Night Light Pollution

 Lesson Plan on Light Pollution for Grades 3rd – 4th

# OVERVIEW & PURPOSE

Learning about the four types of light pollution can empower students to make conscious changes in outdoor lighting to protect nocturnal animals and the overall health of surrounding ecosystems.

# EDUCATION STANDARDS

NYS Science Standards

3-LS3-2 – Use evidence to support the explanation that traits can be influenced by the environment.

 3-LS4-3 – Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less, and some cannot survive at all.

NYS Literacy in Science Standards

3R1 – Develop and answer questions to locate relevant and specific details in a text to support an answer or inference. (3-PS2-1), (3-PS2-3)

3R3 – In informational texts, describe the relationship among a series of events, ideas, concepts, or steps in a text, using language that pertains to time, sequence, and cause/effect. (3-PS2-3)

3R8 – Explain how claims in a text are supported by relevant reasons and evidence. (3-PS2-1),
(3-PS2-2)

# OBJECTIVES

1. To help students gain an understanding of the risks to animals from light pollution, especially nocturnal and migrating species.
2. To introduce students to the four basic types of light pollution.
3. To create a drawing/poster to share their learning with others.

# BACKGROUND INFORMATION FOR TEACHERS

Light pollution can impact animal behaviors, such as migration patterns, waking/sleeping habits, and habitat formation. Night skies often provide shelter and cover for prey that could now be easily spotted in artificial lighting in aids in food chain disruptions. Birds can grow confused and crash into buildings while migrating or foraging for food. Light pollution can even disrupt our own sleeping patterns. This lesson can bring awareness to others and educate them on the harmful effects it has on animals and even humans.

# MATERIALS NEEDED

Books:
 *Lights Out!* By Marsha Arnold
 *Otter Moon* by Tudor Humphries

Lesson 1:
 Learning Junction Light Pollution video on Youtube
 <https://www.youtube.com/watch?v=5gYIeT6GrkA>
 National Geographic Light Pollution 101 Youtube video
 <https://www.youtube.com/watch?v=V_A78zDBwYE>
 Activity Sheet
 Black construction paper
 Flashlight
 Pencils
 Scissors

Lesson 2:
 *Otter Moon* by Tudor Humphries
 Black construction paper
 White crayons

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# LESSON ONE

**Introduce the concept of night light pollution by discussing all types of pollution (air, water, noise, land, and light).**

**Watch the YouTube video by Learning Junction that defines the 4 different types of light pollution.**

**Read the story *Lights Out!***

**Review the four types of light pollution.**

**Activity 1 –**

**Using the activity sheet provided, have the students draw examples of the types of light pollution and share with the class.**

**Activity 2 – The experiment will take place in a dark room.**

1. **Cut a piece of black construction paper slightly larger than the flashlight.**
2. **Using a pencil or scissors, poke holes in the construction paper to form a constellation.**
3. **Place the construction paper over the flashlight and turn it on in a dark room, being sure to aim the flashlight at the ceiling the entire time.**
4. **Gradually brighten the room (using window shades or other ways to increase lighting).**

**Discuss:**

**You probably found that you could easily see the homemade constellation in a darkened room. However, as the “light pollution” (lighting in the room) increased, your constellation slowly disappeared.
If you had different size holes in your constellation you would see that the smaller holes faded sooner. The more artificial light we add, the more difficult it is to see the stars. Light pollution decreases sky visibility!**

**Activity 3 -**

**Have the students use a white crayon to draw the nocturnal animals in the stories that were searching for the dark.**

# LESSON TWO **Review the four types of light pollution.**

**Read *Otter Moon* by Tudor Humphries**

**Comprehensive questions –**

1. **What did the King of the River want from Flibberty the Otter?**
2. **What nocturnal animals did you meet in the story?**
3. **What was the shimmering dish?**
4. **How did the big fish land on the swimming dish?**
5. **How did the great shimmering dish slowly turn into a golden dish?**
6. **Was the Great Blue Heron a good friend to Flibberty?**

**Explain.**

# CHECKING FOR STUDENT UNDERSTANDING

1. Can students identify the four types of light pollution? (Skyglow, Light Trespass, Glare, and Clutter)
2. Are students able to explain how and why lights make stars harder to see at night?
3. Are students able to explain the effects light pollution has on diurnal and nocturnal animals?

OTHER RESOURCES

[www.nationalgeographic.org](http://www.nationalgeographic.org)

[www.fountainhillsdarkassociation.org](http://www.fountainhillsdarkassociation.org)

# VOCABULARY

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| **Clutter –** bright, confusing, and excessive groups of lights. |
| **Diurnal –** active during the day, asleep at night.  |
| **Glare –** excessive groupings of light that may cause visual discomfort.  |
| **Light Pollution –** any bad effect ass a result of manmade (or artificial) lights.  |
| **Light Trespass –** when unwanted light enters one’s property, for example, by shining over a neighbor’s fence.  |
| **Nocturnal** – active at night, sleeps during the day.  |
| **Skyglow –** too many artificial lights cause a glowing effect that can be seen overpopulated areas.  |

Name:

**Light Pollution Activity Sheet**

**Draw a picture depicting the four types of light pollution.**

**Glare –** excessive groupings of light that may cause visual discomfort. **Clutter -** bright, confusing, and excessive groups of lights. **Light trespass –** when unwanted light enters one’s property, for example, by shining over a neighbor’s fence. **Skyglow -** too many artificial lights cause a glowing effect that can be seen overpopulated areas.