

Mods to Measuring Forces lab

We are using the Dual Range Force Sensors (DRFS), a vastly improved sensor compared to the Student Force sensor described in the lab manual.

- 1) Force probes plug into the CH ports, not the DIG ports.
- 2) You do not need to calibrate these as in the lab manual; they come pre-calibrated. You only need to Zero them, just like when you Tare digital balance. Do this in Experiment → Zero. (Don't accidentally Zero the Motion Detector.) When you change the DRFS orientation, i.e. changing from horizontal to vertical positions, you must re-zero.
 - a. Once zeroed, check with a known mass to verify a correct force reading.
- 3) Only pull in the direction along the axis of the beam/hook assembly. Don't pull at some other angle, the DRFS does not read any other component of the force vector. Not into the page, out of the page, up, down... only along the axis as shown in the **GREEN** arrow. The **RED** arrow is just one example of an incorrect pull



- 4) Recall how to carefully select only the parabolic region of the d-t curve.
 - a. What is the shape of the v-t graph when the acceleration is constant? Use that as a guide for finding both the acceleration

and the average force while the car is experiencing constant acceleration.

5) Here's an easy procedure...

- a. Type ^A – you should see that all 3 graphs have handles around them, i.e they are all selected.
- b. Now select Page → Group graphs x-axis
- c. Now select Analyze → Examine
- d. Now when you move the cursor around in the d-t graph to select your parabolic region, watch the v-t graph and make sure the data you are choose only lies in the linear region of the v-t graph.
- e. Make sure you use the same time range for finding the average force, too.