

A Day at the Amusement Park Student Experiment Instructions

Purpose: The purpose of this activity is to reinforce the concepts of potential and kinetic energy and to allow you to identify the points of maximum and minimum energy of each type. This will help to increase your understanding of the effect of height on potential and kinetic energy. You will also use this activity to better understand the transformation of kinetic to potential energy and vice versa.

- 1.) Today you will be assuming the role of roller coaster designers working on an engineering design team. The task of your design team is to create a model of your roller coaster design using the vinyl tubing as the track and a BB as the car. Design teams must use their knowledge of potential and kinetic energy to get their car to the end of the track. **Your team MUST follow the rules listed below!**
 - ✓ The roller coaster must start at the top of the first hill.
 - ✓ There must be at least two loops on the track.
 - ✓ There must be at least two hills after the last loop.
 - ✓ Every hill must be lower than the one that comes before it.
 - ✓ Every loop must be lower than the hill that comes before it.
- 2.) Your design team can use scratch paper for initial and subsequent design plans.
- 3.) Once the team has agreed on an initial design, you can draw the design on the white board panel with a dry erase marker.
- 4.) Using masking tape, your team will tape the vinyl tubing to the dry erase board over the design, which has been drawn on the board. The plastic cup should be taped to the end opening of the track to catch the BB.
- 5.) Holding the board flat against the wall, you will release **(Not Push!)** the BB into the vinyl tubing track.
- 6.) A successful roller coaster is one in which the BB travels from beginning to end without getting stuck in the tube.
- 7.) Once your team has created a successful design, you will complete the Lab Observation Sheet. Students will remove tape from white board panel and tubing, clean the white board panel, and return all materials to the large plastic bag.
- 8.) ***If time allows:*** Once your design team has come up with an effective design, you can change your design to include different numbers of hills and loops, etc. to further investigate the transformation between potential and kinetic energy.

