

Kinematic Motion Lab Data Analysis

Macbook # _____

Setting up your data to Graph

Processing your slow motion videos

1. Upload your videos to a Macbook. Let Ms. Caroline know if you need help uploading them.
2. Open your videos in a quicktime or one of the Adobe Suite programs. These programs should allow you to click frame by frame through your video.
3. Start a Google Sheet for your group and save it to your class [folder](#)
4. Make a Tab for each type of motion/video
5. Pick a section of video that shows the motion you want and click frame by frame through it. For each frame record the position of the object and the frame number in the Google Spreadsheet.
6. Do this for at least 15 frames
7. Repeat this for all of your videos

For each of your data sets convert the frame number to real time by doing the following:

1. Determine how many seconds pass in each frame by determining your camera's frame rate (usually 120 fps or 240 fps) and then dividing one by that number (for example $1/240$). This is how many seconds pass between each frame.
2. Insert a column between your Frame # and Position column and label it Real Time (s)
3. If your frame rate is 240 fps and your Frame # column is Column A, in the first data cell enter the following " $= 1/240*A2$ " and hit enter
4. After entering this in the first cell use the little box in the corner to drag the equation through the remaining cells.

For each of your data sets convert the Real Time to Absolute time by doing the following:

1. Insert a column between your Position and Real Time columns and label it "Absolute Time (s)"
2. In the first cell of this column enter "0"
3. In the second cell of this column enter " $=B2 - B\$1$ " and hit enter
4. After entering this in the second cell use the little box in the corner to drag the equation through the remaining cells.

For each of your data sets convert Position to Displacement by doing the following:

1. Insert a column between Absolute Time and Position and label it "Displacement (m)"
2. In the first cell of this column enter "0"
3. In the second cell of this column enter " $=E2 - E\$1$ " and hit enter
4. If you need to convert your data to meters multiply that difference by the conversion factor.
5. After entering this in the second cell use the little box in the corner to drag the equation through the remaining cells.

Graphing your Data sets

Graph each of your data sets using the Absolute Time and Displacement columns. Make sure to label each axis. The horizontal axis should be time in seconds and the vertical axis should be displacement in meters. Title your graphs with the motion they represent.

Print a set of graphs for each person in your group and put them in your notebook

Look over each of your graphs and make observations about the shape of the graph.