Dark Sky Wheel

How Dark are Your Skies?

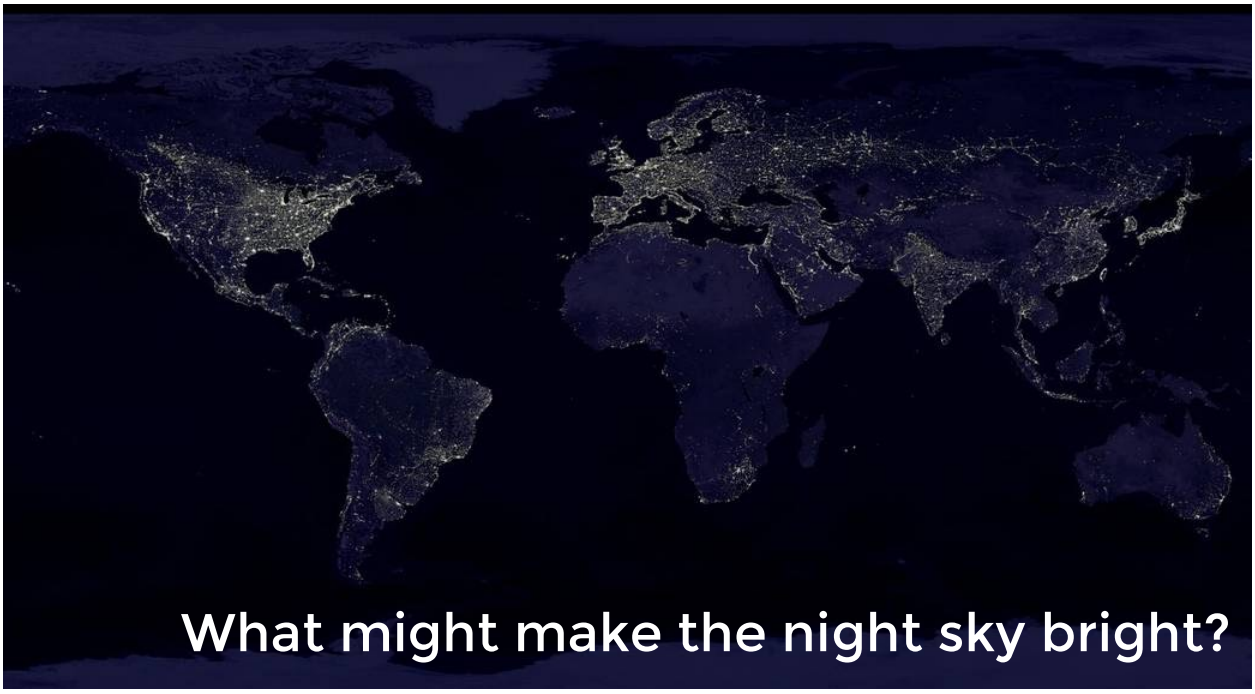
Image above of the Blanco telescope in Chile, with the Milky Way and Magellanic Clouds behind. *Image Credit: R. Smith/NOIRLab/NSF/AURA*

Have you ever been under a very dark sky?

How did it feel?

Find your view tonight on the Dark Sky Wheel.

Composite image below shows a global view of the Earth at night. *Image Credit: NASA/NOAA*



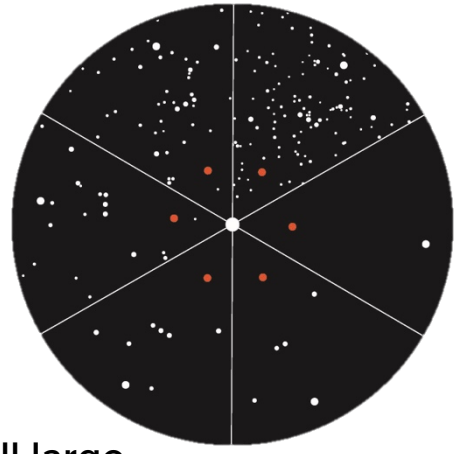
big astronomy
people+places+discoveries

© 2020 Astronomical Society of the Pacific
Copies for educational purposes encouraged.
More activities: bit.ly.bigastro

ASP
ASTRONOMICAL SOCIETY of the PACIFIC

Dark skies are a precious natural resource.

The stars in Orion and Scorpius are legendary in cultures around the globe. The skies have held a fascination and a place of reverence for all of human history. We are losing our cultural connection to the night sky.



Try this: Find the constellation version that most closely mirrors what you see in the sky. Then wait 15 minutes without looking at lights. Do you notice any difference once your eyes become *dark adapted*?

Astronomers, both professional and amateur look for **clear dark skies** for observing the night sky. More than 70% of all large ground-based telescopes in the world are located in the mountains and high deserts of Chile because they have some of the darkest skies in the world.

- High mountaintops above much of the atmosphere
- Still, dry air that does not distort the light
- A commitment to dark skies shared by local communities
- Infrastructure and workforce to support big science projects

How many stars can we see in a very dark night sky?

From the middle of a city, you may only see the brightest stars in the sky. But with good eyes under the darkest skies, we can see around 5,000 stars on a moonless night.

big astronomy
people+places+discoveries

© 2020 Astronomical Society of the Pacific
Copies for educational purposes encouraged.
More activities: bit.ly.bigastro

ASP
ASTRONOMICAL SOCIETY of the PACIFIC

Notes for the Presenter
Dark Sky Wheel

Time: 5-10 minutes
Visitors: General audience, ages 10+
Venue: nighttime, Orion Jan - Mar, or Scorpius Jun-Aug (longer in S. Hemisphere)

Learning Goals

1. Notice how dark or bright our skies are.
2. Understand the impact of lighting on our ability to see the night sky.
3. Understand that stars do not all have the same brightness and color.
4. Notice how our eyes become dark adapted with more time away from light.

Materials (and Sources)

- Set of Dark Sky Wheels for visitors
  Print your own from the Night Sky Network [Outreach Resources]
- Brads for the center to keep them together and allow them to turn

Advance Preparation

First time setup:

- Use the glow-in-the-dark pen to mark the stars for use in the dark.

Setup:

- Make sure your star wheels are flipped for the correct season. Use the Orion side January through March, and the Scorpius side June-August.
- Insert the brad through the center.

Facilitation Notes

Does anyone recognize any constellations? Constellations are patterns that humans make up in the stars. All over the Earth and for all of recorded history, cultures have created these patterns to remember and understand the order of the stars at night. Have you heard stories about them?

Is that constellation always visible? We see different constellations at different times of year and at different times on the same night. As the Earth orbits the Sun, the night sky looks out at different parts of our galaxy.

How many stars are you usually able to see from your home? Do the number of stars you can see vary from night to night, and when you travel elsewhere? **What do you think is going on?** Lighting from the ground or the Moon can affect our ability to see the stars. Better lighting can mean darker skies!

big astronomy
people+places+discoveries

© 2020 Astronomical Society of the Pacific
Copies for educational purposes encouraged.
More activities: bit.ly.bigastro

ASP
ASTRONOMICAL SOCIETY of the PACIFIC

Why do you think some stars are brighter than others? It could be their distance or how big and bright they are. Some stars are also different colors! See if you notice the red star Betelgeuse (in Orion) or Antares (in Scorpius).

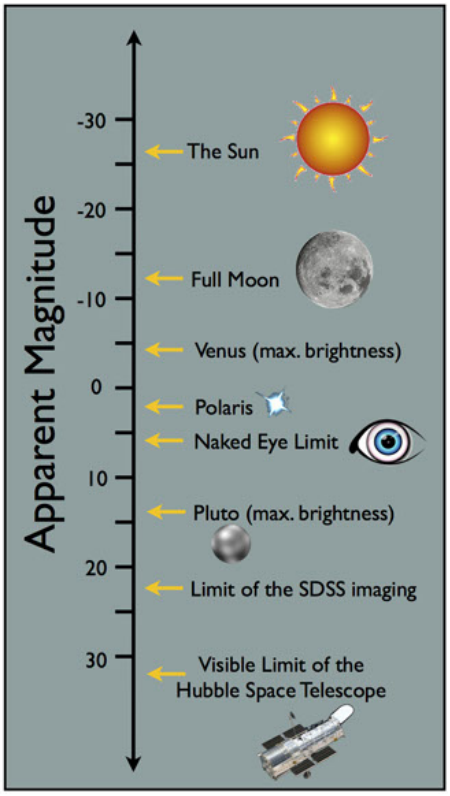
Be a scientist! Record your observations at globeatnight.org and add to a global database of sky brightness.

Background Information

Use a **red light** to help preserve visitors' dark adaptation, allowing them to see the most stars possible when looking up at the sky. Make sure when doing this activity to NOT use a white light to help people see the star wheel.

Have visitors note how many stars they can see when they first look up and then again 15 minutes later to demonstrate dark adaptation.

Magnitudes listed here are **apparent magnitudes**, or the brightness of an object *as seen from here on Earth* (as opposed to the absolute magnitude of an object, a measurement of the light it emits). It is an inverse log scale, with higher numbers indicating dimmer stars.



Scale of magnitudes from SDSS Voyages for teachers. Find more information and many exciting activities. voyages.sdss.org

Virtual and Hands-on Presentation Extensions

- This activity complements the light shielding activity **Good Light, Good Night** provided in the kit or at bit.ly/bigastro
- Tell constellation legends and have visitors create their own with the **Legends of the Night Sky** activity, also in this Toolkit.
- Explore the effects of light pollution on the night sky with Light Pollution Interactive globeatnight.org/light-pollution.php

Additional Resources and Credits

This activity was adapted from the magnitude charts of the Globe at Night Activity. globeatnight.org/magcharts

Big Astronomy is supported by the U.S. National Science Foundation (Award #: 1811436)

big astronomy
people+places+discoveries

© 2020 Astronomical Society of the Pacific
Copies for educational purposes encouraged.
More activities: bit.ly.bigastro

ASP
ASTRONOMICAL SOCIETY of the PACIFIC