

Projects & Activities

Be a citizen-scientist by observing the sky for the [Globe at Night](#) star hunt and the [Great World Wide Star Count](#).

- [Let There Be Night](#)
- [Night Vision](#)
- [Sorry Starry Night](#)
- [Paper Plate Education](#)
- [Light Pollution Workshop](#)
- [Other Projects](#)

Let There Be Night



[Let There Be Night](#) is a combined planetarium program and school district-wide experiment to assess a community's sky glow. Developed for IYA2009 with contributions from Toyota and other [supporters](#), the experiment parallels the Globe at Night initiative. The planetarium program and [DVD resources](#) are available to prepare the teachers and students, who will assess sky glow from within the school district boundaries. See the [Results](#) from one community's vast experiment in 2009, in which teams of students made a 3-D model out of 35,000 LEGO blocks to convey visually how much of the local night sky has been lost to light pollution.



Night Vision



[Night Vision](#) is a NASA-supported program in which observers quantify the sky glow over their community. Families and teams use hand-held [Sky Quality Meters](#) (SQMs) to measure the amount of light reflected back down to earth from multiple sites. They will manually plot the SQM readings on a county map and create "contour lines" of equal brightness. The baseline map can be used in the future to suggest changes in the local [light pollution](#) level. After discussing the trade-offs of lighting technology and the social decisions related to outdoor lighting, participants will report their findings to the community through self-designed presentations.

Sorry Starry Night







For a science project named [Sorry Starry Night](#), a student measured the sky glow from seven sites adjacent to a new retail development. From March to December, 2006, she plotted a downward slope of Sky Quality Meter (SQM) readings, which suggested the sky glow increased. The student attributed the increase to new lights from the development, additional reflectance from snow on the ground in the latter portion of the experiment, and holiday lights in the neighborhood.




Paper Plate Education

How can you convey the impact of glare and the benefits of light shields? Try this simple experiment--so easy it was borrowed from an 8-year old. (Reproduced from *Paper Plate Education*, <http://analyzer.depaul.edu/paperplate/lights.htm>).

	<p>To simulate an unshielded light on a pole, place a Maglite® flashlight in the free-standing "candle mode" on a white surface.</p>
 <p>(No Shield)</p>	<p>Turn off all lights and observe how the light spreads out. Look up at the ceiling, too, to see the light lost to the sky. Note how the flashlight base obstructs the light in a cone of darkness, and how the exposed bulb glares brightly in your eyes.</p>
	<p>Now cover the exposed light with different shields and see what material improves the situation. While not practical, covering the bulb with just a hot pizza is a significant improvement.</p>
	<p>Shields made from various materials--a pair of hands, a paper plate, a pie tin, and a hot pizza-- always improve the situation. Note how the text under the shadow cone becomes clearly visible.</p> <p>You get several positive outcomes with full shields:</p> <ol style="list-style-type: none">1. Light is directed downward to where it is wanted, so lower wattage bulbs can be used, thus saving energy and money.2. Direct glare does not impair night vision or cause light trespass.3. General light pollution overhead--sky glow--is lessened.

Here is another simple illustration--again borrowed from an 8-year old. (Reproduced from *Paper Plate Education*, <http://analyzer.depaul.edu/paperplate/lights.htm>).

	<p>Prop open a book that has a picture of a landscape. In this case, the view is of the Chicago skyline, with street lights in the foreground. Place a Maglite® flashlight in the free-standing "candle mode" in the foreground. Here we put the flashlight so it coincides with the street light on the right. Also place a figurine in the scene.</p>
--	---



Turn off the room lights. Note how the figurine is in the shadow cast by the exposed light. Glare is obnoxious. Objects, like parked cars, are barely seen in the darkness beyond the glare. The sky is aglow with wasted light.



Now cover the light fully with a shield. The figurine and surrounding area is brightly illuminated. Glare is eliminated. Objects, like the parked car, are now visible beyond the light fixture. And the sky is dark.

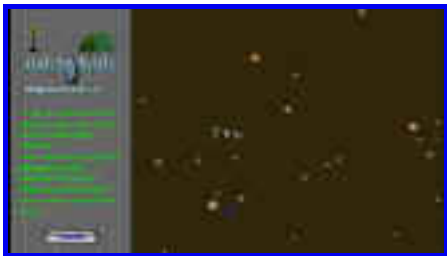
Light Pollution Workshop:



[workshop.htm](#)

A light pollution workshop at a planetarium conference was dedicated to sharing techniques for preserving the night sky. Many of the workshop activities, taken from the perspectives of varied interest groups and stakeholders, can be used by other dark sky advocates.

Other Projects:

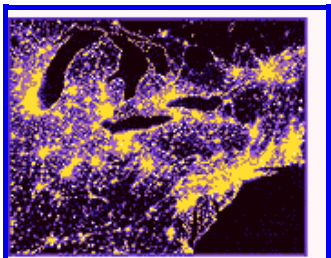


<http://www.globe.gov/GaN/>

Globe at Night is a worldwide campaign to observe and record the magnitude of visible stars as a means of measuring light pollution in a given location. Website has an effective simulator to show the limiting magnitudes of stars in the constellation Orion.



Extended list of [ideas for student projects](#) or academic fairs, with specific reference to issues in northern Indiana.



<http://www.darksky.org/programs/educational-outreach/>

Classroom activities and lesson plans listed by the International Dark-Sky (IDA).



<http://www.sternhell.at/index.php>

Determine night sky visibility conditions by counting stars in Little Dipper and Orion.



www.nasa.gov/audience/foreducators/starcount

Participate in a star count performed by Canadian Space Agency astronaut Steve MacLean aboard the Space Shuttle Atlantis in September 2006. "Students will learn how to estimate the number of stars observed based on random samples of sections of the sky. Students will add to the database by entering their location, number of stars observed and information about their viewing conditions. The students will be able to compare their observations with MacLean's and other observers."



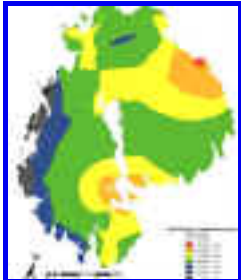
<http://www.starcount.org/>

International event encourages everyone to go outside, look skywards after dark, count the stars they see in certain constellations, and report what they see online.



[gsms.html](#)

Two students measure sky glow in their community, then share results with their classmates in a portable planetarium.



<http://www.islandastro.org/mdilightpollution.html>

"The first light pollution map of Mount Desert Island was created by College of the Atlantic students...as part of the Island Astronomy Institute's new Starlit Communities Project. They gathered 140 data points over two moonless nights this April. The map documents loss of natural starlight caused by artificial sky glow."



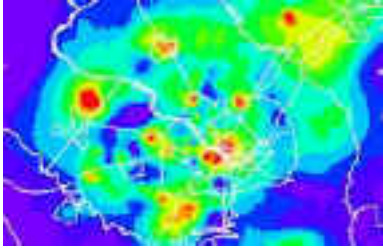
[rockland.htm](#)

Students of the Applied Democracy class at [Watershed Community School](#) in Rockland, Maine used an [SQM](#) and a handheld GPS to map sky glow in their town.



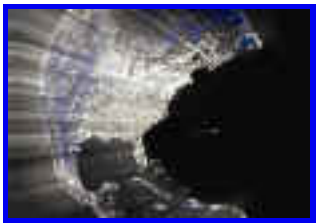
[jefferson2.jpg](#)

Students plot SQM values by hand on a map.



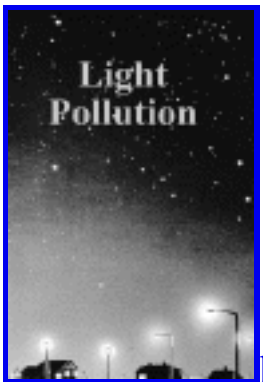
<http://www.novac.com/lp/lpe.php>

The Northern Virginia Astronomers Club (Novac) proposes to extend its earlier star counts, then known as Project Orion, with the Next Generation Light Pollution Map.



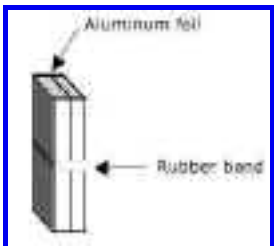
<http://media.skytonight.com/documents/200704042045.pdf>

Count Light Pollution Out by Sky & Telescope contributing editor Fred Schaaf advocates large-scale star counts; pp. 42-47, April, 2007.



<http://www.astrosociety.org/education/publications/tnl/44/lightpoll.html>

Light Pollution, Universe in the Classroom, No. 44, Fall 1998; from the Astronomical Society of the Pacific.



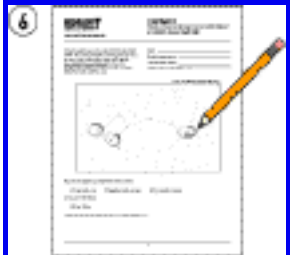
<http://www.nsta.org/programs/laptop/lessons/m4.htm>

At Issue: Light Pollution by Mary Lightbody.



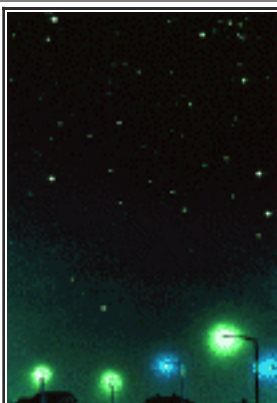
<http://www.darksky.org/infoshts/is113.html>

Count the Stars! An Activity for Elementary Students, Grades 4-6; International Dark-Sky Association, Information Sheet 113.



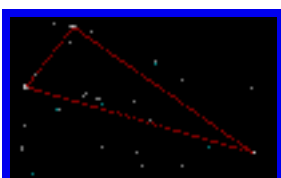
<http://www.redshiftnow.ca/starwatch/default.aspx>

Star Watch measures the sky brightness over Canada by counting the stars of the Little Dipper in Ursa Minor; from the Ontario Science Centre.



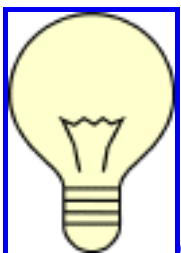
http://www.plugged-in.org/counting_stars.html

Girl Scouts count stars to determine limiting magnitude of their sky.



4.5 is depicted as 45.)

Our printer-friendly [Gemini star chart \(MSWord\)](#) can help your star count in the winter. Or click on the thumbnail images for color versions. (The approximate magnitude of each star is shown without a decimal point so that you don't mistake a decimal point for a star. For example, magnitude



[Energy chain](#)

[Energy chain](#) illustrates how only about 1% of initial energy makes it from generator to roadway reflection.



<http://britastro.org/dark-skies/education.html?20>

Pupil dilation experiments demonstrate the effects of light pollution; from the Campaign for Dark Skies.

www.nightwise.org

Copyright ©2009 [Chuck Bueter](#). All rights reserved