Overview

For this project you will work in a group of one or two and will submit one formal report. As a group you will record a slow-motion video of an object in motion. The precise motion of that object will be analyzed using a powerful, open source, computer program called *Tracker* developed by Douglas Brown ([click here for the website](#)).   The purpose of this lab is to analysis an object's change is position, velocity, acceleration, impulse, momentum, and energy. Depending on your project you may be asked to analyze other aspects of the experiment. The graphing is done through the *Tracker* program but it will be your task to communicate what the data mean and describe what is happening as your object moves.

Evaluation

This project will carry about the same weight as a test and a half in terms of your overall grade. Your mark will be based on two components: participation and the final report document. Each group member will receive the same mark on the report document.   Your report must be written with MS Word and submitted electronically twice; once as a draft and then the final project. Both the draft and final report are to be emailed to me.

- Participation: 20 marks
- Draft/Formal Report: 50 marks

The Details

This project is meant to work in series with the motion unit previously discussed (and upcoming) in class. That means as you work together you may need your notes or textbook to review concepts and definitions of motion; like acceleration, velocity, displacement, etc.

First you need to come up with an object and how you want it to move. Predict what you think will happen; your hypothesis. Your analysis must consist of two different motions for the object. For example, if you analyze the motion of a ball falling to the floor then that is only *one* motion. If you allow that ball to bounce a few times and analyze the bounces then you have met the requirements for the project. All videos must be recorded at the school and you will be able to use the gym equipment to select your objects from (or bring your materials here). Project ideas and hypotheses must be approved before they are videoed. Below are some example projects to choose from:

Taking Video

The video will be recorded with the slow-motion camera and the video will only be a few seconds long should you need to redo any experiments. You will receive your video and use the provided *Tracker* software to analyze the motion. The *Tracker* software will only produce accurate results if your object moves in two dimensions only; take that into consideration in your planning. I will operate the camera which will be mounted and immobilized on a tripod. We will do a tutorial in class about using *Tracker*.

Your formal report will consist of an introduction, explanation of collecting your data, your graphical analysis from the *Tracker* program, and a discussion/conclusion. You will be given a rubric with the marking layout.

Group Members, Project Idea, and Hypothesis: **Apr. 19**; Draft: **May 7**; Final Report: **May. 22**