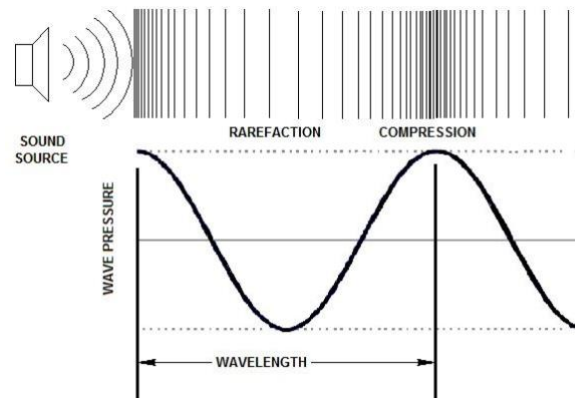




NASA Spotlite Interactive Lesson

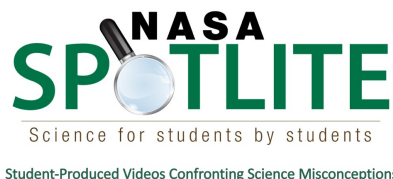
Sound Waves and Media Grades 5-8



Student Packet



NASA Spotlite Interactive Lesson



What are NASA Spotlites?

NASA Spotlites are 90-120 second student-produced video segments that address common science misconceptions.

NASA Spotlites are designed to increase scientific literacy in a standards-based classroom. By producing Spotlite videos, students gain production experience, as well as deepen their understanding of science content. Approved NASA Spotlites can be found at the NASA eClips™ website. <https://nasaclips.arc.nasa.gov>



A misconception is a view or opinion that is incorrect because it is based on faulty thinking or understanding.

This is an Interactive PDF. Features in this packet may include:

- fillable boxes
- quick checks
- multiple choice questions
- interactive GIFs (graphics interchange format)
- links to videos and online interactives

The hyperlinks included in this document open PDFs or webpages and may perform differently based on the device being used. Links may have to be cut and pasted into a web browser to open. PDFs and other documents may need to be downloaded to view.

Try using Adobe Acrobat Reader and Flash Player for optimal performance of all interactive features included in this guide.

Save



Remember to save your responses.
Under "file" choose "save as."
Type your name in front of the document name.
Choose "save."

Pretest

Sound Grades 5-8 Pretest NASA Spotlite Interactive Lesson

Read each question and select the best choice.

1. This is the material through which a sound wave travels.

2. This is a form of energy that is produced by vibrations in matter.

3. Which of the following statements about sound is true?

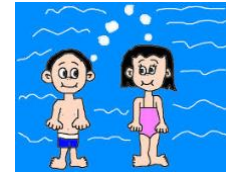
4. Tonya and Derek were discussing the transmission of sound. In which of the scenarios that they discussed would sound NOT travel.

A.

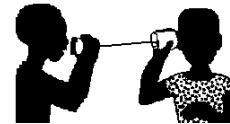


26.195 String telephone

B.



C.



D.



Engage

In today's lesson you will learn how sound waves travel through a medium. Using interactive Frayer Models, you will learn key vocabulary that will help you learn that sound is a form of energy that occurs through vibrations in matter.

What do you already know about sound and how it travels through different media?

Spotlite Video

Next, you will watch a short video about how sound travels through different media. As you watch the video, pay close attention to any new vocabulary.



NASA Spotlite: Sound Waves and Media

NASA eClips™ Website: <https://nasaclips.arc.nasa.gov/spotlite/>

NASA eClips™ YouTube: <https://youtu.be/-uEs6HXhqR0>

True or False: Sound needs air to travel.

Explore

Explore Activity

Use this interactive to explore how sound travels through different media.

There are three media (locations) to choose from. Select "croak" and record how long it takes the man to hear the frog's croak.

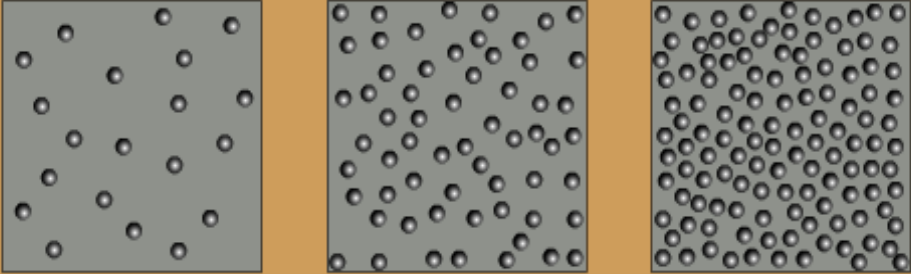
1. land
2. water
3. the near-vacuum of outer space

Select "next" and explore how sound waves interact with different materials.

1. cloth
2. wall

How Sound Travels

The speed at which **sound** travels from one place to another depends upon the **medium** and how closely packed the molecules are in the *matter*. A medium is a substance that allows sound waves to travel through it. Where there is no medium, no sound can be transmitted. Of the three mediums (solid, liquid, and gas), sound waves travel the slowest through gases, faster through liquids, and fastest through solids.



GAS
FAST

LIQUID
FASTER

SOLID
FASTEST!

Next Print Close

Activity Credit: NASA Online - Knowitall.org

Explore

Explore Activity

Use the materials provided to explore how sound travels through different media.

In the space below describe what happened when you placed the vibrating tines of the tuning fork:

1. next to your fingers
2. next to a sheet of paper
3. in the water
4. in contact with the ping pong ball

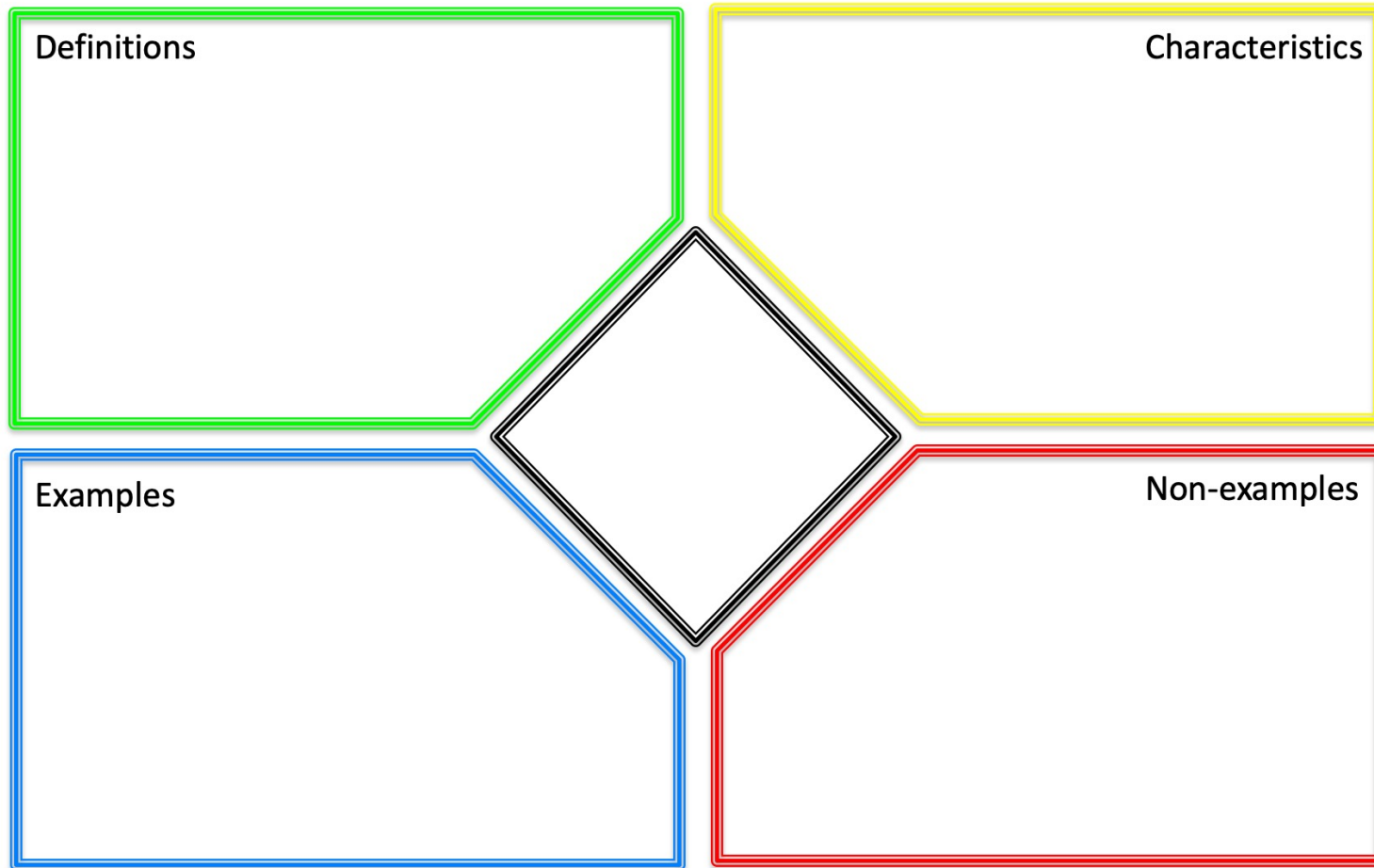
Activity Credit: NASA's Aeronautics Research Mission Directorate- Museum in a Box (<https://www.nasa.gov/aeroresearch/resources/mib/noise-good-vibrations>)

Think - Pair - Share

1. In which medium (solid, liquid, or gas) does sound travel fastest?
2. What happens to sound in the near-vacuum of outer space?
3. Describe what happens to sound waves when they interact with a hard surface such as a wall or a soft surface such as carpeting.

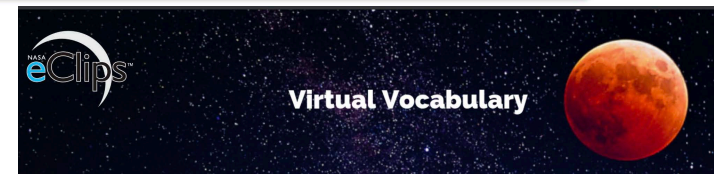
Frayer Model for Vocabulary Development

Use the graphic organizer to write definitions, characteristics, examples and non-examples for a vocabulary word. You can include drawings, graphics, and diagrams.



The diagram is a Frayer Model graphic organizer. It consists of four rectangular boxes arranged around a central diamond shape. The top-left box is labeled 'Definitions' and has a green border. The top-right box is labeled 'Characteristics' and has a yellow border. The bottom-left box is labeled 'Examples' and has a blue border. The bottom-right box is labeled 'Non-examples' and has a red border. The central diamond shape is outlined in black and is empty, serving as a focal point for the four surrounding boxes.

Visit the NASA eClips™ Virtual Vocabulary for more definitions.

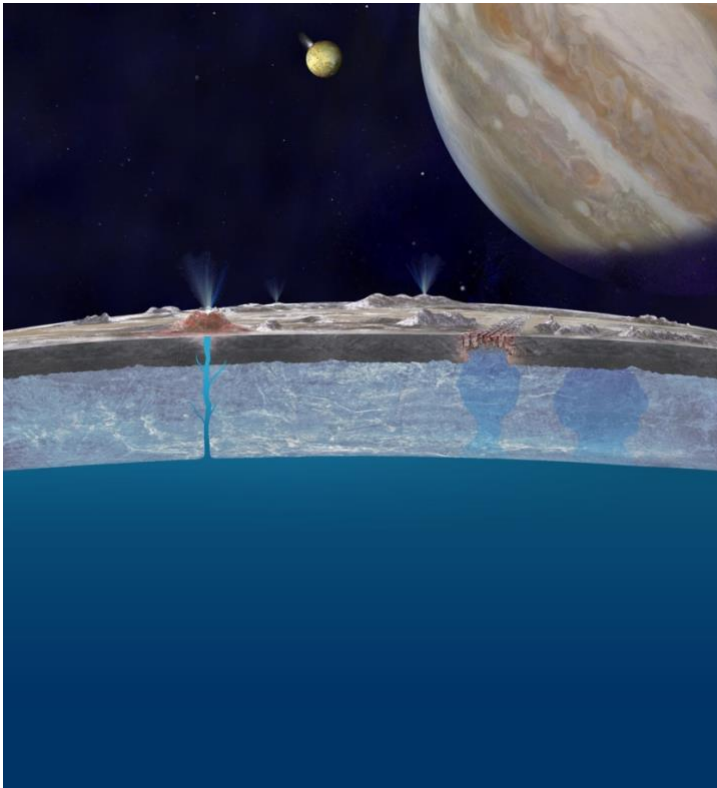


Elaborate/Extend

Elaborate/Extend Activity

NASA Connection

The mineral-infused liquid water NASA believes is under the icy crust of Europa is shown below.



This illustration of Europa (foreground), Jupiter (right) and Io (middle) is an artist's concept.

Image Credit: NASA/JPL-Caltech

Excerpt from Listening for an Ocean on Europa

<https://solarsystem.nasa.gov/news/208/listening-for-an-ocean-on-europa/>

Terrestrial ice mechanics studies show that the vibrations created when ice fractures produce sound waves that can penetrate the thick surface ice layer of Europa. These sound waves propagate what is believed to be hundreds of kilometers through the underlying ocean.

Acoustic sensors deployed on the surface of Europa could pick up echoes from the bottom of the ice layer and the bottom of the ocean. By studying these echoes, one could establish the existence and depth of the ocean as well as the ice layer.

If acoustic sensors are placed on the surface of Europa, how could the sensors pick up sounds from the bottom of the ice layer?

Learn more about Jupiter's moon Europa at this link.
<https://science.nasa.gov/>

Evaluate

Identify Misconception

What is a common misconception people have about sound and how can you correct it?

Carefully rewatch the NASA Spotlight video about sound to assess your understanding of how it travels through different media.



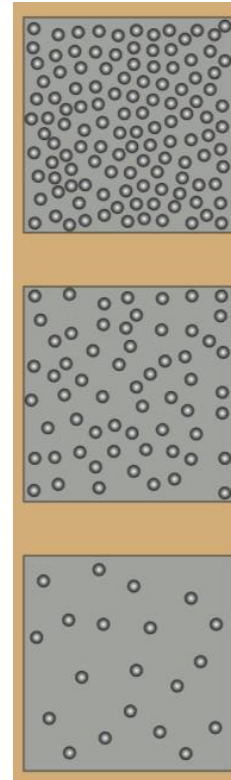
NASA Spotlight: Sound Waves and Media

NASA eClips™ Website: <https://nasaclips.arc.nasa.gov/spotlite/sound-waves-and-mediums/>

NASA eClips™ YouTube: <https://youtu.be/NuWPSCNiJuY>

Vocabulary Review

Using your new vocabulary words, identify and explain how sound waves move through each medium.



Posttest

Sound Grades 5-8 NASA Spotlite Interactive Lesson

Read each question and select the best choice.

1. This is the material through which a sound wave travels.

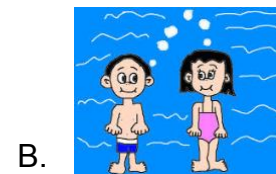
2. This is a form of energy that is produced by vibrations in matter.

3. Which of the following statements about sound is true?

4. Tonya and Derek were discussing the transmission of sound. In which of the scenarios that they discussed would sound NOT travel.



26.195 String telephone



Product Information

Image Credit:

Cover

sound wave diagram: <http://abqoutlanders.club/wp-content/uploads//2018/12/compression-examples-math-rarefaction-rarefaction-and-compression-math-prodigy-hack.jpg>

Vocabulary

vibration: <https://www.sciencebuddies.org/Files/12164/7/sound-waves.png>

longitudinal wave: https://upload.wikimedia.org/wikipedia/commons/9/93/PSM_V13_D058_Sound_waves_1.jpg

medium: <https://cdn.pixabay.com>

sound: <https://www.britannica.com/search?query=sound+waves>

acoustic: <https://infograph.venngage.com/p/215663/acoustics>

Assessment

space: <https://apod.nasa.gov/apod/ap120810.html>

string telephone: https://www.uq.edu.au/_School_Science_Lessons/4.97x.GIF

swimmers: <https://www.deviantart.com/mikejeddynsgamer89/art/lzaylin-and-Me-as-Kids-Swimming-Underwater-546817009>

cow: http://res.publicdomainfiles.com/pdf_view/169/13996270223561.jpg

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