

## Worksheet 1: Sound | Lower Secondary Stage (6-8)

1<sup>st</sup> Semester | 2023-2024

Name: **Key**

Subject: Physics –  
Chapters 3,13: Sound  
Class: 6 CS

Date:

Objectives:

- To use a variety of objects to make sounds.
- Describe how sound waves are produced and how they travel.
- Identify wavelength, amplitude, and frequency.

### Activity 1:

**Materials Required:** You will need **tuning forks** of different sizes, a beaker of water.

### Procedure:

1. Hold a tuning fork by its stem and hit the edge of a surface firmly. What is happening to the tuning fork?

..... **It vibrates** .....

2. Fill a beaker with water. Hit the tuning fork with the edge of the table, and put it in the beaker. What happens?



**When the vibrating fork just touches the water, the kinetic energy is transferred into the water causing a small amount of water from the top to fly out of the beaker**

## Activity 2:

### Materials Required:

- A loudspeaker, with the cone exposed and facing upwards, connected to a signal generator.
- Very light polystyrene balls.

### Procedure:

1. Switch on the signal generator. Watch the loudspeaker carefully. What do you notice?

The balls vibrated and moved up and down on the cone of the speaker.

2. Change the loudness control on the signal generator so that the sound is louder. What do you notice?



The balls vibrated more and some of them flew out of the cone.

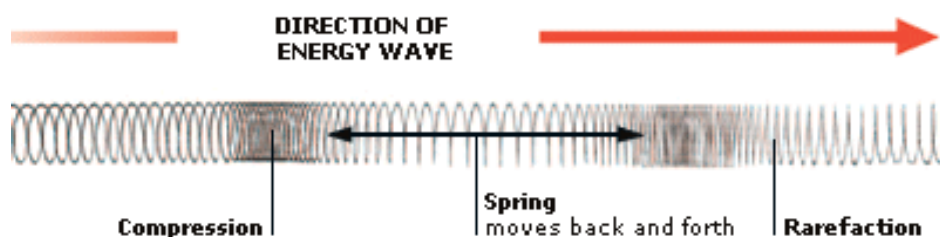
## Activity 3:

- **Materials Required:** A Slinky Spring.

### Procedure:

Hold the **slinky spring** from both ends and move your hands forward and backward. What do you observe?

The coils of the spring move closer together then further apart.

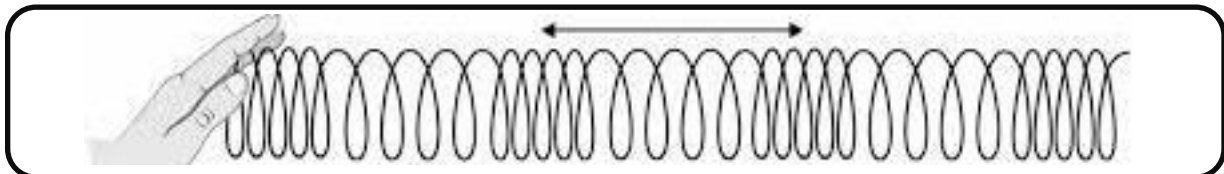


**Questions:**

Question 1:

You cannot see a sound wave moving through the air but you can model it with a slinky spring.

- a. Draw a diagram of a wave on a slinky.



- b. There are places where the coils are close together.

What is that called in a sound wave? **Compression**.

- c. There are places where the coils are far apart.

What is that called in a sound wave? **Rarefaction**.

Question 2:

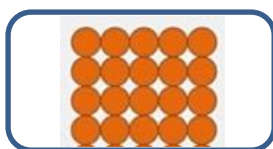
- a. How can we measure the loudness of sound?

**Using a Sound Level Meter** .....

- b. Which unit is used to measure the loudness of sound? **(Decibel dB)**.

- c. Sound has different speeds in different materials.

1. Draw diagrams of the particle arrangements in a solid, liquid, and gas.

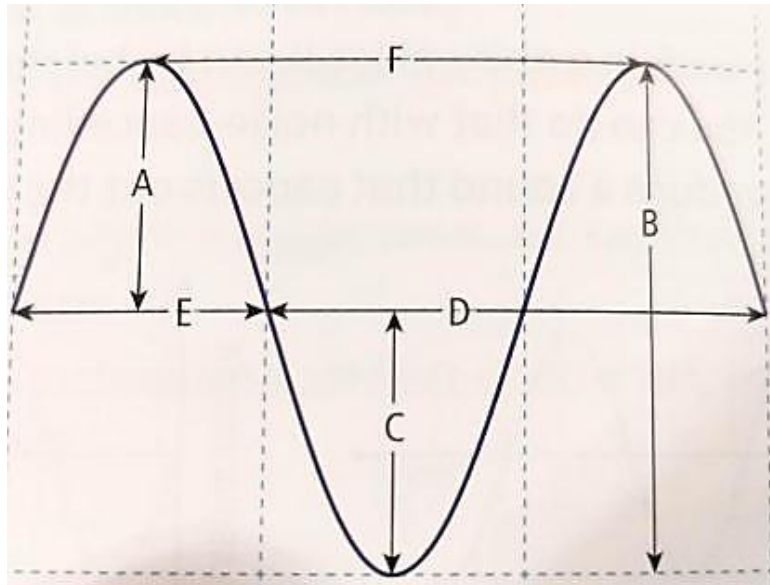


2. Use the diagrams to explain the different speeds in different materials.

**The particles in a solid are closer together, so the vibration is passed on more quickly than in liquids and gases.**

Question 3:

Study the arrows on the diagram below. Tick the correct columns to show whether each arrow shows the wavelength, the amplitude, or neither.

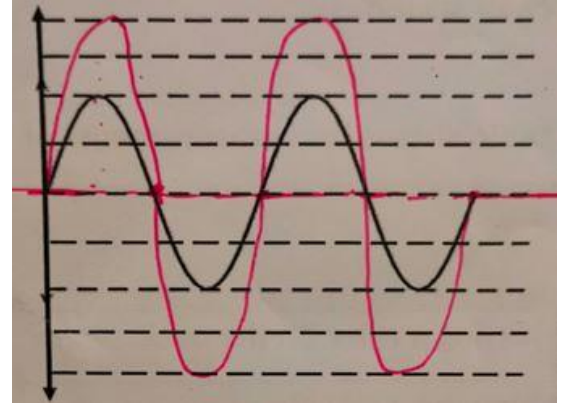


Arrow	Wavelength	Amplitude	Neither
A		✓	
B			✓
C		✓	
D	✓		
E			✓
F	✓		

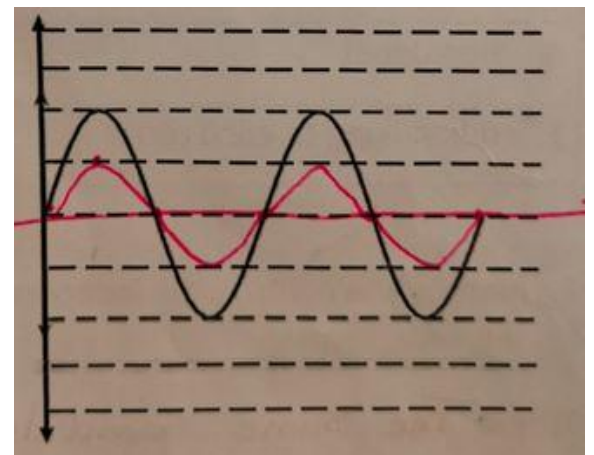
Question 4:

Given this sound wave:

- a) Draw a sound wave that is **twice louder than the following wave with the same frequency.**



- b) Draw a sound wave that is **half the loudness of the following wave with the same frequency.**



Question 5:

State whether each of the following statements is true or false:

	Statement	True/ False
1	The audible sound by humans is from 20 Hz to 2000 Hz.	F
2	A high-frequency sound has a shorter wavelength than a low-frequency sound.	T
3	The amplitude determines whether a sound is low-pitched or high-pitched.	F
4	Whales use echoes to locate their prey.	T

**Question 6: Investigating the loudness of sound:**

Hashem used a sound level meter to measure the volume of different sounds. He held the sound level meter exactly the same distance away from each source of sound.

The table shows his measurements of the volume of each sound:

Source of sound	Sound level (dB)	Distance from source (m)
Hitting a ruler on the desk	50	5
Blowing a whistle	85	5
Shutting the door	70	5
A noisy street	90	5
Friends talking to each other	60	5

1. Identify the control, the independent, and the dependent variables in this investigation.

Control: **The sound level meter, the distance from the sound source.**

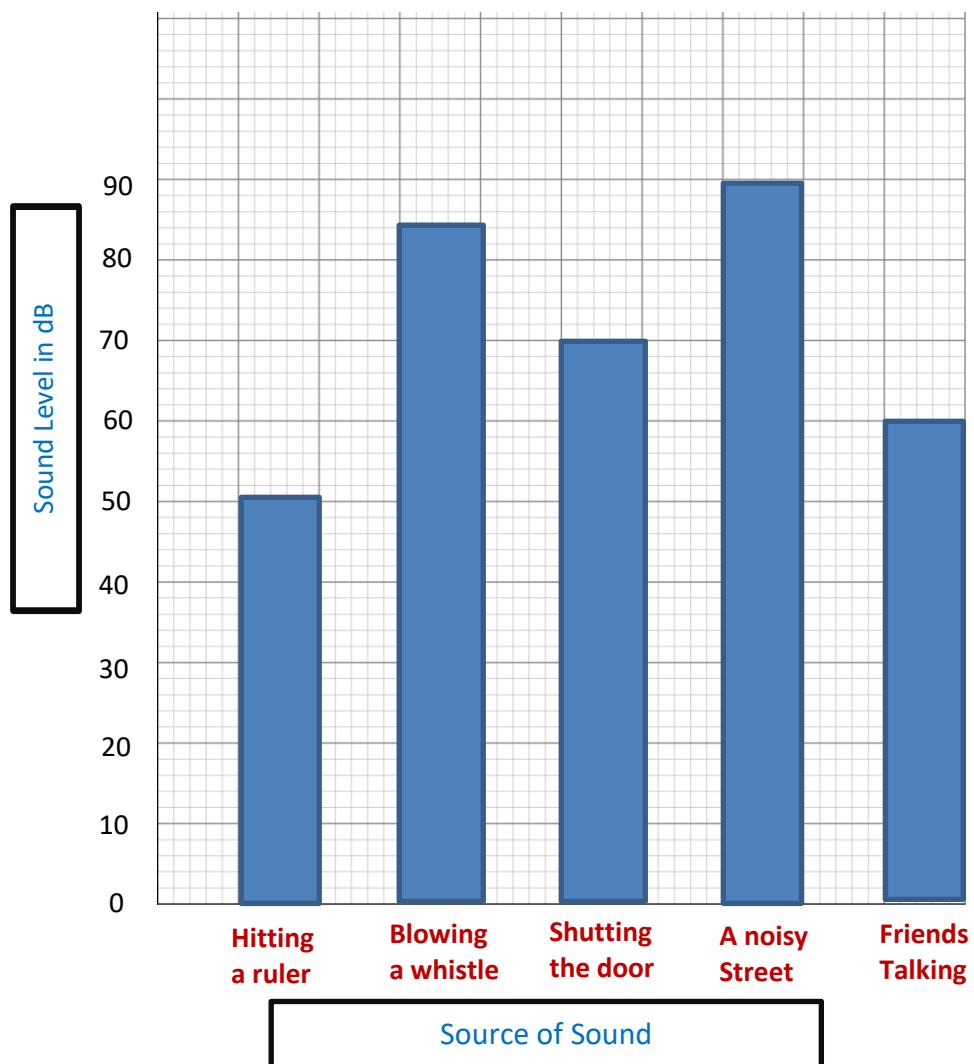
Independent Variable: **\_\_\_ The source of the sound. \_\_\_\_\_.**

Dependent Variable: **\_\_\_ The sound level. \_\_\_\_\_**

2. Describe two ways in which Hashem could make the test fair.
  1. **Use the same sound level meter.**
  2. **Take the measurement from the same distance from the source of the sound.**

- Suggest a way Hashem can do to get more accurate results.  
**By repeating the investigation more than once and taking the average reading for each source of sound.**
- Represent the results in a bar chart.

**Investigating the loudness of sound**



- Which sound was loudest? **A Noisy Street.**
- Which sound was quietest? **Hitting a ruler.**

- **Sound absorption:** is the loss of sound energy when sound waves come into contact with an absorbent material such as clothes.

- **Sound reflection:** is the bouncing back of the sound wave after striking a smooth and hard surface such as a wall.

Question 7:

Sanad has an empty room in his house. When he enters the room, he can hear a reflection of his sound.

a) State the name given to the reflected sound.

\_\_\_ **Echo** \_\_\_\_.

b) Which material in the room helped to reflect the sound back?

\_\_\_ **The wall** \_\_\_\_.

c) Suggest a method at which Sanad can reduce the reflected sound.

\_\_\_ **He can put furniture / Curtains** \_\_\_\_.

