

# Hot Wheels Lab

**Introduction:** Speed and velocity, while similar, are different. Speed is the distance an object moves divided by the time it took. For example, if a car travels 100 miles in 3 hours its speed is 33.3 miles per hour (mph). Velocity is speed in a given **direction**, for example 50 mph North or 33 meters per second West. An object's speed can be constant while its velocity changes, such as in a car turning or circular motion.

**Purpose:** To calculate the velocity of Hot Wheels Cars from different ramp heights.

**Procedure:**

1. There are 6 Hot Wheels courses throughout the classroom numbered 1-6.
2. For each course, you are to record time measurements for your car 3 times, average them, and calculate the velocity for each course.
3. Collect your data in the table below. Remember to use correct units and to "throw away" any data that is inconsistent.

Course #	Time 1 (seconds)	Time 2 (seconds)	Time 3 (seconds)	Time (Average)	Distance (cm)	Velocity (cm/s)
1) 12 cm						
2) 22 cm						
3) 32 cm						
4) 42 cm						
5) 52 cm						
6) 52 cm*						

**Analysis:**

1. How fast was your fastest car going in (m/s)?
2. What is the difference between speed and velocity?
3. How can an object be going at a constant speed, but NOT velocity?
4. Courses 5 & 6 both started from 52 cm of height, why was 5 faster?
5. What trend did you see in the speed of the cars as starting height increased?
6. Why did the cars speed up? What is a change in velocity called?

7. Complete the problems. Show all steps including the formula used.
- What is the speed of a car that moves 339 miles in 6.5 hours?
  - How long would it take a plane to travel around the world (24,800 miles) if its average speed was 612 miles per hour?
8. How fast was your fastest car going in miles per hour? (HINT: 1hr=3600s)
9. How fast was your slowest car going in miles per hour?
10. Create a graph below showing velocity (y-axis) to starting height (x-axis).

