

Nova's Nocturnal Symphony: The Science of Sound

Learning objective: To understand how sound is created through vibrations and how these waves travel to the ear.

Read the text carefully and answer the questions below. Ensure your answers are supported by the evidence in the passage.

Nova the barn owl sits silently on her branch, listening to the forest's hidden orchestra. Sound is not magic; it is a physical phenomenon caused by vibrations. When a twig snaps or a leaf rustles, it creates a rapid back-and-forth movement called an oscillation. These vibrations ripple outwards, travelling through the air as invisible sound waves. Unlike light, sound requires a medium—such as air, water, or a solid object—to travel through; in a vacuum, sound simply cannot exist. When these waves reach Nova's ears, they strike her eardrum, causing it to vibrate in sympathy. This mechanical movement is converted into electrical signals, which her brain interprets as a hoot, a rustle, or the patter of rain. To measure how loud a sound is, scientists use decibels. High-frequency sounds produce a higher pitch, while the amplitude of the wave determines the volume. By observing these patterns, Nova understands exactly where her prey is hiding, proving that the world is composed of invisible, rhythmic energy that we translate into the music of our daily lives.

Word bank: vibration · medium · frequency · oscillation · ear canal · eardrum · decibel · amplitude

1. According to the text, what must be present for a sound wave to travel? (1 mark)

2. What happens to the eardrum when sound waves reach it? (1 mark)

3. Explain why Nova cannot hear a sound if she is in a vacuum. (2 marks)

4. Compare and contrast the roles of frequency and amplitude in creating sound. (2 marks)

5. Justify why it is important for a barn owl to have an acute sense of hearing for survival. Use evidence from the text. (3 marks)

Draw: Draw a diagram showing a sound wave travelling from a musical instrument towards an ear, labelling the vibrations and the medium.



Extension challenge: What might happen if the human ear could detect a much wider range of frequencies than it currently does? Write a short paragraph describing how this would change our daily experience of the world.