Investigating Inertia

You will complete a series of short activities in this lab that all deal with the concept of inertia. It does not matter what order you complete the activities in.

1. Hover Disk Activity
   Each person stands at different sides of the lab bench so the disk does not fall onto the floor. With the disk off, try to slide the disk to each other across the table. Draw the free body diagrams for the disk while it is being pushed and while it is sliding across the table:

While pushed

While sliding

   Now, turn the disk on and do the same thing again. Draw new free body diagrams below:

While pushed

While sliding

2. Egg activity
   Take a raw egg and hardboiled egg and spin them on a counter top. Compare the motion of the two eggs below and suggest an explanation for the differences you see.

3. Weight on a string
   Tie a thread (only use about 8 inches so there is enough for every group) to a large mass and place the mass on a table top. Slowly pull the weight toward you with the thread. Now place the mass back where it started and yank the thread as quickly as you can. Record your observations below and explain what is happening in these two situations. Include the results for what happens to both the string and the mass in each scenario.

4. Nickel Drop
   Fill a cup half way full with water. Place an index card on top of the cup and a nickel on top of the index card. Try to flick the index card so that the nickel drops straight into the water without touching the nickel at all. How are you able to do this? What happens when you move the index card slowly?

5. Tennis Ball Drop
   In this experiment you will try to drop a tennis ball on a target as you run past the target. You must keep your elbow at your side and not through the ball at all. Have someone record your attempt with your ipad so you can watch where the ball lands. Correct your mistakes and try again until you hit the target. Why is this activity not as easy as it first sounds? What real-life situation does this relate to?

6. Spiderman's a Bad Driver
   Place Spiderman in the collision cart. Send the car at the other with a fast pace into the other car. Do not damage our equipment! What happens to Spiderman? Why is inertia important to understand if you ride in a car?

7. Moving blocks
   Have someone help you build and hold stack at least 5 blocks vertically balanced. Walk forward with the blocks slowly then slowly stop, turn around and return to where you began. Now repeat your path moving at a faster pace and stop and turn at a faster rate as well. Explain what happened when you increased your speed and why.