

Shh... What Was That Noise?

Identifying Sound Decibels

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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

Grade 6-8

Basic

Listening and Reading

Standard 1 By the end of each language proficiency level, an English learner can construct meaning from oral presentations and literary and informational text through grade appropriate listening, reading, and viewing.



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B-1: determine the central idea or theme and explain how they are supported by using some text evidence.

B-2: recount specific details and information in a variety of texts. **Speaking and Writing**
Standard 3 By the end of each language proficiency level, an English learner can speak and write about grade appropriate complex literary and informational texts and topics.

B-1: deliver short oral presentations that include some details to develop a topic.

Standard 5 By the end of each language proficiency level, an English learner can adapt language choices to purpose, task, and audience when speaking and writing.

B-1 demonstrate awareness of the need to adapt language choices according to purpose, task, and audience.

B-2: use general academic and content specific words, phrases, and phrases to express ideas.

Listening, Speaking, Reading, and Writing

Standard 6 By the end of each language proficiency level, an English learner can participate in grade-appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions.

B-1: participate in discussions about familiar topics and texts.

B-2: participate in written exchanges about familiar topics and texts.

B-5: contribute relevant information and evidence to collaborative oral and written discussions.

Standard 7 By the end of each language proficiency level, an English learner can conduct research and evaluate and communicate findings to answer questions or solve problems.

B-2: paraphrase observations/information notes with labeled illustrations, diagrams, or other graphics, as appropriate.

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
- (Optional) 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:



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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 the students time to individually fill out the worksheet. **(Grouping Option: Independent; Integrating Processes: Reading, Writing)**
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=-80iyhg8q8>
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; Integrating Processes: Speaking, Listening)**

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 optional 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



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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)

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=YsZKvLnf7wU&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>

Sources



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