

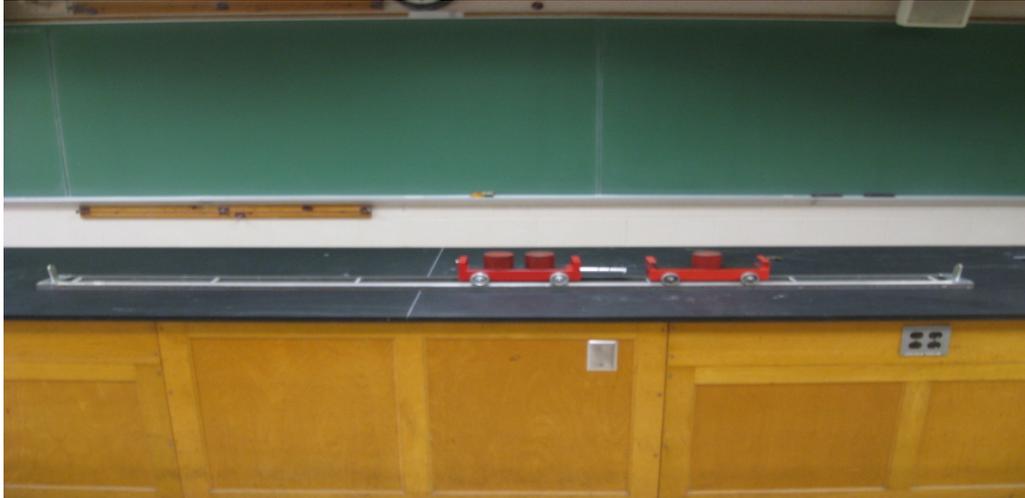
# ML-3

## Linear Momentum

### Colliding Cars

Track: 3077 north wall

All Else: M-4 S-3



Use special 8-ft track, two special cars, and three special weights for loads. The two cars and the three load weights all have essentially equal weights. (See **WARNING**.)

Demonstrate as many of the following as you wish: (1) Cock spring loaded plunger to the first of its two positions, and set the two unloaded cars, with the plunger between, against one another near the center of the track. Release the plunger and note that the two cars proceed in opposite directions with equal (essentially) speeds, and therefore with equal and opposite momenta. (In releasing the plunger it is essential that the trigger rod be given a quick tap. This can be done satisfactorily with the end of the finger.) (2) Cock the spring to its maximum position, thus storing roughly four times the elastic potential energy, and repeat the procedure. (3) Place equal loads on the two cars and repeat the last procedure. (4) Place a double load (two weights) on one car and none on the other, repeat. (5) With equal loads on the two cars, and with one car stationary near the center of the track, give the other car a push so that the two collide with the plunger between. Note that the moving car transfers all of its momentum to the car that was stationary. (6) Repeat, using a double load (two weights) on the moving car and no load on the stationary car, noting that both cars proceed forward. (7) Repeat, using a double load (two weights) on the stationary car and no load on the moving car, noting that one car is knocked forward whereas the other car recoils backward. (8) Orient the cars so they will couple when they collide and, with equal loads and one car stationary near the center of the track, push the other car so that the two collide and couple. (9) Repeat, using a double load (two weights) on the stationary car and none on the moving car, attempting to give the moving car the same velocity as before. (10) Repeat, using a double load (two weights) on the moving car and none on the stationary car, attempting to give the moving car the same velocity as before.

**WARNING:** Never set the cars on their wheels on any surface other than the track; turn them up-side-down. Otherwise the car is apt to roll off and be damaged.