

Nova's Night-time Sound Investigation

Learning objective: To identify how sounds are made, associated with some things vibrating, and to understand how sound travels through a medium to the ear.

Read each question carefully and use your scientific knowledge about vibrations and sound waves to provide detailed explanations. Use the word bank to help you construct your answers.

Nova the owl is sitting in the old oak tree listening to the forest at night. She notices that every sound, from the rustling leaves to the hoot of her friends, starts with a movement. She wants to understand how these sounds reach her ears across the dark woods.

Word bank: vibration · medium · particles · pitch · volume · eardrum · sound waves · travel

1. Nova taps a hollow log and hears a low thud. Explain the relationship between the movement of the log and the sound produced. Use the word 'vibration' in your answer. (2 marks)

2. When sound travels from the log to Nova's ears, it must move through the air. How do the air particles behave as the sound wave passes through them? (2 marks)

3. Compare and contrast: How does the pitch of a sound change if the vibration is very fast compared to when it is very slow? (2 marks)

4. If Nova covers her ears with her feathers, the sound becomes muffled. Justify why this happens in terms of the sound waves reaching her eardrum. (2 marks)

5. Explain why sound cannot travel in a vacuum where there are no particles. What might happen if Nova tried to listen to a sound in outer space? (3 marks)

Draw: Draw a scientific diagram showing a sound wave travelling from a vibrating drum towards a pair of ears. Label the 'vibration', the 'sound wave', and the 'medium' (the air).



Extension challenge: Design an experiment to test how different materials affect the volume of a sound. Write a prediction: if you place a ticking clock inside a box lined with cotton wool, what will happen to the sound? Justify your prediction using your knowledge of how sound travels.