Flame test lab report: sample rubric

NOTE: this is just one of many formats that could be used to assess student understanding of the flame test lab. Teachers should use a lab report format that aligns with the requirements of their course, and should assign points to the following categories in keeping with their course requirements.

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|  | Excellent | Satisfactory | Needs improvement |
| **Title, name, date**  Title is descriptive, first and last names of all students in group are included (author’s name first) date of lab work is included, work is neat and organized | All components are included | 1 of the components is incorrect or missing | 2 or more of the components are incorrect or missing |
| **Purpose**  The purpose of the lab is written, in a complete sentence. The independent and dependent variables should be mentioned in the purpose. (The purpose of this lab is to observe the color released when different metals are heated in a flame) | All components are included | Independent or dependent variable are incorrect or not included , or statement is not a complete sentence. | 2 or more of the components are missing or incorrect |
| **Hypothesis**  Complete sentence, mentions the independent and dependent variable and a prediction about what is expected. An explanation of why the prediction is expected may be required. (NOTE: it is reasonable to expect students to hypothesize if the lab is performed at the end of a unit on light, electrons, etc. The lab can be done as an intro to the unit; in this case students would not be expected to make a hypothesis.) | All components are included with a complete explanation of why each metal produces a different color in the flame. | 1 component is missing or the explanation is less complete or includes some inaccurate statements. | 2 or more of the components are missing or incorrect. |
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| **Procedure**  The steps of the lab are written clearly (usually in a bulleted list). Should be detailed enough for another person to repeat the procedure in exactly the same manner. | Procedure is complete and repeatable. | Procedure is missing minor elements. | Procedure is missing significant elements or has incorrect steps included. |
| **Data table**  Includes all the metals tested along with the color observed when each metal is burned. Colors should be described in such a way that differences are noted. For example: fire engine red for one and pinkish red for another to indicate that the two red tests are not the same. | Data table is neat and complete. | Data table is slightly disorganized or one color is not clearly defined, or is incorrectly recorded. | Data table is disorganized or more than one color is not clearly defined, or is incorrectly recorded. |
| **Conclusion**  Students should make a claim about the colors, give evidence from the data and discuss their reasoning. A claim could be that each element produces a different color. Evidence: they observed different colors in each test. Reasoning relates to the unique electron arrangement in each element and the amount of energy required to excite electron(s) in each element also being unique. | Claim is strongly stated, with evidence from lab and correct reasoning. | Claim is made, with evidence, but reasoning is incorrect or unconvincing. | Significant problems with the claim, evidence or reasoning. |
| **Error analysis**  Sources of error are discussed thoughtfully with regard to the design of the lab. ‘Error’ caused by laziness or incompetence (my partner dropped all the sodium chloride down the sink so we could not test it or we did not get a clear color for the potassium chloride but we did not test it again.) should not be included. Human error should not be included because it is too vague. Specific valid error sources for this lab include   1. The inability of the human eye to detect variances in the colors 2. Possible contamination caused by spillage on the burner, samples being impure, etc. 3. The fact that only a few of the 118 elements were tested, so their sample size is not enough to make a valid conclusion. | at least two valid error sources are stated and fully explained, including how it alters the outcome of the lab. | At least one valid error source is stated and fully explained, including how it alters the outcome of the lab, or two error sources are included, but incompletely or incorrectly discussed. | No valid sources of error are included, or one is included with insufficient explanation. |