

# Good Light, Good Night

## How to Use Light Wisely



Have you  
ever  
been  
under a  
really  
dark sky?

How did  
it feel?

What affects your ability to see the night sky?

Where do  
we put  
telescopes  
and why?

Can you  
think of  
other  
benefits of  
dark skies?



# Using our light wisely is important!

Shielding lights improves our safety, visibility, and vision of the night sky. It has health effects on animals, including people!

## Light Pollution Uses Energy and Money

IDA estimates that least 30 percent of all outdoor lighting in the U.S. is wasted, mostly by lights that aren't shielded. Annually, we're wasting an estimated \$3.3 billion and 21 million tons of carbon dioxide! (We'd have to plant 875 million trees to offset that.)



All of the lights pointed upwards are being wasted.



Baby sea turtles attracted by artificial light. (NIH)

Hatchling turtles have followed the light towards the ocean but now bright artificial light draws them away from safety.

## Artificial Lights Disrupt the World's Ecosystems

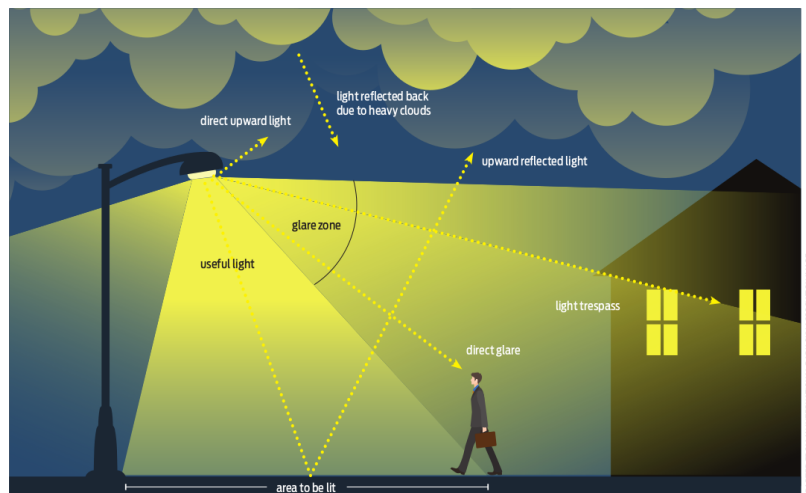
Light pollution radically alters the sleep of nocturnal animals.

Artificial light can cause birds to wander off course and toward the dangerous nighttime landscapes of cities.

Migratory birds depend on cues from properly timed seasonal schedules.

## Exposure to Artificial Light Can Harm Your Health

Research suggests artificial light at night can negatively affect human health, increasing risks for depression, sleep disorders, diabetes, and more.



# Notes for the Presenter

## Good Light, Good Night

**Time:** 10 minutes

**Visitors:** General audience, ages 7+

**Venue:** under a starry sky or in a darkened room with the Star Box

### Learning Goals

1. Understand that well-directed light makes it easier to see the area, rather than using brighter light.
2. Understand the impact of lighting on their ability to see the night sky.
3. Notice lights around them and the effects of light on the environment.

### Materials

- Flashlight with “candle mode,” such as a Maglite
- Small figurine
- 1.5” PVC cap to focus light downward
- (If inside) Star Box, with light (See Advance Preparation)
- (Optional) Green felt

### Facilitation Notes

#### How could we use light more effectively?

Let's look at a model. We'll add a streetlight to the grass here.

*Note: As you put the flashlight in the model, add the small figurine at the same time, in the dark area.*



#### Have you seen streetlights like this? Where is the light shining?

#### Where is the light needed?

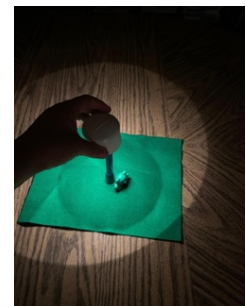
*(Optional)* There are many types of light pollution:

- **Glare** is light so bright that it makes it hard to see, such as headlights.
- **Light Trespass** is light directed in places it's not needed.

#### How could we use this light better?

A lot of light is being wasted in places where it is not needed. Let's add a shield that will direct the light down - **what do we see now?**

Directing the light downwards shows that there was a bear hiding in the shadow. Also, the light is going to the place that needs to be lit. **What type of light do you think is safer?**



**Look up at the stars.** (Indicate lights from the Star Box, if indoors.)

#### Wrap-Up Questions:

- What can you do to use light wisely? (How can you share this message?)
- Have you had experiences when light shines where you don't want it?
- What are some other benefits to using light wisely?

See a video of this demonstration from the Palomar Observatory

[youtu.be/XTjR4vef8JU](https://youtu.be/XTjR4vef8JU)

## Advance Preparation

First time setup, Star Box is used for an inside demonstration:

- In a 4" cardboard box, poke holes in the top with a pin.
- Place a bright light in the bottom of the box, shining up.
- Close the box and place in near the ceiling so that the stars can be seen when the light is shielded (*test this first*).

Setup to begin each time:

- Place green felt down on a flat surface.



## Virtual and Hands-on Presentation Extensions

- **Globe at Night** is a website and app where individuals can measure their own sky brightness each month and contribute to a global map. [globeatnight.org](http://globeatnight.org)
- A full lab for use in classrooms plus many teacher resources from the **Dark Sky Rangers**. [globeatnight.org/dsr](http://globeatnight.org/dsr)
- Read the book "There Once Was A Sky Full Of Stars."
- Build your own light shield activity with [Star Power](#) from SciGirls.
- If you are in a well-populated area, do a **light scavenger hunt**. Walk around your neighborhood taking pictures of lights - both lights that are shielded as good examples and poor examples of lights that are not properly directed.
- Talk to someone responsible for the **lighting in your neighborhood**: [www.darksky.org/our-work/grassroots-advocacy/resources/](http://www.darksky.org/our-work/grassroots-advocacy/resources/)

## Additional Resources

- For more information on how light pollution affects us all and how to preserve dark skies: [International Dark-Sky Association](http://International-Dark-Sky-Association)
- There are easy steps to making change! Conduct an outdoor lighting assessment on your own house: [darksky.org/homelighting](http://darksky.org/homelighting)
- For articles on the particular effects of light pollution: [Artificial Light at Night \(ALAN\) Research Literature Database](http://Artificial-Light-at-Night-(ALAN)-Research-Literature-Database)
- Talk to someone responsible for the lighting in your neighborhood: [darksky.org/our-work/grassroots-advocacy/resources](http://darksky.org/our-work/grassroots-advocacy/resources)

## Background Information

This activity is adapted from NOAO's Quality Lighting Teaching Kit where you can find many more wonderful lighting activities [noao.edu/education/qltkit.php](http://noao.edu/education/qltkit.php)

[NOAO](#) is the national center for ground-based nighttime astronomy in the United States and is operated by the [Association of Universities for Research in Astronomy](#) (AURA), under cooperative agreement with the [National Science Foundation](#). If you would like information about solar astronomy, visit the [National Solar Observatory](#). If you would like information about radio astronomy, visit the [National Radio Astronomy Observatory](#).



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