CORNERSTONE JUNIOR SCHOOL - MUKONO
P.O. Box 704 Mukono. Tel: 0772485711/0786809463,
Email: cornerstonejuniorschool@gmail.com

P.6 SCIENCE SET ONE SELF STUDY LESSONS
SOUND ENERGY
24.5.2020

INSTRUCTIONS

- You are expected to complete one lesson daily
- Use the following references for further reading: MK Integrated Science Book 6, Baroque Integrated Science Book 6 and Comprehensive Science Book 6.

LESSON 1

By the end of this lesson, the learner should be able to:

1. Define sound as a form of energy.
2. Demonstrate how sound is produced.
3. Identify the sources of sound.
4. State how different organisms produce sound.

Introduction

In primary five, you learnt about some forms of energy specifically **heat energy**.

Now in primary six we shall look at another form of energy and this is **sound energy.**

What is sound?

Sound is a form of energy produced by vibrations.

When sound is produced, it stimulates the sense of hearing ***in some animals***.

Try this activity (please don't write this!)

Partner with your friend, sister, or brother.

Stretch a rubber band tightly but carefully.

Play the stretched rubber band with your finger.

What do you observe?

You will observe the continuous and quick up and down movement of a rubber band while producing sound.

This is called *vibration.*

Vibration is therefore the movement of an object to and fro or up and down.

It is from vibration that sound is produced.

Sources of sound

These are materials from which sound is produced**.**

They are grouped into two i.e.

i) Natural sources of sound.

ii) Artificial sources of sound.

Natural sources of sound

These are materials or objects that make sound but exist by nature.

Examples of natural sources of sound

Animals	Birds singing	Wind
Rainfall	Lighting	Water fall.

Artificial sources of sound

These are objects that produce sound and are made by man.

Examples of Artificial sources of sound

i)	Radios	iv)	Bungles	vii)	Cars
ii)	Bells	v)	Flutes	viii)	Drum
iii)	Whistles	vi)	Guns	ix)	Guitars

Uses of sound

Sound plays very important roles in our daily life and the life of certain organisms.

These include:

- Sound is used for communication.
- Sound is used for entertainment.
- Sound can be used as evidence in courts of law.

Explain to your parent or guardian the above uses of sound.

Music

This is an organized sound with regular vibrations.

Noise

This is sound with irregular vibrations.

How sound is produced

Sound is produced by the vibrations.

For any object to produce sound it must first vibrate. Without vibration, sound cannot be produced.

Whenever you hear sound from any object, first identify the part of the object that is vibrating in order for that object to produce sound.

How sound is produced by living things

i) Many types of animals including man produce sound by vibration of their vocal cords in voice boxes.

ii) Birds sing by the vibration of rings of cartilage in the trachea.

iii) Bees and mosquitoes produce sound by vibration of their rapid flapping wings.

iv) Grasshoppers and crickets produce sound by rubbing their hind legs against their vibrating wings.

Activity

1. Which form of energy stimulates the sense of hearing in animals?
2. State any two natural sources of sound in the environment.
3. In which way is sound useful in a classroom?
4. Give the difference between music and sound.
5. How do bees produce sound during flight?

LESSON 2

By the end of the lesson, the learner should be able to:

1. Define musical instruments.
2. State the classes of musical instruments.
3. Explain how sound is produced by the different classes of musical instruments.

Musical instruments

These are instruments that produce music when played well

Types/classes of musical instruments

Musical instruments are classified according to the way they produce sound.

For us to know how an instrument produces sound, we have to look out for what vibrates in order for it to produce sound when being played.

Different instruments produce sound in different ways. That is why we have different classes of musical instruments.

These are:

i) String instruments

ii) Wind instruments

iii) Percussion instruments

(a) <u>String instruments</u>

These are instruments which produce sound by vibrations of the strings when plucked.

<u>Examples of string instruments</u>.

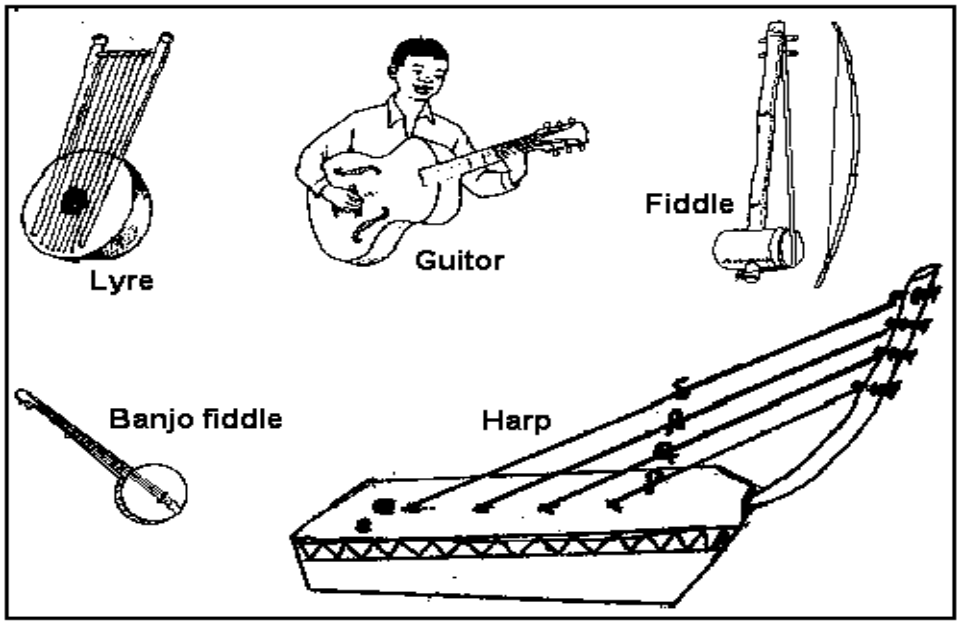
i) Guitar

ii) Lyre

iii) Harp

iv) Violin

v) Tube fiddle

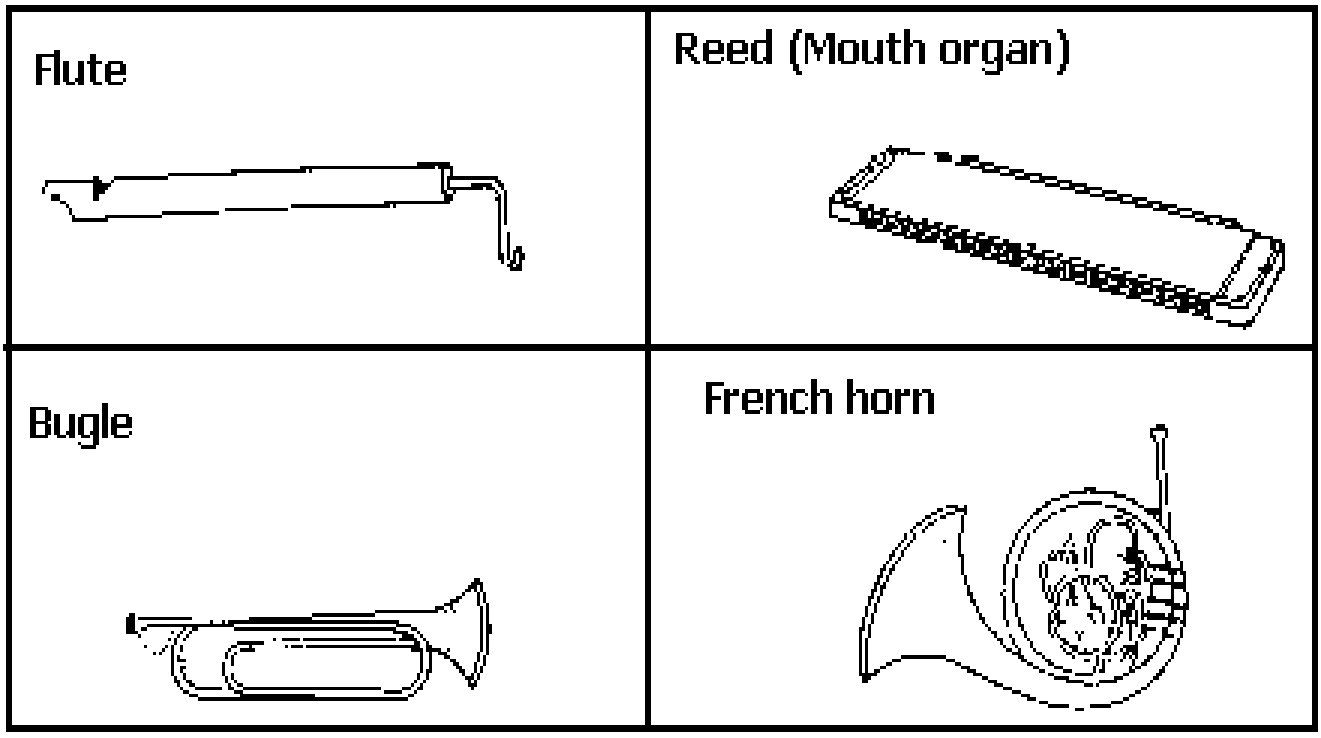


(b) Wind instruments

These are instruments which produce sound by vibration of air inside them when blown.

Examples of wind instruments

i)	Flute	iii)	Saxophone	v)	Bottle
ii)	Trumpet	iv)	Pan pipes	vi)	Horn



(c) Percussion instruments.

These are instruments which produce sound by vibration after striking or beating.

They produce sound by vibration when beaten or struck.

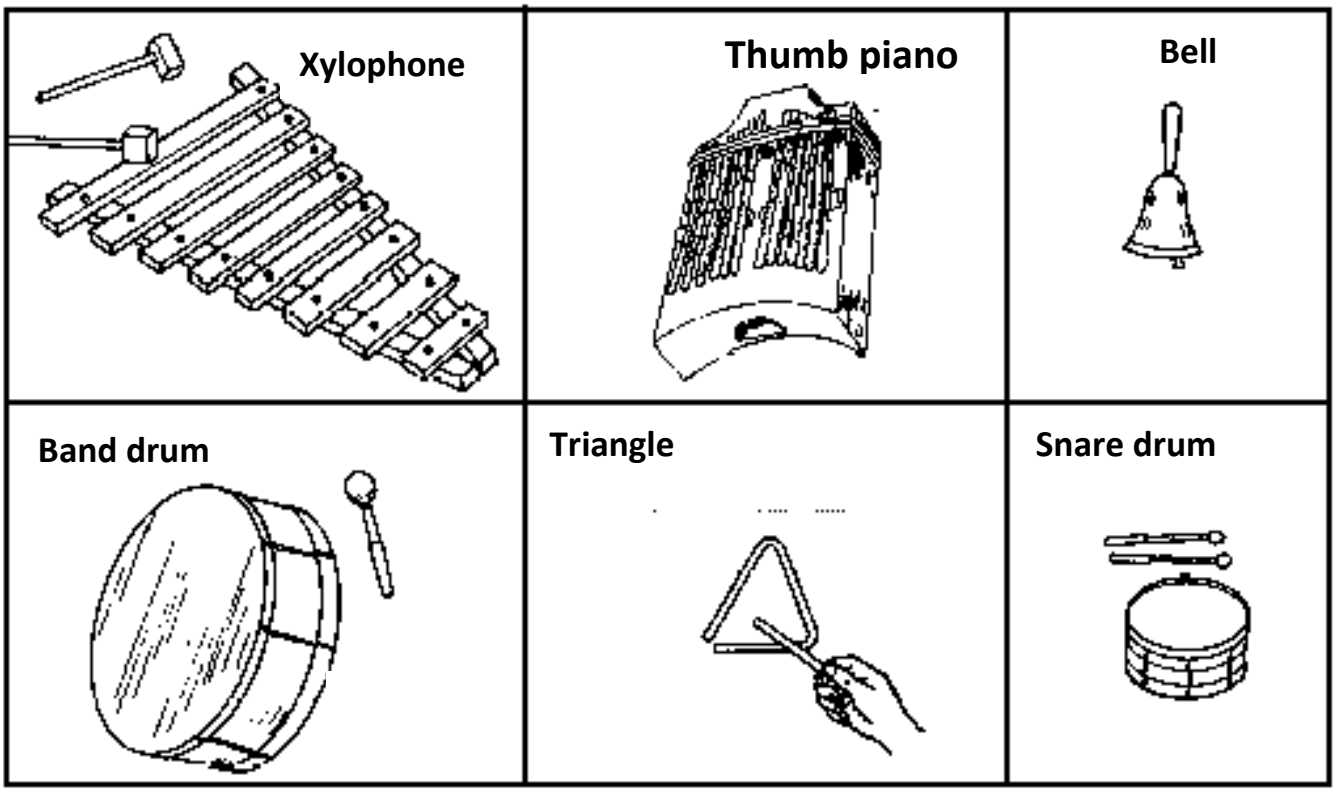
Examples of percussion instruments.

i) A drum produces sound by striking it then the skin vibrates.

ii) Shakers produce sound by striking them and they vibrate.

iii) Xylophones produce sound by striking them and they vibrate.

iv) Rattles and bells produce sound when they are shaken



Exercise

1. What is sound?
2. Name three sources of sound in each of the categories below:
    a. Artificial sources
    b. Natural sources
3. How is sound produced?
4. Name at least two types of instruments.
5. What vibrates for a guitar to produce sound?
6. How does a bird produce sound?

LESSON 3

By the end of the lesson, you should be able to:

1. State how sound travels.
2. State the speed of sound in the different states of matter.
3. Give factors that determine the speed of sound**.**

How sound travels

Sound travels through matter by means of sound waves.

The sound waves travel in all directions from a vibrating object but become weaker as they move away from the vibrating object.

NOTE: Sound does not travel through a vacuum because a vacuum has no medium to transmit sound

The speed of sound

i) Speed of sound in solids is 1500m/sec.

ii) Speed of sound in normal air or gas is 330m/sec.

iii) The speed of sound through water or liquids is 1484m/sec.

Therefore sound travels fastest in solids and slowest in gases.

Factors that affect the speed of sound.

(a) Temperature

We hear very clearly and easily at night than day because during night, the temperatures are low and waves travel very near the ground level. While during day, the waves move far from the ground.

(b) Heat

The heat of the day makes sound waves rise high making it difficult to hear.

(c) **Wind**. This can carry sound further if it is blowing in the same direction. If the wind blows against the sound, it is obstructed.

(d) **Altitude**.

Sound waves move easily along a lower altitude than climbing or going up a hill or mountain.

LESSON 4

By the end of the lesson, you should be able to:

1. Define an echo.
2. State places where echoes can be heard.
3. Give importance of echoes in the environment.
4. Identify disadvantages of echoes in the environment
5. State ways of controlling echoes in halls.

ECHOES

An echo is a reflected sound.

It is caused by the obstruction of sound waves by an obstacle or barrier.

Plural of echo is echoes.

Think about this

Have you ever shouted from an empty room?

Do you notice that there is that sound you hear repeating whatever you are saying!

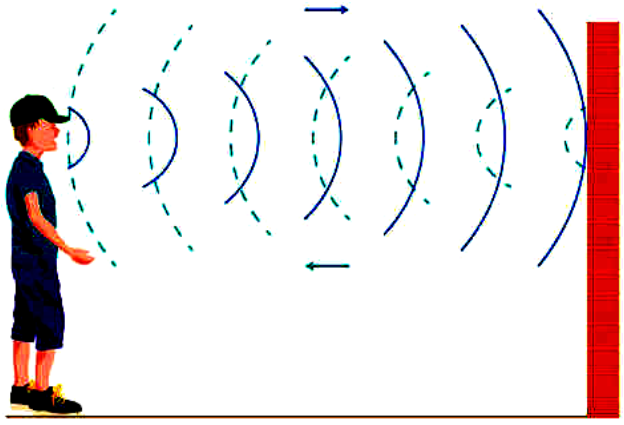
Is there someone repeating what you are saying? Probably not.

Then where does it come from?

It's probably sound being reflected /bounced back by the walls in the room.

And that is what we call an echo.

Echoes appear mostly around tall buildings, wall, cliffs, caves, mountains and empty rooms.



***Importance* of Echoes.**

i) Bats use echoes to locate food and obstacles when flying.

ii) Echoes help pilots to avoid accidents in hills or mountains when flying aeroplanes.

iii) Echoes help sailors to record the depth of the sea to avoid accidents of crashing ice bergs or rocks.

iv) Whales use echoes to dodge obstacles and danger ahead of them.

Disadvantages of echoes

- They disorganize communication
- Disorganize entertainment

How to prevent echoes

i) By covering walls with soft wood or boards.

ii) By putting thick curtains in the rooms.

iii) By putting ceiling boards in the rooms.

Calculations about echoes

(a) It took 3 seconds to hear the echo of a man chopping wood.

How far was the man from the chopping place?

$$\text{Distance} = \frac{\text{Speed (S)} \times \text{Time (T)}}{2}$$

$$= \frac{(330 \times 3)}{2} \text{ metres}$$

$$= \frac{990}{2}$$

$$= 495 \text{ metres}$$

NOTE:
We divide by 2 because sound travels twice i.e. the original sound and the reflected sound.
Remember: Speed of sound in gas is 330 metres per second

(b) Amooti was standing across a valley, which was 660 metre away from the cliff, if he shouts, how long will he take to hear the echo?

$$\text{Time} = \frac{D}{S}$$

$$= \frac{660\text{m} \times 2}{330\text{m/sec}}$$

$$= 2 \times 2 \text{ sec}$$

$$\text{Time} = 4 \text{ sec.}$$

Exercise

1. How does sound travel?

2. Why doesn't sound travel through a vacuum?
3. Identify any four factors that affect the speed of sound.
4. What is an echo?
5. State any two uses of echoes.
6. How does wind affect the speed of sound?
7. How can echoes be controlled in theatres?

LESSON 5

By the end of this lesson, you should be able to:

1. Define pitch of sound.
2. State factors that determine pitch of sound.
3. State different factors affect the pitch of sound**.**

PITCH OF SOUND

Pitch is the highness or lowness of sound.

Factors that determine the pitch of sound

These are things that can make sound go so high or low depending on someone's preference.

They include:

i. Size of the vibrating surface.

ii. Tightness or looseness (tension) of the vibrating object.

iii. Frequency

How frequency determines pitch

Frequency is the number of vibrations produced by an object per second.

Quick vibrations produce high frequency and therefore high pitch of sound.

Low vibrations produce low frequency and therefore low pitch of sound.

i.e.

1. 

Slow vibration, low frequency, low pitch

2. 

Quick vibrations, high frequency, high pitch.

Size of the object

A big object produces sound with a low pitch because it has a big surface for vibration.
Whenever there is a big surface for vibration, the vibrations will be slow.
This results into a low pitch of sound.
A small object produces sound with a high pitch because it has a small surface for vibration.
Whenever there is a small surface for vibration, the vibrations will be very fast. This results into a high pitch of sound.
Therefore, the bigger the object, the lower the pitch of sound and the smaller the object, the higher the pitch of sound.

Illustrations

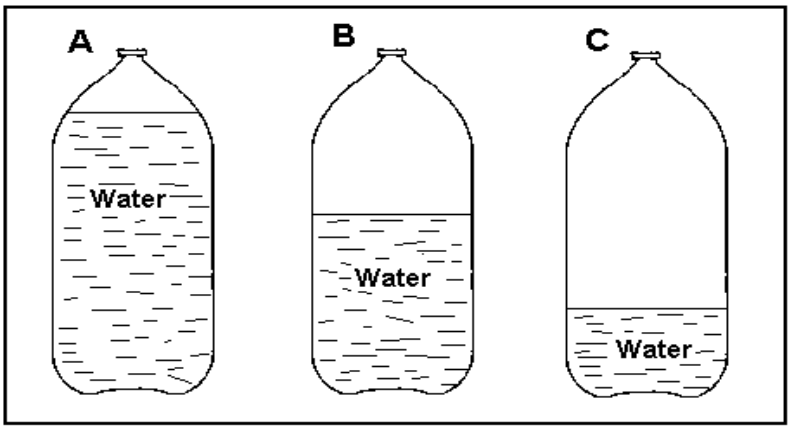
A 

B 

C 

A small object produces a high pitch than a big object.
Drum A produces the highest pitch and
Drum B produces the lowest pitch.
Drum A produces the highest pitch because it has a small surface for vibration.
Drum B produces the lowest pitch because it has a big surface for vibration.

In wind instruments



Bottle A produces the highest pitch because it has a small space for vibration of air.
Bottle C produces the lowest pitch because it has a large space for vibration of air.

Length of the object

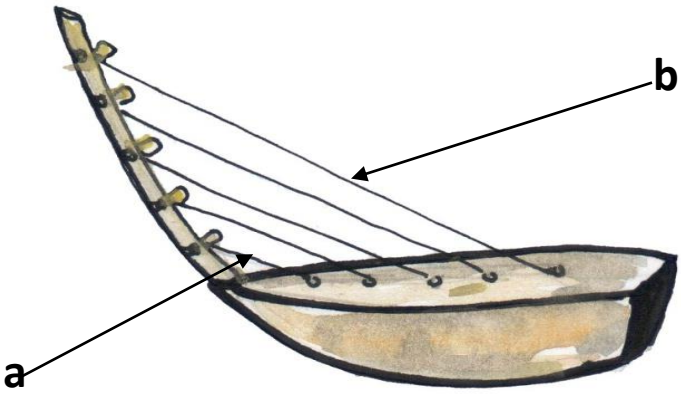
This applies to string instruments.

A long string produces sound with a low pitch because it it produces slow vibrations.

A short string produces sound with a high pitch because it produces fast vibrations.

Therefore, the longer the string, the lower the pitch of sound while the shorter the string, the higher the pitch of sound.

The Adungu/Harp



a= Gives the highest pitch because it is short to produce quick vibrations
b= Gives the lowest pitch because it is long to produce slow vibrations

Exercise

1. What is pitch of sound?
2. Identify any two factors that affect the pitch of sound.
3. How does frequency affect the pitch of sound?
4. Give a reason why a short string may produce high pitched sound than a long one.
5. Give one way of increasing the pitch of sound produced by a guitar.
6. How does a drum produce sound?

Stay home stay safe