Student Work sheet

Air Track

1. Turn on the air pump then lift the air track up from one side by using the handle beside the device or by using your hands. The photo-gate is a device that measure the time the cart takes to pass the gate. Turn the photo-gate on and allow the cart to slide on the inclined plane.
Raise the inclined plane in successive step and record the time registered by the photo-gate at each step for each angle of inclination. What do you notice in the time readings while changing the angle of inclination of the track?

2. Conclude from your previous answer what has happened to the motion of the cart when sliding on the air track?

3. What are the physical quantities that will change every time you increase the tilt of the air track? How can you measure them? If you cannot measure these quantities directly, what other alternative methods can you use for measurements? [Think of a mathematical method knowing that the system resembles a triangle]

4. How can you calculate the acceleration of the cart using the devices in front of you and the laws of motion in one dimension which you have previously learned? Show your work. ($v^2 = v_o^2 + 2\,a\,\Delta x$)

5. After defining the physical quantities that are changing from step 3, collect the data that links these quantities together and tabulate your results. What is the independent and dependant variable?

6. Draw a graph of your tabulated results and calculate the slope of the straight line. If the graph does not show a straight line how can you redefine one of the quantities to correct for this.

7. What is the highest acceleration the cart can obtain? Why? Can you draw it on the graph?

8. Turn the air bump off. Lift the air track until you reach a point where the cart starts sliding. Calculate the acceleration of the cart at this inclination. At this same inclination, turn the air pump on again and calculate the acceleration of the cart. Compare the acceleration in both situations. Are they similar or different? Why? Explain your answer.