



How Loud Is Too Loud?

*An activity to do at home or with a youth group.
Construct a fun learning tool to help recognize
safe levels of exposure to various sounds.*

SCIENCE TOPICS

Sound
Decibels
Sense of Hearing

PROCESS SKILLS

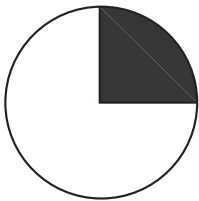
Observing
Measuring
Comparing

GRADE LEVEL

7-12 (requires
reading)

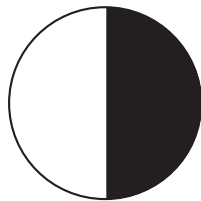
TIME REQUIRED

Getting Ready



15 minutes

Activity



30 minutes

SUPPLIES YOU'LL NEED

1 per person of the following

- Paper fastener (brad)
- Masters A and B

1 per group of the following

- Scissors
- Glue or Scotch tape

GET READY

For the adult supervisor.

- Have supplies on hand.
- Print or photocopy Master A and Master B for each person. (These are the large circles with the dotted lines for cutting.)
- For older children, print or copy the sections in boxes so they can follow instructions to do the activity independently. If you will be working with a group, follow the instructions below to make a sample “How Loud Is Too Loud” wheel to show the children.

TALK WITH THE CHILDREN FIRST

Questions for the parent or adult supervisor to ask children before the activity to get children thinking about sound.

Ask the children the following questions in bold.

Possible answers are shown in italics.

What are some quiet sounds?

Whispering, music (sometimes!), a baby breathing, the wind, tiptoe steps, sleeping, mice, the TV turned down very low, a feather falling, etc.

What are some loud sounds?

Motorcycles, music (sometimes!), drums, guns, lawnmowers, hammers, crying babies, cats fighting, screaming, concerts, car races, motor boats, etc.

Are sounds ever too loud?

Some children will say yes, others may say no. Let them voice their opinions.

What do you usually do when you are around loud sounds?

Again answers will vary.

If you are working with a group, show children your sample "How Loud is Too Loud " wheel so they can visualize what they will make.

Hand out a copy of Masters A and B to each child. Masters A and B are the inner and outer wheel for them to cut.

MAKING THE "How Loud Is Too Loud" WHEEL

You may give the older children the instructions and let them work on their own. Younger children may need supervision or help.

STEPS TO FOLLOW

How to Make a "How Loud Is Too Loud" Wheel

- Step 1.** Find the paper with a picture of an ear in the middle.
- Step 2.** Cut along the black dotted line.
- Step 3.** Find the paper with a circle that looks like a bicycle wheel with spokes.
- Step 4.** Cut out the circle by cutting along the black dotted.
- Step 5.** Place both circles with the pictures facing up on the desk.
- Step 6.** Put your circles with the picture of the ear on top of the circle with the spokes.
- Step 7.** Join the two circles by pressing and fastening a brad through the center of both circles at the black dot.

You have completed your "How Loud is Too Loud" wheel. To use your wheel, hold the top circle and turn the bottom circle until you can see a picture in the "SOUND" window. Directly across from it, you can see how many decibels are produced, on average, by the sound source. It also tells you how long you can listen to it before hearing damage can occur.

FURTHER DISCUSSIONS

What are some quiet sounds? Some loud sounds?

Talking is a quiet sound. The rock concert and the chain saw are very loud sounds.

Which sounds could damage your hearing quickly?

Can you think of other sounds that might be too loud?

Stereo headphones, a rock concert, and a chainsaw.

Does it matter how long you listen to a sound?

Children may have noticed that every sound on their wheel had a time attached to it (except the safe sound level from conversational talking).

The times on the “How Loud Is Too Loud Wheel” refer to the amount of time you can listen to a sound before your hearing is damaged.

Note: **Even when hearing damage occurs, the impact on your total hearing is gradual.**

Rock musicians often don’t notice they have damaged their hearing until it is too late. Most rock musicians have hearing loss.

To prevent noise-induced hearing loss: Study the Caution Message signs on your wheel and follow the 3 basic rules:

3 basic rules to..... PROTECT YOUR EARS!

1. **Turn It Down** (Turn down the volume!)
2. **Walk Away**
3. **Protect Your Ears**
(Earplugs, ear muffs and fingers in the ears work. Tissue in the ears doesn’t work.)

LEARN MORE

In-depth background information for adults and interested children.

Visit the Dangerous Decibels Exhibit at the Oregon Museum of Science and Industry (OMSI) in Portland, Oregon. Book an OMSI Dangerous Decibels program in your community (if you live in the Pacific Northwest of the U.S., or visit www.dangerousdecibels.org).

More about 'How Loud is Too Loud': Noise Pollution

Noise is defined as “unwanted sound” and it is America’s most widespread nuisance. It is not a new problem. In the first century BC, Julius Caesar banned chariots in Rome to cut down the deafening noise of chariot wheels on stone roads. Throughout the ages people have complained that they can’t “hear themselves think” due to noise. Some people talk of “moving to the country” to get away from the noise of the city. Noise presents a real danger to people’s hearing and general health. In addition to the damage noise can cause to our ability to hear, noise can produce other physical and psychological stresses. Although we may seem to become accustomed to noise, our bodies still respond and our hearing capability gradually diminishes. Noise exposure has been linked to:

- permanent hearing damage resulting in reduced ability to communicate
- increased adrenaline, high blood pressure and faster heart rate
- heart and circulatory disease
- overall stress on the body
- problems with fetal development and low birth weight
- interference with the development of language skills
- interference with conversation and social interaction
- diminished work efficiency
- diminished quantity and quality of sleep
- increase in antisocial behavior, extreme emotions and behavior
- accidents, due to overall stress and due to obscuring audible alarms

Despite our knowledge that noise is damaging to our health, the noise levels in our environments continue to rise. The Acoustical Society of America indicates that since 1950 the volume of noise in daily life has doubled every ten years.

Unfortunately, the damage that sound can inflict on our ears does not depend on whether we like it or not. A concert can be just as damaging as noise from firearms or sirens or noisy engines. Also, growing accustomed to loud noise does not diminish its ability to damage our hearing or to cause other physiological effects.

TAKE IT FARTHER... TEST THE SOUNDS AROUND YOU

Make your own "How Loud Is Too Loud" wheel

SUPPLIES

- a sound level meter (purchase, e.g. from Radio Shack™, or borrow one)
- paper
- paper clips or glue stick
- scissors
- ruler
- something to draw with (crayons, colored pencils, markers, etc.)

Measure and draw 12 rectangular boxes 1.5 inch by 1 inch (3.5 by 2.5 cm). Choose 6 sources of sound in your environment.

Draw small pictures of 6 sound sources in 6 of your small boxes.

Use a sound level meter to measure the decibel level for the sound sources from each of your 6 pictures.

Write down the decibel sound pressure level reading for each sound on the back of the picture of the sound. Write the same decibel reading in one of the 6 empty rectangular boxes along with the "safe listening times" from the following table:

<u>Decibel Level</u>	<u>Length of Time</u>
85	8 hrs.
88	4 hrs.
91	2 hrs.
94	1 hr.
97	30 min.
100	15 min.
115	30 sec.

- Cut out your twelve boxes.
- Place one of your sound pictures over each of the six print pictures on the bottom circle of your "How Loud Is Too Loud" Wheel. (Master B)
- Place the rectangular box with the matching sound level reading on the opposite side of the circle.
- Attach the pictures and the sound level measurements with paper clips or glue stick.
- Assemble your personalized "How Loud is Too Loud" Wheel.
- Use the wheel to teach or quiz you family and friends.

Piece "A"

Cut along
dotted lines only.

SOUND

Turn It Down

Protect Your Ears

Walk Away

Dangerous Decibels

How many decibels?*

How much time before damage?

* Decibels are approximations according to NIOSH Standards using dB(A) time weighted averages.

www.dangerousdecibels.org

Funded by grants from NIH-NRC, NIH-NIDCD, Northwest Health Foundation, Collins Medical Trust, Harold & Arlene Schnitzer CARE Foundation, Ford Family Foundation, Crane Creek Family Foundation, and Dal L. Baker Charitable Lead Annuity Trust

Piece "B"

**Cut along
dotted lines only.**

