PHYSICS 2204
Unit 3: Work Power and Energy
Core Lab #3: Conservation Of Energy

STUDENT NAME:_____

DATE:_____

GROUP MEMBERS:

_____ _____

PURPOSE: The purpose of this lab

- Is to see how energy gets transferred in a real world application.
- Understand how variables like mass, height, and friction affect roller coasters
- To understand the physics of a roller coaster ride

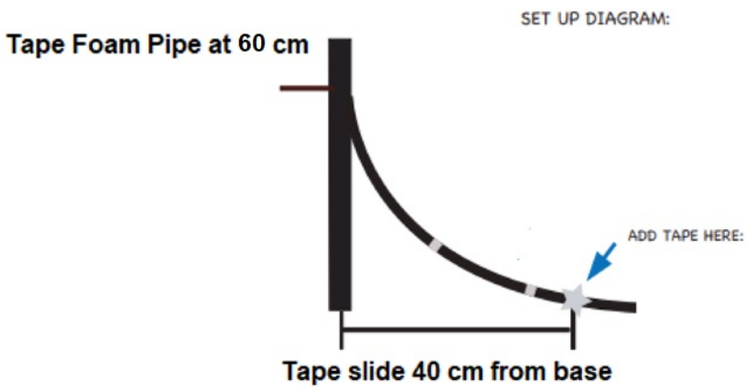
MATERIALS

-Pipe insulation
-Triple beam balance
-Ipad
-Pencil
-Duct Tape
-Small Marble
-Meter Stick

INSTRUCTIONS:

PART 1: Using Small Mass

1.1 Note: You can tape the track to the wall, table, chairs, etc and floor. However, no one should have to stand on a Table/Desk for ANY reason.



1.2 Release your marble from 60 cm from the floor. Use should use tape to mark the point of release.

1.2 Use triple beam balance to measure and record the mass of your small marble. Remember significant figures and to convert mass to kilograms.

1.3 Calculate the potential energy of the small marble

1.4 Drop the small marble and use the setup below to determine the final speed.

1.5 Use your meter stick and slow motion on the Ipad to get distance, time and speed

1.6 Do this for 3 more trials and calculate the average speed.

1.7 Calculate the kinetic energy

1.8 Calculate efficiency

PART 2: Changing Height

2.1 Using one of your previous marbles

2.2 Move your roller coaster to a height 40 cm

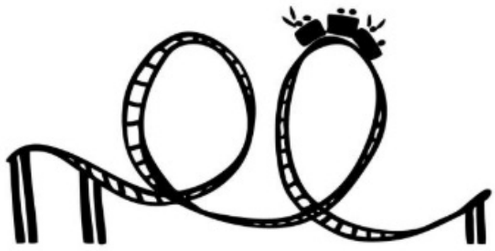
2.3 Repeat steeps from previous labs

PART 3: Design a Roller Coaster With A Loop

3.1 Tape 2 halves of pipe insulation together to create one long track

3.2 Create a roller coaster with one loop that the marble must go around

3.3 If time permits, see how many loops you can get the marble to complete



OBSERVATIONS:

PART 1: Small Marble

Small Marble Mass:_____

Potential Energy (Show your workings):

Trial	Distance	Time	Speed
1			
2			
3			
4			

Average Speed = _____ =_____ m/s
4

Calculate the kinetic energy:

Why is the kinetic energy less than the potential energy?

_____

_____

Is this a closed system? Explain

_____

_____

What is the efficiency?

PART 2: New Height

Height of Marble:_____

Small Marble Mass:_____

Potential Energy (Show your workings)

Trial	Distance	Time	Speed
1			
2			
3			
4			

Average Speed $= \frac{\text{\_\_\_\_\_}}{4} =$ _____ m/s

Calculate the kinetic energy:

What is the efficiency?

How did changing the height affect your roller coaster?

_____

_____

_____

_____

PART 3: Design A Roller Coaster With One Loop

1. Make a NEAT drawing of your planned Roller Coaster in the box below. Indicate the starting height of the roller coaster and the loop on your diagram

2. You must name of your ride! Be creative _____

3. On your diagram use A to label places where the highest Potential Energy occurs and B for highest maximum kinetic energy.

4. What factors determine if a roller coaster can make a loop?

_____

_____

_____

_____

CONCLUSION: