

# Sound

Name & Set



1 If a huge meteoroid were to crash into the Moon we would not hear the sound on Earth.

(a) Explain why you would not hear the sound of this collision from Earth.

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[3]

(b) Describe an experiment that could be carried out in a laboratory on Earth to demonstrate your answer to part (a). Draw a clear diagram of the apparatus and label it.

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(c) Describe how you would experience the event if you were standing on the Moon within sight of the point of impact. Explain your answer.

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[3]

2 (i) During a thunderstorm you see the flash of lightning before you hear the thunder that was produced at the same time? Explain this.

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[2]

(ii) What can you conclude about two lightning bolts, *A* and *B*, if the thunder heard from *A* is much later than that from *B*?

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[1]

3 Sound travels as a longitudinal wave. The speed of sound is 330m/s in air at sea level.

(a) Explain what is meant by saying sound is a longitudinal wave?

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[2]

(b) Explain what is meant by the frequency of a sound wave?

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[2]

(c) Calculate the wavelength of a sound wave of frequency 165 Hz.

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[3]

4 (a) People near the finish of a 100 m race notice that the runners start the race before they hear the sound of the starter's pistol. Explain this?

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[2]

(b) Someone standing 160 m from the start of this race notices that the interval between the smoke coming from the starting pistol and hearing the sound is 0.5 seconds. Use this information to calculate the velocity of sound.

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[3]

5 A man standing at some distance from a tall building fires a gun. He hears two shots, one at the moment he fired the gun and the other one  $\frac{2}{3}$  seconds later.

(a) Explain why he hears two shots. Draw a diagram to help your explanation.

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[3]

(b) How far was the man from the building? Sound travels at 330 m/s.

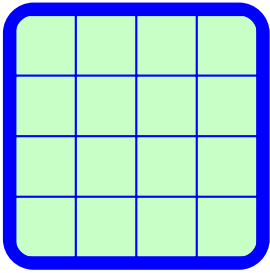
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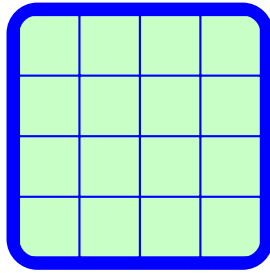
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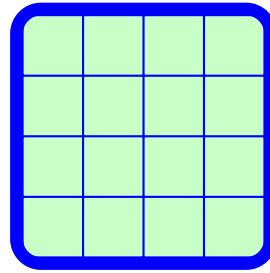
6 Draw diagrams to show the traces that you would see on a CRO when a microphone is connected to it in each of the following situations. 1] x 4



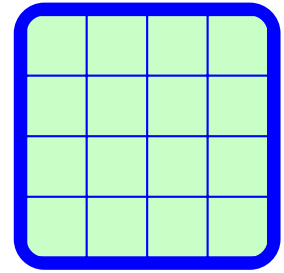
high pitch sound



low pitch sound



loud sound



quiet sound

7 Compare light and sound under the following headings:

	<b>Sound</b>	<b>Light</b>
Speed		
Wave type (transverse/longitudinal)		
A source of this type of wave		
How can it be detected?		
Can it travel through a vacuum?		
Can it travel through water?		
Can it travel through a solid?		
Example of reflection		
Example of refraction		
Examples of t.i.r.		
Example of diffraction		
Example of energy transfer		

8 Noise is now recognised as a critical environmental issue. Like air and water pollution, noise pollution increases with population density. In urban areas, where population density is high, it is a serious threat to the quality of life. Noise-induced hearing loss is a major health problem for millions of people employed in noisy environments. People are also affected in other ways by high levels of noise: noise can interfere with speech, interrupt of sleep and affect concentration.

(a) What do you understand by the term 'noise pollution'?

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[3]

(b) Give three examples of noise pollution. In each case you must say what the source is and how the sound it produces constitutes 'noise pollution'.  
At least one of the examples you give should be of a way in which noise pollution affects you personally. You should also suggest a solution for the problem.

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[3]

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9 Give a detailed description of a situation in which sound is superior or preferred as a method of communication to light.

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