



# The Panasonic Creative Design Challenge

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**Fall 2011**

# Outline – Creative Design Challenge

- Creative Design Challenge Background
- Logistics
- Prizes
- This year's Challenge
- Scoring
- Registration

# Panasonic Creative Design Challenge History

- Goal: *To make science, math, and engineering fun! To apply a wide range of mechanical and electrical engineering, mathematics, and communication skills in the design and construction of a device that has the ability to perform tasks related to the annual challenge.*
- Started in 1991
- On hiatus 2005 – 2007, but back and thriving!
- Different challenge each year

# Past Challenges

- 1991: Wheel-less vehicle
- 1992: Recycling machine
- 1993: Egg-a-naut
- 1994: Solar-powered vehicle
- 1995: Dante I
- 1996: Dante II
- 1997: Span the Gap
- 1998: The Bermuda Triangle Rescue
- 1999: Robotics for the Advancement of Trooper Safety

# Past Challenges

- 2000: The Great Paneverest Challenge
- 2001: Winter Triathlon
- 2002: Basic Training
- 2003: BotSketBall
- 2004: The Great Divide
- 2008: Murky Waters
- 2009: Beach Sweeps
- 2010: The Recycling “Pana”-Plant
- 2011: Wildlife Response and Rescue

# Competition Logistics

- For high school students
  - Students whose parents are employees of NJIT or any division of Panasonic Corporation are ineligible to participate
- Team of three students and one coach
  - Coach must be a full-time employee of the school district as of the start of the academic year
  - Team members may change between the preliminary and final competitions
- Each school may field one team

# Schedule

- Registration Deadline: October 21, 2011
- Preliminary Challenge: January 25-26, 2012  
(snow dates February 1-2, 2012) @ Panasonic
- Oral Reports: March 14-15, 2012 @ Panasonic
- Written Reports Due: March 23, 2012, 3:00 PM
- Logbooks Due: March 23, 2012, 3:00 PM
- Oral Reports: April 24, 2012 @ NJIT
- Final Challenge: April 24, 2012 @ NJIT

# Competition Prizes

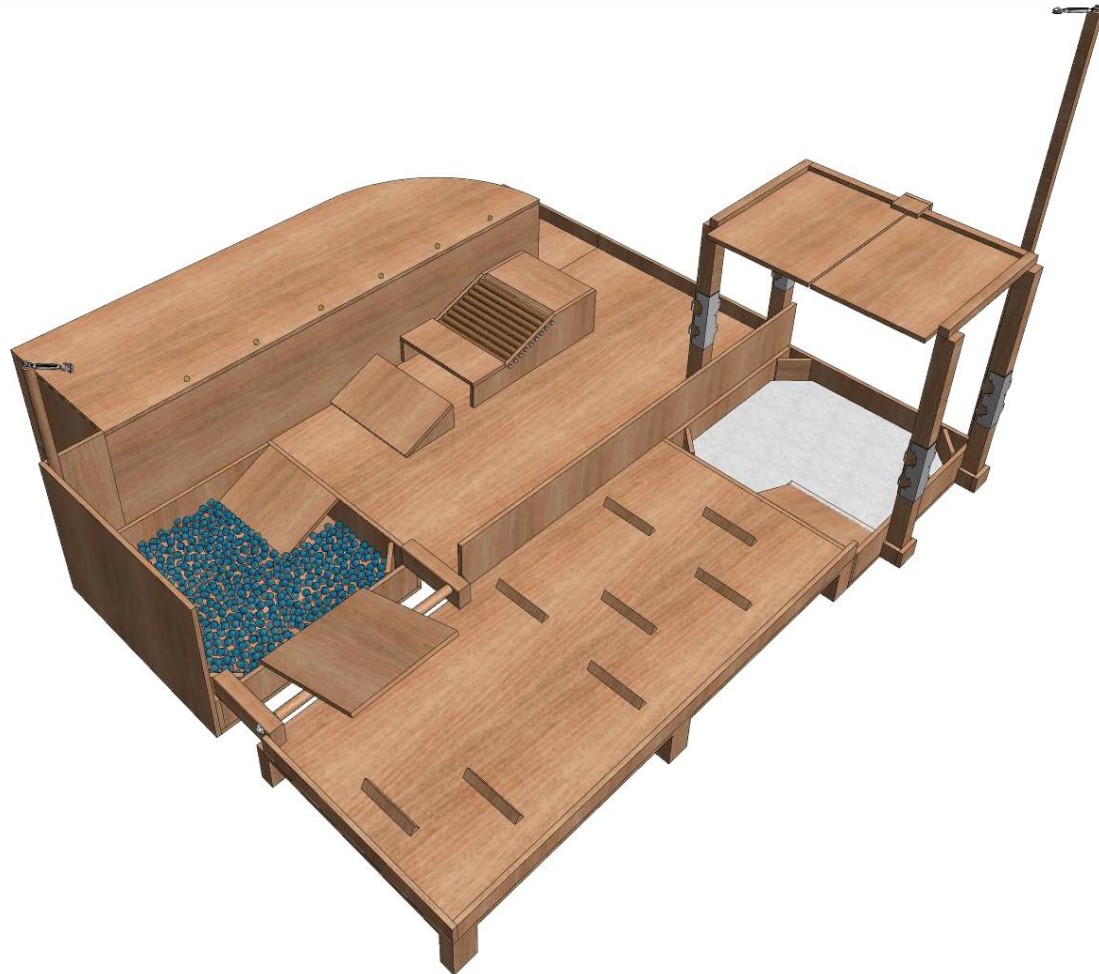
- First place team: \$5,000 scholarship per student
- Second place team: \$4,000 scholarship per student
- Third place team: \$3,000 scholarship per student
- Fourth place team: \$2,000 scholarship per student
- Special prizes are awarded to teams that receive the best score in performance, documentation, and oral presentation

# This Year's Challenge: Mars 3000

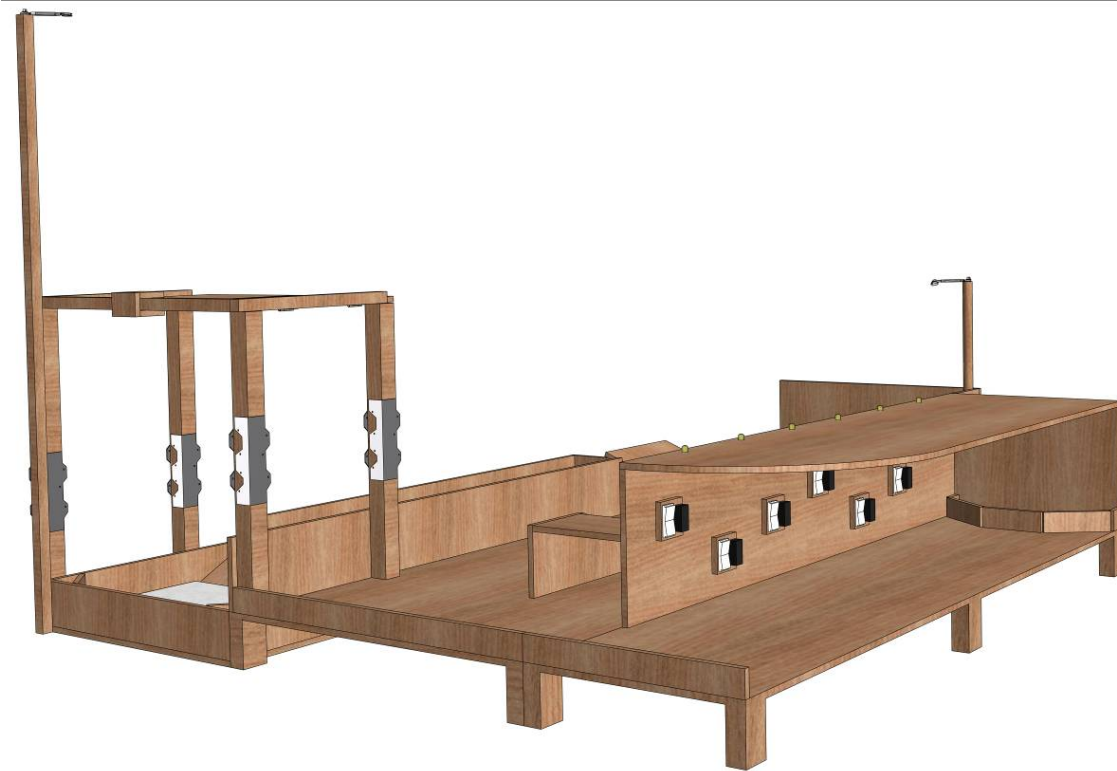
- For this year's Challenge, you must design a device that will land on Mars, maneuver through difficult terrain, and excavate materials that must be sorted and brought back to your spacecraft for research and scientific study.
- The Challenge will require teams to apply a wide range of Mechanical Engineering, Electrical Engineering, and Mathematical skills to be successful. Teams must document their entire journey in the Panasonic CDC engineer's logbook from the start at the problem identification stage to the final product. They must also communicate the steps, in written and oral formats, used to achieve a design solution. Teams will be judged on their written report, oral report, logbook, and the performance of their device.

# The Challenge Course

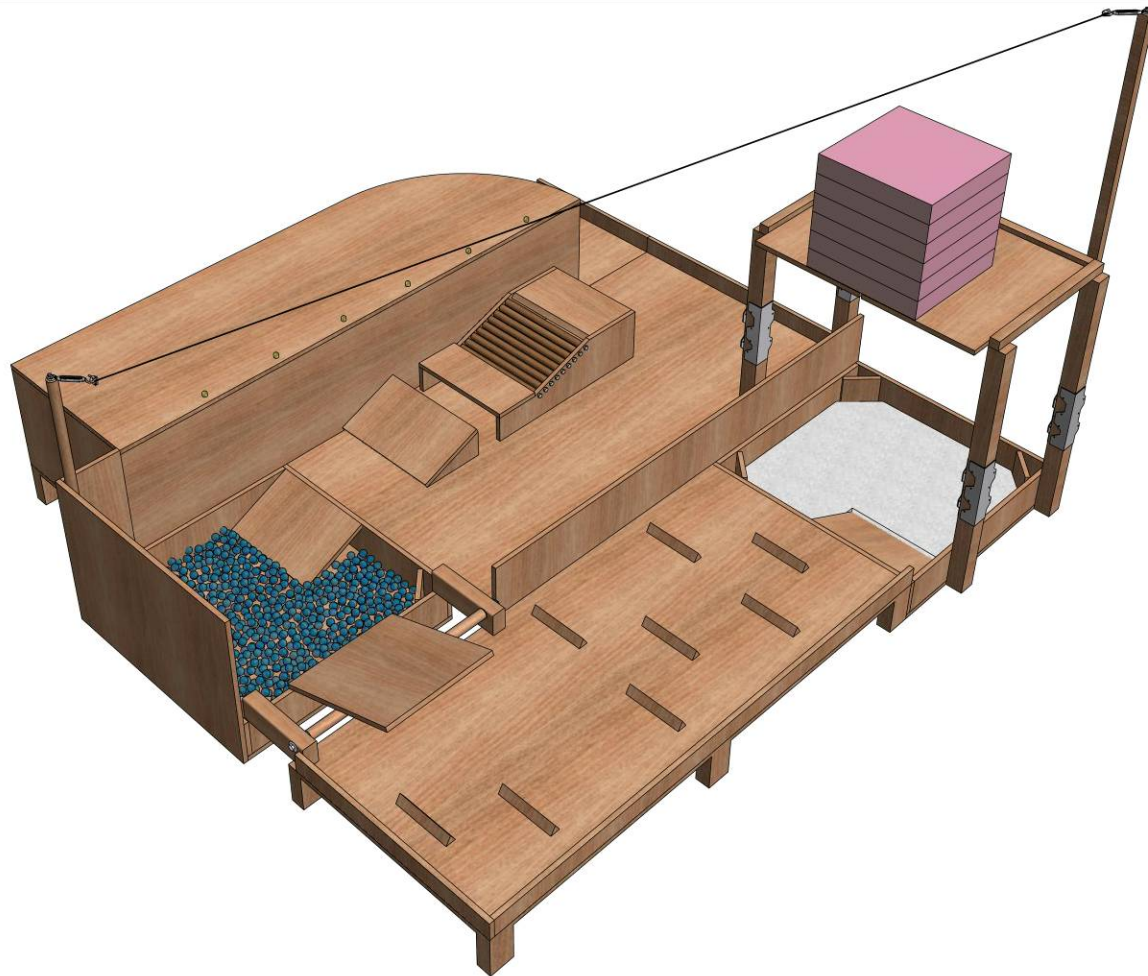
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# The Challenge Course



# The Challenge Course



# Traversing the Course – Preliminary Challenge

- Drop from an elevated platform.
- Maneuver out of Crater 1.
- Travel across a see-saw.
- Retrieve one wooden ball (precious metals).
- Maneuver out of Crater 2.
- Drive through Passage Way 2.
- Drop off wooden ball (precious metals) into the space craft.

# Preliminary Challenge Scoring

- Scoring for the Preliminary Challenge is as follows:
  - Drop from an elevated platform (17 inches)– 5 points
  - Retrieve one wooden marble – 5 points
  - Maneuver out of craters – 5 points each (10 points total)
  - Travel across a see-saw – 10 points
  - Drive through Passage Way 2 – 5 points
  - Drop off wooden ball into the space craft – 10 points
  - Time bonus for completing all tasks – 1 to 5 points

# Preliminary Challenge Scoring

- Time bonus for completing all tasks:

<b>Time Finished</b>	<b>Bonus Points</b>
1 – 60 seconds	+5
61 – 90 seconds	+4
91 – 120 seconds	+3
121 – 150 seconds	+2
151 – 180 seconds	+1

# Preliminary Challenge Rules

- Prior to each trial the Team must designate who will operate their device.
- The operator is ONLY allowed to stand within the designated area, which is extended 3 feet on two sides of the course. Other Team members are not allowed in this area. *For diagram and dimensions of the specific area where the operator is allowed, see page 43 of the “Rules and Guidelines”.*
- While attempting to drop off the wooden ball, team members ONLY are allowed to stand in the area around the tunnel (i.e., NOT the operator’s designated area) to verbally coach the operator. Team members can at no time operate the device using the tether box or touch the device.
- Operators may not step on the competition course.
- No contact is allowed between Team members and the robotic device once a trial has begun except for using a tethered control box.
- The operator may not intentionally use the tether to exert major influence on the motion of the device. Teams cannot use the tether to pull or push the device; doing so will result in disqualification. The tether may only be used for controlling the device (steering) and may not be used to otherwise assist in the motion of the device.

# Preliminary Challenge Rules

- Any contact by Team member(s) with the device after the trial has begun will result in a disqualification for that trial. The remaining time of the 3-minute trial may still be used for modifications, repairs, etc. Once disqualified, Teams will receive no points and any time recorded by the timekeeper is void for that trial.
- The trial begins when the judge gives the signal and starts the time clock. The trial ends after three minutes have elapsed or when the team calls for time to end (to start a new trial).
- No item can be placed on the course other than the device.
- Only judges can remove the clamp to drop the device onto the course.
- If the device falls off the course during a trial run, that trial immediately ends.
- The device **MUST** remain on the course during a trial. Leaving the course will result in team disqualification for that trial.
- Interference with any other Team's device at any time is not allowed. Teams whose devices have been interfered with during a trial will be given the option of repeating that trial. Teams that interfere will be disqualified from the competition if the judge decides that the interference was intentional. Poor sportsmanship will not be tolerated.

# Traversing the Course – Final Challenge

- Drop from an elevated platform OR travel across a zip line.
- Maneuver out of a crater (depending on landing spot)
- Retrieve wooden ball(s) (precious metals)
- Travel across a see-saw
- Drive across Passage Way 1 or Passage Way 2
- Locate switch and turn on light bulb
- Drop off wooden balls (precious metals) into the space craft.

# Final Challenge Scoring

- Scoring for the Final Challenge is as follows:
  - Drop from an elevated platform (29 inches)– 10 points
  - Retrieve wooden balls – 1 point per ball, 10 points maximum
  - Maneuver out of a crater – 5 points each
    - Teams that travel across the zip line will not receive points for traveling across the see-saw or maneuvering out of Crater 1
  - Travel across a see-saw – 10 points
    - Teams that travel across a zip line cannot earn these points

# Final Challenge Scoring

- Scoring for the Final Challenge is as follows:
  - Drive across Passage 1 – 10 points
  - Drive across Passage 2 – no points
  - Locate switch and turn on light bulb – 5 points
  - Drop off wooden ball(s) into the space craft – 1 point per ball, maximum 10 points
  - Drop off blue marble(s) into the mother ship – lose 1 point per marble
  - Time bonus for completing all tasks:

Time Finished	Bonus Points
1 – 60 seconds	+5
61 – 90 seconds	+4
91 – 120 seconds	+3
121 – 150 seconds	+2
151 – 180 seconds	+1

# Final Challenge Rules

- Prior to each trial the Team must designate who will operate their device.
- The operator is ONLY allowed to stand within the designated area, which is extended 3 feet on two sides of the platform. Other Team members are not allowed in this area. *For diagram and dimensions of the specific area where the operator is allowed, see page 43.*
- While attempting to activate the designated light switch and drop off the wooden balls, team members ONLY are allowed to stand in the area around the tunnel (i.e., NOT the operator's designated area) to verbally coach the operator. Team members can at no time operate the device using the tether box or touch the device.
- Operators may not step on the competition course.
- Prior to each trial run, the Team must inform the judges whether they will drop from the elevated platform or use the zip line. Teams may use a different landing method for each trial run (drop or zip line).

# Final Challenge Rules

- No contact is allowed between Team members and the robotic device once a trial has begun except for using a tethered control box. Should a Team elect to use the zip line, only Team members who are not the operator may touch the zip line to remove it from the device, but in this process can at no time touch the device. Any contact by Team member(s) with the device after the trial has begun will result in a disqualification for that trial. The remaining time of the 5-minute trial may still be used for modifications, repairs, etc. Once disqualified, Teams will receive no points and any time recorded by the timekeeper is void for that trial.
- The operator may not intentionally use the tether to exert major influence on the motion of the device. Teams cannot use the tether to pull or push the device; doing so will result in disqualification. The tether may only be used for controlling the device (steering) and may not be used to otherwise assist in the motion of the device.
- The trial begins when the judge gives the signal and starts the time clock. Before each trial run, a judge will roll the dice to determine which light switch will be activated.

# Final Challenge Rules

- The trial ends after five minutes have elapsed or when the team calls for time to end (to start a new trial).
- No item can be placed on the course other than the device.
- Only judges may remove the clamp to drop the device onto the course. Only judges may roll the die to select which light bulb switch the team will activate.
- If the device falls off the course during a trial that trial immediately ends.
- The device **MUST** remain on the course during a trial. Leaving the course will result in team disqualification for that trial. The device is considered **ON** the course if any part of the device is on the course (i.e., wheels and arms may be outside the course so long as a portion of the device is still on the course, such as having two wheels off and two wheels on the course).
- Interference with any other Team's device at any time is not allowed. Teams whose devices have been interfered with during a trial will be given the option of repeating that trial. Teams that interfere will be disqualified from the competition if the judge decides that the interference was intentional. Poor sportsmanship will not be tolerated.

# Device Materials

- **You are provided with the following in the design kit. No substitutions will be allowed!**
  - 5 small electric motors provided by Panasonic. See guidelines for motor specs.
  - 4 sets of LEGO™ axles & gears
  - 6 9V Panasonic alkaline batteries
  - 8 AA Panasonic alkaline batteries
  - Six 9V battery clips and two 4-cell AA battery holders
- Panasonic supplies one kit per school. Additional kits may be ordered from vendors listed in the Rules and Guidelines.

# Device Materials

- You may use an unlimited supply of materials listed on the “Approved Materials” list in the Rules and Guidelines
  - Materials include adhesive tape, caulk, paint, paper clips, staples, foam, and other readily available, low-cost materials
- One fresh set of batteries will be provided at the Preliminary Challenge, and two fresh sets will be provided at the Final Challenge

# Device Limitations

- Other than the materials specification, your device is limited only by the imagination and creativity of your design team
- However, the device must fit within an area of 1' x 1' x 1½' at the beginning of each trial. It may increase or decrease in size once the trial begins.
- *Each team may design a different device to compete in the preliminary and final competitions.*

# Not Allowed – NO EXCEPTIONS!

1. Poor sportsmanship
2. Interference with any other team's device at any time. Teams whose devices have been interfered with during a trial will be given the option of repeating that trial. Teams that interfere will be disqualified from the competition if the judge decides that the interference was intentional and will lose a trial if not intentional.
3. Devices employing helium or hydrogen-filled balloons
4. Devices using any process that involves combustion, fire, explosives, or pyrotechnics
5. Devices employing high voltages or currents. Only Panasonic alkaline batteries may be used for electrical power
6. Devices using materials that do not appear on the parts list
7. Any use of approved materials that will damage the course or scoring objects
8. Metal for traction on device

# Scoring – Final Challenge

- Device performance is 50% of the overall score.
- Other components of the score:
  - Written Report – 12.5%
  - Oral Presentation – 12.5%
  - Logbook – 25%

# Final Challenge Scoring – Written Report

- Maximum of five double-spaced, typewritten pages excluding title page, diagrams, and pictures
- It should include the following
  1. A description of the device's design
  2. Principles, e.g. STEM, employed, including various options considered before the final design was chosen
  3. How the team functioned (how the work was divided)
  4. The biggest obstacle the team had to overcome
- Report must be in a binder. See guidelines for title page specifications.

# Contact Information

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# Panasonic Creative Design Challenge

**Panasonic Creative Design Challenge web site:**

**<http://www.panasonic.com/cdc>**

Q & A

