

STRUCTURAL DESIGN CHALLENGE

Challenge:

- Build an aesthetically pleasing, stable structure with the highest possible structural efficiency.

Review:

- Aesthetics: The properties of an object that make it pleasing to the senses.
- Stability: The level of a structure's ability to maintain its shape and position.
- Structural Efficiency = $\frac{\text{Maximum Mass Supported}}{\text{Mass of Structure}}$

Task:

- You will first design a structure – draw and make notes, one copy per group.
- You will then build your structure – keep the challenge in mind.
- Finally, you will test the structure – see notes below.

Timeline:

- You will have 4 periods to work:
 - Period 1:
 - Discuss the task as a class
 - Form a group of approximately 3 students
 - Design your structure (start build if ready)
 - Periods 2 and 3:
 - Build your structure
 - Period 4:
 - Test your structure
- You may also do work at home in between the periods.

Supplies:

- Several supplies will be available to you:
 - Straws
 - Popsicle Sticks (given 50)
 - White Glue
 - Glue Sticks
- You may bring additional supplies from home, but all structural support must come from popsicle sticks or straws.
- You may also use certain other supplies you can find around the room, provided you ask first.

Criteria:

- Your structure can not be a mass structure.
- The masses must be placed on your structure at a location at least 25cm off the ground.
- Your structure may not be more than 15 cm wide at any part of the base.

Testing:

- You will first weigh your structure.
- You will then put masses on the structure, one at a time, until the structure fails.
- You will be required to document your test results on a worksheet provided.
- There will be a “twist” to the test scenario that you will not be informed of prior to testing; it will have to do with the stability of your structure.

Grade:

- Your grade will be determined as follows:
 - 25 % - Stability Performance
 - 25 % - Structural Efficiency (scaled based on grade 7 average)
 - 25 % - Test Documentation
 - 25 % - Aesthetics (scaled based on class structures)
 - -10 % for each criteria broken or step not followed