



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Aarohi Patel	Project Number J2021
Project Title Medicines in Mailboxes: Melting Microorganisms	
<p style="text-align: center;">Abstract</p> <p>Objectives Ordering things online has become an instinct for our generation and mail ordered medications are no exception. When medicine is ordered in the mail especially in the summer the package starts heating up immediately. Living in Bakersfield, triple-digit summers and frequent heat waves make this is a drastic problem. The objective of this project is to build an efficient, economical, and environmentally friendly solution that keeps medicine at the ideal temperature in a mailbox or outside the house.</p> <p>Methods</p> <ol style="list-style-type: none">1) Collect the thermally insulating materials: fiberglass, air, cloth polyester, foam polyester, cotton, cardboard, and styrofoam.2) Create an insulated box by sticking a layer of the thermally insulating material on the sides3) Designate the control box and fill it with brown packaging paper4) Insert the thermometers into the middle of the control and insulated material5) Place the boxes outside6) Leave the boxes outside for 30 minutes7) Check the temperature inside the boxes, record, and repeat <p>Results After a 70-day trial for all the groups, the experimental results showed that fiberglass was the best thermal insulator. Fiberglass stopped the heat transfer from occurring better than any other thermal insulator. Cotton was the second best insulator according to my rating system and the air was the worst.</p> <p>Conclusions The performance of the fiberglass insulation was more effective than other insulators that I tested. This means that fiberglass insulation can provide a reasonable solution that keeps medicine at the ideal temperature when in a mailbox or a hot environment places like Bakersfield. I analyzed and studied temperatures during the summer in Bakersfield and a few other cities. I noticed that there were only a few days during the summer where the outside temperature was ideal for the medicine to be kept in a mailbox or outside. I also studied Bakersfield s hourly temperature during the summer for 2018 from 12 p.m. to 4 p.m. and found out that it was not suitable for the medicine to be kept in mailboxes. I learned that when you place medicine in the heat, the medicine will lose its efficacy and the proteins will degenerate.</p>	
Summary Statement I tested different insulating materials to build an insulated shipping box that keeps medicine at the ideal temperature when in a mailbox or a hot environment.	
Help Received My sister helped me buy all the materials.	