

Genetics Lab Report Rubric (for exploratory science or hypothesis-driven research)
Modified 7/9/2018

Criteria	Demonstrating (9-10 points)	Emerging (7-8 points)	Beginning (5-6 points)
<p><i>Abstract (10 points)</i> Contains parts: (a) Introduces purpose or motivation for experiment. (b) States the question your experiment is designed to address and its scientific merit. (c) Briefly summarizes experimental approach. (d) Describes major findings and interpretations. (e) Links findings back to question or hypothesis. (f) Describes importance & significant implications of experiment.</p>	<p>Parts a-f flow seamlessly, with clarity, accuracy. Convinces the reader of the importance of the work and compels them to read the full paper. Is concise and to the point, at under 300 well-chosen words.</p>	<p>Includes all the parts a-f with sentences that are correctly structured and flow well between sentences. Content is accurate, with perhaps one error or inaccuracy. Effectively summarizes the study in the paper that follows. Is at or under 300 mostly well-chosen words.</p>	<p>Includes a sentence for each part a-f, but ideas don't connect together well. Accuracy has errors in logic or concept. Attempts to cover parts a-f in less than 300 words.</p>
<p><i>Introduction (10 points)</i></p>	<p>Provides a complete summary of ideas the reader needs to know to understand the research question, ending in a succinct but complete statement of the research topic. Briefly reviews the relevant parts of the general genetics topic under study and why the study system is appropriate to address the research question. Links the purpose for the experiment to relevant genetics concepts. Ideas are organized and flow smoothly. Content is clearly presented and accurate.</p>	<p>Provides a complete summary of ideas the reader needs to know to understand the question, ending in a statement of the research topic. Briefly reviews the relevant parts of the general genetics topic under study and why the study system is appropriate to address the research question. Mostly succeeds at linking the purpose for the experiment to relevant genetics concepts. Organization and flow of ideas is present, with perhaps a few inconsistencies. Content is accurate, with perhaps one error or inaccuracy.</p>	<p>Provides a partially complete summary of ideas the reader needs to know to understand the question, ending in an attempted statement of the research topic. Reviews the general genetics topic under study and/or why the study system is appropriate to address your question. Attempts to link the purpose for the experiment to relevant genetics concepts. States the research topic. Organization and flow of ideas are not fully realized. Mostly accurate but with errors in logic or concept.</p>

<p><i>Methods (10 points)</i></p>	<p>Opens with a clear and succinct description and purpose of the experiment and what evidence is needed to answer the research question. Describes the experimental design with the appropriate treatments, controls, and replicates and how this design will address the question. Names and describes the protocols used with information necessary to replicate but assuming the reader is versed in genetics techniques, while briefly stating the purpose for each protocol. Selects and correctly explains the correct analysis (e.g., statistical test) for the data & question, indicates what evidence will be necessary to draw a conclusion, showing the logic behind the decision. Ideas are organized and flow smoothly. Content is clearly presented and accurate.</p>	<p>Opens with a complete description and purpose of the experiment and indicates some or all of the evidence needed to answer the research question. Describes the experimental design with the appropriate treatments, controls, and some indication of replication and explains how this design will address the question. Names and describes the protocols used sufficiently to replicate, while briefly stating the purpose for each protocol. Selects and explains the correct analysis (e.g., statistical test) for the data & question, indicates what evidence will be necessary to draw a conclusion. Organization and flow of ideas is present, with perhaps a few inconsistencies. Content is accurate, with perhaps one error or inaccuracy.</p>	<p>Opens with a description and purpose of the experiment and indicates some of the evidence needed to answer the research question. Describes the experimental design, indicating some of the treatments and controls, and attempts to explain how this design will address the question. Names and describes the protocols used, providing inconsistent amounts of detail and does not assume the reader is versed in genetics techniques. May or may not state the purpose for each protocol. When needed, attempts to select and explain the statistical test for the data & question, and attempts to indicate what evidence will be necessary to draw a conclusion. Organization and flow of ideas are not fully realized. Mostly accurate but with errors in logic or concept.</p>
<p><i>Results (10 points)</i></p>	<p>Begins with 1-2 well-written sentences that clearly describe the major findings of the research. Provides relevant details of each finding in the same order as the methodology. Reports findings from the data analysis, without explanations or conclusions about the data. When needed, supports findings with the correct statistical approach. Findings correspond exactly to data in lab notebook. Entirely accurate with no errors in logic or concept. Words are chosen deliberately and judiciously.</p>	<p>Begins with 1-2 sentences clearly describing the major findings of the research. Provides details of each finding in the same order as the methodology. Reports findings from the data analysis, without explanations or conclusions about the data. When needed, supports findings with the correct statistical approach. Findings correspond to data in lab notebook. Largely accurate but with perhaps one error in logic or concept. Words are chosen with care.</p>	<p>Describes the overall findings of the research and provides of details each finding. Reports findings from the data analysis, with few explanations or conclusions about the data. When needed, supports finding statistically. Findings largely correspond to data in lab notebook. Mostly accurate but with errors in logic or concept.</p>

<p><i>Discussion (10 points)</i></p>	<p>Begins with a statement that clearly relates the main result(s) to the research goal, then interprets those results well and accurately with respect to the research goal. References specific data from the study as evidence to decide if the research goal was met. Uses scientific concepts accurately and convincingly to explain how the research goal is addressed. Describes important & significant implications of experiment, connecting back to ideas in the introduction. Addresses other issues as appropriate and without overemphasis, such as problems that occurred, sources of uncertainty in the lab procedure or findings, comparison of findings to others' findings and explanation for differences, improvements or extensions. Overall, the content and ideas presented are in support of the research question, goal, or hypothesis. Clearly written with deliberate word choice, correct grammar, and syntax; carefully proofread; with cohesive and logical flow of ideas.</p>	<p>Begins with a statement that attempts to clearly relate the main result(s) to the research goal, then interprets those results well or accurately with respect to the research goal. References specific data from the study as evidence and attempts to use these to decide if the research goal was met. Uses scientific concepts to explain how the research goal is addressed. Describes implications of experiment, connecting back to ideas in the introduction. Addresses other issues as appropriate, such as problems that occurred, sources of uncertainty in the lab procedure or findings, comparison of findings to others' findings and explanation for differences, improvements or extensions. Overall, the content and ideas presented are in partial support of the research question, goal, or hypothesis. Clearly written with few errors in word choice, correct grammar, and syntax; proofread; with cohesive and logical flow of ideas.</p>	<p>Attempts to relate the result(s) to the research goal, then interprets those results with some accuracy with respect to the research goal. References data from the study and attempts to use these to decide if the research goal was met. Attempts to explain how the research goal is addressed. Describes implications of experiment, sometimes connecting back to ideas in the introduction. Addresses other issues sometimes out of proportion with their importance, such as problems that occurred, sources of uncertainty in the lab procedure or findings, comparison of findings to others' findings and explanation for differences, improvements or extensions. Overall, the content and ideas presented may support the research question, goal, or hypothesis. Possible errors in word choice, correct grammar, and syntax; mostly proofread, with some errors in logical flow of ideas.</p>
<p>(7) <i>Figures & tables (10 points)</i></p>	<p>Selects the best graph or table type to represent the data as a descriptive summary (mean, median, etc) with error bars when uncertainty needs to be represented. Orients the data with the independent or response variable on the y-axis. Graph formatting is minimal, and has axis labels and legend, if needed. Caption describes the result clearly and simply in an active-voice sentence, giving the</p>	<p>Selects an appropriate graph or table type to represent the data as a descriptive summary (mean, median, etc) with error bars when uncertainty needs to be represented. Orients the data with the independent or response variable on the y-axis. Graph has axis labels and legend, if needed. Caption describes the result; located below figure or above table. At the point in the text where the</p>	<p>Selects a graph or table type to represents the data, or provides data in a raw format without descriptive statistics or an error bars to indicate scientific uncertainty. Presentation of data may clearly indicate independent versus dependent variables. Graph has axis labels and legend, if needed, that provide a partial explanation of the data presented. Possibly includes a caption to attempt to describe the</p>

	<p>direction of the result when relevant; located below figure or above table. At the point in the text where the result is described, figure/table is clearly referenced in text parenthetically, not as the subject or object of the sentence. While these visuals are part of the results, they are located after the discussion in the lab report document.</p>	<p>result is described, figure/table is referenced in text. While these visuals are part of the results, they are located after the discussion in the lab report document.</p>	<p>result. Figure/table is referenced in text, or embedded in the text, likely in the results section, instead of located after the discussion in the lab report document.</p>
<p>(8) <i>Literature Cited</i> (10 points)</p>	<p>Lists of all published literature cited in the lab report, formatted in the style of the journal <i>Genetics</i>. Avoids work that is not peer-reviewed. Cites as many appropriate peer-reviewed scientific papers as necessary to support the information and arguments made in the report. Includes peer-reviewed articles sought out and vetted for appropriate content and concepts by the author, as well as articles provided to the class. Avoids citing websites, unless appropriate and unavoidable. All citations listed are also cited in text, and vice versa. The in-text citations are located with the concept they reference, not shuffled to the end of a sentence or paragraph. In-text citations flow well with the writing if included as the subject or object of a sentence, or are parenthetical. For example: “Spencer and colleagues (2018) found that frunctons exhibit traits of living organisms,...” and “Frunctons exhibit traits of living organisms (Spencer <i>et al.</i> 2018).”</p>	<p>Lists of all published literature cited in the lab report, formatted in the style of the journal <i>Genetics</i> with one or two errors in formatting. Mostly avoids work that is not peer-reviewed. Attempts to cite as many appropriate peer-reviewed scientific papers as necessary to support the information and arguments made in the report, with only 1-2 concepts missing citations. Includes peer-reviewed articles sought out by the author, with an attempt to vet these for their appropriateness, as well as articles provided to the class. Avoids citing websites, unless appropriate and unavoidable. All citations listed are also cited in text, and vice versa, with only 1-2 mismatches. Most of the in-text citations are located with the concept they reference, not shuffled to the end of a sentence or paragraph. In-text citations usually flow with the writing if included as the subject or object of a sentence, or are parenthetical. For example: “Spencer and colleagues (2018) found that frunctons exhibit traits of living organisms,...” or “Frunctons exhibit traits of living organisms (Spencer <i>et al.</i> 2018).”</p>	<p>Lists of most of published literature cited in the lab report, and attempts to format citations in the style of the journal <i>Genetics</i>. Includes both peer-reviewed and other types of sources. Includes the minimum required count of citations for the assignment, meaning that many concepts are either uncited or incorrectly cited. Perhaps only cites the articles provided to the class. Sometimes cites websites, even when inappropriate and avoidable. Citations listed may or may not be cited in text. In-text citations are not always located with the concept they reference, and are instead shuffled to the end of a sentence or paragraph. In-text citations attempt to flow with the writing but may be incomplete. Good examples include: “Spencer and colleagues (2018) found that frunctons exhibit traits of living organisms,...” or “Frunctons exhibit traits of living organisms (Spencer <i>et al.</i> 2018).”</p>

<p><i>Writing</i> (10 points)</p>	<p>No errors in writing (grammar, syntax, and spelling). Entire work uses words carefully, minimizing excess while retaining clarity and accuracy.</p>	<p>May have an error in writing (grammar, syntax, and spelling) but is relatively clear. Careful word choice evident in parts; wordy in other parts.</p>	<p>May have a few errors in writing (grammar, syntax, and spelling) or some lack of clarity within sentences. Does not strive for economy of words.</p>
<p><i>Format</i> (10 points)</p>	<p>Title is specific and clearly conveys a summary of the lab report findings, without a separate title page. Written entirely in sentences organized as paragraphs, with appropriate paragraph breaks between ideas. Organized into the sections outlined in this rubric, separated by headings in bold, without page breaks between sections. Uses technical terminology minimally and correctly, abbreviating or italicizing consistently and according to the conventions of a Genetics style journal (e.g. species names, gene and allele names). Page formatting follows these conventions: Times New Roman 12 pt font (even for headings); 1 inch margins; single-spaced; pages are numbered.</p>	<p>Title is conveys a summary of the lab report findings, without a separate title page. Written entirely in sentences organized as paragraphs, with mostly logical paragraph breaks between ideas. Organized into the sections outlined in this rubric, separated by headings in bold, without page breaks between sections. Uses technical terminology minimally and correctly for the most part, abbreviating or italicizing consistently and according to the conventions of a Genetics style journal (e.g. species names, gene and allele names). Page formatting follows most of these conventions: Times New Roman 12 pt font (even for headings); 1 inch margins; single-spaced; pages are numbered.</p>	<p>Title is specific and clearly conveys a summary of the lab report findings, without a separate title page. Written in sentences organized as paragraphs, but breaks between paragraphs are not always when logical. Attempts to organize into the sections outlined in this rubric, separated by headings in bold, without page breaks between sections. Attempts to use technical terminology correctly, abbreviating or italicizing consistently and according to the conventions of a Genetics style journal (e.g. species names, gene and allele names). Page formatting follows some of these conventions: Times New Roman 12 pt font (even for headings); 1 inch margins; single-spaced; pages are numbered.</p>