

# Physics - VideoGraph Lab

## VideoGraph Tutorial (menu items at top are in bold face)

1. Go to the [**Setup**] menu, choose [examine details]. Double click the box for the marker, and choose a color you can easily see.
2. From the [**View**] menu, select the [magnifier]. You can move this to a more convenient place by grabbing the title bar and dragging. Then click on the video window to make it the active window (you can tell when it has a title bar at the top).
3. Return to the [**Setup**] menu, choose [calibrate]. Place the pointer at one end of the object with known length and drag a line to the other end. In the calibrate window indicate the length of this line. You must also set the time between frames; calculate this by taking the reciprocal of the frames/second (found in the examine details info window).
4. Position the cross-hairs over the object you wish to mark. When you have it where you want it, click the mouse. A marker is left on the frame and the movie advances a frame. Keep marking the position of the object until you reach the end of the movie. If you mis-mark a point, you can use the rewind or fast forward buttons at the bottom of the movie window to find the frame with the bad point. Then simply remark the point and fast forward to the end.  
**Note:** Depending on the speed of your computer, you may find that the image on the screen appears to be flashing, and that it is difficult to position the crosshairs on the object. If this occurs, go to [examine details] and choose the show the markers [Frame by Frame] rather than [Every Frame].
5. Now select [graph] from the [**View**] menu. The default is x-position vs time, but you can change the variable on the y-axis by moving the pointer up to the axis label and holding down the mouse. Go to the [**Setup**] menu, select [Graph Window], and choose the 4-graph option. Expand the window to full screen, then produce  $x$  vs  $t$ ,  $y$  vs  $t$ ,  $v_x$  vs  $t$  and  $v_y$  vs  $t$  graphs. *Print the graphs!*
6. On the  $v_y$  vs  $t$  graph, go to the [**Measure**] menu and select [slope of graph], drag a tangent line through the points. *Record the value of the slope.*
7. Close the graph window and return to the video window. Select [Horizontal velocity] from the [**View**] menu. Examine the horizontal velocity vectors for your object at different points in its path (if you see only one vector, go back to [Examine details] in the [**Setup**] menu and choose to mark every frame. De-select the horizontal velocity vectors and choose [Vertical velocity]. Note how these vectors change. You will have to make comments on these in your conclusion.
8. Before you close your video, choose [Clear all data] from the [**Edit**] menu, then save the changes.
9. Sketch a force diagram for the object at some point in its path.

## **Conclusion**

In your conclusion, describe the motion of the object in the x-direction and in the y-direction. Explain how the horizontal and vertical velocity vectors help to support your descriptions. Explain how your force diagram accounts for the difference in the motion in the x and y directions. How does the slope of the  $V_y$  vs t graph you obtain compare to what you expect it to be?