

Momentum and Collisions Notebook - Scoring Rubric

Your notebook will be collected at the end of class on _____/_____/_____. The following items should be in your notebook. They should be clearly organized and easy to find. Use an organizational system and label all work. Each lab will be graded separately. Ten Momentum and Collisions lab grades will be entered into the gradebook. An overall notebook grade will be determined based on your use of the notebook as an organized and effective record-keeping tool which documents your engagement in the learning cycle during classtime and labtime.

Name: _____

Period: _____

Item	Score
<p>M1. Being Impulsive About Momentum Change Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes quantitative information relevant to the purpose, presented in an organized and informative manner. Such information could include graphs, slope values, data tables of impulse and momentum, etc. Data is reasonably accurate. Data provides evidence which can support an answer to the <i>question</i> posed in the Purpose. Labels, units and calculations are shown. ___ Conclusion/Discussion answers the <i>question</i> posed in the Purpose. Evidence to support the conclusion is presented and elaborated upon; the manner and the extent to which the data support the conclusion is discussed. A percent difference calculation is used in the discussion; work is shown. 	<p>_____/4 (Lab score)</p>
<p>M2. Balloon Toss Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes a table of observations made for the collision of several water balloons. Observations are well documented using notes, diagrams, words, etc. ___ Conclusion responds to the <i>question</i> posed in the Purpose. The effect (direct or inverse) of the three variables upon force is clearly and accurately stated. ___ Post-Lab Questions are answered and the provided page is taped in. Answers are correct. 	<p>_____/3 (Lab score)</p>
<p>M3. Rebounding versus Sticking Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes quantitative information relevant to the purpose, presented in an organized and informative manner. Such information could include graphs, slope values, data tables of impulse and momentum, etc. Data is reasonably accurate. Data provides evidence which can support an answer to the <i>question</i> posed in the Purpose. Labels, units and calculations are shown. ___ Conclusion/Discussion answers the <i>question</i> posed in the Purpose. Evidence to support the conclusion is presented and elaborated upon; the manner in which the data support the conclusion is discussed. 	<p>_____/3 (Lab score)</p>
<p>M4. Before and After Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes a well-documented record of the results of several trials using mass values and velocity vector diagrams (or some comparably effective representation). The mass and the relative before- and after-collision velocities should be depicted. At least four inelastic and at least two elastic collisions are represented. ___ Conclusion/Discussion suggests some principles capable of predicting the results of a collision. Specific evidence from the Data section is used to support the conclusions. Conclusion is detailed enough to be used in the analysis of a collision; sample numbers might have been used to provide the necessary details. 	<p>_____/4 (Lab score)</p>
<p>M5. Action-Reaction Lab</p>	

<ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes a sketch of the graphs used to determine the post-explosion velocities. A table of both measured and calculated data is organized to present the results of several reliable trials. An example calculation is included for each type of calculation performed. ___ Conclusion/Discussion answers the <i>question</i> posed in the Purpose. Specific evidence for the <i>answer</i> is discussed. An error analysis is conducted. Percent difference calculations (comparing the post-collision momenta of the two carts) for the trials are included; work is shown for one of the trials. 	<p style="text-align: right;">____/5 (Lab score)</p>
<p>M6. Sand Balloon Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes a table of pre- and post-collision mass and velocity values; column headings and units are included. Momentum values are calculated for the cart, the sand balloon, and the system; results of calculations are labeled ($p_{\text{cart}} = \dots$); work is shown; units are provided. Measurements are reasonably accurate. ___ Conclusion/Discussion compares the total system for the before- and after-collision situations. An error analysis is conducted and a percent difference comparison is performed; work is clearly shown for the percent difference. 	<p style="text-align: right;">____/5 (Lab score)</p>
<p>M7. Inelastic Collision Analysis Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes the provided table; measured values are reasonably accurate. Calculations are correct; example calculations are shown for p_1, p_1', p_2', p_{tot} and p_{tot}'; 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 <i>the proof</i>. An error analysis is conducted; a percent difference is calculated, comparing p_{tot} and p_{tot}'; work is shown. 	<p style="text-align: right;">____/6 (Lab score)</p>
<p>M8. Elastic Collision Analysis Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes two organized tables; measured values and calculated values are separated; column headings and units are provided. Appropriate attention was given to +/- signs on velocity values. Measured values are reasonably accurate. Calculations are correct; example calculations are shown for p_1, p_1', p_2', p_{tot} and p_{tot}'; 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 <i>the proof</i>. An error analysis is conducted; a percent difference is calculated, comparing p_{tot} and p_{tot}'; work is shown. 	<p style="text-align: right;">____/8 (Lab score)</p>
<p>M9. What's Cooking? Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes a diagram of the physical set up; specific variables being measured are shown and labeled in the diagram. Actual values for these variables for several trials are organized in a table using a row-column format; column headings are provided and units are stated. An example calculation is shown for v_{cannon}, p_{cannon} and v_{ball}; Work is shown and labeled; calculations are correct. Conversion of speed values to miles/hour is performed accurately. ___ Conclusion answers the <i>question</i> posed in the Purpose. 	<p style="text-align: right;">____/4 (Lab score)</p>
<p>M10. Two-Dimensional Collision Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes an informative sketch; the four strategic locations are shown. Measurements of p_1, p_1', p_2', Θ_1, Θ_2 are recorded and labeled on the sketch; units are included. Calculations of x- and y-momentum values for the individual objects and for the system are provided for before and after the collision; work is shown in an organized fashion; results are labeled and clearly discernible. Reveals both an understanding of momentum analysis and the 	<p style="text-align: right;">____/8 (Lab score)</p>

<p>— ability to organize a complex solution. Results are accurate. 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 <i>the proof</i>. An error analysis is conducted for the total x-momentum; work is shown.</p>	
<p>M11. Use of Notebook as a Record-Keeping Tool Ideally, a student would use the notebook to record notes from class lectures, post-lab sections, textbook readings, etc. Answers and discussions of opening questions are provided. The notebook is a record of the involvement of a scientist/student in both class and lab. A blank or even sparsely-used notebook with little evidence of involvement in class is not a sign of a student who has used the notebook to document and record their involvement in class. A diligent student keeps careful records which subsequently become an effective and useful learning tool.</p>	<p>____/10 (HW score)</p>