Year 5 Science Assessment: The Science of Sound

Learning objective: To demonstrate an understanding of how sound is produced, how it travels through different mediums, and how it is detected by the human ear.

Read each question carefully. Use the word bank to support your answers where appropriate. Ensure your explanations are clear and use scientific terminology.

Nova the owl is sitting in the forest at dusk. She notices that when she hoots, the sound travels through the air to reach her friends. Meanwhile, Max the monkey is tapping on different wooden logs to see which ones make the loudest sound, while Pip the caterpillar watches the ripples in a nearby pond caused by a falling leaf.

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

1. Explain how sound is created. Use the word 'vibrations' in your answer. (2 marks)

2. Nova notices that sounds change depending on the distance. Explain why the volume of a sound decreases as you move further away from the source. (3 marks)

3. Max taps a long, heavy log and a short, thin stick. Which will produce a higher pitch? Justify your answer using the concept of frequency. (3 marks)

4. Sound can travel through solids, liquids, and gases. Compare and contrast how sound travels through these three mediums. Why might sound travel faster through a solid than a gas? (4 marks)

5. Describe the journey of a sound wave from the moment it enters the outer ear until it reaches the inner ear. (4 marks)

6. If Max wanted to design a device to dampen the sound of his drumming practice, what materials would he choose and why? Explain your scientific reasoning. (4 marks)

7. Extended Writing: Imagine you are an inventor tasked with creating a 'Silent Room' for reading. Using your knowledge of sound insulation and wave absorption, describe how you would construct the walls, floor, and ceiling to prevent sound from entering. Consider the properties of materials and how they interact with sound waves. (5 marks)

Draw: Draw a diagram showing how sound waves travel from a source (like a bell) to a listener's ear. Label the source, the vibration waves, and the direction of travel.

Extension challenge: Total: /25. Greater Depth Challenge: Design an experiment to test which material is the best sound insulator. Write a hypothesis, identify your independent and dependent variables, and explain how you will ensure the test is fair.