# ME 2210 Dynamics: Working Model Homework 04

Conservation of Linear and Angular Momentum: Problem 14-048 from the Handouts

14.47 Two small spheres A and B, weighing 5 lb and 2 lb, respectively, are connected by a rigid rod of negligible weight. The two spheres are resting on a horizontal, frictionless surface when A is suddenly given the velocity $v_0 = (10.5 \text{ ft/s})\mathbf{i}$. Determine (a) the linear momentum of the system and its angular momentum about its mass center G, (b) the velocities of A and B after the rod AB has rotated through 180°.

14.48 Solve Prob. 14.47, assuming that it is B which is suddenly given the velocity $v_0 = (10.5 \text{ ft/s})\mathbf{i}$.


Fig. P14.47
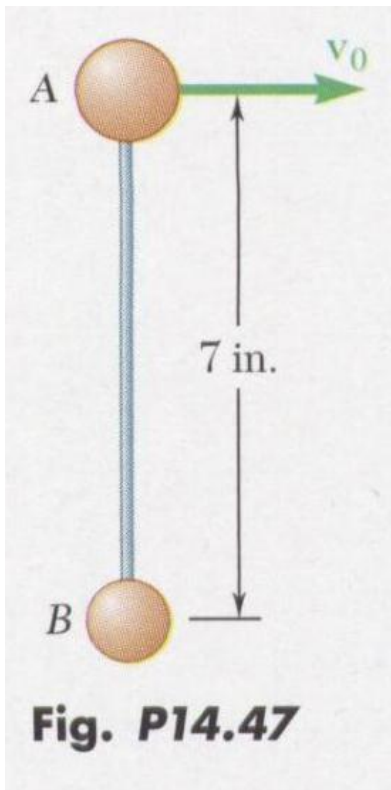
Open Working Model. Create the 5-lb sphere by placing a small circle (r = 0.15 in) onto the panel at x = 0 and y = 0. Use the Properties Window to change the weight of the circle to 5 lb. Use the drop-down menu near the bottom of the Properties Window to change the circle to a 3D Sphere.
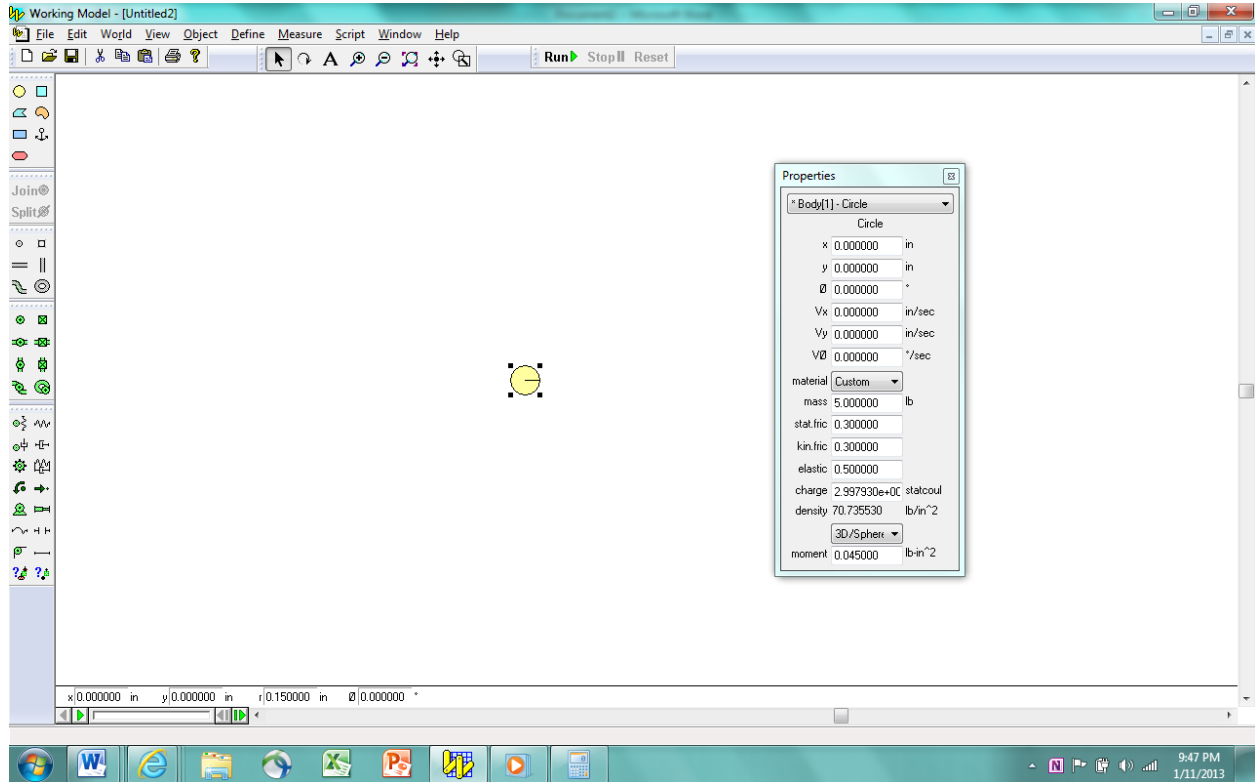
Create the 2-lb sphere (r = 0.15 in) in the same manner, and place it at x = 0, y = -7 in. Set the initial x-direction velocity to Vx = 10.5 ft/s.
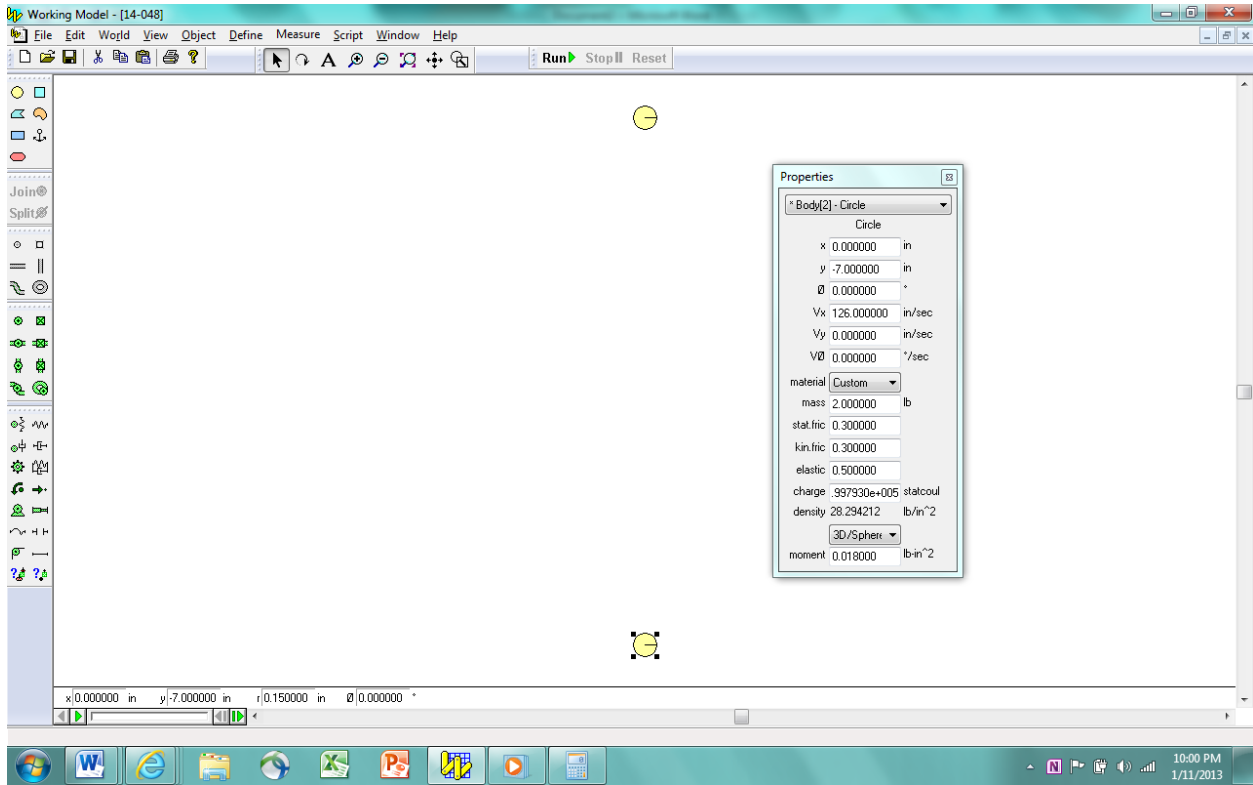
Create a very thin rectangle (W = 0.15 in, H = 7 in) using the Rectangle Tool. Change the rectangle to a 3D rod by using the drop-down menu on the Properties Window. Set the location of the rectangle to x = 0, y = -3.5 in. Attach the rectangle to the two spheres by using the Pin Joint Tool.
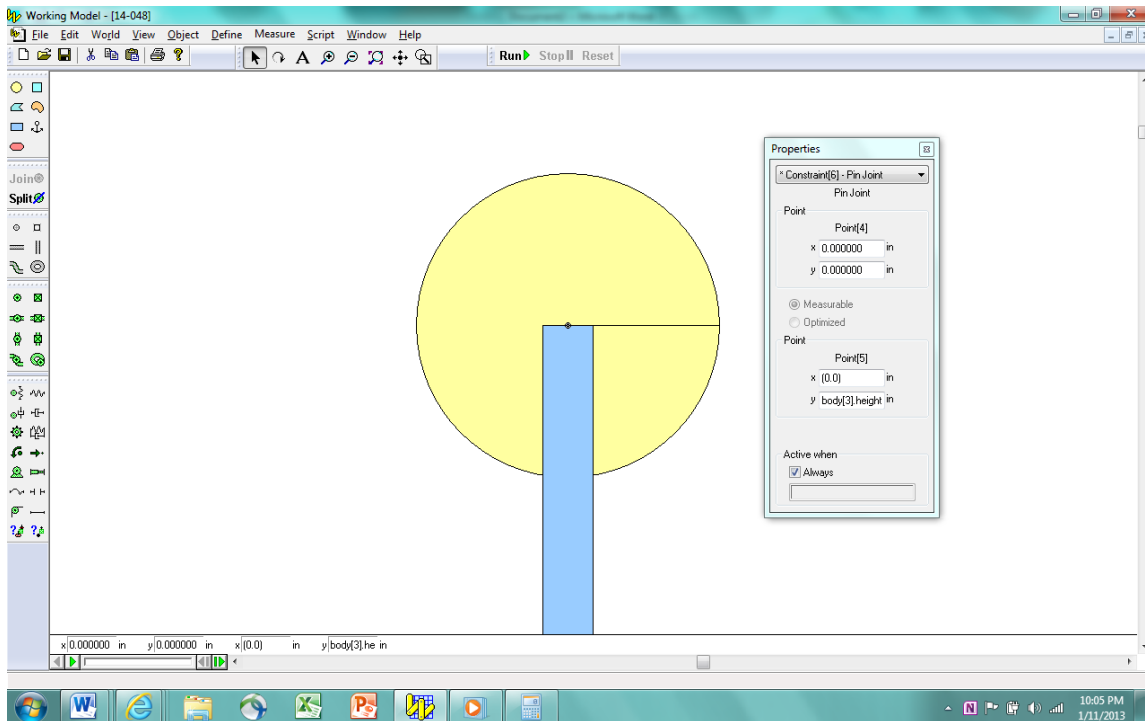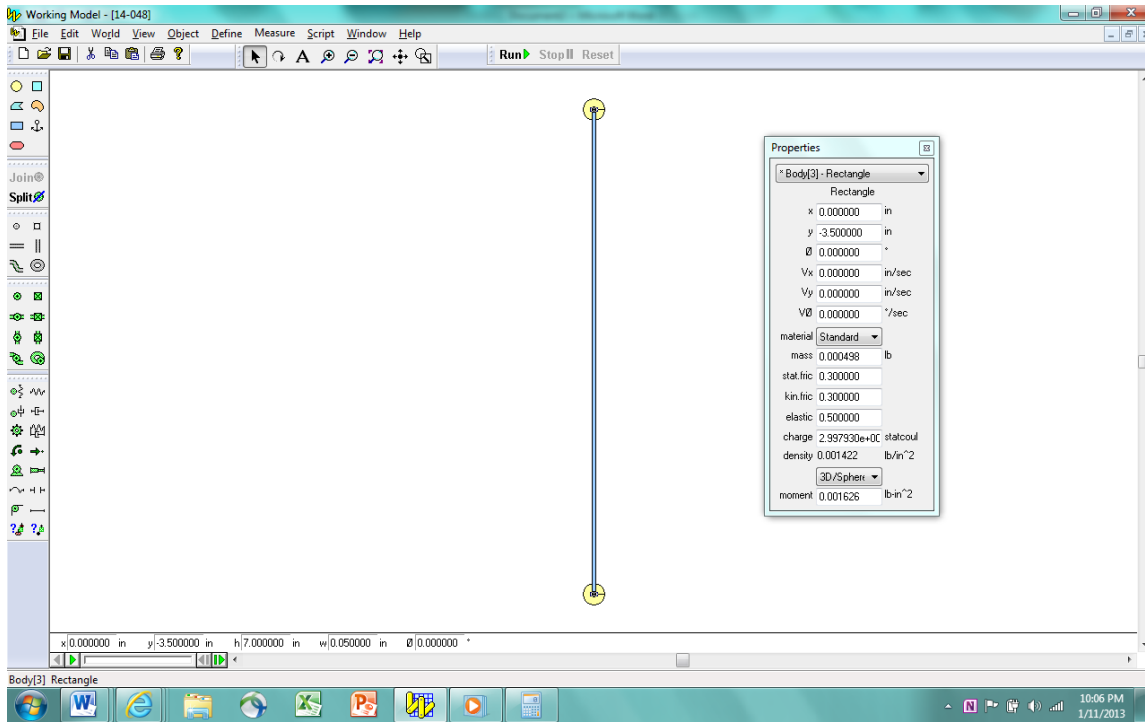
Place a graph on the panel to measure the x-direction velocity of sphere A. Right-click on the label of the graph and go to the Appearance Window of the graph. Change the name of the graph to "Velocity of Sphere A".
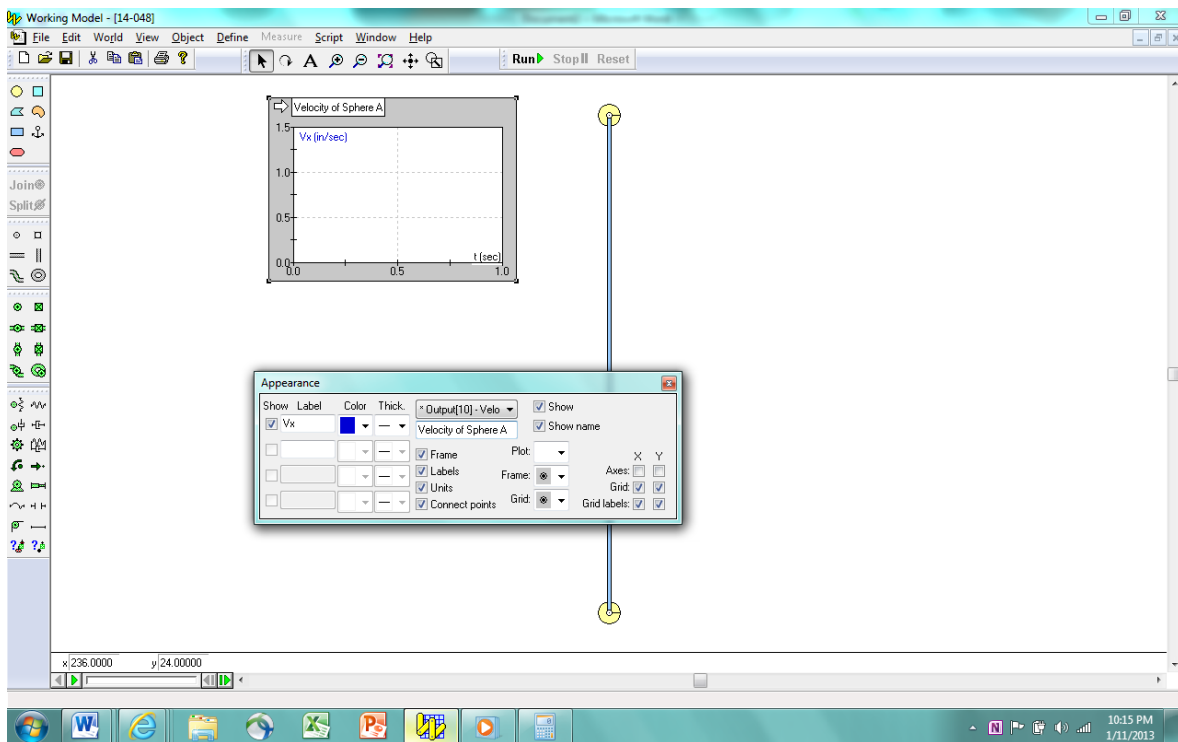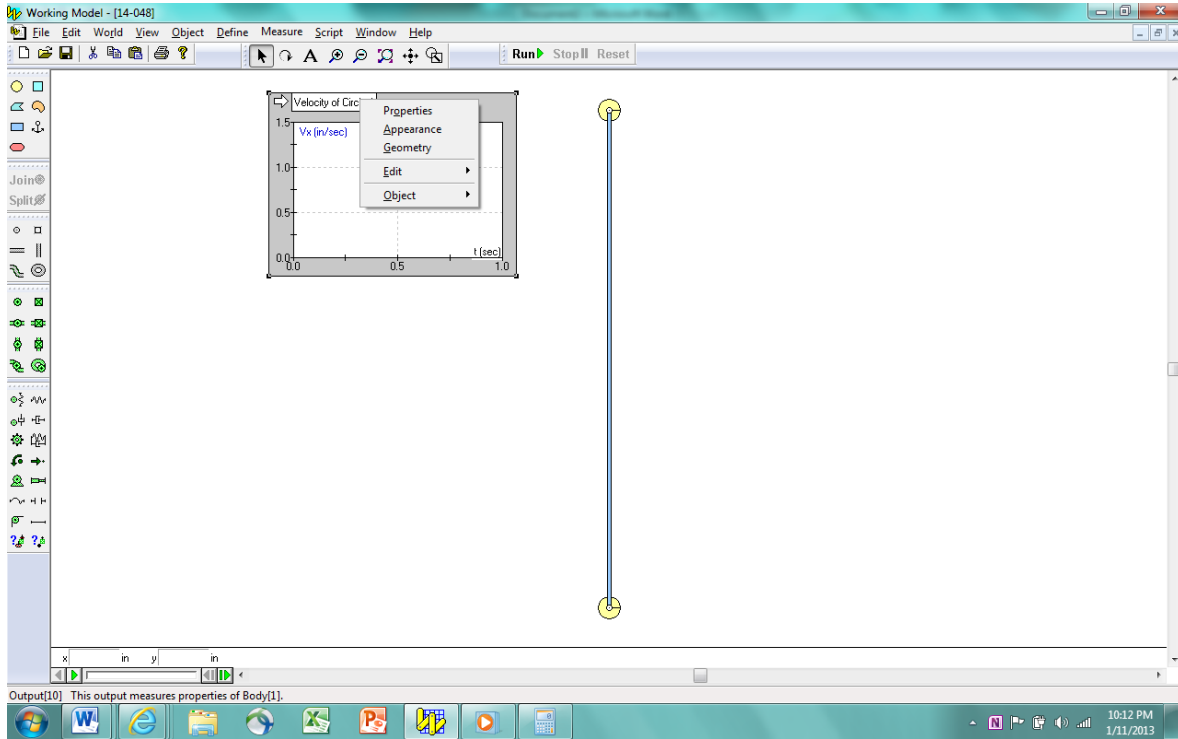
Place a graph that indicates the velocity of sphere B and change the graph title. Place a graph on the panel to measure the angle of the rod by using the Measure Tab/Position/Rotation Graph. Change the graph title as well.
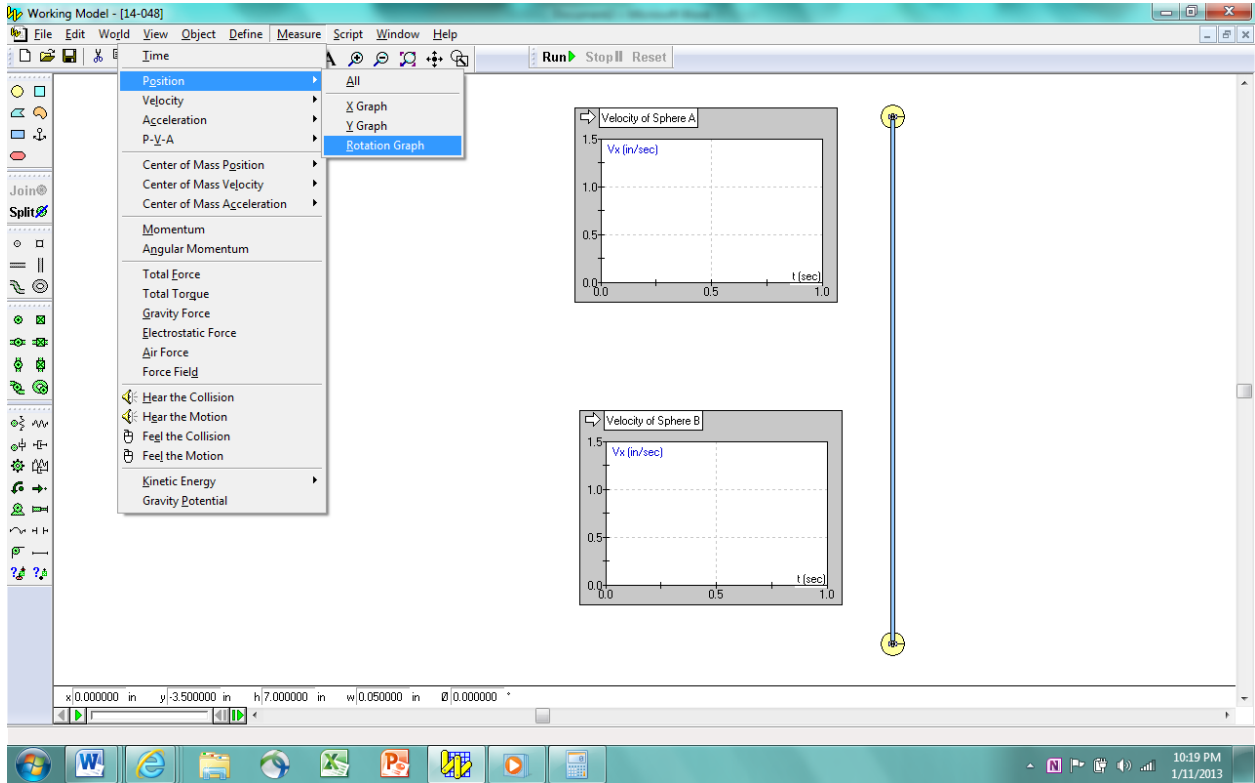
Run the simulation and note the values. If the simulation runs too quickly, go to the World Tab/Accuracy and change the Animation Step size. Place your name onto the panel using the Text Tool. Take a screenshot of your simulation and place it in the Dropbox Folder entitled, "myname WM Homework 04. Save your simulation for your records.

Answer: