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Junk Drawer Design

Objective: The purpose of the Junk Drawer Design competition is to design, construct, and implement a vehicle using only the “junk” provided and to promote creativity and thinking “outside the box”.

Rules:

1. Teams will be provided with a variety of common household materials the day of the competition. A list of specific items is included below. Additionally several unknown items will be added to the supplies on the day of the competition.
2. The vehicles may consist of only the materials provided. No outside materials will be allowed, including prototype vehicles.
3. The vehicle must accelerate by its own power without the use of outside force other than for the purpose of triggering the propulsion mechanism (i.e. teams may not push the vehicle).
4. Vehicles must travel along the ground.
5. Teams will have ninety minutes to design, construct, and test their vehicle.
6. Vehicles must travel at least 10 feet to receive a qualifying score.
7. In the event more than one vehicle travels the entire length of the track, the vehicle with the fastest time will receive 1 extra foot traveled for each second or portion thereof faster than the second fastest time.
8. Teams shall prepare and submit a report outlining the design process the day of the competition. Teams are encouraged to start the report before the competition. Pencil and paper will be provided on the day of competition. Computers, cell phones, PDAs or other electronic devices will not be allowed nor will they be provided.

The Event: Prior to the event, teams will be chosen at random in the order in which they will compete. Each team will setup at the starting point and when instructed will activate their vehicle. After the vehicle has come to a complete stop, the judges will measure the distance traveled and the distance deviated from a straight marked path to the center of the vehicle. Teams will attempt two trials.

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The Report: Each team will prepare a report that outlines the team plan of action the day of competition. The report shall be a minimum of 2 pages in length. Areas that will be judged and scored in the report are as follows:

1. **Design Theory/Process** – This can define how the energy of the vehicle will be stored and how the stored energy will be released to power the vehicle.
2. **Construction process** – This can define how to maintain a vehicle that withstands multiple runs, what are the key concepts or methods to effectively connect the pieces of the vehicle together.
3. **Modifications Plan** – What types of unknown items were anticipated? What are the keys to determine how to effectively add the new “junk”?
4. **Testing Plan** – What testing should be done to determine the viability of the vehicle? How do you anticipate the testing the day of the event will affect the design? What test was done prior to the event to confirm theories of methods?
5. **Aesthetics** – What is your plan to make your vehicle something that is attractive?

The report should include a narrative of the design process and theories, construction process, and a summary of any testing and design modifications. Judges will determine a score for the presentation in the report. Charts, drawings and sketches will play a significant role in the scoring of the report. The judges’ scores will be average to determine the Report Score. Materials (pencils and paper) to prepare the report will be provided the day of the competition. The report may be started prior to the competition, and completed on the day of competition.

Scoring: A score will be determined for each trial based on the distance traveled and distance deviated from a straight line. The highest score from both launches will be used and added to the presentation score. The winner will be the team with the highest score. In the event of a tie, the winner will be chosen based on the team with the lowest mass vehicle. A sample score sheet is attached.

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Material List:

Styrofoam blocks (2 - approximately 2"x2"x3")
Tape (¾ inch, Scotch Magic Tape or equivalent)
String
Pencils
Rubber bands (variety of sizes)
Playing cards
Latex gloves
Aluminum foil
Glue (Elmer's Glue)
Thread

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Score Sheet

Team Name/Number: _____

School: _____

Trial #1 Evaluation

Distance Traveled (feet): T = _____
 Trial Time (seconds) t = _____
 Distance Deviated from Line (feet): D = _____

Subtotal of Trail #1 $\frac{2 \times T}{D + 1} =$

Trial #2 Evaluation

Distance Traveled (feet): T = _____
 Trial Time (seconds) t = _____
 Distance Deviated from Line (feet): D = _____

Subtotal of Trail #2 $\frac{2 \times T}{D + 1} =$

Best Trial Score

Report

Design Theory/Process	(0-5 points)	_____
Construction Process	(0-5 points)	_____
Modifications	(0-5 points)	_____
Testing	(0-5 points)	_____
Aesthetics	(0-5 points)	_____

Subtotal of Report

Total Event Score