Building A Roller Coaster

Physics Quarter 3 Project (2015)

Purpose: To use the principles of centripetal force and momentum along with Newton's Laws of Motion to develop a roller coaster that will successfully transport a marble, golf ball or tennis ball through the course unaided and in the fastest time while accurately hitting a target.

Criteria of Roller Coaster: Minimum requirements for grading include

Start with a hill
2 complete loops
3 hills after loops
Each hill after loop must be taller
Needs to be at least 2-3 m long (linear length of track)
Project Ball into container 0.5 m below the track (you can provide this or we can set up a small bowl)

Materials: whatever you have available to you ~ this includes what I may have hanging around ~ don't go spending a bunch of money

Extra Credit Can be Given for ingenuity, creativity and construction of roller coaster

Due Dates:
Feb. 6 - Introduce project
Feb. 13 – Test roller coasters and show them off! (75 points)
Feb. 18 – Report and Evaluation of your roller coaster (75 points)

Roller Coaster Rubric

Criteria	**3**	**1**	**0**
Meets Hill requirements	Yes	Mostly	No
Meets loop requirement	Yes	1 loop	Zero loops
Object rolls entire distance	Yes	¾	Less than ¾ of distance
Meets distance	Yes		No
Appearance	Neat and well constructed	Mostly neat with good construction	Needs to be cleaned up and construction is weak
Design (doubled)	Sound and based upon the science	Mostly sound	Lacking in scientific principles
Target is reached (doubled)	Every time (3 trials)	Misses once	Misses more than once

To do this project, you should do research that enables you to understand the following terms and concepts:

- Potential energy (stored energy)
- Kinetic energy (energy of motion)
- Conservation of energy (basic law of physics)
- Gravity
- Velocity

* Friction
* Slope (rise/run)
* Law of Conservation of Momentum