

SCRAMBLER

Div C

EVENT DESCRIPTION

Teams design, build, and test a mechanical device, which uses the energy from a falling mass to transport an egg along a straight track as quickly as possible and stop as close to the center of a Terminal Barrier (TB) without breaking the egg.

BUILD SUMMARY

- Scrambler consist of an egg transport (Vehicle) and an energy propulsion system.
- Entire Scrambler must fit within an imaginary rectangular box with a 100.0 cm by 50.0 cm base and a 100.0 cm height. This includes the egg and falling mass.
- All energy used to propel the Vehicle comes from a falling mass of 1.5kg or less
- Egg must be mounted to the Backstop on front of Vehicle. See diagram below.
- 1/4" to 3/8" Dowel attached to top of Backstop used for timing
- Must use #2 pencil to actuate a release mechanism
- All parts of the Vehicle must move as a whole

TRACK SUMMARY

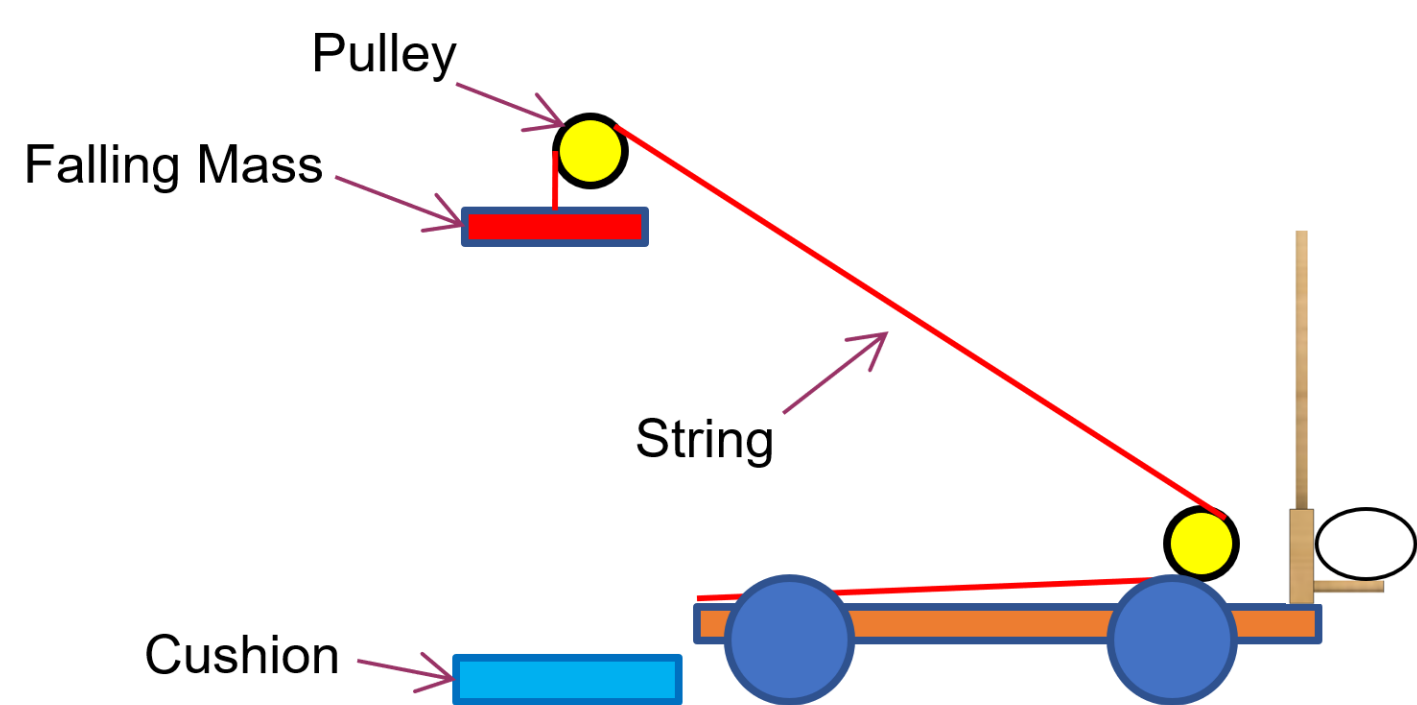
- Target Distance : Between 8 and 12 meters
- Start Point marked on 2.5 cm by 5.0 cm tape
- Timing Lines at 0.50 m and 7.00 m from Start Line
- 5 Gallon Bucket placed at mid-point
- Terminal Barrier is 25 cm tall by at least 1.0 m long

COMPETITION SUMMARY

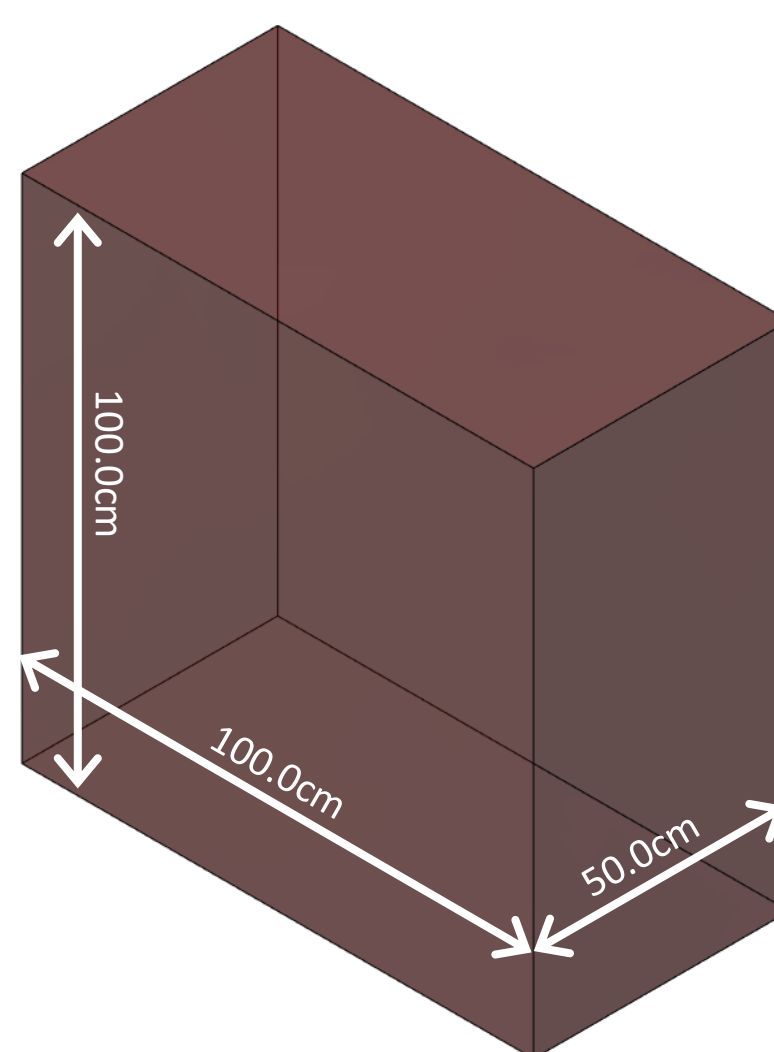
- Impound Event
 - Released after Impound : Distance to Terminal Barrier
- Distance to Target Point (8 to 12m)
 - Regionals/Invitationals : Interval 0.5m : 8.0, 8.5, 9.0, 9.5, 10.0, 10.5, to 12.0
 - States : Interval 0.2m : 8.0, 8.2, 8.4, 8.6, 8.8, 9.0, 9.2, 9.4, to 12.0
 - Nationals : Interval 0.05m : 8.00, 8.05, 8.10, 8.15, 8.20, 8.25, to 12.00
- Event Time : 8 mins
 - Up to 2 Runs can be completed. Best scoring run used.
 - Modifications allowed during Event Time
- Tip of egg must be placed over Start Point
- Breaking egg is a competition violation. No 2nd run if egg is broken on 1st run.
- No electric or electronic tools except a calculator
- Runs receive a Competition Penalty when Vehicle fails to reach the 7.00m Timing Line

SCORING SUMMARY

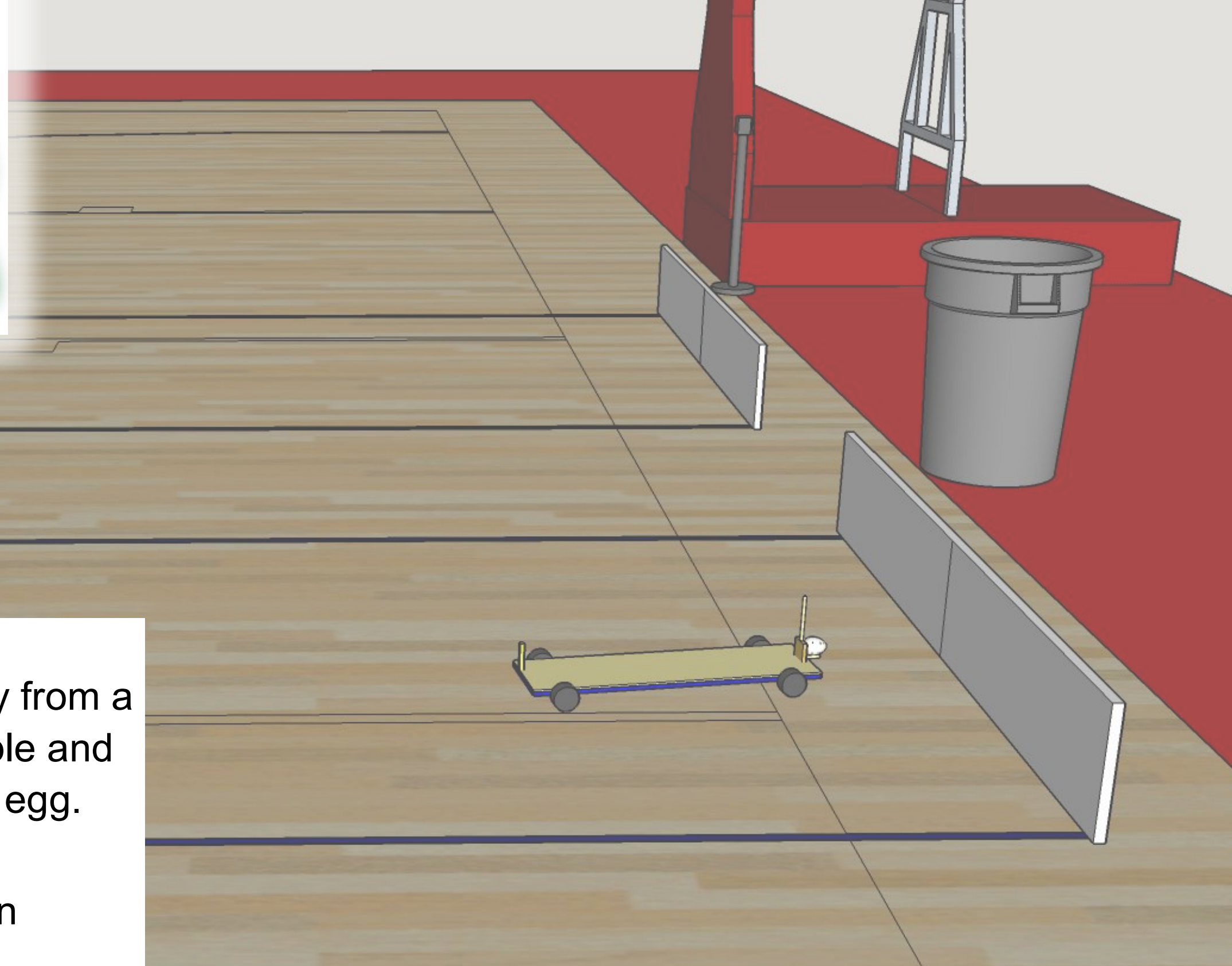
- Team with the lowest Final Score wins
- Final Score is lowest Run Score of the team's runs
- Run Score = Distance Score + Time Score + Run Penalties
- Time Score = Run Time x 2
 - Run Time begins when the dowel crosses the 0.50m Timing Line and ends when the dowel crosses the 7.00m Timing Line
 - Time Score is zero (0) for runs failing to reach 7.00m Timing Line and for Failed Runs
- Distance Score = 1 point per cm the Measurement Point (Tip of Egg) is from center of Terminal Barrier
 - Distance Score is 2000 points for a Failed Run
- Failed Runs occur:
 - Egg failed to reach the 0.50m Timing Line
 - Team is unable to complete the run(s) within the 8-minutes



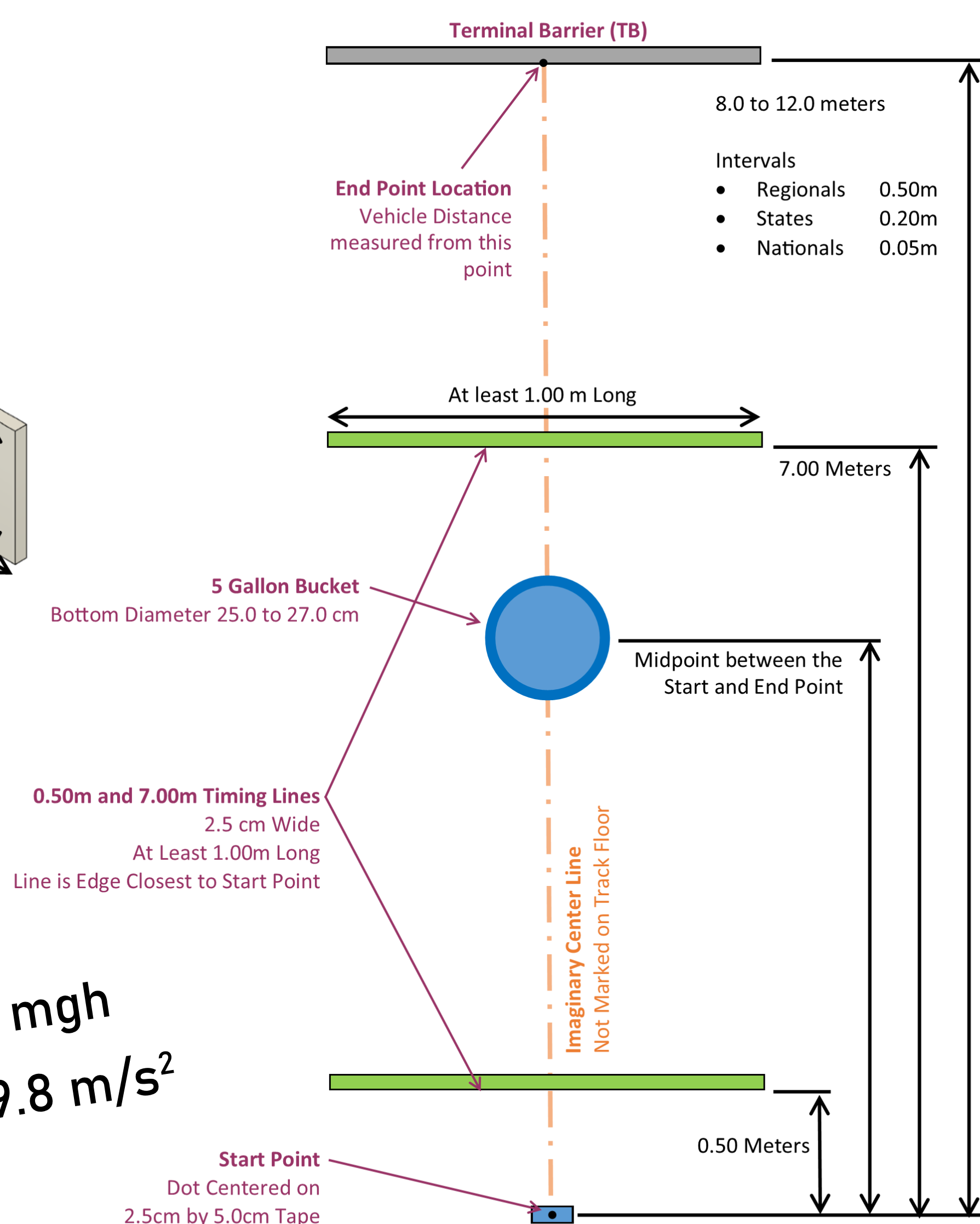
Example Concept - Not Required Design



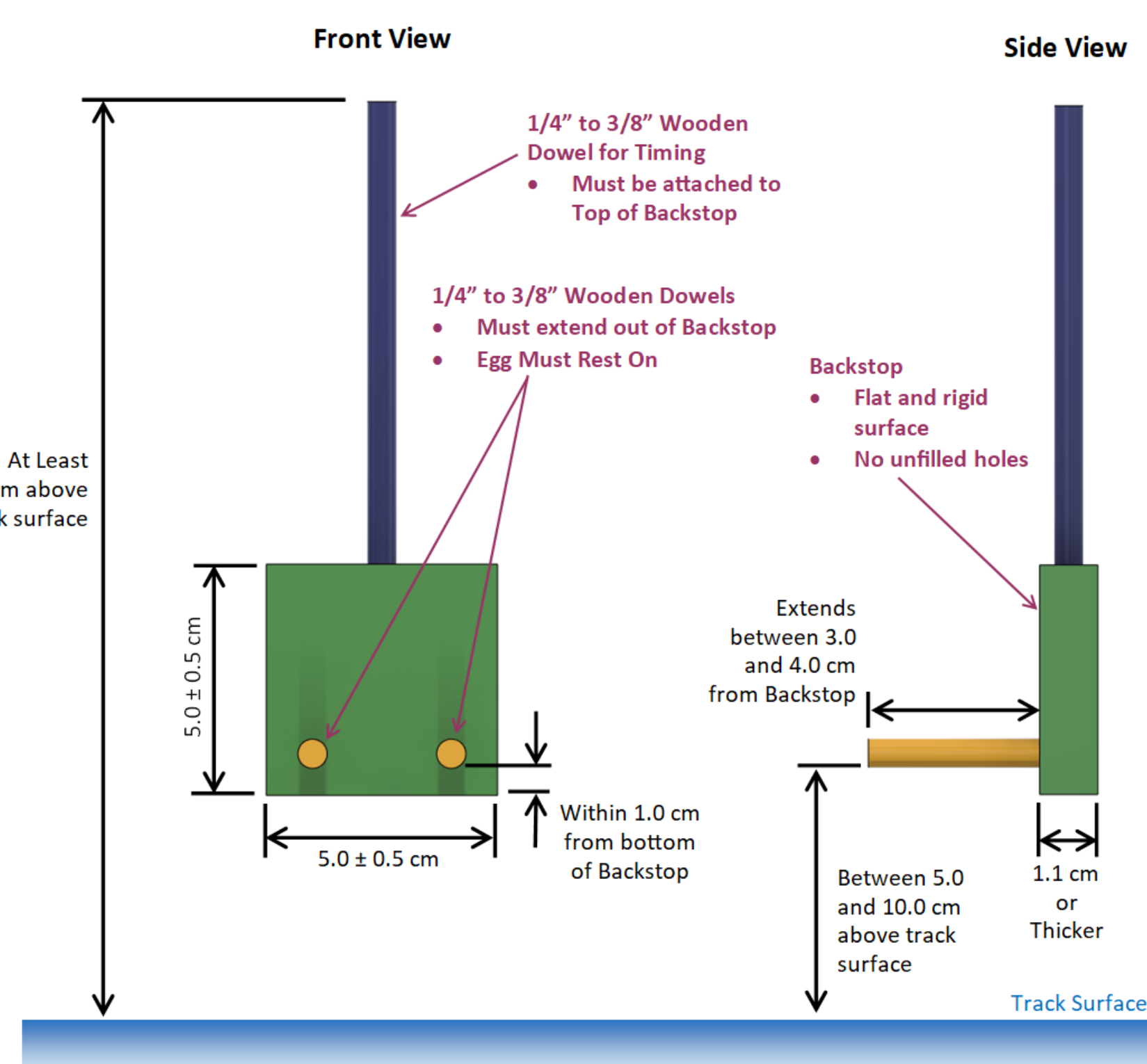
Scrambler Size Limits



Example Track Configuration



$$PE = mgh$$
$$g = 9.8 \text{ m/s}^2$$



Backstop Requirements



Exploring the World of Science