

Literary Reading - Sound

Did you know that all sounds are caused by vibrations (something moving back and forth)? 15
Actually, three things are necessary for the creation of sound: (1) a source of energy or disturbance, 31
vibrations, and (3) a medium (any solid, liquid, or gas) for the vibrations to travel. The source of 48
energy could be you plucking the string of a guitar, blowing across a reed, or hitting a drum. This 67
disturbance causes the string, the reed, or the drumhead to vibrate rapidly. When a drum is hit, the 85
drumhead vibrates and creates a disturbance in the molecules in the air near it. These vibrations travel 102
through the air (the medium), one particle bumping into another like dominoes, until they reach the ear. 119
If there are no molecules to bump into (no medium), sound waves do not travel. Sound, unlike heat and 138
light, cannot travel through space because space has no medium for it to travel. 152

Sound waves like all waves have four basic properties: amplitude, wavelength, frequency, and speed. 166
Amplitude in a longitudinal wave is a measure of how compressed the medium becomes. High-energy 182
vibrations (hitting the drum harder) cause the molecules to become more compressed. Increasing the 196
amplitude of the wave (intensity) makes the sound louder. Frequency is the number of waves that pass 213
a given point in a second (how fast the medium is vibrating). The pitch (highness or lowness of a sound) 233
that is heard depends on the frequency of the sound wave. Sound waves of high frequency (vibrating 250
fast) have a high pitch, while sound waves of low frequency (vibrating slowly) have a low pitch. The 268
pitch of an instrument changes by adjusting its length or width. The frequency of a vibration of a 286
drumhead, for example, depends on the material used, the size of the drumhead, and how tight it is. A 305
tighter or smaller drumhead would create a higher pitch than a looser or larger drumhead. A guitar 322
string that is tighter, thinner, or shorter will have a higher pitch than one that is looser, thicker, or longer. 342
Therefore, size makes a difference in sound. If the shape and material used in two instruments are the 360
same, then the larger instrument will vibrate with a lower frequency and create a lower pitch than the 378
smaller instrument. 380

You know that air can carry sound, but did you know that sound travels even faster through liquids 398
and solids? Sound waves reflect (bounce off) smooth surfaces just like light reflects off a mirror. We 415
call reflection of sound an echo. Many animals, such as dolphins use reflected sound to navigate, find 432
food, or communicate with each other. 438