Gravity Vehicle - 2021

NCSO Coach’s Clinic - October 3rd, 2020

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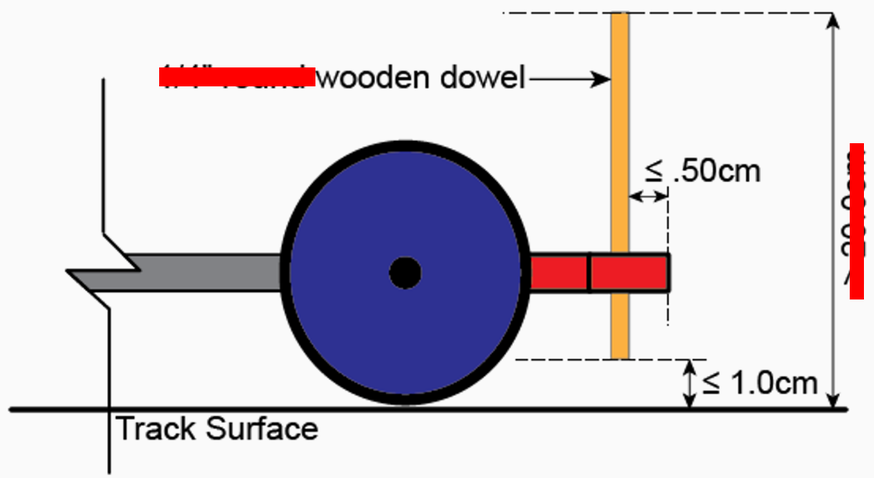
Disclaimer: This presentation is meant to be an overview and a basic guide. Official rules take precedence.

What is Gravity Vehicle?

- (1) Description: Teams will design, build, and test one Vehicle and Ramp that uses the Vehicle's gravitational potential energy as its sole means of propulsion to reach a target as quickly and accurately as possible.
- (1) Team Size: 1 or 2
- (5b) Event Time: 10 min to perform up to three runs
- (2a) Impound:
  - A single vehicle, a single ramp
  - Practice log
- (2b) Not needed to impound but can bring:
  - Tools, measuring devices, stand-alone calculator, **SAFETY GLASSES!!!!**
- (2b) Do not bring or impound: Any electric or electronic tools

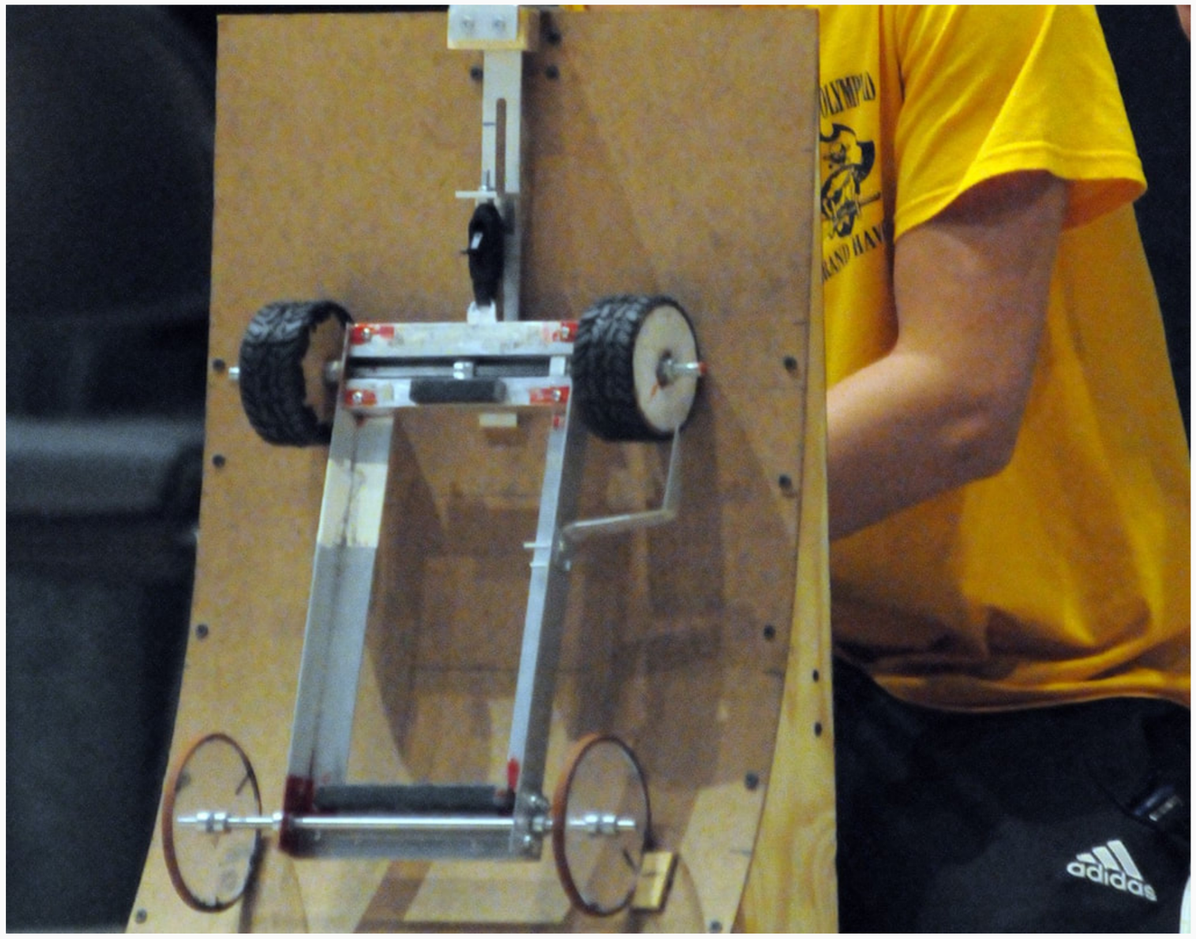
Vehicle Construction Parameters

- (3f) The Vehicle and the Ramp, together, in the ready to run configuration must fit within a rectangular box with a 50cm x 50cm base and 100cm height.
- (3a) A release mechanism must be included as part of the ramp to hold the vehicle in the ready to run configuration until triggered by the team.
- (NC Clarification)Dowel: For this year:
  - All that is required is a slim, vertical piece to be still placed at the leading edge of the vehicle. This dowel will be placed over the start point and used for measuring the vehicle distance.



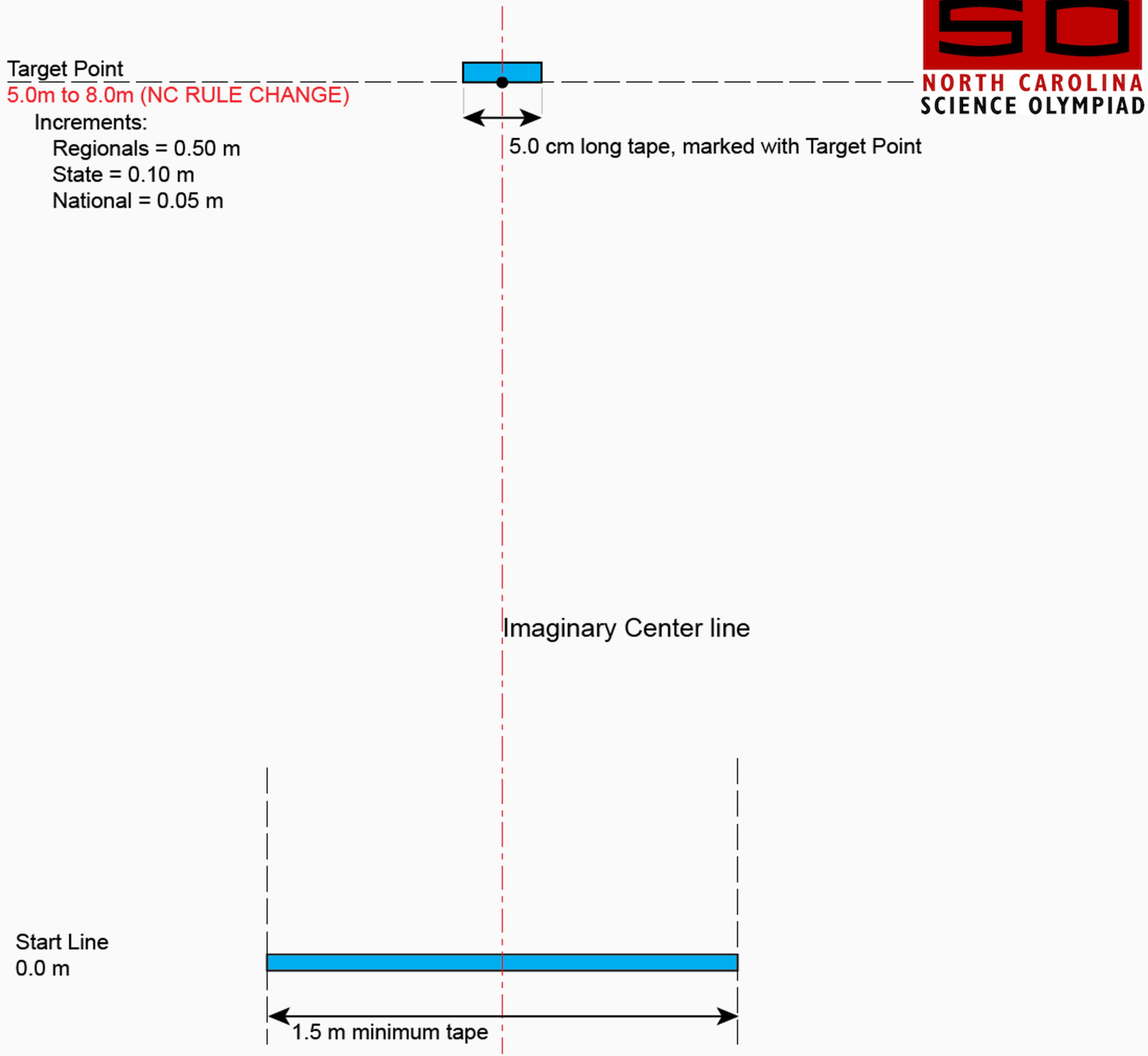
What can I use in my vehicle?

- Wheels: CDs, roller wheels, plastic
- Chassis: Wood, metal, aluminum, 3D print, laser cut, etc



Track layout

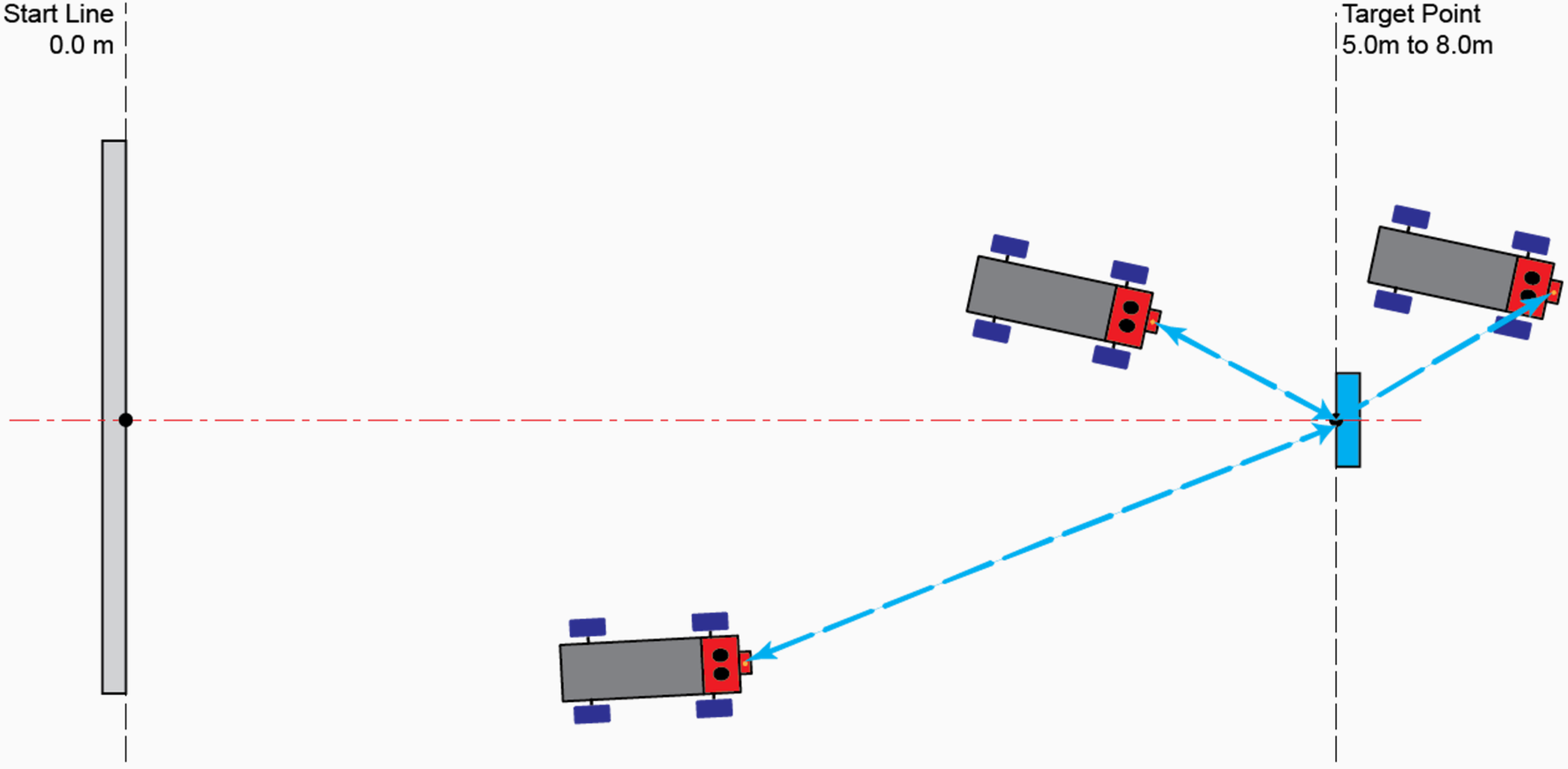
- (NC Clarification) Track will be on the surface the competitors choose to be on.
- (NC Clarification) The Target Point will be between 5.0 and 8.0 m from the Start Point.
  - (6c) The Target Distance (chosen at a designated time) will be chosen in the following intervals:
    - Regionals: 0.5m
    - State: 0.25m
    - Nationals: 0.05m



Scoring - Vehicle Distance Score

- Run Score = **Distance Score** + Run Penalties

- (7d) Point to point measurement from the dowel (Measurement Point) to the Target Point, rounded to the nearest 0.1cm
- (7c) Distance Score for a Failed Run is 2500 Points



Scoring - Run Penalties

Run Score = Distance Score + Run Penalties

- (7e.i) Competition Violation: 1500 points added to each Run Score that has 1 or more Competition Violations
- (7e.ii) Construction Violation: 3000 points added to each Run Score that has 1 or more Construction Violations

Scoring - Final Score

- (7a) Each team's Final Score is the sum of their 2 best Run Scores out of their 3 runs + any Final Score Penalties.
- (7f) Final Score Penalties:
    - Incomplete Practice Log: 250 points added to the team's Final Score
    - Missing or not Impounded Practice Log: 500 Points added to the team's Final Score
- (7a) Low Score wins

Practice Log

- Practice log to be uploaded as a pdf via the Google Form
  - Teams without a practice log are penalized 500 points
  - Teams with incomplete practice logs are penalized 250 points
- Practice log must include Team name and number
- Intent is to show that teams are testing prior to competition and varying parameters while testing
- (4a) Practice log must record the Target Distance, Vehicle Distance, and one additional parameter. (example: # of string wraps around the axle)
- (4a) Minimum of 10 runs

Run Number	Target Distance	Vehicle Distance	(additional parameter)
1	6.5m	75.6cm	[data entry]
2	7.5m	37.5cm	[data entry]
...	...	...	...

Common Mistakes / Tips and Tricks

- Dowels - NEED TO HAVE THEM! Have extras, and even better if it is adjustable!
- Start mechanism does not start with a pencil
- Not reading the rules
- Phones, can not be used as a calculator, can not be used during competition for any reason
- Let the students do it! Parents and coaches want to help, but once students are in the event area, they can not receive assistance with the competition
- Check the NCSO website for any rule clarifications and any updated diagrams, scoresheets, this presentation!
- Not reading the rules
- Remember to have fun and learn!

Resources:

National website videos, youtube videos