DAY 8

Homework Assignment (see syllabus for homework collection information)

In each of these problems, ignore air drag unless the problem specifically mentions it.

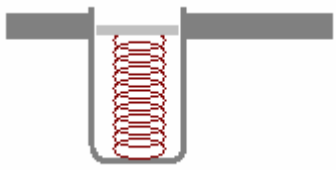
1. If you dropped a coin from the observation deck of the Sears Tower (412 m above the ground) in Chicago, and air resistance was NOT important, how long would it take to hit the ground, and how fast would it be moving (in m/s and mph)?

2. How high up would you be if you dropped a coin from a high place and it took only half the time to reach the ground as it did in the above problem? How high up would you be if you dropped a coin and it reached the ground moving only half as fast as in the above problem?

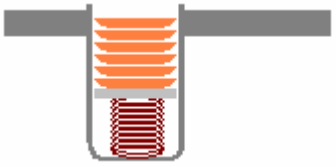
3. It takes 10 lb of force to draw a slingshot back 20 inches. A rock that weighs 0.25 lb is placed in the slingshot; the slingshot is drawn back 32 inches and released. How high will the rock go above the point of release and how long will it be in the air?

4. A ball is thrown straight up from the ground with a speed of 30 m/s. 2 seconds later an arrow is shot up at it at a speed of 150 m/s. At what height does the arrow hit the ball?

5. Plates at a buffet-style restaurant weigh 0.65 lb and are 0.375 inch thick. The plates are placed on a spring-loaded platform that is recessed into a well in the top of the buffet table. The desired effect is to have a plate always level with the top of the buffet table, no matter how many plates are in the well. What spring constant is needed for the spring? Give your answer in metric and English units.



No plates.



Loaded with plates.