

Frequency, Pitch, and Voice

The referee blows a whistle. You hear a high pitched sound. Your friend blows a dog whistle. You hear nothing. Pitch is how high or low a tone sounds. The higher the frequency of a sound wave is, the higher the pitch is. Humans can detect sounds with frequencies between 20 Hz and 20,000 Hz. The frequency of most dog whistles is within the range of 23,000 to 54,000 Hz. Dogs and cats can hear it, but we can't. The voiced speech of a typical adult male will have a fundamental frequency from 85 to 180 Hz, and that of a typical adult female from 165 to 255 Hz. Speech also has overtones at higher frequencies that affect the quality of the sound and make it understandable. Human sound is formed when air passing the vocal cords causes them to vibrate. The length and thickness of the vocal cords determine the pitch. Shorter, thinner vocal cords vibrate at higher frequencies. Muscles in the throat can stretch the vocal cords, enabling people to vary their pitch within a limited range.



Answer the questions below based on the reading above, and on your knowledge of physics.

1. What is pitch? _____
2. What is the relationship between pitch and frequency? _____

3. What is the frequency range for human hearing? _____
4. What is the range of fundamental frequencies for typical adult human voices? _____
5. How is sound produced for speech? _____

6. How do people vary the pitch of their voices? _____

7. What anatomical differences in the vocal cords cause females to generally have higher voices than males? _____

