

## The Great Energy Hullabaloo: Roller Coaster Design Challenge

Level: Middle School

Type of Contest: Team

Composition of Team: 3-5 students per team. Students may only participate on one team.

Overview: Students will design and build a model roller coaster out of materials that are provided at the competition that transport a standard marble successfully through 6 pool noodles with various elements incorporated into the track.

Materials: Glass marble, ruler, 6 pool noodles, plastic cups, Styrofoam cups, paper towel rolls, toilet paper rolls, roll of painters tape

Rules:

1. The model will be designed for a glass marble. This means that the glass marble when released from the top of the first hill by the judge will travel through the entire ride, and arrive at the bottom loading platform. (Note: for this contest, you will raise the glass marble by hand from the loading platform to the top of the first hill to start the "ride").
2. Students may use a glass marble to test their coasters while building and designing their roller coaster.
3. Students may only use provided materials listed above for rollercoaster.
4. Marble must run through the entire track, from the defined beginning to a defined end without any outside assistance. Gravity must provide the only source of energy for the marble.
5. Size restrictions- coaster must not exceed 3 meters in height. Area of the roller coaster (its footprint on the floor) must not exceed 1.8 square meters.
6. Rollercoaster must also be labeled with school, team members, and rollercoaster name.

Judging:

Roller coasters will be judged using the following criterion:

1. Design (each element, no limit on the number of elements incorporated)
  - a. Vertical loop (x15 points)
  - b. Horizontal loop (x20 points)
  - c. Break in track (10 points)
  - d. Marble travels up an incline (x10 points)
2. Safety
  - a. Marble safely completes coaster within 2 official attempts: 10 points
  - b. Marble safely completes coaster within 3-4 official attempts: 5 points
  - c. Marble does not complete the coaster during official attempts: 0 points

For the marble to “safely complete” a coaster, it must remain on the defined coaster track through the entirety of its run, from the defined beginning of the coaster to the defined end.