

Self – Study Pack

- Subject - Science
- Grade - Grade 7
- Term - 2nd Term
- Unit - Sound
- Learning outcomes –
 - Explains that sound is generated by vibration
 - States that a medium is necessary for the propagation of sound.
 - Explains that the speed of sound is different in different media.
 - Generate sound by vibrating suitable objects.

Activity 1 – Let us listen to the sounds in the surrounding.

- Go to an open place outside the house.
- Close the eyes and listen to the sounds in the surrounding.
- Make a list of sounds that you listened to

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Activity 2 – Let us classify sounds. (Recalling Grade 6 knowledge)

Classify sounds in the above list as follows.

Natural sounds	Artificial sounds

Sounds generated naturally are called **natural sounds** and sounds produced by man are called **artificial sounds**.

Music	Noise

Sounds produced to a rhythm are called **music** and sounds produced without a rhythm are called **noise**

✓ **Sound is a kind of energy that produces the sensation of hearing.**

How do the sounds mentioned by you generate?

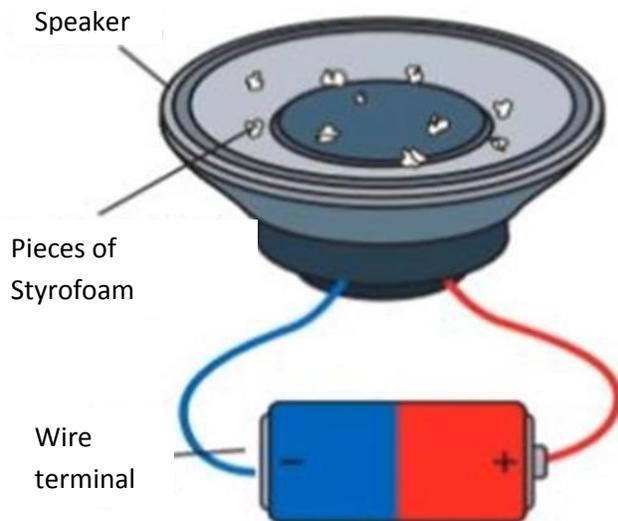
Ex: - Sound of wind – By motion of air

Sound of vehicles - By contacting tires of vehicles with the road/ rubbing of parts of vehicle engine

Activity 3 – Let us investigate how sound is generated

- Sound is always generated due to back and fore motion, if not vibration of something.
- At the same time sound waves too, have the ability of vibrating something.
- Collect the following things from your home and engage in the activity given below.

3.1



Do you know?

The diaphragm of the speaker vibrates according to the electric signals received by it.

By this method, the speaker amplifies sound waves.

Method: -

- Connect a dry cell to a speaker.
- Keep small pieces of paper or Styrofoam on the diaphragm of the speaker.
- Now disconnect and connect the wire attached to the dry cell several times and observe.

Observations: - Write down your observations.

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3.2

Method: -

- Take somewhat large speaker at your home.
- Arrange a way to supply electricity and sound to the speaker and keep it horizontally in the way that its diaphragm is up.
- Take some water into a glass container or a saucer which is approximately equal to the size of the diaphragm of the speaker. Keep it on the diaphragm of the speaker.
- Now supply music to the speaker.
- Observe the water container.



Speaker



water container

Observations – Write down your observations.

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3.3



Method -

- Put a dice into a balloon. Inflate the balloon. Tie the opening of the balloon and shake it.

Observations – Write down your observations.

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3.4



Method

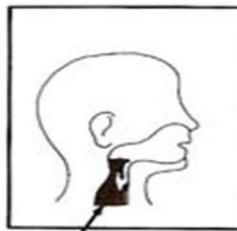
- As shown in the diagram, keep fingers on your throat (larynx).
- Pay your attention to what you feel with your fingers while producing a low sound.
- Then gradually increase the volume of sound you produce and pay attention to what you feel with your fingers.
- Record your observations.

Observations –

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Do you know?

- ▶ In human, voice is produced,
- ▶ By vibration of vocal cords in the larynx,
- ▶ When air (exhale air) is made to pass through the slit of,
- ▶ The vocal cords.



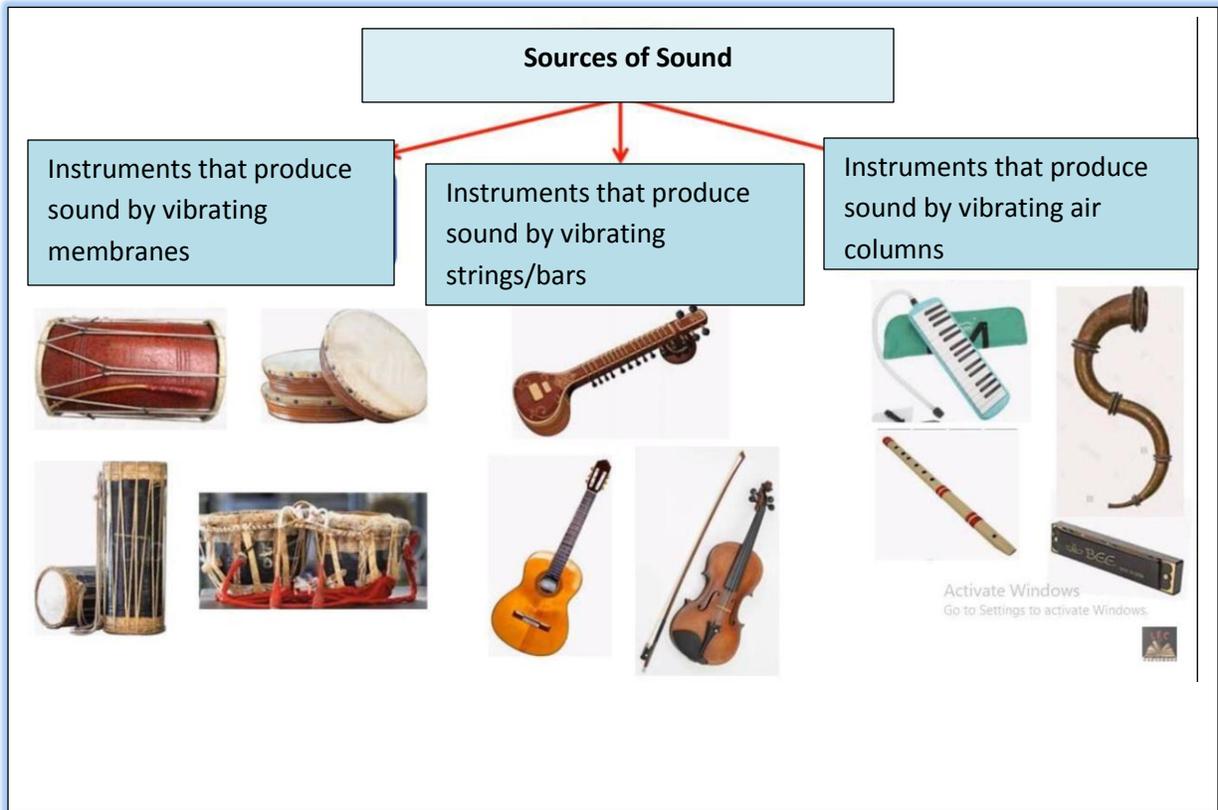
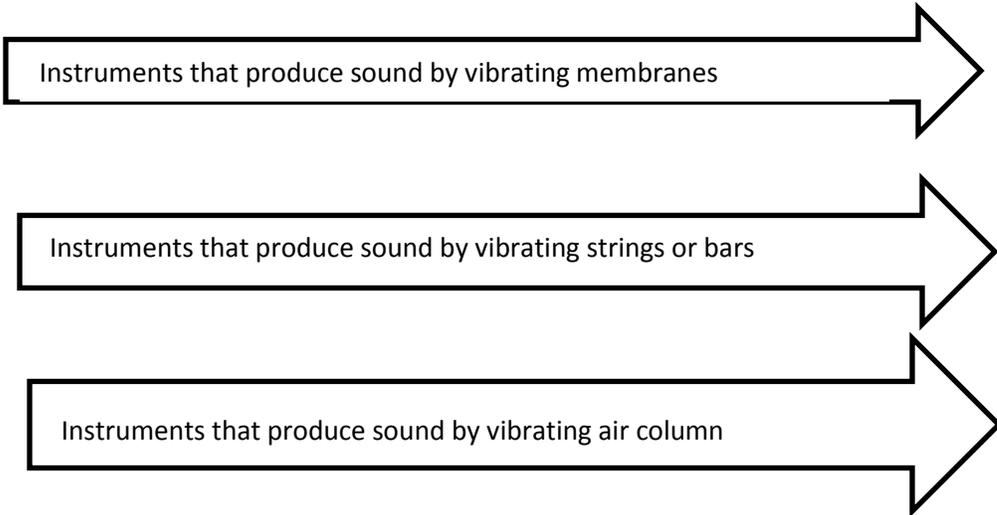
Vocal cords



According to all activities given above, it is clear that sound is produced by vibrating something.

Activity 4 – Let us investigate the instruments that produce sound.

- Instruments that produce sound are called sources of sound.
- Sources of sound are classified according to the part that vibrates when producing sound.



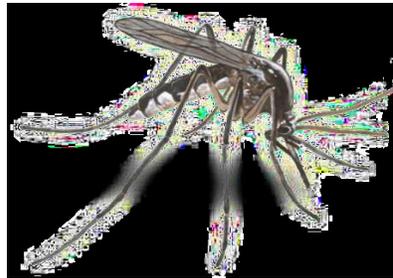
- Classify following instruments according to the way that they produce sound.

Drum flute Serpina cymbal conch shell violin guitar sitar
 Mouth organ Tabla trumpet

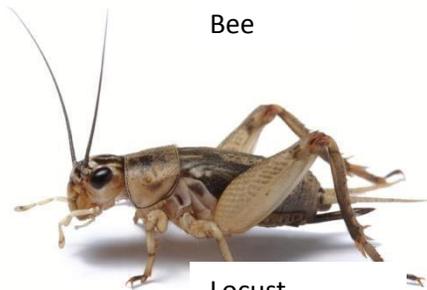
Vibrating Membrane	Vibrating Strings/bars	Vibrating air column



Bee



Mosquito



Locust



Grasshopper



Cricket/cicadas

- Mention how each of the above animals produces its characteristic sound.

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Compare your answers with the facts given below.

- **Mosquitoes – produce sound by fast motion of their wings while flying**
- **Grasshoppers- Produce sound by rubbing the bristles on their legs**
- **Cicadas/Crickets– Produce sound by vibrating a special membranous structure in their body**
- **Locusts – Produce sound by rubbing their wings together.**
- **Bees – Produce sound by fast motion of their wings**

Activity 6 – How does sound propagate?

6.1

Can sound propagate without a medium (through vacuum)?

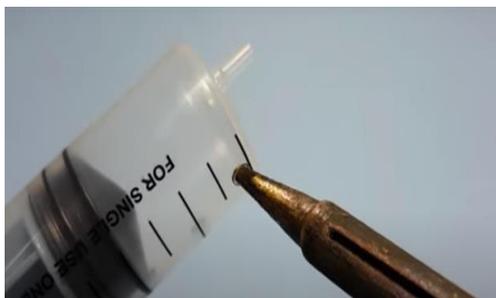
- A vacuum pump is necessary for this activity.
- How to make a vacuum pump at home?

Things needed: - three bicycle valves, a big syringe, a somewhat large glass bottle with a lid (jam bottle), a somewhat long plastic/rubber tube with the diameter equal to that of bicycle valves



Method: -

- 1) Make a hole at the side of the syringe as shown in the diagram and fix a bicycle valve to that hole and seal around it.



- 2) Fix the other valve to the place where the needle of syringe is fixed. Be careful to fix the valves in the correct direction. Use a piece of tube in order to fix the valves properly.



- 3) Pierce the bottle lid and fix the remaining valve to it. Insert one end of the plastic/rubber tube to that valve and seal it.



- 4) Now fix the other end of the rubber/plastic tube to the syringe. Now you have a vacuum pump.

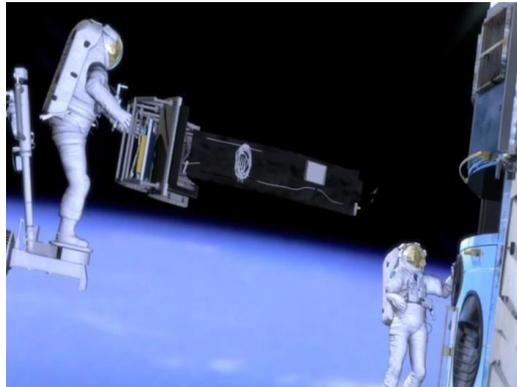


- Now put something that produce sound into the bottle of the vacuum pump you made. (a small phone, part of a toy etc.)
- Now gradually pull out the piston of the syringe.
- What happens to the sound emitted by the instrument when the piston is pulled out several times?
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- You will realize that the intensity of sound emitted by the source of sound gradually decreases when air is removed.

✓ **Conclusion – Sound cannot propagate through a vacuum.**

- Do you know?

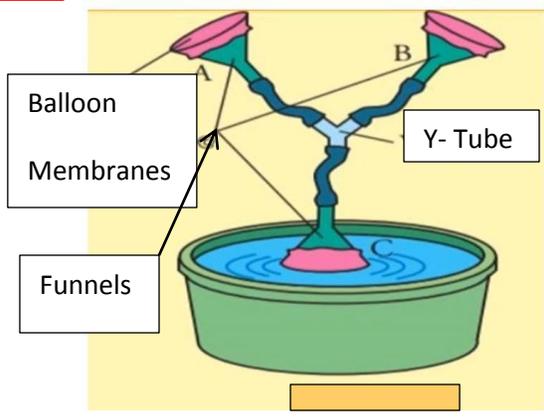
Astronauts cannot hear sounds in the space. Thus, they find it difficult to communicate with each other. Therefore they use special devices to communicate in the space.



6.2 Does sound propagate through air?

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- Give an example to confirm it.
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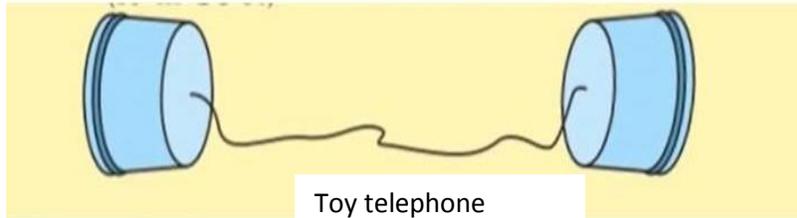
6.2 Does sound propagate through water?



Method –
As shown in the diagram, make a toy stethoscope. Keep one funnel of it in a water basin and the other two funnels to the ears. Put your hands into the water basin and shake water in it. Can you hear a sound?

6.4

Does sound propagate through solids?



Make a toy telephone with two yoghurt cups and a piece of thread.

Engage in a conversation with a friend at somewhat distant place using the toy telephone.

Do you hear the person in the other end?

Observations –

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- ✓ **By above activities you can understand that sound propagates through air, liquids and solids.**
- ✓ **Sound needs a medium for propagation.**

The speed of propagation of sound is different in solid, liquid and gaseous media.

Speed of sound is highest in solid media. Speed of sound in liquid media is less than that of solid media and it is lowest in gaseous media.

Assessment

- 1) Give examples from day today life instances for propagation of sound in solid, liquid and gaseous media.
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- 2) Why do you see light first and hear sound later when it is lightning and thundering though they both occur at the same time?
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- 3) A flute produces sound by vibrating
- 4) Sound is produced by something.
- 5) The highest speed of sound is in medium.

Summary

