



2016-2017 MESA USA NEDC Prosthetic Arm Challenge (PAC 2.1) EVENT MANAGEMENT SUGGESTIONS

Judging Requirements and Assignments

In order to properly and consistently judge all components of the competition, the following judging team should be utilized. Please refer to the specific component “Judging Guidelines” in the specifications/rules for additional details.

Lead Judge Responsibilities:

Oversee all components of the competition and provide final rulings on event related issues.

Judges Needed:

<i>Component and Responsibilities</i>	<i>Middle School²</i>	<i>High School²</i>
Technical Paper	3	3
Academic Poster Presentation ¹	3	3
Performance Testing and Impound ³	6 or 7	

¹ Academic Poster Presentation judges are encouraged to participate in technical paper

² Judges should be assigned either Middle School or High School level only

³ Performance Judges must complete the device inspection checks and measurements as well as monitor all repairs and adjustments; team may use only replacement parts and materials

Technical Paper Judging Guidelines

1. Read and become familiar with rules, resource document, judging guidelines, and scoring criteria.
2. Anonymize technical papers by removing the title page and numbering each paper before providing them to the judges.
3. Read each paper without using the scoring criteria.
4. Using the scoring criteria, revisit each paper and assign a score to each paper.
5. Submit a score sheet for each paper to the lead judge.

Academic Poster Presentation Judging Guidelines

1. Read and become familiar with rules, resource document, judging guidelines and scoring criteria.
2. If possible, set aside time before the presentation to judge posters.
3. Assemble all competing students and review rules and judging criteria. Teams will be allowed to ask any questions pertaining to this component at this time.
4. Call first team and excuse all other teams from area.
5. Once presentation begins, no one will be allowed to enter or leave area until presentation is complete. Audience members, if allowed, are not allowed to disrupt or aid the team (e.g. talking, gesturing, etc.). Any non-complying audience members may be asked to leave.
6. Provide time signals at 3 minutes, 1 minute, 30 seconds and 5 seconds before time is called.
7. Ask questions of the team. To the furthest extent possible, ask questions that are specific to the team, including their technical paper, poster, and/or device.
8. Using the Presentation Scoring Criteria, assign a score to each presentation.
9. Using the Poster/Display Scoring Criteria, assign a score the poster. Note: scoring of poster/display should be completed prior to the presentation.

Device Performance Materials and Supplies Check List

General

- Inspection and Performance Datasheets
- PAC 2.1 Guidelines/Rules
- Resource Document
- Non-Conforming Entries Sheet
- Measuring Tape (up to 2 meters)
- Masking Tape / Painters Tape
- Scale (≥ 5 pounds/ 2.2 kg)
- 3 stop-watches or timers
- Post-Its for random order
- 3 to 4 - six foot tables
 - 1 table for registration/Judges' table
 - 2 to 3 tables (same table can be used for both Object Relocation and Dexterity)
- Tables for Team Impound / Inspection Area
- Tables, easels or wall space for Academic Poster Presentations (for posters/displays)

Distance Accuracy Task

- 1 Home Depot's "Homer's All-Purpose Bucket (Model # 05GLHD2)
- 1 meter stick (one meter)
- 12 – 5 inch by 5 inch nylon bean bags (www.orientaltrading.com Reinforced Bean Bags # IN-61/4000 or similar)

Object Relocation Task

Container

- 1 – Sterilite Storage Crate 1692 – 15.25” L x 13.75” W x 10.5” H ([Walmart Item # 007418704](#) – Model # 16928006)

Relocation Objects*

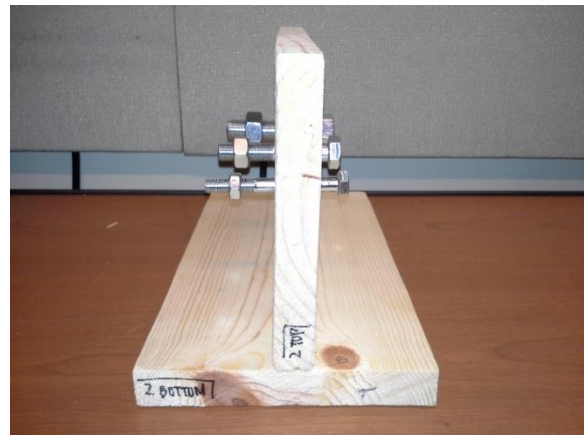
- One – pack of 100 Index Cards
- One – Composition Notebook, 100 pages, approximate size 7.5 inch by 9.5 inch (**revised 7 ½" x 9 ¾"**) ([Office Depot Item # 998584 - 7 ½" x 9 ¾"](#) or similar)
- One – empty 0.5 liter water bottle
- One – 12 inch Ruler ([Office Depot Item # 765465](#) or similar)
- One – unsharpened No. 2 pencil
- One – CD or DVD
- Four (4) Unidentified Objects – vary size and weight of objects
 - a. Objects no heavier than 500 grams
 - b. Objects not require artificial fingers to open wider than 3 inches to grasp, lift, and release the objects

** Host is encouraged to include more of some of the objects in case objects are dropped and broken.*

Dexterity Task

Testing Device

- ❑ 2 – 1 inch by 6 inch x 12 inch (actual 3/4" x 5-1/2" x 12") board from Home Depot *Model # 144703* or similar.
- ❑ US Drill Bit **23/64"** (0.359375 in or 9.128125 mm) – Home Depot *Model 48-89-2729 / Store SKU # 767398* or similar
- ❑ US Drill Bit or Paddle Bit **1/2"** (0.5 in or 12.7 mm) – Home Depot *Model 48-89-2738 / Store SKU # 771919, Model # 88824 / Store SKU # 959154*, or similar
- ❑ US Drill Bit or Paddle Bit **11/16"** (0.6875 in or 17.4625 mm) – Home Depot *Model # 48-89-2744 / Store SKU # 774206, Model # 1768419 / Store SKU # 958190*, or similar



Dexterity Materials

Bolts and nuts are available from www.boltdepot.com. Specifications for each are as follows:

- ❑ Metric hex bolt, Zinc plated class 8.8 steel, 8mm x 1.25mm x 70mm (*Product # 6230*)
- ❑ Metric hex nut, Zinc plated class 8.8 steel, 8mm x 1.25mm (*Product # 4788*)
- ❑ Metric hex bolt, Zinc plated class 8.8 steel, 12mm x 1.5mm x 70mm (*Product # 6341*)
- ❑ Metric hex nut, Zinc plated class 8.8 steel, 12mm x 1.5mm (*Product # 6877*)
- ❑ Metric hex bolt, Zinc plated class 8.8 steel, 16mm x 2.0mm x 70mm (*Product # 6292*)
- ❑ Metric hex nut, Zinc plated class 8.8 steel, 16mm x 2.0mm (*Product # 7360*)

In setting up Dexterity Materials, test and ensure nuts freely rotate around bolts.

Location

This event needs to be held indoors, in preferably a large classroom or open room with hard floors. It is recommended that the room be large enough to hold all the tables for the challenge in one location, while allowing for an impound area and spectators.

Device Performance Judging Guidelines

SET-UP (see diagrams – last two pages)

- Set up test configurations – *Working Area, Target Zone* and meter stick – for **DISTANCE ACCURACY TASK** by using tape measure and masking tape (see Diagram 1 on page 6 of rules).
 - When setting up the step pyramid, make sure the pyramid is marked off accurately to the specifications indicated. When making off the pyramid include the outside edge of the tape in the measurement.
 - If you are using a pre-printed step pyramid, the measurements should be exactly as indicated on Page 6 of the rules. Make sure to measure the step pyramid after printing.
- Set up test configurations for **OBJECT RELOCATION TASK** by using one table, tape measure and masking tape (see Diagram 2 on page 8 of rules).
- Set up test configurations for **DEXTERITY TASK** by using one table, tape measure and masking tape. Note that the table used for the Object Relocation Task may be used for this task as well.
 - Test and ensure nuts freely rotate around bolts.

DEVICE CHECK-IN, INSPECTION AND IMPOUND

1. Please be at the designated location to check in entries.
 - a. **Station 1** – Ensure that student name(s), school and Center are clearly identified on all components. Have each team complete top section of *Inspection and Performance Datasheet*. Take photo of team with device and sign with school name for visual record. Once entries are registered, design changes are not allowed.
 - b. **Station 2** – Weigh Device. Inspect and verify device meets the following on *Inspection and Performance Datasheet*, including:
 - Verify device is a generalized tool (does not include different parts for different tasks).
 - Verify device includes at least two artificial fingers that open and close.
 - Verify artificial fingers can grab and release objects.
 - Verify artificial fingers are controlled by Arduino programming and components.
 - Have team demonstrate that they have immobilized the wrist, hand and fingers separate from the device.
 - Review itemized budget sheet completed with supporting printed documentation;
 - Verify budget does not exceed \$80 pre-tax price limit.

Entries that do NOT conform to the Performance General Rules will NOT be allowed to compete in device performance.

If devices are checked in prior to inspection, consult team to verify that device meets rules before not allowing team to compete in device performance.

- c. **Station 3** – Impound device and all repair materials. Guide students to student team seating area.
2. Randomly assign each entry a number for trial order or have team draw random number.

ADMINISTRATION AND MANAGEMENT

1. Gather all teams and spectators and give an introduction and event summary. Explain specific tasks and judging procedures. Ask for questions.

It is recommended that before the commencement of each task the specific TASK DETAILS are reviewed with competing teams. This will help eliminate questions and misconceptions.

NOTES

- To minimize arbitration problems, only students should come in contact with their own devices and be allowed to repair and adjust devices. **TEACHERS, PARENTS AND STUDENTS NOT ON TEAMS** are NOT allowed in the competition or impound areas. Repairs and adjustments should only be done by the students on that team, and under the supervision of a judge.
 - Two trials are allowed for each task. Trials can be consecutive or non-consecutive. Although consecutive trials decrease the time to administer the competition, non-consecutive trials allow for repairs and adjustments of device between trials. The rules do not specify which method to use.
2. Call teams according to randomly assigned or drawn competition order.
 - a. **Team In-the-Hole (Impound Area):** team moves from the student team seating area and gets device in impound area.
 - b. **Team On-Deck:** team moves from impound area to On-Deck area and prepares device for next task.
 - c. **Team Up (Task Area):** team moves from On-Deck area to the task area and prepares device and task objects for task.
 - i. Judge – DIRECTS team to prepare device and task objects for task. (1 minute timed)
 - ii. Students – PREPARE device for operation and indicate “ready-to-operate” status and WAIT.
 - iii. Judge – ACKNOWLEDGES team “ready status”.
 - iv. Judge – VERIFIES equipment setup.
 - v. Judge – PREPARE TIMERS
 - vi. Judge – STARTS trial...
 - vii. Judge – RECORDS the following:
 - Violations, as needed
 - Distance Accuracy Task
 - Number of bean bags in each Target Zone (1, 2, 3, 4 and 5)
 - If any portion of a bean bag overlaps scoring zones, indicate the lesser of scoring zones for that bean bag.



- If any portion of a bean bag is outside the boundaries of the Target Zone, do NOT count that bean bag.
- Total time (00.00 seconds)
- Object Relocation Task
 - Total time (00.00 seconds)
 - Which objects have been placed into the *Finishing Area*
 - Any broken or dropped objects
- Dexterity Task
 - Total time (00.00 seconds)
 - Scores for each bolt
- Performance and Rule Violation Comments

All participating teams will be seated in an area separate from the general audience. Under the direction of the Lead Judge, only one team will be allowed in the Testing Area at any one time. Team members will be escorted by judges to each of the respective testing areas. The judges and host center staff must ensure that the Test Area is not disturbed once it is set up.

Based on the pre-determined order, teams will be summoned to the Test Area in the following area and will be repeated until all tasks are completed:

1. Team In-the-Hole (Impound Area)
2. Team On-Deck
3. Team Up (Task Area)

Calculating Results

Use the datasheet on page 17 of the PAC 2.1 rules to record data. An automated Microsoft Excel Scoring Tool has been developed and is available for download on the CA MESA Statewide MESA Day Curricula website.

Questions

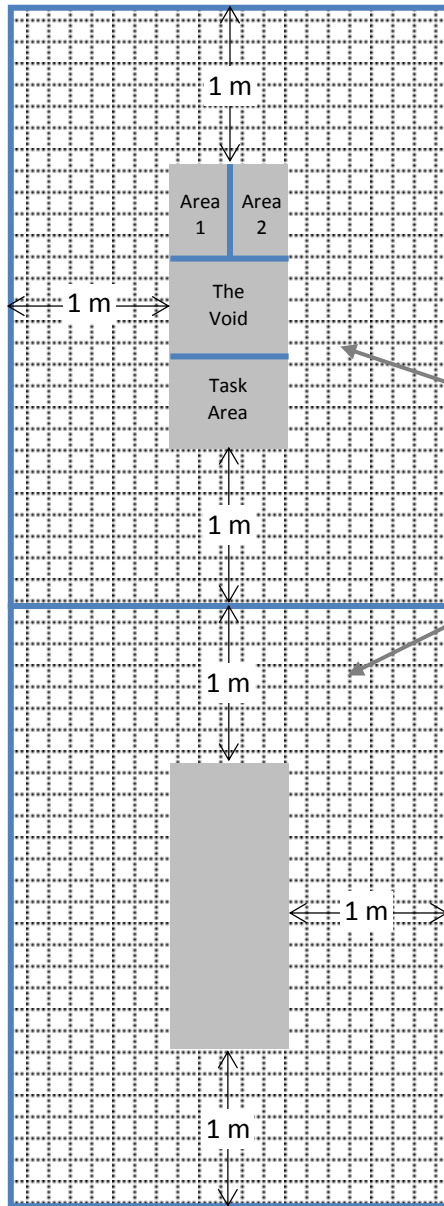
Cathy Douglas, UCLA MSP

Ben Louie, USC MSP

CA Representatives, MESA USA NEDC Rules Committee

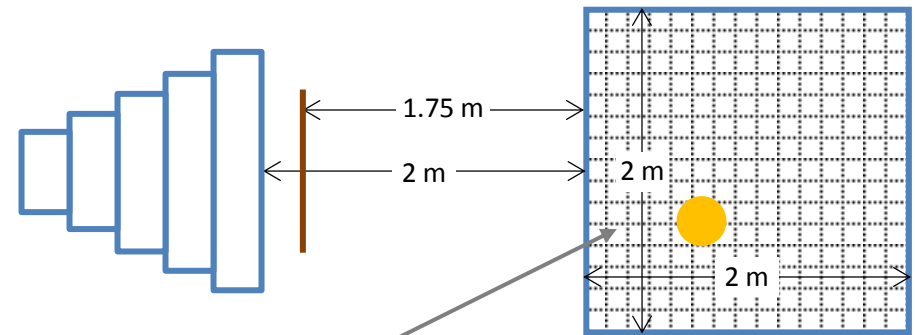
cathyd@seas.ucla.edu or blouie@usc.edu

**Object Relocation Task
(MS/HS)**



**Dexterity Task
(HS)**

**Distance Accuracy Task
(MS/HS)**



*Working Area
for each task*

**Painters Tape or
Masking Tape**

Judges Table
(check-in, rosters, supplies
kept in this area)



30 ft

**Impound/Inspection
Area**

Area
(26 ft x 12 ft)

SMALL ROOM CONFIGURATION

There are many ways to set-up the task area. It is recommended that you find at least a 30 ft x 40 ft open space. Spectators will have to watch from outside of the task area.

40 ft

GYM / LARGE ROOM CONFIGURATION

