Collision Analysis Lab

Question- What is the evidence that momentum is conserved in the following interactions: elastic collisions, inelastic collisions, and changes in mass? How does the evidence support the law of momentum conservation?

Purpose-To gather convincing evidence that total system momentum is conserved in an elastic collision, an inelastic collision, and changes in mass that occur in each situation; Also, describe how the evidence supports the law of momentum conservation.

A complete lab write-up includes a Title, a Purpose, a Data Section, and a Conclusion/Discussion of Results. The Data section should include a data table showing primary and secondary data collected (see example below.) One sample calculation should be shown for each type of calculation. The Conclusion/Discussion should provide a thorough analysis of the results, identifying successful and unsuccessful trial; specific evidence from each trial that indicate success (or lack thereof) should be elaborated upon. Percent error or percent difference calculations should be performed and a complete error analysis included within the discussion.

**YOU WILL MAKE YOUR OWN DATA TABLES that might look something like these – adjust as needed!**

**For ELASTIC collisions…**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Primary Data: **Elastic** | | | Before Collision | | After Collision | |
| Trial | Mass 1 | Mass 2 | Velocity 1 | Velocity 2 | Velocity 1 | Velocity 2 |
| 1 |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Secondary Data | Before Collision | | | After Collision | | | % Difference  Ptotal |
| Trial | P1 | P2 | Ptotal | P1 | P2 | Ptotal |  |
|  |  |  |  |  |  |  |  |

**For IN-ELASTIC collisions:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Primary Data: In-**Elastic** | | | Before Collision | | After Collision | |
| Trial | Mass 1 | Mass 2 | Velocity 1 | Velocity 2 | Mass (1+2) | Velocity (1+2) |
| 1 |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Secondary Data | Before Collision | | | After Collision | | % Difference  Ptotal |
| Trial | P1 | P2 | Ptotal | P (1+2) | Ptotal |  |
|  |  |  |  |  |  |  |

Scoring Rubric:

|  |  |  |
| --- | --- | --- |
|  | Included, labeled and organized all parts of the lab report. | \_\_\_\_\_/12 |
|  | Data section includes primary and secondary tables for both types of collisions. Calculations are correct; example calculations are shown for each column on the secondary data table. Work is organized and labeled. |
|  | Conclusion/Discussion of Results describes how the evidence suggests that momentum is conserved or not conserved; actual data values are referenced in an effort to establish *the proof*. A % difference is calculated & discussed comparing Ptotal-before and Ptotal-after for EACH type of collision; work is shown. |