



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Sean Li; Aditi Raju; Alex Shin	Project Number J0317
Project Title Formulating Novel Acoustic Designs for Varying Building Layouts to Absorb Excess Ambient Noise and Increase Productivity	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Unseen and undetectable, noise pollution is a severely unaddressed issue in the world. Yet its effects are widespread, affecting everyone, and significantly dangerous, leading to severe hearing problems, increased heart disease risk, disrupted sleep, and drastically reduced productivity. To combat this issue, the purpose of this project was to formulate a cheap, practical, yet effective novel method of sound insulation for all buildings, that reduced outside noise and sound transmission, improved residents' health and increased productivity.</p> <p>Methods/Materials To construct the prototype, a scaled down version of real-life building structures was built, with the addition of an optimal combination of soundproofing materials, including plywood, fiberglass, stone wool, mass loaded vinyl, drywall, and double pane windows, in a right parallelepiped of dimensions 7x11x13in. The final prototype consisted of two separate identical floors, fastened with nails and glue. The model then was tested with controlled 90 db beeps outside each lateral surface, and a sound meter inside to measure the amount of absorbed sound.</p> <p>Results The resulting sound after passing through the final prototype averaged at 45 db. In other words, it was able to reduce noise transmission by 45 db, which is 33 percent more effective than typical buildings.</p> <p>Conclusions/Discussion Overall, the project was a huge success. With a practical structure, it can easily be implemented into existing or new urban structures and benefit all residents. Made of cheap materials, the prototype's benefits are undeniable. With its effectiveness, practicality, and cheap costs, this novel acoustic method benefits residents and improves health and productivity for all.</p>	
Summary Statement The group formulated a novel acoustic design for building sound insulation that increases resident health and productivity by decreasing noise pollution by 45 db.	
Help Received The group independently created the design after extensive research on acoustics, after which our science teacher reviewed the prototype.	