

“Roller Coaster Physics”

Converting Potential Energy to Kinetic Energy

Objective: The goal of this project is to build a roller coaster for marbles using foam pipe insulation and other materials to investigate how much of the gravitational potential energy of a marble at the starting point is converted to the kinetic energy of the marble at various points along the track.

Materials:

- Foam Pipe Insulation
- Tape

Pre-Lab Questions:

1. What is potential energy?

2. What is kinetic energy?

3. Define gravitational potential energy.

Procedure:

1. Construct a roller coaster that has **at least two high points** where you can observe potential energy converting to kinetic energy. (*sketch out a design before you start building...*)
2. You may use any of the provided materials to construct your roller coaster.
3. **You must name of your ride!** Be creative 😊
4. It is up to your group how you want to construct the roller coaster and make use of your materials. However, you only have one class period to work on this project.
5. Run the marble through the roller coaster at least 10 times to determine an average velocity in m/s. You will record the data below
6. Make a NEAT drawing of your planned Roller Coaster in the box below. Note: You can tape the track to the wall, table, chairs, etc. However, no one should have to stand on a Table/Desk for ANY reason.

_____ Teachers Initial (good plan). Now, you can get your material.

HYPOTHESIS: How do you think the shape of the track will affect the marbles speed (for example, describe where the speed was the greatest and least and hypothesize how the shape or position affected the marble)?

Length of roller coaster: _____ meters (include everything the marble touches...desk, chair, cardboard, etc.)

Trial	Time (seconds)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Average	

Average velocity: _____ . (meters/second)

Height of roller coaster (tallest point): _____ . (meters)

Mass of marble: _____ . (grams)

Name of roller coaster: _____ .



Post-Lab Questions:

1. How many points on your roller coaster allowed you to observe potential energy?

2. How many points allowed you to observe kinetic energy?

3. What would you do differently in constructing a roller coaster again in the future to make it more accurate?

4. List any other forces or types of energy that may affect an actual roller coaster in a theme park:

5. Think: If height, weight, or points of energy changed, how would the experiment change?
