

# 2024 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 by 36 inches 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), but may choose to use these dimensions in any direction. If the coaster model design exceeds 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 to the park into their coaster design.

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. Teams will be asked to clearly indicate the start and end points of the coaster. If the team 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). Adjustments to the track between runs may be made at the judges’ discretion. Judges will move on to the next coaster at the end of the time slot to remain on schedule.

**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 coaster will be collaboratively scored by the judging team.***

### **Technical Score (up to 61 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 later) then the team will be allowed up to five runs.***

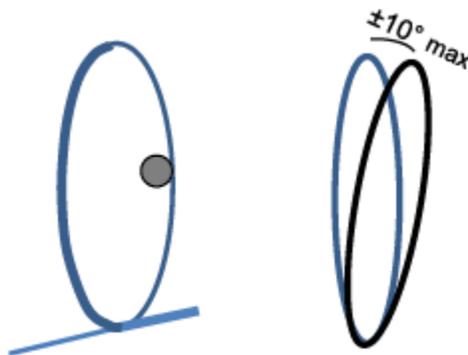
- **Ride Duration (15 points maximum).** Each of the three runs will be timed. The judges will use the average of the three run times as the official time. Teams will earn 0 points for a duration less than 4 seconds, 5 points for a duration between 4 and 6 seconds, 10 points for a duration from 6.01 to 10 seconds, and 15 points for a duration over 10 seconds.
- **Engineering (10 points maximum).** Judges 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. Paper tracks may only receive a maximum of five points.

### Theme (up to 40 points)

- **Creativity (20 points).** This includes the coaster name and decorative elements, as well as any other unique design features, and is based on the judges' discretion.
- **Feasibility (20 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, but also consider how riders may experience elements of the coaster. These points are awarded based on the judges' discretion.

### 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  $10^\circ$  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.

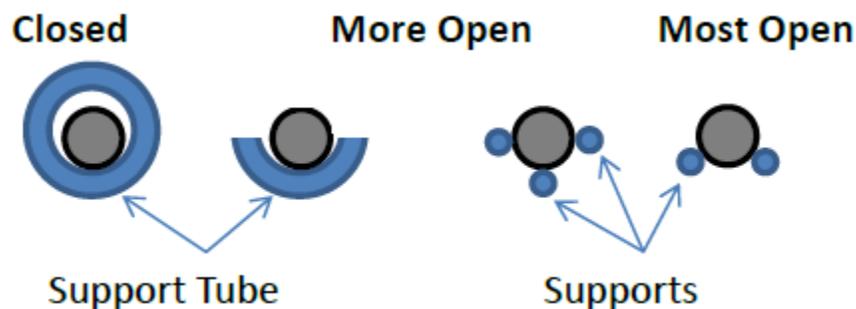


- **Track Design (up to 40 points).** Coaster models that use a predominantly “More Open” track design (the middle two examples in the diagram below) will receive a maximum of ten (10) bonus points; in order to earn these bonus points, at least 90% of the track length must be “More Open”.

Coaster models that use a predominantly “Most Open” track design (the far right example in the diagram below, with only two rails/points of contact) will receive a maximum of 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. **Any theme or design elements that keep the ball on the track will disqualify teams from the full 40 bonus points.**

Judges may use their discretion in modifying bonus scores due to theming or other elements that are used to keep the ball on the track or assist it in completing its circuit.



***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 superlative coasters in each of the categories, and each superlative award will add ten bonus points to that teams’ score. Each entry can only win one superlative award.
  - Most likely to be implemented as a real design
  - Most Creative/Unique

## 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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