



Light Pollution

Introduction

In the process students will use their experimentation techniques to reinforce the concepts of variables, controls, and accuracy. The students will also be introduced to the concept of stellar magnitude. In order to participate in the worldwide sharing of light pollution data, students should have access to a computer and the worldwide web.

Activity 1: Northern Hemisphere, late summer or early fall

Objective

In this activity, students will be introduced to the factors that influence light pollution by observing the constellation Cygnus.

Materials

- Recording Forms 1-4
- Pencil
- Flashlight which has been [prepared for nighttime use](#)
- Star chart

Several websites have star maps that you can download. They include:

- www.skymaps.com
- www.gsat.edu.au/astronet

Vocabulary

- Cygnus
- Stellar magnitude

Procedure

1. Review the procedures for a nighttime field trip and pass out permission slips.
2. Arrange for several parents to take calls in case of bad weather.
3. Begin at least one hour after sun set. Once you gather the students at your observation place wait at least 15 minutes to allow your eyes and theirs time to adjust. While you are waiting, discuss any sources of light pollution and have your students write them in their journals.
4. Instruct students to locate Cygnus (using their star charts). Starting with Recording Form one, have the students circle every star on the form that they can see in Cygnus.



5. If they see more stars than those on Recording Form One, have them go on to form 2. Have them circle every star they can see on Recording Form two. Continue through the forms in this manner. Only locations with very little light pollution will be able to see stars on chart four.
6. Have the students staple their charts and their report forms into their journals.

Discussion

Students should bring their Recording Forms to class the day following your observation and discuss their answers.

Conclusions

Students should use their collective data to draw a conclusion regarding light pollution at your location.

Appendix: How to prepare for nighttime observation

Observe at least one hour after sunset to eliminate the effects of sunlight

Wait 10–15 minutes before observing to allow their eyes time to adjust to the dark. While the students are waiting they can look for artificial sources of light pollution such as street lights, or security lights.

Prepare your flashlight for nighttime use. The human eye needs to adjust to the dark before it can observe properly. Using a normal flashlight to help one record what they see in the sky would ruin any adjusting that the eye has done. Hence, a flashlight has to be specially prepared before it can be used while observing. To do this, place several layers of red cellophane or two coats of red fingernail polish over the flashlight. The color red does not disturb night vision as much as normal (white) light does.

Activity 2

Objective

This activity will tie students around the world together to share light pollution data using the worldwide web. It will also give students a chance to review experimentation techniques and data analysis.

Vocabulary

- Control
- Data
- Stellar magnitude
- Variable



Procedure

1. As a class, decide what is the highest magnitude of star that can be seen from your location.
2. On the worldwide web, have your students help you fill out the [online response form](#).
3. Bring up the on-line data page. Pick several of the classes that have responded and have your students research their locations (useful information would be population, location, and setting).

Discussion

Discuss the following questions as a class:

1. What classes could see the highest magnitude stars? How does this relate to where those students live?
2. Are there controls and variables in this experiment? What are they?

Activity 1: Northern Hemisphere, late winter or early spring

Objective

In this activity, students will be introduced to the factors that influence light pollution by observing the constellation Orion.

Materials

- Recording Forms 1-4
- Pencil
- Flashlight which has been [prepared for nighttime use](#)
- Star chart

Several websites have star maps that you can download. They include:

- www.skymaps.com
- www.gsat.edu.au/astronet

Vocabulary

- Orion
- Stellar magnitude

Procedure



1. Review the procedures for a nighttime field trip and pass out permission slips. Make copies of star charts and recording forms 1-4 for all of your students.
2. Arrange for several parents to take calls in case of bad weather.
3. Begin at least one hour after sun set. Once you gather the students at your observation place wait at least 15 minutes to allow your eyes and theirs time to adjust. While you are waiting, discuss any sources of light pollution and have your students write them in their journals.
4. Instruct students to locate Orion (using their star charts). Starting with recording form one, have the students circle every star on the chart that they can see in Orion.
5. If they see more stars than those on Recording form one, have them go on to recording form 2. Have them circle every star they can see on recording form two. Continue through the charts in this manner. Only locations with very little light pollution will be able to see stars on recording form four.
6. Have the students staple their recording forms into their journals.

Discussion

Students should bring their recording forms to class the day following your observation and discuss their answers.

Conclusions

Students should use their collective data to draw a conclusion regarding light pollution at your location.

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- Stellar magnitude
- Variable

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 2. Are there controls and variables in this experiment? What are they?
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Source: <http://www.nsta.org/publications/interactive/aws-din/din-u3.aspx>



