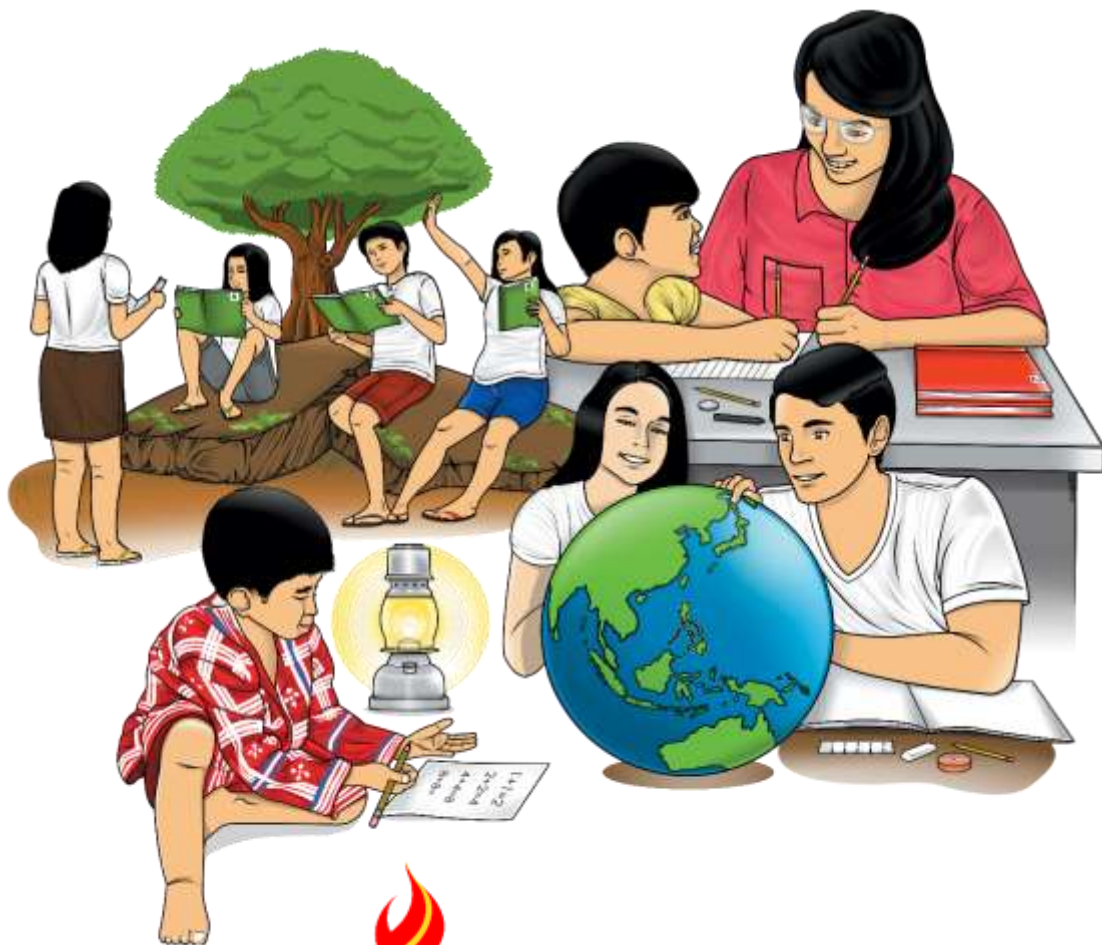


Science

Quarter 3 – Module 4: Properties and Characteristics of Light and Sound



Science – Grade 4
Alternative Delivery Mode
Quarter 3 – Module 4: Properties and Characteristics of Light and Sound
First Edition, 2020

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Science

Quarter 3 – Module 4: Properties and Characteristics of Light and Sound

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



What I Need to Know

In your past lesson, you have learned that light and sound are forms of energy which have different properties and characteristics. Sound and light are similar in the sense that both travel in waves. There are lots of sounds in everyday life and each sound has certain characteristics that make it unique. On the other hand, light is all around us. Without it, we will be in total darkness because light wave is generally associated with color and brightness. Just like sound, light has different properties and it is important that we know them to make our lives even better.

The lesson will focus on:

- Lesson 1- Properties of Light (S4FE-III h-5)
- Lesson 2- Properties and Characteristics of Sound (S4FE-III h-5)

After going through this module, you are expected to be able to:

1. identify transparent, translucent and opaque materials;
2. describe what happens when light hits an opaque and transparent material;
3. investigate how sound is produced;
4. describe how loud and soft sounds are produced;
5. infer that sound could be reflected in a form of echo; and
6. describe through various activities that sound can be reflected in the form of echo.



What I Know

Directions: Write “**FACT**” if the statement is true and “**BLUFF**” if it is not. Do this in your Science notebook.

1. Light and sound travel in waves.
2. The bouncing of light is called reflection.
3. Light bends as it hits an opaque material.
4. Shiny objects reflect more light than dull objects.
5. The more energy, the softer the sound produced.
6. Sound bounces back when it hits a hard material.
7. Light can be separated into 7 different bands of colors.
8. The sound that can be heard by a person has no limits.
9. The sound heard by a person is due to the vibration of an object.
10. Reflection of light can only be demonstrated by mirrors and shiny objects.
11. Sound waves are always bounced back and cannot be absorbed by objects.
12. When somebody faces a mirror, his reflection can be seen in reversed manner.
13. Loudness of sound depends on the area of the vibrating body and distance of the listener from the source of sound.
14. The stronger the source of light, the bigger the shadow and the bigger the source of light, the smaller the shadow.
15. Light can either be absorbed or reflected by the object. Absorption and reflection of light cannot happen at the same time.

Check your work and collect your stars.

<p>0-7 It's okay, you can still do better in the next activities.</p> <p style="text-align: center;"></p>	<p>8-11 Good job! You are doing well!</p> <p style="text-align: center;"></p>	<p>12-15 Amazing! You got a great score. Keep it up!</p> <p style="text-align: center;"></p>
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Lesson

1

“Properties of Light”

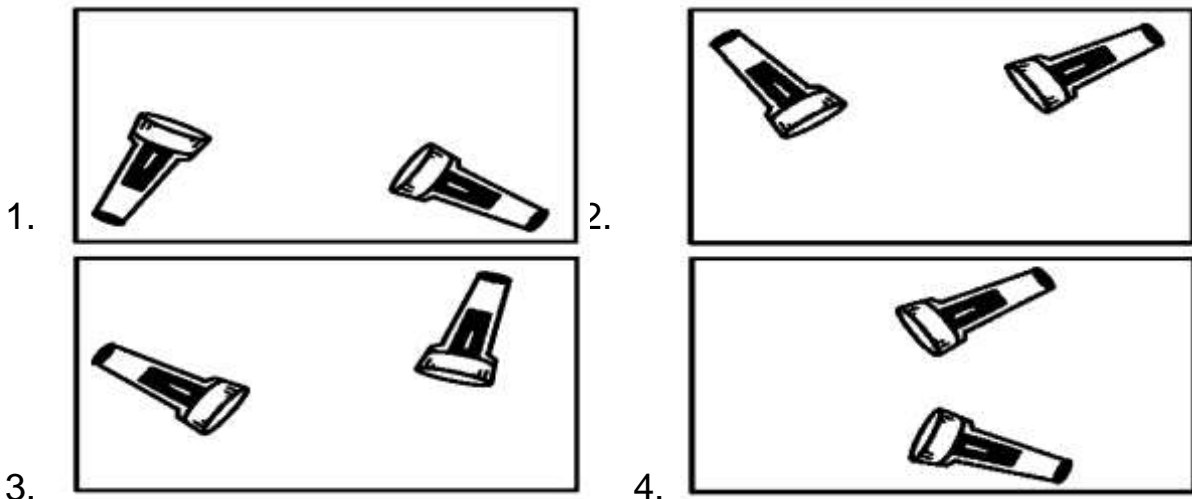
Earth has been gifted with light from the sun. It is our most important source of energy. Light warms us, enables plants to produce oxygen and allows us to find our way around all day. Without light, life is not possible. Do you know the properties and characteristics of this important energy?

This lesson will introduce us on the different properties of light.



What's In

Directions: Draw the path of light in the following pictures using lines. Then answer the questions that follow. Do this in your science notebook.



Question: Based on your drawing, describe how light travels?

Very good! Now, you may proceed to the activities about the properties of light.



What's New

Note to Parent/Learning Facilitator: Guide your children in doing this activity. Be careful in handling the materials while performing the activity.

For the learner: Do the activities carefully and strictly follow the safety precautions found in each activity. Do not aim the source of light to your eyes or someone's eyes.

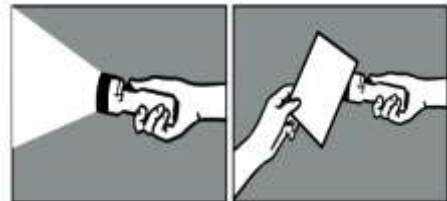
Directions: Perform the activities below and answer the guide questions. Write your answers in your science notebook.

Activity 1: To Pass or Not to Pass

What you need: flashlight, cardboard, glass slab, book, glass with water, cloth

What to do:

1. Hold the flashlight and turn it on.
2. At 10cm from the flashlight, try to block the flashlight with the following materials one at a time: cardboard, glass slab, book, glass with water, cloth.



3. Observe what happens to the beam of light each time. Write your observations in the the table below.

Materials	What happens to light?
card board	
book	
glass slab	
glass with water	
thick cloth	

Guide Questions:

1. Which materials allowed light to pass through? How are they the same?
2. Which materials did not allow any light to pass through? How are they the same? What do you think will happen to light?
3. What happened to light as it passed through the cloth?
4. What does this say about light?

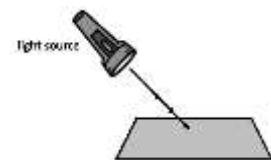
Activity 2: Bouncing Light

What you need: laser pointer or flashlight and a mirror

What to do:

1. Aim the laser pointer or flash light at an angle to the center of the mirror just like the picture below.

Note: Do not aim the laser pointer to your eyes or somebody's eyes because it can cause harm.



2. Draw what happens to the light after it hits the mirror.

Guide Questions:

1. What happens to light after it hits the mirror?
2. What does it say about light?

Activity 3: The Broken Pencil

What you need: transparent glass, pencil, water

What to do:

1. Get a transparent glass half-filled with water.
2. Place a pencil inside the glass of water. Observe how the pencil would look like from the top and from the side of the glass.
3. Remove the pencil out of the water. Compare the pencil before and after removing the pencil outside of the glass of water.



Guide Questions:

1. What happens to the pencil when you look at it from the top of the glass?
2. What happens to the pencil when you look at it from the side of the glass?
3. What is the difference when you look at the pencil from the top and from the side of the glass?
4. Is there a difference between the way it looks inside the glass of water and outside the glass of water?
5. What does this say about light when it passes through different materials or sets of medium?

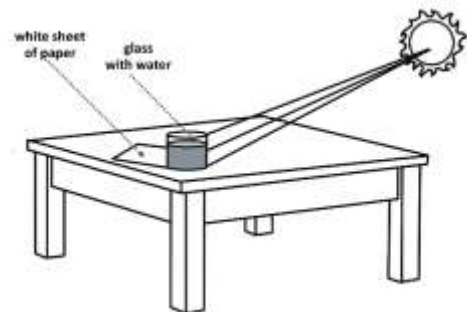
What does a rainbow tell you about light? Can you make your own rainbow? You will know more about the relationship of rainbows with light in the following activity.

Activity 4: I See Your True Colors

What you need: glass with water, bond paper, bright sunlight

What to do:

1. Set a glass of water on top of the table exposed to bright sunlight.
2. Place the white bond paper underneath the glass of water. Observe the ray of light that passes through the glass.



Guide Questions:

1. What happens to the ray of light that passes through the glass of water?
2. What are the different colors that you saw? Identify them in order. Where do you usually see such kind of colors?
3. What can you say now about light?

I hope you got similar answers. Congratulations for being such a hardworking learner. Keep it up!



What is It

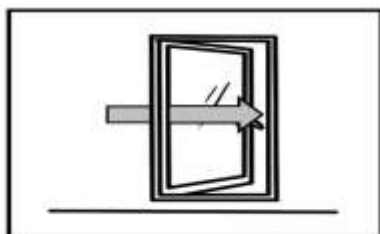
What happens to light when it hits a material?

Some materials will allow light to pass through them thus you can clearly see through that object. They are classified as **transparent materials**.

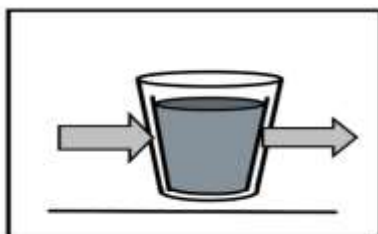
Some materials will allow some light to pass through while the remaining light will scatter. These are **translucent materials** and you can usually see fuzzy or unclear images through this kind of materials.

Some materials do not allow light to pass through them. These materials are called **opaque materials**. As they blocked any light from passing through them, you cannot see on the other side of the material.

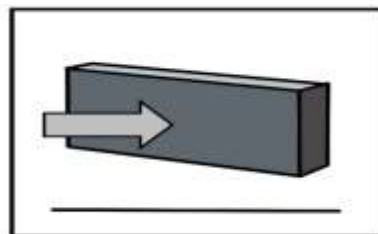
The arrows in the following diagrams show how light behaves when it strikes different materials. More specifically, the pictures show the different behaviour of light as it strikes to different types of materials.



transparent window



glass of water

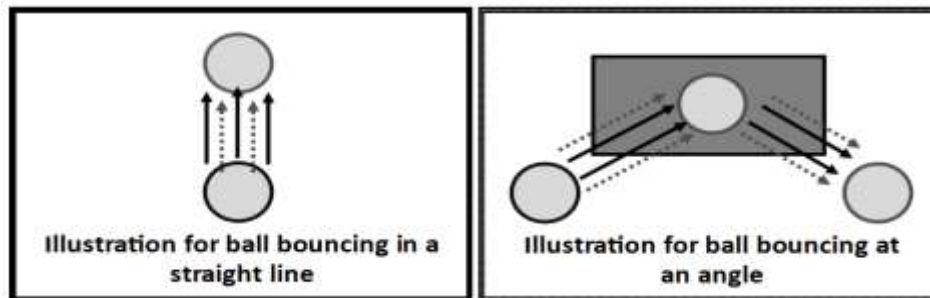


block of wood

What happens to light on the surface of the material?

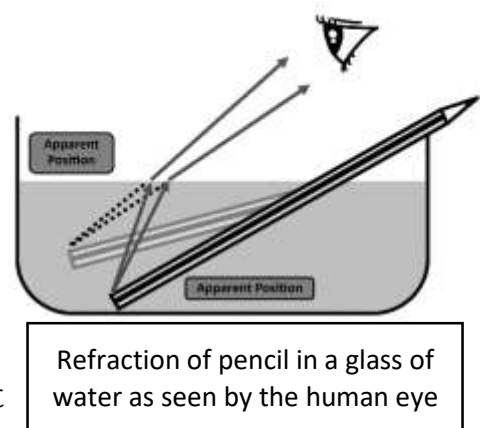
When light strikes a very smooth opaque surface, light bounces back in the same direction. The way light bounces back is very much similar to the way a ball bounces back on a hard smooth surface. When you throw a ball straight down, it will bounce straight back at you. When you throw a ball at an angle, it will bounce off at the same angle away from you. Light behaves in the same way when it hit the mirror which has a very smooth

surface. Light bounces off at the same angle that it struck the mirror. This bouncing of light is called **reflection**.



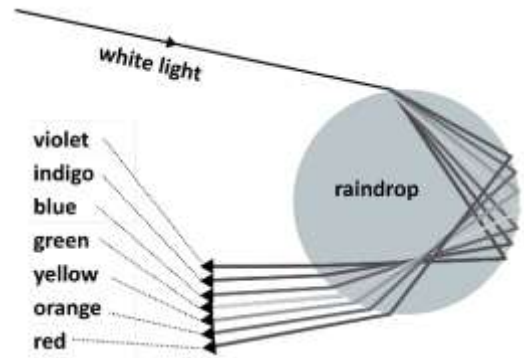
What happens to light when it passes through different materials?

In the activity you had, the pencil appears to be broken when viewed at an angle. This appearance shows that when light passes through different transparent materials (from the air to the glass of water), it changes direction resulting in what appears to be bending of light. This change in direction is due to the light traveling slower in the water and the glass than it did in the air. This bending of light is called refraction. **Refraction** only happens when light moves from one transparent material or medium such as in air to glass and in glass to water.



This visual effect is witnessed if you look at a pencil in a glass half-filled with water. As you look at the pencil from the top or on one side, the pencil appeared bent at the water surface. However, when you took it out of the glass, it was still as straight as it was before you put it into the glass with water. When part of it was placed in the glass of water, it looked bent. It even appeared as if it was cut and its lower end was bigger. But when you raised the pencil and touched, it was not bent and the lower end is on the same size as the upper part.

Rainbows are formed from the interaction of light and the rain drops. Below is a diagram of what happens to light when it strikes a droplet. During rainbow formation, two things happen to the light: refraction and reflection. Refraction happens as some of the sunlight enters the surface of the droplet. This bends light and will initially separate them into different bands of light (colors) that will be reflected at the back of the droplet. As the bands exit the raindrop, it will be further refracted into the order of colors displayed in a rainbow arc. Sir Isaac Newton assigned the 7 different color division into the following order of colors: **RED, ORANGE, YELLOW, GREEN, BLUE, INDIGO, and VIOLET (ROYGBIV).**



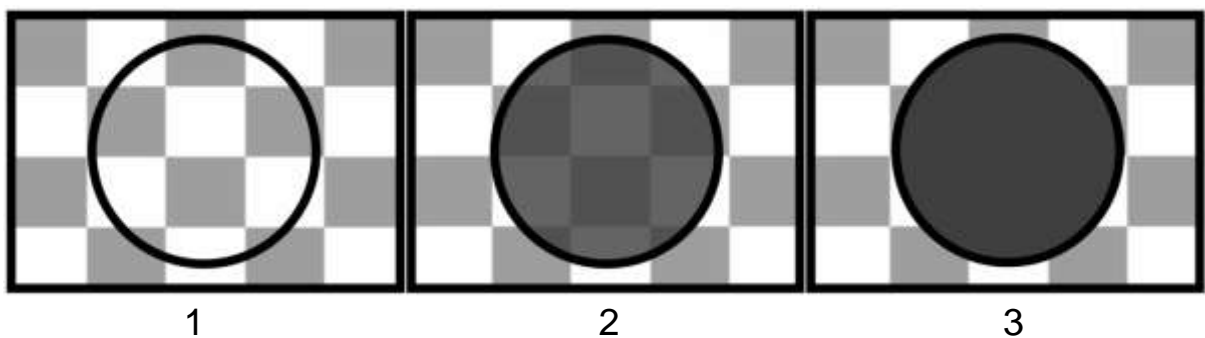
Rainbow formation through refraction and reflection of light



What's More

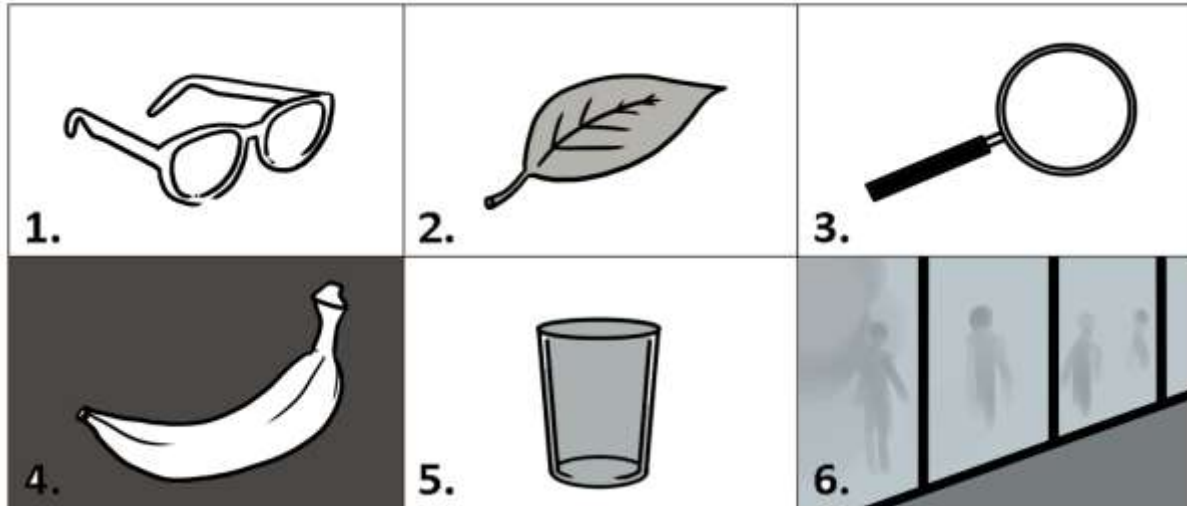
Activity 1: What Material Am I?

Directions: Identify which material is transparent, translucent and opaque. Write your answer in your science notebook.



Activity 2: Transparent, Translucent or Opaque?

Directions: Identify whether the following objects are transparent, translucent, or opaque. Write your answers in your Science notebook.



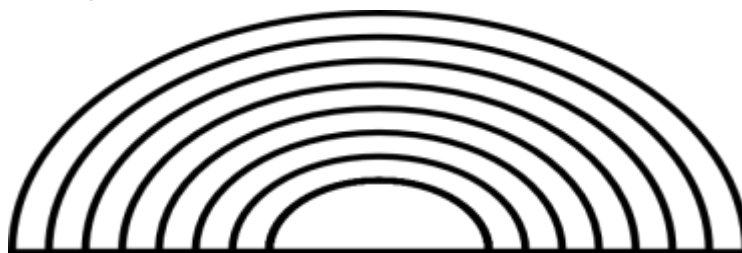
Activity 3: Reflect or Bend?

Directions: Determine whether light will **reflect** or **bend** when it hits the following materials. Write your answer in your science notebook.

1. mirror - _____
2. spoon - _____
3. straw in water - _____
4. magnifying glass - _____
5. prism - _____

Activity 4: Colors of Light

Directions: Draw a rainbow with the colors of light in correct order. Do this in your science notebook.



Check your answers. I hope you got the correct answers. If not, please remember the correct concepts this time. Alright? Now, it's time to wrap up everything that you've learned.



What I Have Learned

Directions: Complete the statements below. Write your answers in your Science notebook.

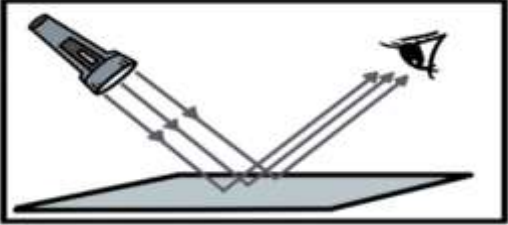
1. The bouncing of light is called _____.
2. The bending of light is called _____.
3. An object that is clear and almost all light can pass through it is called as _____.
4. An object that is cloudy and only part of the light can pass through is described as _____.
5. An object that light cannot pass through is called as _____.
6. Light is made up of _____ different colors bands.


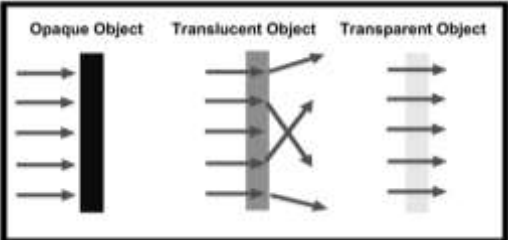
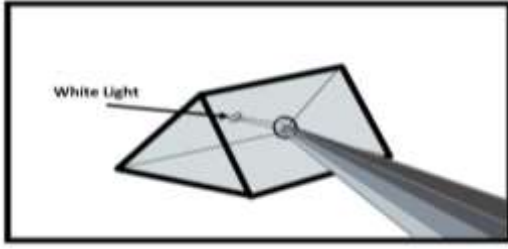
Very good! Now, it's time to apply what you have learned.



What I Can Do

Directions: Look at the diagrams below and describe what each tells about the properties and characteristics of light.

Diagram	What does this tell about light?
1. 	

<p>2.</p> 	
<p>3.</p> 	
<p>4.</p> 	

Perfect! Now, it's time for the final test!



Assessment

Directions: Read and answer the following questions. Write the letter of the correct answers in your science notebook.

1. It is the bouncing of light on the smooth surface of an object.
 - a. diffusion b. reflection c. refraction d. vibration

2. What do you call the bending of light as it passes through different media?
 - a. diffraction b. diffusion c. reflection d. refraction

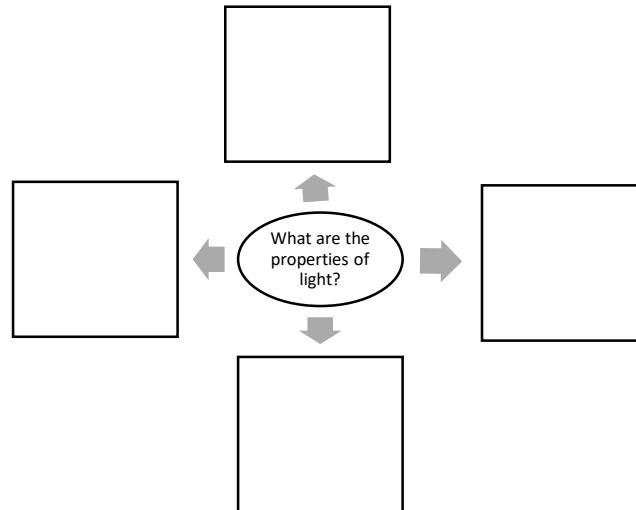
3. What happens when light meets a thick dark-colored surface?
- Light is refracted.
 - Light travels faster.
 - Light passes through it.
 - Light is blocked or obstructed.
4. What happens when you focus a pen light through a hole?
- Light becomes brighter.
 - Light changes direction.
 - Light passes through the hole.
 - Light is blocked or obstructed.
5. Refraction is the bending of light as it passes from one _____ to another.
- area
 - boundary
 - glass
 - medium
6. When light travels from air to glass its speed _____.
- increases
 - decreases
 - remains the same
 - increases then decreases
7. What happens to light when a coin appears bigger when you look at it through a hand lens?
- absorbed
 - reflected
 - refracted
 - stopped
8. What happens when light is separated into different colors through a prism?
- absorption
 - motion
 - reflection
 - refraction
9. Why does a person standing waist-deep in a swimming pool appear to have short legs?
- Light is refracted.
 - Light is reflected.
 - Light is absorbed.
 - Light is absorbed and reflected.
10. What do you call an object where light cannot pass through?
- invisible
 - opaque
 - translucent
 - transparent

11. It is an object that is cloudy and only allows part of the light to pass through.
- a. invisible
 - b. opaque
 - c. translucent
 - d. transparent
12. These are materials which allow light to pass through.
- a. invisible
 - b. opaque
 - c. translucent
 - d. transparent
13. Which of the following is a translucent material?
- a. clear window
 - b. stained glass window
 - c. brick wall
 - d. block of wood
14. Your grandmother has plants in her kitchen which need lots of light. What type of windows should have installed that will be best for her indoor plants?
- a. opaque windows
 - b. translucent windows
 - c. transparent windows
 - d. no windows, just walls
15. After a rainstorm, a rainbow may appear in the sky. Which statement explains this observation?
- a. Raindrops act as prisms separating sunlight into color bands.
 - b. The white clouds are actually prisms composed of different colors.
 - c. The colors of the rainbow come from raindrops in the atmosphere.
 - d. When the sunlight is reflected by the ground towards the clouds, it separates into different colors.



Additional Activities

Directions: Complete the semantic web below by listing the properties of light in the surrounding boxes. Do this in your science notebook.



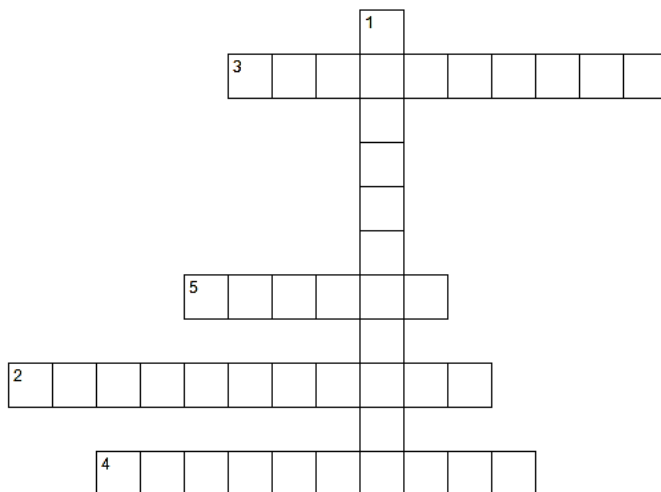
Congratulations! See? With perseverance and hard work, everything will be possible. I'm happy for you! You can now proceed to the next lesson.

Lesson**2****“Properties and Characteristics of Sound”**

We use and hear sounds every day. It helps us communicate messages in many different ways, soothes the mind and also makes us relieve stress from our everyday lives. Sound also makes us aware of what is happening around us. Hence, it is important to know its properties and characteristics. This lesson will let us know how sounds are produced, its properties and characteristics.

***What's In***

Directions: Answer the following crossword puzzle using the given clues.

**Across:**

2. materials that allow light to pass through
3. happens when light moves from air to glass
4. bouncing of light
5. materials that do not allow light to pass through

Down:

1. materials that allow some light to pass through

Good job! You learned already about concepts on the lesson about properties of light. You are now ready to proceed to the activities about the properties and characteristics of sound.



What's New

Note to Parent/Learning Facilitator: Guide your children in doing this activity. Be careful in handling the materials and observe precautionary measures while performing the activity.

For the Learner:

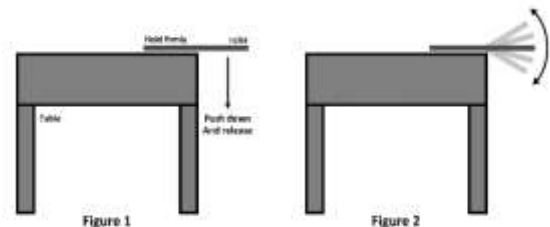
Directions: Perform the activities below and answer the guide questions. Write your answers in your science notebook.

Activity 1: How are sounds produced?

What you need: ruler, table

What to do:

1. Place the ruler over the edge of the table. Hold it firmly.
2. Push/tap it downwards, then let it go, so that the ruler moves back and forth.



Note: *Ensure that you hold the ruler firmly and always protect yourself from being hit as it moves.*

Guide Questions:

1. What did you exert when you push down the ruler and release it?
2. What happened to the ruler?
3. How will you describe the movement of the ruler?
4. Did you hear a sound?
5. Did the sound coming from the moving ruler suddenly stop when you held it?

6. What happened to the ruler when you released it again? Did you hear a sound?
7. How do you think sounds are produced?

When you are watching TV or listening to the radio, to what volume do you usually set your radio or TV? Why? Do you know how soft and loud sounds are made? The following activity might help you answer these questions.

Activity 2: Soft or Loud?

What to use: hands

What to do:

1. Clap your hands slowly and lightly three times. Listen to the sound.
2. Clap your hands faster and stronger three times. Listen to the sound.



Guide Questions:

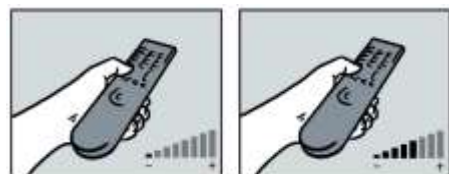
1. When you clapped your hands slowly and lightly, what kind of sound did you produce?
2. Why do you think so?
3. How about when you clapped your hands faster and stronger, what kind of sound were you able to produce?
4. What do you think is the reason?
5. What does this tell about sound?

Activity 3: Higher, Lower Volume

What to use: radio/ television set

What to do:

1. Turn on the radio/ TV set. Set it to the lowest volume. Listen to the sound.
2. Then, set the radio/TV set to the highest volume. Listen to the sound.



3. Compare the sound produced on different volume levels.
4. Go farther away from the radio/ TV set. Compare the sound when you're near and when you're far.

Note: High volume can damage your ear. Please stop setting the TV to a higher volume when the sound becomes intolerable. Do this activity with the guidance of your guardian or an older family member.

Guide Questions:

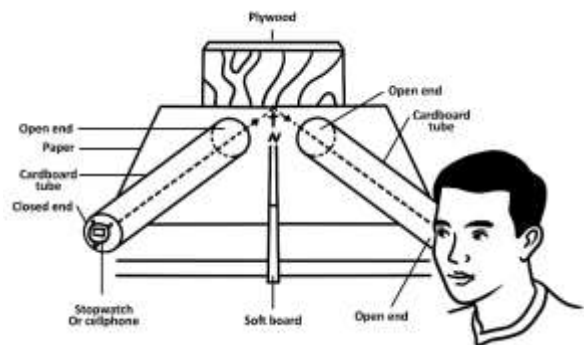
1. When you set the radio/ TV set to volume one, what can you say about the sound produced?
2. How about when we set the radio/ TV set to a high volume?
3. What can you say about the sound when you hear it near from the source (radio/ TV set)? How about when you hear it far from the source (radio/ TV set)?
4. What does this say about sound?

Activity 4: Bouncing Sound

What you need: two pieces of wood, an open space with a flat wall

What to do:

1. A stopwatch is placed inside the end part of the tube. If cellphone will be used, place it at the end of the tube. The cardboard tube will have one end open and the other end closed. Place the tube at least 45-degree angle as shown in the illustration.
2. Another cardboard tube with both ends open is adjusted at 45-degree angle so that one ear is placed close to one end of the tube to hear the loudest possible sound of the stopwatch or the cellphone. The set-up is shown in the figure.



Note: To protect your exposed ear to the tube, position it at least 5 centimeters away from the end of the tube to protect it from too much sound. Close your left ear that is not exposed to the tube to know if you will hear a sound.

3. Play a ringtone from the cellphone or turn on the stopwatch to produce sound.

Guide Questions:

1. Did you hear the sound of the cellphone or the stopwatch?
2. What does this say about sound?

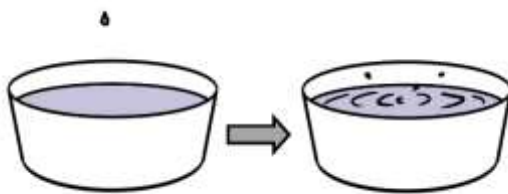
Great! I hope you enjoyed and learned from the activities.



What is It

Sound is a type of energy made by **vibrations**. When any object vibrates, it causes movement in the air particles surrounding it. These particles bump into the particles close to them, which makes them vibrate too causing them to bump into more air particles. These movements, called **sound waves**, keep going until they run out of energy.

The picture below shows a drop of water dropped into a basin filled with calm water. This will then form the rings of waves that will expand indefinitely until the water becomes calm or still again. The same is true with sound.



The sounds that you hear may vary in different ways. Some sounds may be too loud while others may be too soft. When you describe a sound, the first thing you think about is loudness. You may whisper around a sleeping baby, but might give an all-out shout when your favorite basketball player scored in a crucial end-game.

Loudness is a measure of how strong a sound seems to us. This volume of sound would depend on the strength of a vibration. If we apply greater force in an object, we produce loud sounds. If we apply lesser force in an object, we can produce soft sounds. A stronger force causes a louder volume of sound as in the case of the rumbling thunder while a lesser force makes softer sound like the soft breeze of a fine day. Other soft sounds may not be loud enough to be heard by the human ear while some loud sounds may not be pleasing to the ears.

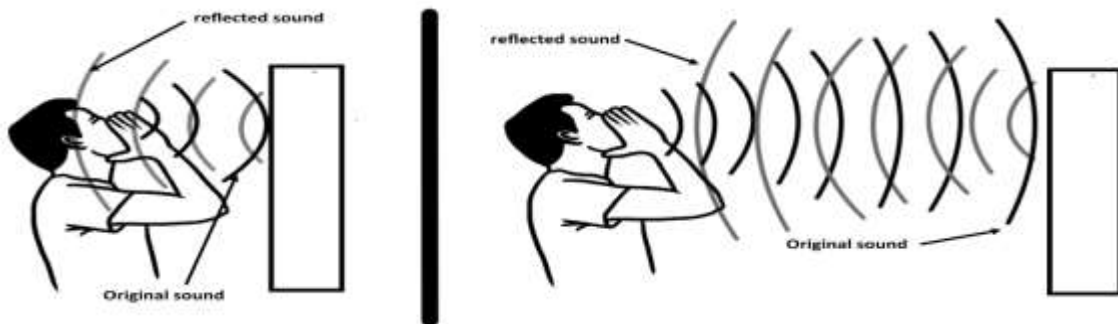
These sound waves may travel and pass these vibrations into our ears thus we ‘hear’ the sound. If you are near the source, the sound you usually hear seems louder and then it gradually fades or becomes softer as we move away from it. The sound does not lose some of its energy as it travel through the air. The energy just spreads out to cover a larger area.

People react to sounds in different ways. Some sound can distract us and break our concentration. When this happens, the sound becomes unwanted noise. Noise is any undesirable sound which disturbs the activities of human or animal life. Sometimes it is the repetitive nature of a certain sound and our inability to control it that makes it annoying. Car blowing its horn and the seemingly endless barking of a dog at night are good examples. We also contribute to the production of noise when we talk altogether at the same time in our classroom or at home.

Characteristics of Sound

A sound wave travels at different speed through different media. As it travels, it often bumps into objects it encounters. When sound comes in contact with different materials like walls or carpets, it is either reflected or absorbed. If it hits a hard smooth surface, the wave reflects. The sound wave that is reflected or bounces back is called an **echo**.

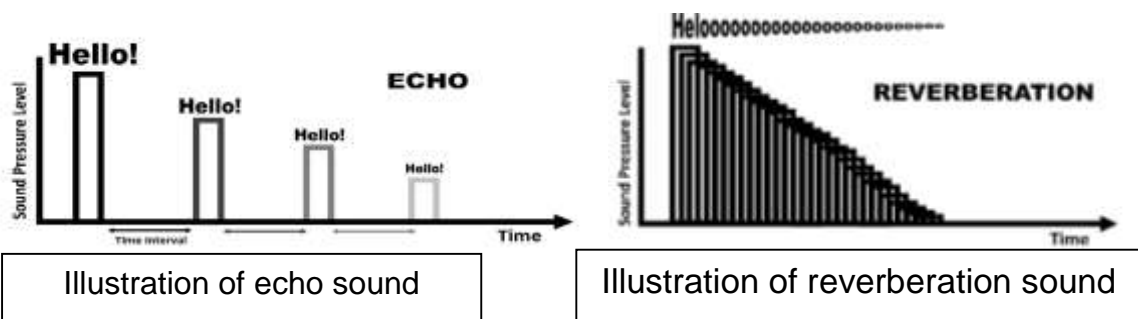
An example of an echo is when you shout. Part of the sound waves you created may hit an opposing hard wall or surface. Part of the sound was reflected by the wall that is why you heard the same sound again.



Sound waves when the distance of the source of sound and the wall is less than 9 meters.

Sound waves when the distance of the source of sound and the wall is more than 10 meters.

Sometimes, we cannot hear an echo if we are too close to a big hard wall. The sound we made bounces back very fast and it mixes with the original sound thus we cannot tell which the original sound is and which



the echo is. Echo is perceived reflected sound with enough time to be distinguished from the original sound. Reverberation happens

when the time interval is not enough. Reverberation is also described as series or collection of echo.

We do not always hear echoes. Here are some reasons why an echo is not produced.

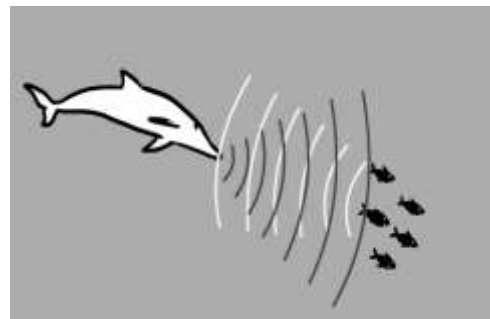
1. The original sound maybe too weak.
2. The surface absorbs, rather than reflects the sound.
3. The reflecting surface is too small.

Concert halls are covered with carpet and curtains because these materials absorb the sound. So the sound that will be heard by the audience is the initial/ original sound instead of a reflected sound which is neither an echo nor a reverberation.



Ships and bats used echo in locating objects. **Echolocation** is the transmission of sound waves to locate objects. Most species of bats rely on echolocation to help them find their food.

Meanwhile, whales use echoes to move and find their way through the sometimes murky depths of the deep ocean. They send out high-pitched sounds (clicks) which bounces off an object and returned to the whale. The whale can then determine how far the object is. Other than distance, they can also determine such things as texture, shape and size of the object. This helps them in deciding on where the prey and the different objects around the ocean may be.



Echoes have proven to be of wide practical use by applying this concept to many of our navigational equipment such as locating landmarks and for surveillance.



What's More

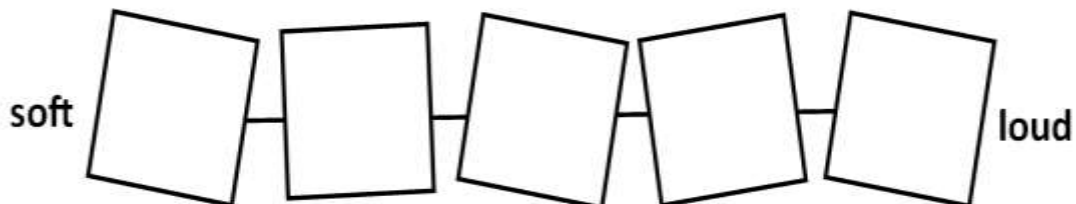
Activity 1: True or False

Directions: Write “**T**” if the statement is **TRUE** and “**F**” if the statement is **FALSE**. Write your answer in your science notebook.

1. The medium travels with the sound.
2. Repeated echo is known as reverberations.
3. Ships and bats used echo in locating objects.
4. Sound waves carry different amounts of energy.
5. The stronger the vibrations of an object, the louder the sound.
6. Hitting an object harder or softer changes its volume/ loudness.
7. Echolocation is the transmission of sound waves to locate objects.
8. The bouncing back of sound when it strikes a barrier is known as echo.
9. Noise is any desirable sound which helps the activities of human or animal life.
10. In order for sound from a speaker to reach a listener, air near the speaker must move to the listener.

Activity 2: Soft to Loud

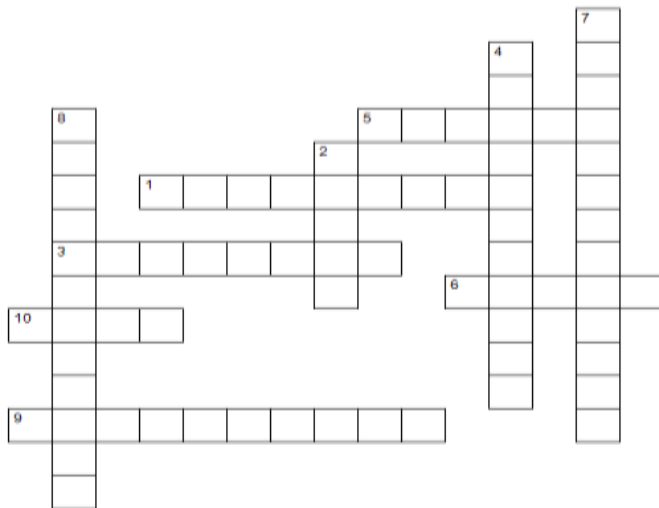
Directions: Draw objects that produce soft to loud sounds in order. Do this in your science notebook.





What I Have Learned

Directions: Answer the crossword puzzle below. Do this in your Science notebook.



Across:

1. Sound may be reflected or _____.
3. Measure of how strong a sound is.
5. It depends on the strength of vibration.
6. Navies used it to locate sunken ships.
9. Sound is a type of energy made by _____.
10. Reflection of sound.

Down:

2. Undesirable sound
4. Movement of sound
7. Reflection with no enough time interval
8. Used to locate things

Great work! I hope you learned the lesson by this time. Now, it's time to apply your learnings in real life scenarios.



What I Can Do

Directions: Read and answer the following questions. Write your answer in your science notebook.

1. When you are watching TV or listening to the radio, to what volume do you usually set your radio or TV? Why?
2. What might be the reason why the walls of movie houses are designed to be rough?
3. Wild animals have different adaptations or characteristics to help them survive. Why do some animals use echolocation to help in survival?



Assessment

Directions: Read and answer the following questions. Write the letter of the correct answers in your science notebook.

- Which of the following produce sound?
 - soft objects
 - radio stations
 - vibrating objects
 - objects under pressure
- Which of the following would be useful in locating a sunken ship at the bottom of the ocean?
 - laser
 - sonar
 - spectroscope
 - telescope
- The loudness and softness of sound is called _____.
 - amplitude
 - echo
 - pitch
 - volume
- An echo is an example of sound being _____.
 - absorbed
 - broken
 - reflected
 - transmitted
- The quality of being high or low is a sound's _____.
 - amplitude
 - frequency
 - loudness
 - pitch
- It is a measure of how strong a sound seems to us.
 - frequency
 - loudness
 - noise
 - Pitch
- Which of the following is NOT true about sound?
 - It is a form of energy.
 - It is something you see.
 - It is any vibration in space and time.
 - It is a type of wave that takes the form of vibrations traveling through air or another material.
- What happens to sound as you get farther and farther from its source?
 - becomes louder
 - becomes softer
 - becomes flatter then louder
 - the same as when it was first created

9. Which of the following will make the loudest sound?
- dropping a pin
 - dropping a ballpen
 - dropping a paper clip
 - dropping a big box on the floor
10. Which of the following is TRUE about the relationship of force applied to an object and the sound produced?
- The greater force applied to an object, the louder the sound produced.
 - The weaker the force applied to an object, the louder the sound produced.
 - The greater force applied to an object, the softer the sound produced.
 - Force has no effect on the loudness or softness of sound.
11. The use of echo to measure distance is known as _____.
- echolocation
 - echo destination
 - echo dictation
 - echo displacement
12. It is perceived as a reflected sound with enough time to be distinguished from the original sound.
- echo
 - reverberation
 - vibration
 - volume
13. Which of the following is NOT a reason why we do not always hear echoes?
- The surface is soft.
 - The reflecting surface is too small.
 - The original sound maybe too weak.
 - The surface absorbs, rather than reflects the sound.
14. Which of the following is NOT related to the loudness of sound?
- frequency of the sound
 - energy of a vibrating object
 - condition of the air the sound waves travel through
 - distance between the observer and the sound source

15. Echo has different uses. Which of the following is NOT a situation when echo is used?
- to find large shoals of fish
 - to measure the depth of the sea
 - to locate a sunken shipwreck or cargo
 - to know the composition of materials found in the surroundings



Additional Activities

Directions: Search the 10 words that are related to the lesson about the properties and characteristics of sound hidden in this puzzle. Then, write a sentence or a phrase stating what you learned about each word based on the lesson. Write your answer in your science notebook.

L	O	U	D	N	E	S	S	S	O
R	E	F	L	E	C	T	V	H	L
A	S	E	E	I	T	T	O	I	P
F	D	C	E	I	Q	O	L	P	E
O	G	H	B	A	T	S	U	S	Y
K	G	O	F	G	F	R	M	G	T
W	A	V	E	S	R	T	E	T	I
L	V	I	B	R	A	T	I	O	N
I	O	A	S	O	N	A	R	Y	O
E	L	N	O	I	S	E	U	I	F

Words found in the puzzle

What do you know about the word?

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

Very good! It's another achievement for you, Kid! I hope to see you soon in your next modules. Keep learning and have fun in your next journey, young scientist! Good luck!



Answer Key

What I Know

1. FACT	2. FACT	3. FACT
4. FACT	5. BLUFF	6. FACT
7. FACT	8. BLUFF	9. FACT
10. BLUFF	11. BLUFF	12. FACT
13. FACT	14. FACT	15. BLUFF

LESSON 1 - Properties of Light

What's In

Path of light must be drawn using straight lines from the source.
 -Light travels in a straight line.

What's New

Activity 1: To pass or not to pass

Materials	What happens to light?
card board	Did not pass through
Book	Did not pass through
glass slab	Passed through
glass with water	Passed through
Cloth	Some light passed through

Answers to Guide Questions:
 1. glass slab, glass with water, cloth- they are transparent materials
 2. card board, book- they are non-transparent materials
 3. Some light passed through it.
 4. Light can pass through transparent materials. Light cannot pass through solid and non-transparent materials. Some light can also pass through certain materials like cloth.

Activity 2: Bouncing Light

Answers to Guide Questions:
 1. It bounces/reflects back.
 2. Light bounces/reflects back when it hits a mirror.

Activity 3: The Broken Pencil

Answers to Guide Questions:
 1. The part of the pencil in the water looks bigger.
 2. Looking on top of the glass, the pencil appears bigger, on the side, it appears broken.
 3. Yes
 4. Light bends when it is seen through different medium.

Activity 4: I See Your True Colors

Answers to Guide Questions:
 1. It separates into different colors.
 2. red, orange, yellow, green, blue, indigo, violet/
 rainbow
 3. Light is made up of 7 different colors

What's More

Activity 1: What Material Am I?

1. transparent 2. translucent 3. Opaque

Activity 2: Transparent, Translucent or Opaque?

1. transparent 2. opaque 3. transparent
 4. opaque 5. translucent 6. translucent

Activity 3: Reflect or Bend?

1. reflect 2. reflect 3.
 bend
 4. bend 5. bend

Activity 4: Colors of Light

Arrangement of colors: Red, Orange, Yellow, Green, Blue, Indigo, Violet

What I Have Learned

1. reflection 2. refraction 3. transparent 4. translucent 5. opaque 6. 7

What I Can Do

1. Light can be reflected when it hits a material.
 2. Light bends when it travels through different media.
 3. Opaque objects do not allow light to pass through; translucent allows some light to pass through; and transparent allows all light to pass through.
 4. Light is made up of 7 different colors.

Assessment

1. b 2. d 3. d 4. c 5. d
 6. b 7. c 8. d 9. a 10. b
 11. c 12. d 13. b 14. c 15. a

Additional Activities

Light can be reflected.
 Light can be refracted.

Light can pass through transparent materials; and Light cannot pass through opaque materials; Some light can pass through translucent materials.

Light is made up of 7 different colors, ROYGBIV.

LESSON 2- Properties and Characteristics of Sound

What's In

1. translucent
2. transparent
3. refraction
4. reflection
5. opaque

What's New

Activity 1: How are sounds produced?

Answers to Guide Questions:

1. Force
2. It vibrated/ moved.
3. up and down
4. Yes
5. Yes

6. It vibrated/moved up and down and produced sound again.
7. Sounds are produced when force is applied and there is vibration in an object.

Activity 2: Soft or Loud?

Answers to Guide Questions:

1. soft sound
2. lesser force was exerted
3. loud sound
4. stronger force was exerted
5. When stronger force is exerted, loud sound is produced. When lesser force is exerted, soft sound is produced.

Activity 3: Higher, Lower

Answers to Guide Questions:

1. soft sound
2. loud sound
3. loud, soft
4. Volume is a measure of how soft or loud a sound is. Volume or loudness or softness of sound depends on how far or near the receiver of the sound is from its source.

Activity 4: Bouncing Sound

Answers to Guide Questions:

1. yes
2. Sound bounces when it hits a hard material.

What's More

Exercise 1: True or False

1. F
2. F
3. T
4. T
5. T
6. T
7. T
8. T
9. F
10. F

Exercise 2: Soft to Loud

Pupils' answers may vary.

What I Have Learned

1. refracted
2. noise
3. loudness
4. sound waves
5. volume
6. sonar
7. reverberation
8. echolocation

What I Can Do

1. Just enough to be heard because too loud sound is already a noise which may affect the activities of the members of my family.
2. To avoid too much echo and to have better sound quality
3. They use it to locate food and give them a sense of direction.

Assessment

1. c
2. b
3. d
4. c
5. d
6. b
7. b
8. b
9. d
10. a
11. a
12. a
13. a
14. a
15. d

Additional Activities

1. LOUDNESS- How loud or soft a sound seems to the listener
2. REFLECT- bounce back
3. NOISE- unpleasant sound
4. VIBRATION- Sounds are made by vibrations.
5. WAVES- Sound travel in waves.
6. SONAR- Sonar uses sound to locate things underwater or map the seafloor.
7. SHIPS- Ships use sonar to search the ocean.
8. ECHO- reflection of sound
9. VOLUME- measure of loudness or softness of sound
10. BATS- They use echolocation to find food and to determine their distance.

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