💡 Lesson Plan: Light and Sound

Grade Level: 4
Subject: Physical Science
Duration: 45–60
NGSS 4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

🎯 Learning Objectives

By the end of this lesson, students will be able to:

- **Identify** the behaviors of light including reflection, refraction, and absorption.
- **Describe** the properties of sound such as pitch, volume, and frequency.
- **Explain** how the human ear processes sound vibrations.

- Worksheet: Light and Sound Concepts (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-light-and-sound-2-0.pdf)
- Worksheet: Light and Sound Quiz (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-light-and-sound-2-1.pdf)
- Vocabulary Matching Worksheet 1 (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-light-and-sound-2-1.pdf)

- Vocabulary Matching Worksheet 2 (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-light-and-sound-2-2.pdf)

Lesson Procedure

Step 1: Introduction (5 minutes)

- Hook students by asking: 'When you look in a mirror, why can you see yourself? What happens to sound when you shout in an empty gym?'
- Show the spectrum image on Page 1 of the Study Guide to introduce light energy. (https://newpathworksheets.com/api/guide/study-guide-science-grade-4-light-and-sound-2.pdf)

Step 2: Direct Instruction (15 minutes)

(https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-light-and-sound-2-0.pdf)

Step 5: Assessment (5 minutes)

- Administer the Light and Sound Quiz to evaluate understanding of transparent/opaque materials and sound vibrations. (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-4-light-and-sound-2-1.pdf)

Differentiation Strategies

For advanced learners:

- Ask students to research how optical fibers (mentioned in the guide) are used in modern technology like the internet.

For learners needing support:

- Provide a labeled diagram of the ear for students to reference while completing the vocabulary activity.

Extension Activities

- Create a 'cup telephone' using string and cups to demonstrate how sound travels through solids.

- Vocabulary 2 PDF (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-light-and-sound-2-2.pdf)
- Vocabulary 3 PDF (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-4-light-and-sound-2-3.pdf)

LIGHT AND SOUND

Light!

Light is a form of energy that travels in waves.

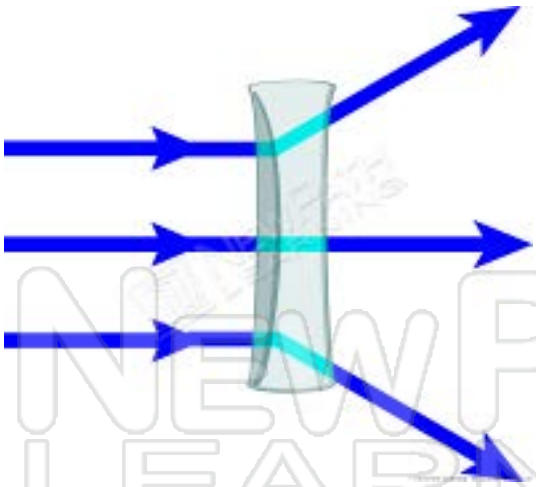
Seeing in Color

We can see only the wavelengths and frequencies of the colors in the visible spectrum which include red, orange, yellow, green, blue, and violet. On the visible spectrum, as you move from the colors on the right to the colors on the left, wavelength decreases and frequency increases.

Absorption is when an object takes in light wave.
Refraction is when light **bends** moving from one medium to another.

Different Lenses

A **concave lens** is **thinner in the middle** than on its edges and makes things look **smaller**.



A **convex lens** is thicker in the middle than on its edges and makes things look larger. A magnifying glass contains a convex lens.

PREVIEW

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- A **translucent** material allows light to pass through, **but it's not clear**, like waxed paper.

- An **opaque** material does **not** allow any light to pass through at all, like a brick wall.

which are bundled together in a flexible tube and have a source of light at the end.

Lesson Checkpoint:
What is a transparent material?

What is that you hear?

Sound is a type of energy that travels in waves that is caused by vibrations. **Vibrations** are movements made rapidly back and forth. Sound needs something in which to travel. Sound can travel through solids, liquids, and gases. Sound travels through solids the fastest.

How do we hear?

- Sound is funneled into our inner ear by our outer ear.

within it to vibrate as well.

- The vibrations of the **hairs inside the cochlea** of the ear send a signal to the brain, which the brain then interprets as SOUND!

Lesson Checkpoint:
How do you hear sound?

Characteristics of Sound:

The **pitch** is the highness or lowness of a sound.

Volume is the **loudness or quietness** of a sound.

Frequency is the number of vibrations in a certain amount of time. The faster the vibration, the higher the frequency.

A **wavelength** refers to the **distance between** a point on one sound wave and a similar point on another sound wave.

Is there an echo in here?...Is there an echo in here?
An **echo** occurs when a sound wave bumps into an object and **bounces back.**
An echo is a **reflected sound**.

Light and Sound

Sci D

Name_____ Class_____ Date_____

1 **Light** is a form of energy that travels in _____.

A units
B waves
C reflections
D decibels

2 We can see only the wavelengths and frequencies of the colors in the _____, which include red, orange, yellow, green, blue, and violet.

A night spectrum
B day spectrum
C viable spectrum
D visible spectrum

3 As you move from left to right on the visible light spectrum, wavelength decreases and frequency increases. Which color of the visible spectrum then would have the **shortest wavelength and the highest frequency**?

4 Most waves in the **electromagnetic spectrum** are _____ to our eyes. X-rays and waves in your microwave that cook your food are examples of electromagnetic waves.

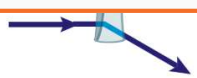
A invisible
B visible

5

7

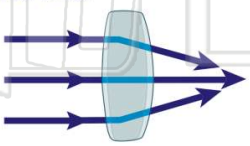
D Twisting

C microscope lens
D concave lens



9 A _____ lens is **thicker in the middle** than on its edges and makes things look **larger**. A magnifying glass contains a convex lens.

A concave
B convex
C large
D convert



10 Materials react to light in different ways. What type of material allows light to pass through clearly **without any effects**, like a window?

A translucent
B opaque
C transparent
D dense

Light and Sound

Sci D

Name_____ Class_____ Date_____

1 **Light** is a form of energy that travels in _____.

A units
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B

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C

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5

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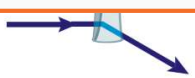

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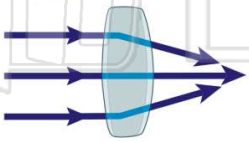


B

10 Materials react to light in different ways. What type of material allows light to pass through clearly **without any effects**, like a window?

A translucent
B opaque
C transparent
D dense

C

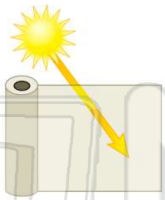
Light and Sound

Sci D

Name_____ Class_____ Date_____

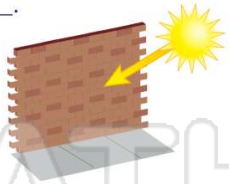
1 _____ material, such as wax paper, allows light to pass through, **but it's not clear**.

A Translucent
B Opaque
C Transparent
D See-through



2 Materials that **do not allow any light** to pass through at all, such as brick, are _____.

A translucent
B opaque
C transparent
D clear



3 What is a **powerful beam of light** that creates a lot of heat?

A flashlight
B optical fiber
C laser

4 _____ are **extremely thin fibers**, made out of glass or plastic, which are bundled together in a flexible tube and have a source of light at the end.

A Optical fibers

PREVIEW

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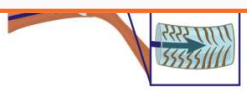
5

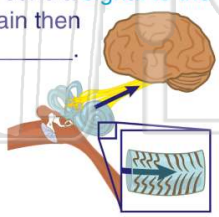
B be still
C rub
D vibrate

B ear canal
C ear wall
D cochlea



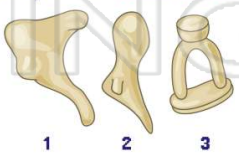
9 The vibrations of the **hairs inside the cochlea** of the ear send a signal to the brain, which the brain then interprets as _____.

A sound
B light
C heat
D smell



10 This is a picture of the **three tiny bones** located in your middle ear: the hammer, stirrup, and anvil. They get their names because of how they look. Which bone is labeled **#2?**

A hammer
B stirrup
C anvil
D bucket



Light and Sound

Sci D

Name_____ Class_____ Date_____

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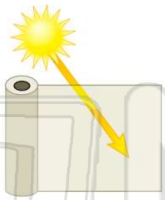

A

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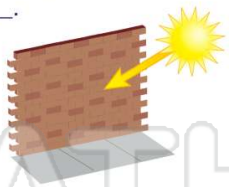


B

3 What is a **powerful beam of light** that creates a lot of heat?

A flashlight
B optical fiber
C laser

C

4 _____ are **extremely thin fibers**, made out of glass or plastic, which are bundled together in a flexible tube and have a source of light at the end.

A Optical fibers

A

5

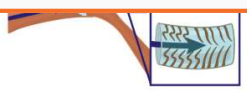
C

7

B be still
C rub
D vibrate

D

B ear canal
C ear wall
D cochlea



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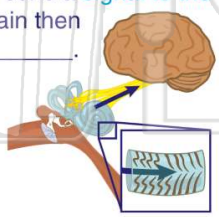

A

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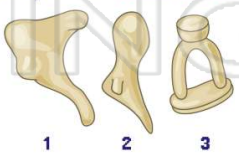


A

Light and Sound

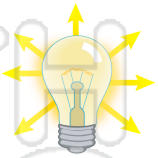
Sci D

Name_____ Class_____ Date_____

Match each of the following terms to its definition:

Laser	Absorption	Light	Convex lens
Echo	Concave lens	Cochlea	Frequency

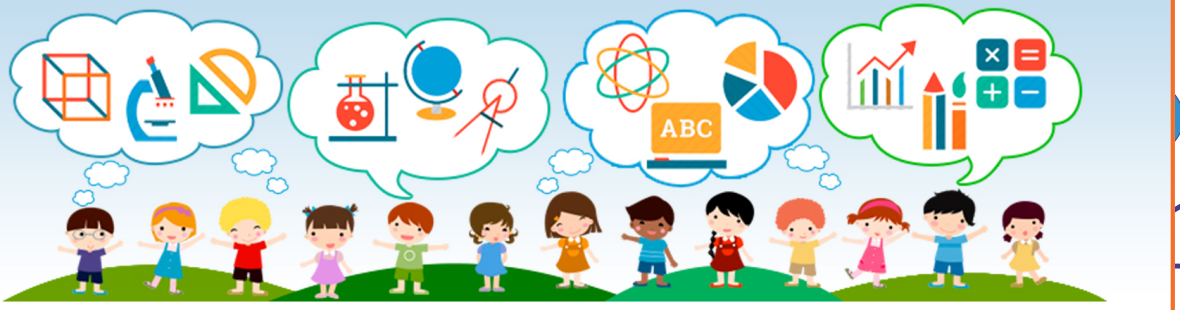
1. - a form of energy that travels in waves; brightness that comes from an object such as the sun, a fire, a flashlight, or a lamp



2. - in reference to light, when an object takes in light waves

3. liquid
vibrat

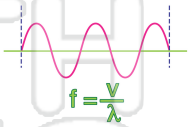
4. edges



5. makes

6. back;

7. - the number of waves (vibrations) in a certain period of time



8. - a narrow and powerful beam of coherent light of only one wavelength

Light and Sound

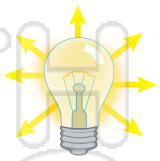
Sci D

Name_____ Class_____ Date_____

Match each of the following terms to its definition:

Laser	Absorption	Light	Convex lens
Echo	Concave lens	Cochlea	Frequency

1. light - a form of energy that travels in waves; brightness that comes from an object such as the sun, a fire, a flashlight, or a lamp



2. absorption - in reference to light, when an object takes in light waves

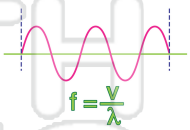
3. coc
and vi
well

4. con
edges

5. con
makes

6. ech
reflect

7. frequency - the number of waves (vibrations) in a certain period of time



8. laser - a narrow and powerful beam of coherent light of only one wavelength

Light and Sound

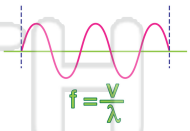
Sci D

Name_____ Class_____ Date_____

Match each of the following terms to its definition:

Opaque	Sound	Pitch	Refraction
Frequency	Laser	Optical fiber	Reflection

1. - the number of waves (vibrations) in a certain period of time



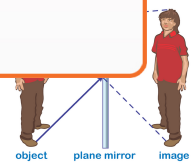
2. - a narrow and powerful beam of coherent light of only one wavelength

3. throug

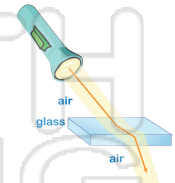
4. for lor

5.

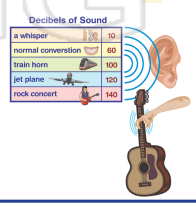
6.



7. - the bending of a wave as it moves at an angle through two different mediums; when light bends moving from one medium to another



8. - a type of energy that travels in waves caused by vibrations



Light and Sound

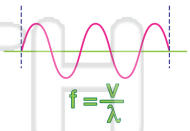
Sci D

Name_____ Class_____ Date_____

Match each of the following terms to its definition:

Opaque	Sound	Pitch	Refraction
Frequency	Laser	Optical fiber	Reflection

1. frequency - the number of waves (vibrations) in a certain period of time



2. laser - a narrow and powerful beam of coherent light of only one wavelength

3. opa
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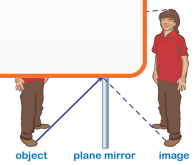
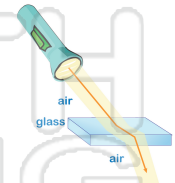
6. ref



7. refraction - the bending of a wave as it moves at an angle through two different mediums; when light bends moving from one medium to another



8. sound - a type of energy that travels in waves caused by vibrations