Problem Set #7 due beginning of class, Monday, Feb. 24.

1) Chapter 5.3, Do exercise 1 and 2, but don't hand it in. Does it stay in the bucket? Answers at end of chapter.

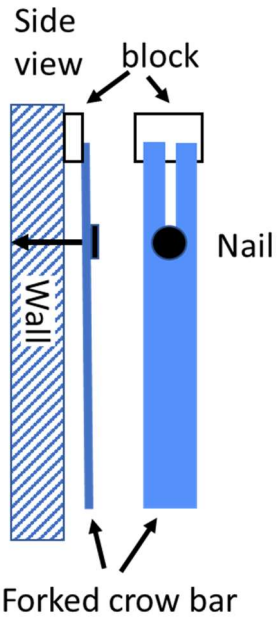
2) Chapter 5.3, Exercise 4, Loop the loop

3) Chapter 5.3, Exercise 6, Driving up and down hills in a car

4) Chapter 5.3, Exercise 7, Do you weigh the same at the equator?

5) Chapter 6.0, carefully consider Examples 1, 2, and 3. Then do the following:
   What if there is a coefficient of friction $(\mu_d = 0.1)$ on the 1 kg mass as is slides across the horizontal surface?
   a) How would this change the energy considerations in Example 1? Find the new speed of the system as it hits the ground 1 m below. Then find the time to fall and the acceleration.
   b) How would this change the dynamics considerations of the system (Exercise 2)? Find the new acceleration directly (is it the same as you found above?) and tension in the string. It will be helpful to first watch the systems/dynamics video for Monday's class.
   c) How would this consideration change the method of simultaneous equations (exercise 3)?

6) Chapter 6.1, Example 3
7) Chapter 6.1, Example 4
8) I use the device at right to pry a nail out of a wall. At right is what you see looking directly at the wall. At left is a side view, looking along the wall. The distance between the nail and the block is 5 cm. I pull with a force of 200 N on the bottom end of the crow bar, which is 15 cm below the nail.
   a) How much force did this put on the nail?
   b) What force is put on the block?



9) Two identical planets orbit the same star in a circular path. But planet B is twice as far as planet A. That is:
   $R_B = 2R_A$
   Please find the following ratios:
   a) Which planet has greater gravitational attraction to the sun, or are they the same?
      or, $F_B = \_\_F_A$
   b) Which planet has a greater acceleration or are they the same?
      or, $a_B = \_\_a_A$
   c) Which planet has a greater speed, or are they the same?
      or, $v_B = \_\_v_A$