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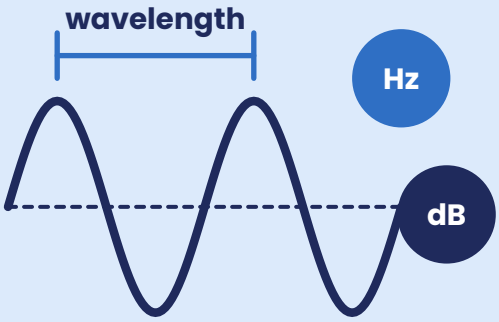

Year 9 • KS3 Physics

Waves & Sound

Homework Worksheet

Practise wave properties, the wave equation, pitch, loudness, echoes and hearing.

Wavelength **Frequency** **Amplitude** **Pitch** **Loudness** **Echoes**

KEY IDEAS IN THIS WORKSHEET **YEAR 9**

Name: _____ Class: _____

Date set: _____ Date due: _____

What's inside

Section A	Wave basics	**10 marks**
Section B	Sound	**14 marks**
Section C	Pitch, loudness and hearing	**14 marks**
Section D	Protecting hearing	**2 marks**

Instructions

- Answer all questions in the spaces provided.
- Show your working in calculations.
- Marks for each question are shown in [ ].
- Use the word boxes and diagrams to help you.

Total score

/ 40

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Waves and Sound Worksheet

Year 9 • KS3 Physics • Wave properties, sound, pitch, loudness, echoes and hearing. Show your working in calculations.

Section A Wave basics [10 marks]

Word box amplitude | wavelength | frequency | hertz (Hz) | transverse | longitudinal

1 Use words from the box to complete the sentences.

(a) The distance from one crest to the next crest is the ..... . [1]

(b) The number of waves passing a point each second is the ..... and is measured in ..... . [2]

(c) The maximum height of a wave from the rest position is the ..... . [1]

(d) In a ..... wave the vibrations are at right angles to the direction of travel, for example light. In a ..... wave they are parallel to the direction of travel, for example sound. [2]

2 State what a wave transfers and what it does **not** transfer. [2]

.....

.....

3 Use wave speed = frequency × wavelength to calculate the speed of a wave with frequency 50 Hz and wavelength 6.0 m. [2]

.....

wave speed = ... m/s

Section B Sound [14 marks]

4 Explain how sound travels from a drum to your ear. [4]

.....

.....

.....

.....

5 Explain why sound cannot travel through a vacuum. **[2]**

.....

.....

6 Complete the table to explain the speed of sound in each material. **[3]**

Material	Speed (m/s)	Explanation
Air	about 330	
Water	about 1500	
Steel	about 5000	

7 You see lightning and hear the thunder 6 seconds later. The speed of sound is 330 m/s. Calculate how far away the storm is. **[3]**

.....

.....

distance = ... m

8 Explain why you see lightning before you hear thunder. **[2]**

.....

.....

Section C Pitch, loudness and hearing [14 marks]

9 Complete the table. **[4]**

Wave property changed	Effect on the sound
Higher frequency	
Larger amplitude	
Lower frequency	
Smaller amplitude	

10 Describe how an oscilloscope trace would look for a quiet, high-pitched note compared with a loud, low-pitched note. **[3]**

.....

.....

.....

11 The normal range of human hearing is 20 Hz to 20 000 Hz. What name is given to sound above 20 000 Hz? Give one use. **[2]**

.....

.....

12 Describe how an echo is formed. **[2]**

.....

.....

13 A ship sends a sound pulse to the seabed and receives the echo after 0.8 s. The speed of sound in water is 1500 m/s. Calculate the depth of the water. **[3]**

.....

.....

depth = ... m

Section D Protecting hearing [2 marks]

14 Give **two** ways to protect your hearing from loud noise. **[2]**

.....

.....

END OF WORKSHEET **Total: _____ / 40**