Roller Coaster Blueprint Data

My name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Group members: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name of roller coaster: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*All measurements should be recorded using metric units!

1. Track width: \_\_\_\_\_\_\_\_\_\_\_\_cm

2. Track length: \_\_\_\_\_\_\_\_\_\_\_\_cm or \_\_\_\_\_m \_\_\_\_\_cm

3. Track heights: all heights are recorded from the base up

1st hill: \_\_\_\_\_\_\_\_\_\_\_cm 1st loop: \_\_\_\_\_\_\_\_\_\_\_cm 2nd hill: \_\_\_\_\_\_\_\_ cm

2nd loop: \_\_\_\_\_\_\_\_\_\_cm top of jump: \_\_\_\_\_\_\_\_cm

4. Time trials: 5 separate trials and then average them (add all 5 and divide by 5)

|  |  |
| --- | --- |
| Trial | Time in seconds |
| Trial #1 |  |
| Trial #2 |  |
| Trial #3 |  |
| Trial #4 |  |
| Trial #5 |  |
| AVERAGE |  |

5. Velocity: Calculate the velocity by dividing the distance (length of track-see #2) by the average time (see #4)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m/s

6. Potential energy: calculate the potential energy for your roller coaster by using the following equation:

PE = (weight of marble in Newtons)(height of 1st hill in meters, see #3)

* Weight of marble in grams: \_\_\_\_\_g
* Weight of marble in kilograms: \_\_\_\_kg (move decimal 3 places to left from grams)
* Move decimal 2 places to LEFT to convert weight to Newtons: \_\_\_\_\_\_\_\_\_\_\_\_N

PE = ( \_\_\_\_\_\_\_\_N) (\_\_\_\_\_\_\_m)

PE = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Joules

7. Kinetic energy: calculate the kinetic energy of your roller coaster using the following equation:

KE= ½ (mass of marble in kg)(velocity)2

KE= \_\_\_\_\_\_\_\_\_\_\_\_\_Joules

8. Momentum: calculate the momentum of your roller coaster using the following equation:

Momentum= (mass of marble in Kg-see #6) (velocity-see #5)

Momentum = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_kg/m/s

1. Complete a neat side view sketch of your roller coaster and then add all of the above data to your sketch.

2. Use the abbreviation “PE” to label each place there is potential energy on the track.

3. Use the abbreviation “KE” to label each place there is kinetic energy on the track. Or, you may develop a symbol system such as a dashed line where there is KE and create a KEY.

4. Identify any place where Newton’s 1st law of INERTIA is located.

5. Identify any place where Newton’s 3rd law of ACTION/REACTION is located.

6. Identify any place where CENTRIPETAL FORCE (force that keeps objects moving in a circle) is located.

\*Make sure you can discuss all of the above information for your presentation!