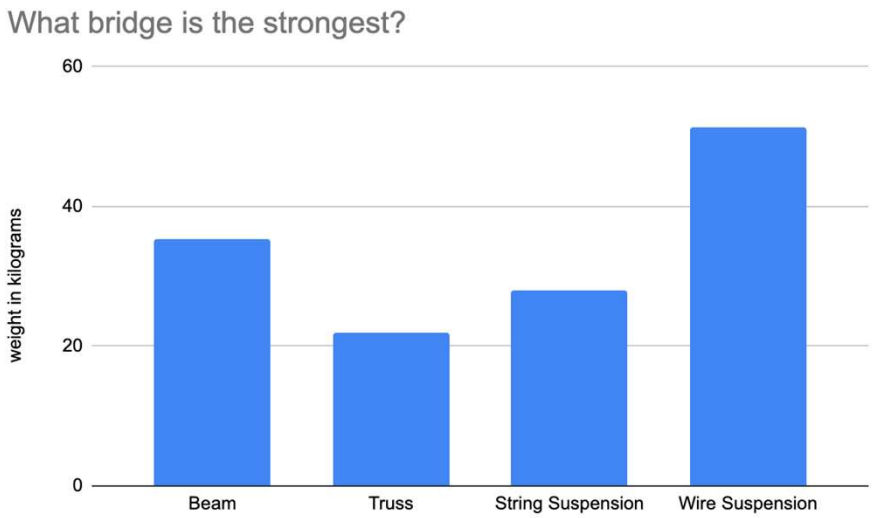
Research Question/Engineering Goal

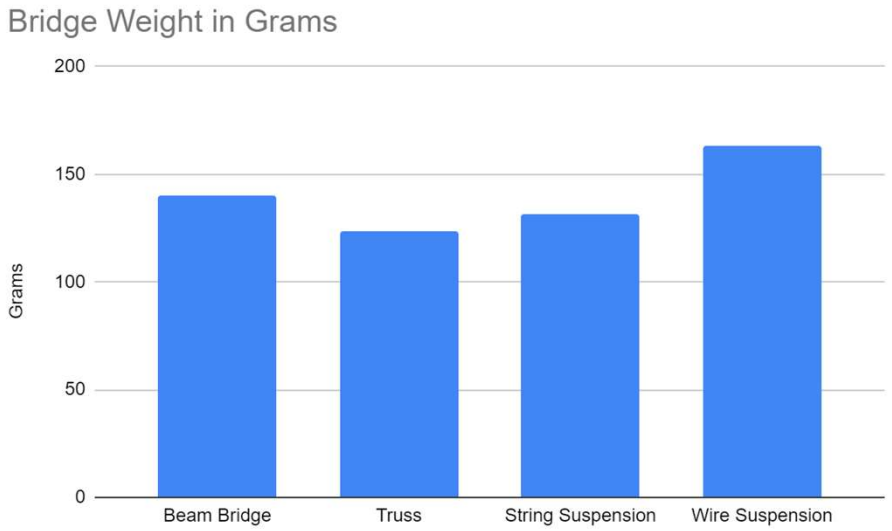
- The purpose of this experiment is to see which bridge is strongest when comparing a suspension bridge, beam bridge, or truss bridge.
- I became interested when I saw different bridges everywhere, which raises the question of what bridge is the strongest and the most efficient.
- Even though engineers have been building bridges for thousands of years, this experiment will help add to the knowledge of engineers all around the world to see what types of bridges they should build.
- The problem that this experiment will solve is the problem of what bridge is the safest and at what distance (one end to another) and why. It is very clear that we do not have a perfect understanding about bridges because they fail all the time.

Methodology/Project Design

- First, I built the three types of bridges.
  - Truss bridge
  - Beam bridge
  - String suspension bridge
  - Wire suspension bridge (the “cable” material was string on one suspension bridge and the other suspension bridge had wire for the “cable”).
- I decided to make two types of suspension bridges out of two different cable materials to see whether it mattered as much as the strength of the wood base.
- The four bridges were put between two sawhorses.
- Weight was applied until the bridges failed completely, and the data was recorded.

Data Analysis & Results

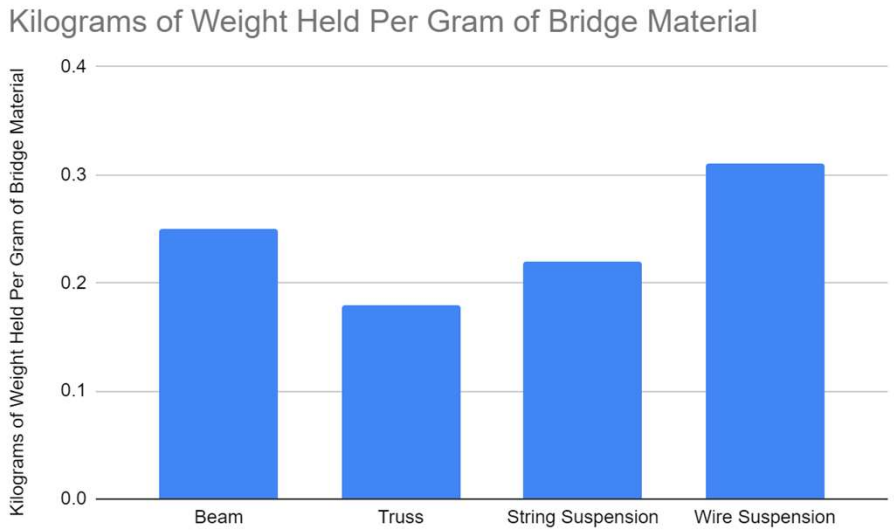




The graph on the top left is showing how much weight each bridge held.

The graph on the top right is showing how much weight each bridge weighed.

The graph on the bottom right is showing how many kilograms of weight for for every gram of material.



Interpretation & Conclusions

- In conclusion, the wire suspension bridge held the most weight. On the other hand, The truss bridge was the weakest.
- The reason the wire suspension bridge broke was because the supports holding the wire up collapsed, but on the string suspension bridge, the string snapped instead of the support towers.
- The string suspension bridge broke because the string broke at the bottom of the support tower. Once one string broke the rest fell.
- I thought that the truss bridge would be the strongest because it had triangle supports which are the strongest shape. As it turned out, the glue broke at all the joints, and it all collapsed.
- The beam bridge broke because it bent and got pulled down too much, so then it snapped in half.
- The truss bridge did not bend at all, but when it collapsed it exploded so I would say that it failed the most catastrophically. The reason it broke was because the pieces of wood pulled out of the glue and then it all sort of exploded.