**General guidelines for writing reports:**

Scientists write scientific papers for other scientists. You should assume that your audience has a general understanding of the key concepts, but you will need to explain any that are new. Lab report must be typed using 10 point Arial or Tahoma font and double-spaced.

Listed below are a few general guidelines to use when writing lab reports.

**1.****Use the correct verb tense**

 Lab reports and research papers should be mainly written in the past tense. You should limit the use of present tense to the Introduction section.

**2. Write in the third person; NO Personal Pronouns**

 A common question is whether the words *I*, *me*, *my*, *we*, *our*, or *us*, belong in science writing.  Because scientific experiments demonstrate facts that do not depend on the observer, reports should avoid using the first and second person. For example, the second sentence below is better because it avoids the use of the first person:

* + *I placed the three pieces of potato in each solution for 2 hours and then I weighed the potato and took the average.*
	+ *Three potato pieces were placed in each solution for 2 hours and then the potato was weighed and the mass was recorded. The average mass was calculated using the class data.*

**3. Be clear but concise; select vocabulary carefully**

 Reports and papers should fully describe experiments in a precise and factual manner. Both the depth of the error analysis and the writing style must be appropriate to this task. Consider the following sentence in a discussion:

* + *The potato in Solution A increased in mass a little, making it easy to identify Solution A as the hypotonic solution.*

Words and phrases such as “a little”, “easy”, and “very accurately” have no definite meaning, and are therefore inadequate. Quantitative descriptions and analyses are always preferred over the use of such imprecise terms. The following rewrite is better:

* + *The average mass of the potato soaked in Solution A increased 35% after being in the solution for 60 hours, indicating that Solution A was hypotonic.*

**3. Be clear but concise; select vocabulary carefully (cont.)**

Although you should strive to describe experiments in sufficient detail to be reproduced, it is also important to write concisely.  Text can be shortened by condensing or rephrasing without changing the meaning. In the two examples below, the latter conveys the same information in a more concise and preferred, writing style.

* + *Three pieces of potato were weighed and then placed in Solution A. Next, we weighed three pieces of potato and placed them in Solution B. Finally, we weighed three more pieces of potato and placed them in Solution C. In each case, 50 mL of the solution was added.*
	+ Three pieces of potato were weighed and then placed in 50 mL of each unknown sucrose solution.

**4. Use appropriate abbreviations and numbers.**

 **Abbreviations**

For units of measurement it is common to use the abbreviated version. For example, millimeter would be represented as mm and degrees Celsius would be represented by **0**C.

 **Numbers**

Numbers must be spelled out and not written numerically when found at the beginning of a sentence or used in a non-quantitative manner.

* + *Three pieces of potato were weighed and then placed in Solution A.*
	+ *One of the procedures followed yielded no conclusive results.*

In the case of two adjacent numbers, the number without a unit is spelled.

* + *The solution was divided into four 250-mL flasks.*

**5. Presenting data...the good, the bad, and the ugly**

Reports should usually include a narrative text that describes and explains the information presented. Use the results section to explain the purpose of every figure, equation and table. Published research results never include “orphan” data, that is, information that is not explained or put into context by the written text. This is also a good rule to follow in lab reports.

When referring to a figure, table, or equation use its number in the text, for example:

* *Our data was consistent with the class data, as indicated in Table 1.*

It follows that every figure, table and equation needs a number. Figures and tables require a caption that includes the number and a descriptive title:

* *Figure 1. % Change in Mass of Potatoes in Each Solution*
* *Table 1. Average Mass of Potatoes Before/After Soaking in Each Solution*

**5. Presenting data...the good, the bad, and the ugly (cont.)**

Note that the labels “chart” and “graph” are somewhat antiquated terms, and have been largely replaced by “figure”. Equations will normally have a number placed in parentheses at the right margin:

* E = mc2 (1)

Here are some additional tips for preparing figures and tables:

* All graph axes require labels that include both the variable name **and** units.
* Axes should use reasonable scales to clearly show the data and be divided into even increments.
* Each column in a table should include a heading and units if appropriate.
1. **Revise and proofread**

Treat your first written copy as a draft, and then read through and revise. A final proofreading is also important, and can help to minimize spelling and typographical errors.  Make sure to use the Spellcheck but keep in mind it may not include all the scientific terminology or abbreviations.

1. **Citing Sources**

Here are some tips for citing sources:

* When using APA format, follow the author-date method of in-text citation. This means that the author's last name and the year of publication for the source should appear in the text, for example, (Jones, 1998), and a complete reference should appear in the reference list at the end of the paper. If no author is cited use the first two words of the title of the publication followed by the year (First two words of title, year).
* Don’t forget to cite sources for images as well as content. You can use a citation website like [www.citationmachine.net](http://www.citationmachine.net) or [www.bibme.org](http://www.bibme.org) to generate citations in APA format.
* The citations sections should be place after the conclusion section of the lab report.
* All citations should be in alphabetical order.

HS Science Lab Report Writing Framework

Student name:

Lab Title:

Use this framework when completing lab reports. Use it like a checklist.

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| **0. General Format and Submission (5 points)** |
| 0a | Report is typed 10 point in Arial or Tahoma |  |
| 0b | Bolded/underlined headings are included for each section |  |
| 0c | Write concisely and use correct spelling, grammar and punctuation |  |
| 0d | Correct verb tenses used (Past tense for Abstract, Method, Discussion and Conclusion. Present tense for Introduction) |  |
| 0e | Report is written in third person, no personal pronouns. |  |
| 0f | Use scientific vocabulary and formatting where appropriate (chemical formula written with correct subscripts, genus and species format in Biology) |  |
| 0g | Submit lab hand-out and original data/graphs as an appendix of final hard copy report |  |
| 0h | **All** work should be cited if it is not your own, this includes images/diagrams. Use APA format. |  |
| 0i | Hard and electronic copy should be submitted to teacher. Electronic filename should be in the format“last name, first initial,lab name” eg **smithjburningcandlelab** |  |

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| (-1 point for every criteria missed) |

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| **1. Abstract (Honors only) (5 points)** |
| 1a | Single paragraph (125 – 150 words) | (0/-1) |
| 1b | Background information is stated in one or two sentences | (1) |
| 1c | Specific questions clearly addressed | (1) |
| 1d | Method/Procedure is summarized in no more than three or four sentences | (1) |
| 1e | Major findings are reported in no more than two or three sentences | (1) |
| 1f | Concluding sentence relates to specific question(s) addressed | (1) |

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| **2. Introduction (8 points)** |
| 2a | Title is specific and informative | (1) |
| 2b | Name of student writing lab report and name of lab partner included (plus bench #) | (1) |
| 2c | Statement of purpose | (1) |
| 2d | Significance/Relevance | (2) |
| 2e | Scientific background (e.g. info on organism, chemicals, define keywords, concepts, terms) | (2) |
| 2f | Identify the independent, dependent and controlled variables, products/reactants and equipment | (1) |

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| **3. Procedure/Method (5 points)** |
| 3a | Numbered procedure (Chem) or paragraphs (Biology) | (1) |
| 3b | Safety clearly addressed | (1) |
| 3c | Experiment is clearly described in a way that can be repeated | (1) |
| 3d | All equipment listed | (1) |
| 3e | Independent variable range clearly identified | (1) |

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| **4. Results/Data and Observations (8 points)** |
| 4a | Draw a table (can be a spreadsheet) for all measured/collected data plus processed/calculated data.  | (2) |
| 4b | Correct units and abbreviations should be given with column title. | (1) |
| 4c | There should be at least 5 trials for each time you change the independent variable. | (1) |
| 4d | Significant figures should be consistent for each variable (eg. time, length, mass) | (1) |
| 4e | Qualitative labs should include observation table. | (1) |
| 4f | Sample calculation shown (one for each data set) | (2) |

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| **5. Discussion (8 points)** |
| 5a | Results are briefly restated and explained | (2) |
| 5b | Unusual/unexpected findings discussed logically | (2) |
| 5c | A suitable graph or chart to support quantitative data | (2) |
| 5d | Independent variable should be on x-axis, should include axis labels and units. | (1) |
| 5e | Best fit line or curve should be added (can be done by hand or automatically). | (1) |

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| **6. Conclusion and Evaluation (6 points)** |
| 6a | Identify and discuss any possible sources of errors | (2) |
| 6b | Clearly and concisely summarise your findings | (1) |
| 6c | Identify possible improvements to procedure and explain the potential effects | (1) |
| 6d | Suggest extension work that could further the investigation. | (2) |

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| Total – 45 points (Hons) - 40 points (C1 & C2) |