

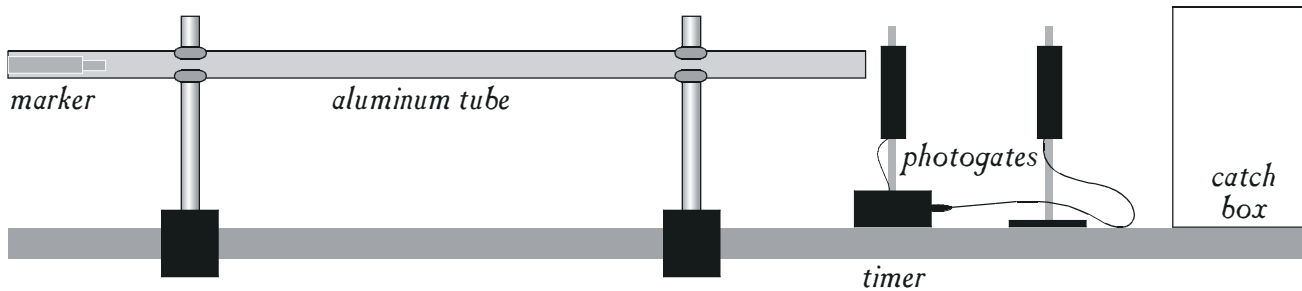
# BLOWOUT

## A DEMONSTRATION OF FORCE AND MOTION

Name: \_\_\_\_\_ Per: \_\_\_\_\_ Date: \_\_\_\_\_

### THE SET-UP

A marking pen is blown through a tube. At the end of the tube, photogates are arranged as shown. A box is placed to catch the marker.



### 1. CALCULATING THE SPEED

The timer connected to the photogates begins counting when the marker passes through the first gate. It stops counting when the marker passes through the second gate.

a. How can you use the time information to determine the speed of the marker? (And what other information do you need to know?)

b. Record the information and show the calculation of the marker's speed.

### 2. IN THE BARREL

Ignore gravitational effects. Describe the motion that occurred while the marker was in the tube

a. in terms of Newton's first law (discuss the role of inertia).

b. in terms of Newton's second law (discuss force, mass, and acceleration).

c. in terms of Newton's third law (discuss the interactions between various objects).

### 3. BETWEEN THE BARREL AND THE BOX

Ignore gravitational effects. Describe the motion that occurred when the marker was between the tube and the catch box

a. in terms of Newton's first law (discuss the role of inertia).

b. in terms of Newton's second law (discuss force, mass, and acceleration).

c. in terms of Newton's third law (discuss the interactions between various objects).

### 4. AT THE CATCH BOX

Ignore gravitational effects. Describe the motion that occurred when the marker impacts the catch box

a. in terms of Newton's first law (discuss the role of inertia).

b. in terms of Newton's second law (discuss force, mass, and acceleration).

c. in terms of Newton's third law (discuss the interactions between various objects).

### 5. A SPEEDIER BULLET

What changes could be made to the demonstration so that the marker pen would leave the barrel with a greater speed? Justify each idea using one or more of Newton's laws of motion.