**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Rollercoaster lab Per: \_\_\_**

Challenge: You have just been hired by Kings Dominion to design the best most thrilling, fastest rollercoaster the park has ever had. Using what you know from Physics design a rollercoaster that will allow 3 types of carts to go the entire length of the track and land in the cup.

* Plastic ball simulates the cart in very early season that has very little passengers.
* Glass ball simulates a cart ride in mid-season that is halfway full
* Steel ball simulates a cart ride in the summer that is completely full.

**Rules:**

1. All tracks must begin at least at the top of your desk.
2. All tracks must touch the floor at least once.
3. All “carts” must land in the cup- The track should not touch the cup.
4. The cup should be free standing. Nothing should be holding the cup down.
5. All tracks must have at least 2 loops.
6. The ride must work for all types of rides.
7. Use tape to secure the track and you may use your own supplies to elevate the track.

**Day 1: Glass Cart**

Sketch your rollercoaster: **Neatness Counts!**

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| **Day 1: Glass Marble Data**  Rollercoaster Height (m)\_\_\_\_\_\_  (Highest point of the track)  Number of loops\_\_\_\_\_\_\_  Distance (m): 3.66m  Time (sec):\_\_\_\_\_\_\_\_\_  Speed= Distance/Time  Speed= \_\_\_\_\_\_\_\_\_\_\_ |

**Day 2: Wood and Steel Carts**

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| **Day 2: Plastic and Steel Marble Data**  Rollercoaster Height (m)\_\_\_\_\_\_  (Highest point of the track)  Number of loops\_\_\_\_\_\_  Distance (m): 3.66m  Time (Plastic) (sec):\_\_\_\_\_\_  Speed (Plastic)= Distance/Time  Time (Steel)= \_\_\_\_\_\_\_\_\_  Speed (steel) \_\_\_\_\_\_\_\_\_\_ |

Sketch your rollercoaster and label any changes you made from day 1. **Neatness Counts**!

**Class Roller Coaster Data**

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| **Coaster Name** | **Track Height (m)** | **Distance (cm)** | **Time (S)** | **Speed (m/s)** |
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2. Draw your finished product. Label the points at which your cart would have kinetic, potential energy.

**Conclusion Questions:**

1. Compare the rollercoasters in your class that were fastest to those that were not as fast. Analyze the information you gathered in class and justify why certain rollercoasters were faster than others.
2. What design challenges did you face with your roller coaster construction? How was your team able to redesign to overcome these challenges?
3. Compare the speeds of each type of marble. Defend why a certain type of marble was the fastest.
4. Reflecting on this lab create a 5-7 sentence paragraph connecting how the following terms relate (Gravity, friction, kinetic energy, potential energy, acceleration, conservation of energy)