

Energy Conversions and Roller Coasters

THE CHALLENGE: Using the materials provided and only 30 minutes, design and build a roller coaster to demonstrate energy conversions.

MATERIALS: Rubber tubing, a BB, tape, a funnel (*optional*), and only 30 minutes

SPECIFICATIONS:

1. Basic expectations of your roller coasters are below. These criteria are worth 70 points.
 - a. There must be at least two more hills after the first hill.
 - b. There must be one loop (careful!).
 - c. There must be one additional feature (a corkscrew, free fall drop, etc.).
 - d. The BB must complete the journey without any assistance from the group.
2. The tubing for the roller coaster should be taped to a wall. However, at strategic points, it may extend from the wall.
3. Roller coasters that meet the above criteria will receive a grade of 70. Additional points will be given for the following:
 - a. 5 pts. For each additional feature
 - b. 5 pts. for the roller coaster with the most total inches of height in the hills (top to base) plus inches in loop diameter
 - c. 5 pts for the roller coaster that is the longest in duration
 - d. 5 pts. for the roller coaster that is declared the scariest and *King of the Roller Coasters*
4. *Tape the cup at the end of the tubing to catch the BB.* **You only get one BB, DO NOT LOSE IT!!**
5. A successful roller coaster is one in which the BB travels from beginning to end without getting stuck in the tube. **DO NOT USE YOUR MOUTH TO BLOW OUT THE BB!** The moisture in your breath will make matters worse! Get creative to resolve the crimped tube problem!
6. The group that creates a roller coaster with the most total inches of height in the hills and loop will win the title of *King of the Roller Coasters* and also win 5 bonus points.

OBSERVATIONS

(Turn in one per group with all group member names included. Any items lacking will result in exorbitant deductions from the final grade.)

Draw a sketch of your roller coaster.

- Label the heights of the hills and loop diameters.
- Label the spots where the BB has the most potential energy (PE).
- Label the spots where the BB has the most kinetic energy (KE).