

Nova's Nocturnal Sound Investigation

Learning objective: To understand how sound is produced through vibrations and how these vibrations travel through a medium to the ear.

Read each question carefully. Use your scientific knowledge of sound waves to provide detailed explanations. Remember to use precise terminology.

Word bank: vibration · medium · pitch · amplitude · particles · ear canal · eardrum · frequency

1. Nova is observing a vibrating tuning fork. Explain why the tuning fork produces a sound when struck and why the sound eventually stops. (2 marks)

2. Sound needs a medium to travel. If Max the monkey shouted in a vacuum (a space with no particles), would we hear him? Justify your answer using your knowledge of how sound waves move. (3 marks)

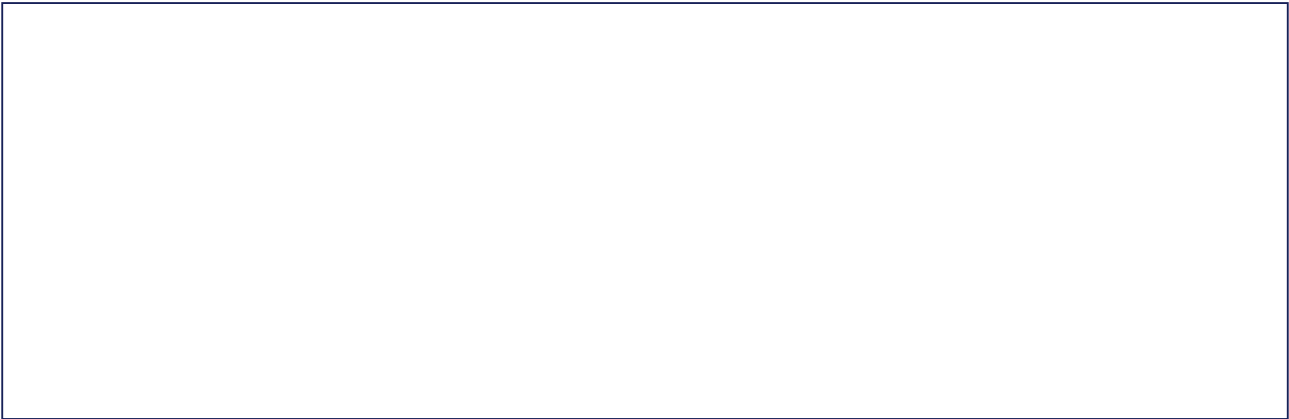
3. Compare and contrast how sound travels through a solid (like a wooden table) versus a gas (like air). Why does sound often travel faster through solids? (3 marks)

4. If you increase the frequency of a vibration, how does this affect the pitch of the sound produced? Use an example of a musical instrument to support your explanation. (2 marks)

5. Describe the journey of a sound wave once it enters the human ear. What role does the eardrum play in this process? (3 marks)

6. What might happen if the amplitude of a sound wave was significantly increased? How would this change the listener's experience? (2 marks)

Draw: Draw a scientific diagram showing a sound wave travelling from a ringing bell to an ear. Label the following: 'vibrations', 'medium (air particles)', and 'eardrum'.



Extension challenge: Design a simple experiment to prove that sound causes vibrations. Write a prediction, a list of equipment, and a step-by-step method. Explain why it is important to keep your test 'fair' by changing only one variable.