Dark Skies Outreach to Sub-Saharan Africa

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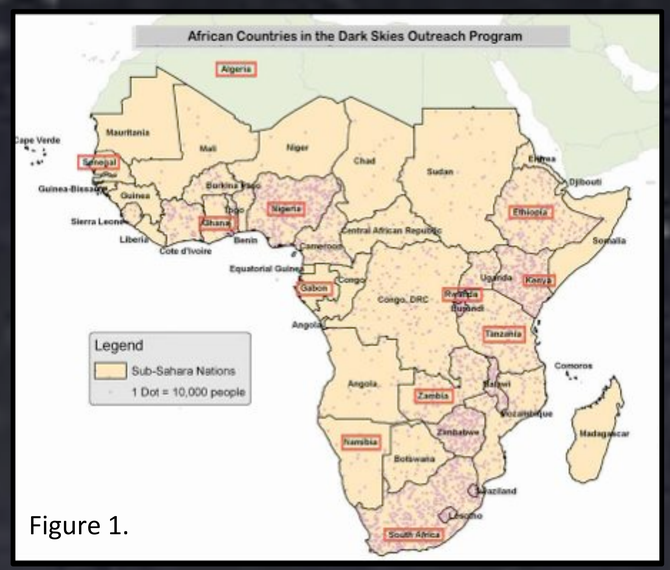
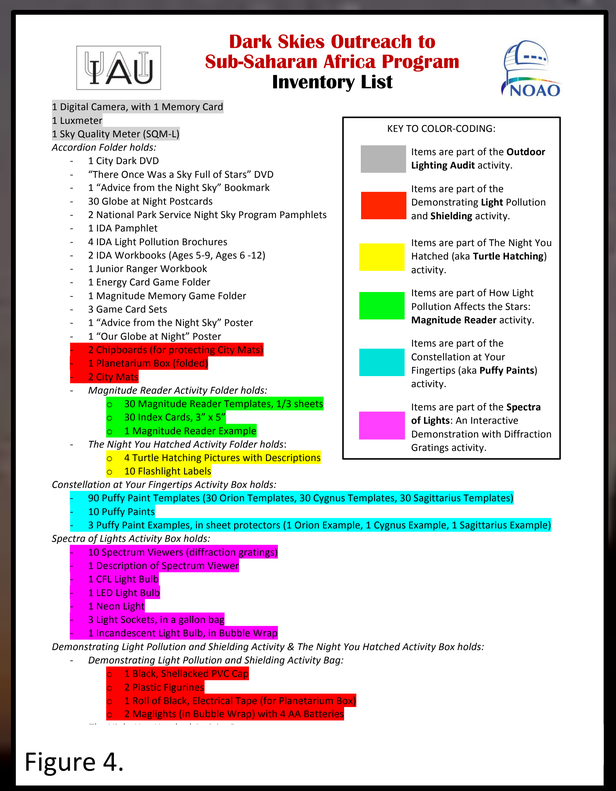


Figure 1.

Figure 2.

Figure 3.



Dark Skies Outreach to Sub-Saharan Africa Program
Inventory List

1 Digital Camera, with 1 Memory Card
1 Luxmeter
1 Sky Quality Meter (SQM-L)
Accordion Folder holds:
- 1 City Dark DVD
- "There Once Was a Sky Full of Stars" DVD
- 1 "Advice from the Night Sky" Bookmark
- 30 Globe at Night Postcards
- 2 National Park Service Night Sky Program Pamphlets
- 1 IDA Pamphlet
- 4 IDA Light Pollution Brochures
- 2 IDA Workbooks (Ages 5-9, Ages 6 -12)
- 1 Junior Ranger Workbook
- 1 Energy Card Game Folder
- 1 Magnitude Memory Game Folder
- 3 Game Card Sets
- 1 "Advice from the Night Sky" Poster
- 1 "Our Globe at Night" Poster
- 2 Chipboards (for protecting City Mats)
- 1 Planetarium Box (folded)
- 2 City Mats
- *Magnitude Reader Activity Folder holds:*
  - 30 Magnitude Reader Templates, 1/3 sheets
  - 30 Index Cards, 3" x 5"
  - 1 Magnitude Reader Example
- *The Night You Hatched Activity Folder holds:*
  - 4 Turtle Hatching Pictures with Descriptions
  - 10 Flashlight Labels

Constellation at Your Fingertips Activity Box holds:
- 90 Puffy Paint Templates (30 Orion Templates, 30 Cygnus Templates, 30 Sagittarius Templates)
- 10 Puffy Paints
- 3 Puffy Paint Examples, in sheet protectors (1 Orion Example, 1 Cygnus Example, 1 Sagittarius Example)

Spectra of Lights Activity Box holds:
- 10 Spectrum Viewers (diffraction gratings)
- 1 Description of Spectrum Viewer
- 1 CFL Light Bulb
- 1 LED Light Bulb
- 1 Neon Light
- 3 Light Sockets, in a gallon bag
- 1 Incandescent Light Bulb, in Bubble Wrap

Demonstrating Light Pollution and Shielding Activity & The Night You Hatched Activity Box holds:
- *Demonstrating Light Pollution and Shielding Activity Bag:*
  - 1 Black, Shellacked PVC Cap
  - 2 Plastic Figurines
  - 1 Roll of Black, Electrical Tape (for Planetarium Box)
  - 2 Maglights (in Bubble Wrap) with 4 AA Batteries

KEY TO COLOR-CODING:
- Items are part of the **Outdoor Lighting Audit** activity.
- Items are part of the Demonstrating **Light** Pollution and **Shielding** activity.
- Items are part of The Night You Hatched (aka **Turtle Hatching**) activity.
- Items are part of How Light Pollution Affects the Stars: **Magnitude Reader** activity.
- Items are part of the Constellation at Your Fingertips (aka **Puffy Paints**) activity.
- Items are part of the **Spectra of Lights**: An Interactive Demonstration with Diffraction Gratings activity.

Figure 4.

Overview

The International Astronomical Union's Office of Astronomy for Development (IAU's OAD) has provided the National Optical Astronomy Observatory (NOAO) with a grant to deliver a "Dark Skies Outreach for Sub-Saharan Africa" program to institutions in 12 different African countries (See the country names outlined in red in Figure 1.) This program helps students identify wasteful and inefficient lighting and provides ways to reduce consumption and to keep energy costs in check. The goal of the project is to inspire students to be responsible stewards in helping their community safeguard one of Africa's natural resources - a dark night sky. The program's kit includes complete instructional guides and supplies for six activities, including a project on energy conservation and responsible lighting. Six Google Plus Hangout sessions are scheduled from June to November. From the end of November until mid-December final class projects (such as posters or movies) will be shared on the program's website. The entire program is designed to help educators work with students, parents, and the communities to identify dark sky resources, lighting, and energy issues while assessing their own status, efficiency and effectiveness.

In Spring 2013, the activities were created based on the NOAO Dark Skies Rangers (DSR) program. (See http://www.noao.edu/education/ads.php.) The original intent of the DSR program was to provide foundational content for the Globe at Night campaign, an international citizen-science program involving the public in awareness, measurement and research of light pollution. The activities have children building star-brightness "readers," creating glow-in-the-dark tracings to visualize constellations, and role-playing hatching sea turtles confused by on-shore lights. In particular, secondary school students create a model city with shielded lights to stop upward light, examine different kinds of bulbs for energy efficiency, and perform an outdoor lighting audit of their school or neighborhood. These last three activities are in a scaffolded sequence that lay the foundation for a student-led, project-based learning experience.

The kits were redesigned to accommodate all six activities. (See Figures 3 & 4.) The kits were built and shipped to 12 coordinators recommended by the IAU OAD, each coordinator in a different African country. (See Figure 2 of Sivuyile Manxoyi, a coordinator in South Africa.) The 12 coordinators committed to Google+ Hangout sessions on the activities and to recruiting and teaching teachers the activities using the kits.

Google+ Hangout sessions started in June and are every three weeks on weekends to accommodate schedules. There have been two sets of sessions on the first two activities in the scaffolded sequence, with one on shielding lights and one on the efficiency of different bulbs. (See the photos on the right.) The third set of sessions on the third activity ("The Outdoor Lighting Audit") will be the first weekend of August.

To better serve the African coordinators, a PBworks forum web site was created by the IAU OAD, as well as a formal webpage on the project (http://www.astro4dev.org/category/tf3/dark-skies-africa/). On the PBworks site is placed useful information the coordinators have requested, as well as answers to their questions and Google+ Hangout updates.

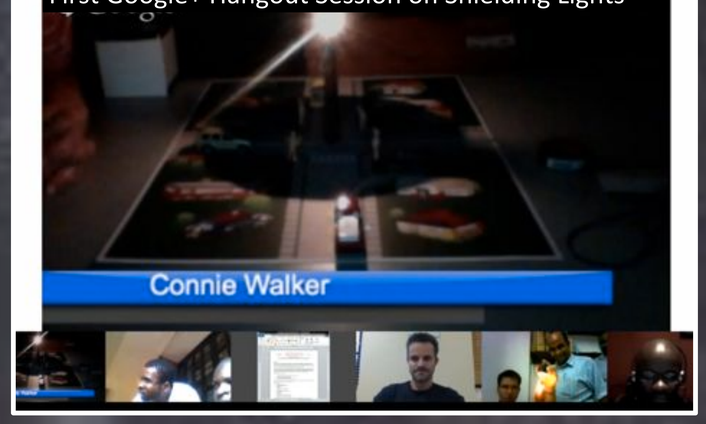
Challenges

Although precautions were taken to minimize difficulties with Customs, challenges arose with half of the kits. Official invoices, letters specifying the kits were for educational purposes only and not for resale, and detailed content lists and prices were included in each package. However, two kits still took 6 weeks to arrive. Discussions between the carrier, Customs, the recipient and NOAO were unavoidable.

Getting all the coordinators to attend the Google+ Hangout sessions has also been a challenge. To accommodate their schedules, 3 different dates were offered for the 1st Google+ Hangout session and 2 different dates for the 2nd Google+ Hangout session. For those truly unable to attend, the sessions were all recorded and placed on-line.

First Google+ Hangout Session on Shielding Lights

First Google+ Hangout Session on Shielding Lights



Second Google+ Hangout Session on the Efficiency of Different Bulbs

Second Google+ Hangout Session on the Efficiency of Different Bulbs

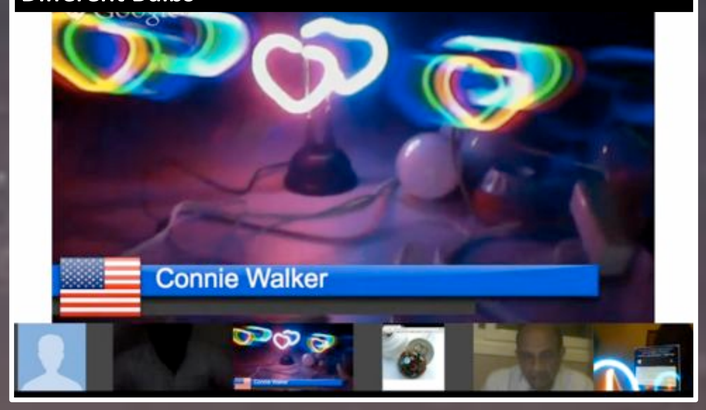


Photo Credit: The photograph used as the poster's background is by Jia Hao from China. Submitted to the April 2012 international "Earth and Sky" photo contest on Dark Skies Importance, the photo is of Comet Lovejoy over Australia. For more info, see www.twanight.org/contest.

Acknowledgement: This project is supported by the IAU's Office of Astronomy for Development as a TF3 grant to the National Optical Astronomy Observatory. NOAO is operated by the Association of Universities for Research in Astronomy under a cooperative agreement with the National Science Foundation.