1. **(75%)** Practice energy and collision problems by completing WeBWorK set # 5.

2. **(25%)** In the software download area of the Physics 121 website (located at http://teacher.pas.rochester.edu/phy121/Software/SoftwareIndex.htm) you will find a movie that shows elastic and inelastic two-dimensional collisions. Use LoggerPro to analyze these movies and study the motion of the center of mass of the two-puck system.

   Use the following steps in this analysis:

   a. Download the movie clip from the Physics 121 website.
   b. Start LoggerPro.
   c. From the "Insert" menu, select "Movie" to open the movie you want to analyze.
   d. At the bottom right-hand side of the video window you see a button with red dots with allows you to "Enable/Disable Video Analysis". Enable video analysis a set of tools will appear on the right-hand side of the video window.
   e. Select the ruler button to set the scale. Use the rulers on the left-hand side of the video to calibrate your screen. After selecting the ruler button you move your mouse to one end of the "ruler" in the video, click-and-hold your mouse button, move your mouse to the other end of the "ruler," and release the mouse button. A window will emerge, asking you for the length the "green line" you just drew on the screen.
   f. Use the "red-green dot button" to add a "point series" and use the mouse to the position of one of the two pucks in your collision video. Each time you select a position in a frame, the video will advance to the next frame.
   g. At the end of the video, rewind it, use the "red-green dot button" to add another "point series", specifying the position of the other puck.
   h. After completing your data entry you will see that the x and y positions and velocities for all frames and for both data series are listed in the data table. These data can be exported by selecting "Export as …. Text" from the file menu. The file created can be opened with Excel and you can use Excel to determine the position of the center of mass of the system as function of time.

Hand in the two graphs showing the x and y position of the center of mass as function of time for the elastic and the inelastic collisions and for each movie determine the average speed of the center of mass. The solution to this problem needs to be dropped off in the Physics 121 homework locker in B&L, across from B&L 106. Please make sure your work is clearly labeled with your name.