AP Chemistry Lab 1: Sports Drink Concentration– Dalian American International School

	Far Below Expectations 0-1 point	Below Expectations 2 points	Meets or Exceeds Expectations 3 to 4 points
1. Cover Page, Title, Date, Terminology and Organization **(AP Chemistry Investigative Communication Skills)**	Cover page not included, or missing a significant amount of the required data. The lab report fails to meet two or more of the expectations for neatness, organization, title and date, experiment #,	Cover page is missing appropriate information. The font is not appropriate or a graphic is not appropriate. The lab report fails to meet two of the expectations for neatness, organization, title and date. Identifies and uses content specific vocabulary with occasional errors in use of terms that might have similar meanings.	The cover page contains all the appropriate information. The Font used is professional and appropriate. An interesting appropriate title and/or a graphic may be included. 1. The lab report is **typed** with name and date. 2. The **sections** are in **correct order**, **clearly labeled,** and presented in a professional manner. 3. No spelling/grammatical errors in the report. 4. Consistently and accurately uses correct and specific **vocabulary.**
2. Introduction/background: Variables, Purpose, and Design **(AP Chemistry Investigative Communication Skills)**	Purpose and introduction is missing, or is only loosely related to the lab being performed.	Contains some relevant researched information about the relevance of the lab. The Purpose addresses the procedural aspects of the lab, but does not accurately summarize the theoretical foundation of the experiment.	Research and describe any information that is relevant to the topic that we are studying. This is open-ended and you can write about anything that interests you regarding the lab. You must however, include the objective or purpose by the end. 1.Contains some relevant researched information about the relevance of the lab. 2. States the purpose of the lab and a hypothesis if relevant. 2. Purpose accurately describes the theory that is intended to be reinforced by performing the lab. 3. Briefly describes the design used to vary a desired variable and control other relevant variables.
3. Procedure	Procedure is missing altogether, missing important steps, or is wrong. Important safety issues are not addressed. Does not identify variable being tested.	Procedure is a mostly copied directly from the lab description, with little attempt at brevity. Or the procedure lacks sufficient content. Identifies the variable being changed in the experiment. Correctly selects and uses tools to measure desired quantities. Describes some safety procedures.	Procedure is a brief summary of each of the steps taken in completing the lab. It is NOT an exhaustive description containing minute detail. Clearly articulates which variables are being tested and which are being controlled. Demonstrates a plan that varies a desired variable and controls other relevant variables. Plans for safety including references to any special techniques or hazardous chemicals.
4. Experimental Data	The student has copies or makes up data after the lab, The data section is missing, or fails to meet 2 or 3 of the expectations.	The lab report fails to meet one or two of the of the Data section.	Reports data to the appropriate level of precision. Displays data appropriately in graphs or charts. 1. All data from experiments in included 2. Data is neatly organized (in tables if appropriate), and is easy to interpret. 3. All data is correct with regard to significant figures and labels.
5. Calculations and Graphs	The student omits graphs or calculations, or makes significant errors to making the graphs/calculations incomprehensible	The student makes 3 to 5 errors in graphing, labeling, calculations, and significant figures.	The report includes all of the required graphs and all calculations (with correct labels, descriptions, significant figures, etc…)
6. Conclusions	Conclusion is missing, or is in conflict with the student's experimental results.	Conclusion is present, and does not conflict with the student's experimental findings, but fails to address the theoretical basis for the lab.	The Conclusion succinctly describes what can be concluded from the **experimental results**. It is aligned with a well-written statement of Purpose at the beginning of the lab.

7. Discussion of Theory	Discussion of theory is missing, or does not adequately address both of the expectations for this section.	Discussion of theory is present, but fails to correctly address one of the two expectations of this section.	1. **Addresses the theory demonstrated** by the lab 2. **Explains how the calculations** do/do not support the theory and fulfill the purpose of the lab
8. Error Analysis	The report fails to meet multiple expectations for error analysis. Or the error analysis section is omitted.	The report fails to meet all the expectations for error analysis. The error is given as ***personal observation rather then quantitative value***s.	1. Relative error, if appropriate, has been calculated. 2. Specific sources of experimental error are addressed. 3. Write-up analyzes the effect of errors on the magnitude of calculated quantities.
9. Questions	Post-lab questions contains multiple 3 errors, or is omitted.	Post-lab questions contain some errors.	Post-lab questions contain no errors.
10. Abstract (May or May not be Required)	Important theories or concepts misrepresented. Lacks summary of procedure and/or fails to clarify conclusion.	Describes methods used to complete this investigation. This should be a summary, not a detailed procedure. Describes what happened. Summarize observations and results of calculations and graphs.	*Abstract:* 1. Defines important concepts, theories or laws being examined. What were you attempting to do in this lab? *2.* Describes methods used to complete this investigation. This should be a summary, not a detailed procedure. *3.* Describes what happened. Summarize observations and results of calculations and graphs. *4.* Describes important concepts or theories reinforced by the results. What experimental errors or limitations might have negatively influenced the results?

t

Modified but based on AP Chemistry rubric found at AP Chemistry = Laboratory Report Rubric - Teacher Pages called *Rubric for Laboratory Assessment – GMR Version 03*

Formative Knowledge and Skills being developed

Progression of Content Knowledge:

Content Development **Big Idea: Atomic Structure--spectroscopy -stoichiometry**	Recognizes connections between macroscopic-level and particulate level but is unable to correctly and consistently calculate chemical dilutions Fails to recognize connections between macroscopic-level and particulate level.	Applies Beers law to determine the concentration of an absorbing species in a stock solution. Uses the mole concept quantitatively in computing dilution measurements at the macroscopic level (Ml of stock solution) to particle level (concentration). (Is able to connect and calculate Ml of stock solution diluted to determine the change in concentration of a stock solution.)	Use spectrophotometry to design an experiment to quantify the concentration of phosphate in four water samples. Interpret data using spectrophotometry for qualitative analysis. Justify the use of spectrophotometry to analyze phosphate concentration. Analyze data using Beer's law. Describe how light transmitted through a sample of water can be used to analyze the amount of light absorbed. Use stoichiometric reasoning to determine concentrations when diluting a stock solution of phosphate. Design an experiment to determine concentration. Connect measurements at the macroscopic level (Ml of stock solution) to particle level (concentration) Interprets data to determine the concentration using Beer's law.