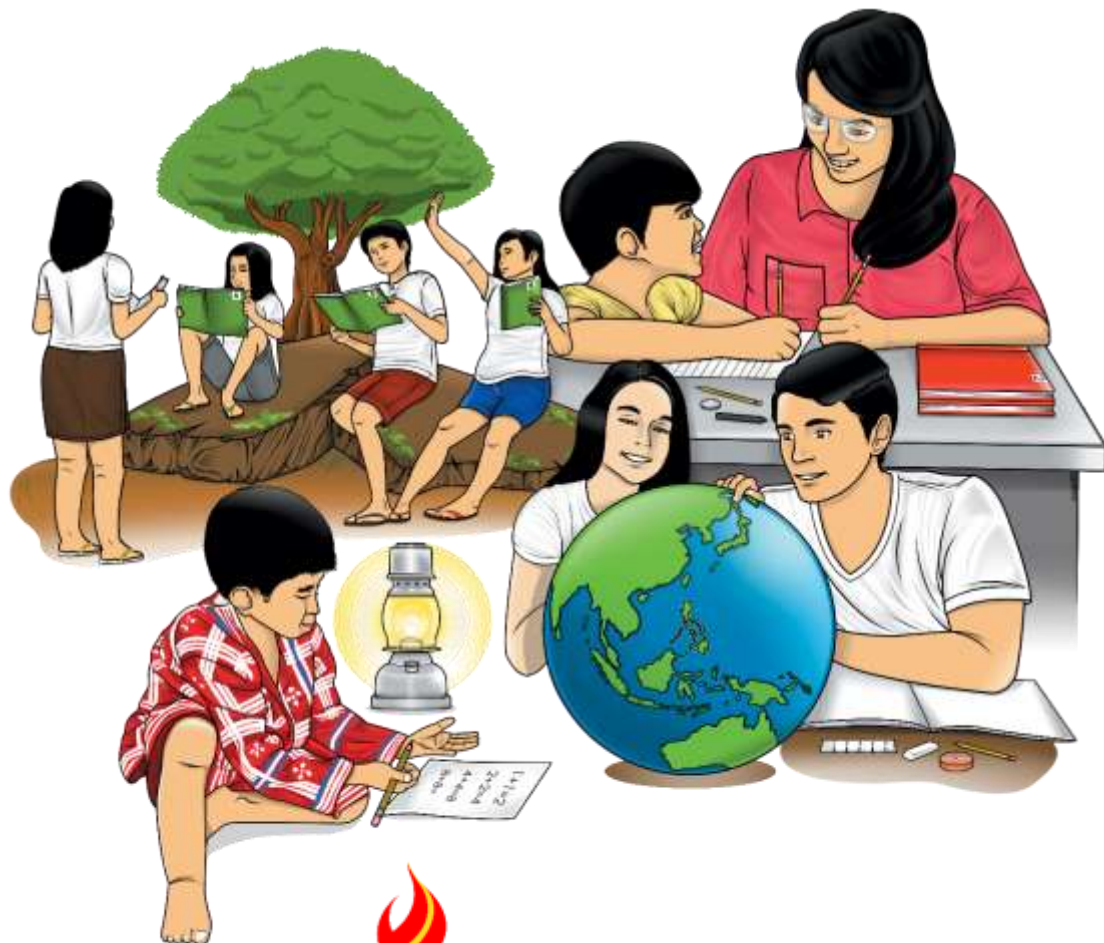


Science

Quarter 3 – Module 3: Light, Sound and Heat Travel



Science – Grade 4
Alternative Delivery Mode
Quarter 3 – Module 3 “Light, Sound and Heat Travel”
First Edition, 2020

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Science

Quarter 3 – Module 3: Light, Sound and Heat Travel

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

Light, sound and heat are essential part of our lives. Light allows us to see objects, shapes, and colors. Sound is the main form of communications for us humans. Without sound, we would not hear and therefore would not be able to speak. Sounds are also used by animals for communication. On the other hand, heat is needed for our activities like cooking, drying the washed clothes, and warming our bodies during cold weather.

In this module, you will be informed of how light, sound and heat travel in different media. You will be provided with activities which will help you develop the concepts you have to learn.

The lesson focuses on:

- Lesson 1- How Light Travels (S4FE-III f-g-4)
- Lesson 2- How Sound Travels (S4FE-III f-g-4)
- Lesson 3- How Heat Travels (S4FE-III f-g-4)

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

1. describe how light travels;
2. describe how sound travels in solid, liquid and gas materials; and
3. describe how heat travels in solid materials, through liquid materials and air.



What I Know

A. Directions: Write **FACT** if the statement is true and **BLUFF** if it is false in your science notebook.

1. Sound travels in waves.
2. Light needs air to travel.
3. Sound travels fastest in a vacuum.
4. Sound travels faster in liquid than gas.
5. Sound travels together with the medium.
6. Sound can travel through solids, liquids and gas.
7. Light travels in a straight line until it hits something.
8. Light is a form of energy that we can see things with our eyes.
9. When light hits a material, it begins to travel in a curve line.
10. Light travels at a speed of 300,000 kilometers per second through a vacuum.

B. Directions: Study the illustrations below on how heat travels. Identify whether heat travels through **conduction**, **convection**, or **radiation**. Write the correct answer in your science notebook.



Well done! Please check your answers against the Answer Key found at the end of the module. If you got 12 to 15 correct answers, that means you're on the right track. If not, it's okay, you will have more activities that can help you learn more about this.

Lesson

1

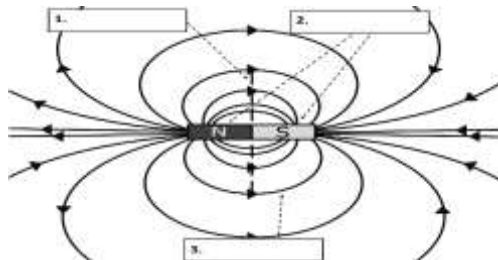
“How Light Travels”

Close your eyes for a minute, and then open them afterwards. What did you see when you closed your eyes? How about when you opened them? Have you wondered how we are able to see all the things around us? It is all because of light. The world will be so dark without light. You can only see the beauty of our surroundings because of light. Light is very important for us to live. This module will try to uncover the concepts on how light travels and its properties.

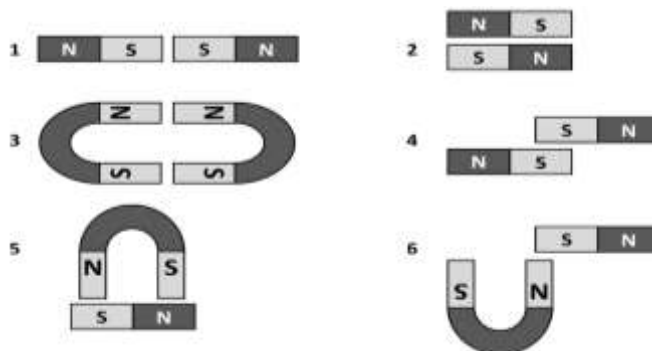


What's In

A. Directions: Identify the following parts of magnetic field lines. Write your answer in your science notebook.



B. Directions: Determine whether the following pairs of magnets will **repel** or **attract** each other. Write your answer in your science notebook.



Great! You must have gotten all the correct answers. Now, it's time to discover more about the new lesson.



What's New

Note to Parent/Learning Facilitator: Guide your children in doing this activity. Remind them of the precautionary measures. Tell them to be careful in handling the materials while performing the activity.

To the Learner:

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

Activity 1: The Right Path

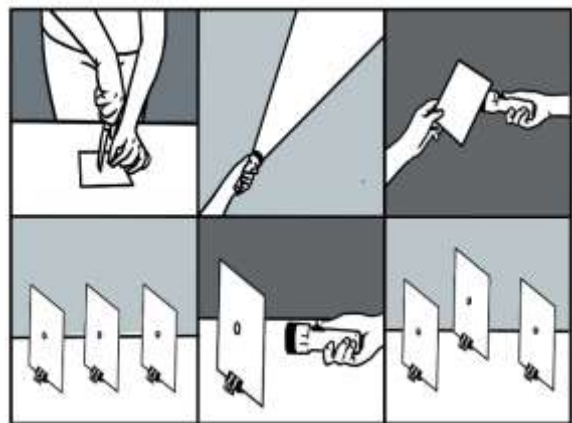
Objective: Describe how light travels.

What you need: flashlight, 3 pieces illustration boards (1/8 size), 1 piece thick cardboard, a partner (your sister or brother)

In the absence of a partner, a modeling clay could be used to create a “stand” to hold the illustration boards. In addition, this activity could be better observed when the room is dark (switch off lights, close doors, windows, curtains, etc.)

What to do:

1. Make a 2 inches hole at the center of the 3 pieces illustration boards.
2. Get a flashlight and aim it at a distant wall. Observe the path of light. Record your observation.
3. Block the path coming from the flashlight with a thick cardboard. Record your observation.
4. Hold each of the cardboard with a hole. Make sure the holes are aligned in such a way that the wall could be seen through the holes.
5. Aim the flashlight through the first hole. Observe what happens.



6. Misalign the middle cardboard your sister or brother is holding. Keep the light aimed at the cardboards. Observe what happens.

Guide Questions:

1. What happened to the light when the cardboards' holes were aligned?
2. What happened to the light when the cardboards' holes were not aligned?
3. Did the light form a straight line when you aimed it on the wall without blockage?
4. When you blocked the light with a thick cardboard, was it able to pass through the light? What was formed behind it?
5. When you aligned the cardboards with holes, was the light able to pass through? What was its path?
6. What can you say about the way light travels?

Congratulations! You have done well performing all the tasks. Proceed to the next to know more information about how light travels.



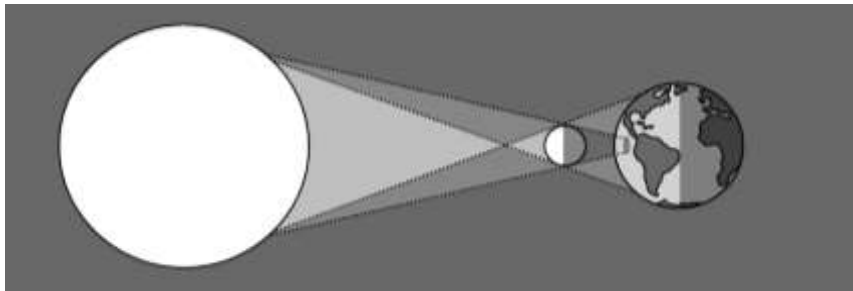
What is It

Points to Remember:

For a very long time, scientists were not sure exactly how light travels. Some say that light behaves like a wave while others claim that light behaves like a group of particles.

Then, they discovered that light travels as a wave in straight lines through empty space. Once light is produced, it will keep travelling in a straight line until it hits a material. Shadows are evidence of light traveling in straight lines. They are formed when the path of light is blocked.

During eclipse, the moon casts a shadow falling onto the Earth. Eclipse is a shadow in space. It happens when the light from the Sun is blocked by the Moon or the Earth.



Light travels very fast at nearly 300,000 km/s in vacuum space. Light is faster than sound. Unlike sound, which needs a medium (like solid, water or air) to travel through, light does not need a medium to propagate or move through and can travel in vacuum space.

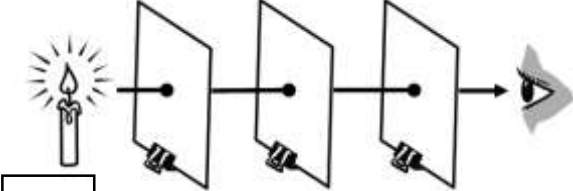
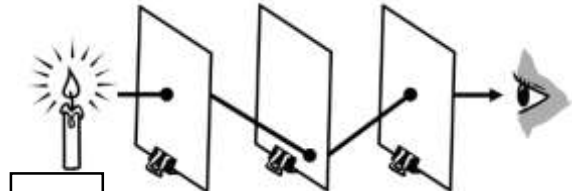
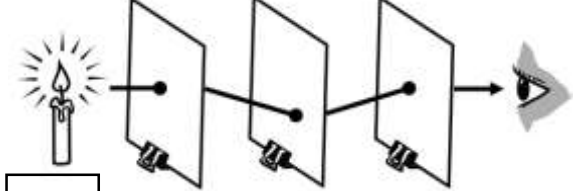
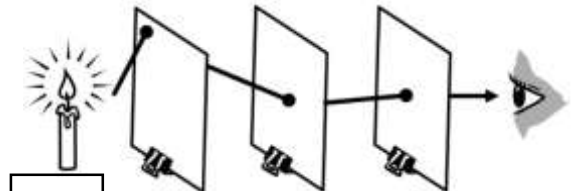
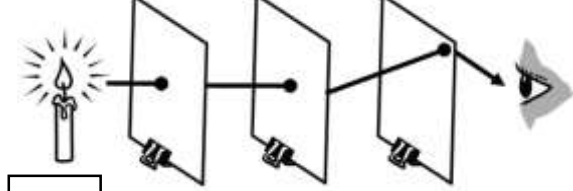
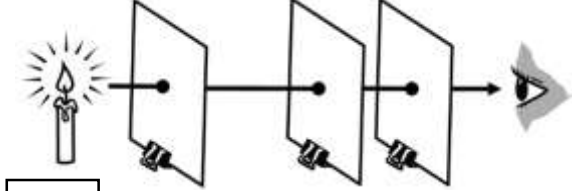


What's More

A. Directions: Write **TRUE** if the statement is correct and **FALSE** if it is not. Do it in your Science notebook.

1. Light needs a medium through which it can travel.
2. Fireworks show how light travels faster than sound.
3. Light travels faster in glass than it does in a vacuum.
4. Light travels in a straight line when it passes through a single medium.
5. Light rays could not be blocked and they could pass through all types of materials since they travel on a straight line.

B. Directions: Observe how light travels in the pictures. Write a check mark (✓) if the flame will be seen and a cross mark (X) if not. Do it in your science notebook.

<p>1.</p>  <p><input type="checkbox"/></p>	<p>2.</p>  <p><input type="checkbox"/></p>
<p>3.</p>  <p><input type="checkbox"/></p>	<p>4.</p>  <p><input type="checkbox"/></p>
<p>5.</p>  <p><input type="checkbox"/></p>	<p>6.</p>  <p><input type="checkbox"/></p>

Great! You really learned well the lesson.



What I Have Learned

Directions: In one or two sentences, describe how light travels using the picture below. Write your answer in your science notebook.



What I Can Do

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

1. Why aiming laser pointer at a person's head and eyes is harmful?
2. When you take a picture, in what direction will you position yourself with reference to the source of light?

Great job! After performing the activities about how light travels, you are now ready to answer the assessment.



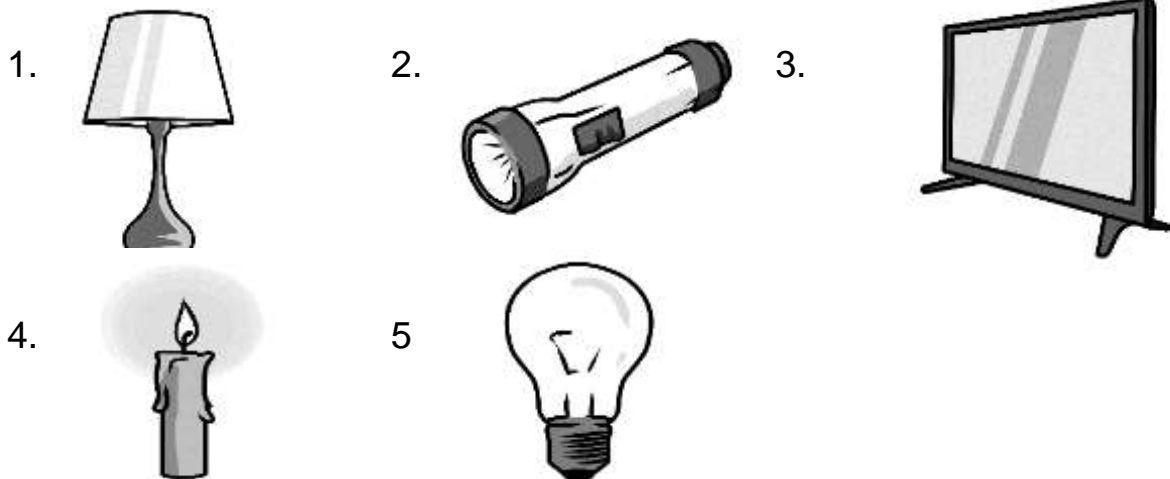
Assessment

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

1. Which of the following statement is TRUE?
 - a. Light does not travel.
 - b. Light travels in a curve line.
 - c. Light travels in a straight line.
 - d. Light reflects in opaque materials.
2. Light is a form of _____ that is needed to support life on Earth.
 - a. compression
 - b. energy
 - c. motion
 - d. vibration
3. What evidence/s show/s that light travels in a straight line.
 - a. Shadows are formed.
 - b. Light passes through the holes which are aligned together.
 - c. Rays of light are made of straight lines moving outwardly in all directions.
 - d. All of these
4. What happens when you focus a pen light through a hole of a thick cloth?
 - a. Light becomes brighter.
 - b. Light changes direction.
 - c. Light passes through the hole.
 - d. Light is blocked or obstructed.
5. Which of these describes how light travels through an empty space?
 - a. It travels in a straight line without stopping.
 - b. It comes to a stop after it travels a certain distance.
 - c. It changes direction often even if there are no objects.
 - d. It travels straight but may change direction to avoid objects.
6. What kind of path does light take?
 - a. It bounces off in all objects.
 - b. It goes through in all objects.
 - c. It curves around in all objects.
 - d. It travels in a straight line until it hits something or goes through it.

7. Which word best describes how light moves?
 - a. in circles
 - b. straight line
 - c. slowly
 - d. faster through opaque objects
8. What do we call a material that light can travel through?
 - a. air
 - b. medium
 - c. pathway
 - d. water
9. We see shadow because light travels in a _____ line.
 - a. curved
 - b. rainbow
 - c. straight
 - d. zigzag
10. Which of the following is true?
 - a. Sound travels faster than light.
 - b. Light travels faster than sound.
 - c. Light travels at the same speed with sound.
 - d. Light and sound do not travel in any medium.

B. Directions: The following pictures of objects are considered as sources of light. Using lines, draw the path of light of each object when they are lighted. Do it in your science notebook.



Additional Activities

Directions: Cut out at least three (3) pictures of sources of light from old magazines and paste them in your Science notebook. Using lines, draw how light travels from its source.

Congratulations! You are now ready for the next lesson.

Lesson

2

How Sound Travels

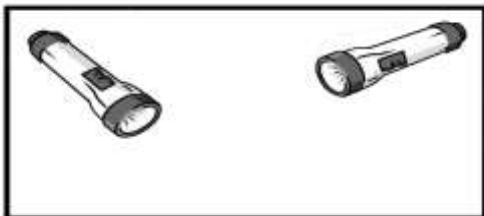
Sound is all around us, all the time. Sometimes we ignore, sometimes we love and enjoy listening to it. Like light, sound is also very important in our life. People can communicate because of it. Animals and the things around us produce sound that make our surroundings more lively and interesting. This module will show you how sound travels in different materials.



What's In

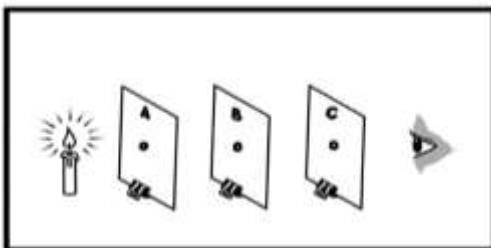
Directions: Draw the path of light in the following set-ups. Then, answer the questions. Do it in your science notebook.

1.



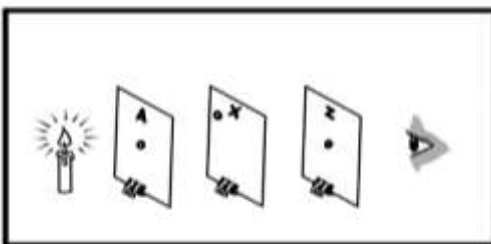
How does light travel?

2.



Can you see the flame of the candle in this set-up? Why?

3.



Can you see the flame of the candle in this set-up? Why?

Good job! Just like light, sound also travels in different materials. Please proceed to the succeeding activities to know more about sound.



What's New

Note to Parent/Learning Facilitator: Guide your children in doing this activity. Remind them of the precautionary measures. Tell them to be careful in handling the materials while performing the activity.

To the Learner:

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

Activity 1: How Sound Travels in Different Materials

What you need: a meter stick, a pencil, a big pail or can of water, 2 stones, a partner (your brother or sister)

What to do:

1. Get a meter stick and a pencil.
2. Hold the meter stick close to your ear. Have a partner scratch the other end of the meter stick with a pencil.
 - What happens?
3. Hold the meter stick away from your ear and repeat the activity.
 - Did you hear a softer or louder sound?
 - Where does sound travel faster? In solid or in air? Why do you think so?
4. Get a big pail of water. Get 2 pieces of stones and hit them together under water inside the pail. Now, hit them together out of water.
 - Did you hear sounds when you hit the two stones together outside the pail and underwater? Why?



- Which sound was louder, in air or water? Why do you think so?



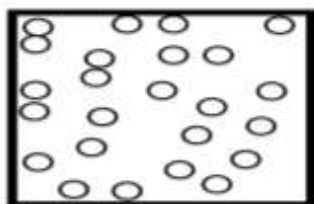
What is It

Points to Remember:

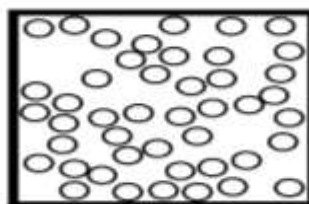
Sound is an energy produced by vibrations. When any material vibrates, it causes movement in the particles which are called sound waves. These sound waves keep going until they run out of energy.

The speed at which sound travels from one place to another depends upon the medium and how closely packed the particles are in the material. A medium is a substance that allows sound waves to travel through it. In a vacuum like the outer space, sound cannot travel so you cannot hear anything there.

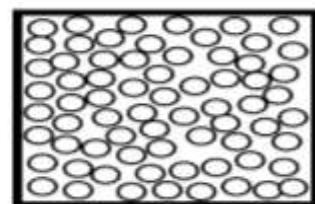
As can be shown in the diagram below, sound waves travel the slowest through gases, faster through liquids, and fastest through solids. Sound travels most quickly through solids because the molecules of a solid are closer together and, therefore, can transmit the vibrations (energy) faster. Sound travels slowest through gases because the molecules of a gas are farthest apart. Sound also travels slower than light.



Gas particles



Liquid particles



Solid particles



What's More

A. Directions: Write **TRUE** if the statement is correct and **FALSE** if it is not. Write your answers in your science notebook.

1. Sound cannot travel in a vacuum.
2. Sound travels in solids, liquids and gas.
3. Sound travels fastest through liquid materials.
4. Sound travels faster through solid materials than gas.
5. Sound is not affected by the medium through which it travels.

B. Directions: Copy and complete the sentences using the words from the box. Do it in your science notebook.

closer	speeds	liquid	gas	medium	solid
--------	--------	--------	-----	--------	-------

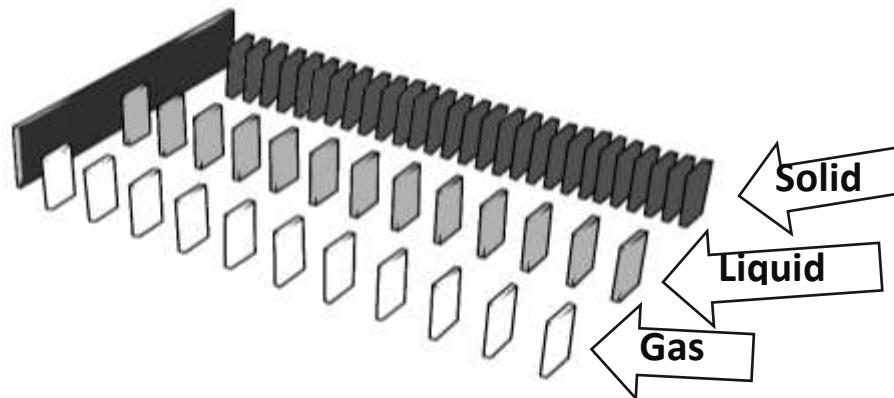
Sound can travel at different 1. _____ depending on the 2. _____ it is travelling through. Sound travels faster in a 3. _____ than it does in a 4. _____ or in a 5. _____. This is because the particles in a solid are 6. _____ together than they are in gas.

Did you get a perfect score? Good! Now, proceed to the next activity.
--



What I Have Learned

Directions: Using the representations of the three states of matter below, describe how sound travels through solid, liquid, and gas. Write two (2) to three (3) sentences in your science notebook.



What I Can Do

Directions: Read and answer the following questions. Do it in your notebook.

1. Why do you think that most of the musical instruments are made up of solid materials?
2. What should a motorist do upon hearing the sirens of an ambulance or a fire truck behind him?
3. Why do doctors use stethoscope when examining on their patients?



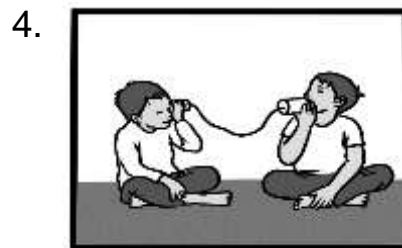
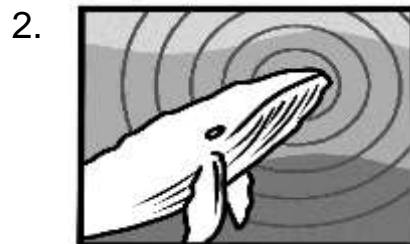
Assessment

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

1. When sound travels in solids, vibration is _____.
a. fast b.irregular c.moderate d. slow
2. How does sound travel through air?
a. very fast c. in jumping motion
b. very slowly d. fast in random manner
3. What affects the speed of the sound as it travels?
a. person receiving it c. the origin of the sound
b. loudness of the sound d. the nature of the material
4. Which of the following statements about sound is correct?
a. Sound cannot travel through solids.
b. Sound travels faster in air than in liquid.
- c. Sound travels faster in solids than in air.
d. Sound is not affected by the medium through which it travels.
5. You are standing 5 meters away from your teacher. Why did you immediately respond when she called your name?
a. Sound travels in solids. c. Sound travels in air.
b. Sound travels in liquids. d. Sound travels in a vacuum.
6. Compared to light, sound travels _____.
a. faster
b. slower
c. at the same speed
d. There is not enough information to compare the two.
7. Which of the following would be most likely to transmit sound the best?
a. steel in cabinet c. air in your classroom
b. water in the ocean d. water in a swimming pool
8. On which place will we not be able to hear any sound?
a. a theatre c. in a spaceship
b. a closed room d. in the outer space

9. Sound waves travel fastest in _____.
- a. air b. liquids c. solids d. vacuum
10. In which of the following does sound travel fastest?
- a. ice
b. steam
c. water
d. Sound travels at the same speed in each of the above.

B. Directions: Describe how sound travels in each picture. Write your answer on your science notebook.





Additional Activities

Directions: There are 9 words hidden in this puzzle. Find the words and make meaningful sentence/s about how sound travels in different medium.

S	O	L	I	D	S	O	U	N	D
F	A	S	T	T	R	A	V	E	L
D	O	L	I	Q	U	I	D	T	W
J	R	U	F	A	S	T	E	R	I
M	E	D	I	U	M	U	G	A	S
G	F	A	S	T	E	S	T	E	S

Congratulations! You are done with the two lessons! You are now ready to move on to the next! Good luck!

Lesson

3

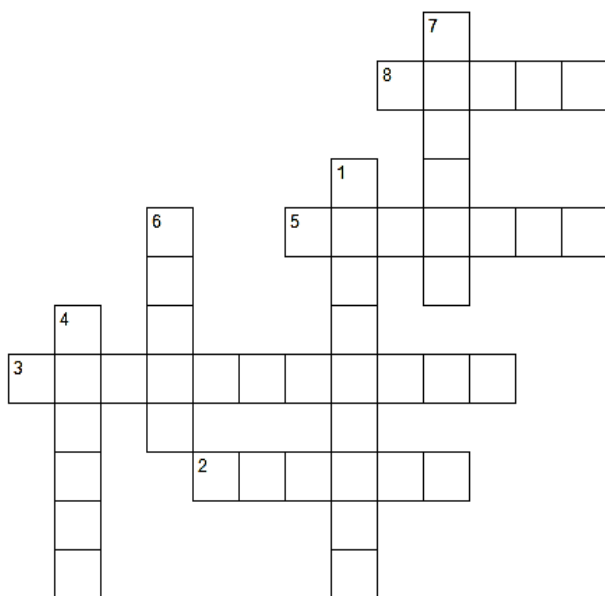
How Heat Travels

Heat is a form of energy and it is also very important in our life like light and sound. Heat keeps us warm, cooks our food, and does a lot of other things. Heat travels through different phases of matter. It travels through a solid, liquid and gas. How does transfer of heat happen? You will find out the answer to this question as you go through this lesson.



What's In

Directions: Answer the following puzzle using the clues. Write your answers in your science notebook.



Across:

2. needed by sound in order to travel
3. movement in particles when material vibrates
5. sound travels _____
8. sound travels slowest in _____

Down:

1. up and down movement
4. sound travels fastest in _____
6. produced by vibrations
7. place where sound cannot travel

Check your answers using the key on the last page. I hope you got the correct answers. If not, it's okay, you can go back to the previous lesson.

Just like light and sound, heat also travels. Proceed to the next activities that will enable you to describe how heat travels in solid, through liquid and gas. Good luck!



What's New

A. Directions: In your notebook write two to three sentences in a given situation.

Some people say that putting a spoon in a cup of coffee would make it cool fast. Do you believe so? Why or why not?



You will be able to know if your answer is correct after you performed this activity.

Note to Parent/Learning Facilitator: Guide your children in doing this activity. Remind them of the precautionary measures. Tell them to be careful in handling the materials while performing the activity.

To the Learner:

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

Activity 1: “You’re Hot and You’re Cold”

Objective: Describe how heat transfers in solid materials.

What you need: hot water, coffee mug, metal spoon, watch/ timer

What to do:

1. Fill the mug with hot water. Be extra careful when pouring hot water to the mug. Avoid spilling the hot water.
2. Place a metal spoon into the coffee mug.

3. Wait for about five minutes. Carefully feel the exposed end of the spoon. Slightly touch the outside surface of the mug, too. Record your observations in your Science notebook.



Guide Questions:

1. What happened to the exposed end of the spoon when you touched it after five minutes?
2. What happened to the water inside the mug after five minutes?
3. What did you notice about the outside surface of the mug when you touched it? Why?
4. What conclusion about heat transfer can you formulate or draw out from this activity?

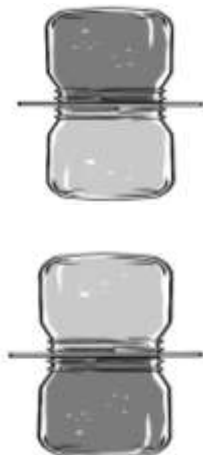
Activity 2: Up, Down, and Spin Around

Objective: Describe how heat travels in liquid.

What you need: 2 jars, cardboard, food color (blue and red)

What to do: Dissolve the food colors in separate jars. The red jar contains warmer water and the blue jar contains colder water. Place two jars with one on top of the other. A cardboard separates the two. After that, gently remove the cardboard. Observe and record what happens.

Now, reverse the jars' positions then carefully remove the cardboard. Observe and record what happens.



Guide Questions:

1. What is the direction of the flow of warm water and cold water in the first set up?

2. What is the direction of the flow of warm water and cold water in the second set up?
3. What is the direction of heat flow in liquids?
4. If both jars are equally hot, what do you think will happen? Why?
5. If both jars are equally cold, what do you think will happen? Why?
6. What conclusion about heat transfer can you formulate or draw out from this activity?

How does the Sun dry your clothes when it's too far away from Earth? Observe what happens to your clothes when exposed to sunlight.



How about sitting near a barbecue stand where live coals are used for grilling? What did you feel?

Activity 3: How heat is transferred through radiation?

Objective: Describe how heat is transferred through empty space or vacuum.

What you need: margarine, small plastic plate, spoon, place for direct exposure to sunlight

What to do:

1. Scoop a small portion of the margarine from its container using the spoon and place it on a small plate.
2. Place the plate with margarine under the Sun and observe for five minutes. Record your observation in your notebook.



Guide Questions:

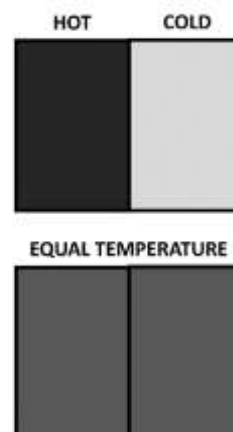
1. What happened to the margarine after exposing it to the Sun?
2. Why do you think it happened?
3. What do you think made the change on the margarine?
4. Predict what might happen to the margarine if it is continuously exposed to lamp/ Sun for a long period of time.
5. Why is it necessary that margarine or butter should be kept refrigerated?
6. Based on the activity, what can you say about heat transfer through radiation?



What is It

Points to Remember:

Heat can travel through solids by **conduction**. Conduction is the transfer of heat energy through direct contact between the heat source and another object. When this happens, heat energy moves out of the warmer object into the cooler object due to temperature difference. This heat transfer continues until both objects reach the same temperature (or thermal equilibrium). The figure at the right illustrates this.



The illustration below shows conduction. The heat from the lighted candle travels to the spoon (cold object) by direct contact causing the spoon to become hot.

Another example of conduction is shown below. The heat from water travels to the ladle by direct contact.

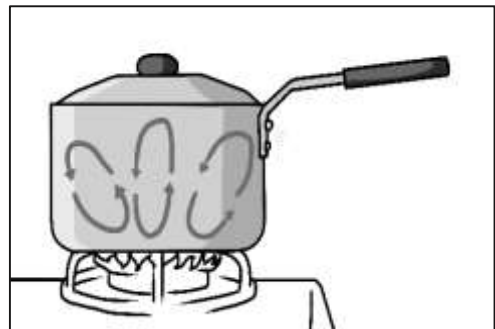


The water and the ladle are composed of small particles called molecules. Heat energy makes the molecules in the object move faster. The fast movements of the water molecules make the cooler ladle molecules move fast, too. As the fast moving particles collide with the slow moving particles, energy is transferred. As a result, more molecules move fast. This movement of water molecules continue until heat is spread uniformly throughout the materials.

There are materials that allow heat to flow through easily. We call them **conductors**. Metals are good conductors. That's why we use them as cooking utensils because heat moves fast through the metal pan to the food. There are materials through which heat passes slowly or not at all. We call them **insulators**. Some insulators are wood, plastic and ceramic.

Heat Travels by Convection

Convection is the transfer of heat by the movement of the heated parts of a liquid or gas. Fluids include liquids and gases. Convection involves the motion of fluids in circulating currents. When water is heated in a kettle, the molecules at the bottom get heated first. The heated molecules move and rise pushing the top molecules, which are cold, to the bottom. The colder molecules sink, get heated at the bottom, and move up. Warm fluid rises and cold fluid sinks forming circulating currents. The heat moves from a higher temperature region to a lower temperature region. This movement continues until the fluid is evenly heated and you see bubbles forming.



This is also true with winds and breezes. Warm air rises, expands and cools. Cool air sinks. Convection is the reason why we have wind movements and local breezes. During daytime, air over the land is heated. It rises and expands. Cool air over the sea moves towards the land. That's why you feel a refreshing breeze by the seaside during daytime.

Heat Travels by Radiation

Heat can also be transmitted across empty space or vacuum. This is called **radiation**. Radiation does not depend on the presence of matter to transfer heat. Radiant energy travels as waves through space. Heat waves hit Earth and cause warming. The Earth's atmosphere traps the heat from the Sun.

Your house gets warm when the Sun's waves or rays travel through a window and are trapped in your house. Heat waves are invisible. All warm objects radiate or give off heat waves. Some other examples of heat transfer by radiation are: the heat you feel when you are near a fire source, the heat given off by an electric heater, and the heat near a hot oven.

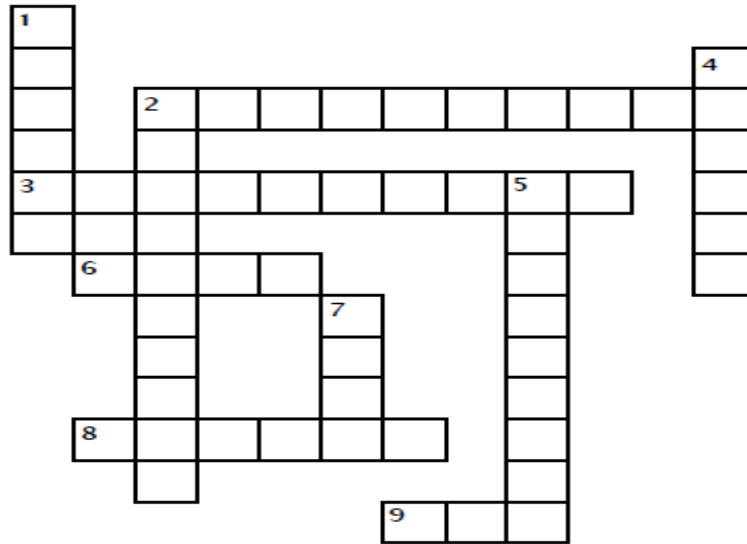
Amazing! I hope you got the concepts about heat transfer.



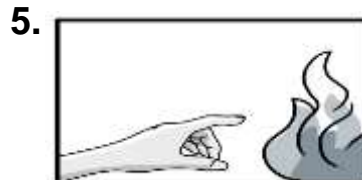
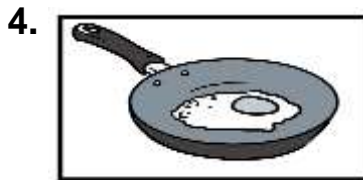
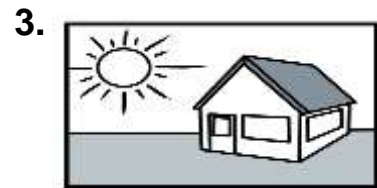
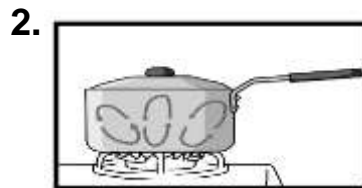
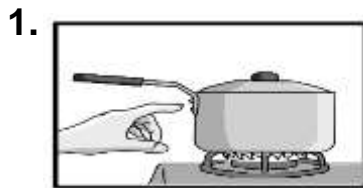
What's More

A. Directions: Guess the Word. Solve the puzzle, use the clues below. Write your answer in your science notebook.

Down	Across
1 Heat can be transferred through _____ contact by the heat source and the body receiving the heat.	2 Heat transfer through direct contact
2 Heat transfer by the movement of heated parts of liquid or gas.	3 Materials that transfer heat easily
4 Heat is a form of _____.	6 A form of energy that keeps us warm
5 Heat transfer through space	8 Heat can travel through _____ in conduction.
7 Heat transfer from a hot object to _____ object.	9 The greatest source of heat energy.



B. Directions: Identify how heat travels in each illustration whether it shows **conduction**, **convection** or **radiation**. Write your answer in your science notebook.



C. Directions: Identify what kind of heat transfer is described in the situations below. Choose your answer from the words listed in the box. Write your answer in your science notebook.

conduction	convection	radiation
------------	------------	-----------

- | | |
|---|---|
| <p>1. campfire</p> <p>2. boiling water</p> <p>3. heating the iron</p> | <p>4. warming of nail over the lighted candle</p> <p>5. drying of clothes under the heat of the Sun</p> |
|---|---|

D. Directions: Decode the hidden word by filling the blank with the correct letters as indicated by the following numbers. Then, write a sentence describing the meaning of the words that are formed.

A	B	C	D	E	F	G	H	I	J	K	L
1	2	3	4	5	6	7	8	9	10	11	12
M	N	O	P	Q	R	S	T	U	V	W	X
13	14	15	16	17	18	19	20	21	22	23	24
Y	Z										
25	26										

1. _____ _____ _____ _____

 8 5 1 20
2. _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

 3 15 14 4 21 3 20 9 15 14
3. _____ _____ _____ _____ _____ _____ _____ _____ _____

 18 1 4 9 1 20 9 15 14
4. _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

 3 15 14 22 5 3 20 9 15 14
5. _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

 20 5 13 16 5 18 1 20 21 18 5

You are really enlightened now! Great job! Now, let's see if you can connect your learnings with real life situations.



What I Have Learned

Directions: Write **TRUE** if the statement is correct and **FALSE** if it is not. Then, change the part that makes the sentence incorrect. Do it in your science notebook.

1. Radiation is the heat transfer through space.
2. Heat transfer occurs in solid through conduction.
3. Radiation is the transfer of heat by movement of fluids.
4. Conduction is the transfer of heat through physical contact.
5. Heat moves from a lower temperature region to higher temperature region.
6. The method of heat transfer between the hot water and the metal spoon is called convection.

Way to go! This time let's see if you can apply what you learned in real-life situations. Good luck!



What I Can Do

Directions: Answer the following questions briefly in your science notebook.

1. Why do we need to use a pot holder when we are removing hot casseroles or any hot cooking wares out of the stoves?
2. When we expose half of an iron nail outside on a sunny day, then we cover the other half with cartoon, the covered half still gets heated. Why is this so?
3. When is the best time for us to dry our clothes outdoors, during sunny day or a cloudy day? Why?
4. Staying too long under sunlight may damage our skin due to the radiation. What must we do to protect our skin from being hurt or injured by the heat of the Sun?

Amazing! You reason out so well. It's time for the final test. Good luck!



Assessment

Directions: Write the letter of the correct answer in your science notebook.

1. What energy transfer is shown through direct contact of the heat source and the body receiving the heat?
 - a. conduction
 - b. convection
 - c. heat
 - d. radiation
2. Which of these activities show heat transfer by radiation?
 - a. boiling egg
 - b. heating the wire
 - c. refrigeration
 - d. lighting the room with a bulb
3. When one uses an exhaust fan, what kind of heat transfer is demonstrated?
 - a. conduction
 - b. convection
 - c. nuclear
 - d. radiation
4. Which of the illustrations show heat transfer?



5. Which of the following DOES NOT show transfer of heat energy?
 - a. boiling water in a kettle
 - b. cutting paper in small pieces
 - c. lighting a room with a fluorescent lamp
 - d. placing a spoon in a cup of hot coffee
6. What is the direction of flow of heat transfer?
 - a. from hot to cold
 - b. from bottom to top
 - c. from cold to hot
 - d. from side to side
7. How is heat transferred in solid materials?
 - a. through radiation
 - b. through conduction
 - c. through vacuum
 - d. through convection
8. What happens to a liquid when heated?
 - a. It remains the same.
 - b. It increases in volume.
 - c. It increases in temperature.
 - d. It increases its water level.

9. What will happen to butter and chocolate bar when they are continuously exposed to heat?
- They may become heavier.
 - They may decrease in volume.
 - They may melt.
 - They may expand.
10. When heat is transferred through gases it is called _____.
- convection
 - radiation
 - conduction
 - roasting
11. Which of the following is NOT true?
- Convection is the transfer of heat energy by circulating currents.
 - Heat energy transfers from a colder body or cooler region to a hotter body or warmer region.
 - Heat energy transfers by convection in liquids and gases.
 - Conduction is the transfer of heat energy from molecule to molecule or atoms in an object.
12. During heating, the water at the bottom of a jar gets heated first and begins to rise. As warm water rises, cold water goes down. This shows what kind of heat transfer?
- conduction
 - convection
 - insulation
 - radiation
13. You left a fork in a bowl of hot water. When you got the fork, you observed that it became hotter. What do you call the heat transfer involved in the situation?
- conduction
 - convection
 - insulation
 - radiation
14. Which of the following shows convection?
- A spoon gets hot when left in a bowl of hot soup.
 - A girl holding a hot spoon felt her fingers becoming warm.
 - Larry feels his head and arms getting warm as he walks under the Sun.
 - The hot surface of the land heats the air above it and the air becomes warm.
15. Grade IV pupils went camping. They lighted a bonfire and they felt their face and arms were getting warm. How did the heat from the fire transfer to the pupils?
- through radiation
 - through convection
 - through insulation
 - through conduction



Additional Activities

Directions: Write a simple reflection about what you have learned in this module by completing these statements. Do it in your science notebook.

1. In this module, I discovered that_____.
2. The most exciting activity for me was_____.
3. The easiest lesson for me was _____ while the hardest was _____.
4. Next time, I want to learn more about_____.
5. I will use all that I have learned by _____.

Congratulations! You did great! Now, you may proceed to the next module. Good luck, keep learning and have fun!



Answer Key

Light travels in a straight line until it hits a material. Shadows are formed when light is blocked.



What I Have Learned

- B. 1. ✓ 2. X 3. X 4. X 5. X 6. ✓

- A
1. FALSE 2. TRUE
3. FALSE 4. TRUE
5. FALSE



What's More

Answers to Guide Questions:
1. The light passed through.
2. The light did not pass through.
3. Yes
4. No, shadow was formed.
5. Yes, straight path.
6. Light travels in a straight line until it hits a material. When light is blocked, a shadow is formed.

Activity 1: The Right Path

What's New



- A. 1. magnetic axis 3. magnetic field
2. magnetic poles
B. 1. repel 2. attract
3. repel 4. repel 5. attract 6. attract



What's In

LESSON 1- How Light Travels

- B. 1. conduction 2. radiation 3. convection 4. conduction 5. radiation

- A. 1. FACT 2. BLUFF 3. BLUFF
4. FACT 5. BLUFF 6. FACT
7. FACT 8. FACT 9. BLUFF
10. FACT

What I Know



- A
1. TRUE 2. TRUE
3. FALSE 4. TRUE
5. FALSE

What's More



- I will hear a scratching sound.
- Yes
- Solid
- Yes, sound travels in water and air
- Water

Activity 1: How Sound Travels in Different Materials

What's New



1. Light travels in a straight line.
2. Yes, because the light from the candle will pass through straight to the aligned holes of the cardboard.
3. No, because one cardboard is not aligned.

What's In



LESSON 2- How Sound Travels

Pupils' answers may vary.

Additional Activities



B. (Straight lines moving outwardly from the source of light.)

- A. 1. c 2. b 3. d 4. c 5. a
6. d 7. b 8. b 9. c 10. b

Assessment



1. Laser pointers can damage the person's eyes.
2. Towards the source of light.

What I Can Do





What's New

Activity 1: You're Hot and You're Cold

Answers to Guide Questions:

1. It became hotter.
2. It became colder.
3. It became hotter because heat from the water was absorbed by the mug.
4. Heat travels in solids from hot to cold materials.

Activity 2: Up, Down, and Spin Around

Answers to Guide Questions:

1. upward, towards the cold water
2. going down, towards the cold water
3. from hot to cold region
4. There will be no movement. Temperature differences make the movement of heat from hot to cold region.
5. There will be no movement. There is no difference in temperature.
6. Heat travels in water from hot to cold region.

Activity 3: How heat is transferred through radiation?

Answers to Guide Questions:

1. It melted.
2. The sun's heat traveled in space and absorbed by the margarine.
3. The increase in temperature.
4. It will turn into liquid.
5. To maintain its low temperature and for it to remain solid
6. Heat is transferred through space.



What's More

- A.**
- 1- direct
 - 2- down: convection;
 - 3- across- conduction
 - 4- across- conduction
 - 5- sun
 - 6- heat
 - 7- cold
 - 8- solids
 - 9- sun
 - 10- radiation

- B.**
1. conduction
 2. convection
 3. radiation
 4. conduction
 5. radiation
- C.**
1. radiation
 2. convection
 3. conduction
 4. radiation
 5. radiation
- D.**
1. HEAT
 2. CONDUCTION
 3. RADIATION
 4. CONVECTION
 5. TEMPERATURE



What I Have Learned

1. TRUE
2. TRUE
3. FALSE- radiation should be changed to convection
4. TRUE
5. FALSE- high temperature to low temperature
6. FALSE, convection should be changed to conduction



Exercise 2- Fill in the blanks

1. speeds
2. medium
3. Solid
4. liquid
5. gas
6. closer

What I Have Learned

Sound travels in solid, liquid, and gas. It travels fastest in solid, faster in liquid, and slowest in gas. Sound needs a medium to travel through.

What I Can Do

1. Sound can travel easily in solids.
2. Move out of the way of the ambulance or fire truck because it could be an emergency.
3. To hear the heartbeat and sounds of the internal parts of the body

Assessment

- A**
- | | | | | |
|------|------|------|------|-------|
| 1. a | 2. b | 3. d | 4. c | 5. c |
| 6. b | 7. a | 8. d | 9. c | 10. A |

- B.**
1. Sound travels when the boy hit the drums.
 2. The sound of the whale travels in water.
 3. Sound travels when the boy hits the table.
 4. Sound travels from the can, then through the string until it reaches the other end of the line.
 5. The sound of the parking dog is heard by the man because sound travels in air.

Additional Activities

Solids, Sound, Fast, Travel, Liquid, Faster, Fastest, Gas, Medium

Sound travels in different medium. It travels fast in gas, faster in liquid, and fastest in solids.

LESSON 3- How Heat Travels

What's In

- 1-vibration
- 2- medium
- 3- sound waves
- 4- solids
- 5- liquids
- 6- sound
- 7- vacuum
- 8- gases



What I Can Do

1. Pot holder protects us from very hot casseroles because it is a poor conductor of heat.
2. Heat travels through space and reaches the exposed part of the nail.
3. Sunny day because the sun's rays can readily travel through space and dries the clothes.
4. We should use protective materials like shades and umbrella.



Assessment

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



Additional Activities

Pupils' answers may vary.

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