

LIGHTS OUT: ACTIVITIES FOR EDUCATORS & READERS

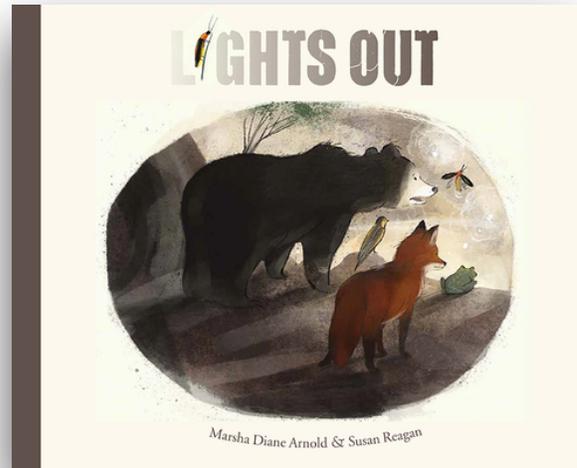
ABOUT THE BOOK

Lights Out

by Marsha Diane Arnold
Illustrated by Susan Reagan
Published by The Creative Company
ISBN-13: 9781568463407
Age Range: 6-10 Years

In a world marred by light pollution, this quest for true darkness is a clarion call to turn out the lights—so that all may see.

“The closing spreads with the dark sky and natural, nocturnal lights are enchanting. Stars twinkle, and the moon glows, as Mother Nature would have it....An author’s note kicks off the book, noting how little we hear about light pollution. Illuminating.”
—*Kirkus Reviews*



ABOUT THE ACTIVITIES

Lights Out readers who have followed the animals’ quest to find the Dark of Night may also want to embark on their own quest to decrease the Earth’s light pollution. In this series of STEAM activities, readers will be able to actively engage in research, astronomy, math, art, languages arts, and social action.

View & Download: <https://bit.ly/LOActivities>

THOSE ACTIVITIES INCLUDE THESE TOOLS:

LIGHTS OUT: RESEARCH CARDS (STEM)

This activity provides readers with six Research Cards to explore the effect of light pollution on the animals featured in the book and on humans. There is a brief paragraph to get readers started and a place for their own questions and research. Are they curious about other animals? The activity also provides a blank Research Card to record those explorations.

View & Download: <https://bit.ly/LOResearch>

LIGHTS OUT TO SEE EVERYTHING (CONSTELLATIONS)

Light pollution has greatly diminished our relationship with the night sky. This astronomy activity provides links to explore the night sky, introduces the most recognized constellations, and includes templates to map *Ursa Minor* and *Canis Major* using images of the book’s characters.

View & Download: <https://bit.ly/LOMajorMinor>

LIGHTS OUT: ACTIVITIES FOR EDUCATORS & READERS

PAINTING DARKNESS (ART & SCIENCE)

To highlight how nature has its own ways to light up the darkness, this activity provides links to study *bioluminescence* and *tapetum lucidum* and shares a wax resist art project.

View & Download: <https://bit.ly/LOArt>

MATH (TO ILLUMINATE) PROBLEMS (MATH)

Readers are encouraged to go on a nighttime neighborhood walk with a parent or guardian to count the number of illuminated outdoor lights. Back at home or in the classroom, they can calculate the cost of keeping the lights on.

View & Download: <http://bit.ly/LOMathProblems>

CALLING FOR LIGHTS OUT (SOCIAL ACTION & SCIENCE)

Taking everything they have learned, readers can call for “lights out” in their home or community. This activity includes a light pollution informational sheet/letter, an action guide, and blank templates to create their own versions of both.

View & Download: <https://bit.ly/LOSocialAction>

SHEDDING LIGHT ON LIGHTS OUT (ENGLISH LANGUAGE ARTS)

Author Marsha Diane Arnold offers opportunities for readers to explore the book’s structure, write haiku, create and send a persuasive letter, and write up their observations of nature.

View & Download: <https://bit.ly/LOELA>

LIGHTS OUT IN MANY VOICES (READERS’ THEATER)

Author Marsha Diane Arnold wants many voices raised against light pollution. With this Readers’ Theater Script, readers can join a multi-voice read aloud.

View & Download: <https://bit.ly/LOReaders>

ABOUT THE BOOK & ACTIVITY PARTNERS

These activities were a collaboration between the following partners. Our special thanks to Charles Fulco, an Education Consultant to International Dark-Sky Association, who reviewed these activities. Explore:

MarshaDianeArnold.com for more of her acclaimed books.

[Susan Reagan](#) for the beautiful art she creates for books.

CuriousCityDPW.com for more free classroom activities, programming guides, and lessons for home learning.

[Charles Fulco](#) for engaging science experiences for educators of all backgrounds

DarkSky.org for discovering how to reduce light pollution and engage with dark skies.

LIGHTS OUT: RESEARCH CARDS

The picture book *Lights Out* follows several animals through the too-bright night in search of Darkness. As we meet each animal, we discover that they are "confused and ever circling" or waiting to join the "nighttime chorus." Why?

These animals are affected by light pollution. Too much light hampers their rest, feeding, reproduction, and crucial journeys. All of these things put our animal populations at risk. Wild animals are not the only ones affected. Humans, surrounded by artificial light all day and night, have disrupted their circadian rhythms or the physical, mental, and behavioral ways we change as the light changes.

This activity provides you with six Research Cards to explore the effect of light pollution on the animals featured in the book and on humans. There is a brief paragraph to get them started and a place for their own questions and research. Are they curious about other animals? The activity also provides a blank Research Card to record those explorations.

Print and fold Research Cards on the dotted line like a greeting card. While there is only a small space for their questions and research inside the card, opening the card reveals an entire blank page.

Here are some resources on light pollution:

Encore: Blue Light And Sleep

<https://bit.ly/LOLightSleep> (Source: Weekend Edition Sunday)

These animals depend on darkness

<https://bit.ly/LODarkness> (Source: Washington Post)

Dark matters: night light stops toads in their tracks

<https://bit.ly/LOToads> (Source: Conservation Physiology)

Fireflies Have a Mating Problem: The Lights Are Always On

<https://bit.ly/LOFirefliesMate> (Source: New York Times)

Light Pollution Can Impact Nocturnal Bird Migration

<https://bit.ly/LOMigration> (Source: All Things Considered)

Animals Need the Dark

<https://bit.ly/LOAnimals> (Source: National Park Service)



*Where is Darkness?
Where is Night,
where coyotes sing,
owls hunt, and
birds fly across
continents,
where foxes move
through the dark
and beetles are more
than beetles?*

*Fox and Beetle
wonder
if Night is only lost.
Out there.
Somewhere.*

*And so, together,
they set out.
Across the wide,
wide world,
they search...
for the Dark of
Night.*

—*Lights Out*

QUESTIONS & RESEARCH

Need more room?
Open the research card and use the blank side.

LIGHTS OUT

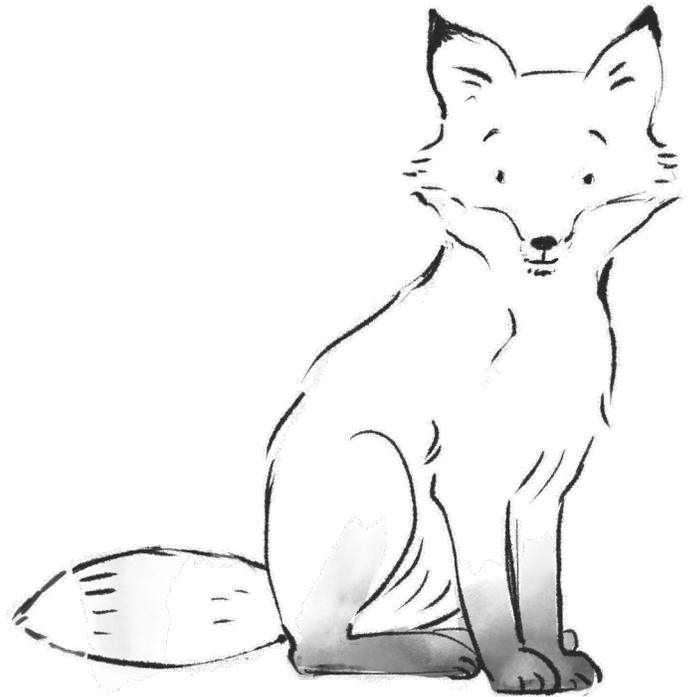
A picture book by Marsha Diane Arnold
and illustrated by Susan Reagan
(The Creative Company)

Image © Susan Reagan

LIGHT POLLUTION & FOXES

Lots of animals, like foxes, rely on the change from day to night for their survival. Foxes are nocturnal, which means they do their important work, like hunting, eating, and reproducing, at night. But too much light from our growing towns and cities can confuse foxes into thinking it is daytime even after the sun has set. And for foxes, who are experts at finding their food in the dark, the extra light makes hunting difficult because their prey won't come out.

Just as you need the right amount of light to play or sleep, it's important to remember that other mammals need time with *lights out* too!



LIGHTS OUT

Need more room?
Open the research card and use the blank side.

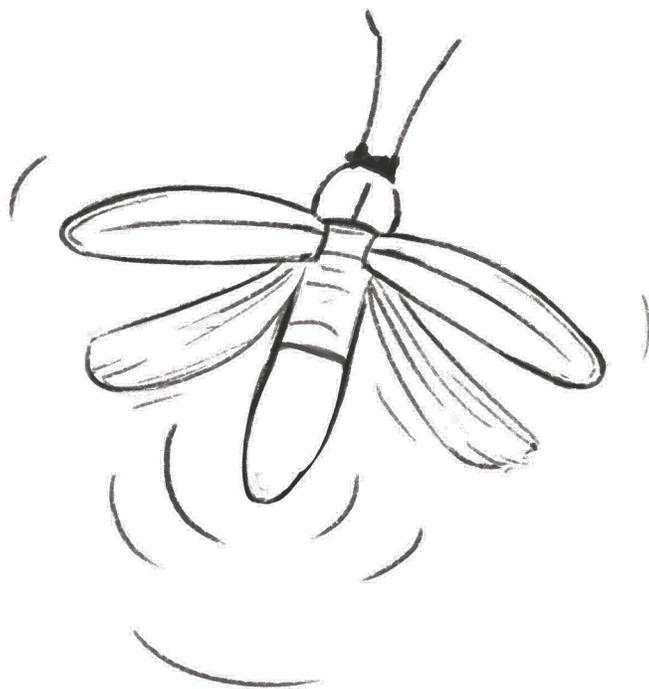
QUESTIONS & RESEARCH

LIGHTS OUT

A picture book by Marsha Diane Arnold
and illustrated by Susan Reagan
(The Creative Company)

Image © Susan Reagan

LIGHT POLLUTION & FIREFLIES



LIGHTS OUT

One of the best ways to spend warm summer nights is watching flickering fireflies in the dark. But what happens when lights from cities and towns make it too bright to see them? That's not only a problem for you and me--that's a problem for fireflies, too! Those tiny little insects use their bodies as beacons to help their partners find them, and if lights nearby are too bright, fireflies can't locate each other to reproduce. To help fireflies maintain their populations, remember to keep the lights out!

Need more room?
Open the research card and use the blank side.

QUESTIONS & RESEARCH

LIGHTS OUT

A picture book by Marsha Diane Arnold
and illustrated by Susan Reagan
(The Creative Company)

Image © Susan Reagan

Did you know that humans aren't the only ones who use the stars to navigate on dark nights?

Migrating birds also follow stars and landmarks on the ground, like rivers and shores, to find their way from place to place. But what happens if our feathered friends get distracted by the bright lights of a city or town? You guessed it! Too much light can confuse birds and cause them to be injured or lost before they reach their destination.

To help migrating birds find their way, remember to keep the *lights out!*

LIGHT POLLUTION & BIRDS



LIGHTS OUT

Need more room?
Open the research card and use the blank side.

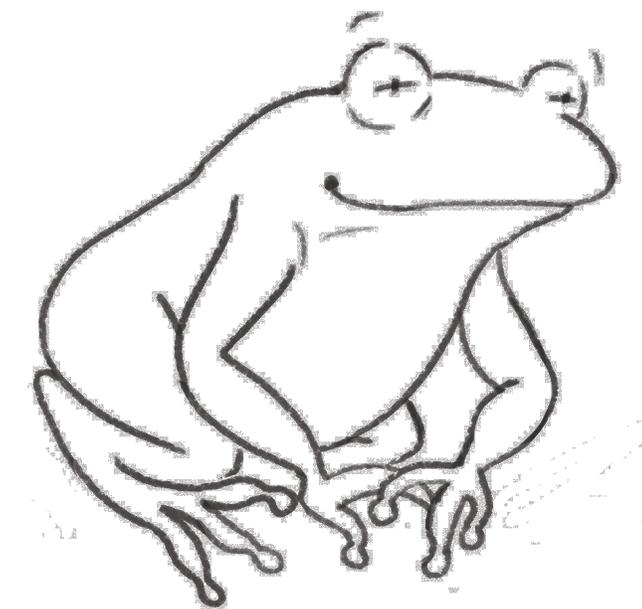
QUESTIONS & RESEARCH

LIGHTS OUT

A picture book by Marsha Diane Arnold
and illustrated by Susan Reagan
(The Creative Company)

Image © Susan Reagan

LIGHT POLLUTION & FROGS



LIGHTS OUT

While you've probably spotted frogs and other amphibians hopping around during the day, they are actually nocturnal, which means they take care of their most important work at night. Like other nocturnal animals, frogs' bodies notice when it gets dark, but in some areas, too much light from towns and cities makes it hard to tell the sun has set. For frogs, this means they don't know that it's time to eat, digest their food, travel to a new place, or reproduce, and that is a problem for them and their entire habitat!

So remember that when you hear frogs croaking, it's time to turn the lights out!

Need more room?
Open the research card and use the blank side.

QUESTIONS & RESEARCH

LIGHTS OUT

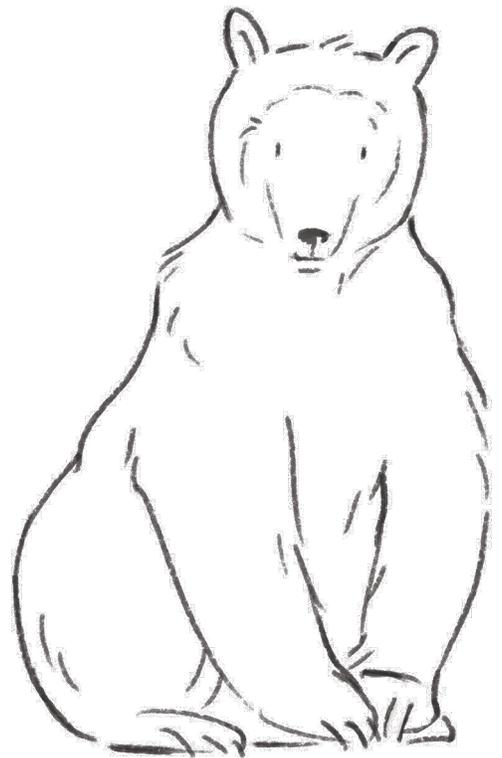
A picture book by Marsha Diane Arnold
and illustrated by Susan Reagan
(The Creative Company)

Image © Susan Reagan

LIGHT POLLUTION & BEARS

Lots of animals, like bears, rely on the change from day to night for their survival. Bears are diurnal, which means they do their important work, like hunting, eating, and reproducing, during the day. But too much light from our growing towns and cities confuses bears into thinking it is still daytime even after the sun has set. And for bears, who sleep at night like us, too much light means their bodies get tired from not knowing when to go to bed.

Just as you need the right amount of light to play or sleep, it's important to remember that other mammals need time with *lights out*, too!



LIGHTS OUT

Need more room?
Open the research card and use the blank side.

QUESTIONS & RESEARCH

LIGHTS OUT

A picture book by Marsha Diane Arnold
and illustrated by Susan Reagan
(The Creative Company)

Image © Susan Reagan

LIGHT POLLUTION & HUMANS

Humans are exposed to lots of light, even at night, and screen time is a big source. Like other animals, chemicals in our bodies notice when it is dark and tell us it's time to sleep. So sitting in a bright room or staring at a screen, especially right before bed, can make it difficult for our bodies and minds to rest. That's why it's best to put screens away 30 to 60 minutes before you are ready to go to sleep.

Beyond the light from your devices, remember to use dim, cool lights, like the moon, in the evening and warmer, bright lights, like the sun, during the day. And when you are ready for bed, you'll always get better rest when you turn the *lights out!*

Draw a self-portrait.

LIGHTS OUT

Need more room?
Open the research card and use the blank side.

QUESTIONS & RESEARCH

LIGHTS OUT

A picture book by Marsha Diane Arnold
and illustrated by Susan Reagan
(The Creative Company)

Image © Susan Reagan

LIGHT POLLUTION &

Draw your chosen animal.

LIGHTS OUT

LIGHTS OUT TO SEE EVERYTHING

CAN YOU SEE EVERYTHING?

Have you ever sat at night under the stars? If you have, how did it make you feel? Children living 300 years ago could see 99% more stars than you can. Why? Unless you live very far from cities and towns, light pollution blocks your view of most of the night sky. How does that make you feel?

In the picture book **Lights Out**, the animals find an island so far out in the ocean that light pollution does not block their view of the night sky. What do they see?

Everything.

Groups like the International Dark-Sky Association are working toward more "dark skies" and less light pollution. They are helping create, identify, and protect places where we can see "everything," or the stars in all their glory. Do you think this is important?

SEEING STARS

While not all of us are lucky enough to see a full spread of stars, here are some ways for you to explore them:

Stargaze with Family:
<https://bit.ly/LOStargaze>
<https://bit.ly/LONightTourist>

Explore the Stars Online:
<https://bit.ly/LOStarsAMNH>
<https://go.nasa.gov/31TFwA3>

Make Night Sky Crafts:
<https://bit.ly/LOCrafts>

Visit a Planetarium:
<https://bit.ly/LOPlanetariums>

Discover Dark Sky Places:
<https://bit.ly/LODarkSkyPlaces>

SEEING PATTERNS IN THE STARS

In this poem, author Marsha Diane Arnold describes what the animals see in the night sky:

Nighttime weavers
Webs of stars
Constellations
Venus, Mars

Great Bear, Little
Comet play
Dancing moonbeams
Milky Way

People who have looked at the stars since the beginning of time have been "nighttime weavers." They pulled together "webs of stars" into groupings or constellations.

Have you ever done a dot-to-dot activity and watched a picture appear as you drew lines between the dots? Much like that, astronomers looked at the stars and drew pictures with them and around them. The pictures, the names they gave them, and stories they told about them have helped people remember the position of the stars for hundreds of years.

Here are some of the Western World's most recognized constellations:

Ursa Major or "Great Bear": Contains the Big Dipper and points to the north.

Ursa Minor or "Little Bear": Contains the Little Dipper and Polaris, known as the North Star.

Orion or "the Hunter": This constellation's star patterns resemble a hunter with a bow.

Canis Major or "Greater Dog": Considered the larger of Orion's two hunting dogs. It has Sirius, the brightest star in the night sky.

LIGHTS OUT TO SEE EVERYTHING

MAPPING THE CONSTELLATIONS: URSA MINOR & CANIS MAJOR

Do the stars in the constellations *Ursa Minor* and *Canis Major* truly make the shape of a bear and a dog? Let's look at the bear and the fox from the picture book ***Lights Out***. Can we lay the constellations within their forms?

(A fox is not a dog, of course, but they both belong to the same animal family, *canidae*.)

- 1) Look in a library book or online to view the constellations *Ursa Minor* and *Canis Major*.
- 2) Turn to the Mapping the Constellations activity sheets.
- 3) Try drawing the constellations within the bodies of the animals.
- 4) Mark the major stars in the constellations.
- 5) Once you have drawn and marked the major stars in the constellations, lay the paper on a folded towel.
- 6) With a sharpened pencil or pointed chopstick, gently poke a hole through each star.
- 7) Hold the sheet between yourself and a light to see the "stars" shine through.

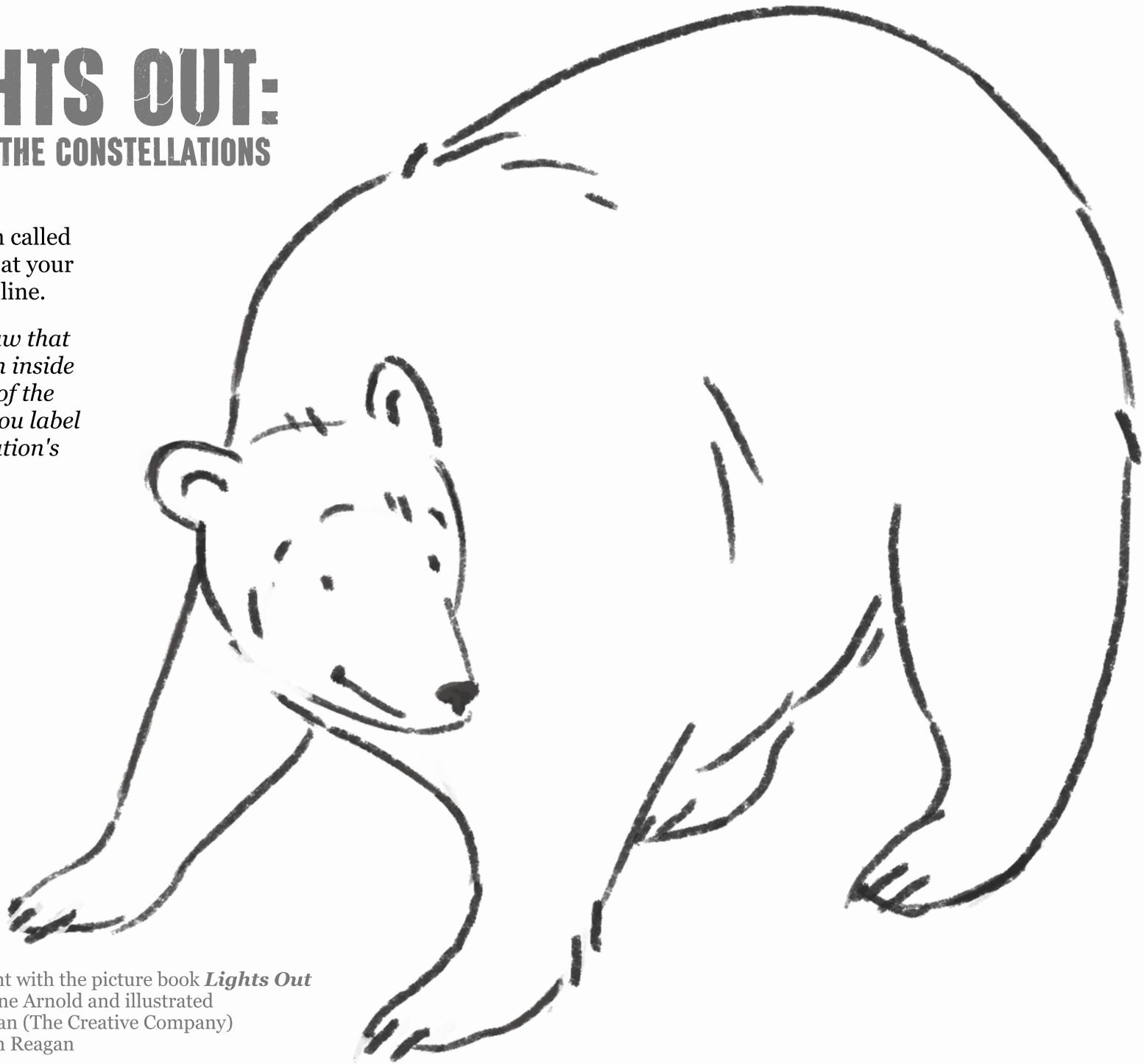


LIGHTS OUT:

MAPPING THE CONSTELLATIONS

Look up the constellation called *Ursa Minor* at your library or online.

Can you draw that constellation inside this picture of the bear? Can you label the constellation's stars?

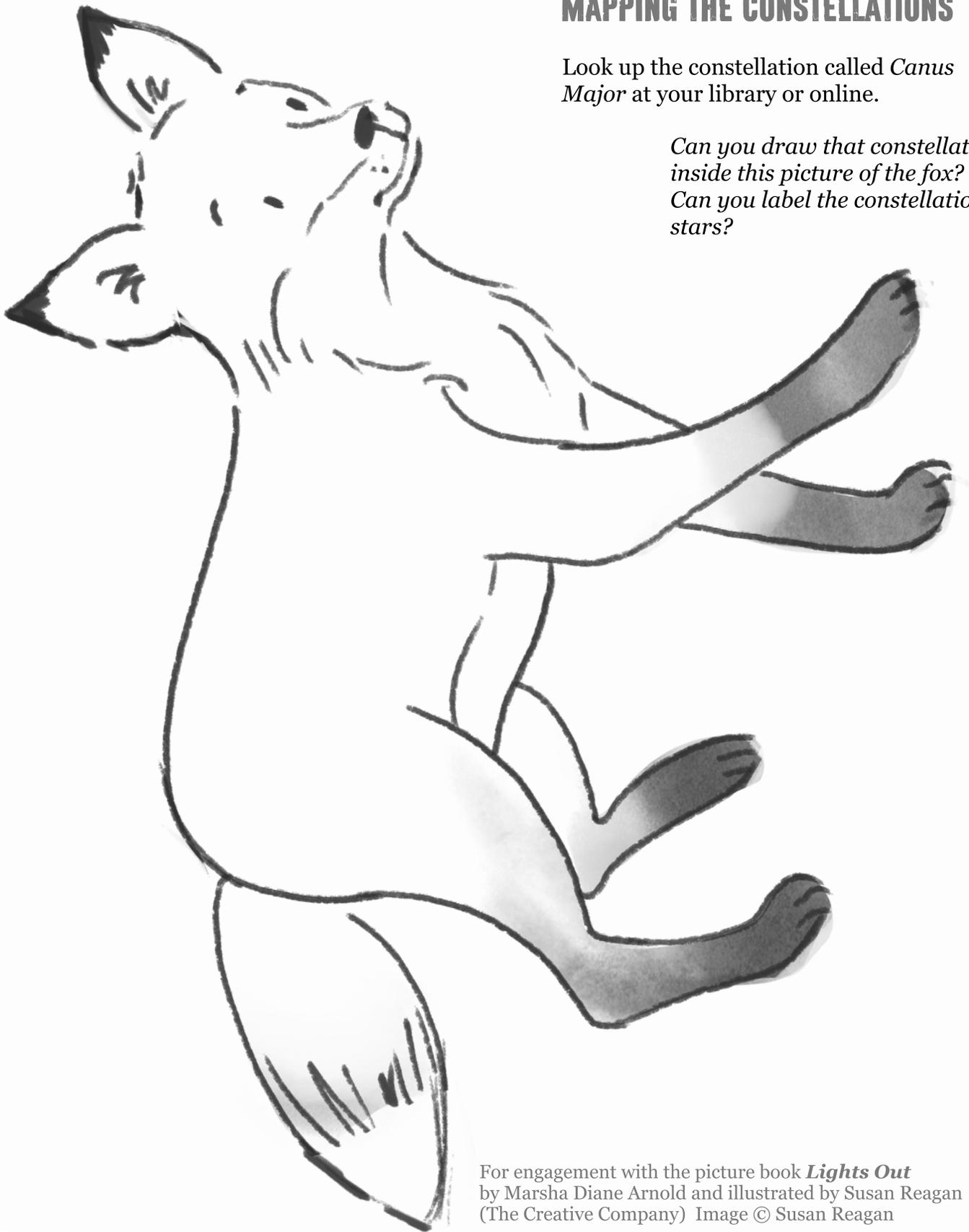


For engagement with the picture book *Lights Out* by Marsha Diane Arnold and illustrated by Susan Reagan (The Creative Company) Image © Susan Reagan

LIGHTS OUT: MAPPING THE CONSTELLATIONS

Look up the constellation called *Canus Major* at your library or online.

*Can you draw that constellation
inside this picture of the fox?
Can you label the constellation's
stars?*



For engagement with the picture book *Lights Out*
by Marsha Diane Arnold and illustrated by Susan Reagan
(The Creative Company) Image © Susan Reagan

LIGHTS OUT: LIGHTING DARKNESS

As the picture book *Lights Out* closes, the animals finally find true darkness. They also find flora and fauna that lights up in the dark.

They are experiencing the *bioluminescence* of the firefly, jelly fish, and fungi. They are seeing the moon reflect off of the whiteness of the night-blooming moon flower and the spider web. Additionally, they are observing that the fox has *tapetum lucidum* or a reflective surface in her eyes that bounces back any light showing in the darkness.

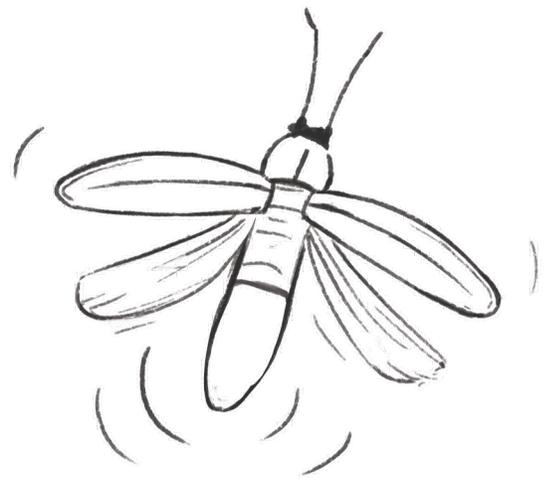
Here are some resources to explore and even experiment with *bioluminescence* and *tapetum lucidum*.

Bioluminescence Video at Article's Close
<https://bit.ly/LOBiolum> (Source: Time for Kids)

In A Flash: Firefly Communication
<https://bit.ly/LOFirefly> (Source: Science Friday)

Illuminate Your Science Class with Glow-in-the-Dark Experiments and Activities
<https://bit.ly/LOGlow> (Source: Project Learning Tree)

Explore How Cats' Eyes Glow with this Science Activity
<https://bit.ly/LOCats> (Source: Carrots are Orange)



*And when they come to
the darkest place of all*

they can see...

Everything.

*Shadowy shapes
Dappled gray
Silvery white
Shimmering bay*

*Mushrooms glowing
Fireflies
Moonlit garden
Shining eyes*

*Nighttime weavers
Webs of stars
Constellations
Venus, Mars*

*Great Bear, Little
Comet play
Dancing moonbeams
Milky Way*

“Lights On.”

—Lights Out

PAINTING DARKNESS

Using your study of *bioluminescence* and *tapetum lucidum* and/or your observations from the final spread of *Lights Out*, demonstrate how light can show itself in the darkness with this art project.

You will need:

- White crayon or birthday candle
- Watercolors
- Paintbrush
- Print-out of next page (Printing on card stock is best, but regular paper is fine.)

Steps to follow:

- 1) Look at the drawing on the next page. Using your crayon or candle, "color" the sections of the drawing that you think might light up in the dark.
- 2) With black watercolor, paint over the entire drawing.
- 3) Observe how the darkness of the paint reveals the light. *What is happening?* The paint cannot stick to the wax you have laid down with the crayon or candle. The wax "resists" the water in the paint.

*And when they come to
the darkest place of all*

they can see...

Everything.

—Lights Out

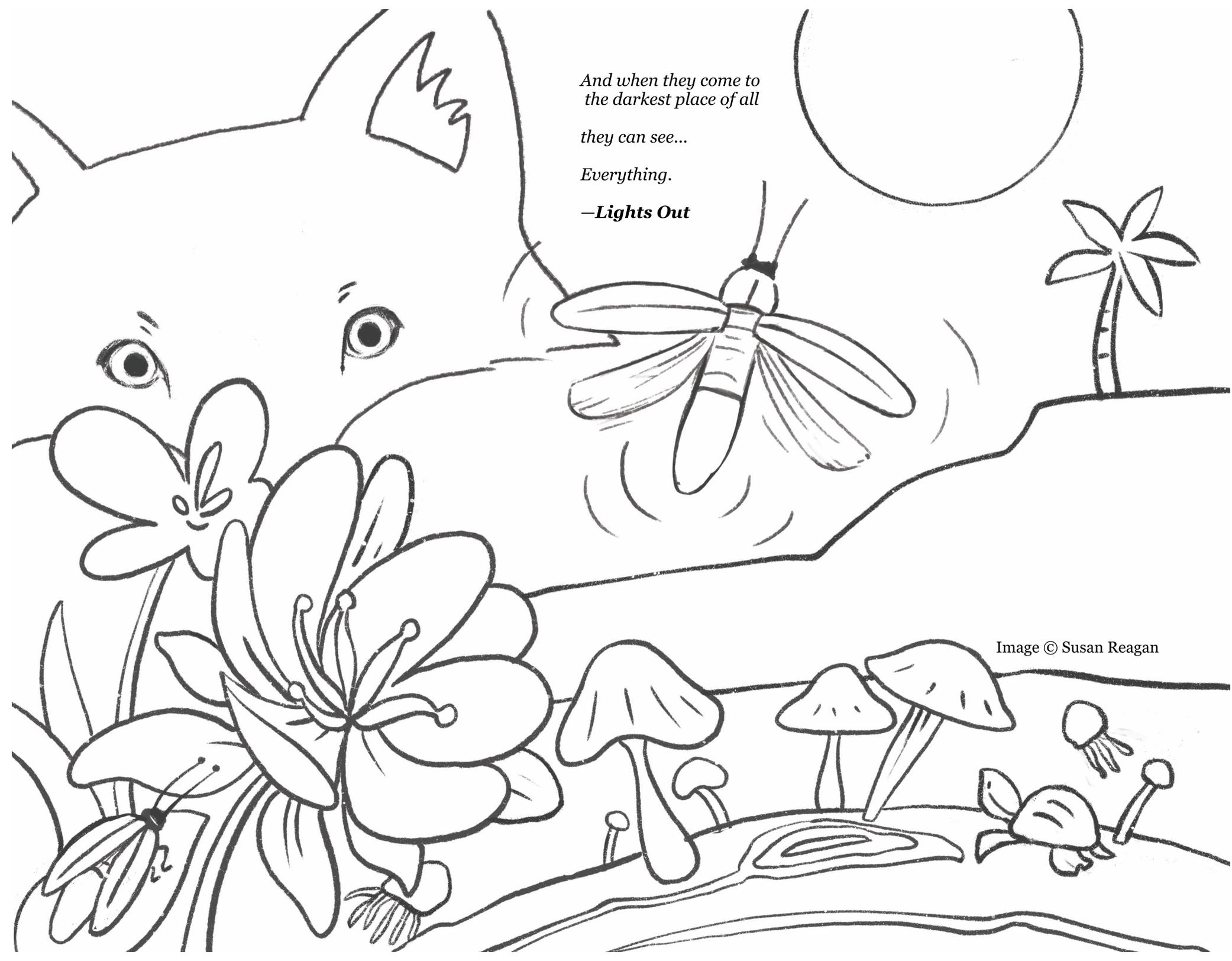


Image © Susan Reagan

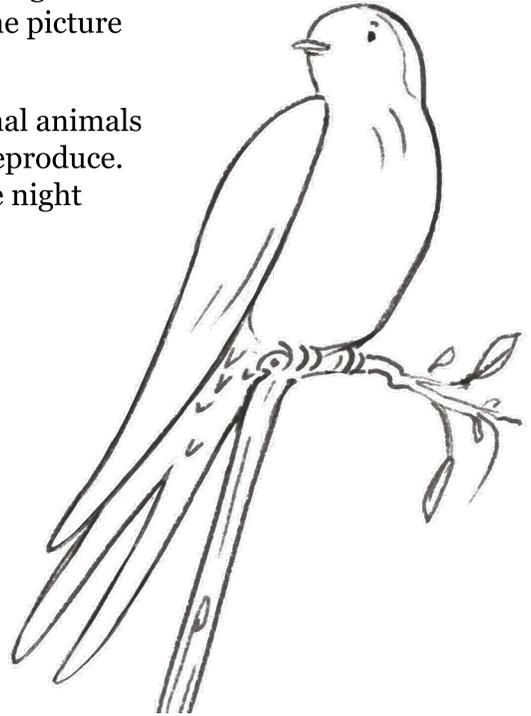
MATH (TO ILLUMINATE) PROBLEMS

Humans (like you) are **diurnal**. This means you are active during the day and go into shelter and sleep at night. While you are winding down to sleep, the **nocturnal** world becomes active. Is the fox in the picture book *Lights Out* diurnal or nocturnal?

Just as you use daylight to eat, play, and go to school, nocturnal animals need darkness to learn, grow, obtain food, move about, and reproduce. While the darkness allows you to rest, the darkness allows the night animals to do their work for survival.

While humans keep the inside of their homes dark at night, they often light the outside. This confuses and harms nocturnal insects, birds, and animals. It also uses up a lot of electricity. Electricity costs your family, your town, and your country a lot of money. Many of the ways we create electricity in this country also have a cost — they hurt the planet.

If we are hurting the nocturnal creatures, spending too much money, and hurting the environment by creating too much electricity, is it time to change how we use lights at night? **Let's use math to "illuminate" the problem.**



ONE OUTDOOR LIGHT

A single light bulb consumes 100 Watts of electrical energy every hour. If the light stays on for 12 hours of darkness, how many watts of electricity will the bulb use in a night?

Your Calculation: _____

A WHOLE NEIGHBORHOOD OF OUTDOOR LIGHTS

Talk with your family about what you consider to be your "neighborhood." Is it your street of houses side by side? A city block of apartments and stores? A road with houses spread apart? Plan to go on a nighttime walk through your neighborhood with a parent or guardian. Bring paper and a pencil. As you walk, count the number of illuminated outdoor lights on the buildings you pass.

Number of Outdoor Lights: _____

Let's assume those outdoor lights stay on all night or for 12 hours. How many watts of energy are being used on outdoor lighting in your neighborhood each night?

Your Calculation: _____

MATH (TO ILLUMINATE) PROBLEMS

A WHOLE NEIGHBORHOOD OF OUTDOOR LIGHTS (CONT.)

How many watts of energy would those buildings use in one year?

Your Calculation: _____

If each of those watts cost \$.015, how much money is being used in your neighborhood on the electricity for outdoor lighting?

Your Calculation: _____

DO YOU WANT TO SHARE THIS INFORMATION?

You have collected important data on your neighborhood! You may be the only one that has taken the time to gather this information.

Do you want to share information with your neighborhood about the estimated cost of outdoor lighting? Do you want to share information with your neighborhood about the negative affects of outdoor lighting to nocturnal insects, birds, and animals?

Talk with your family and your classroom about how you might want to share this information.

Look for ideas on sharing the impact of light pollution in the **Lights Out** guide called "Calling for Lights Out." You can download that guide at: bit.ly/LOSocialAction.

.....

MEASURE LIGHT POLLUTION

Want to help improve light pollution while using your math skills? Explore Globe at Night at bit.ly/LOGlobeAtNight. The program is an international citizen-science campaign to raise public awareness of the impact of light pollution by inviting citizen-scientists to measure their night sky brightness and submit their observations from a computer or smart phone.

.....

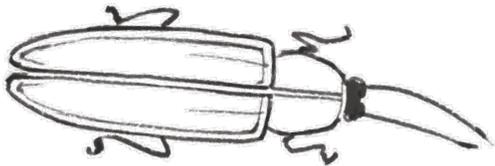
Our thanks to engineer and math tutor Abdelaziz Rhazzali for this math lesson.

For engagement with the picture book **Lights Out** by Marsha Diane Arnold and illustrated by Susan Reagan (The Creative Company). Image © Susan Reagan.

CALLING FOR LIGHTS OUT

DEAR FRIENDS & NEIGHBORS,

After reading the picture book **Lights Out**, I became curious about light pollution. I wanted to share with you what I have learned. I hope you will join me to make small and big changes in our community. Thank you for reading, listening, and caring.



WHAT IS LIGHT POLLUTION?

Light pollution, like any other pollution, is harmful to animals, the climate, and, yes, humans like you and me. Light pollution comes from outdoor lights that are too bright or lights that touch areas where it is not needed. Light pollution comes from businesses that use colorful or flashing lights to attract our eyes to places they want us to visit or things they want us to buy. This mass collection of lights creates a skyglow that blocks out the night sky and confuses and hurts living things.

HOW DOES IT AFFECT HUMANS?

Have you heard of circadian rhythms? Circadian rhythms are the ways the brain and the body respond to daylight and nighttime. Too much light at night means those rhythms are interrupted and we sleep badly. Sleeping badly affects our physical and mental health in so many ways.

Light pollution also keeps us from seeing the stars. Millions of children across the globe will never experience the Milky Way. Our collective skyglow from light pollution blocks out the broader universe. Many children have never seen fireflies on a summer night. *How do you think losing that wonder affects us?*

HOW DOES IT AFFECT ANIMALS?

Here is some of the saddest news about light pollution: Migrating birds who are guided by the stars can fixate on an artificial light and circle it until they cause themselves harm. Hatching sea turtles can also be confused by our lights and head for busy streets rather than the ocean and the moon that hangs over it. Nocturnal animals like frogs and foxes who eat, communicate, and mate at night get confused when the night is light. The light causes them to reduce these activities that are essential to their survival.

HOW DOES IT AFFECT CLIMATE?

The International Dark-Sky Association estimates that at least 30 percent of all outdoor lighting in the U.S. alone is wasted, mostly by lights that aren't shielded. That adds up to \$3.3 billion and the release of 21 million tons of carbon dioxide per year! *What effect do you think 21 million tons of carbon dioxide has on climate change?*

INTL. DARK-SKY ASSOCIATION

Look for other ideas and more details on the excellent International Dark-Sky Association website at www.DarkSky.org.

HOW CAN YOU HELP PREVENT LIGHT POLLUTION?

TURN LIGHTS OUT

You can do your part around your home by turning off or dimming any unnecessary lights you find on at night. It's as simple as flipping a switch!

WARM UP LIGHTS

Nocturnal animals are bothered by cool, white lights, but lights in the red wavelength don't bother them. To keep our nocturnal friends safe and healthy, encourage everyone to find warm-toned outdoor lights.

KEEP LIGHTS LOW

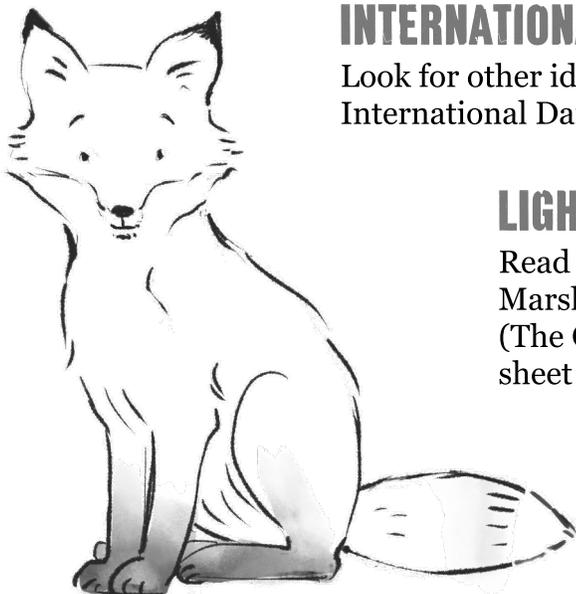
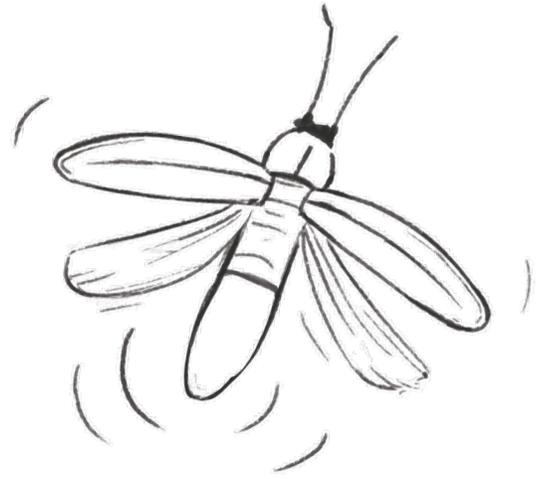
Ask everyone to install lights around the home as low to the ground as possible or to put shields on lights that point the light downwards. That means everyone, from animals to insects, can get all of their important work done at night.

LIGHT UP MOTION, NOT THE NIGHT

Many lights are left on to make us feel safe and secure. Lights that are on all night, though, do not make animals safe. Lights with motion detectors have been known to make homes safer and significantly reduce light pollution—which helps us all.

WRITE TO COMMUNITY LEADERS

Much of the light pollution in our towns and cities comes from streetlights and buildings. Since we can't turn those on and off ourselves, write to the people who manage your town/city and ask them to keep lights dim and provide shields whenever possible to avoid spill beyond the area that needs to be lit.



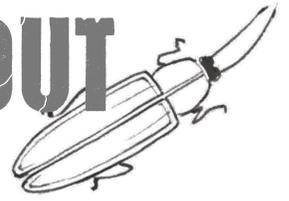
INTERNATIONAL DARK-SKY ASSOCIATION

Look for other ideas and more details on the excellent International Dark-Sky Association website at www.DarkSky.org.

LIGHTS OUT

Read and share the picture book *Lights Out* by Marsha Diane Arnold and illustrated by Susan Reagan (The Creative Company). Look for more copies of this sheet and other activities at MarshaDianeArnold.com.

CALLING FOR LIGHTS OUT



DEAR

WHAT IS LIGHT POLLUTION?

HOW DOES IT AFFECT ANIMALS?

HOW DOES IT AFFECT HUMANS?

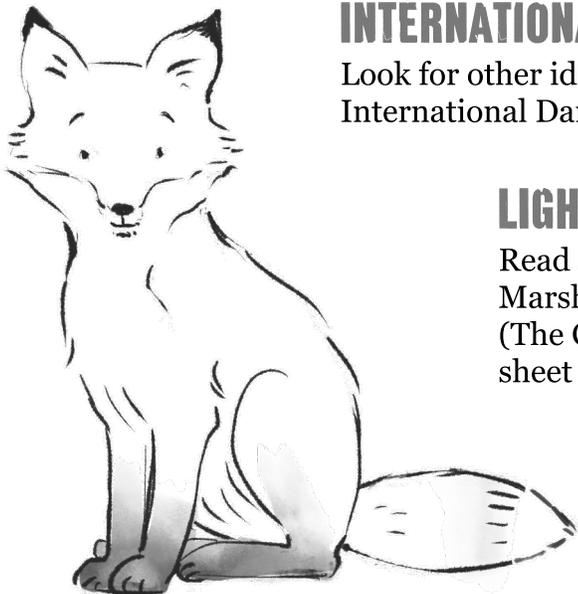
HOW DOES IT AFFECT CLIMATE?

INTL. DARK-SKY ASSOCIATION

Look for other ideas and more details on the excellent International Dark-Sky Association website at www.DarkSky.org.

Read and share the picture book *Lights Out* by Marsha Diane Arnold and illustrated by Susan Reagan (The Creative Company). Image © Susan Reagan.

HOW CAN YOU HELP PREVENT LIGHT POLLUTION?



INTERNATIONAL DARK-SKY ASSOCIATION

Look for other ideas and more details on the excellent International Dark-Sky Association website at www.DarkSky.org.

LIGHTS OUT

Read and share the picture book *Lights Out* by Marsha Diane Arnold and illustrated by Susan Reagan (The Creative Company). Look for more copies of this sheet and other activities at MarshaDianeArnold.com.

LIGHTS OUT: ENGLISH LANGUAGE ARTS

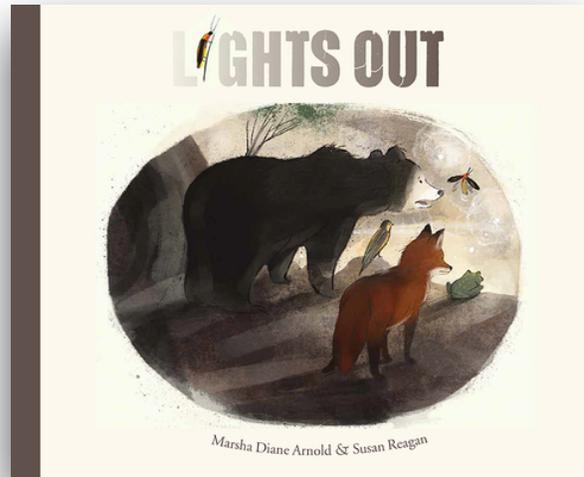
ABOUT THE BOOK

Lights Out

by Marsha Diane Arnold
Illustrated by Susan Reagan
Published by The Creative Company
ISBN-13: 9781568463407
Age Range: 6-10 Years

In a world marred by light pollution, this quest for true darkness is a clarion call to turn out the lights—so that all may see.

“The closing spreads with the dark sky and natural, nocturnal lights are enchanting. Stars twinkle, and the moon glows, as Mother Nature would have it. The fade-in title design on the book’s cover is especially smart, communicating much about the story. An author’s note kicks off the book, noting how little we hear about light pollution. Illuminating.” —*Kirkus Reviews*



ABOUT THE LESSON PLANS

Explore these English Language Arts lesson plans created by author Marsha Diane Arnold.



Reading Comprehension

Explore the Book’s Structure Page 2
Summarize the Book Page 3

Writing Activities (With Math)

Four-Line Poem Page 3
Haiku Poetry Page 4

Writing Activities

Point of View and Haiku Page 5
Persuasive Letter or Story Page 6

Writing Activity (With Science)

Observe and Write Page 7

LIGHTS OUT: ENGLISH LANGUAGE ARTS

READING COMPREHENSION

EXPLORE THE BOOK'S STRUCTURE

All things have a structure, an overall design. In *Lights Out*, you see a natural structure in the spider's web, the flower, and in the stars. The *Lights Out* story also has a structure. The author has used a rhythmic repeating refrain: "Across the wide, wide world..." There are also two spreads near the beginning and end of the story, in rhyme, which contrast artificial and natural light.

The physical book has a structure too. Let's explore it. Before reading *Lights Out*, identify the book jacket, jacket flaps, the front cover, back cover, title page, spine, and end papers.

The Book Jacket and Cover

- What do you see on the front book jacket?
- What do you think the animals see?
- What do you think the story is about?
- Take the book jacket off. How are the illustrations different on the front and back covers from the book jacket front and back?

The Jacket Flap

- After replacing the book jacket, open the book to see the jacket flaps. This is the part of the book jacket that folds into the book.
- Read or listen to the short summary of the book on the front jacket flap.
- Read or listen to the short biographies of the author and illustrator on the back jacket flap.
- What kind of work did the author do to make the book? What did the illustrator do?

The End Papers

- Open the book to the very first page, before the story begins. These are the endpapers.
- Are there endpapers at the back of the book too?
- What is on the endpapers?
- Do you think these animals might be an important part of the book?

The Copyright Page

- What is on this page besides the copyright?
- How does the illustration compare with the cover?

The Author's Note

- Often the Author's Note is at the end of the book, but this Author's Note is at the beginning. Why do you think the publisher put it at the beginning?
- Read the Author's Note and share what part you think is most interesting.

LIGHTS OUT: ENGLISH LANGUAGE ARTS

SUMMARIZE THE BOOK

- Why do you think the story is called *Lights Out*?
- If you were an animal, would you have gone on the journey with Fox and Beetle to find “the Dark of Night?”
- Take a “Picture Walk” through the book. Look at the illustrations as you page through the book. Talk about what the animals are doing, feeling, and thinking. Here are some examples:
 - On the first page what do you think Fox is thinking? From his face, how do you think he feels?
 - Find the pages with the turtle hatchlings. How do you think Bear feels?
 - Look at the final page. Have the expressions on the animals’ faces changed? How do you think they are feeling now?
 - Were you surprised by the change in “Beetle?” Would he have realized what he was if he hadn’t found “the Dark of Night?”



WRITING ACTIVITIES (WITH A GLIMMER OF MATH)

FOUR-LINE POEM

This is a fun way to begin writing poetry — a short four-line poem. Marsha Diane Arnold sometimes calls this the “four-line special person” poem. She has shared it with many children around the world. Usually, it’s written about a friend, family member, or pet.

We’re going to write it about an animal affected by light pollution, one of the animals in *Lights Out* or another animal you know. The poem can include how light pollution affects the animal, but it doesn’t need to.

- 1) Think of the animal you want to write about.
- 2) Choose three short phrases that describe the animal.
- 3) The fourth line will name the animal to honor it. For example, you might say, “The flashing firefly” or “The hopping frog” or simply “Bear.”
- 4) Have fun writing your poem.
- 5) After you finish your four-line poem, draw a picture of your animal.
- 6) Share your poem with someone.

LIGHTS OUT: ENGLISH LANGUAGE ARTS

Here is an example of a four-line poem Marsha Diane Arnold wrote about her dog.

A muddy paw
A wagging tail
A slobbery kiss
My dog, Ali

Here is an example of a four-line poem about an animal affected by light pollution:

Swooping in darkness,
Eating one thousand insects!
Staying away from lights
Thank you, Little Brown Bat

HAIKU POETRY, COUNTING SYLLABLES, AND STRUCTURE

Counting is fun! Young children begin counting early — toes, bananas, family members. This is the foundation for more complex skills and understandings later. It's especially fun when we can combine counting with writing.

Haiku is a form of Japanese poetry with a very specific structure. The first line has 5 syllables, the second line has 7 syllables, and the last line has 5 syllables. Traditionally, haikus are written about nature.

Look at the first page of the *Lights Out* story. Count the syllables of each line.

- Which of the four lines could be part of a haiku poem?
- Could you add or subtract a word to the other three lines to make them have the right number of syllables for a haiku poem?

Little Fox peeks out from her den.
Beetle flits above her.
“Lights Out!” she barks.
But the lights stay on.

Write a haiku about one of the animals in *Lights Out*. It can be about their journey or light pollution or simply about the animal.

One way to approach haiku is to first choose what you'd like to write about. You might look through the pictures in *Lights Out* first. Something may catch your attention or inspire you. You might read about your chosen animal in a book or on the internet. Something in what you read may inspire you.

After you have your subject or idea, brainstorm some words that relate to what you'll be writing about. Make a list of these words. Try to use descriptive words. Write the number of syllables beside each word.

LIGHTS OUT: ENGLISH LANGUAGE ARTS

Now write your haiku. You don't need to use all the words on your list, but they may be helpful. Write Line 1 with 5 syllables, then Line 2 with 7 syllables, then Line 3 with 5 syllables.

You can repeat words, if you like. You can capitalize and punctuate as you like. Traditionally, the last line is an observation or a surprise, but you don't need to do this.

Here is an example from a haiku master, Matsuo Basho (1644-1694):

An old silent pond...
A frog jumps into the pond,
splash! Silence again.

Here is an example that Marsha Diane Arnold wrote:

Birds migrating north
Bright city lights confuse them
"Which way do we go?"



WRITING ACTIVITIES

POINT OF VIEW AND HAIKU

It might be fun to write a haiku from the Point of View or Viewpoint of one of the animals in *Lights Out*.

- What do we mean by viewpoint or point of view? Viewpoint is simply the way each of us sees the world. Each of us has a view of the world that's not like anyone else's.
- Look up toward the ceiling. What do you see? That's an interesting viewpoint.
- If you are telling a story from an ant's point of view, you will need to think like an ant. What are some of the things you'd see as an ant that would be different from what you see now? How does a cup look to an ant? How long does it take an ant to cross the room?

Now that we've explored viewpoint a little, let's write.

- Choose the animal from *Lights Out* that you want to write about.
- Think about that animal: what the animal looks like, where the animal lives, what he eats, feels, thinks.
- Write your haiku as if you are that animal, speaking as that animal would speak.

LIGHTS OUT: ENGLISH LANGUAGE ARTS

Here is an example from the point of view of a turtle hatchling:

I hatched from my egg
Where to go? So many lights.
There! Into the sea.

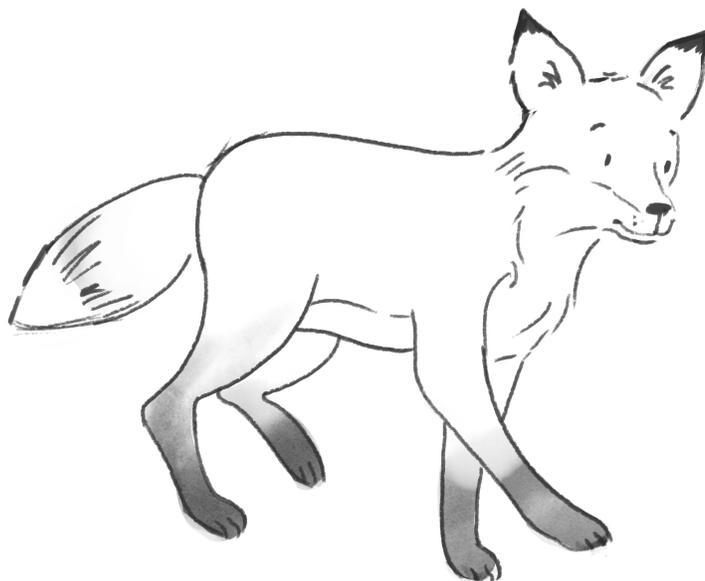
PERSUASIVE LETTER OR STORY

- Do you know what the word “persuade” means? If you’re not sure, can you guess?
- Talk about what it means to persuade.
- Talk about why or when you might want to persuade someone, like persuading your parents to buy you a scooter or let you stay up late.

One guideline on writing to persuade is to first tell the reader what you believe. Then give three reasons why you believe it or think it’s important. Try to have a good ending paragraph to summarize and convince your reader. You can ask for the reader to take action here or present an idea about what they can do.

In *Lights Out*, the author doesn’t explain how the animals are persuaded to join the search for the Dark of Night. They may not have needed much persuading. But if they did, and if you were Fox, how would you persuade the other animals to help you search for Darkness? Let’s write a story showing how one animal persuades another. Have the two animals talk to each other in dialogue, as if they are having a conversation.

For older students, let’s write a persuasive letter. You might use the guideline from above. If you have information about light pollution in your town or city, you could write the mayor. You could try to persuade her to help do something about light pollution. Try to find other towns/cities that have done things to reduce light pollution and refer to them in the letter. Here’s a link to two towns recognized by the International Dark-Sky Association (IDA), one in [Arizona](#) and one in [Colorado](#).



Look for the **Calling for Lights Out: Social Action Templates** at MarshaDianeArnold.com for ideas and templates.

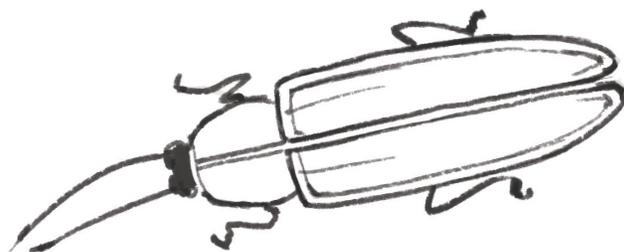
LIGHTS OUT: ENGLISH LANGUAGE ARTS

WRITING ACTIVITIES (WITH A GLIMMER OF SCIENCE)

OBSERVE AND WRITE

To be a good writer, you need to observe. There are other things good writers do: find important information about what they want to write about, recognize and create patterns, and communicate feelings. These are all things scientists do, too. Let's do some observing, thinking, and writing.

- Plan to journal in a notebook for at least two days. You may wish to journal for a week or more.
- At dusk and night time, look out your window, step outside your house, or, if it is safe, take a short walk with a trusted adult. Make a list of the artificial lights you see around you. Make another list of the natural lights you see. Most of the natural lights will probably be in the night sky, but you may see bioluminescent animals, like fireflies. You may see flowers that seem to glow. Some people enjoy planting moon gardens to enjoy at night, filled with white flowers and silver foliage which seem to illuminate the dark. You can include the glowing eyes of any animals you see as well. You may not see plant or animal lights during your observation. That's okay. These are more unusual to see.
- Note any animals you see and how they react to the natural or artificial light.
- Note how *you* react to natural and artificial lights.
- At the end of your journaling, count the different types of natural lights you saw and the different types of artificial lights you saw. You may not be able to count all of the lights, but try to count the different types – streetlights, house lights, airplanes, etc. Depending on where you live you may see hundreds of artificial lights or just a few. The same for natural lights.
- Make a simple bar graph. Here's a link on how to [make bar graphs](#) that may be helpful.



LIGHTS OUT: ENGLISH LANGUAGE ARTS

- To make a bar graph, have a sheet of paper. It works best to have the longer side on the bottom. Along the left edge, vertically, write numbers (Count by 10 up to 100, if possible. If you saw a clear sky full of stars, you will not be able to show that number on the bar graph. It will be “off the charts.” You can draw a line to the top of the chart with an arrow.) At the bottom, horizontally, write the different types of light you saw – moon, fireflies, streetlights, car lights, etc. (If you run out of room, use only the first letter or letters of each type). If you have streetlights as the first category at the bottom and you saw 9 streetlights, color a wide line (the bar) up to the number “9.” Do the same for the rest of the categories.
- Which type of natural light did you see the most of? The least? Which type of artificial light did you see the most of? The least? Does the bar graph show any surprises?
- During all the observations, did you see any problems? How might those problems be addressed? What might be done about them?

Write three paragraphs on your observations. Use your journal and graphs as your guide. This would be considered non-fiction writing.

- Now switch into fiction writing mode. Write a poem or a short story about the most interesting thing you saw during your journaling or how you felt during your observations.



LIGHTS OUT: READERS' THEATER

ABOUT THE READERS' THEATER

This Readers' Theater was written by **Lights Out** author Marsha Diane Arnold. Most of the words have been taken directly from the book, but some have been changed or moved to make a more engaging group read-aloud or staging.

STAGING

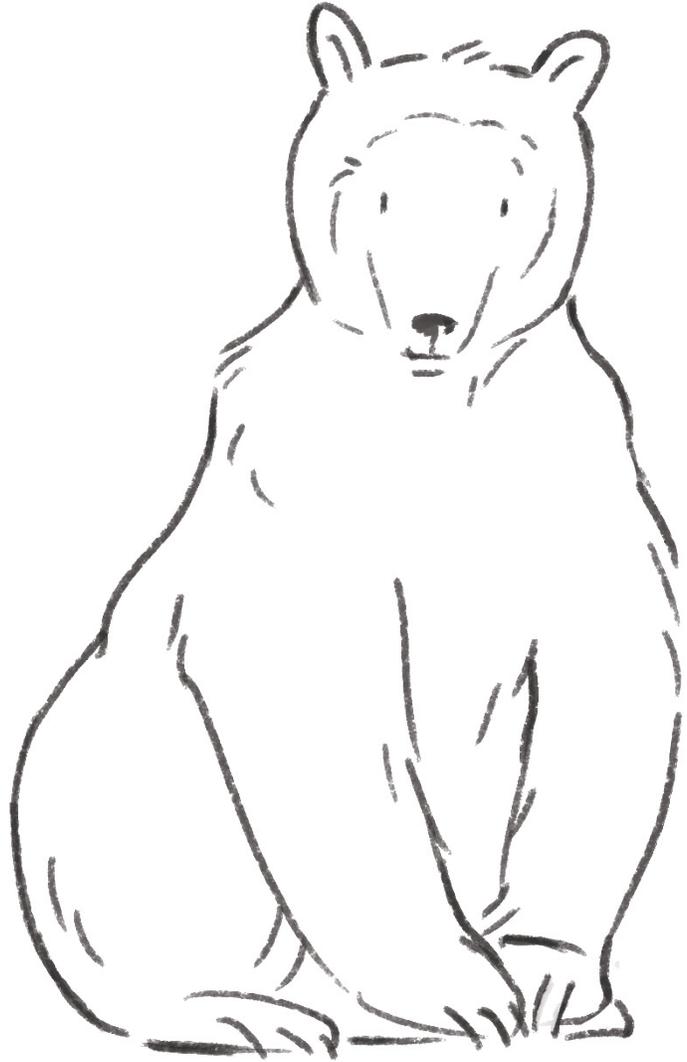
While this could easily be done in a classroom or another seated setting, imagine the reading in motion. Could the characters/cast move around a room, a stage, or outside, as if they are going on a journey?

ADD STEM & STEAM

Could you perform this story for other students and community members and then follow it with a presentations about light pollution and the night sky? Imagine this as the opening to a light pollution or astronomy-themed Science Fair!

CAST

- 1) Narrator
- 2) Fox
- 3) Beetle/Firefly
- 4) Songbird
- 5) Frog
- 6) Bear
- 7) Turtle Hatchlings : You can use as few or as many turtles as you wish. The turtles have just two lines, but there are many turtles in the book.
- 8) Chorus: These lines could be read by 16 individual readers, a chorus of readers, or used as audience participation with cue cards.



LIGHTS OUT: READERS' THEATER

SCRIPT

Chorus:

House lights
Car lights
Truck lights
Street lights

Red lights
Yellow lights
Blue lights
Green lights

Flood lights
Boat lights
Search lights
Bridge lights

Blinking lights
Flashing lights
Blazing lights
Flicking lights

Fox: Lights out!

Beetle: Where is Darkness? Where is Night?

Fox: I wonder if Night is lost.

Beetle: Out there. Somewhere.

Narrator: Across the wide, wide world, they search...for the Dark of Night
(Fox and Beetle move toward Songbird.)

Songbird: Everywhere - Lights! Where are the stars to guide me? I'm so confused.
(Songbird joins Fox and Beetle. They move toward Frog.)

Narrator: Across the wide, wide world, they search...for the Dark of Night.

Frog: Where is Darkness? How long must I wait to join a nighttime chorus?
(Frog joins Songbird, Fox, and Beetle. They move toward Bear.)

Narrator: Across the wide, wide world, they search...for the Dark of Night.



LIGHTS OUT: READERS' THEATER

Bear: ROAAAARRR! There's too much light to hibernate.
(*Bear joins Frog, Songbird, Fox, and Beetle.*)

Narrator: Across the wide, wide world, they search...for the Dark of Night.

Fox: We search through forests.

Beetle: And meadows.

Songbird: Across highlands, deserts, dunes.

Frog: Tundra, prairies.

Bear: High mountains.

Fox: And seashores. What is happening on the beach?

Bear: Baby turtles hatching!

Beetle: Baby turtles scattering!

(*The animals direct the hatchlings and run to an area designated as water.*)

Fox, Beetle, Songbird, Frog, and Bear: Follow us! Away from the lights! Follow us!

Turtle Hatchlings: We're following.

Beetle: I'm sparking. Sparkling! Glowing!!

Fox: You're more than a beetle.

Fox, Songbird, Frog, Bear: You're a firefly!

Fox: Follow Firefly!

Turtle Hatchlings: We're following.

Firefly: Follow the moon's glow on the water.

Turtle Hatchlings: We're following! We're following!



LIGHTS OUT: READERS' THEATER

Narrator: Patterns of the Night emerge. The hatchlings paddle safely away.

Turtle Hatchlings: Thank you. Good-bye.

Fox: There's an island in the distance.

(The animals climb onto the island seashore.)

Fox: We can see...

Fox, Firefly, Songbird, Frog, Bear: Everything.

Chorus:

Shadowy shapes
Dappled gray
Silvery white
Shimmering bay

Mushrooms glowing
Fireflies
Moonlit garden
Shining eyes

Nighttime weavers
Webs of stars
Constellations
Venus, Mars

Great Bear, Little
Comet play
Dancing moonbeams
Milky Way

Fox: Lights On!

