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| [Homepage](http://docs.google.com/homepage.htm)  [Abstract](http://docs.google.com/abstract.htm)  [Introduction](http://docs.google.com/introduction.htm)  [Review of the Literature](http://docs.google.com/research.htm)  [Statement of the Problem](http://docs.google.com/problem.htm)  [Hypothesis](http://docs.google.com/hypothesis.htm)  [Materials](http://docs.google.com/materials.htm)  [Procedure](http://docs.google.com/procedure.htm)  [Results](http://docs.google.com/results.htm)  [Recommendations](http://docs.google.com/recommendations.htm)  [Acknowledgments](http://docs.google.com/acknowledgements.htm)  [Daily Log](http://docs.google.com/biolog.htm)  [Images](http://docs.google.com/images.htm)  [Works Cited](http://docs.google.com/workscited.htm) | Page 2  The waves produced by a sound mimic the trigonometric sine function. Sounds that come the closest to sine are a human whistle or the test tone for the Emergency Broadcast System. (10) Most sounds, however, are complex mixtures of many different frequencies. (10) Every note has a series of overtones, just like every sound produces a series of vibrations. When a note is played, the lowest pitched one is called the fundamental, generally being the loudest note also. (10) The overtones of the note are higher in pitch and quieter than the fundamental. If a piano plays a note at 110Hz, then the overtones will sound at 220Hz, 330Hz, 440Hz, 550Hz, 660Hz and continue upward. (10) This orderly pattern is called the harmonic overtone series and states that for a note with a fundamental frequency of xHz, the overtones will be 2xHz, 3xHz, 4xHz, 5xHz, etc. (10) The human ears can't pick out individual tones from this, however. The ears react to the series as a package, incorporating all of the sounds into one tone. (10) Similar to this, human eyes don't look at the color purple and first see the red, and then the blue; the eyes react to the mixture as a whole, interpreting it as purple. Human ears can detect the presence or absence of overtones. Strong upper overtones make the note sound "bright," while if the upper tones are taken out, the produced sound becomes "darker." (10)  When listening to a song, the brain is being bombarded with many different frequencies from each individual note and all of the overtones in each series. In a second, the brain could be sent the signal for millions of individual sounds. All of these sound waves are entering the body vibrating, causing it to vibrate also. The definition stating that music is "ordered sound" can be tested by looking at the wave pattern produced by the sound. If the sound that appears looks orderly and symmetrical, the body will most likely interpret the vibration as a pleasing sound. If the sound looks irregular or out of control, the body will probably interpret the vibration to not be a pleasing sound. (10) The definition can still apply to these types of music, however, since the artist could have deliberately made the music be irregular. Composers, such as Gershwin, have incorporated sounds normally not thought of as music into great work. In "American in Paris," Gershwin incorporates the sounds of the street like car horns and engines. Mahler incorporated animal sounds into many of his compositions. Even "Sleigh Ride," widely played during the holiday season, incorporates the sound of a whip snap and a horse whinny. An American composer John Cage is perhaps the most controversial though because of one of his compositions, called 4'33", named for its length of four minutes and thirty-three seconds. The piece starts and ends exactly four minutes and thirty-three seconds later, but the orchestra doesn't play a single "note"-they have four minutes and thirty-three seconds of rest written on the music sheet. The music consists of all the other sounds in the silence: the shuffling of feet, the rustle of programs, the polite coughs in the audience, the distant sound of traffic or an airplane flying overhead. (8) Whether this is music or not is highly controversial since there are no actual "notes" being played, but the composer has definitely organized his piece in a certain way. The vibrations felt by any sound, be it pleasing or not, music or not, have a definite effect on human beings.  [Next Page](http://docs.google.com/research3.htm) |