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Sound energy

Sound is a form of energy that enables us to hear.

It is caused by vibration of objects

Properties of sound

Pitch is the highness or lowness of sound.

Volume is the loudness or softness of sound

Sound travels fastest in solids, followed by liquids and lowest in gases.

Sound does not travel in vacuum (empty space)

Ways of producing sound

(i) By hitting or beating a drum

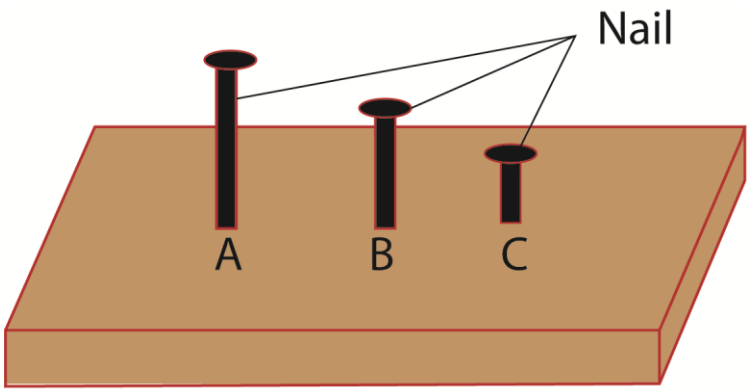


The volume of the drum is determined by how hard one hits the drum

The pitch of the drum is determined by

(a) Tension of the skin: the higher the tension, the higher the pitch

(b) Size of the drum: small drums have high pitches than big drums



When hit C produce the highest pitch

(ii) Plucking like in guitars

Volume is determined by how strong one plucks the string

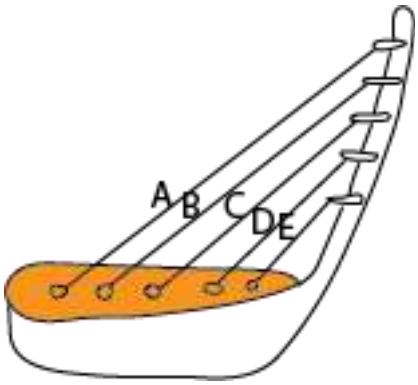
The pitch of the drum is determined by

(a) **Tension of the string:** the higher the tension, the higher the pitch

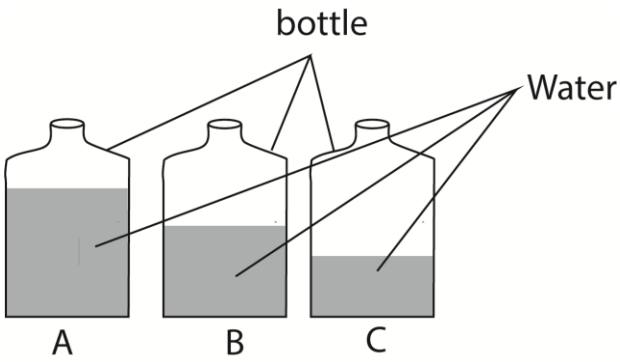
(b) **Size of the size of the string:** the smaller the string the higher the high pitches

(c) **Length of the string:** shorter strings give higher pitch.

For instance in in guitar below string E has the highest pitch and A has the lowest pitch.



(iii) Blowing such as blowing a trumpet, horn, bottles with water and flute



When blown, A produces the highest pitch of sound

(iv) Clapping hand

(v) Playing piano

Importance of sound

Sound and instruments in communication. Examples of special sounds are:

- **Hooting** - a car hoots to mean move out of the way.
- **Ambulance** siren - this generally means move out of the road and let the ambulance pass. There is an emergency.
- **Screaming** - this means something dangerous or exciting is happening.
- **Ringing of a bell** - this means that you are being alerted or reminded that something you are aware of is happening. At school it means it is time to change from one lesson to another. In offices it may mean fire.
- Fire engine siren - the siren means that there is need to move out of the way and let the fire engine proceed to where fire or danger might be. It also means an emergency.

Echo

Is reflected sound

How to reduce echoes in a hall

- Use of blanket on the walls

- Putting ceiling boards
- Thick carpet
- curtains

Means of storing sound

(i) Writing solfa notation

(ii) On devices like memory disc, flush disk, compact disc

(iii) computer

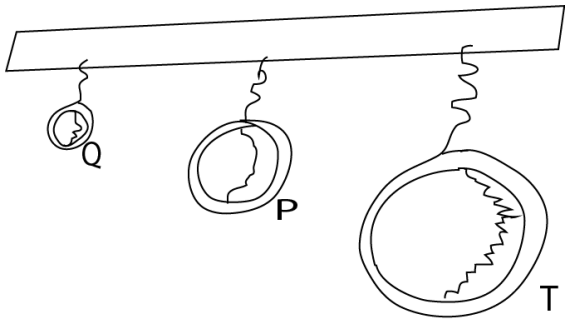
Pollution from sound

Loud sound such as loud music, shouting, industrial noise and screaming irritate the ears of the receiver.

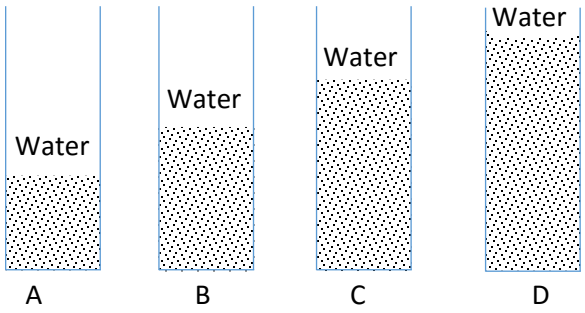
Revision questions and answers

1. How does a flying be produce sound?
   By vibration of its wings
2. When a drum is hit, you hear sound.
   (a) How does the eardrum help you to hear sound?
   It vibrates sending signals to the inner ear.
   (b) There is wax in the outer ear. What is the function of wax?
   To trap dust and foreign matter.
   (c) What is the effect of too much wax in one's ear?
   Blocks the ear canal leading loss of hearing

3. The diagram below shows three metallic rings Q, P, T.



   (a) Which ring will produce:
      (i) Sound of a low pitch? : **T**
      (ii) Sound of a high pitch? **Q**
   (b) Name any two devices that can be used to store sound.
      Sound tapes
      Compact disc
4. The diagram below shows glass tubes of the same size with water at different levels as indicated. Study then and answer the questions that follow.



   (a) If each tube is blown separately, which one will produce

(i) Highest sound **D**

(ii) Lowest sound: **A**

(b) What happens to the sound produced by A if water is increased to the level of the tube D?

The pitch will increase to that produced by D

(c) What happens to the sound produced by each of the tubes if water was replaced by the same quantity of milk?

They will produce sound with the same pitch as those produced with water

5. (a) What enables a drum to produce sound when it is hit with a stick?

By vibration of the skin

(b) Give a clear example that shows that light travels faster than sound.

A lightening is seen before thunder.

(c) State two ways in which sound can be stored.

(i) Compact disc
(ii) On cassettes
(iii) Tape recorder
(iv) On the computer

Susan shouted loudly in a big house, as she shouted, she heard another similar sound.

Answer the questions 6 and 7 using this information.

6. Give the name of the similar sound Susan heard after shouting.

Echo

7. How was the sound you have named in question 31 formed?

Due to reflection of sound waves

8. What causes an echo?

Reflection of sound waves

9. (a) How does a guitar produce sound when its string is plucked?

By vibration

(b) How can the pitch of a guitar be changed?

- by tightening the string

- by loosening the string

- by increasing the thickness of the string

(c) Name one way of storing sound.

On the compact disc (CD)

Through tape recorder.

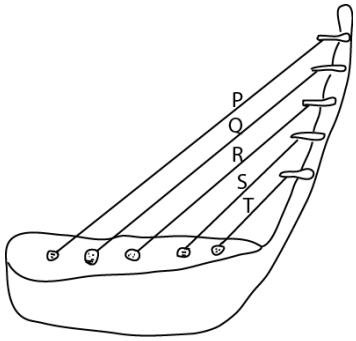
(d) Give a reason why sound cannot travel through a vacuum.

There no matter to vibrate

10. Mary shouted in a big house and she head the same sound repeated. Name the repeated sound she heard.

Echo

11. State **one** way in which echo can be reduced in a hall.
    - **Use of blanket**
    - **Putting ceiling boards**
    - **Thick carpet**
    - **curtains**
12. The diagram below shows a well-tuned musical instrument. The string P, Q, R,S and T are of uniform thickness. Use it to answer the question that follows

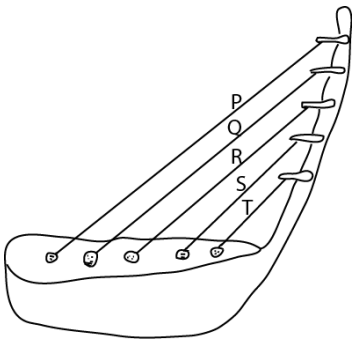


(a) Which string produces sound of the highest pitch?

T

(b) Give a reason for your answer in (a) above
It is the shortest.

13. The diagram below shows a well-tuned musical instrument. The string P, Q, R,S and T are of uniform thickness. Use it to answer the question that follows



Why does string T produce sound of the highest pitch?

Because it is the shortest, the shorter the string and the tighter the string the higher the pitch.

14. (a) apart from using solfa notation, mention any other ways of storing sound
    (i) On computer
    (ii) On memory cars
    (iii) On compact disc

    Name two instrument used to reproduce the sound stored by solfa notation

    Piano

    Guitar

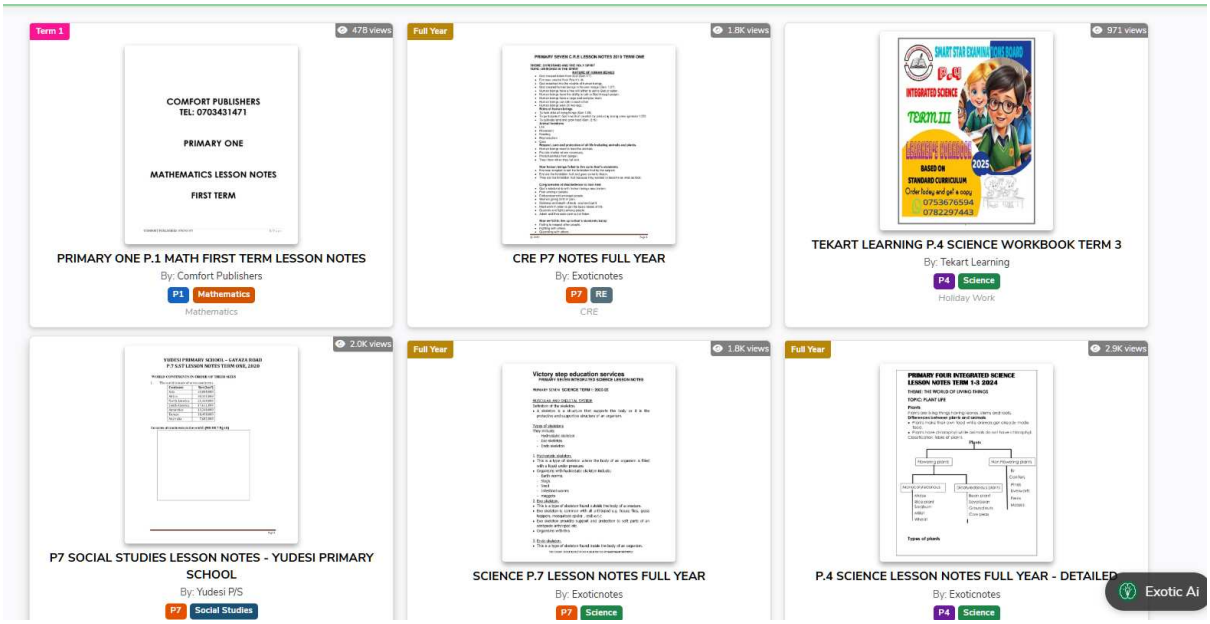
15. What would you do to a guitar string to make it produce a high pitched sound

    Increase the tension of the strings

16. State any one reason why animal make sound.
    To communicate
    To express pain
    To lure opposite sex into sex intercourse
17. How is a reflected sound helpful to sailors
    To detect obstacles

Thanks

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