Mr. Jenkins
Physics 1

Assignment Sheet
Linear Momentum

Objectives
You will be able to:

A. define linear momentum and impulse.
   state Newton's second law in terms of momentum.
   determine change in momentum, force applied, or time of application given the other two.
B. state the law of conservation of momentum and apply it to simple situations.
C. analyze situations involving the collision of two objects in 1 and 2 dimensions.
D. explain how a rocket functions and relate this to other physical situations.

Reading

A. 7.1, Momentum and Impulse, p. 123–126
   Newton's second law restated (notes, $F = \Delta p/t$)
B. 7.2, Conservation of (Linear) Momentum, p. 126–128
C. 7.4, Elastic and inelastic collisions, p. 130–132
   7.5, Momentum conservation in two dimensions and explosions, p. 132–136
D. 7.3, Recoil, p. 128–130
   Center of mass momentum (notes)

Laboratory

Air cart collisions
2-D collisions

Focus Questions

1. We claim that momentum is conserved, yet most moving objects eventually slow down and stop. Explain.
2. How can a rocket change direction when it is far out in space and is essentially in a vacuum? (Hint: look up the reaction control system (RCS) for the space shuttle.)
3. Cars use to be built as rigid as possible to withstand collisions. Today, though, cars are designed to have "crumple zones" that collapse upon impact. What is the advantage of this new design? (Look it up! Explain in terms on momentum.)
4. At a hydroelectric power plant, water is directed at high speed against turbine blades on an axle that turns an electric generator. For maximum power generation, should the turbine be designed so that the water continues to move forward, so that it is brought to a dead stop, or so that the water rebounds? Briefly explain.