



**CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY**

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| <b>Name(s)</b><br><b>Paige E. Silong</b>   | <b>Project Number</b><br><b>J2031</b> |
| <b>Project Title</b><br><b>Hear Today, Gone Tomorrow. Comparing Sound Levels: Safe or Damaging?</b>  |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>The objective of my experiment was to test three listening devices at varying volume levels to determine which device would provide the safest sound level for listening to music. I believed that earphones would produce the most unsafe decibel sound levels when compared to headphones and speakers at equivalent volume settings.</p> <p><b>Methods/Materials</b><br/>I downloaded a noise meter app to my cell phone which I used to measure and record sound levels in decibels (dB). I chose three listening devices (headphones, earphones and speakers), three volume settings, and three different songs in three different music genres all sung by female artists. The music was played on my iPod Touch. I ran a total of 27 tests (9 tests for each listening device) in a quiet room where I measured the dB levels of each artist for the first 30 seconds of each song. Once I completed the tests, I used the app to email myself the recorded dB data which I then analyzed and compiled my results.</p> <p><b>Results</b><br/>An excerpt of some of my results at high volume settings of recorded dB levels showed earphones at 94.63 dB, headphones at 97.68 dB, and speakers at 92.58 dB. The Center for Disease Control (CDC) and National Institute of Occupational Safety and Health (NIOSH) has determined that possible hearing damage may occur after a permissible exposure time of only thirty minutes to one hour at 94 to 97 dB.</p> <p><b>Conclusions/Discussion</b><br/>I concluded that my hypothesis was incorrect because of the three compared listening devices (earphones, headphones and speakers), the headphones were the most unsafe device of the three tested. Through this experiment, I also determined which iPod Touch volume level settings produced unsafe levels that could cause possible hearing damage.</p> |                                       |
| <b>Summary Statement</b><br>My project is to test three listening devices at varying volume levels to determine which device provides the safest sound level for listening to music.   |                                       |
| <b>Help Received</b><br>My mom helped me by cutting paper for my board and with the organization of the board. My dad assisted me with using the app necessary to conduct this experiment. My dad also used his excellent computer skills to help me put all the test results into graphs and a result table.  |                                       |