



LIGHT STEWARDS



Lesson Plan

Grades: 6-12

Purpose:

Have students take notice of light pollution in their daily life through field studies at different scales of a city/town, observe its impacts on their surroundings and wildlife, and think of holistic solutions to artificial light at night.

Desired Learning Outcomes:

1. Know what light pollution is, how it can be addressed, and why it is important.
2. Analyze the issue of light pollution in their city/neighborhood/home.
3. Become lighting stewards of their communities.
4. Empathize with the experiences and needs of other species
5. Relate the issue of light pollution to other current issues (environmental, political, social).

Materials:

- Slideshow presentation: intro to light pollution
- Three worksheets:
 - Pre-Activity Survey
 - Intro to Light Pollution worksheet
 - Fieldwork Guide
- Handouts for homework field study

Procedure

Day 1 (4 hours)

SCALE: CITY

- Intro to light pollution (presentation / in-class lesson)
 - What is light pollution? (think-pair-share)
 - What causes it?
 - Where can it be seen?
- Field trip to see the city from afar at night (ex: take a bus and incline to Mount Washington)

- Recap of light pollution
- Notes and observations in worksheets
- Class discussion
 - How might light pollution look different from the scale of the street?

Day 2 (2 hours)

SCALE: STREETSCAPE

- Class splits up into groups of 6-8
- Shorter field trip to a commercial street
 - Document luminaires and streetscapes with photos and/or sketches
 - Notes and observations in worksheets
 - Group discussion

Day 3

SCALE: HOME

- Using the strategies learned in the previous lessons, students will study their own homes, working independently. This activity can be assigned as homework.
- Students will continue to use worksheets to guide their observations and include additional information as needed (more detail, counting, etc.)
- Students will assess the lighting of and around their home and propose solutions to decrease levels of light pollution.
 - Students will present their findings to the class, either in small group discussions or as a brief presentation.

Potential logistical challenges to consider:

- Field trips need parent chaperones and transportation to/from the site. Depending on the distance, students could carpool in chaperones' vehicles, take public transportation, or be shuttled in a charter bus.
- Field trips must happen at night time, and require permission from school administration and parents.
- Parents may be wary of the idea, so invite them into the process!
- If parents object to the entire sequence of field trips, the lesson loses much of its impact, but can be adapted as follows:
 - Hold class discussions and an intro to light pollution in the classroom.
 - Skip to "Scale: Home" and have students fill out worksheets as homework.

Light Stewards



Intro to Light Pollution



Name: _____ Date: _____

Key terms

Skyglow: _____

Glare: _____

Light trespass: _____

Uplight: _____

Clutter: _____

Light fixture: _____

Bortle Scale: _____

What do you use artificial lighting for?

What causes light pollution?

What is an example of light pollution near your home?

How might light pollution affect wildlife?

Give an example of how herbivores are affected by light pollution.

How might light pollution affect the human body?

How might light pollution affect safety?

How can streetlights be changed to reduce light pollution?

Light Stewards



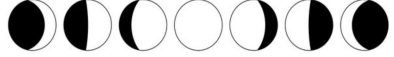
Fieldwork Guide



Name: _____ Group members (if any): _____

Date: _____ Time: _____ Scale of observation (circle): **city** **street** **home**

Location: _____

Weather: _____ Moon phase: 

Estimated Bortle Scale (1 is darkest, 9 is most light-polluted): _____

Estimated number of stars visible: _____

What does the sky look like at this scale? _____

Describe your surroundings. Are there lots of people? Car traffic? Stores? Houses? What happens here? What do you know about the area?

Does the area seem highly illuminated, dark, or somewhere in between? Why?

Look at the lighting fixtures in the area. Where are they directing light toward?

Identify 3 different lighting fixtures you see. **Sketch them below.**

Be sure to note where they are directing their light, the source/purpose (streetlight, home interior, etc.), and the perceived brightness level.

<i>Light A type:</i> _____	<i>Light B type:</i> _____	<i>Light C type:</i> _____

Which light is the brightest? Why?

Which directs the light most effectively? Why?

How would you change the lighting to make it more effective and less polluting?

What animals do you see? If you don't see any, what types of animals do you imagine living at this location?

How might artificial light at this location affect the animals that live nearby?

Identify 3 different animals that may live nearby and consider how artificial light at night may disrupt their way of life (food, predators, migration, etc).

<i>Animal:</i> _____	<i>Animal:</i> _____	<i>Animal:</i> _____
<i>Habitat:</i> _____	<i>Habitat:</i> _____	<i>Habitat:</i> _____
<i>How is it affected by artificial light?</i>	<i>How is it affected by artificial light?</i>	<i>How is it affected by artificial light?</i>

What have you learned from this field study? Did anything surprise you?

What questions do you have about light pollution, cities, and wildlife?

Brainstorm these questions, and keep them in mind to investigate during the next field study or class discussion.

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Exploring Light Pollution



Pre-Activity Survey



What is pollution?

Have you heard of light pollution?

What does light pollution look like?