



# Acceleration

## STEM Sims

### Lesson 8: Average Speed

A person riding a bike looks down at the bike's pedal for a couple of seconds. Suddenly, the person looks up to see a large dog directly in the bike's path. Whether a collision between the bike and dog occurs or not depends mainly on the speed the bike was moving. Speed is a measure of how fast an object is moving. Average speed is the total distance an object travels divided by the total time the object took to move that distance. Speed is often measured in miles per hour or meters per second.

### Doing the Science

1. Select the Sim tab to open the Acceleration simulation.
2. Select the black car on the left side of the screen by clicking on the car.
3. Select a speed of 10 m/s.
4. Allow a couple of seconds for the car to reach a constant or steady speed. A box appears when the car reaches a constant speed.
5. Select an acceleration of zero ("0"). This means that your car will be moving at a steady speed. As soon as you select a "0" acceleration, the simulation will begin running. Immediately begin counting the number of yellow road lines that the car passes. Record this number in Table 1. The car will move for a total of 10 seconds.
6. Calculate the speed of the car by dividing the number of road lines you counted by the total time (10 seconds). Record this value in Table 1. The car's speed should be reported in road lines per seconds.
7. Select the "Restart" option. Select the same car as before. Select a speed of 20 m/s.
8. Complete steps 4–6 above.

**Table 1.**

Speed	Number Road Lines Passed	Time	Speed (road lines/second)
10 m/s		10 seconds	
20 m/s		10 seconds	

### Do You Understand?

1. How did the speed in road lines per second compare for the two trials?

2. Create a graph of your data. Use your graph to determine the speed of the car in lines passed per second for the following speeds:

a. 8 m/s \_\_\_\_\_ b. 13 m/s \_\_\_\_\_ c. 27 m/s \_\_\_\_\_

3. A student riding in a car counted 25 roadway lines passed when the car moved at 10 m/s and 50 lines passed when the car moved at 20 m/s. Create a graph of this data plotting the car's speed in m/s on the  $y$ -axis and lines/sec on the  $x$ -axis. Use your graph to write an equation of the line in  $y = mx + b$  form.

4. Using your equation from question #3, if the car's speed was 233 lines/sec, what would the car's speed be in m/s?