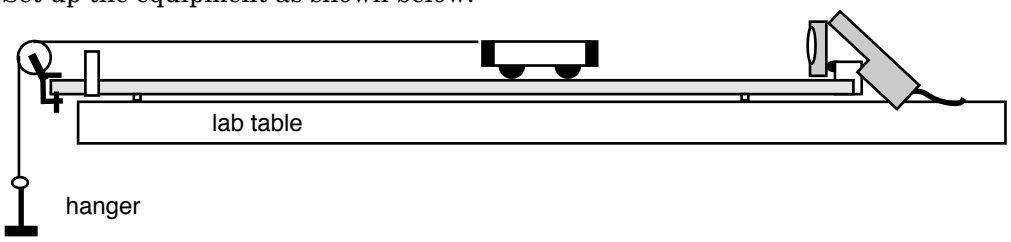
Lab 2-3: **Constant Acceleration**

Purpose:
1. To define the term *acceleration*.
2. To examine the motion graphs for an object that is speeding up.
3. To examine the motion graphs for an object that is slowing down.

Materials: 1 track 1 pulley 1 hanger 1 string 1 motion cart

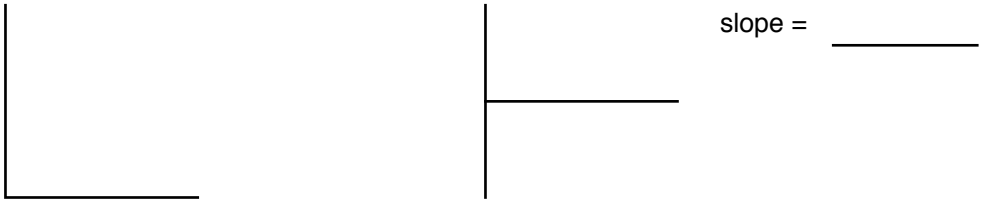
Procedure & Data:

1. Start up Logger Pro and open the file "02_Cart.cmbl".
2. Set up the equipment as shown below.



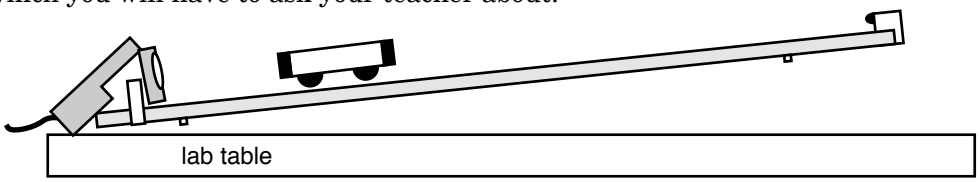
3. Hold the cart in place, hit "Collect" and once you hear the motion detector making noise, release the cart. Please don't let it slam into the end of the track or pulley.

4. Sketch the resulting position and velocity graphs below. ONLY SKETCH THE PARTS THAT SHOW THE CART SPEEDING UP. Sorry for yelling, but expect a lot of sarcasm if you attempt to copy the entire graph from Logger Pro.



5. Determine the slope of the straight part of the velocity graph while the cart was speeding up. Record the slope above.

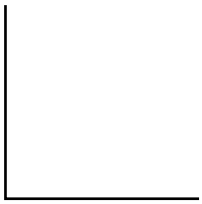
6. Remove the pulley from the track and remove the string from the cart. Raise one end of the track by placing a couple books under it, or use a special clamp and stand, which you will have to ask your teacher about.

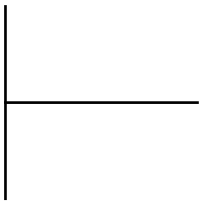


. Hit the "Collect" button, and when you hear the motion detector, give the cart a slight push up the ramp. It should get close to the end - but don't let it hit the end of the track and don't let it slam into the motion detector.

8. Determine the slope of the straight part of the velocity graph while the cart went up and down the track. Now sketch both graphs in the space on the other side and record the slope. Only sketch the parts after the cart left your hand and before you stopped it

Lab 2-3: **Constant Acceleration**





slope = _____

Questions:

1. From both trials, how can you tell that the positions vs time graphs were not constant velocity?

2. From both trials, how can you tell that the velocity vs time graphs were not constant velocity?

3. Recall that *velocity* is the slope of *position*, and tells you the rate at which your position changes. What does the slope of a *velocity* graphs tell you? What do we call that?

For the first trial with the cart just speeding up

4. How do the graphs show you that the object is speeding up?

5. What was the acceleration of the cart while being pulled across the table?

For the second trial with the cart going up and down a small hill

6. On both graphs, show where the car was slowing down and where it was speeding up.

7. What was the velocity of the cart at its maximum height? How you can tell from both graphs?

8. Compare the acceleration of the cart while it was slowing down to the acceleration while it was speeding up. What were they?

9. What was the acceleration of the cart at its maximum height?

10. What is the definition of acceleration?