Name _____

Date _____ Period _____

Loudness

The higher the amplitude of a sound wave is, the more compressed the particles in a compression are, and the more spread out the particles in the rarefaction are. Sound waves with higher amplitude have higher energy, and are generally perceived as louder. To humans, however, sounds with frequencies between 1,000 Hz and 4,000 Hz are perceived as louder than sound waves with the same energy at other frequencies. Loudness is measured in decibels (dB). The decibel scale is a logarithmic scale based on the ratio of the energy of a sound wave to a reference level at the threshold of human hearing which is 20 micropascals or 0 dB (200 trillionths that of normal air pressure).An increase of 10 decibels refers to a tenfold increase in loudness (10 times as much energy for a sound wave). An increase in loudness from 0 dB to 10 dB is 10 times as loud, while an increase in loudness from 0 dB to 20 dB is 100 times as loud. Hearing damage begins around 85 dB.
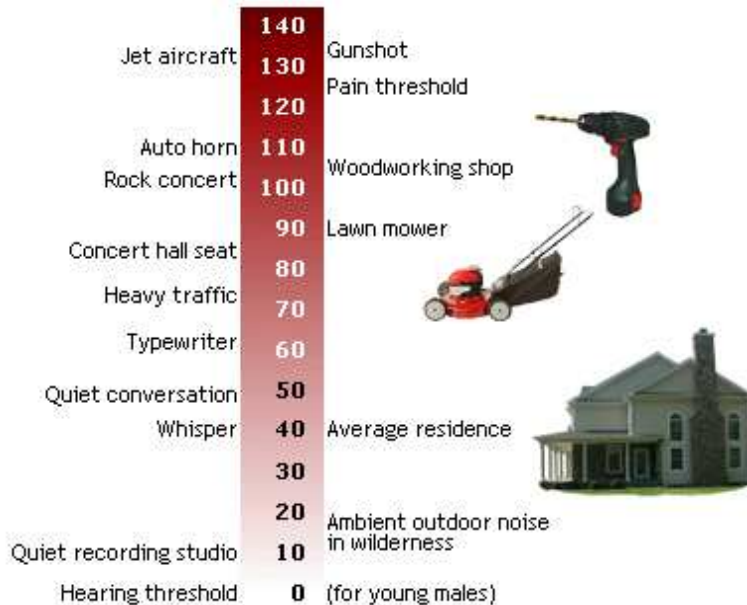
Answer the questions below based on your reading above, and on your knowledge of physics.

1. What are the units of loudness? _____

2. What is the meaning of 0 dB? _____

3. How many times louder is 20 dB than 0 dB? _____

4. How many times louder is a lawn mower than an average residence? _____

5. Why do landscapers wear protective, sound dampening covering over their ears when they mow lawns? _____

_____

_____

6. What would happen to the members of a rock band over time without ear protection. Why? _____

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