

Formulas: $time = \frac{Number\ of\ Frames}{Frame\ Rate}$ $Velocity = \frac{distance}{time}$

$$Speed\ in\ mph = (Speed\ in\ m/s) \times 2.24$$

How to find the speed of an object in meters per second and miles per hour...

Step 1: Find a video of a moving object.

Step 2: Watch the video and find a spot where the object travels a distance that you can measure or estimate. Write down the distance, in meters.

Step 3: Advance the video one frame at a time, and count the number of frames that it takes for the object to travel the distance that you recorded. Write down the number of frames.

Step 4: Find the frame rate of the video. For most normal videos, the frame rate is 30fps (30 frames per second). This means the video camera takes 30 pictures every second. An iPhone slow motion video has 240fps. Write down the frame rate.

Step 5: Use the time formula, above, to calculate the amount of time it took the object to move that distance. Write down the time, in seconds.

Step 6: Use the velocity formula to calculate the speed. Write down the speed, in meters per second.

Step 7 (last step!): Use the "speed in mph" formula to convert the m/s speed to mph. Write the speed in mph.

Practice:

1. Object Description:

Measure or estimate the distance traveled, in meters. **d = _____ m**

Count the number of frames for the object to travel this distance. **# of frames = _____ frames**

Find the video frame rate. **Frame rate = _____ fps**

Calculate the time for object to travel this distance.

Time = _____ s

Calculate the object's velocity, in meters per second.

Speed = _____ m/s

Convert the object's speed to mph.

Speed = _____ mph

2. Object Description:

Measure or estimate the distance traveled, in meters. $d = \underline{\hspace{2cm}}$ m

Count the number of frames for the object to travel this distance. # of frames = $\underline{\hspace{2cm}}$ frames

Find the video frame rate. **Frame rate** = $\underline{\hspace{2cm}}$ fps

Calculate the time for object to travel this distance.

Time = $\underline{\hspace{2cm}}$ s

Calculate the object's velocity, in meters per second.

Speed = $\underline{\hspace{2cm}}$ m/s

Convert the object's speed to mph.

Speed = $\underline{\hspace{2cm}}$ mph

3. Object Description:

Measure or estimate the distance traveled, in meters. $d = \underline{\hspace{2cm}}$ m

Count the number of frames for the object to travel this distance. # of frames = $\underline{\hspace{2cm}}$ frames

Find the video frame rate. **Frame rate** = $\underline{\hspace{2cm}}$ fps

Calculate the time for object to travel this distance.

Time = $\underline{\hspace{2cm}}$ s

Calculate the object's velocity, in meters per second.

Speed = $\underline{\hspace{2cm}}$ m/s

Convert the object's speed to mph.

Speed = $\underline{\hspace{2cm}}$ mph