

Star-light, Star-bright, Measure Sky Brightness with a Metre Tonight!

Sky-brightness metres provide a more precise method to measure the night-sky brightness. The GLOBE at Night and the How Many Stars...? programmes offer opportunities to use metres to make these more objective measurements.

HOW MANY STARS...?

Newly developed light metres will continuously measure the night sky brightness at 1000 locations around the globe to monitor changes and provide an unbiased reference for the naked-eye measurements within constellations. Adopt a light metre and record the brightness of the night sky in your city, at your school or at your observatory. You need: (1) a computer with USB and Windows XP/NT/2000. (2) A place with a good view of the sky within 20 metres of the computer. (3) About 100 EUR for the light metre. Contact Verein@Kuffner-Sternwarte.at to adopt a starlight metre! For more information, visit <http://wiki.sternhell.at>.

GLOBE AT NIGHT

The low-cost, hand-held, digital Sky Quality Metres (SQM) (about 100 EUR), manufactured by Unihedron of Canada (www.unihedron.com), are used to make a highly repeatable, direct measurements of night-sky brightness. The SQM model has an almost all sky view for use in rural areas. The second-generation (SQM-L) has a narrower "field of view" for use in city environments, where surrounding lights or buildings may affect the readings. For a project, you can imagine students canvassing a city with SQMs, centered on a How Many Stars metre at their school. For information about the SQM program and suggestions on taking measurements, visit www.globe.gov/GaN/learn_SQM.html.

Why Monitor the Night Sky Brightness?

Your help in taking metre and/or naked-eye measurements this year and over the next few years will allow for more in-depth analysis. More measurements within a city or more rural area will provide maps of higher resolution. Comparisons between years would allow people to monitor changes. Monitoring our environment will allow us as citizen-scientists to identify and preserve dark sky oases in cities or catch an area developing too quickly and influence people to make smart choices in lighting. Monitoring our environment might allow us to track the habitats of animals endangered by over-lighting. ...If more and more people took a few minutes during any of the three campaigns to measure sky brightness toward one of the designated constellations with the naked-eye or toward zenith with a digital metre (or both!), their measurements will make a world of difference. ...Happy star-hunting!

Credit: TWAN/Stefan Seip



The International Year of Astronomy 2009 Dark Skies Awareness Cornerstone Project *Star-Hunting Programmes*

The arc of the Milky Way seen from a truly dark location is part of our planet's cultural and natural heritage. The ongoing loss of dark night skies for much of the world's population, caused by light pollution, is a serious and growing issue that impacts the economy, ecology, energy conservation, human health, public safety and our shared ability to see the night sky. According to the United Nations, 2008 is the first year in which over half of the world's population (some 3.3 billion people) lives in cities. As urban environments grow, so do their impact on the global environment.

For this International Year of Astronomy 2009 (IYA2009) Cornerstone project, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Astronomical Union are collaborating internationally with partners in dark-sky and environmental education to promote three main citizen-scientist programmes that measure light pollution at a local level. These programmes take the form of "star hunts" or "star counts", providing people with a fun and direct way to acquire heightened awareness about light pollution through first-hand observations of the night sky. Together the three programmes will span the entire year:

- How Many Stars...? (Jan., Feb., April – Sept., Nov., Dec. 2009)
- GLOBE at Night (March 16–28, 2009)
- Great World Wide Star Count (October 9–23, 2009)



For further information the Dark Skies Awareness programmes, please visit www.darks skiesawareness.org.

Credit: TWAN/Laurent Lavender

How You Can Participate in the Star-Hunting Programmes

The three star-hunting or star-counting programmes are fun citizen-science activities that encourage everyone — students, educators, amateur astronomers and the general public — to measure the darkness of their local skies and contribute their observations online to a world map. In the last few years these programmes successfully conducted campaigns in which more than 35,000 observations were submitted from over 100 countries.

During the IYA2009, citizen-scientists will take data on light pollution levels by comparing what they see within designated constellations, with star maps showing progressively fainter stars. The idea is that anyone from anywhere in the world at the same time of year can look within the constellation for the faintest stars and match them to one of seven star maps. For more precise measurements, digital sky-brightness metres can be used.

All anyone needs is his/her location, time, date and naked-eye and/or metre measurements. Measurements are submitted online from around the globe, and within a few days to weeks a

world map showing the results is available. These measurements can be compared with data from previous years, as well as with satellite data, population densities, and electrical power-usage maps. Measurements are available online via Google Earth or other tools and as downloadable datasets. Data from multiple locations in one city or region are especially interesting, and can be used as the basis of a class project or science fair experiment, or even to inform the development of public policy.

The five simple steps for participating in the programmes are listed in this brochure. To learn more about these and to obtain important information on light pollution, stellar magnitudes, the location of the constellation, your location in terms of latitude and longitude, and using a sky brightness metre, see the webpages for the star-hunting programs listed in this brochure. Downloadable activity packets are available in different languages as well.

Join tens of thousands of other citizen-scientists around the globe hunting for stars during the International Year of Astronomy 2009! Take part in this international campaign to preserve and observe the nighttime sky! Be part of a local solution to a global problem.

Five Simple Steps to Naked-Eye Observing with the 3 Star Hunting Programmes

Helpful information supporting all of the steps can be found on the websites for the programmes listed in the table, as well as observing forms and activity guides.

Programme & Website	Time of Year	Constellation
How Many Stars...? www.sternhell.at	Jan., Feb., April–Sept., Nov., Dec.	Little Dipper (north of Casablanca, Cairo, Delhi, Shanghai, L.A. & Atlanta)
	Jan., Feb., April, May, July– Sept., Nov., Dec.	Orion's Belt
GLOBE at Night www.globe.gov/GaN	March 16–28, 2009	Orion (best viewed: south of Greenland, Oslo, Stockholm, Helsinki, Magadan & Anchorage; north of the Antarctic coast)
Great World Wide Star Count www.starcount.org	October 9–23, 2009	Cygnus in the Northern Hemisphere; Sagittarius in the Southern Hemisphere

1. From the table above, determine what time of year, what star hunting programme and what constellation to use.
2. Make sure you have a clear, dark and moonless night sky. How long you need to wait for a dark sky depends on your location and time of year. To find out, see www.sunrisesunset.com/. For GLOBE at Night and Great World Wide Star Count, measurements can be made until moonrise (e.g., before 10pm).
3. Match the stars you see within the constellation with 1 of 7 "magnitude" charts.
4. Report your choice of magnitude chart (1 – 7) on the programme's website along with the date & time of observation and the location you took your observation. The websites help you submit your location in terms of latitude and longitude.
5. View the resulting map from this international event.

Hints:

- Avoid places with nearby direct lighting, such as street-lights.
- If you want to shine light on these instructions or the observing form, use a flashlight with a red balloon, red cellophane, a thin brown bag, or your hand to cover the light so that it dimly shines through.
- Before observing, you should give your eyes time to adapt to the dark.
- Multiple observations are encouraged from different locations.