

## **161221LinearMotionTrackerProject**

### **5 pts: Creation of videos themselves.**

1. You are to make two videos with lengths of not less than 2 seconds and not more than 10 seconds showing two kinds of motion: (1) Constant velocity (2) Constant acceleration
2. The videos must use a format readable by the Tracker program. Please make a sample video using the camera and test that it works with Tracker. Also, check that the computer you use for analyzing video works with Tracker too.
3. Name the videos so they include (1) group leaders name (2) either velocity or acceleration video
4. The constant velocity video may be made using a hard sphere rolling against a hard surface or an object gliding on an air track. These are two suggestions, but you are not limited to these two ideas; however, it is essential that friction be tiny so velocity is constant.
5. The constant acceleration video may be made using an inclined plane. We have wooden planks with grooves for you to use for this purpose. Please remember to tilt the video camera so all motion takes place along the x-axis (horizontal plane).
6. The videos should show the rolling ball clearly with enough detail that it's easy to follow. The visible motion analyzed should also contain at least 20 frames for analysis for 30 fps (frames per second) video.

### **10 pts: Graphing**

1. Your graphs should contain all the elements outlined in your notes. These include a title, labels ( $X$  and  $Y$  including units) and linear spacing. You may hand draw any of these elements neatly if you choose. You may also mark-up graphs to make a point. This includes comments and fitting a line among individual points (please use a ruler).
2. You will need a total of six graphs. You need  $X$ ,  $V$ ,  $a$  graphs for both constant velocity and constant acceleration.
3. For each of the graphs, you need to comment about the shape of your graph compared to the theoretical shape of  $X$ ,  $V$ ,  $a$  graphs. Comments should be brief, contained near the graphs themselves (marked-up) and examples might include: horizontal slope, straight line whose slope is velocity, should have a constant value of zero.....etc.

### **5 pts: Conclusion, project overall and participation**

1. Your conclusion is the only written part of the project and should address the following. Please title each section according
  - a. Did the experimental results match expectations from theory? This should be a few sentences summarizing what you found from graphing and commenting on any unexpected results.
  - b. What was your biggest challenge during this project including making the videos, analyzing the videos, organizing the report itself and working together as a team?
2. Did the group have a positive attitude and use their time wisely in class? Please address your opinion on this (I may or may not agree with your conclusion).
3. Do all group members deserve full points? Of course it's impossible to have everyone contribute exactly the same. Team projects require an understanding of individual schedules and looking for other ways to contribute for team members who can't meet when remaining team members can (or get sick at the last minute, etc.). Taking everything into consideration, is there any team member that deserves to be marked down for participation? Do ALL team members agree with that conclusion?