Name: _____Date: _____Period: _____

Lab Activity: Inertia – A Body in Motion

In this experiment you will try to drop a tennis ball on a target as you run past the target. Think it's easy? Before you begin, try to guess what will happen. Try to figure out when you will need to release the ball in order to hit the target.

What are your predictions?

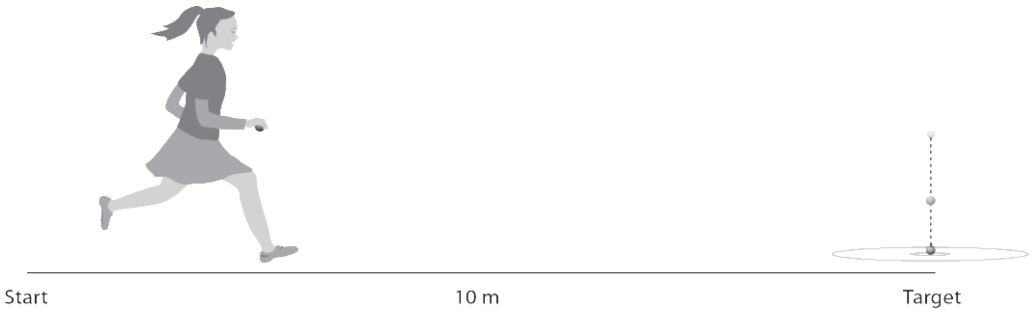
As you conduct this experiment, think of the challenges Air Force pilots had before the invention of the guided missiles that are used today. Pilots in World War II had to understand mathematics in order to drop bombs on targets while causing as little harm as possible to surrounding buildings and people. These are the same concepts that you will learn with this experiment.

Materials

• one tennis ball
• clearly-marked target(s), i.e., notebook paper, a chalk mark, tape, bucket…

Procedure

1. Place a target about 10-15 meters away from a starting line. Mark the starting line with the meter stick.



2. Hold the tennis ball and do not let your elbow leave your side as you run and drop the ball. **Do not throw the ball**. You should hold the ball from its sides so that you can release your grip as you let it drop. Remember to drop the ball and not throw it, otherwise you will change the intent of the experiment.

3. Have your three group members stand alongside (but slightly back from) the running path to act as observers. **One should stand before the target, one at the target, and one just after the target**. Their objective is to determine exactly where the runner **released the ball** and where the **ball strikes the ground.**

4. Each group member will sprint toward the target as fast as she or he can and try to drop the ball so that it lands on the target. **<u>You will draw a diagram</u>** for each group member's attempt to drop the ball on the target. The diagram should display where the ball was released, and where it actually landed.

5. Repeat the experiment until the ball hits the target from at least one of your group members.

Names: **Diagrams:**

Group member _____

Group member _____

Group member _____

Group member _____

6. **What are your predictions if you ran at a slower speed?**

7. Now, have a group member run towards the target to drop the tennis ball at a slower speed.

What happened when the runner reduced his/her speed?

8. **Use the information in the previous trials to predict what would happen at a walking speed**.

9. For the last trial, have one of your group members walk towards the target and drop the tennis ball. **How is this trial different from the others?**

10. **Relate today's lab with Newton's First Law of Motion and with inertia**.

11. **Write a summary of your results for each trial** (running in full sprint, reducing speed, and walking towards target). **Form conclusions** based on the speed of each runner, the location of each ball's release, and the exact point where each ball landed.
(Length needs to be ½ page)