Name: Date: Period:

**Physical Science Mid Term, October 19-20, 2015**

**This is a mid-term project and the completed project is due October 20, 2015.**

**LATE PROJECTS WILL EARN A MAXIUM GRADE OF 50!**

**Provided Materials**:

 Foam Pipe Insulation

 Tape

**Pre-Lab Questions**. Use complete sentences. To be done individually. (4 points each)

1. What is potential energy?
2. What is kinetic energy?
3. Define gravitational potential energy.
4. How does momentum relate to kinetic energy?

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Initials 1\_\_\_\_\_\_

1. Explain how the law of conservation of energy relates to kinetic and potential energy.

**Each group member will have an assigned job. List the name for each student next to the job. Additional responsibilities will be assigned for each section of the mid term. (1 point each)**

\_\_\_\_\_\_\_\_\_\_\_\_ **Engineer**

* Time Keeper and maintains team to stay on task
* Oversees check/stop points
* Completes page 1 answers

\_\_\_\_\_\_\_\_\_\_\_\_ **Architect**

* Completes page 2 answers
* Oversees and helps with construction
* Assigns jobs to each group member so everyone participates in construction

\_\_\_\_\_\_\_\_\_\_\_\_ **Procurement**

* Completes Page 3 answers
* Responsible for asking clarifying questions to Mr. Case
* ****Responsible for getting and returning supplies

\_\_\_\_\_\_\_\_\_\_\_\_ **Journalist**

* Completes page 4 answers
* Responsible for making sure all parts are complete
* Helps Engineer keep time

Initials \_\_\_\_\_\_

**Minimum requirements: The roller coaster must include at least two points where you can measure the potential energy convert to kinetic energy. Additionally, your roller coaster must include two locations where you can measure the time.**

**HYPOTHESIS:** Write a statement that can be proven correct or incorrect about kinetic or potential energy for a marble roller coaster. (3 points if complete sentence)

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. (3 points)

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**Experiment stage** (up to 10 points for teamwork, time management and doing the construction)

Initials \_\_\_\_\_\_

1. You may use any of the provided materials to construct your roller coaster.
2. **You must name of your ride**! Be creative Put the name on a sign and add to the roller coaster. Name of roller coaster:
3. 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.

Length of roller coaster to location 1: meters (include everything the marble touches…desk, chair, cardboard, etc.) (1 point)

Length of roller coaster to location 2: meters (include everything the marble touches…desk, chair, cardboard, etc.) (1 point

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 (4 points if complete)

|  |  |  |
| --- | --- | --- |
| Trial | Location 1  Time (seconds)  Person recording: | Location 2  Time (seconds)  Person recording: |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |
| 9 |  |  |
| 10 |  |  |
| Average |  |  |



**Analysis:**

Height of roller coaster (tallest point): \_. (meters) Mass of marble: \_. (kilograms)

Initials \_\_\_\_\_\_

What is the average velocity at location 1? (5 points)

Variables Formula Math Answer Units

What is the average velocity at location 2? (5 points)

Variables Formula Math Answer Units

What is the acceleration from starting at rest at the beginning to location 2? (5 points)

Variables Formula Math Answer Units

What is the force at location 2? (5 points)

Variables Formula Math Answer Units

What is the potential energy at the beginning of the ride? (5 points)

Variables Formula Math Answer Units

What is the kinetic energy at location 1? (5 points)

Variables Formula Math Answer Units

What is the kinetic energy at location 2? (5 points)

Variables Formula Math Answer Units

What is the momentum of the marble at either location? Which location are you using? \_\_\_\_\_\_ (5 points)

Variables Formula Math Answer Units

Initials \_\_\_\_\_\_

**Post-Lab Questions**: (4 points each if complete sentences are use)

1. How many points on your roller coaster allowed you to observe potential energy? Explain why you chose those points.
2. What forces affected the movement of the marble on your roller coaster?
3. Explain how changing height or weight for the marble would change the experiment.
4. Was the energy at the beginning the same as the end of the roller coaster (Law of Conservation of Energy)? Explain your answer.