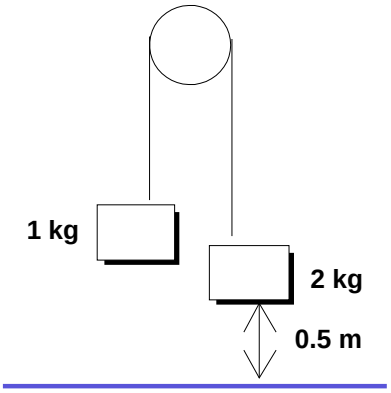
# Problem Lab #3

## Lab due Thursday September 21, 2006! Clarity of presentation counts!

Consider the Atwoods machine shown below. The ultimate goal of this problem is to find how high up does the 1 kg block go.



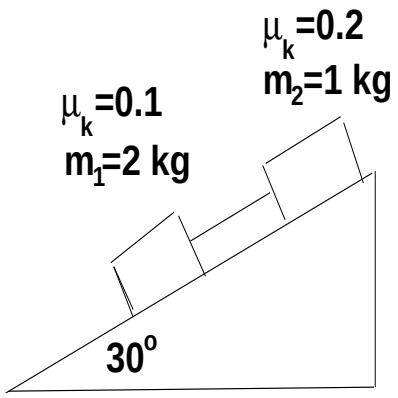

- Find the tension in the ropes and the acceleration of the blocks.
- Find the velocity when the first block hits the bottom?
- What is the tension in the rope after the 2 kg block hits the bottom ?
- How high up does the 1kg block go.
- Before the 2 kg block hits the ground what upward force required to keep the pully in the air? How does

An air hockey puck slides along a rough playing surface has a speed of $10m/s$. It slows downs due to friction and eventually stops after 2 m.

- Draw all the forces on the hockey puck – a "free body diagram"
- From this information you should be able to deduce acceleration of the puck.
- Using the acceleration compute the coefficient of kinetic friction.
- Suppose that the same experiment was performed in an elevator which is moving upward and slowing down at a rate of 2 meters/s every second.

- "moving upward and slowing down at a rate of 2 meters/s every second." says that a=?
- Draw a "free body diagram"
- Use $F = ma$ in both the y and x directions to determine the friction force
- Use this friction force to find how much the puck travels in the elevator.

Consider two blocks on a ramp. The first each of which have




- First consider the first block ONLY on the ramp without friction. What is the acceleration of the block? Then consider the second block ONLY on the ramp without friction what is the acceleration of the block?
- Now consider the first block ONLY with the friction coefficient shown. What is the acceleration? Consider the second block ONLY with the friction coefficient shown. What is the acceleration?
- Now consider both blocks tied together. What is the acceleration of the system¿
- What is the tension in the rope?
- What would happen qualitatively if the order of the two blocks were reversed?