



TEACHER'S GUIDE

# Welcome to the NoiseOFF Teacher's Guide.

The individual units may easily be adapted to many levels and taught across different scholastic curriculums:

- Science (Environment, Human Health)
- Social Science (Civics, Activism, Government, Consumer Protection)
- Language Arts, Communications (Advertising, Marketing, Public Relations)

Level 1 is for elementary and high school students to learn about noise pollution and how they can protect their hearing.

- What is sound?
- How does the human ear work?
- What is noise pollution?
- What is a decibel?
- How can you protect your hearing?

Level 2 is for high school students to develop a critical analytical ability about noise pollution, civics, human health and the environment.

- Does noise pollution have physical effects on the human body?
- Why has noise pollution become so prevalent in society?
- What is society doing about noise pollution?
- What negative social effects result from noise pollution?
- Are all noise pollution problems the same?
- Critical Analysis: The Tavern
- Critical Analysis: Boom Cars
- Critical Analysis: Backyard Motocross Track
- What is NoiseOFF?

The questions in each section are designed to engage students to better understand noise pollution issues from their own perspective. The questions are open-ended, there is no assumed right or wrong answer.

It may be helpful to establish ground rules for constructive discussion, including ways to respectfully disagree.

We would love to hear from you. If you have any ideas, comments or questions, you can write us at [info@noiseoff.org](mailto:info@noiseoff.org)

You can download and print additional educational materials at [www.noiseoff.org](http://www.noiseoff.org)

## What is sound?

Sound is something that can be heard audibly, such as voices, music, nature, machinery and so on. Sounds enable us to perceive our physical environment, especially to communicate (speaking and listening), to enjoy (music), and to alert us (danger).

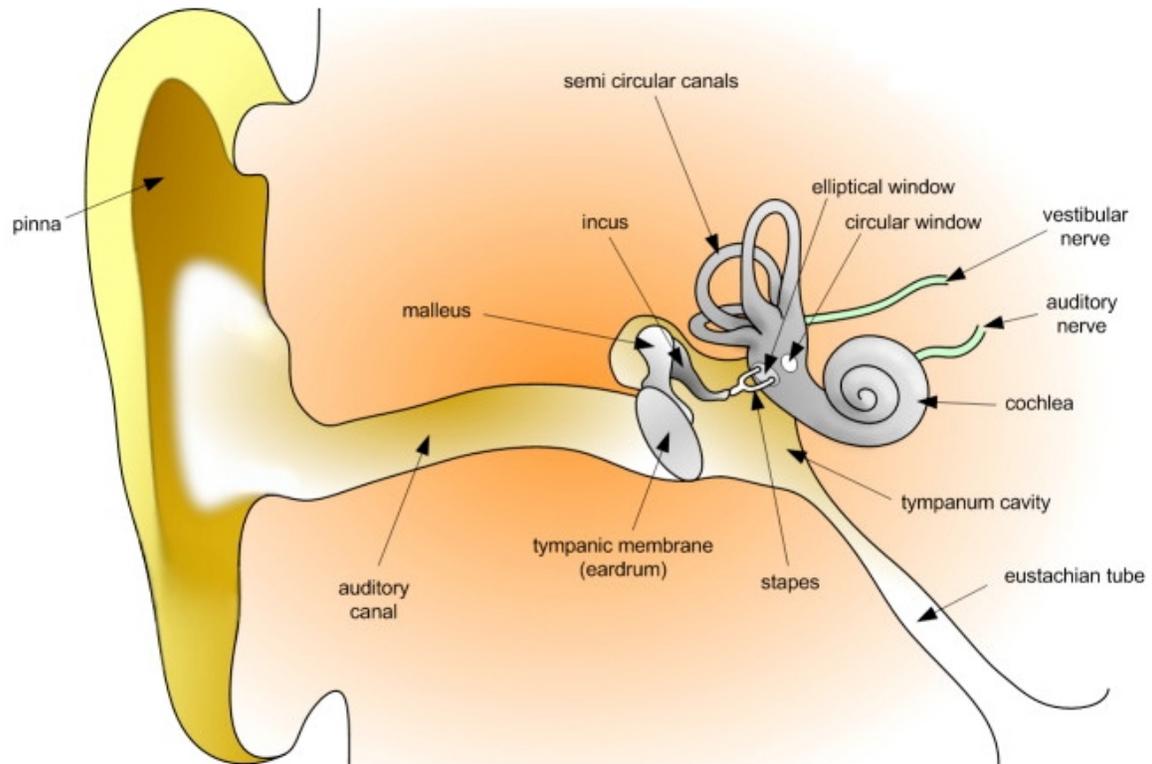
*What are your favorite sounds?*

*What kinds of sounds might alert you?*

Sounds can also be felt through the human body. Loud and low-frequency sounds can be felt as vibrations.

*What kinds of sounds can you feel?*

## How does the human ear work?



The human ear has three sections: the outer ear, the middle ear, and the inner ear. The shape of the outer ear (*pinna*) acts to redirect sound through the auditory canal to your eardrum. The eardrum is a delicate membrane that vibrates to sound waves.

These vibrations are passed in order to three tiny bones in the middle ear: the hammer (*malleus*), the anvil (*incus*) and the stirrup (*stapes*). At the inner ear, the stirrup touches a liquid filled sack and the vibrations travel the *cochlea*. Inside the cochlea, hundreds of special hair cells attached to nerve fibers transmit information to the brain through the *auditory nerve*.

Each part of our ears is tiny and highly sensitive. Exposure to loud or prolonged noise damages the hair cells and the transmission of sound is permanently altered.

In the course of a lifetime, you will lose a percentage of your hearing because of *noise pollution*.

## What is noise pollution?

Noise pollution is unwanted human-created sound that has the effect of being annoying, distracting, painful, or physically harmful. The word noise comes from the Latin word *nausea* meaning seasickness.

Environmental sound is not noise pollution. For example, the sound of a thunderstorm is not noise pollution.

*Can you describe at least three sources of noise pollution?*

## What is a decibel?

A decibel (*denoted as dB*) is a measurement of sound. The “A” standard is a filter used to approximate human hearing; the “C” standard is commonly used to measure low frequency sound that can be felt.

Decibels are measured logarithmically, that means that the perceived loudness doubles with every 10 (dB) increase.

Here is a decibel scale showing different kinds of sounds and how it can affect you.

Type of Sound	Decibel dB(a)/(c)	Hearing Effect
Jet Takeoff	150	Permanent Hearing Loss
Boom Car	140	
Train Horn	130	
Car Alarm	120	Pain Threshold
Leaf Blower	100	Risk of Hearing Loss
Motorcycle	90	
Traffic Noise	80	Loud
Vacuum Cleaner	70	Intrusive
Classroom Activities	60	Comfortable
Conversation	50	
Whisper	30	Very Quiet
Breathing	20	Barely Audible

## How can you protect your hearing?

The simplest way to protect your hearing when you hear loud noises is to cover your ears with your fingers or the palms of your hand.

When using a portable music player, a television, or stereo, adjust the volume so that it does not prevent you from hearing other sounds in your surroundings. If you feel any kind of discomfort or ringing in your ear, it is definitely too loud.

You can also protect the hearing of others by being considerate, by not creating excessive noise.

*What other ways can you protect your hearing?*

## Does noise pollution have physical effects on the human body?

Yes. Many world health agencies and non-government organizations recognize noise pollution and its harmful effects. They include the World Health Organization (WHO), United Nations, Environmental Protection Agency (EPA), and National Institutes of Health (NIH).

According to NIH, more than 10 million people in the United States suffer permanent, noise-induced hearing loss.

According to WHO, their report titled: “*World Health Organization Guideline for Community Noise*,” there are seven categories of adverse health effects of noise pollution:

1. Hearing Impairment
2. Interference with Spoken Communication
3. Sleep Disturbances
4. Cardiovascular Disturbances
5. Disturbances in Mental Health
6. Impaired Task Performance
7. Negative Social Behavior and Annoyance Reactions

*Can you describe an incident in your life  
when you were affected by noise that was annoying or painful?*

*Have you ever been awakened in the middle of the night  
by noise outside your home?*

## Why has noise pollution become so prevalent in society?

Noise pollution is the result of several factors that include the economic interests of business and industry, the inaction of governments to afford adequate protection of its citizens, and individuals who create or allow noise pollution to continue.

There are three prevalent forms of bias for people dealing with noise pollution issues.

1. **Social bias.** Noise pollution issues are often characterized as a lifestyle issue than a public health issue. It is assumed that only a few would be offended by or complain about noise.
2. **Economic bias.** A neighbor or business might refuse to acknowledge a noise problem they created because they would be liable for the time and cost to mitigate or abate the problem.
3. **Bureaucratic bias.** When public officials say, *“we are doing everything we can”* without detailing specifics, they may be managing the issue instead of effectively reducing noise.

In most conflicts between two parties, there is usually a hidden third party. Most disputes between neighbors are often caused by the use of noisy products, whereby the industries that manufacture and sell them quietly profit and assume no liability.

Below are some common expressions and attitudes about noise pollution. What exactly is the inherent bias in these statements?

*“If it's too loud, you're too old.”*

*“Noise equals prosperity.”*

*“No one else is complaining about the noise except you.”*

*“You must have overly sensitive hearing.”*

## What is society doing about noise pollution?

In 1972, the U.S. Congress enacted the Noise Control Act (NCA). It declared that the policy of the United States to promote an environment for all Americans to be free from noise that jeopardizes their health or welfare.

Following enactment of the NCA, the Environmental Protection Agency (EPA) created the Office of Noise Abatement and Control (ONAC).

The function of ONAC was to create noise emission standards, establish product labeling, coordinate federal noise reduction programs and assist state and local noise abatement efforts.

Ten years later, ONAC lost its funding.

Today, noise issues are under the jurisdiction of various state and local regulating bodies and agencies. Because each community has its own noise codes and enforcement policy, residents get a different response to common noise complaints across the country.

*Should noise codes and enforcement be different or the same everywhere?*

Communities across the United States have passed laws that prohibit excessive noise from different sources. In recent years, there has been increasing legislation and additional enforcement to reduce noise.

With increasing media reports about the harms of noise pollution, people are considering that noise is not merely an annoyance.

In the past, consumer products were designed without any noise insulation to give the impression it was more powerful. Today, household and office products are much quieter, such as vacuum cleaners, dishwashers, and computer equipment.

Many homeowners opt for quiet push reel or electric lawn mowers that are environmentally friendly. In some communities, leaf blowers are banned because of the noise.

*As a consumer, what quieter products would you like to see on the market?*

*Should products be banned or restricted because of noise emissions?*

## What negative social effects result from noise pollution?

The National Highway Traffic Safety Administration (NHTSA) estimates that twenty five percent (25%) of vehicle accidents are caused by driver distraction.

Motorists experience reduced reaction times when listening to loud music and adjusting the controls on their car stereo equipment. The sound from a loud car stereo decreases a driver's ability to hear pedestrians and other vehicles.

That also includes emergency vehicles such as police cars, ambulances, and firetrucks.

### *What responsibilities do motorists have when driving?*

Economic effects include lowered property values in communities where noise pollution is prevalent, medical expenses related to treating hearing loss, emotional and physical stress for noise sufferers.

Additional law enforcement resources are spent enforcing existing noise codes to protect residents.

Workers experience lost productivity, increased health costs and absenteeism when they cannot rest at night from outside noise, or when they work in noisy offices and manufacturing environments without proper noise abatement or mitigation solutions.

### *As a student, how can noise pollution affect you academically?*

## Are all noise pollution problems the same?

No. Most people deal with noise from boom cars, car alarms, motorcycles and automobiles with loud exhaust systems. Other common sources include barking dogs, leaf blowers, and building construction.

*If your next door neighbor had a barking dog keeping you up at night, how would you attempt to negotiate a solution?*

*Does the noise from one loud motorcycle present the same issues as the noise from one hundred loud motorcycles?*

The noise from car alarms is a common urban blight. Some alarms also use audible status indicators that make noise whenever there is any external vibration or sound.

For all the noise they make, there is little evidence that car alarms deter auto theft. In fact, auto thieves often trip the alarm to mask the sound of breaking glass. Most people do not respond to car alarms. The noise disrupts students in the classroom, people in their home or workplace. They even disrupt celebrations, weddings, funerals and other events.

*What better ways can motorists protect their vehicle?*

## Critical Analysis: The Tavern

A tavern bordering a residential neighborhood is keeping neighbors up at night. Residents complain to the owners but they seem unable or unwilling to correct the problem.

*If you were an affected resident, how would you attempt to handle the problem?*

*If you were the tavern owner, how would you respond to noise complaints?*

Residents organize and decide that they are going to lobby their local officials and police department with the goal to abate or mitigate the noise problem. They also want to rally public support by raising awareness of the problem.

*What is grassroots organization?*

*What is the difference between abatement and mitigation?*

They lobby their local officials for an ordinance requiring local bars to close past midnight. The tavern owners and interested business groups respond by lobbying to defeat the proposed legislation. Other residents support the tavern because they believe it is beneficial to the economic development of the community.

*How do individuals and groups lobby legislators?*

*In what ways can legislation effect the economic development of a community?*

One local newspaper writes an unbiased story that presents the issue allowing the reader to make an informed opinion. Another local newspaper decides not to run the story because they do not want to offend their advertisers.

*How does the media influence public policy?*

*Can the media shape public opinion?*

Some legislators appear to respond to political pressure from the voting public while others appear to respond to political donations.

*In what ways can political pressure and political donations affect a legislative decision?*

The residents want the police to be more proactive in enforcing existing noise codes, but they are unsure if police enforcement policy is based on political influence or the number or severity of complaints.

*How do police departments prioritize and handle different types of complaints?*

*Can police enforcement policy be influenced by political pressure?*

## Critical Analysis: Boom Cars

A *boom car* is a vehicle equipped with an audio system producing a powerful bass sound that can be heard and felt outside of the vehicle. The bass sound can rattle windows and travel through walls into residences.

The inherent causes for noise pollution go beyond the indifferent motorist blasting noise with a car audio system. The car audio industry manufactures and markets its products to promote “*booming*.”

Pioneer Electronics, a leader manufacturer marketed its line of car audio equipment products with the slogan: “*Defy, Disrupt, Disturb, Ignite*.”

They produced a marketing video titled “*Disturb*.” A young man talks about spending half of his inheritance money to purchase car audio equipment costing \$30,000. Another brags about how his boom car sets off car alarms and once caused a little boy to cry in the middle of the street.

Manufacturers of car audio equipment promote their products with marketing messages and slogans of their own.

JBL: “*Either we love BASS or hate your neighbors*.”

JL Audio: “*Be Very Afraid*.”

Lightning Audio: “*Sonic submission*.”

Boss Audio System: “*Turn it down? I don't think so*.”

Crossfire: “*We're louder...Deal with it!*”

Viper Audio: “*Cold Blooded. Violent Fury and Multi-Channel Mayhem*.”

Orion High Performance Car Audio: “*Be Loud. Be Obnoxious*.”

Cerwin-Vega Mobile Audio: “*Shake the living, wake the dead*.”

Concept: “*When TOO loud...is just right!*”

Kicker: “*You deserve a beating...Kicker's loudest, meanest subwoofer ever!*”

*What is the car audio industry trying to convey?*

*What consumer demographic is the car audio industry targeting?*

*What television shows do car audio companies promote themselves through advertisements and product placement?*

An industry group, Mobile Enhancement Retailers Association (MERA) represents manufacturers and installers of car audio equipment.

MERA released a position statement warning its members: “*...not to use symbols, messages or suggest behavior that would adversely affect the industry. Irresponsible promotion could negatively impact the perception of our industry by the public at large and could be used against us by activists or government to regulate our products and activities*.”

*To what extent is MERA concerned about noise pollution?*

*What does it mean to be a good corporate citizen?*

## Critical Analysis: Backyard Motocross Track

The Mayer family built a motocross racetrack to race dirt motorcycles and all-terrain vehicles (ATVs) on their property. They host local race meets and often invite the community to join and participate.

The Lopez family is the next door neighbor. After six months, they finally complain to the Mayer family that the noise is affecting the use and enjoyment of their own property. They claim that the noise level is so severe that they have to flee their home during practice runs and race meets.

It seems they are the only family affected by the noise; the other neighbors support the Mayer family and the continued operation of the motocross track.

*Who do you believe is right in this matter?*

*Is majority opinion a factor in determining who is right?*

*Is time a factor in determining who is right?*

They file a complaint to the authorities, but police and public officials assert that the neighbor have not broken any criminal laws. The Lopez family files a civil lawsuit against the Mayer family on the basis that the motocross track is a public nuisance.

*As the attorney representing the Plaintiff, the Lopez family,  
how would you advocate your client's case?*

*As the attorney representing the Defendant, the Mayer family,  
how would you advocate your client's case?*

## What is NoiseOFF?

NoiseOFF is a grassroots effort working to raise awareness of noise pollution. Our core functions include political lobbying, public relations, and education.

Concerned activists alarmed at the increase in noise pollution founded NoiseOFF in 2004. As they researched the causes and effects of noise pollution, there was a need to widely disseminate information on the problem.

The website was founded as a working toolkit that people can use to reduce their noise problem and the message board as a place where people can connect with others. Our goal is to help empower people to reduce noise problems in their own community.

Our group is not orchestrated or influenced by traditional power structures, such as a corporation or a government agency. Our funding and resources come from our members.

Website:

*<http://www.noiseoff.org>*

Message Board:

*<http://groups.yahoo.com/group/noiseoff>*

Contact Us:

*[info@noiseoff.org](mailto:info@noiseoff.org)*