MOUNTAINFILM
EDUCATION

LOST IN THE LIGHT

DURATION: 3 mins | **DIRECTOR:** Sriram Murali

The night skies remind us of our place in the Universe. Imagine if we lived under skies full of stars. That reminder we are a tiny part of this cosmos, the awe and a special connection with this remarkable world would make us much better beings - more thoughtful, inquisitive, empathetic, kind and caring. But in reality, most of us live under heavily light polluted skies and some have never even seen the Milky Way. We take the skies for granted and are rather lost in our busy lives without much care for the view of the stars. How does light pollution affect the night skies and quite possibly our lives?

STANDARDS

Literacy in History/Social Studies:

- **CCSS.ELA-LITERACY.RH.6-8.4 (Craft and Structure)**
  Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

Literacy in Science:

- **CCSS.ELA-LITERACY.RST.6-8.2 (Key Ideas and Details)**
  Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
- **CCSS.ELA-LITERACY.RST.6-8.7 (Integration of Knowledge and Ideas)**
  Integrate quantitative or technical information vxpressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

Writing:

- **CCSS.ELA-LITERACY.WHST.6-8.1.E (Text Types and Purposes)**
  Provide a concluding statement or section that follows from and supports the argument presented.

TAGS: Light pollution, environment

VOCABULARY: Light pollution, pollution, glare, skyglow, light trespass, clutter, population

FILMMAKER INTERVIEW: SRIRAM MURALI

WHERE DID YOU GROW UP? I grew up in a small town in South India called Pollachi.

WHAT IS YOUR FAVORITE COLOR? Red

WHAT IS YOUR FAVORITE FOOD? Curd Rice, a South Indian delicacy

WHAT IS YOUR FAVORITE FILM? Donnie Darko

IF YOU COULD HAVE ANY SUPERPOWER, WHAT WOULD IT BE? Fly in Space

WHAT IS ONE THING YOU ARE AFRAID OF? House lizards found in tropical climates

WHY DID YOU BECOME A FILMMAKER AND HOW DID YOU GET STARTED?
When I showed my photos and videos of the night skies to my friends and family, they often questioned how there could be so many stars. It bothered me that most people don't know or even believe that a sky full star exists. So, I started making films to raise awareness on Light Pollution. I don't have any professional experience in Photography. I bought a camera and started taking photos. After a lot of trial and error, patience and perseverance, I started to get good at it. My passion for Astronomy makes all the learning enjoyable.

WHY DID THIS STORY APPEAL TO YOU?

Over the years, it has quite saddened me that people don't care enough about Astronomy or the night skies. We are lost in our busy lives without much care for the view of the stars. I wanted to make a film showing how Light Pollution affects the view of the night skies in a way people can understand. My hope was that once people understand that these stars do exist, they will go out to see them and take their kids.

WHEN EDITING THE FILM, WAS THERE ANYTHING YOU WISHED YOU COULD HAVE INCLUDED IN THE FINAL CUT?

No. I planned each of the sequences and knew the layout of the film even before I started shooting.

WHEN YOU MADE THE FILM, DID YOU HAVE A SPECIFIC AUDIENCE IN MIND?

I wanted every single person on this planet to see this film and realize what we have missed. The night skies reminds us of our place in the Universe. It gives us identity, makes us feel a connection. The night skies are what we have in common. It's what unites us.

IS THERE AN ACTION YOU HOPE PEOPLE ARE INSPIRED TO TAKE AFTER SEEING THIS FILM?

Yes. I hope people are more aware of the effects of Light Pollution after watching this film and start to take measures on reducing it by making a few simple changes like turning lights off when not in use, shielding the lights and using motion sensors.

WHAT ARE SOME OF THE CHALLENGES YOU ENCOUNTERED MAKING THIS FILM?

Finding locations to shoot at every Light Pollution level was a challenge. Cities and parks have parking restrictions after dark. On the other hand, getting to the darkest night skies was journey of its own. We drove for 24 hours and 1,200 miles in 2 days, last 4 hours of which on steep backcountry dirt roads up the mountains, sweltered in 120F(49 C) desert heat, set up tent in gusting winds with sand from the dunes blowing all over the body, no humans in the near 50 miles, hardly any sleep and energy left, running a fever and the fear of scorpions, venomous spiders and snakes at night... All for one reason - Pristine night skies with absolutely no light pollution at the remote Eureka Dunes in Death Valley. The Milky Way dazzled so bright that it cast shadows. We felt like the only beings on an alien planet; such an ethereal experience, hard to come by these days. I'm grateful to my kind-hearted, lovely wife Priya for being an integral part of this crazy trip.

HAS WORKING ON THIS PROJECT CHANGED ANY OF YOUR OUTLOOKS ON HUMAN NATURE?

I made this film to primarily show my friends and family that a sky full of stars does exist. I didn't expect it to go viral. It made me understand that people do have the appetite for Astronomy. It's just that the story needed to be told in a way they can relate to.

WHY DO YOU THINK IT IS IMPORTANT TO INCLUDE THIS FILM IN MOUNTAINFILM FOR STUDENTS?

Astronomy has inspired so many people throughout our history from Artists to Poets to Scientists. I think that we have lost the potential for thousands of great minds these days. Millions of children will never see a sky full of stars or the Milky Way. It is very important for children to be fascinated by the night skies and exposed to Astronomy. The nice thing about Astronomy is that it makes you ask questions. And when kids ask questions, they learn more about our surroundings and the world we live in and beyond. So, I'm extremely happy for this film to be part of Mountainfilm for Students.

WHAT'S THE NEXT BIG ADVENTURE OR FILM PROJECT ON THE HORIZON FOR YOU?

I'm currently working on a Documentary movie on Astronomy and Light Pollution. The documentary is about the significance of Astronomy and the night skies, effects of Light Pollution on Astronomy, human health, wildlife and beyond, what we can do to fight it. It will stress on the message that fighting light pollution doesn't mean sacrificing necessary lighting. Movie is a powerful medium to deliver this message. The movie will show what the people in cities are missing out on, the importance of Astronomy in our lives, the impact Astronomy can have on children, how Light Pollution costs a lot of money, affects our health, wildlife and our environment, show the work of nonprofits fighting to preserve dark night skies, what people can do at home to fight Light Pollution and talk to cities that have successfully handled this issue. The movie is non-profit, made only for educational purposes.

WHAT IS ONE PIECE OF ADVICE YOU CAN GIVE STUDENTS THAT YOU WISH SOMEONE HAD SHARED WITH YOU?

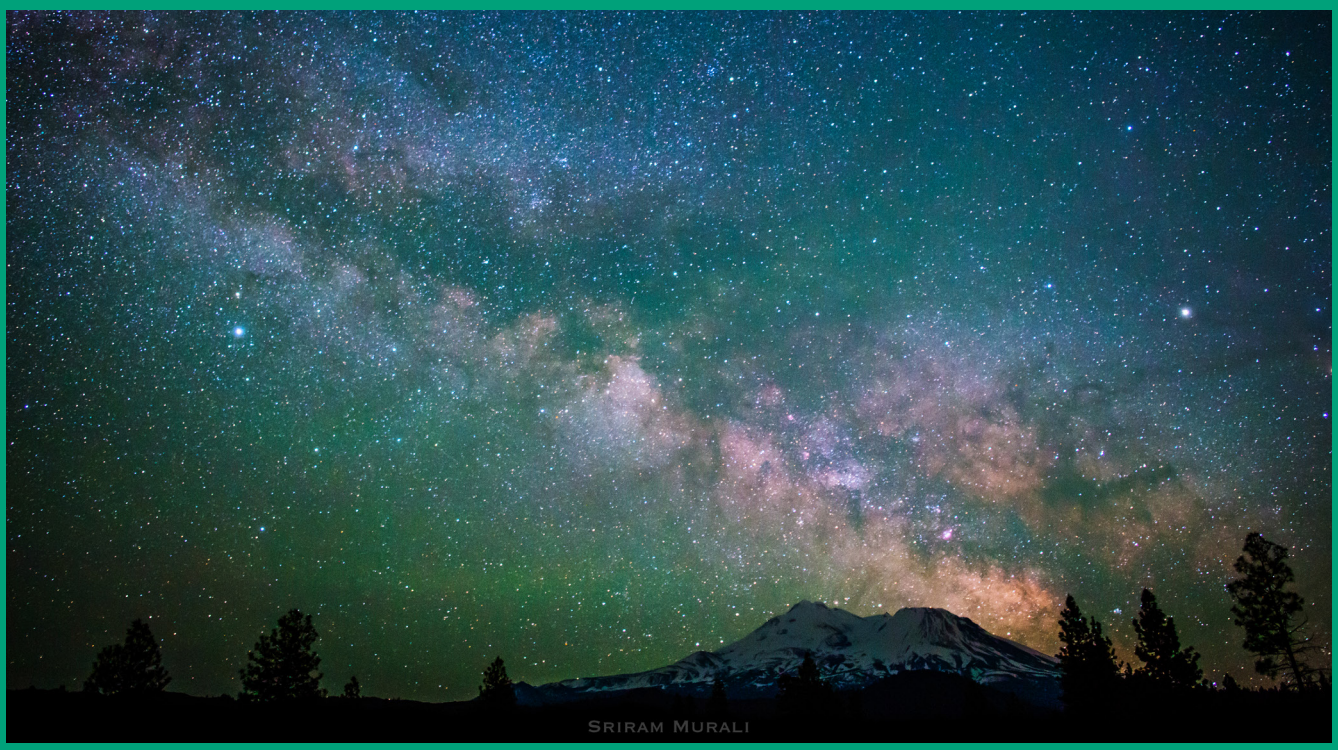
Keep asking questions. Never be afraid to ask questions. And do more of what you really like to do - whether it's Sports or Music or Art or Astronomy or anything else.

PRE-SCREENING ACTIVITY

Depending on your student's prior knowledge of light pollution or pollution in general, you might want to lead a discussion starting out with types of pollution and the effects they have on the environment and then segue into a conversation about light pollution. The definition of light pollution is: the inappropriate or excessive use of artificial light that can have serious consequences for humans, wildlife, and our climate which is a side effect of an industrialized civilization (Light Pollution, n.d.).

To help students make a personal connection to light pollution, have them explore this light pollution map: *(https://www.lightpollutionmap.info/#zoom=4&lat=5759860&lon=1619364&layers=B0TFFFFFFF)* either alone, with a partner, or as a whole class. You could create some type of scavenger hunt to see who can find the radiance information for various cities around the world, either by giving your students hints like "This city is called the city of light," "Capital of Serbia," "Capital of the first state in the United States," or have your students look up the light pollution radiance information of five cities important to their lives and families.

INTRODUCING THE FILM



There are four different components of light pollution that will be helpful to understanding the message of Lost in Light. Review these terms with your students as you will have them mark off a chart while watching Lost in Light.

1. **GLARE** - excessive brightness that causes visual discomfort
2. **SKYGLOW** - brightening of the night sky over inhabited areas
3. **LIGHT TRESPASS** - light falling where it is not intended or needed
4. **CLUTTER** - bright, confusing and excessive groupings of light sources

Give each student a piece of paper and ask them to fold it into thirds. At the top they will write City, Light Pollution Level and Population. As the students watch Lost in Light, have them mark off the light pollution level for each place shown. You can either provide the places for them, have them write it on a handout prior to starting the movie, or let the students know that there are 9 total places that will be shown. After the movie, ask what the students notice about the order of the cities, or why they think that places like San Jose, California, have a higher light pollution level than other cities. Ask students what factors could potentially contribute to the light pollution. After the discussion, ask the students to search the population for each city. Do they notice a correlation between the light pollution level and the population?

CITY	LIGHT POLLUTION LEVEL	POPULATION
San Jose, CA		
Mountain View, CA		
Los Altos Hills, CA		
Monte Bello Open Space Preserve, CA		
Pigeon Point Lighthouse, CA		
Crater Lake National Park, OR		
Lassen National Park, CA		
Mt. Shasta Area, CA		
Eureka Dunes, Death Valley, CA		

DISCUSSION QUESTIONS/CATEGORIES

GENERAL/OPEN PROMPTS

1. What do you think is the message of Lost in Light?
2. Why do you think it is important to know about light pollution?
3. What are some negative effects of light pollution?

EXPLORING SELF

1. What are some things you could do to help reduce light pollution?
2. Think about how you sleep with the lights and TV on. Now imagine you have no control over turning off these things. How would this affect your life?

EXPLORING THE WORLD

1. Do you think that countries with a larger population are more likely to have higher levels of light pollution? What would happen if everyone around the world had access to the same amount of electricity? Would would be some benefits to this? How would this affect light pollution?

EXPLORING FILMMAKING

1. The filmmaker chose to show the cities in order from greatest amount of light pollution to least. What would happen if you were to reverse this order? Would that make the message more or less effective?
2. Do you think that the filmmaker helped to communicate a point about light pollution? What do you think that point was?
3. There is no narration in the movie, Lost in Light. If you were to create a narration, what would it say? Why do you think the filmmaker chose to only narrate the film with a song? Could you think of a song that would pair well with the filmmaker's images?

EXPLORING SOCIAL ISSUES

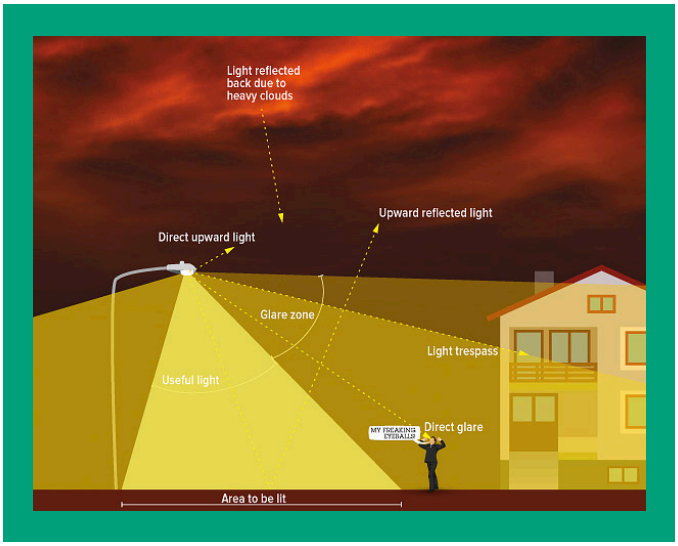
1. What are some solutions to light pollution? How could you help mitigate its impact?

SENSE OF WONDER

1. Think of the light pollution map you explored prior to watching Lost in Light (https://www.lightpollutionmap.info/#zoom=4&lat=5759860&lon=1619364&layers=B0TFFFFFFF). What are some ways you could help all people explore this tool? Could you design an advertisement or an art installation that shows the beauty of the map while communicating its message?

ACTIVITIES

After students have filled out their charts and had a discussion regarding the correlation between light pollution and population, ask students to read one of the following three sources.



All three sources summarize a 2016 study on the effects of light pollution on the environment (two are summaries and one is the actual research paper), but progress in reading levels. Depending on your class, you may want to assign different groups to each text, or have them read the same source together.

OPTION 1 (MOST ACCESSIBLE READING LEVEL):

https://newsela.com/read/elem-light-pollution/id/28432
Can be adjusted further for reading level and has a great interactive feature for vocabulary.

OPTION 2 (REQUIRES HIGHER LEVEL OF DECODING SKILLS AND VOCABULARY):

http://www.darksky.org/80-of-world-population-lives-under-skyglow-new-study-finds/

OPTION 3

http://advances.sciencemag.org/content/2/6/e1600377.full
The research paper that the two other summaries focus on, dense with academic vocabulary.

If you decide to break your class up into reading groups to read all three sources, have them read the source they have been assigned together (they will need the extra support for understanding the academic vocabulary in Option 3), and then report to the class what the source summarizes. They can do this either verbally, or make a poster. If you choose to have your students construct a poster, have them include the title, authors, publishing date, key terms, two illustrations, and two summary sentences.

However, if it suits your class better to read one source collectively, have your students complete a “jigsaw.” Print out a paper copy for the students and have them number each paragraph. Assign each student a paragraph from the selected source and summarize it. Then go around and read the article to the class and have each person debrief each other on their assigned paragraph.

If you would like to do a hands-on activity with your students, here is a recommended activity:

YOU WILL NEED THE FOLLOWING:
Paperboard box (cereal box or gift box), electrical tape or duct tape, scissors, pencil or end of compass (you only need the pokey part), markers, scissors, and flashlight.

DIRECTIONS:

1. Have students poke holes into their box on the top side (this should be the side with the most surface available) using either a pencil or the end of the compass. Depending on how technical you want the constellation box to be, you can have students create their dots in accordance with a constellation map (here is a quick example: http://www.constellation-guide.com/wp-content/uploads/2015/03/Northern-constellations.png. It might be easier to have them choose a couple constellations to copy or just have them poke holes to mimic stars.
2. Once students have successfully poked holes into their box, have them flip it over and cut a larger hole on the opposite side. This will be where the flashlight goes to shine through to the "stars."
3. Once both sides have been cut, have the students secure the flaps on either end with electrical tape or duct tape.
4. Put the flashlight into the box and turn on. Turn off lights to demonstrate what the night sky would look like without light pollution, and then turn the lights back on to demonstrate what it looks like with light pollution. You can use various lamps to demonstrate glare (excessive brightness that causes visual discomfort), skyglow (brightening of the night sky over inhabited areas), light trespass (light falling where it is not intended or needed) and clutter (bright, confusing and excessive groupings of light sources). (lesson adapted from Demonstrating light pollution and shielding, .nd.)

EXIT TICKET

Have students fill out a sentence stem stating, "Light pollution affects _____. Three ways I can help to reduce light pollution are: ____, ____, ____." They can do this on a sticky note and share with just you or the class.

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