PreAP: due Tues., Dec 13 (Assigned: Fri., Dec 8)
Reg: due Wed., Dec 14 (Assigned: Mon., Dec 12)

Fall Final Review 1

1. **This is to show you just how interrelated all Physics is.**
   Situation: A 3 kg cannonball is launched at 40^o and 60 m/s by a cannon. Answer the following questions:
   A. What is the cannonball's mass? B. What is the cannonball's weight?
   C. Which one would change if the cannon were shot into space?
   D. As the cannonball is resting in the cannon, how much normal force does the cannon have to give to the ball?
   E. Since the cannonball is moving against the cannon barrel, what kind of friction is that?
   F. Before the cannonball is shot how much energy does it have?
   G. In order to move the cannonball the gunpowder in the cannon has to do what on the ball?
   H. After the cannonball is shot it has what kind of energy?
   I. In order to give energy to the ball the gunpowder has to apply what to the ball?
   J. Before the cannonball reaches the top of its trajectory what kind of energy is it gaining?
   K. At the top of its trajectory the ball stops in the _____ direction for an instant. Is it at equilibrium at that point?
   L. As it returns to the ground the cannonball is losing _____ and gaining _____.
   M. After it was shot the only force on the ball was:
   N. This force on the ball is in what direction?
   O. If the ball went up 15 m into the air and back down, what is the total distance it traveled?
   P. In the x-direction the initial and final velocities of the ball will be:
   Q. The x-direction acceleration on the ball is:
   R. In the y-direction if the ball is launched and lands on the ground the displacement of the ball is:
   S. In the y-direction the initial and final velocities of the ball are:
   T. The energy at the top of the path and the bottom of the path must be equal due to what Law:
   U. If the ball were to get stuck into the object what kind of collision would it be?
   V. The sound the cannon makes is a kind of:
   W. Before the cannon fires the net momentum of both the cannon and the ball is:
   X. Afterward the net momentum of the cannon and ball is:
   Y. If the cannonball is fired to the right, the cannon will move to the:
   Z. In order for the cannon to move the force of the ball on the cannon has to overcome what friction?
   AA. Which will be moving faster?
   AB. The how does the force of the cannon on the ball compare with the force of the ball on the cannon?
   AC. Which of Newton's Laws proves this:
   AD. Since we know the speed of the cannon ball, we would use what law to find the speed of the cannon?

   AE. If the ball starts from rest. Find the Δp of the ball.

   AF. What is the impulse on the ball?
   AE. If it takes 0.2 seconds for the ball to reach full speed, find the force on the ball.

   AG. Now that you've found the force on the ball and you know its mass, find the acceleration on the ball:

   AH. If it was launched from the ground to the ground, find the range of the cannonball:

   AI. Using the x-component of the cannonball's velocity, find how fast the cannon moves backwards if it is 300 kg. (The cannon and ball are at rest beforehand.)

   AJ. If you change the angle to 10^o, answer all of the above questions again. *(Just kidding!)*

2. How can you easily find the MA of a pulley?

3. How do simple machines multiply force?

4. At the right draw two levers. Make lever 2 with the greatest MA.

5. Label the following as Scalars (S) or Vectors (V)?

A. _____ Distance	D. _____ Velocity	G. _____Kinetic Energy
B. _____ Displacement	E. _____ Acceleration	H. _____Work
C. _____ Speed	F. _____ Force	I. _____Momentum

6. Two students are trying to determine the period of a pendulum using a stopwatch. Nick uses a state-of-the-art digital stopwatch accurate to 0.0001 seconds and records 1 period. Irene uses a stopwatch accurate to 0.1 sec and records 5 periods and divides by 5. Destiny uses Tyler's cheap Wal-Mart watch (accurate to only 1.0 second) and records 200 periods and divides by 200.
   A. Who got closest to the actual period of the pendulum?
   B. Why?

7. If the actual number is 12.36 m decide if the following are accurate or precise: 11.45 m; 11.41 m; 11.46 m.

8. If an instrument is inaccurate, but precise what could you do the instrument?

9. Convert 1204 μm to centimeters.

10. Why is it important to record the procedures you use in an experiment?