

## Lab 5: Rolling Stuff and Specific Heat

### Rolling Stuff

Consider a disk and a hoop. Suppose the objects are released from rest and allowed to roll down an incline. The incline has length  $L$  and one end is raised to a height of  $h$ .

1. Determine an expression for the velocity of the hoop at the bottom of the incline. Your expression will depend on  $h$ .
2. Determine a similar expression for the velocity of the disk.
3. Calculate the ratio of the two velocities.
4. Make reasonably careful measurements of the velocities of the hoop and the disk at the bottom of the incline. (Take several measurements and average your results.)
5. Does your experimental velocity ratio agree with the theoretical velocity ratio?

### Specific Heat

Suppose you place a hot piece of metal of mass  $m$  in a Styrofoam cup containing some water of mass  $M$ . Let the initial temperature of the metal be  $T_m$  and the initial temperature of the water be  $T_w$ . By how much will the temperature of the water increase? Try this out with one of the pieces of metal. Does your measured temperature increase agree with what you calculated?