# Momentum and Collisions Auxilliary Items

## For Balloon Toss Lab
(Tape the following into your Post-Lab Question section and complete.)

**Post-Lab Questions:**
Assume that we were able to collect the following table of data for a balloon toss lab. The table represents numerical values for force, time, mass, velocity change, impulse, and momentum change for various catches of a balloon. Use the table to answer the following questions.

|    | Mass (kg) | ΔVelocity (m/s) | ΔMomentum (kg m/s) | Impulse (N s) | Force (N) | Time (s) |
|----|-----------|-----------------|--------------------|---------------|-----------|----------|
| a. | 0.50 | -4.0 | | | | 0.010 |
| b. | 0.50 | | | -2.0 | | 0.100 |
| c. | 0.10 | | -0.40 | | | 0.010 |
| d. | 0.20 | -8.0 | | | -80 | |
| e. | 0.50 | | | | -400 | 1.0 |
| f. | 0.50 | -8.0 | | | | 0.010 |

1.  Use the impulse-momentum change theorem (and the definitions of impulse and momentum change) to fill in the above table.

2.  The force required to stop a balloon is dependent upon the mass, velocity change, and collision time. Use the data in the table above to express your understanding of these relationships.
    a.  What effect does a ten-fold increase in time have upon the subsequent force which is required to change an object's momentum (assuming other quantities are constant)?




        Identify at least one set of two rows which illustrate this cause-effect relationship.


    b.  What effect does a five-fold increase in mass have upon the subsequent force which is required to change an object's momentum (assuming other quantities are constant)?




        Identify at least one set of two rows which illustrate this cause-effect relationship.


    c.  What effect does a two-fold increase in velocity change have upon the subsequent force which is required to change an object's momentum (assuming other quantities are constant)?




        Identify at least one set of two rows which illustrate this cause-effect relationship.