

2023 Show Us Your Coaster

Summary

Roller coasters will be judged in two categories;

1. Coasters
2. 3D Printing/ Commercial Tracks

Roller Coasters will be judged based on the following criteria:

A. Technical Merit

- Reliability
- Ride Duration
- Engineering

B. Theme and Creativity

- Ride Name
- Creativity

Coaster Model Rules

A. The roller coaster and all theming and decorations must be no greater than 36 inches long by 36 inches wide by 60 inches high (i.e., the design needs to be able to fit into a box with these dimensions, with no parts sticking out). If the coaster model design exceeds any of these dimensions, it will be disqualified. This is a maximum size limit; the team is welcome to submit a smaller coaster model entry, and the team should factor transportation into their coaster design to ensure that it will fit into the bus or vehicle that will be transporting them to Elitch Gardens.

B. The model should be designed for a steel ball or glass marble. This means that the steel ball or 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 steel ball or glass marble by hand from the loading platform to the top of the first hill to start the "ride".)

C. A ball must be provided by the team so that it can be tested on judging day. The ball must be either a glass marble or regular size or greater, or a steel ball that is 1 cm (1/2") diameter or greater.

D. The ball must remain in contact with the track at all times; it may not jump the track or free-fall.

E. Magnets, electricity, springs and other forms of energy may not be used to propel and or launch the ball forward – this is a “gravity ride” only. Gravity is to be the only driving force. These other sources of energy can be used for esthetics (i.e., background lighting). No electricity is provided in the contest area.

F. The starting position at the top of the first hill should be clearly marked. The steel ball or glass marble must end at the base of the lift or loading area.

G. Each competing team can have a maximum of 4 students.

H. When it is time to judge the coaster, once the team says they are ready, they will be judged. If the team then has problems with the coaster completing the circuit, it is too late to postpone judging. They will get their three chances (or up to five chances for 100% “most open” track designs) and then the judges will move on to the next coaster.

I. The decision of the judges is final. Any coaster that violates the rules above or the spirit of the competition will be disqualified.

Judging Criteria

Each judge will score each entry independently; the final score for each entry will be the average of the judges’ scores for that entry.

Technical Score (60 pts)

- **Reliability (36 points maximum).** Each team will demonstrate their coaster for three runs. Each successful completion of the ride (from the designated start point to the designated finish point) will earn twelve (12) points; if all three attempts are successful, the team will earn thirty-six (36) points. There are no partial points for an incomplete circuit; if the ride does not make it to the designated end point, that ride attempt will not earn any points.

EXCEPTION FOR 100% “MOST OPEN” TRACK DESIGNS: If the coaster model uses a 100% “most open” track design (explained in more detail on the next page), then the team will be allowed up to five runs. This is because “most open” track designs are much more challenging to build and are often more finicky, so this will allow the judges to discard up to two incomplete track runs for these coasters.

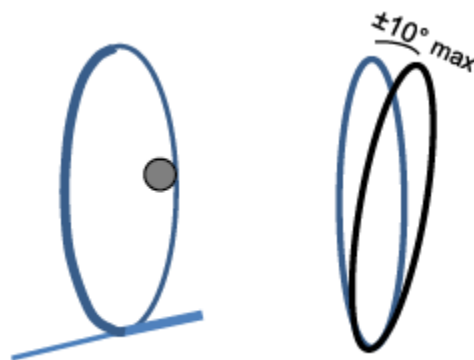
- **Ride Duration (14 points maximum).** Each of the three runs will be timed. The longest time to go from the start position to the finish will be the official time for that model, unless there is a significant discrepancy (greater than 20 percent) in run times, in which case the judges may, at their discretion, use the average of the three run times as the official time. Each team will earn seven (7) points if their coaster duration is between four and six seconds, and fourteen (14) points if their coaster duration exceeds six seconds.
- **Engineering (10 points maximum).** Each judge will subjectively award up to ten points for the overall design and construction of the coaster. Factors may include the type of materials used to construct the coaster, quality of construction, etc.

Theme (40 points)

- **Ride Name (10 points).** Though a “cool” name is always desirable, this score also includes how well the name fits the overall theme of the coaster.
- **Creativity (30 points).** The model roller coaster will be judged for its merits as a possible ride to be purchased by an amusement park. Theming is an essential element of a new ride.

Bonus Points

- **Vertical loops (5 points each).** Vertical loop is defined as any time for the “rider” is upside down on a loop of track that is within 10° of vertical (see illustration below). If the vertical loop is a portion of a corkscrew (helix), it counts as a vertical loop. Horizontal loops do not add bonus points.

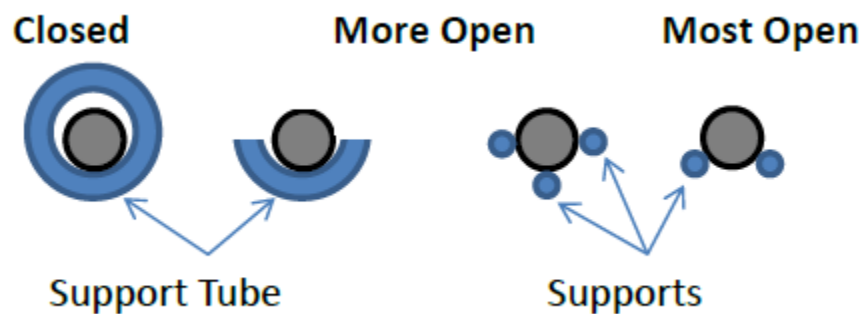


Vertical loops may appear to be subjective, but the judges plan to bring protractors to the contest this year and enforce the maximum 10% variation from vertical.

- **Track Design (10-40 points).** Coaster models that use a predominantly “More Open” track design (the middle two examples in the diagram below) will receive ten (10) bonus points; in order to earn these bonus points, at least 90% of the track length must be “More Open”.

Coaster models that use a predominantly “Most Open” track design (the far right example in the diagram below) will receive twenty (20) bonus points; in order to earn these bonus points, at least 90% of the track length must be “Most Open”.

Coaster models that use an entirely (100%) “Most Open” track design will receive 40 bonus points.



Due to feedback from some of the schools, the judges have decided that coaster models that use a track made from paper will only be eligible for a maximum of five (5) engineering points. This is due to the growing prevalence of online templates that make it much easier to print out a design.

During previous contests some teams were under the misconception that banked track was not allowed. Banked track is allowed, but any theming or elements that serve to keep the ball in contact with the track (e.g., side walls around a sharp turn) will count against the “most open” percentage and will disqualify coaster designs from being eligible for 40 bonus points. Be sure to keep this in mind when your teams add theming to their coaster!

- **Judge's Superlative Awards (10 points each).** The judges will collectively decide on the best coaster in each of the following categories, and each award superlative award will add ten bonus points to that teams' score. Each entry can only win one superlative award (i.e., the judges will not give both of these awards to the same coaster):
 - Most likely to be implemented as a real design
 - Most Creative/Unique

The judges received feedback last year that some faculty consider these awards to be essentially "fluff", and that we are awarding too many points in these categories - bonus points in these categories should not exceed the value of points earned for a successful ride completion. We also reduced the number of superlative awards from three to two.

Documentation

(1) Each team must attach a 3" x 5" index card to the ride. The front of the card should include:

Name of the Roller Coaster

The back of the card (not showing) should include:

School Name

Members of the Team with grade level

Teacher Name

Teacher's contact phone number

(2) Each team should download and complete the Entry / Scoring Form. Bring it with you to the model judging at Elitch Gardens.

The contest rules and idea is based on Canada's Wonderland, California's Great America Roller Coaster Building Contest and Kings Dominion Coaster Mania Building Contest.

For more information, contact:

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