Physics 10: Discussion Lab 1

# HOVER PUCK

1. Get to know the hover puck.
   1. Slide it along the floor with the fan off. What happens?
   2. Now turn on the fan but don’t push it.
   3. Now give it a push. What happens? Why?
   4. What do you need to do to get the hover puck to travel at a constant velocity? Make a prediction first and write it here, then try it:
   5. Now predict what would happened if you push it with a constant force (first write it here, thentry it):
2. The figure depicts a hover puck sliding with constant speed v in a straight line from point “a” to point “b” on a frictionless horizontal surface. Forces exerted by the air are negligible. You are looking down on the puck. Predict and **sketch** what will happen to the puck if you were to give it a brief push in the direction of the heavy print arrow at point “b”.



1. Now experimentally test your hypothesis. Discuss your findings vs. your predictions with your group members.
2. Make the puck perform circular motion (i.e. move along in a circular path). What do you have to do?

# Level Plane with Cars

Note that this experiment should approximate a frictionless environment.

1. Level the tracks that the cars run along.
2. Briefly push (apply an instantaneous *force* to) the lighter (less *massive*) car.
3. Now stack more blocks on the heaver (more *massive*) until it is about 6 times as massive as the first. Then give it a brief push (apply an instantaneous *force*), which is as close to the same force as you applied to the first car.
4. Briefly comment on your observations.
5. For both cars:
   1. Where is the acceleration greatest?
   2. Where is the velocity greatest?
6. If you were to briefly push both of the cars from the starting line at the same time and you wanted them to reach the finish line at the same time, would you have to push the more massive car:
   1. harder (more force)
   2. lighter (less force)
   3. same (same force)
7. Assume that “car a” is the same mass as “car b” but “car a” is placed at the beginning of the plane while “car b” is placed at the midpoint of the plane. If you were to apply a force to “car a” and then were to apply an equal force to “car b” right as “car a” reaches “car b”. Roughly draw velocity and acceleration plots for the two cars on the same plot.

X

X

v

a

1. For the situation in part 7:
   1. “car a” will reach the finish line first.
   2. “car b” will reach the finish line first.
   3. both cars will reach the finish line at the same time.

# Inclined Plane with Cars

1. If “car a” is 2 times as massive as “car b” and both are released from rest, will:
   1. “car a” reach the finish line first.
   2. “car b” reach the finish line first.
   3. both cars reach the finish line at the same time.
2. For both cars:
   1. Where is the acceleration greatest?
   2. Where is the velocity greatest?
3. Assume that “car a” is the same mass as “car b” but “car a” is placed at the beginning of the plane while “car b” is placed at the midpoint of the plane. If you were to release “car a” and then were to release “car b” right as “car a” reaches “car b”. Roughly draw velocity and acceleration plots for the two cars on the same plot.

t

t

v

a

1. For the situation in part 4:
   1. “car a” will reach the finish line first.
   2. “car b” will reach the finish line first.
   3. both cars will reach the finish line at the same time.