



Monday, April 5, 2021

How Many Stars Can You See?

What a beautiful sight it is to be in a dark place, look up, and be overwhelmed by the multitude of stars above your head! Light pollution blocks our ability to see the stars—the more light that is sent up to the sky from Earth, the less sky we see. Here's an experiment you can do, provided by the Longmont Astronomical Society:

Using a source like <u>www.darksitefinder.com</u>, identify a location where light pollution is less of a problem. Take a drive and take a picture of the night sky. Come home and take another picture. As much as possible, use the same settings on your camera. Compare the images to see the difference. Alternatively, use the camera of your eye. That is, go somewhere dark and count stars. Come home and count again. Obviously, there may be too many to count, especially at a dark site. You could make a circle with your thumbs and forefingers, and count stars in there as best you can. In both situations, after you go outside, give your eyes a few minutes to dark-adjust, and don't turn on any lights until after you have completed your experiment.

How Light Pollution Affect Wildlife and People

In addition to seeing more stars, darkness is important in other ways. Did you know over 200 species of birds migrate at night across North America each year? Light pollution can cause issues like throwing off their ability to see landmarks and collisions with lit buildings. Over half of the wildlife species are nocturnal, and need darkness for survival. Human health also depends on darkness. Too much constant light has been shown to contribute to certain types of cancers and other diseases in humans.

From the International Dark Sky Association:

Nocturnal animals sleep during the day and are active at night. Light pollution radically alters their nighttime environment by turning night into day.



According to research scientist Christopher Kyba, for nocturnal animals, "The introduction of artificial light probably represents the most drastic change human beings have made to their environment."

"Predators use light to hunt, and prey species use darkness as cover," Kyba "explains. "Near cities, cloudy skies are now hundreds, or even thousands of times brighter than they were 200 years ago. We are only beginning to learn what a drastic effect this has had on nocturnal ecology."

Glare from artificial lights can also impact wetland habitats that are home to amphibians such as frogs and toads, whose nighttime croaking is part of the breeding ritual. Artificial lights disrupt this nocturnal activity, interfering with reproduction and reducing populations.

Find out more about how light pollution affects wildlife.

Dark Sky Tip:

LED lights save energy, but blue LEDs are extremely bright. When using lights outside, stick to the "warmer" colors like amber and red to keep the sky dark, and to cause less harm to birds, insects, and other animals. It also allows your eyes to better adjust to seeing in the darkness.





Tuesday, April 6, 2021

Zooming in on the Sky

When you look up, especially on a dark night, the stars can be overwhelming! You can see even more through the simple aid of using binoculars. Here are some tips from the Longmont Astronomical Society:

If you have a pair of binoculars, go outside and look up. It can be hard to hold the binoculars still enough to get a really good look, so try resting them on your elbows on a car hood, a fence, or anything that's solid. Look at part of the sky first with just your eyes, then at the same area with binoculars. You'll be amazed at how many more stars appear through the binoculars. What you are doing is essentially using a small telescope.

One of the most amazing things to look at through binoculars is the Milky Way. The binoculars will allow you to see countless stars that make up the band of our galaxy. This month, the Milky Way is just above the horizon to the north and west.

From the International Dark Sky Association:

Lighting that emits too much light or shines when and where it is not needed is wasteful.



Environmental responsibility requires energy efficiency and conservation:

- Installing quality outdoor lighting could cut energy use by 60-70 percent, save billions of dollars and cut carbon emissions.
- Outdoor lighting should be fully shielded and direct light down where it is needed, not into the sky.
- Fully shielded fixtures can provide the same level of illumination on the ground as unshielded ones, but with less energy and cost.
- Unnecessary indoor lighting—particularly in empty office buildings at night—should be turned off.

New lighting technologies can help conserve energy:

- LEDs and compact fluorescents (CFLs) can help reduce energy use and protect the environment, but only warm-white bulbs should be used. Learn more about LEDs and color temperature from our <u>LED</u> Practical Guide.
- Dimmers, motion sensors, and timers can help to reduce average illumination levels and save even more energy.



Dark Sky Tip:

Replace lights on the outside of your house with those that face down towards the ground. Light shining upwards doesn't do any good, wastes energy, causes problems for wildlife and people, and obliterates the sky. Click here for lighting basics.

International Dark Sky Week 2021



Wednesday, April 7, 2021

Catch a Daytime Moon

We think of the Moon as Earth's night light, but we often see it during the daytime. Here's a note about that from the Longmont Astronomical Society:

During International Dark Sky Week, the Moon is rising in the early morning—about 3:40 a.m. on April 5 and a little later each day until about 7 a.m. on April 12. Unless you are a night owl, if you want to see the Moon look during the day. A daytime Moon is much fainter than at night as there is much less contrast against the bright blue sky. But it's fun and surprising to see it then. Myriad sources provide rising and setting times for the Moon.

If often surprises some people that we can see the Moon during the day. It's all about motion! The Moon goes around the Earth about once a month; meanwhile, the Earth is traveling around the Sun. Here's a nice demonstration from the National Science Teaching Association that explains how the Moon phases work. But why do we see it during the day? When you see a crescent Moon in the sky before dark, the Moon is still near the Sun with our view from Earth, and is waxing, or getting bigger. If you see a crescent moon in the morning light, it's a waning moon and has made its journey around the Earth, approaching the New Moon phase.

Here's a fun way to tell if the Moon is waxing or waning: If the light is on the <u>right</u> (side of the Moon), it's getting bright; if it's on the left rim, it's getting dim.

From the International Dark Sky Association:

There is no clear scientific evidence that increased outdoor lighting deters crimes. It may



make us feel safer, but has not been shown to make us safer. In fact, most property crime occurs in the light of day. And some crimes like vandalism and graffiti actually thrive on night lighting. A dark sky does not necessarily mean a dark ground. Smart lighting that directs light where it is needed creates a balance between safety and starlight.

Outdoor lighting is intended to enhance safety and security at night, but too much lighting can actually have the opposite effect. Visibility should always be the goal. Glare from bright, unshielded lights actually decreases safety because it shines into our eyes and constricts our pupils. This cannot only be blinding, it also makes it more difficult for our eyes to adjust to low-light conditions.

To learn more about lighting, crime, and safety, visit the <u>IDA webpage</u>.



Dark Sky Tip:

Concerned about street lights and other community lights? Here are Boulder County's Lighting Requirements. To find out more about ordinances in your own community, click here.

International Dark Sky Week Parks & Open Space 2021



Thursday, April 8, 2021

Patterns in the Sky: Asterisms

Even if you have a difficult time finding constellations in the sky, you have most likely been able to see the Big Dipper at some point. But guess what? The Big Dipper is actually not a constellation! Here's news from the Longmont Astronomical Society:

There are constellations and there are asterisms. The constellation Ursa Major, the big bear, is a large area of the sky. Contained in that constellation is the Big Dipper, an asterism of seven stars. Asterisms are the patterns we more typically know. This week, besides the Big and Little Dippers, find Cassiopeia's Chair, or Orion's belt. These are observed without aid. If you have access to a telescope with an eyepiece, many more appear, the telescopic asterisms. These provide intriguing viewing and spark the imagination with their shapes. Examples are Brocchi's Cluster, also known as the coat hanger, and NGC2169 aka "37," Kemble's Cascade.

There are 88 official constellations used by astronomers throughout the world. This serves as a roadmap of the sky and a universal language so that astronomers can talk to each other across the globe, and know what part of the sky they are looking at.

Did you know that many animals use stars and light patterns to navigate and migrate? The Indigo Bunting uses Polaris, the North Star, to know how to migrate to South America in winter. The African dung beetle observes the light of the Milky Way to help it carry its precious load to safety.

INTERNATIONAL DARK-SKY

From the International Dark Sky Association:

Artificial Light and Human Health

Like most life in Earth, humans adhere to a circadian rhythm. Artificial light at night can disrupt that cycle. Our bodies produce the hormone melatonin in response to circadian rhythm. Melatonin has antioxidant properties that induce sleep, boost the immune system, lower cholesterol, and help the functioning of the thyroid, pancreas, ovaries, testes, and adrenal glands. Nighttime exposure to artificial light suppresses melatonin production.

Exposure to blue light at night is especially harmful. To minimize harm from blue light in your home, choose the right light bulb and download a color temperature app that adapts your electronic screen to the time of day—cool light during the day and warm at night. You can also use a red light bulb in your night light.

Click <u>here</u> for more information on lighting and human health.

Dark Sky Tip:

Did you know Boulder County is part of an annual dark sky study? Each year we measure light pollution at open space sites as well as towns, along with other areas along the Front Range. Caribou Ranch and Mud Lake open spaces are two of the darkest sky sites in the county, with measurements near those of Trail Ridge Road in Rocky Mountain National Park and Soapstone Prairie Natural Area north of Fort Collins.





Friday, April 9, 2021

Catch the ISS

When you look up at the stars in the sky, you may also see a lot of human-made satellites. They look like tiny dots of light moving across the sky. If you know when and where to look, you also get a glimpse of the International Space Station, just about 200 miles above your head!

Longmont Astronomical Society gives us these tips:

- There are several sources that provide information on when and where to look to see the ISS as it orbits the Earth. Perhaps the easiest to access is <u>spotthestation.nasa.gov</u>. It can be set to a specific location—for us it's Denver. It provides date and time of the crossing, maximum height (elevation in degrees), duration of the crossing, and direction (where to look).
- Another good source is found at <u>www.clearoutside.com</u>. This site is provided by First Light Optics, a telescope retailed in the UK. Set your specific location, usually by GPS coordinates. A week of information is active. The fifth line down shows any ISS crossings with an ISS icon. Touch/click on the icon and you get the elevation, duration, direction, etc. Sometimes there are several crossings over the course of an evening. This site is useful as it not only lets you know when and where to look, but also what the likely cloud situation will be at the time of crossing.

Most of all, remember to look up! There are so many wonders above your head, and if you see the ISS, think about the fact that the astronauts might be looking down at the Earth at the same time.

From the International Dark Sky Association:

Your Neighbor's Lights



Many of us have experienced this scenario: a neighbor installs a new light on their property. It's an unshielded fixture that casts a bright light that spills onto your property and perhaps even inside your home.

This is known as light trespass and it can cause a lot of agony and frustration. Although IDA doesn't get involved in neighbor disputes, we have provided a resource that we hope will help you resolve your problem.

To be fair, your neighbor may not even realize that their unshielded lighting is shining on your property, wasting energy, money, and creating a safety hazard.

Many people believe that more and brighter lighting makes us safer, but there is no conclusive evidence suggesting that's true. In fact, glare from unshielded lights can create harsh shadows where criminals can hide. And bright lighting can even make it easier for criminals to work.

To view our resource about neighbor lighting, click here.

Thank you for Celebrating Dark Sky Week!

We hope to soon return to our astronomy programs at open space locations. Follow our <u>site</u> for updates later this year, or email <u>dprice@bouldercounty.org</u>.

The Longmont Astronomical Society also provides educational outreach. Visit their site here.

Help protect the night sky by getting involved! Follow the International Dark Sky website for more information.