

BMES Prosthetic Challenge

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Biomedical Engineering Society at the University of Tennessee

DESCRIPTION: This challenge has students design a usable, below knee, leg prosthetic with the items in their own homes. Students will design and construct a leg prosthetic within the criteria mentioned below that can hold weight, allow students to walk and jump, be comfortable to wear, as well as get in and out of chairs. This challenge can be completed individually as well as in teams of any size! (*Devices must be made in advance and brought to Engineers Day.)

MATERIALS: Students can use any found items as well as the items listed below.

NOTE: You can **not** use any toys or other items that are already pre-made to resemble an aspect of the body: poles/pipes are structurally sound and already work like bones, a shoe performs like a foot, etc., but you can be creative in what you use to construct the prototype.

- 1 small sized cardboard box (11"x17"x11") or 1 piece of thick foam board (40" by 60")
- Hot glue, staples, or any sort of item needed for attachment
- Duct tape - 3 ft max (no max if you choose not to use an adhesive or staples)
- Velcro - 2 ft max
- Sponges - 2 max

***IMPORTANT TO NOTE: any purchases made for items may not exceed \$15.**

(hint) Groups or individuals can work together to minimize costs.

TESTING:

- On Engineers Day, students will check in for the events they want to participate in (jumping, racing, comfort, all of the above, etc) at the main table with information about BMES.
- Students then will be directed to areas in which the testing of their prosthetic device occurs and wait in line to complete the challenges.
- BMES executives will then review and assess the design performance for each challenge and determine the winners for the day.

SCORING: Each challenge will be scored differently and we will have a top 3 for each challenge. As well as a top 3 in overall score. (all categories will be weighted equally)

- **Jumping:** The team who is able to jump the highest off of the ground, and their prostheses remain intact, wins.
- **Walking:** The team that can move to the finish line the fastest wins.
- **Chair Challenge:** The team that can get out of a chair with no assistance and move to the finish line the fastest wins.
- **Comfort:** This one is more subjective, but we will have one judge that will try on every prosthetic and will assess the comfort of each one to determine our winners.
- **Cost:** Having the lowest cost in terms of additional purchases will also help improve your score!



Questions? Contact Gabe Crye at gcrye@vols.utk.edu.