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| --- | --- | --- | --- | --- |
|  | **Beginning** | **Developing** | **Accomplished** | **Exemplary** |
| **Procedure** | o Lab could ***not*** be reproduced if procedure repeated by an outside party. | o Lab could be ***somewhat*** reproduced if procedure repeated by an outside party. | o Lab could be ***mostly*** reproduced if procedure repeated by an outside party. | o Lab would be reproduced if procedure repeated by an outside party. |
| **Data** | o Data is incomplete. | o Data is ***somewhat*** complete. | o Data is ***mostly*** complete. | o Data is complete. |
| **Calculations** | o Calculations ***have not*** communicated understanding of the concepts covered in this lab. | o Calculations ***somewhat*** communicates understanding of the concepts covered in the lab. | o Calculations ***mostly*** communicates understanding of the concepts covered in this lab. | o Calculations ***clearly*** communicates understanding of the concepts covered in this lab. |
| **Graphs** | o ***Does not*** demonstrate the relationship between variables. | o ***Somewhat*** demonstrates the relationship between variables. | o ***Mostly*** demonstrates the relationship between variables. | o ***Clearly*** demonstrates the relationship between variables. |
| **Discussion** | o Discussion questions are ***not*** answered completely and do not connect concepts explored in lab to theory. | o Discussion questions ***somewhat*** answered completely and connect concepts explored in lab to theory | o Discussion questions are ***mostly*** answered completely and connect concepts explored in lab to theory. | o Discussion questions are answered completely and connect concepts explored in lab to theory  o Citations are included when appropriate |

**Procedure**:

* clear, includes diagrams/pictures of apparatus
* stepwise and concise
* references to tables/diagrams/calculations/graphs

**Data**:

* all measured data is included in the table
* multiple trials for each point
* tables are well-organized
* includes units in headers
* includes uncertainty
* includes label/heading

**Calculations**:

* includes FBD (if necessary)
* includes statement of understanding (eg. Fnet = Fapp - Ff)
* ordered in a stepwise fashion
* calculations are free from errors

**Graphing**:

* title follows x vs. y for “process being analyzed”
* axis labelled with units
* lines/curves of best fit include equation
* line of best fit is not “forced” through the origin

**Discussion**:

* questions are answered completely and connect to theory,
* citations are in APA format