CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY

Name(s)

Nicholas Saldavia

Project Number

J0325

Project Title

Fallen Arches: The Surprising Strength of Eggshells

Abstract

Objectives

I wanted to learn if the strength of an arch decreases as the size of an arch increases.

Methods

Eggshells have a naturally occurring arch shape. I used different sizes of eggshells to test the strength of different sizes of arches. I began with large, extra large, and jumbo eggs. Each egg was cracked, emptied, and the shell was cut in half. I then placed three of the half eggshells on a flat surface and gently stacked books on the shells until a shell cracked. The books were weighed on a kitchen scale to determine the mass it took to break the shell.

Results

I chose three different size eggs to represent three sizes of arches. The egg sizes were large, extra large, and jumbo. I completed five trials on each size for a total of fifteen trials. The large and jumbo eggs were brown and the extra large eggs were white. The large eggs held an average of 10,631 grams, the extra large eggs held an average of 8,984 grams, and the jumbo eggs held an average of 10,346 grams before breaking.

Conclusions

My results did not support my hypothesis. They were inconclusive. There was only a small difference in the mass each of the eggshell sizes could support. I believe this occurred because the eggshell sizes I tested were too similar in size to make a significant difference in the amount of mass they could support. I did learn that an arch, even made of eggshell, can be very strong.

Summary Statement

I wanted to test the strength of an arch by using the naturally occurring arch shape of an eggshell.

Help Received

I received help from my parents, Sean & Nicole Saldavia, and my teacher, Mrs. Arghavani.