



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Samuel J. Lin	Project Number J1216
Project Title Can You Hear Me Now?	
Objectives/Goals The goal of this auditory study is to evaluate three listening devices to determine which among them creates the highest decibel and vibration levels; thus having the most potential to cause auditory damage.	
Abstract	
Methods/Materials Materials: Pink silicon ear, plastic tubing, dB meter, iPhone 4S, Pair of ear buds, Set of headphones, Pair of iPhone 4S external speakers, Ruler, Bottle of silicon glue, Different types of polyvinylchloride piping, Different types of plastic funnels, Plastic cup, Pair of scissors, Candle lighter, Broom stick, Bass speakers, Container of salt, Bag of small, black balloons, Bag of large, black balloons, Silver marker, Tripods, Bag of rubber bands, 2x4 Lego piece, Salt Crystals Methods: I. After preparations for dB test. A. Ear buds. 1. Plugged ear bud into the ear canal of silicon ear. 2. Played Rock and Roll music 10x for 30s each time and record data. 3. Played Pop music 10x for 30s each time and record data. 4. Played Classical music 10x for 30s each time and record data. B. Headphones. 1. Attached headphone onto the auricle of silicon ear. 2. Proceeded with same steps as steps 2 # 4 in ear bud testing. C. External Speakers. 1. Placed speaker 6 inches away from silicon ear. 2. Proceeded with same steps as steps 2 # 4 in ear bud testing. *I could not fit the second half of my procedure because of character limits. It included Vibration Testing.	
Results The highest decibel(dB) levels that the ear bud reached were 101.5 dB. The highest dB levels that the headphone reached was 97.5 dB. The highest dB levels the external speakers reached was 91 dB. The highest displacement distance that the ear bud reached was 6 mm. The highest displacement distance that the headphone reached was 1.5 mm. The highest displacement distance that the external speaker reached was 0 mm.	
Conclusions/Discussion The results of the testing revealed that the hypothesis was correct: that the ear buds had the highest levels of dB and vibrations, therefore having the most potential to cause auditory damage. If you compare the data on the graphs, the ear bud's graph is significantly higher in decibel and vibration level while the other graphs are much lower.	
Summary Statement My project is a comparison between three listening devices--ear bud, headphone, and speakers--to see which one has the highest decibel and vibration levels therefore having the highest potential to cause auditory damage.	
Help Received Father helped construct framework of project; Mother helped with the color scheme.	