Physics 140 Discovery Room #4

3.1 Spring Scales; **3.2** coefficient of restitution, center-of-percussion; **3.3** circular motion, centripetal force

Name_____ **Date/Time_____**

Masses on Various Springs

1. What is the relationship between the spring force and the distance a spring is stretched?

2. Use a mass and a meter stick to determine the spring constant for one of the springs.

Bathroom Scale

Go to the elevator. Stand on the scale, press a floor button and watch the scale as ascend.

1. What happens to the scale reading when the elevator starts? when the elevator stops?

2. Watch the scale as you come to a stop on a floor. What happens to the scale reading? Why?

Now press the button to return to the original floor.

3. What happens to the scale reading as you descend? What forces are acting on you when you stand on the scale? Do any of those forces change when the elevator moves?

Happy Ball and Sad Ball

Drop each of the balls to the ground.

1. Which one bounces the highest? lowest? Why?

2. What happens to its kinetic energy for the ball that does not bounce?

"Sweet Spot" on Baseball Bat

Have one person hold the bat by the handle. Another person uses the rubber mallet to hit the bat in various places along its length.

1. When you hit the bat it vibrates. Are more or less vibrations better for the batter?

2. Where can you hit the bat so that there are the fewest vibrations? (find this by experiment) Most vibrations?

3. In terms of energy how do the vibrations effect how far the ball goes? What does this mean about the coefficient of restitution?

Duck!

Hold the tube vertically in one hand with the brass weight hanging toward the ground. Very carefully, swing the rubber cork in a horizontal circle so that less than a foot of string is between the cork and the top of the tube. Make sure to swing the cork so that the weight does not move up or down. Now, let the string out and swing the cork so that several feet of string are between the top of the tube and the cork. Again, swing the cork so that the weight does not move up or down and the length of string between the tube and cork does not change.

1. What creates the centripetal force that causes the cork to go around in the circle?

2. Did the cork go around the circle more or fewer times a second when the cork moved in a bigger circle? How can you explain this in terms of centripetal force and angular velocity? (hint: what is not changing?)

Using the margins of this sheet of paper, write down a question regarding a topic, concept, or example you do not understand from this week in PHYS140.