Speed of Sound Lesson Worksheet

**LESSON OBJECTIVES:**

* Understand the relationship between sound characteristics (amplitude, frequency) and wave properties.
* Conduct an experiment to measure the speed of sound using practical tools.
* Analyse data to understand how sound waves behave in different conditions.

# Fill in the blanks

1. The speed of sound, like all waves, depends on the \_\_\_\_\_\_\_\_\_ through which it travels. Sound travels fastest in \_\_\_\_\_\_\_\_\_ and slowest in \_\_\_\_\_\_\_\_\_\_.
2. Louder sound leads to a larger \_\_\_\_\_\_\_\_\_\_.
3. Higher frequency of sound means a higher \_\_\_\_\_\_\_\_\_\_.

Amplitude, Solids, Pitch, Medium, Gases.

# Experiment Setup

**Equipment:**

* Smartphones or tablets with the Arduino Science Journal app installed
* Wooden blocks (for creating sound)
* Trundle wheel or measuring tape (for measuring distance)
* Stopwatch or timer (optional, if not using the app’s built-in timer)
* Worksheet for recording data

**Variables:**

* Independent Variable: Distance from the sound source to the wall
* Dependent Variable: Time it takes for the sound to return as an echo
* Controlled Variables: Type of sound, environmental conditions (e.g., wind, temperature)

**Method:**

1. Set Up: Use the trundle wheel or measuring tape to measure and mark distances (e.g., 30m, 50m, 75m) from a solid wall.
2. Recording: In your group, have one student use the wooden blocks to create a sharp sound. Another student will use the Arduino Science Journal app to record the sound and the echo.
3. Measure Time: The app will display the sound wave and record the time it takes for the echo to return. Repeat this process 5 times for each distance.
4. Data Collection: Record the distances, times, and sound wave screenshots in the worksheet.

**Questions**

1. How far did the sound travel in each experiment?
2. Work out Speed = Distance/Time for each point, using the mean of the measured times

|  |  |  |  |
| --- | --- | --- | --- |
| Distance |  |  |  |
| Time |  |  |  |
| Speed |  |  |  |

1. What changes with time?
2. Plot a graph with distance and time, do you notice a similar pattern?