



Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Understand: How Sound is Produced
- ✓ Understand: Speed of Sound
- ✓ Understand: Pitch and Loudness
- ✓ Understand: The Decibel Scale

Section A • Concept Check • BEGINNER $4 \times 1 = 4$ _____

- 1 A sound wave has frequency 880 Hz, speed 343 m/s. Find wavelength.

- 2 A sound wave has wavelength 1.7m at speed 343 m/s. Find its frequency.

- 3 Why is the decibel scale logarithmic rather than linear?

- 4 Does sound travel faster in water or in air?

Section B • Problem Solving • INTERMEDIATE $4 \times 3 = 12$ _____

- 5 What physically constitutes the 'compressions' and 'rarefactions' of a sound wave?

- 6 A dog whistle produces a frequency too high for humans to hear. What does this tell you about human hearing range?

- 7 What produces the sound when you pluck a guitar string?

- 8 Why does sound get quieter as you move farther from its source (in open air)?

Section C • Challenge • CHALLENGE $2 \times 2 = 4$ _____

- 9 Approximately what is the speed of sound in air at room temperature?

- 10 Why does thunder arrive after lightning is seen, even though they occur at the same moment?

Reflection — the most useful thing I learned: _____

⌘ ANSWER KEY – FOLD OR CUT BEFORE HANDING OUT

1 = $343/880 \approx 0.39\text{m}$ 2 = $343/1.7 \approx 202\text{ Hz}$ 3 = The human ear can detect an enormous range of sound intensities, and a logarithmic scale compresses this huge range into manageable numbers 4 = Water (denser medium transmits sound faster) | 5 = Regions of higher air pressure (compressions) and lower air pressure (rarefactions) as molecules bunch together or spread apart 6 = The whistle's frequency exceeds the upper limit of the typical human audible range (about 20,000 Hz) 7 = The vibrating string pushes and pulls on nearby air molecules, creating sound waves 8 = The sound energy spreads out over a larger area as it travels outward, reducing intensity at any given point | 9 = 343 m/s 10 = Light travels vastly faster than sound, so the flash is seen almost instantly while the sound takes noticeably longer to arrive