BLOWOUT

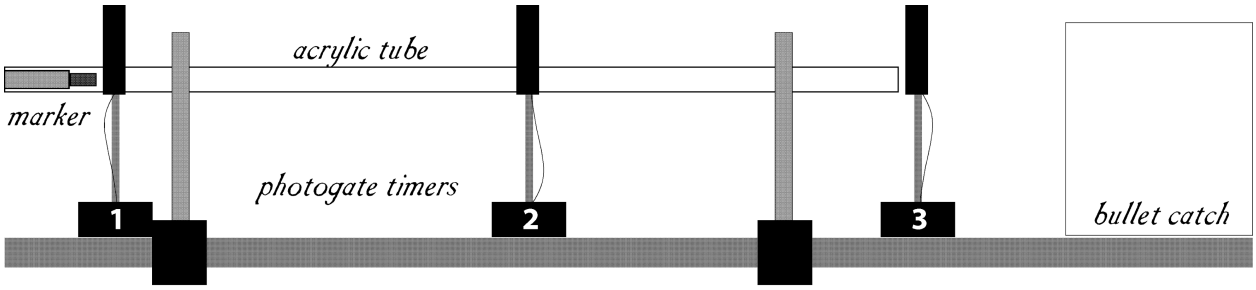
CHALLENGE OF THE CRYSTAL-CLEAR CONDUIT

QUANTITATIVE DEMONSTRATIONS INVOLVING ACCELERATION

Name:_____ Per:_____ Date:_____

1. TIME TRIALS

A whiteboard marker is fired through an acrylic tube. Along the length of the tube lie three photogate timers.



QUESTIONS

a. During a *Blowout* demonstration, what happens to the speed of the marker as it passes through the tube?

b. Each *photogate* timer will independently record the time it takes for the marker to pass through *its* photogate beam. How will the time values on the photogate timers compare after the marker has been fired?

OBSERVATIONS

Photogate 1: Photogate 2: Photogate 3:

CONCLUSIONS

Based on the observations, describe what happens to the speed of the marker as it passes through the tube. How does this compare to your prediction?

2. MEASURING ACCELERATION

QUESTION

Acceleration due to gravity near the surface of the earth is given as 9.8 m/s^2. This acceleration is often referred to as one *g*. How many *g*'s does the marker experience?

ESTIMATE

What is the acceleration of the pen while it is in the tube? Which of these is closest to the acceleration of the pen?

___Less than 1 *g*.
___1 *g* -- the acceleration due to gravity on Earth.
___5 *g*'s -- the top acceleration on an amusement park roller coaster.
___10 *g*'s -- the acceleration at which people pass out.
___More than 10 *g*'s.

HOW TO PROCEED

How can photogates be arranged to determine the acceleration of the marker pen in the tube? How many photogates are needed? (Auxiliary photogates may be used.)What mode should they be in? Where should they be placed? Is there more than one way to do it? Draw your configurations/instructions below. Record corresponding configurations, data, and calculations of acceleration.