Problem Set #5 due beginning of class, Tuesday, May 15.

1) Chapter 5.0, Exercise 1, You see something moving in a circle.

2) Chapter 5.1 Exercise 1, Lunar period!

3) Chapter 5.2, Exercise 2, Lower Earth Orbit

4) 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.

5) Chapter 5.3, Exercise 4, Loop the loop.

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

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

8) Infamous Tow Truck Problem: A 2-ton Tow Truck pulls a 1-ton car on a smooth level road, with a rope that has a tension of 3000 N on it. If the wheels of the car are free to roll, what coefficient of friction is necessary between the Tow Truck's wheels and the ground? This is a multi-step problem that will require some thought and some drawing.

9) Chapter 6.0, carefully consider Examples 1, 2, and 3 – solutions are provided in the text. 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? Find the new acceleration directly (is it the same as you found above?) and tension in the string.