Effects of Light Pollution on Diurnal
& Nocturnal Animals

Lesson Plan on Light Pollution for Preschool-Grade One

# OVERVIEW & PURPOSE

 Learning about light pollution and the living things it affects gives children the information they need to make good environmental choices as they grow. This information can empower them to have discussions at home about ways to help.

# EDUCATION STANDARDS

NYS Next Generation Learning Standards

 PKR1 – Participate in discussions about a text.

 KR1 – Develop and answer questions about a text.

 1R1 – Develop and answer questions about key ideas and details in a text.

NYS Science Learning Standards

P-LS1-1 Observe familiar plants & animals and describe what they need to survive. (Emphasis on determining what a variety of living organisms need to live and grow.)

K-LS1-1 Use observations to describe patterns of plants and animals (including humans) need to survive.

# OBJECTIVES

1. To introduce students to the four basic types of light pollution.
2. To help students gain an understanding of diurnal and nocturnal animals.
3. To introduce students to the effects of light pollution on animals, plants, and humans.

# BACKGROUND INFORMATION FOR TEACHERS

Light pollution influences all living things including plants, trees, animals, and people. One half of the earth’s animals are nocturnal and depend on the night. Night provides safety, helps to regulate behaviors, and secures animals. Excessive lighting causes problems because of this.

Migratory birds become confused when flying in excessive lighting. It can cause exhaustion and possible collisions with buildings.

Unnecessary lights can interfere with the life cycle of animals.

Bright lights shining in a bedroom window can even interrupt our sleeping patterns.

# MATERIALS NEEDED

Books:
 *There Once Was a Sky Full of Stars* by Bob Cremlin
 *Lights Out!* By Marsha Arnold
 *Otter Moon* by Tudor Humphries
 *What if Night?* By Paul Bogard

Lesson 1:
 Sorting Game (Printed)
 St. Lawrence River graphic
 Paper
 Pencils
 Crayons

Lesson 2:
 Lamp with shade
 Tin foil
 Poster board
 Various materials for drawing and coloring

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# LESSON ONE ACTIVITY

**Post the graphic of the St. Lawrence River and define it.**
Show the children the difference between land and water areas. Then invite children to point out areas of land and water. Remind children that animals need clean drinking water, food, shelter, and the regular cycle of daytime and nighttime. The darkness of night provides a type of shelter.

**Diurnal – Nocturnal Sorting Game**Prepare for activity by defining:
 Diurnal animals are awake and active during the day.
 Nocturnal animals are awake and active during the night.

Place the sorting Diurnal/Nocturnal mats. (For the very young children it may be helpful to model the activity by working together first.) Then the activity can be a center time activity. Name each animal and invite the children to sort the animal picture cards.

Ask children if they have ever been bothered by bright lights? When? Describe.

Select a few pictures from the sort of activity and describe a bit more about the animal and why it needs night or day.

* Examples:
Goose – as geese fly south for the winter, they need darkness to help them navigate safely. Bright lights can make them lose their way south or collide with a building.
Rabbit – the darkness of night helps provide shelter for a rabbit from predators.
Toad/ Frog – darkness helps them to blend into their surroundings keeping them safe.
Opossum – their eyes are very sensitive to bright lights. This can make it difficult for them to remain active at night.

Ask the children to name an animal picture and tell if it is nocturnal or diurnal. How can we help these animals have nighttime?
Draw and write about your favorite animals from this activity.

# LESSON TWO ACTIVITY

**Define the four basic types of Night Light Pollution:
Glare –** Bright lights that make it difficult for you to see at night.
**Skyglow –** The up light that glows in the night sky. This fades stars from view. **Light Trespass –** Lights from your neighbor or the street that shine in your window and on your yard. **Clutter –** Too many lights in a group that makes it difficult to see at night.

**Read *There Once Was a Sky Full of Stars* by Bob Cremlin.**

**Before the Story**Invite children to look at the book cover and predict what the story may be about.
Take a “picture walk” through the book, pausing to allow students to comment on the pictures.

**During the Story**

* Refer to important vocabulary, adding further explanation as you deem necessary.
* 2nd page – **ask children if they have seen the Milky Way. Did you know 80% of Americans no longer see this due to excessive lighting?**
* 4th page – **Ask children if they have ever seen a shooting star. If so, describe.**
* 8th page – **Invite children to name the animals they see on this page.**
**This page may make children feel sad – it is important to explain there are simple ways to help.**
* 9th page **– Add additional information about trees. Light pollution may confuse a tree so they do not drop their leaves when they should in the fall.**
* 10th page – **Invite children to point to lights that are shining downward (less harmful).**
* 12th page – **Ask what this mother is doing to the lights that helps lesson their impacts.**

**After the Story Activities**

The final pages of the book offer discussion points.

Activity 1 – Use the tabletop lamp to show children how a shade (pointing the lights downward) can be helpful with outdoor lighting.

* Turn off the classroom lights and close the blinds if possible.
* Turn on the lamp without the shade – invite children to describe the brightness.
* Now put the shade on the lamp and invite children to describe the difference and how they feel about it. Ask children how this might help in their neighborhood, in the town, and along the river.

Activity 2 – What is light pollution? Great Basin Observatory Mini Lesson

* <https://greatbasinobservatory.org/lesson-plans/what-light-pollution-mini-lesson>

Activity 3 – Poster Fun

* Provide children with poster paper, crayons, markers, pencils, and ask them to draw a picture about light pollution.
	+ - What does it look like?
		- What might it look like without light pollution?

\*Note: Grade 1 children may be able to draw one of the four types of light pollution. You can extend their learning by asking them to describe how they or their family can help prevent light pollution.\*

# 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 the risks of light pollution on nocturnal and diurnal animals? (Life-threatening disruptions to daily schedules, predator/prey relationships, reproduction, foraging for food, and other necessary components.)
3. Did students complete a poster, demonstrating their knowledge of at least one form of light pollution, and its negative effect on wildlife?

OTHER RESOURCES

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

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

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

# VOCABULARY

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| **Atmosphere –** the layers of gases surrounding the planet. |
| **Clutter –** bright, confusing, and excessive groups of lights. |
| **Diurnal –** active during the daylight hours. |
| **Galaxy –** millions of stars, gases, dust all held together by gravitational attraction. |
| **Glare –** excessive brightness that makes it hard to see. |
| **Forage -** to hunt for food |
| **Habitat** - the natural place animals and plants live in, such as a frog in a marsh |
| **Light Trespass –** light falling where it is not intended or needed. |
| **Milky Way** – the large star-filled galaxy. The “path look” is billions of stars.  |
| **Nocturnal** – an animal that is awake and active during the night. **Shooting Star** – small rocky debris that enters the Earth’s atmosphere then quickly burns up, causing a streak across the sky.  |
| **Sky –** the atmosphere above the earth. |
| **Skyglow –** brightening of the night sky. |
| **Skyline –** the outline of the land and/or buildings at the sky’s edge. |
| **Space –** the physical universe beyond the Earth’s atmosphere**.**  |
| **Starlight –** the light that comes from stars. |
| **Twilight –** the soft glow of light right after the sun sets. |
| **Universe –** everything we touch, feel, measure, or detect including living things, planets, stars, and clouds. |