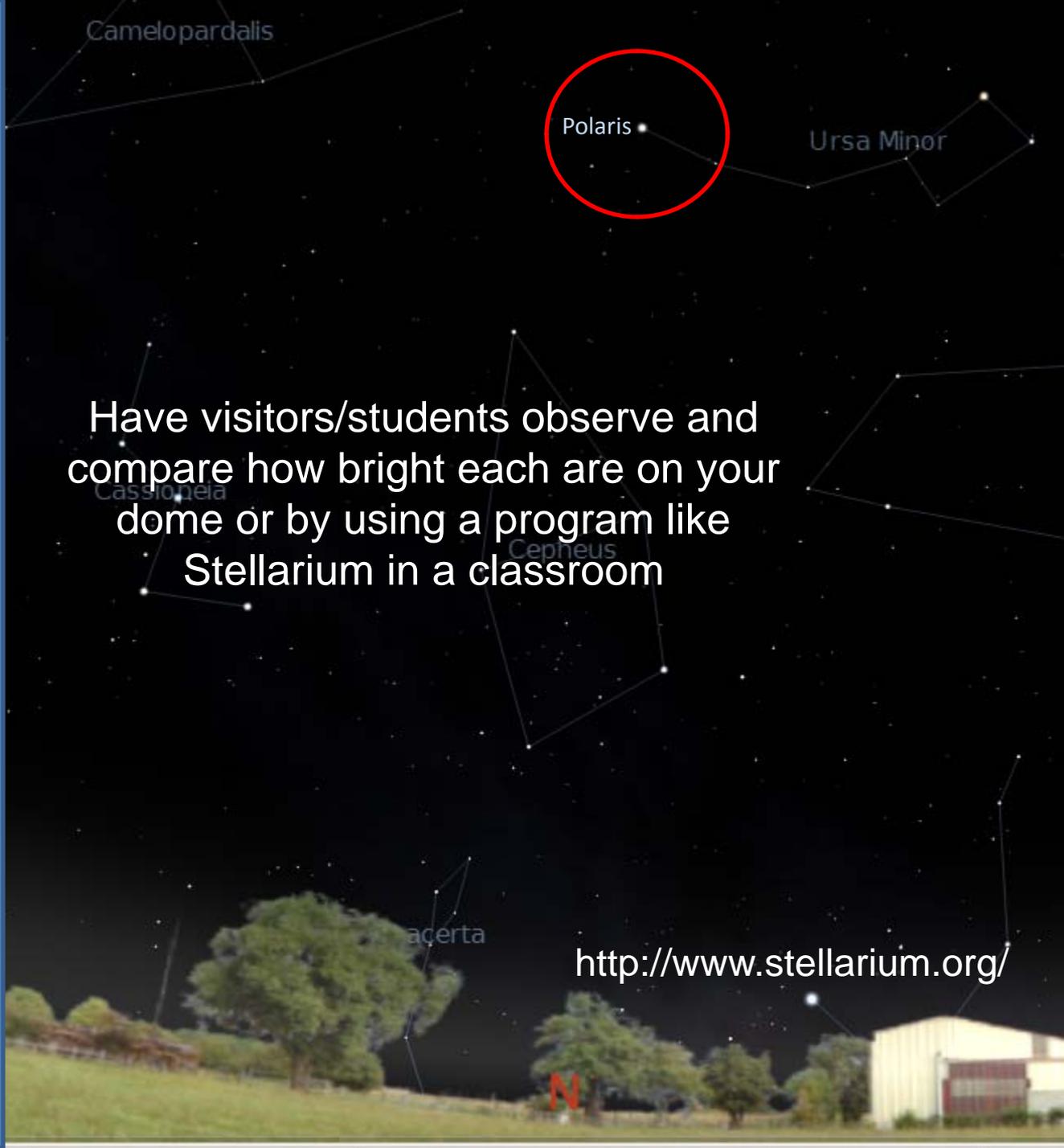
1. Brightest Star in the Night Sky
2. Shape of Earth's Orbit
3. Reason for the Seasons
4. Distance Order from Earth
5. Moon Phases
6. Earth-Moon Distance

# Brightest Star in the Night Sky

**NOT** the North Star, Polaris, in Ursa Minor!!!!

Sirius, the “Dog Star” in Canis Major, is indeed the brightest star in our night.

How to bust this misconception using the planetarium?

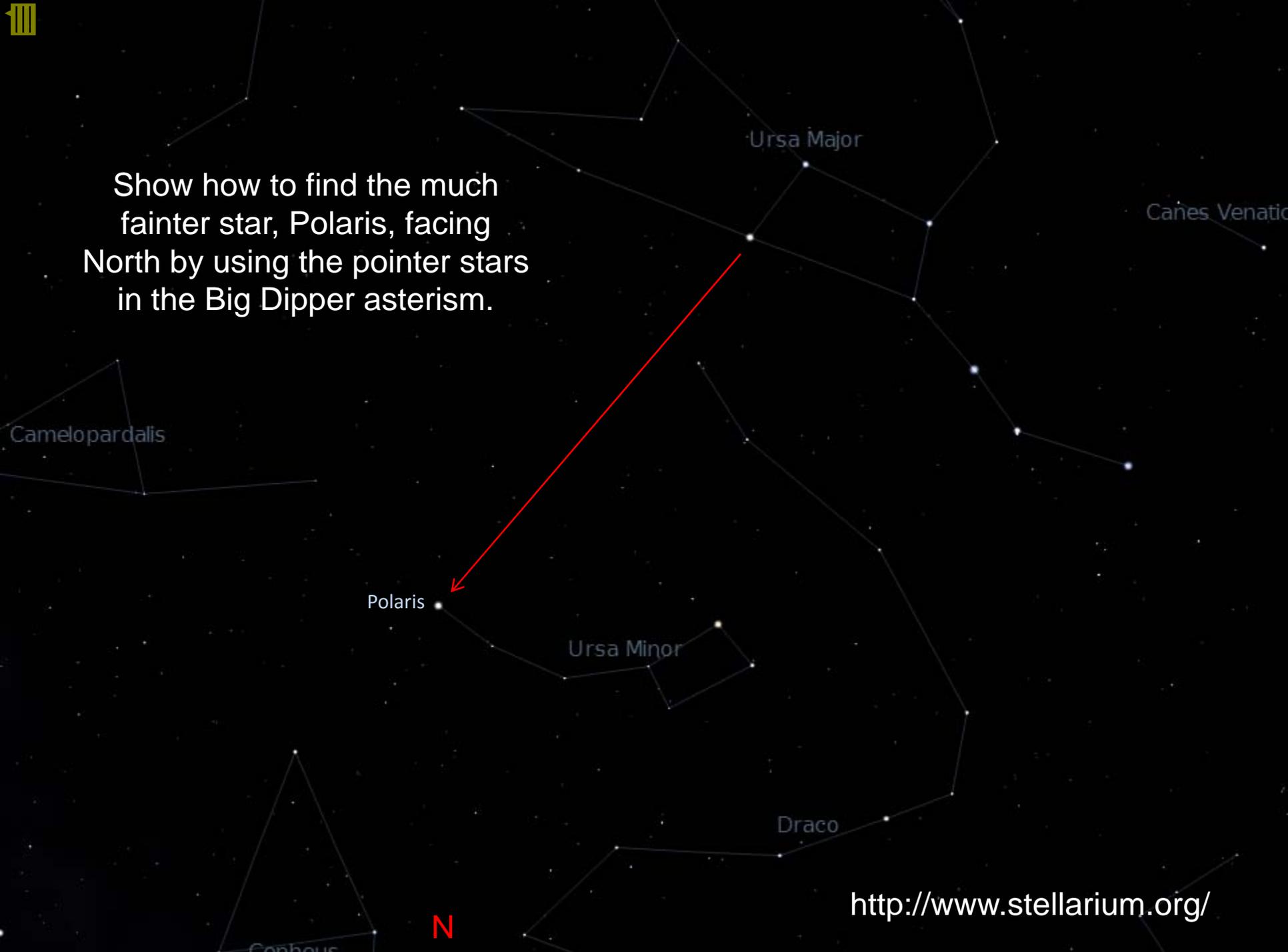


Have visitors/students observe and compare how bright each are on your dome or by using a program like Stellarium in a classroom

<http://www.stellarium.org/>



Show how to find the much fainter star, Polaris, facing North by using the pointer stars in the Big Dipper asterism.



Ursa Major

Canes Venatici

Camelopardalis

Polaris

Ursa Minor

Draco

N

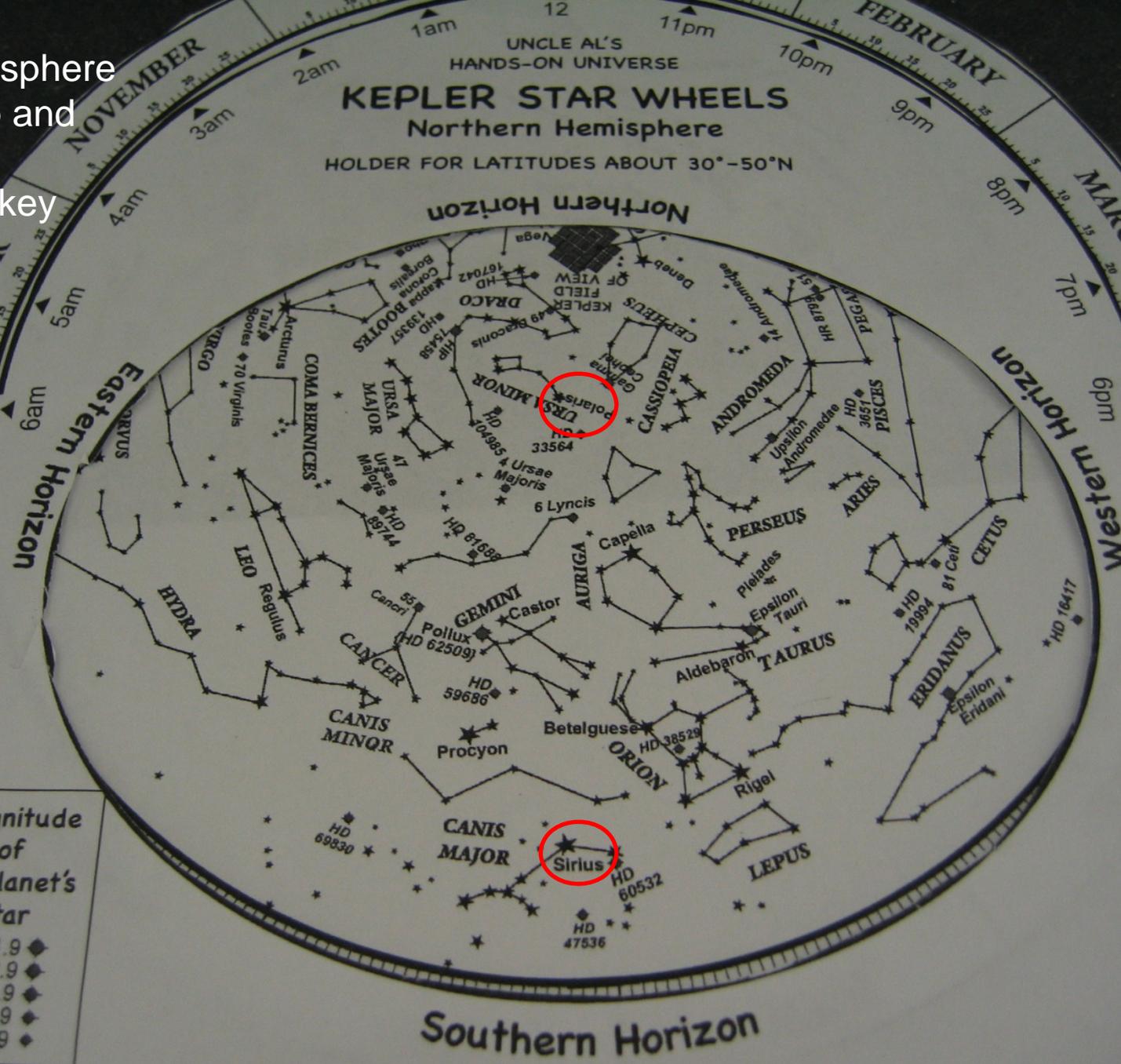
<http://www.stellarium.org/>

Use a planisphere or star map and explain the magnitude key

The Kepler star wheels show Kepler field of view and naked-eye stars known to have planets (stars down to about magnitude 6)

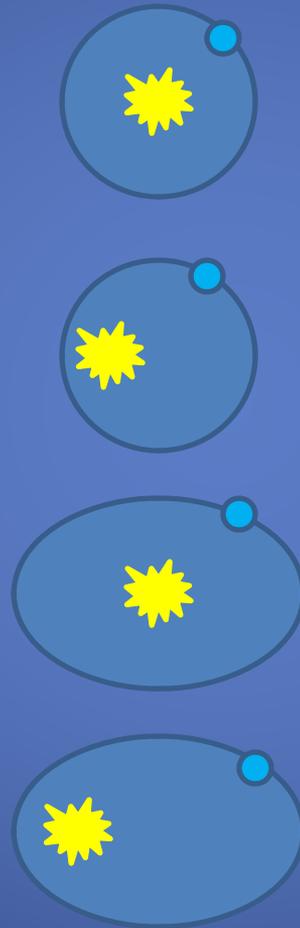
Magnitude of Exoplanet's Star

- 1.0-1.9 ◆
- 2.0-2.9 ◆
- 3.0-3.9 ◆
- 4.0-4.9 ◆
- 5.0-5.9 ◆





# Shape of Earth's Orbit





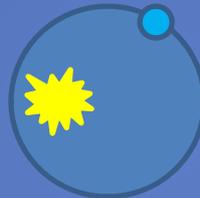
# Shape of Earth's Orbit

31

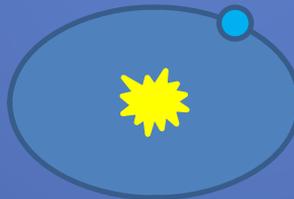


Correct answer

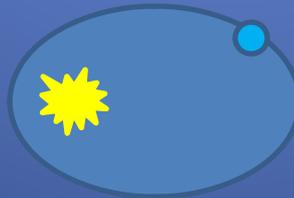
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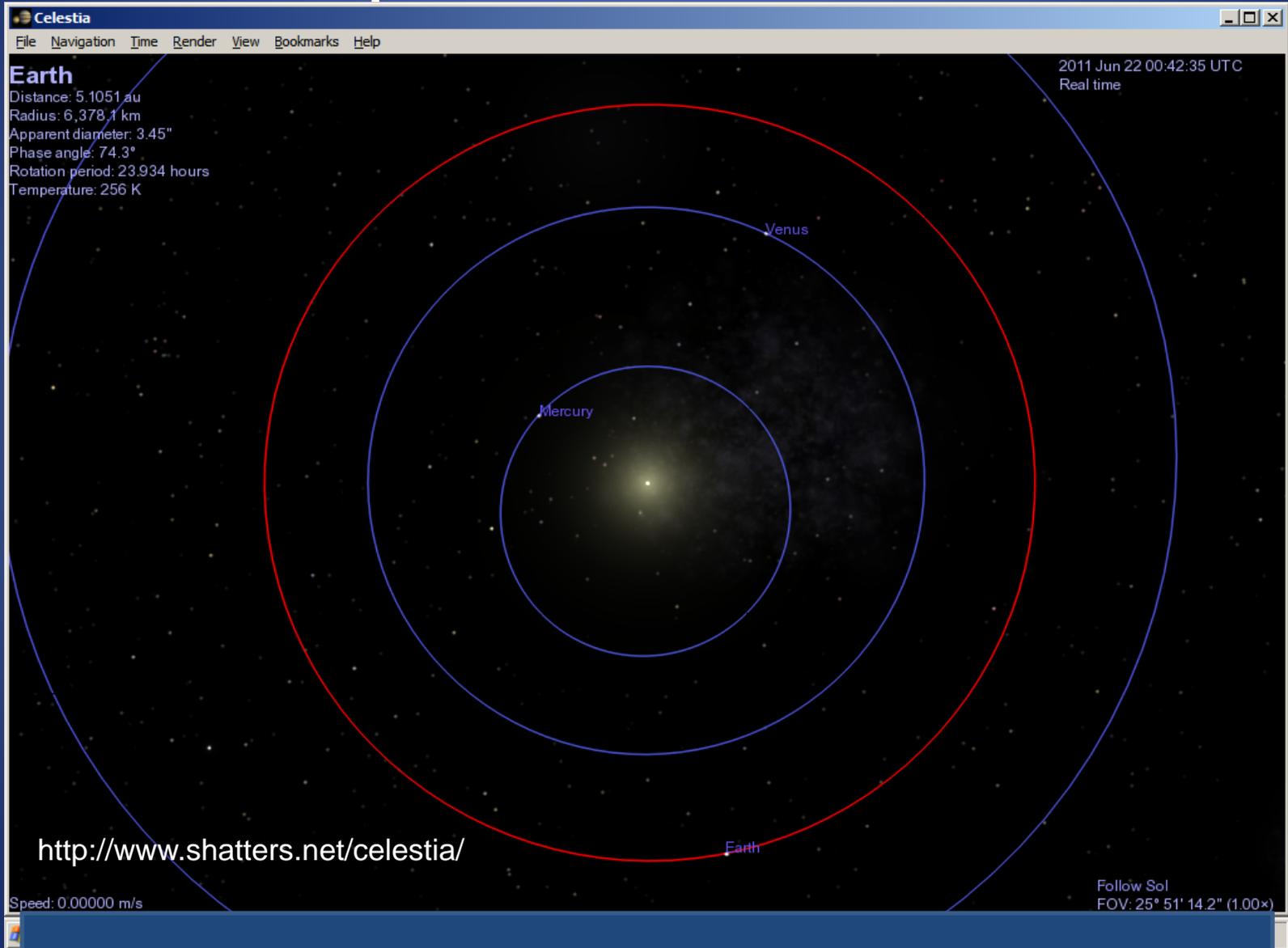
90 !



47 !



# Shape of Earth's Orbit





# Seasons

Why is it hotter in New York in June than it is in December?

The Sun gives off more heat energy in June

Earth is closer to the Sun in June.

The Northern hemisphere is closer to the Sun in June.

The Sun is higher in the sky and provides more hours of daylight in June.



# Seasons

Why is it hotter in New York in June than it is in December?

The Sun gives off more heat energy in June

1!

Earth is closer to the Sun in June.

31!

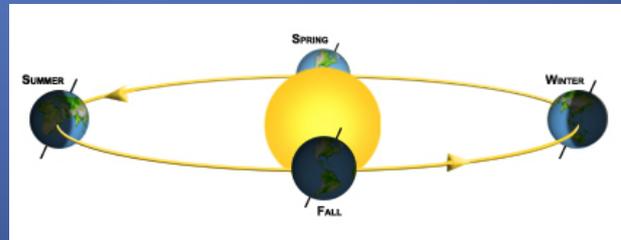
The Northern hemisphere is closer to the Sun in June.

113 !!

Correct answer

The Sun is higher in the sky and provides more hours of daylight in June.

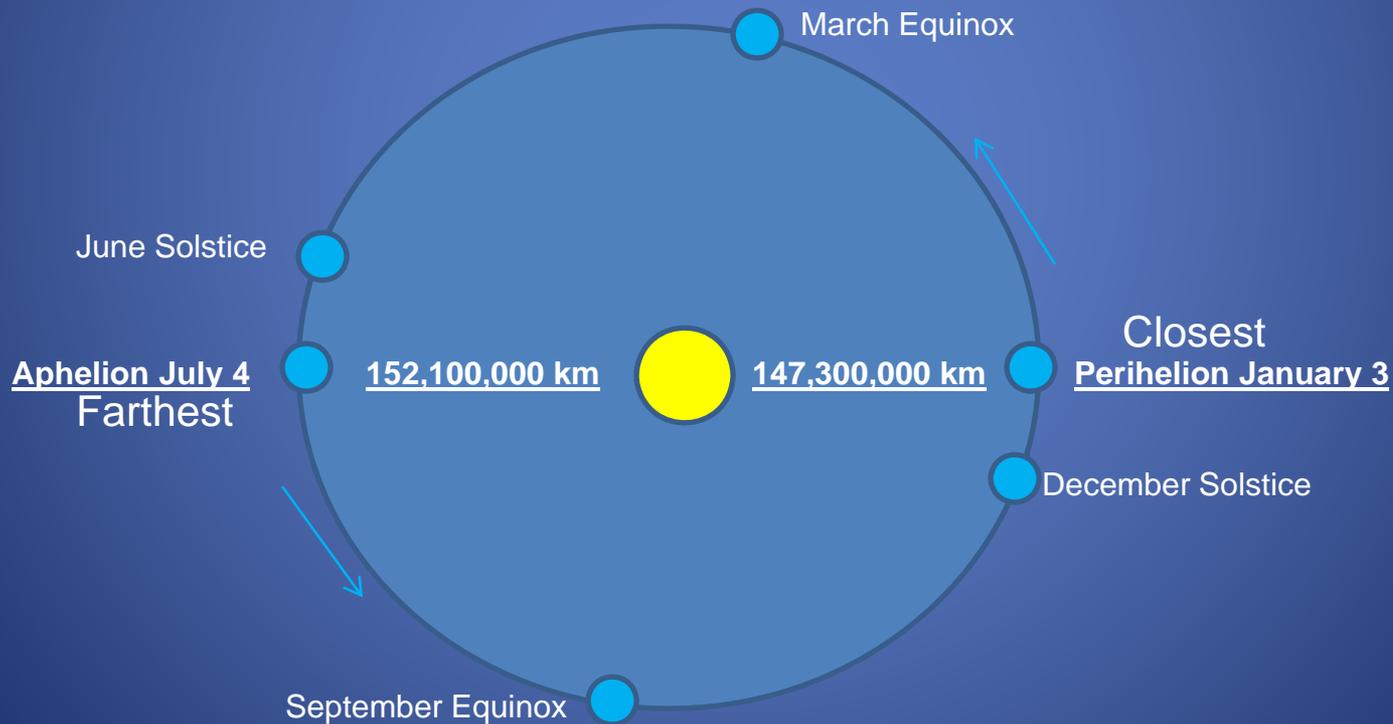
31





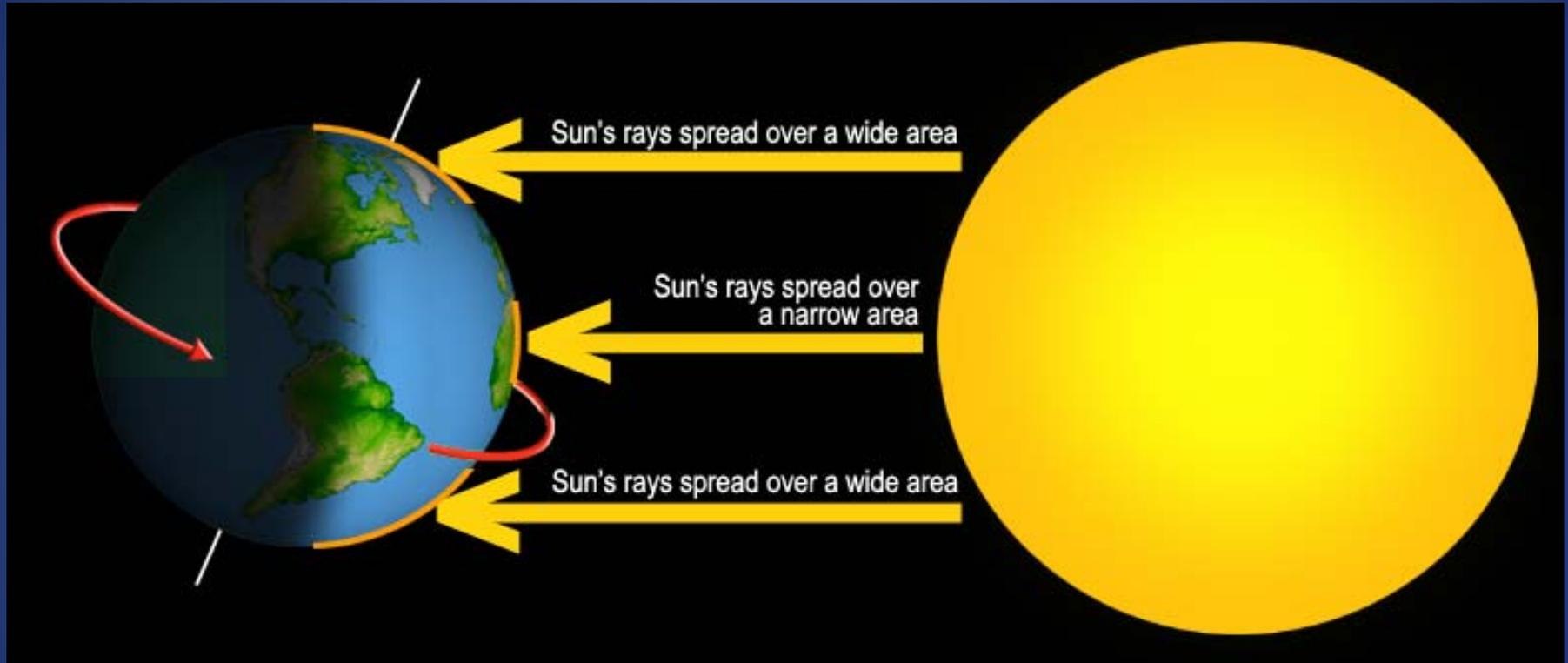
# Seasons

Why is it hotter in New York in June than it is in December?





# Seasons

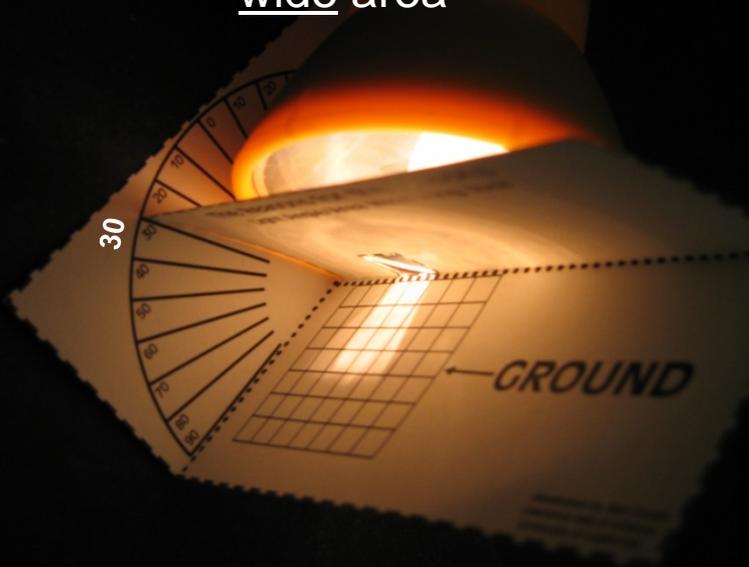


Northern Hemisphere **Summer**  
More daylight hours, more direct sunlight

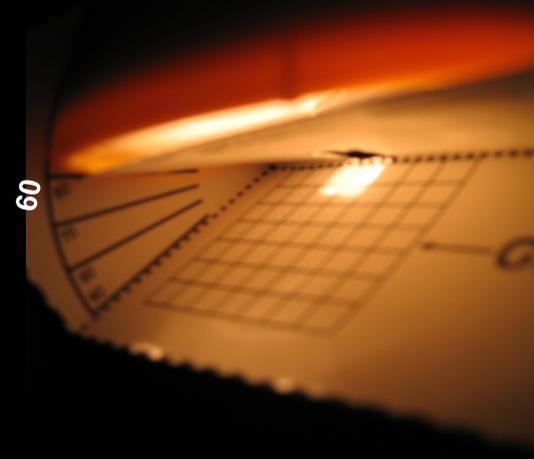
# Activity on Seasons

Flashlight is used as the Sun

Sun is lower in the sky,  
Sun's rays spread over a  
wide area



Sun is higher in the sky,  
Sun's rays spread over a  
narrow area





NASA

# Distance Order from Earth



B.Lowder



B.Lowder



STScI



Pluto  
STScI



NASA

# Distance Order from Earth

3

Moon Sun Clouds Pluto Stars

14

Clouds Stars Moon Sun Pluto

134

Clouds Moon Sun Pluto Stars



Correct answer



25

Clouds Moon Sun Stars Pluto

University students taking astronomy  
first week of lab before topic covered in lecture



# Distance Order from Earth

3 !!

Moon Sun Clouds Pluto Stars

9 !!!

Clouds Stars Moon Sun Pluto



6

Clouds Moon Sun Pluto Stars

Correct answer

6 !

Clouds Moon Sun Stars Pluto

Early childhood education majors  
science education class  
before astronomy was covered



# Moon Phases

As the Moon orbits Earth, Earth's shadow covers the Moon.

Clouds block part of the Moon from our view.

As the Moon orbits around Earth, we see different views of the Moon's sunlit side.



# Moon Phases

85 !

As the Moon orbits Earth, Earth's shadow covers the Moon.

0

Clouds block part of the Moon from our view.

91

As the Moon orbits around Earth, we see different views of the Moon's sunlit side.

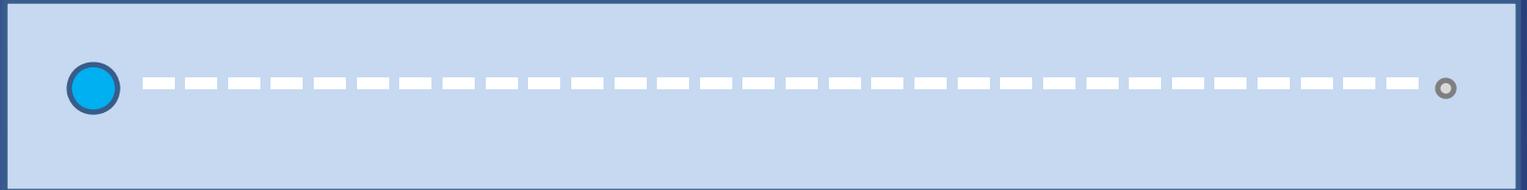
Correct  
answer



Photo Credit – B Lowder



# Earth-Moon Distance

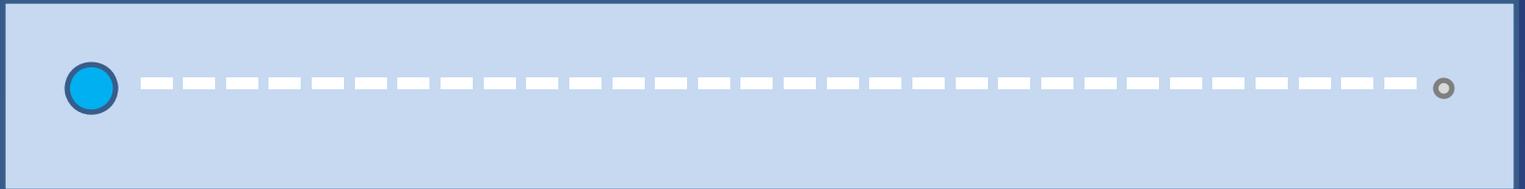




# Earth-Moon Distance

Correct  
answer

36



91



49





# Conclusion

- These basic astronomy misconceptions are common in college aged students and the general public
- We as planetarians and educators have the best environment for helping to “bust” and correct these misconceptions using our planetarium sky with hands-on activities and/or videos
- These early learned misconceptions are sometimes very difficult to correct, even with the activities
- Continue coming up with new ways to help our visitors/students understand the correct concepts in astronomy while having fun doing so



# Resources

- The Annenberg Media Math and Science Project Teachers' Lab  
[www.learner.org/teacherslab/pup/studentquestions.html](http://www.learner.org/teacherslab/pup/studentquestions.html)
- NASA Night Sky Network (activities) -  
[nightsky.jpl.nasa.gov/download-search.cfm](http://nightsky.jpl.nasa.gov/download-search.cfm)
- Earth and Moon balls –[www.peacetoy.com](http://www.peacetoy.com)
- Celestia - [www.shatters.net/celestia](http://www.shatters.net/celestia)
- Stellarium - [www.stellarium.org/](http://www.stellarium.org/)
- Kepler Star Wheel - [kepler.nasa.gov/education/starwheel/](http://kepler.nasa.gov/education/starwheel/)
- NASA - [www.nasa.gov](http://www.nasa.gov)
- Space Telescope Science Institute - [Hubblesite.org](http://Hubblesite.org)
- Seasons - [www.lpi.usra.edu/education/skytellers/seasons/about.shtml](http://www.lpi.usra.edu/education/skytellers/seasons/about.shtml)
- Seasons Activity from The Universe at Your Fingertips 2.0 ASP/Alan Gould  
- [www.astrosociety.org/uayf/index.html](http://www.astrosociety.org/uayf/index.html)
- Bad Astronomy - [www.badastronomy.com/bad/misc/index.html](http://www.badastronomy.com/bad/misc/index.html)