

# The Wildcat

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Named after the first roller coaster at HERSHEY PARK, this wooden coaster twists its way through or over itself 20 times during the ride.

**Question 1:** What is the average speed of the Wildcat from the time the coaster starts down the first hill until the time when the brakes are first applied at the end of the ride?



**Prediction 1:** NOTE - MAKE THIS PREDICTION AFTER YOU HAVE RIDDEN THE COASTER!! THEN TAKE YOUR MEASUREMENTS FROM THE GROUND JUST TO SEE HOW WELL YOUR PERCEPTIONS COMPARE TO THE ACTUAL SPEED.

The average speed of the ride seems to be about:

- (a) 10 miles/hour (almost 5 m/s)
- (b) 20 miles/hour (about 9 m/s)
- (c) 40 miles/hour (about 18 m/s)
- (d) 60 miles/hour (about 27 m/s)
- (e) 80 miles/hour (about 36 m/s)

**Try It!!:** From the ground, use a stopwatch to measure the time of the ride **from the time the coaster starts down the first hill** until the **time when the brakes are first applied at the end of the ride**. Find the average speed of the ride using the equation below. (See the Engineering Specifications.)

Time = \_\_\_\_\_

Average Speed = Distance traveled / Time = \_\_\_\_\_ = \_\_\_\_\_ m/s

**Observations/Conclusions:** How did your prediction compare to the actual measurement of the ride's average speed? If there was a difference between the two, explain why you think this might happen.

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**Question 2:** While standing in line, you'll notice that the coaster stops at the end of the ride by applying the brakes a number of times. What is the maximum stopping acceleration (in g's) that the coaster undergoes during braking?

**Prediction 2:** You can make your estimate by comparing what you see while standing in line to what you've experienced in a car that comes to a quick normal stop which is about 0.7 (g's).

The maximum stopping acceleration for the coaster is about \_\_\_\_\_ g's.

**Try It!!:** Before reaching the end of the ride, set the horizontal accelerometer **firmly and horizontally on the lap bar with the 80° facing forward**. As the car goes through the braking process, note the maximum angle to which the beads rise. The tangent of this angle is the acceleration (in g's).

The maximum stopping acceleration on the ride is \_\_\_\_\_ g's.

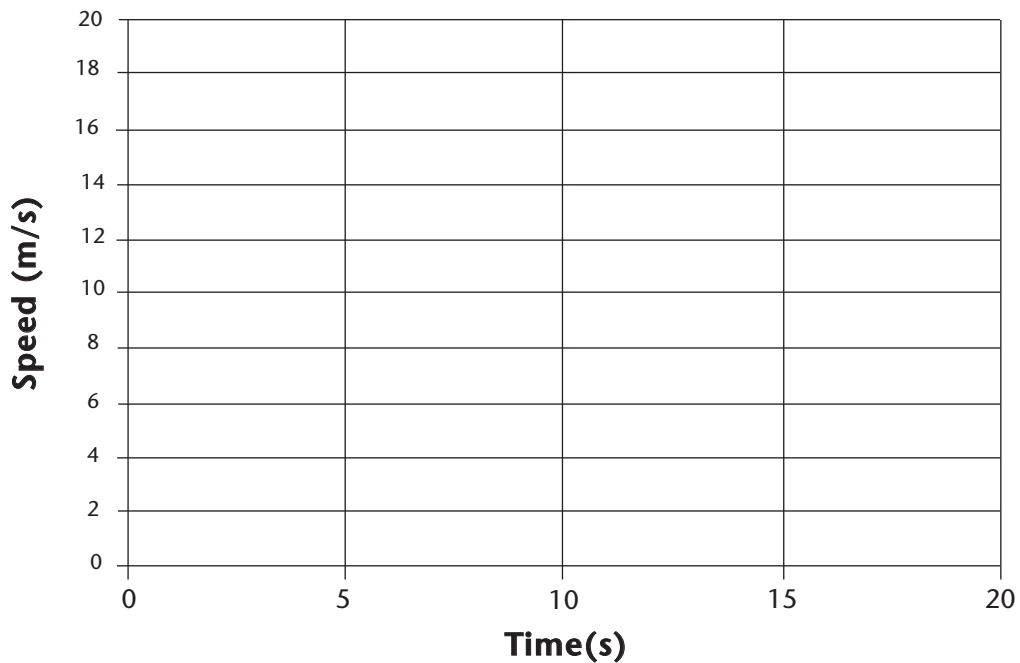
**Observations/Conclusions:** How did your prediction compare to the actual meter reading? Explain any differences. \_\_\_\_\_

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\_\_\_\_\_

**Graph It!!:** Sketch a Speed-Time graph that shows how the speed of the coaster varies during the braking process.

### THE WILDCAT STOPS!



**Engineering Specification:**

Ride length from top of 1st hill to where brakes first applied = 775 meters