Drop Zone

DATA & OBSERVATIONS

A SPOT is provided near Psycho Mouse where the horizontal distance to Drop Zone is measured carefully. Use this SPOT to complete the work that follows.

Measurements & Observations While Standing in Line

_____ (a) Determine how high the cabin is lifted. Explain how you calculated this figure (show your work!)

_____ (b) Time for vehicle to ascend tower.

_____ (c) Determine the distance of true "free fall". Explain how you made this measurement (show your work!)

Measurements & Observations While Riding

1. Hold a small tethered plastic washer steady in front of you while the car is still at the top of the tower. Release the washer as the car begins to fall. Describe the motion of the washer during the ride as the car moves straight down.

2. From your perspective in the cabin, what is the mathematical description of the path traced out by the washer as it falls? Would an observer on the ground describe the path differently? How?

3. Briefly describe how the force you feel changes during the ride. Be sure to describe the ascent, free fall, and braking portions of the ride.

CALCULATIONS & QUESTIONS

IN ORDER TO EARN FULL CREDIT YOU SHOULD SHOW YOUR METHOD, INCLUDING EQUATIONS, AS APPLICABLE

1. Calculate the duration of the free fall period from your free fall distance.

2. Calculate the maximum speed attained (ie., at the end of the free fall period).

3. How many g's did you experience during free fall? Justify your answer.

4. If the mass of the loaded car is 750 kg, how much work is done to raise the car to the top of the tower? (Neglect the energy losses due to friction)

5. Neglecting friction and assuming a constant rate of lifting, how much power is expended by the motor as it raises one car to the top of the tower?