

Craft Stick Crane

Objective: The build a crane to hold the maximum amount of torque (load force * horizontal distance)

Materials given: 50 craft sticks, 1.5-meter length of string, 5 mini glue sticks, base for the crane

Tools that can be used in building the crane: two glue guns, scissors, ruler

You are given 50 craft sticks, a 12" x 3 1/2" x 3/4" base, a 1.5 m cable (ordinary household twine or the equivalent), and 5 small glue sticks. You are allowed to attach your crane to any part of the base except the bottom or the 5 cm crossed out part at one end (used for clamping to the testing station). Your cable will have to be attached to your crane in such a way that the load loop hangs below the load lever approximately 5 cm so that the testing device can attach to it. The load lever must extend at least 30 cm from the edge of the base. The crane will also have to be portable so that you can bring it to the testing station.

The crane will be tested by clamping it to the table with the edge of the base lined up with the edge of the table (no overhang) and adding downward force on the hanging cable until failure. Your crane will be considered at failure if any part of it breaks or separates, if any part touches the testing table, or if the load lever extends below the flex limit (10 cm below the top of the base). Your score will be determined by the maximum load before failure and the distance from the base to the cable along the load lever as below.

Score = (maximum load in Newtons) * (horizontal distance from the edge of the base to the hanging cable in cm)

Team Number _____

Team Members _____

School _____

Team Members _____

Circle one: (Middle School) (High School)

Maximum Load: _____(Newtons)

Horizontal Distance of load _____cm

(if it hits any part of the pan target, the predicted distance will be used)

Scoring: The score will be based on the maximum torque held by the crane:

$$\text{Score} = \text{Maximum Load Force} * \text{Horizontal Distance of load}$$

Scoring: The highest raw score will receive 100 points, and the remaining scores will be proportional.