

## Vectors and 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. Eight Vectors and 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><b>VF1. It's a Breeze Lab</b></p> <ul style="list-style-type: none"> <li>___ Included, labeled and organized all parts of the lab report.</li> <li>___ Data section includes a diagram; the angle <math>\theta</math> is defined. Force and <math>\theta</math> measurements are recorded in a table format; units are identified. Analysis of the data is clearly documented (methods may vary); and equation is derived from the analysis. Data and associated equation are accurate.</li> <li>___ Conclusion answers the <i>question</i> posed in the Purpose.</li> <li>___ Discussion of Results explains the logic which leads from the data to the conclusion.</li> </ul>	<p>____/5 (Lab score)</p>
<p><b>VF2. Getting Hung Up by Tension Lab</b></p> <ul style="list-style-type: none"> <li>___ Included, labeled and organized all parts of the lab report.</li> <li>___ Data section includes a diagram for the three situations; forces are clearly labeled with a magnitude (unit included) and a direction. A labeling convention is used. Calculations and analysis is clearly documented. Analysis is error-free and leads to a reasonable result for the <math>F_{net}</math> value.</li> <li>___ Conclusion/Discussion identifies the net force for each of the three situations and includes a thorough error analysis. Discussion and preceding analysis reveals a solid understanding of equilibrium and its mathematics.</li> </ul>	<p>____/6 (Lab score)</p>
<p><b>VF3. Sign Hanging Lab</b></p> <ul style="list-style-type: none"> <li>___ Included, labeled and organized all parts of the lab report.</li> <li>___ Data section includes an informative diagram of the sign and supporting strings; important measurements are clearly identified on the diagram; units are stated. A force analysis, beginning with a force triangle, is accurately presented; documentation of analysis is thorough and complete.</li> <li>___ Conclusion/Discussion answers the <i>question</i> posed in the Purpose. An error analysis is included; the reliability of the results are evaluated; a percent difference calculation is performed and discussed; work is shown.</li> </ul>	<p>____/4 (Lab score)</p>
<p><b>VF4. Maximum Load Lab</b></p> <ul style="list-style-type: none"> <li>___ Included, labeled and organized all parts of the lab report.</li> <li>___ Data section includes an informative diagram of the experimental setup; method of measurement is indicated. Data for several trials are organized; unit is stated; outliers are indicated and an average maximum load is calculated. Theoretical analysis based on the breaking strength is presented in an organized fashion, beginning with a <i>force triangle</i>.</li> <li>___ Conclusion/Discussion answers the <i>question</i> posed in the Purpose. An error analysis is included; the reliability of the results are evaluated; a percent difference calculation is performed and discussed; work is shown.</li> </ul>	<p>____/4 (Lab score)</p>
<p><b>VF5. Science Friction Adventure Lab</b></p> <ul style="list-style-type: none"> <li>___ Included, labeled and organized all parts of the lab report.</li> <li>___ Data section includes an organized table (with column headings and stated units) and analysis which leads to the calculation of the coefficient of friction. All work is shown and documented. Data is reasonable and analysis is error-free. Measurements of the threshold angle are provided; results for several trials are</li> </ul>	<p>____/6 (Lab score)</p>

<ul style="list-style-type: none"> <li>___ provided; outliers are indicated and an average value is reported.</li> <li>___ Conclusion answers the two <i>questions</i> posed in the Purpose. Results seem reasonable and reflect accuracy of measurement.</li> <li>___ Discussion of Results includes a discussion of the expected relationship between <math>\mu</math> and the threshold angle and an evaluation of the reliability of the results. An error analysis and percent difference calculation is included. work is shown.</li> </ul>	
<p><b>VF6. Inclined Plane Lab</b></p> <ul style="list-style-type: none"> <li>___ Included, labeled and organized all parts of the lab report.</li> <li>___ Data section includes a diagram with recorded data. Class data is recorded; units are stated. Includes a thorough and accurate analysis of the data in an effort to determine the mathematical equation; this might include several failed attempts and wrong turns.</li> <li>___ Conclusion states the relationship in both words and an equation.</li> <li>___ Discussion of Results includes a thorough discussion of the logical connection between the collected data and the conclusion. Reveals a solid understanding.</li> </ul>	<p>___/4 (Lab score)</p>
<p><b>VF7. On a Roll Challenge Lab</b></p> <ul style="list-style-type: none"> <li>___ Included, labeled and organized all parts of the lab report.</li> <li>___ Data section includes a diagram with assigned values, <math>x</math>-<math>y</math> measurements, angle calculation, free-body diagram (with labeled forces) and a Newton's laws analysis. Documentation is clear, labeled and thorough. Photogate time and flag width are included (with units) and the measured speed is calculated; work is clearly shown.</li> <li>___ Conclusion reports the predicted and the measured speed. Results reflect careful measurement and analysis.</li> <li>___ Discussion of Results includes an evaluation of the lab results and a percent error calculation; work is shown.</li> </ul>	<p>___/5 (Lab score)</p>
<p><b>VF8. Modified Atwood's Machine Lab</b></p> <ul style="list-style-type: none"> <li>___ Included, labeled and organized all parts of the lab report.</li> <li>___ Data section includes a table of collected data with column headings and indicated unit. The results of a power or a linear regression analysis is provided; sketch of plotted quantities, statistics and equation are reported. Data is reasonable and analysis is accurate and well-documented.</li> <li>___ Conclusion states the equation derived from the data; symbols are defined.</li> <li>___ Discussion of Results provides a reasonable and organized derivation of a theoretical equation relating <math>v_f</math> and <math>m</math>. Derivation is clear, labeled and thorough; included accurate FBD, a Newton's laws analysis and use of a kinematic equation. Reveals a high level of understanding.</li> </ul>	<p>___/8 (Lab score)</p>
<p><b>VF9. Use of Notebook as a Record-Keeping Tool</b></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>