The National Orthodox School/ Shmaisani

Subject: Science/ Physics

Name: …… **Key** ………

Worksheet 1: Sound

Unit 3: Sound

Date: …………………..

Grade 6 all sections (CS)

Objectives:

- **To use a variety of objects to make sounds.**
- **Describe how sound waves are produced and how they travel.**

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 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?

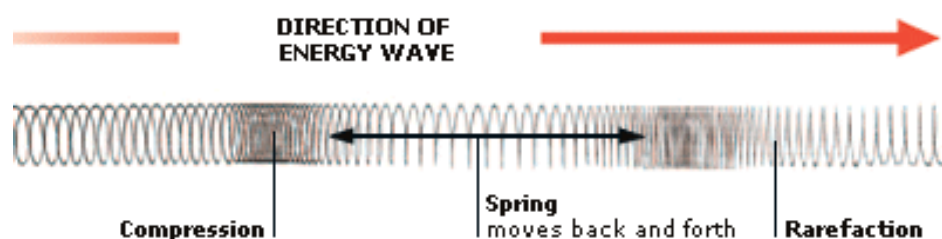   **The balls vibrated more and some of them flew out of the cone.**

Activity 3:

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

Procedure:

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

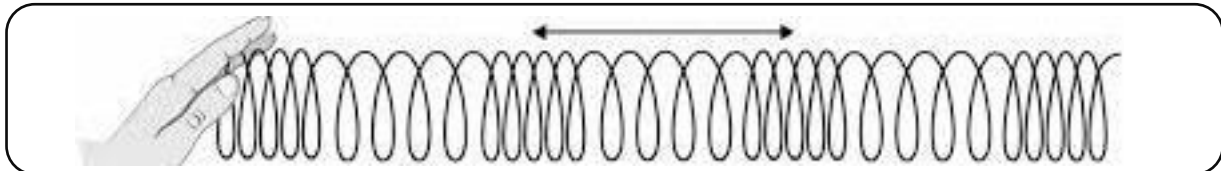   **The coils of the spring move closer together then further apart.**

DIRECTION OF ENERGY WAVE

Compression

Spring moves back and forth

Rarefaction

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**.

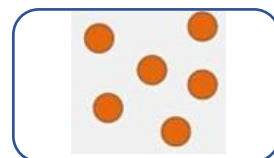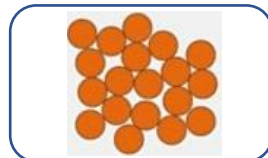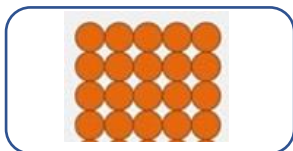Question 2:

    a. How can we measure the loudness of sound?
       Using a Sound Level Meter.

    b. What is the unit of the loudness of sound?
       (Decibel dB).

    c. Sound has a different speed 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 liquids and gases.

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	70	5
Blowing a whistle	85	5
Shutting the door	90	5
A noisy street	100	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 sound.**

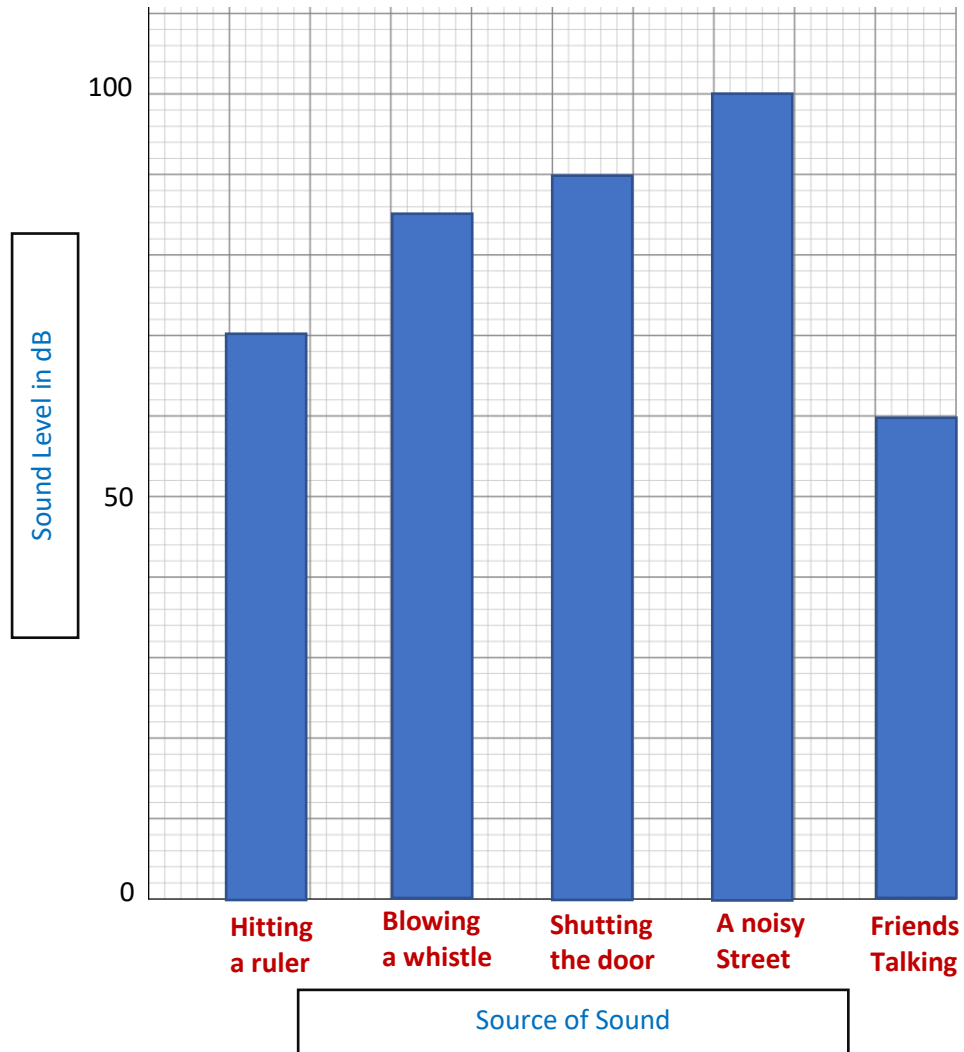Dependent Variable: **The sound level.**

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 sound.**

3. How could Hashem get more accurate results?

By repeating the investigation more than once and taking the average reading for each source of sound.

4. Draw the results in a bar chart.

Sound Level in dB	(vertical axis, marked 0, 50, 100)

Bars: Hitting a ruler, Blowing a whistle, Shutting the door, A noisy Street, Friends Talking

Source of Sound

5. Which sound was loudest? **A Noisy Street**

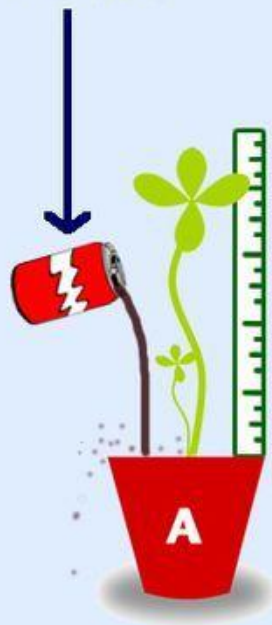6. Which sound was quietest? **Friends Talking**

Types of Variables

Independent

The one thing you change. Limit to only one in an experiment.

Example:
The liquid used to water each plant.

Dependent

The change that happens because of the independent variable.

Example:
The height or health of the plant.

Controlled

Everything you want to remain constant and unchanging.

Example:
Type of plant used, pot size, amount of liquid, soil type, etc.

Independent Variable

Dependent Variable

Controlled Variables

A

B

C