


MESA Prosthetic Arm Competition



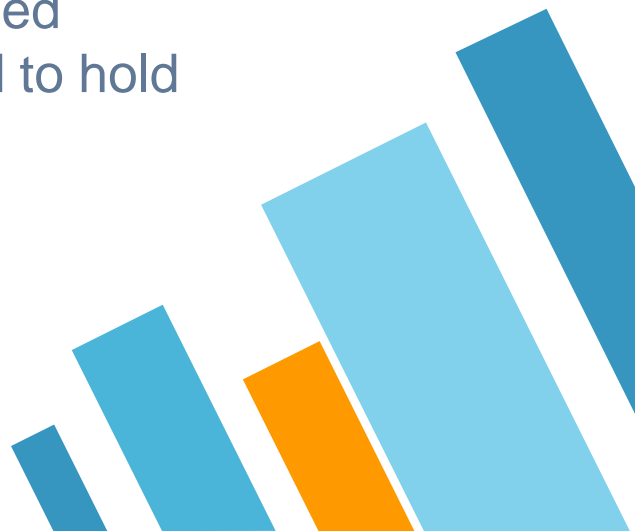


General Guidelines

- » 2 - 3 students per team
 - ◇ Grades 6, 7/8, 9/10, 11/12
 - » Materials:
 - ◇ Anything, excluding hazardous materials
 - » Device **MUST** be labeled with:
 - ◇ Full names, school, grade, MESA center
- 




General Guidelines

- » MUST have at least two artificial fingers
 - ◇ Two are REQUIRED to move
 - » Arm operating device MUST be immobilized
 - ◇ Unencumbered arm can only be used to hold and organize the workspace
 - » MUST have engineering notebook
- 

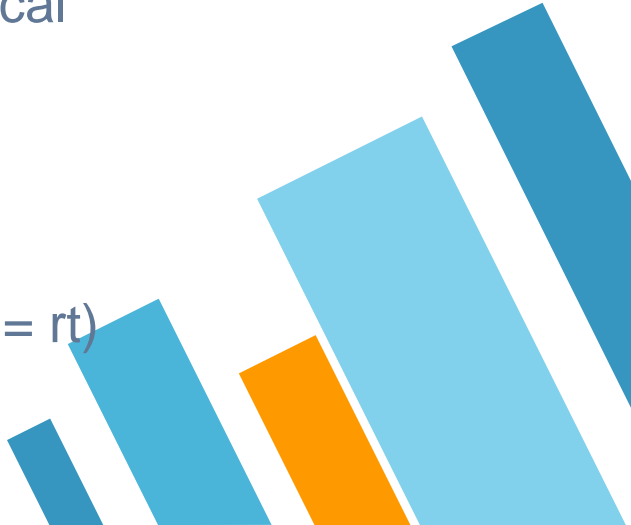


Engineering Notebook

- » Introduction
 - ◇ One page introduction
 - ◇ Half page description of two different medical reasons why someone might need a prosthetic arm
 - ◇ Only one one can be a type of trauma/injury
 - » Daily Entries
 - ◇ At least 10 dated daily entries
- 



Engineering Notebook

- » Project Sketches
 - ◇ One anatomical sketch of an arm
 - ◇ One sketch of the final device
 - ◇ Correctly label eight required anatomical structures
 - » Applied Mathematics, calculate:
 - ◇ Work done by fingers ($W = Fd$)
 - ◇ Grab and release speed of fingers ($D = rt$)
- 



Required Anatomical Structures

- » Radius/Ulna
 - » Flexor Carpi Ulnaris
 - » Radiocarpal Joint
 - » Carpus
 - » Carpometacarpal Joint
 - » Metacarpus
 - » Phalanges
 - » Tendons
- 




Engineering Notebook

- » Must contain “Materials Table”
 - ◊ List of materials utilized for required anatomical structures


Sample Materials Table

Structure	Material
Radius/Ulna	Mailing Tube
Flexor Carpi Ulnaris	Bungee cord
Radiocarpal Joint	Hinge

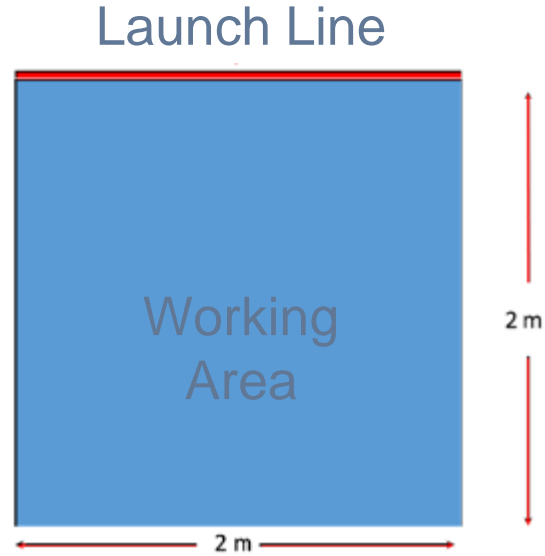
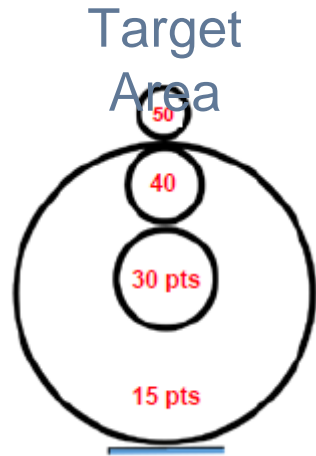




Important Judging Notes

- » Repairs will only be allowed with duplicate parts/materials
 - » Only two non-consecutive trials are allowed (including mistrials)
 - » Teams must demonstrate immobilization
 - » 60 seconds for preparation
 - » 60 seconds for trial run
 - » Time called upon completion or when time runs out
- 

Middle School Set-Up



High School Set-Up

Working Area

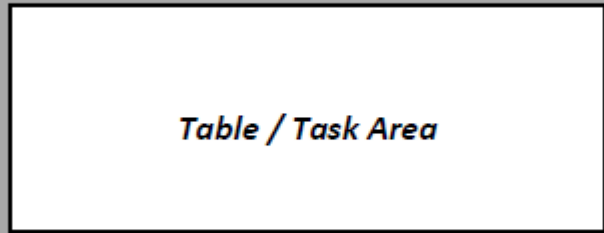


Table / Task Area

74 cm

180 cm





Scoring

- » Best point-to-time ratio
 - ◇ Middle School
 - ◇ Points per zone: 15/30/40/50
 - ◇ High School
 - ◇ Points per cup: 20
 - » 4 points for sketches and materials table
 - » 20% deduction for incomplete engineering notebook
- 