

Newton's Laws 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. Eleven Newton's Laws 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>NL1. Pass the Water Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes an organized documentation of observations. Observations are reasonably accurate and (most of all) clear. ___ Conclusion answers the <i>question</i> posed in the Purpose; <i>answer</i> is correct. ___ Discussion of Results relates the findings of the labs to Newton's first law of motion. Discussion is clear, thoughtful, and specific to the lab experience. 	<p>____/4 (Lab score)</p>
<p>NL2. Galileo for a Day Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes a record of your investigation – showing the various velocity-time graph results for the trials of varying friction. Graphs are clearly labeled (axes labels and information about the level of friction). Graphs appear accurate and suitable to the task of drawing a conclusion. ___ Conclusion accurately answers the question posed in the purpose (as always). ___ Discussion of Results discusses how the evidence (observations from the Data section) supports such a conclusion. Accurately <i>extrapolated</i> the results of study to predict the expected result under the condition of no friction. ___ Post-lab questions were included and completely and accurately answered. 	<p>____/5 (Lab score)</p>
<p>NL3. Wait! Hmmm. Gee. Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes the data table with labeled columns and units. A sketch of plot is included; axes are labeled; results of linear regression analysis is included. Class data is reported ___ Conclusion states the relationship between the mass and the force of gravity. An equation is reported; symbols are defined. 	<p>____/4 (Lab score)</p>
<p>NL4. F-m-a Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes two Logger Pro plots (sketches only) with the mass and the slope of the best fit line recorded for each. Axes are labeled and units reported. Class data are included and labeled as such. ___ Conclusion describes the relationship and reports the experimentally-derived equation relating force, mass and acceleration; symbols are defined. ___ Discussion of results accurately and thoroughly explains the logical connection between the data and the reported equation. An error analysis is included. 	<p>____/5 (Lab score)</p>
<p>NL5. Coffee Filter Skydiver 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 two LabPro plots (velocity-time and acceleration-time) for a falling coffee filter (megasize); axes are labeled. ___ Conclusion/Discussion accurately and thoroughly describes how the velocity and acceleration of the filter changed over time. References are made to specific parts of each graph to support such conclusions. Efforts to explain such changes using Newton's laws are thorough, logical and intelligent. 	<p>____/6 (Lab score)</p>

<p>NL6. From a Feather to an Elephant Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes terminal velocity information for the various trials - either as velocity-time graphs or actual readings from such graphs; axes are labeled; units are indicated, results are organized and clearly recorded. ___ Conclusion/Discussion describes the effect of varying mass on the terminal velocity. Actual data which support such a conclusion are referenced and explained. 	<p>____/4 (Lab score)</p>
<p>NL7. Falling Body Spreadsheet Study</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Purpose section includes a succinctly worded statement which clarifies the intention of the study. ___ Description of Study section describes details related to how the study was conducted. Independent and dependent variables are discussed. The procedure which was used was related to the purpose. ___ Data section identifies the input variables for all trials; units are stated. Reasonable values were used for all inputs. Relevant output variables are clearly stated in an organized fashion. Included a relevant trajectory plot and at least one other plot for each trial. ___ Conclusion/Discussion provides the answer to the question posed in the Purpose. Answer is relevant to the purpose and reasonable. Evidence which supports the conclusions are discussed in a rational manner. 	<p>____/12 (Lab score)</p>
<p>NL8. Sliding Friction Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes tabulated data in a row-column format with units about the $F_{\text{frict-static}}$, $F_{\text{frict-sliding}}$, and F_{norm} values; appropriate plots are constructed and the results of linear regression analysis are correctly and clearly reported. Data appear reasonable as reflected by the regression constant and slope value. ___ Conclusion states the experimentally-determined values of the coefficients. ___ Discussion of Results explains the rationale behind the connection between the graphs and the reported coefficients. 	<p>____/6 (Lab score)</p>
<p>NL9. Mu Shoe Phyzx Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Description of Study section describes the methods used to conduct the study. Includes diagram where relevant. Discussed details regarding how the shoes were pulled and the direction of pull, how the normal and the friction forces were measured and the range of values used. The rationale behind such methods was clearly, thoroughly and accurately explained. ___ Data section includes a table of collected data; units were included. Trials were repeated to insure reliable results; averaging was conducted. Coefficients of static friction for at least three shoes were calculated for both longitudinal and lateral movements. Work is shown for calculations. ___ Conclusion states all coefficient values and ranks the shoes according to relative effectiveness for providing traction. Conclusions are clear and complete. ___ Discussion of Results provides a reflection upon the results of the study. Errors are analyzed and alternative approaches are suggested. 	<p>____/6 (Lab score)</p>
<p>NL10. Breaking Strength Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes an informative and labeled diagram. Measured data (with units) are stated clearly. Observational notes are included to provide insight into any irregularities in the data. Disregarded trials are noted and an average value is calculated. Results appear reliable based on precision. ___ Conclusion/Discussion provides an answer to the question posed in the Purpose and discusses details related to the study and the task of achieving reliable results. 	<p>____/3 (Lab score)</p>
<p>NL11. Two Body Lab</p>	

<ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes an informative and labeled diagram. Measured data (with units) are stated clearly. Relevant calculations are conducted; work is clearly shown and organized. ___ Conclusion/Discussion describes the mathematical relationships and states the equation which expresses the relationship; meaning of symbols are defined. Conclusion is supported by intelligent references to the data and calculations. Discussion reveals a clear and thorough understanding. 	<p>___/6 (Lab score)</p>
<p>NL12. Ut Tensio, Sic Vis Lab</p> <ul style="list-style-type: none"> ___ Included, labeled and organized all parts of the lab report. ___ Data section includes collected data organized in a row-column format; units and column headings are indicated. A sketch of the plotted data is provided and the results of the linear regression analysis (slope, y-intercept and regression constant) are reported. ___ Conclusion/Discussion identifies the mathematical equation relating the stretch distance and the applied force; symbols in the equation are defined. The meaning of the Ut tensio, sic vis title is discussed and related to the lab findings. The meaning of the numerical constant in the equation should be discussed. 	<p>___/5 (Lab score)</p>
<p>NL13. Normal Force-o-meter Lab</p> <ul style="list-style-type: none"> ___ The normal force-o-meter was carefully and successfully constructed. ___ Included, labeled and organized all parts of the lab report. ___ Data section includes collected data for the four different locations of the simulated free fall ride. Free-body diagrams (with clearly labeled force types) are used to calculate the net force and acceleration for each of the four locations; work is clearly shown and labeled; calculations are accurate. ___ Conclusion/Discussion thoroughly and accurately describes how the stretch of the spring on the constructed normal force-o-meter allows one to determine the acceleration. Discussion reveals a high level of understanding. 	<p>___/5 (Lab score)</p>
<p>NL14. Use of Notebook as a Record-Keeping Tool</p> <p>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>