



TASK FORCE CHALLENGE 3: LIGHT TRESPASS

Student Instructions for Challenge 3: Light Trespass

1. Consider the complaints made by citizens of your city by reading the Light Trespass Citizen Letters.
2. Begin by brainstorming with your Task Force Members. Use the Problem Solving Worksheets to just begin to write down: What are the issues? What do you know? What's the problem? What are some possible solutions? What do you still need to know?
3. Next, refer to the Background Information on Light Trespass. When you have finished reading, revisit your Problem Solving Worksheets and fill in additional information based on your reading.
4. In order to solve the problems you've identified, you have been provided with a model of a street, a house, a streetlight (represented by a Mini Maglite or book light), and one figurine of a person. The person should be in the house, laying by the window as if they are sleeping. Ask yourself: how can we keep the light from going to unwanted places?
5. Place the house near the street but in the grass. Remove the cap on the Mini Maglite, and place it on the bottom of the Mini Maglite to be used as its base. Carefully put the ping pong ball over the bulb. Place the Mini Maglite across the street from the house. What are your observations? Where is the light going? Where is the light not going? Where should the light be going?



6. Try moving the Mini Maglite to different locations. Record your observations in a table. Repeat this entire step, building your own solution that will prevent light from going to unwanted places.
7. Repeat the above step with the book light shining at a 45 degree angle. Then try changing the angle of the top of the book light from 45 degrees to shining straight down.
8. See if you can re-create some of the problems you wrote down on your Problem Solving Worksheets. Spend some time experimenting with various set ups, angles and distances to see what works and what does not work for solving the problem(s).
9. When you have finished experimenting, revisit your Problem Solving Worksheets once more. Based on your experience, how would you update, change or support your statement of the issues and problems and your proposed solutions?
10. Conduct additional research as needed in order to create a single group document that lists:
 - The issue or list of issues raised
 - A clear problem statement
 - Information you believe would be helpful that you have not been able to obtain (remaining unanswered questions)
 - A list of one or more suggested solutions with justification for why you recommend each one.
11. Based on the document you created in step 10, create a presentation for your Mayor and other Task Forces (written report, video, poster, website etc.) that clearly communicates the issues, problem(s), solutions and your recommendations.

**Citizen Letters for Task Force Challenge 3: Light Trespass**

Dear Mayor,
Every night my neighbor's porch light and a streetlight on our street shine right into my children's bedroom windows. We have curtains, but the light still comes in. It is hard for them to fall asleep with the light shining in their faces. I'm sick and tired of this light trespassing onto my property! What can the city do?
Sincerely,
Kurt Tan

Dear Mayor,
I live behind a major shopping center in town. The parking lot & building lights stay on all night. The bright lights shines into mine and my neighbors' homes at all hours of the night. Why can't the light be turned off after hours?
Sincerely,
N. Som Nia



Background Information for Challenge 3: Light Trespass

Light Trespass

- Light trespass is when light goes somewhere it is unwanted and unneeded, such as into a bedroom window at night.
- As you may have experienced, it can be hard to fall asleep or stay asleep with light shining into your room.

Blue Light at Night

- Most white lights contain all the colors of the rainbow and a lot of blue.
- Blue light at night can have negative effects on people who are frequently exposed to it.
- Because blue light waves are the right size to bounce off particles in our atmosphere, it easily scatters in our atmosphere and thereby contributes to a lot of light pollution.
- While you sleep, a chemical called melatonin is produced. Melatonin helps regulate many functions in our body. Any light at night will decrease melatonin production, but blue light suppresses production more than other colors of light.

Sleep Cycles

- Humans have a biological clock that follows the 24 hour cycle of day and night called the circadian rhythm.
- Exposure to light at night can disrupt this cycle, such as light from a streetlight coming in the window or looking at computer, tablet, or phone screens before bed.
- This can cause fatigue and insomnia (the inability to sleep at night) as well as other sleep disorders and health issues.

Lighting Responsibly

- Making sure lights are task-oriented is key to reducing light trespass. Task-oriented means the light has a specific job. How can the light be directed only where it needs to be?
- How might the height of the pole or the spacing between poles affect light trespass?

Start Here! Resources for additional research on Light Trespass can be found at: www.laserclassroom.com/TOTN