



Light and Noise Pollution Activity Guide Environmental Science Camp

What you need

- Activity Guide Worksheet, included in the final pages of this Activity Guide
- Pencil, pen, or other writing utensil

Preparation

Pollution is any harmful substance that is released into the environment that can cause health issues and have other negative consequences on the well-being of living things like plants and animals, including humans. Pollution can occur in the air and water. Pollution can also be caused by bright lights and loud noises. Light pollution is caused by bright lights. Noise pollution is caused by loud noises and other sounds.



Plastic pollution near a source of water. Image from NOAA.

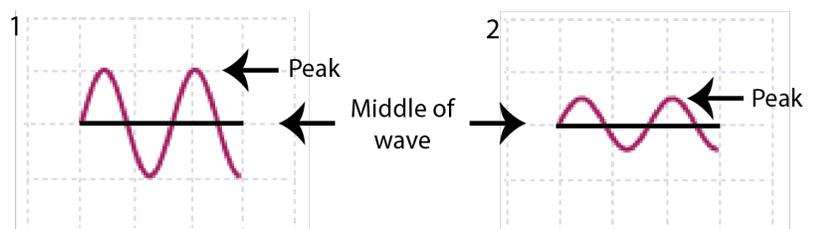
What to do

Use the Activity Guide Worksheet to explore light and noise pollution.

What is happening?

Light pollution occurs as a negative consequence of too much artificial light. Artificial light includes human-made light bulbs that produce visible light with the use of electrical energy. Light pollution can cause brightness in areas that are not meant to be illuminated by artificial light. Too much artificial light in an area can illuminate the night sky. This is known as skyglow.

Noise pollution is caused by loud noises and other sounds. Sound travels as waves through air. In humans, sound travels through the outer, middle, and inner ear as vibrations, a type of movement. These vibrations travel to the inner ear where they are transferred to the brain as electrical impulses. An oscilloscope can be used to illustrate sound waves, including a sound's frequency, also referred to as pitch, and amplitude. The louder a sound, the greater its amplitude!



Two examples of sound waves. A sound's amplitude is measured by determining the height from the middle of the wave to its peak. The first sound wave has a greater amplitude than the second. The height of the first sound wave from the middle of the wave to the peak is much larger than the second sound wave. Images of sound waves modified from BBC.



Light and Noise Pollution Activity Guide Worksheet
Environmental Science Camp

Part 1.

Light pollution can have negative effects on many living things, including animals that rely on natural light from the moon and stars. Sea turtles live in the sea, or the ocean, but they are born on land. Adult female sea turtles create their nests and lay eggs on sandy beaches during the night. These eggs will hatch and young sea turtles will emerge from these nests to return to the ocean, usually at night. These sea turtles are attracted to light, and scientists believe they follow the light of the moon reflected on the ocean water. Unfortunately, artificial lights can confuse these young sea turtles and lure them away from the ocean. Artificial lights can result in harm to the young sea turtles.

There are many solutions to reduce the amount of artificial lights on beaches. For example, windows that face beaches can be tinted or curtains can be used to cover the windows. These solutions will keep light from spilling out onto beaches. Additionally, outdoor lights can use special fixtures to ensure the lights do not cause glare onto beaches. If artificial light needs to be used on a beach, flashlights that emit red light can be used. Red light is not as harmful to sea turtles as other light.

Using the word bank, write the number of the correct solution for reducing artificial light on beaches under the appropriate image. Hint: one image will have more than one solution!

Word Bank

1. Tint windows that face near beaches.
2. Add a special fixture to outdoor lights including street lamps.
3. Use flashlights that emit red light.
4. Cover windows that face near beaches with curtains.

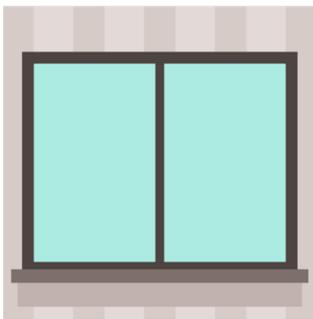


Image of window modified from publicdomainvectors.org.

Light and Noise Pollution

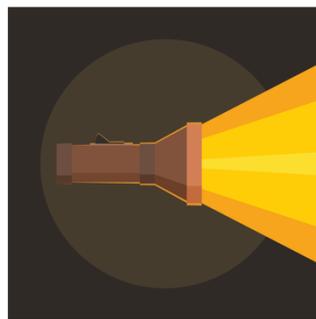


Image of flashlight modified from publicdomainvectors.org.

Activity Guide Worksheet



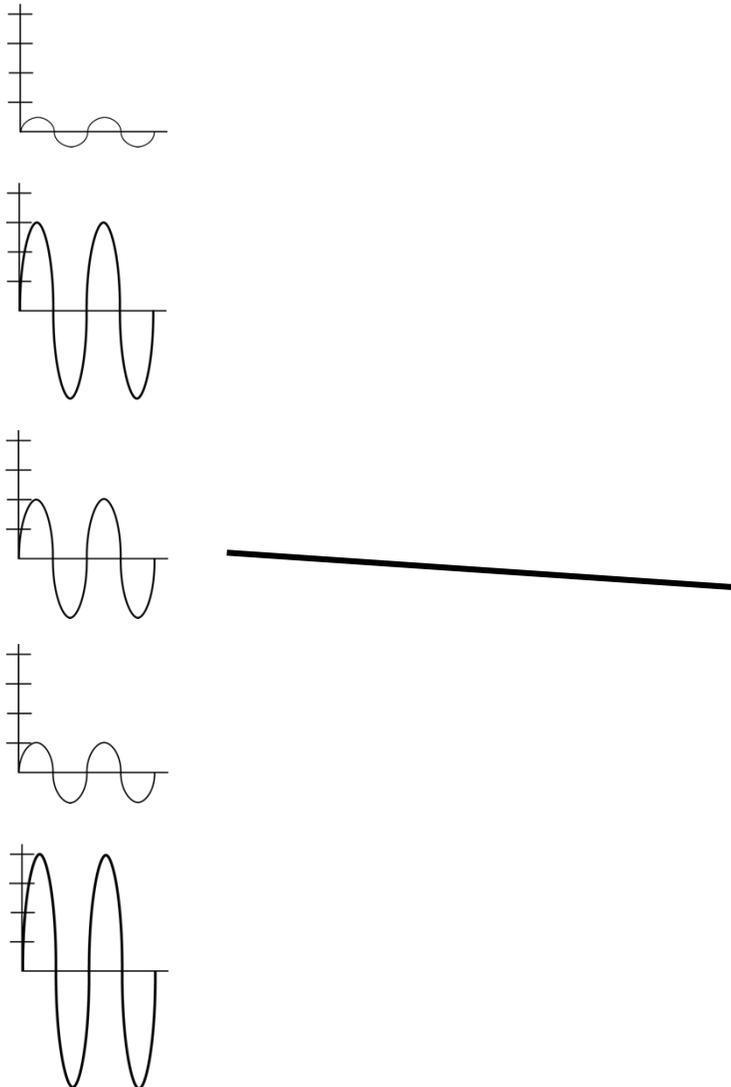
Image of street lamp from publicdomainvectors.org.



Part 2.

Sound is measured by a numerical unit known as a decibel. The sounds of loud noises, like those made by railroad traffic from trains and air traffic from airplanes, have great amplitudes as illustrated on their sound waves created with oscilloscopes. These sounds are defined by large decibel numbers. Sounds defined by large decibel numbers can cause a lot of harm. Exposure to sounds above 85 decibels can be harmful to hearing!

Draw a line to match the wave shape with its correct location on the Sound Thermometer, which lists the decibels of common sounds. An example has already been completed for you. Remember that the louder a sound, the greater its amplitude. And sounds with great amplitudes are defined by large decibel numbers.



Sound Thermometer

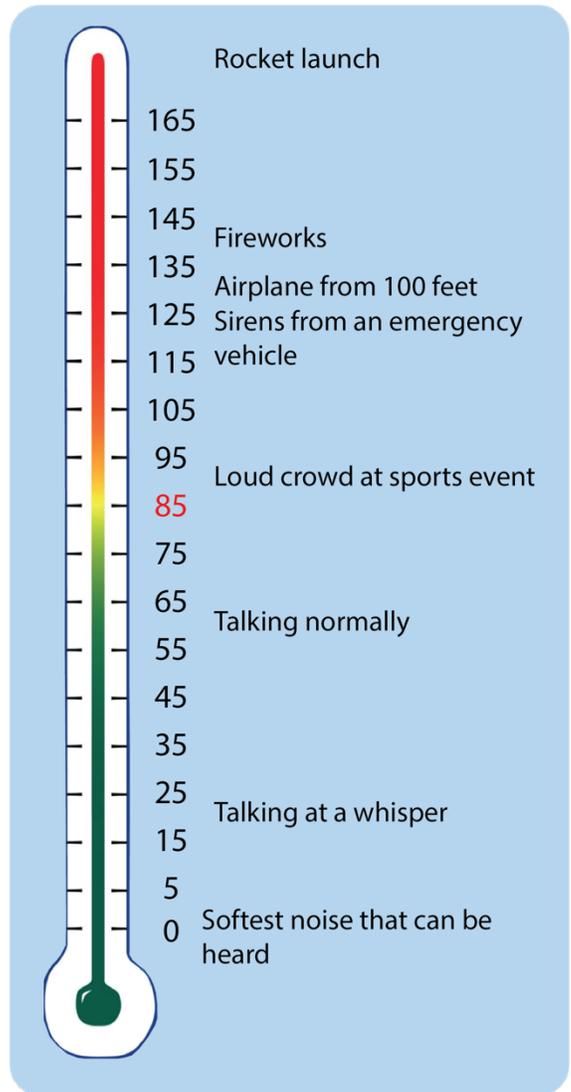


Image of Sound Thermometer modified from *Educator Resource Guide (Dangerous Decibels)* and *Listen Up! Play It Safe With Your Ears. Play It Safe With Your Health. For Elementary School Students* (EPA).