

**Reading:**

In this past week we have worked with HRW Chapters 10 and 11 (on rotation)  
New material for this week will be in Chapter 12 (which will be quick) and 14

**Problems:**

*Due in class Friday, November 8.*

- (1) HRW Chapter 10 Problem 39
- (2) HRW Chapter 10 Problem 44
- (3) HRW Chapter 10 Problem 45
- (4) HRW Chapter 10 Problem 51
- (5) HRW Chapter 10 Problem 63
- (6) HRW Chapter 10 Problem 66
- (7) HRW Chapter 10 Problem 45
- (8) HRW Chapter 11 Problem 68
- (9) Seeking distraction from finishing your problem set you decide to make a yo-yo from an empty soda can by wrapping a string around the outside.
  - (a) What is the moment of inertia of the can? Assume that it is made of a cylindrical shell with solid disks at either end.
  - (b) As your yo-yo falls, find the linear acceleration of the can. Is this larger or smaller than free fall? Why?
  - (c) Find the tension in the string.
  - (d) Why would this yo-yo be less than wonderful? Do no more calculations for this part.
- (10) Loop-the-loop II: A ball of radius  $a$  rolls down a track and (hopefully) around a loop of radius  $R$ , with  $R > a$ . Find the minimum height that will allow the ball to safely navigate the loop-the-loop. Feel free to look up the moment of inertia of the ball.
- (11) Examine the photograph on the next page, taken by Mike Verostek last spring. Given that the picture was taken over an interval  $\Delta t = 1/250$  s, carefully explain the reason for the blurry top and middle part of the wheel while the bottom appears sharply defined. The size of the wheel is 27 inches. Approximately how fast was the bicycle going?

