

**Greater San Diego Science and Engineering Fair  
2017 PROJECT SUMMARY**

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**Project Title:** Perception of Sound Frequency Ability and the Impact of Region and Age

**Objectives/Goals:** The purpose of this experiment was to conclude which of two regions has the greater hearing ability and why.

**Hypothesis:** Based on the three previous experiments it was hypothesised that at least 10% more of adolescents in America than adolescents in India would suffer hearing losses due to the fact that there was a higher usage of headphones and that at least 5% more of adults in India would suffer a hearing loss (than Americans) due to the fact that India wasn't as clean as India today 10- 20 years ago.

**Methods/Materials:** Juveniles and adults from India and America were tested using an audiometer. All subjects signed a consent form and filled out a data survey before they were tested. Both ears were tested on the required Hz's. The results collected were graphed on audiometric graphs and then compiled on to tables, before results were made.

**Results:** Based off of the tests, 81.25 % American adults suffer hearing disabilities, 77.7 % of Indian adults suffer hearing disabilities, 60.9% of American adolescents suffer hearing disabilities, and 27% of Indian adolescents suffer hearing disabilities. 33.9 % more of adolescents in America suffer hearing losses than in India. 3.55% more of adults in American than adults in Indian suffer hearing losses.

**Conclusions/Discussion:** After a thorough examination, it has been noticed that many American adolescents struggle with hearing low frequencies, but can easily detect high frequencies. The opposite is true for Indian adolescents: they easily detect low frequencies, but struggle to hear high frequencies. This may be connected to earphone usage. Humans speak at frequencies from 85 - 250 Hz. Therefore, American juveniles who overuse their devices, which also work at the same frequencies, might be losing their ability to hear low frequencies as well as Indian juveniles. The same theory works for Indian adolescents however, they are surrounded by high noise pollution, especially from cars. A car horn emits a 400 - 450 Hz sound, and constant noise like car horns can start to deteriorate the ability to hear high frequencies.

**Summary Statement:** This project compares two regions' ability to hear, and from this project, it was determined that American adults and juveniles suffer more hearing disabilities than Indian adults and juveniles.

**Helped Received:** The help that was received was from the mentor of the experimenter, who taught her how to use an audiometer. Her parents

