

Physicists Workshop 4: Straight Line Motion

Goals

- Gain confidence in scientific investigation, including appropriate use of equipment
- Use video analysis software and graphing programs to make motion diagrams and position vs. time graphs
- Compare and contrast uniform motion and uniformly accelerated motion

Equipment

- Computer
- Videos for analysis

Video Analysis

Your instructor will orient you to the video analysis software. You should have taken notes on the following:

- finding & saving files
- launching LoggerPro
- inserting movies
- starting video analysis
- scaling pixel coordinates to world coordinates
- taking data
- copying data to Excel
- making motion diagrams
- making position vs. time graphs

Analyzing Videos

You will analyze the videos of various physical situations available at the web-site and described by your instructor.

For each video, produce

- a) a motion diagram, which shows the y-position of the object on the y-axis (vertical axis) and the x-position of the object on the x-axis (horizontal axis).
 - make sure you are plotting world coordinates, not pixel coordinates
 - make sure you have scaled the axes appropriately (picked an appropriate zooming factor) so you can display the important behavior
 - do not connect data points with any lines or curves
- b) a position vs. time graph, which shows either the x-position or the y-position (whichever one is important in the case you are examining) on the y-axis (vertical axis) and time on the x-axis (horizontal axis).
 - make sure you are plotting world coordinates, not pixel coordinates
 - make sure you have scaled the axes appropriately (picked an appropriate zooming factor) so you can display the important behavior
 - do not connect data points with any lines or curves.
 - include a trendline with equation and R^2 value.
 - If you have reason to believe the data is linear, do a Linear fit.
 - If you have reason to believe the data is quadratic, do a Polynomial fit of Order 2.

We'll discuss and decide as a class a variety of reasonable and interesting ways to present your results and demonstrate your understanding.