

# Shh... What Was That Noise?

## Identifying Sound Decibels

**Author** Heather Moll  
**Grade Level** 8  
**Duration** 2 class periods

### National Standards

#### GEOGRAPHY

##### Element 1: The World in Spatial Terms

1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information  
 3. How to analyze the spatial organization of people, places, and environments on Earth's surface

##### Element 2: Places and Regions

4. The physical and human characteristics of places

##### Element 5: Environment and Society

14. How human actions modify the physical environment

### AZ Standards

#### SCIENCE

##### Physical Science

8.P4.U1.4 Develop and use mathematical models to explain wave characteristics and interactions.

#### ELA

##### Writing

##### Production and Distribution of Writing

8.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

### Arizona Social Science Standards

#### GEOGRAPHY

**The use of geographic representations and tools helps individuals understand their world.**

8.G1.1 Use geographic tools and representations to analyze historical and modern political and economic issues and events.

**Human-environment interactions are essential aspects of human life in all societies.**

8.G2.1 Examine impact of and responses to environmental issues such as air, water, and land pollution, deforestation, urban sprawl, and changes to climate.

### SIOP Elements

#### Preparation

**Adapting content**  
**Linking to background**  
 Linking to past learning  
 Strategies used

#### Scaffolding

Modeling  
**Guided practice**  
**Independent practice**  
**Comprehensible input**

#### Grouping Option

Whole class  
**Small groups**  
**Partners**  
**Independent**

#### Integrating Processes

Reading  
**Writing**  
**Speaking**  
**Listening**

#### Application

**Hands on**  
 Meaningful  
 Linked to objectives  
**Promotes engagement**

#### Assessment

**Individual**  
**Group**  
**Written**  
 Oral

### Arizona English Language Proficiency Standards

#### Stage IV

#### Basic

**Standard 1: The student will express his or her thinking and ideas in a variety of writing genres. The student will express his or her thinking and ideas by using a variety of writing genres, as demonstrated by:**



Education Studies Department  
 Teachers of Language Learners Learning Community (TL<sup>3</sup>C)



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B-3: taking notes using a teacher selected and student created graphic organizer or cloze notes.  
B-5: writing original questions and predictions for further inquiry based on the conclusions of scientific investigations.

## Overview

In our modern world, citizens have become accustomed to noise from early morning until night. Television, phones, radios, classrooms, homes, businesses, and even rural areas are producing sounds. Is it possible to get away from all of this noise?

## Purpose

In this lesson, students will learn about sound waves and investigate their homes and schools to determine noise levels. They will measure levels of sound in various places and then solve a problem using what they have learned. This lesson includes strategies for diverse learners (ELLs).

## Key Vocabulary

**crest:** highest point of a wave

**decibel:** a unit used to express the loudness of a sound

**sound:** vibrations that travel through the air and can be heard

**trough:** low point of a wave

**wave height:** the difference between a wave's high point (crest) and its low point (trough)

**wavelength:** the distance between two wave crests

## Materials

- Smart devices with a free decibel measuring app installed
- Decibels Data Tables worksheet
- Parts of a Wave worksheet
- Parts of a Wave Answer Key
- Map of your school grounds, or city.
- Designing Your Own High School worksheet
- ELL Writing Assessment
- Vocabulary Cards
- Vocabulary Test and Answer Key
- Document camera (optional)

## Objectives

The student will be able to:

1. identify the distinctive parts of a sound wave.
2. gather information and solve a problem.

## Procedures

*Note to Teacher: Because apps are constantly being created and prices can change, the teacher will need to do the research on a free app for measuring the decibels of sound in order to recommend one(s) for the students to download.*

### SESSION ONE

#### Engage:

1. Draw a t-chart on the board or on a paper under the document camera. One side should be titled "Loud." One side should be titled "Quiet."
2. Ask the students to think about places they have been that are loud or very quiet.
3. Lead a discussion with your class about where some of these places are located. Write them on the t-chart in the correct column. (**Preparation: Adapting content, Linking to Background**)
4. Model the use of the decibel meter on a handheld device. Have them be very quiet and then have them be loud to show the decibel differences on the device. (**Scaffolding: Guided Practice**)
5. Give students time to install a sound measuring app on their handheld devices.

#### Explore:

6. Explain to the class that they will work in teams to explore different parts of the campus and record decibel levels. (**Grouping Option: Small groups**)
7. Distribute the Decibels Data Tables worksheet. Point out that they will need to find at least three locations on campus with different decibel readings.
8. Allow students 15-20 minutes to do this task--depending on how large your campus is in size. (**Application: Hands On, Promotes Engagement**)
9. As homework, have the students record at least two decibel readings around their home: one loud and one quiet. Have them mark the readings and location on their Decibels Data Tables Worksheet. (**Scaffolding: Independent Practice**)

### SESSION TWO

#### Explain:

10. Distribute the Parts of a Wave worksheet. Allow



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the students time to individually fill out the worksheet. **(Grouping Option: Independent)**

11. Explain the different parts of a wave to the students and how it relates to decibel levels. **(Scaffolding: Guided Practice)**
12. Show the first 3 minutes of Bill Nye Sound YouTube video. **(Scaffolding: Comprehensible Input)** <https://www.youtube.com/watch?v=-80i-yhg8gq8>
13. Distribute a map of their campus and have partners mark where the quiet and loud locations were located. Have one partner share out their findings and put the class data on a school map that is under the document camera. Look at the spatial distribution. Where are the noisy areas? **(Grouping Option: Partners)**

### Elaborate:

14. Distribute Designing Your Own High School worksheet. Explain the assignment and how it will be graded. Give students about 25 minutes of class time to design their school keeping in mind sound issues. Assignment can be homework. **(Assessment: Written, Individual or Group)**

### Evaluate:

15. On day the assignment is due, have students explain in groups of three or four how they designed their schools and ask for feedback. Student may submit their maps that day or based on feedback, revise their maps and then submit. **(Scaffolding: Comprehensible Input)**
16. Give Parts of a Wave worksheet as vocabulary test. **(Written Assessment: Individual)**
17. ELL students can complete the ELL writing assignment on writing "where" and "why" questions. **(Written Assessment: Individual)**

## Assessment

### Science

Decibels Data Tables worksheet can be graded for completeness. Mastery will be considered 100%.

Parts of a Wave worksheet can be used as a vocabulary test and graded for correctness. Mastery will be considered a score of 80% or higher.

### ELA

Parts of a Wave worksheet can be used as a vocabulary test and graded for correctness. Mastery will be considered a score of 80% or higher.

Vocabulary test can be given. Mastery will be considered a score of 80% or higher.

### Geography and ELA

Designing Your Own High School map can be graded for elements of a map (date, orientation, scale, title, author, legend, and symbols) as well as the concept that noise influences where humans locate certain features. Mastery will be considered a score of 80% or higher on the Scoring Criteria.

### ELP

Sentences created by ELLs will be graded on their correct use of "where" and "why." Mastery will be considered 1 error in the 8 questions written about their map.

## Extensions

Have students keep recording sound samples as they occur around them. A chart in the room could be made like a thermometer with new data being added to the chart (rock concerts, gun firing, whistle blowing, etc.).

Talk about ear protection and the damaging effects of excessive decibels.

Show the YouTube video on Cool Things Sounds Can Do. (3 minutes)

<https://www.youtube.com/watch?v=Ude8pPjawKI>

Or Can Silence Actually Drive You Crazy?

<http://youtu.be/mXVGlb3bzHI> (10 minutes)

## Sources

Mr. Andersen explains how sound waves are created and perceived. A brief discussion of pitch and loudness are included. A generated sound of varying pitches is also included. (9 minutes)

<https://www.youtube.com/watch?v=OFU2jwl8Uwg>

This black and white production looks like something from the 1950s, but it does a good job of showing how the sound waves are different with different pitches. (2 minutes)

<https://www.youtube.com/watch?v=YsZKvLn7wU&list=PL06FF8833CADA0ACC&index=6>

Sound waves are all around us, and when harnessed, can do some super cool things. It also looks at a few ways we're using the power of sound waves to our advantage. (3 minutes)

<https://www.youtube.com/watch?v=Ude8pPjawKI>

