

IB Physics

Conservation of Momentum - groups of 2

When a moving glider strikes a glider at rest on an air track the velocity will go down, but momentum will be conserved. Here you will test this. We will measure the velocity of the gliders using a range finder.

1. You will need **one** lab partner, (Work in groups of 2 – if you have a group of 3 then you must analyze two different collisions), an air track, two gliders, and a computer with Logger Pro on it.
2. **Mass** the two gliders and record this. Level the air track. Practice the collision (Not too fast, not too slow) – you will need to hold the stationary glider still with a finger until just before the collision. For the lab, you will need to gather the mass of both gliders, and the velocity of the gliders before and after, and the uncertainty of everything you measure.
3. Gather the velocity before and after the collision using the range Finder. Run the momentum lab on the desktop. You will need to adjust the rangefinder until you get a nice graph of the collision on your velocity graph. When you get the graph you want, you can use “Analyze” > “Statistics” and it will pop up a neat balloon on your graph that has the information you need. (Including uncertainty!)
4. With the statistics balloons showing, you can print out the graph of the collision on the printer in my room.
5. Make a nice neat data table, and calculate the momentum and the uncertainty of momentum before and after the collision.
6. Write an appropriate IB conclusion.

Here's what you turn in:

1. The printout of your collision graph.
2. **A nice data table that has the information you used in your calculations. (units and uncertainties)**
3. Your calculations of the momentum before the collision, and after the collision and the uncertainty of those momenta.
4. An appropriate conclusion and evaluation of the experiment as per IB criteria.
 - a. Use the numbers to make an argument as to whether the data you have disproves conservation of momentum. You will need to intelligently use the uncertainties, as well as the calculated momenta before and after.
 - b. Discuss the sources of error present, and what effect those source might have had on the investigation
 - c. Suggest ways to improve the procedure to eliminate the sources you mentioned