

Aim: To calculate the speed that you can throw and kick a ball.

Method:

- From a wall, measure out a 10-metre distance and place two cones down about a metre apart.
- Kick and throw a ball from between the cones towards the wall. (Every student should do one kick and one throw.)
- Record the event with a digital camera and then use Quicktime (and the arrow keys on your PC) or similar software to count the number of frames that the ball took to travel 10 metres.
- The software that you use should be able to tell you the frame rate that it was shot in. The most common frame rates are 24 fps (frames per second), 25 fps, and 30 fps.
- Using the tables below calculate the speed that you (and others) were able to kick and/or throw the ball.



Student A (Name and Action)	
Distance	10 metres
No. of Frames (that the ball took to hit the wall):	
Frames per second (that the video was shot in):	
Time taken for the ball to travel the 10m distance (no. of frames/frames per second):	
Average speed of ball in m/s:	$v_{ave} = \frac{d}{t} =$
Average speed of ball in km/hr (to convert m/s to km/hr, simply multiply by 3.6):	

Student B (Name and Action)	
Distance	
No. of Frames	
Frames per second	
Time taken for ball to travel the 10m distance	
Average speed of ball in m/s	
Average speed of ball in km/hr	

Student C (Name and Action)	
Distance	
No. of Frames	
Frames per second	
Time taken for ball to travel the 10m distance	
Average speed of ball in m/s	
Average speed of ball in km/hr	

Questions:

1. We have assumed that the ball travelled 10 m. Give reasons why this distance may not be 100% accurate.

2. Does the frame rate of the video affect the accuracy of the results? Would a higher or lower frame rate be better?
