

Potential Energy Cart Scope Document 2025

Junior Skills (Team Competition)

Competition Entry:

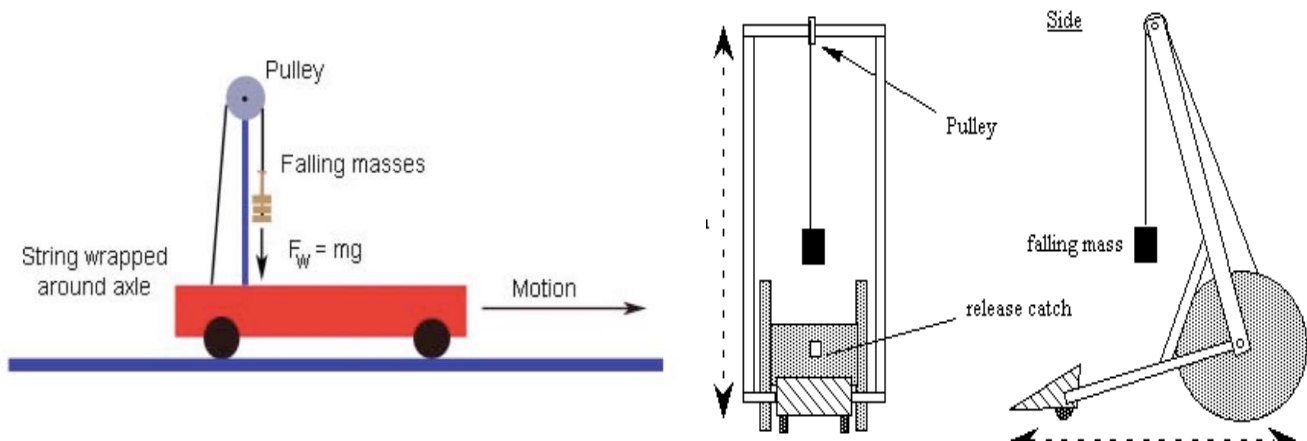
Grade 6 – 10

Contest Length: 4 hours

Purpose of the Challenge:

Working in teams (max 4 members per team), contestants will use the potential energy of a 500-gram mass suspended 1 meter above the ground to propel a pre-built cart as far as possible across a level surface. This will be a distance event and the cart that covers the greatest distance along the course will be the winner. If more than one of the carts travels the entire length of the track, the fastest recorded to complete track will determine the winner. Personalization of team carts is encouraged (ex: name, theme, etc.)

Cart General Lay out:



**** Only for reference, participants are encouraged to follow project description****

Learning and skills:

Understanding gravitational potential energy can be converted into mechanical kinetic energy. Students will encounter problem solving scenarios focused on ratio's, gears, pulley systems, design processes, energy relationships, friction, and force.

Project Description:

- Team must pre-build their cart and transport it to the competition event.
- The energy to move the car must come exclusively from the potential energy of the single 500-gram mass.
- The single 500-gram mass will be provided and will be a standard physics hooked mass.
- The design must have a 500-gram mass starting no higher than 1 meter above the ground (measured from the bottom of the mass to the floor surface) and stay ON the cart all the way to the cart's stopping point. Weight cannot fall on the ground or leave the cart in any manner and must be transported on the cart until the stopping point.
- No kits allowed
- Team name and/or Cart name is encouraged!
- No projections, vaults, motors, springs, elastics or other energy storing devices are not allowed. The movement of the cart **MUST** come directly from the 500-gram mass.
- The contestants will attach the provided mass to the cart system and will be prompted by officials when to release the weight.
- The cart must not be pushed to get started. Once the weight is released the cart has to begin movement on its own.
- The cart cannot be touched or redirected by contestants after the release of the mass or at any point on the course.
- The cart must remain on the ground during the run on the length of the course.
- The course will be approximately 6 feet wide and 80 feet long. The course will be restrained using PVC pipe side walls. Carts are allowed to deflect and keep going but must do so on their own. The cart must fit the width of the track. ****Length of course is subject to change due to building constraints****
- If carts are reaching the limits of the track. Time over distance formula will be used to determine the winner. Therefore, speed should be considered in your design if the current design allows for track length completion.

Equipment/Tools/Materials:

Carts are to be constructed before coming to the event using any materials. Repairs may be made between the 3 trials using materials similar/like to those used in the original. The basic design and mechanics may not be changed in between trials. Contestants are responsible to bring their own tools and supplies.

Safety:

Contestants will behave in a safe, courteous manner during the event. Any horseplay, naming calling or interference with other trials by a team member will result in disqualification of the entire team.

The tech chair will have the final authority over the matter of safety.

Judging Criteria:

Time to practice prior to trials will be given.

Each team trial will have the distance traveled and time taken recorded.

The cart that covers the greatest distance along the course will be the winner. **NOTE: Track may be limited to or exceed approximately 80 feet, depending on location. If more than one of the carts travels the entire length of the track, the fastest cart to travel the course length will be used to determine the winner.**

The number of trials and race compositions may be adjusted due to varying track factors or unforeseen circumstances.

Technical Committee:

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