Exploring Pitch: A Scientific Investigation with Nova

Learning objective: To understand how the size, length, and tension of objects affect the pitch of the sounds they produce.

Join Nova the owl in her secret forest laboratory! Use this experiment record to track your findings as you investigate how different materials and vibrations create sounds. Ensure you test a variety of instruments or household objects to observe how pitch changes.

Word bank: vibration · frequency · pitch · oscillation · tension · wavelength · sonorous · audible

1. Hypothesis: Before testing, explain what you believe will happen to the pitch if you change the length of a vibrating string or object. (2 marks)

2. Methodology: Describe the steps you took to test your instrument. How did you ensure your experiment was a 'fair test'? (3 marks)

3. Data Observation: Compare and contrast a high-pitched sound and a low-pitched sound. What physical differences did you notice in the object producing them? (4 marks)

4. Scientific Analysis: Explain why an object that vibrates more rapidly produces a higher pitch than one that vibrates slowly. (3 marks)

5. Justification: If you were building a musical instrument, why would you choose specific materials to create a range of different pitches? (3 marks)

6. Critical Thinking: What might happen if you changed the tension of a drum skin or a guitar string? Predict the effect on the frequency. (2 marks)

Extension challenge: Creative Challenge: Design a 'Forest Orchestra' instrument using only recycled materials found at home. Write a short paragraph justifying how your instrument design allows the player to manipulate pitch to create both deep, rumbling tones and sharp, piercing notes.