Teacher Set-Up

Equipment (per group):

Dynamics Track | iBook Computer | Cart Launcher
Vernier LabPro Interface | Dynamics Cart | End Stop
2- Motion Detectors | Collision Cart | 2- 500 g Masses
USB Cable | Power cube for LabPro | 2- cables (Motion Detector to LabPro)

Cautions:
Never leave a cart on its wheels unless it is sitting on the track, as it will roll quietly off of the table when you least expect it! The motion detector is fragile and must be handled gently.

Procedure to set up the Momentum, Collisions, and Energy experiment:

1. Set the dynamics track on the lab table with the measurement scale toward you. Make sure that the track is secure and not going to be bumped by passersby.
2. Level the track—there is a level included with the kit. Leveling is easier if you leave the two center feet retracted until the leveling is complete. Then extend the center legs until they just touch the tabletop. Sight down the edge of the track and adjust the center support to take any “bow” out of the track.
3. Cock the cart launcher and look at the scale, if it is at 1.5 cm, then skip the next step.
4. Adjust the cart launcher so that the spring is compressed 1.5cm in the cocked position. Do this by:
   a. Place the launcher in the cocked position (the round latching clamp held by the hook)
   b. Loosen the nut on the latching clamp with the wing nut or allen wrench.
   c. Slide the shaft until its index line is at the 1.5cm mark
   d. Tighten the latching clamp.
   e. Release the launcher so it won’t go off at the wrong time.
5. Mount the cart launcher on the left end of the track (at the zero end of the scale). Slide its nut into the groove in the front of the track and secure it to the track by firmly tightening the mounting screw.
6. Mount the end stop on the opposite end of the track from the cart launcher at the 210 cm mark, with the magnets facing the cart launcher.
7. Open one motion detector from its locked position (this has the effect of tilting the gold disc upward about 1°) and stand it at the end of the track behind the cart launcher.
8. Open the other motion detector to 90° and put it on the track with the gold disc facing the cart launcher but behind the end stop.
9. Aim the gold sensor discs at the middle of the track. The easy way to check this is to put your head at the 110 cm mark and look toward the motion detector. If you see your face reflected in the gold sensor disc the aim is right.

10. Set up the Vernier LabPro interface as follows:
   a. Plug the cable from the motion detector near the cart launcher into the “DIG/SONIC 1” socket on the interface. Plug the cable from the motion detector near the end stop into the “DIG/SONIC 2” socket on the interface.
   b. Plug the wire from the power supply cube into the interface and plug the power supply into a wall outlet.
   c. Plug the USB cable into the interface.
   d. Place the iBook computer on the table near the dynamics track. Be sure that the USB cable from the LabPro can reach it.
   e. Plug the USB cable into socket 1 on the left side of the iBook.
   f. If desired, you can hook the iBook to its power supply and line power.