Kinematics and Vectors

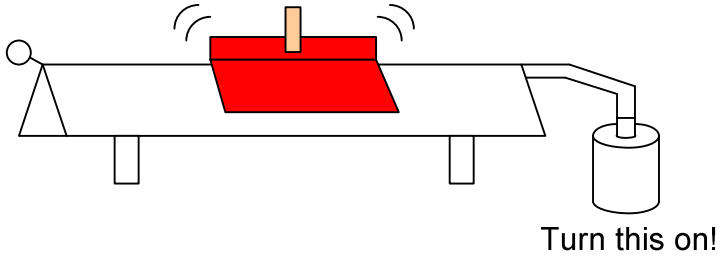
Name:_____T.A._____

Partners:_____

Course Number:_____Section Number:_____Date:_____

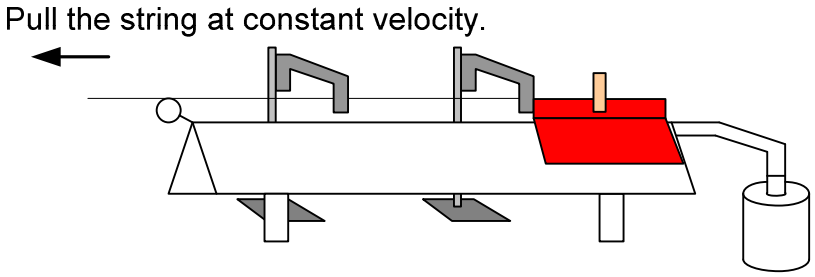
1. Kinematics

Turn on the air pump and level the air track so that the glider stays one place.



- **Experiment 1 – Measuring Velocities**

Use "Time in photo gate"; make a constant velocity to go through two gates as follows.



d (distance between photo gates) = _____ (m)

	Photo Gate 1 (ini. velocity)	Photo Gate 2 (fin. velocity)	Stopwatch (t)	Velocity d/t
1				
2				
3				

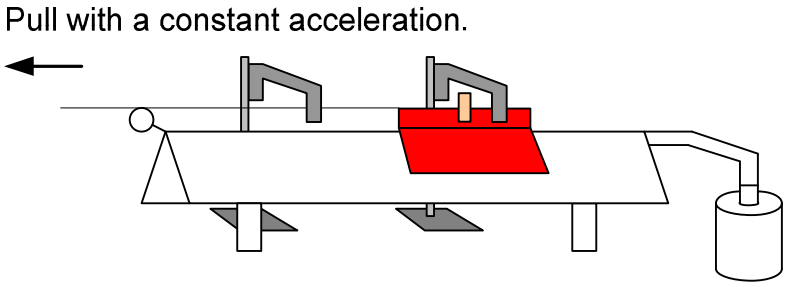
Questions:

- Did you make constant velocities? (Are the first and second columns close?)
- Are the velocities measured by photo gates close to the velocities measured by stopwatch?

- **Experiment 2 – Measuring Acceleration**

Conceptual Discussion:
What is acceleration? Explain it in your own words.

Use "Time in photo gate"; make the initial position as close to the first photo gate as possible.



d (distance between photo gates) = _____ (m)

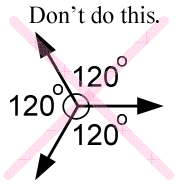
	Photo Gate 1 (ini. velocity)	Photo Gate 2 (fin. velocity)	Stopwatch (t)	Acceleration 1 lini. vel. – fin. vel.l/t	Acceleration 2 $2d/t^2$
1					
2					
3					

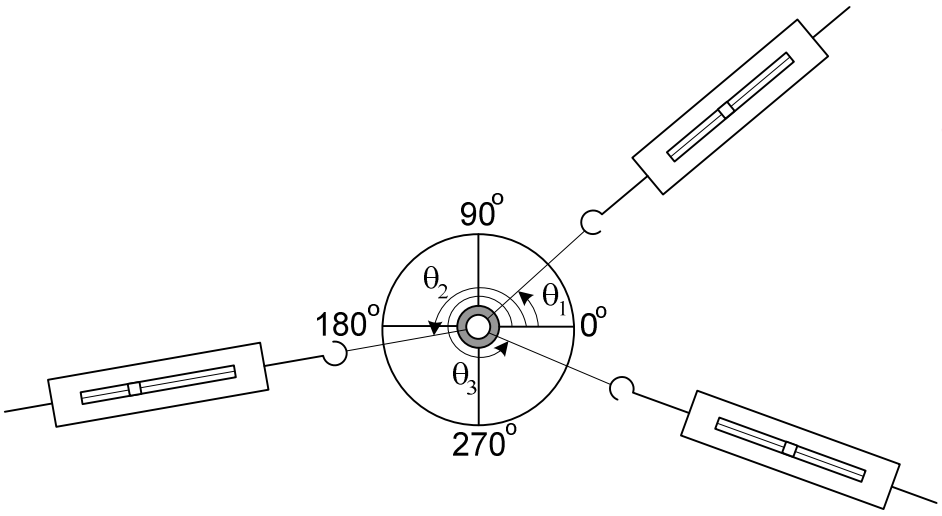
Questions:
- Did you have similar values in last two columns?

Explain velocity and acceleration in your own words from the above experiments.

2. Vector Addition

Make a circle with a compass, and label the angles by using a protractor. After that, using three scales, you make a balanced state as follows.





	Mass	Angle	$Mass_x$ (= Mass×cosθ)	$Mass_y$ (= Mass×sinθ)
Force 1		θ_1 =		
Force 2		θ_2 =		
Force 3		θ_3 =		
Sum of x- and y- components of each force ⇒				

Do the force components add up to zero?

What is the meaning of vector addition above?