Physics 140 Discovery Room #2

1.2 weight, Newton's 2nd law, projectile motion; **1.3** Newton's 3rd law; **2.1** torque, rotational mass, angular acceleration, mechanical advantage

Name_____ Date/Time_____

Three blocks

1. Pick up each block as quickly as you can. Do the blocks have the same weight? Do they have the same mass?

2. Now imagine taking the blocks to the moon. Would the blocks have the same mass as on Earth? The same weight? Would it be easier or harder to pick up the blocks? Why or why not?

3. Next try to pick up each block using the same force. How can you use a physics concept to understand why the motion of each block is different?

Baseball

Throw the baseball straight up and catch it when it comes down.

1. What are the ball's vertical and horizontal components of its velocity throughout its trajectory?

Now play a small game of catch standing a few feet apart.

2. What are the ball's vertical and horizontal components of its velocity throughout its trajectory? How do they compare to when the ball was thrown straight upward?

(over)

Inertia Rods

Pick up each of the bars and rotate them around their centers.

1. Which of the two bars has a larger rotational mass? How can you tell? What makes the rotational mass of the bars different?

Lever Fulcrum and Weight

Try to lift the weight with the bar placed at different distance from the pivot point.

1. In which configuration is it easier to pick up the weight? Why?

Pinwheel

Make a pinwheel using the template that you printed out before DR.

1. Blow gently on the pinwheel. Watch how it starts to spin—does it immediately reach full speed or does its speed increase gradually? Why?

2. Which direction is the angular velocity? The angular acceleration?

3. Blow directly onto your hand. Now, place your hand behind the pinwheel and blow on the pinwheel. What changed? How can you use a physics concept to understand what happened?

Using the margins of this sheet of paper, write down a question regarding a topic, concept, or example you do not understand from this week in PHYS140.