Vectors and Projectiles 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. *Auxiliary items* should be taped, glued or stapled into the notebook in the appropriate location; they should not be *hanging loose*. Use an organizational system and label all work. Each lab will be graded separately. Thirteen Vectors and Projectiles 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
VP1.	**Map Lab** ____ Included, labeled and organized all parts of the lab report. ____ Data section includes completed table with accurate measurements for all four trips; measurements are converted to miles (from cm). ____ Conclusion/Discussion should include an accurate and thorough statement of how the legs of the trips are mathematically related to the overall displacement. To provide evidence for the statement, a mathematical analysis of two of the trips is performed; one of the analyzed trips is a three-legged trip; work is organized, labeled and discussed.	_____/5 (Lab score)
VP2.	**As the Crow Flies Lab** ____ Included, labeled and organized all parts of the lab report. ____ Data section includes the number/letter of the destination. The magnitude and direction of the N-S and E-W hallway displacements are organized in a table; units are listed. Trigonometric analysis is accurate, organized and *follow-able*; all work is shown. The scaled vector diagram indicates a scale and shows vectors added head-to-tail; arrowheads are placed on all vectors; their magnitude is labeled next to the vector; the resultant is drawn and labeled; its magnitude and direction are measured and reported with units; reported value is the result of a measurement. Results seem reasonably accurate. ____ Conclusion states the resultant displacement from the physics classroom door to the assigned location; reported results from both analyses.	_____/8 (Lab score)
VP3.	**Where Am I? Lab** ____ Included, labeled and organized all parts of the lab report. ____ Data section includes completed table. Each vector is sketched and labeled with magnitude and direction; a trigonometric function is used to accurately determine the N-S and E-W components of the vectors; work is labeled and organized. The final destination is correctly identified - a sign of both good mathematics and good measurements. ____ Conclusion correctly states the final destination resulting from the combination of the three given vectors.	_____/6 (Lab score)
VP4.	**Road Trip** ____ Included, labeled and organized all parts of the lab report. ____ Data section includes the provided table taped in. Table is completed; work is shown in each cell of the table; results of the work - both magnitude and direction - are clearly reported. Calculations are accurate. The sum of x- and y-components is determined and used to determine the resulting magnitude and direction; this work is shown in organized fashion somewhere in the report (beside the table or below it). The resulting magnitude and direction is reported in the appropriate box. Units are included. Results are accurate. ____ Conclusion states the resultant displacement resulting from the three-legged trip - both magnitude and direction - and identifies the ultimate destination. ____ Answers to post-lab questions are included; answers are accurate.	_____/6 (Lab score)

VP5. Crossing the River Lab ____ Included, labeled and organized all parts of the lab report. ____ Data section includes a collection of data for each independent variable; data is organized in a table with column headings and units; data is complete enough to allow student to accomplish the purpose. Reflects student understanding of how to conduct a systematic and controlled experiment. ____ Conclusion/Discussion responds to the purpose in its entirety (six parts); each concluding statement is supported by a reference to the data and results; conclusions are accurate and consistent with data.	_____/6 (Lab score)
VP6. Basketball Analysis Lab ____ Included, labeled and organized all parts of the lab report. ____ Data section includes appropriate graphs (d_x and d_y, v_x and v_y , and a_x and a_y with respect to time); axes are labeled; plots are reasonably accurate. Slopes for the two velocity graphs are reported and labeled (along with the unit). ____ Conclusion/Discussion describes how the six quantities (d_x and d_y, v_x and v_y , and a_x and a_y) change (or don't change) with respect to time; at least one piece of supporting evidence is provided for each statement. Discussion is thorough and accurate.	_____/6 (Lab score)
VP7. Projectile Simulation Lab ____ Included, labeled and organized all parts of the lab report. ____ Data section includes provided graphic. The velocity components are drawn and labeled; the relative size of the v_x and v_y vectors were accurately drawn for both the horizontally-launched and the angle-launched projectile. ____ Conclusion uses words to clearly and completely described the changes (or lack of changes) in the v_x and v_y vectors for both types of projectiles. ____ Discussion of Results includes accurate answers to the provided post-lab questions; writing is thorough and complete.	_____/4 (Lab score)
VP8. Projectile Problem-Solving Lab ____ Included, labeled and organized all parts of the lab report. ____ Data section includes complete solutions to the three types of projectile problems; solutions are accurate clear, sequential and easy to follow. (An organized solution is a sign of an organized mind.) ____ Conclusion uses words to describe the strategy which is used to solve each of the three types of projectile problems. Strategy is accurate, detailed, specific and complete. Writing is organized.	_____/6 (Lab score)
VP9. Projectile Problem-Solving II Lab ____ Included, labeled and organized all parts of the lab report. ____ Data section includes complete solutions for all three variables for an angle-launched projectile problem; solutions are accurate clear, sequential and easy to follow. (An organized solution is a sign of an organized mind.) ____ Conclusion uses words to describe the strategy which is used to solve for each of the three variables of an angle-launched projectile problem. Strategy is accurate, detailed, specific and complete. Writing is organized.	_____/4 (Lab score)
VP10. Launcher Speed Lab ____ Included, labeled and organized all parts of the lab report. ____ Data section includes diagram of experimental set-up; the d_x and d_y values are labeled on the diagram. Correctly used kinematic equations to determine the launch speed. Work is organized and labeled; clearly indicated the symbols of the quantities being used in multiplication and division steps. Launch speed value is reasonably accurate; units are stated. ____ Conclusion states the launch speed (with units) of the projectile launcher.	_____/4 (Lab score)
VP11. Maximum Range Lab ____ Included, labeled and organized all parts of the lab report. ____ Data section includes a data table of angle-range values; column headings and	_____/6 (Lab score)

units are labeled. A plot of range vs. angle is completed; plotted values seem reasonably accurate. ____ Conclusion describes the complexities of how the angle of launch effects the range; correctly states the angle which provides for the maximum range; conclusions are consistent with data. ____ Discussion of Results demonstrates how the range can be determined using kinematic equations. Work is shown, labeled, organized and accurate. Includes error analysis to evaluate the reliability of the measurements; indicated expected answer to the angle of maximum range and compared the expected to the actual value determined in the lab.	
VP12. Hit the Target Lab ____ Included, labeled and organized all parts of the lab report. ____ Data section includes diagram of experimental set-up; the d_x and d_y values are labeled on the diagram. Correctly used trigonometric functions and kinematic equations to determine the velocity components, time of flight and vertical displacement. Work is organized and labeled; clearly indicated the symbols of the quantities being used in multiplication and division steps. Placed target at an accurate location and scored a perfect or near-perfect hit. ____ Conclusion/Discussion states the predicted height and identifies whether or not the target was hit.	_____/5 (Lab score)
VP13. Hit the Target - The Sequel Lab ____ Included, labeled and organized all parts of the lab report. ____ Data section includes diagram of experimental set-up; the d_x and d_y values are labeled on the diagram. Correctly used trigonometric functions and kinematic equations to determine the velocity components, time of flight and horizontal displacement; work is organized and labeled; clearly indicated the symbols of the quantities being used in multiplication and division steps. Placed target at an accurate location and scored a perfect or near-perfect hit. ____ Conclusion/Discussion states the predicted horizontal displacement and identifies whether or not the target was hit.	_____/5 (Lab score)
VP14. 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.	_____/10 (HW score)