Newton’s Law – Multiple Masses Lesson

You will be tasked to determine the magnitude of the friction acting on a cart as it accelerates along a track by a falling mass. Design a procedure to measure the acceleration of the cart that involves at least three different trials.

Procedure will be typed and consist of bulleted steps that include equipment set up, and a description of how you will collect data as well as what data you will collect. This will be posted to the class blog at [Edublogs.org](http://chemdog55.edublogs.org/). One procedure per group needs to be posted by 23:59 Thursday, Nov 3, 2017.

Lab Groups will review the procedures of the other groups in the class and comment with strengths as well as areas that need improvement. You will use the attached rubric to “grade” the procedures you read. I would suggest that one person from each group read the procedure of one other group and evaluate it. Ask your group members for help in commenting upon the procedure you evaluate if necessary.

Comments should contain at least one positive comment, some statement that says something about a similar experience or idea your group had when writing the procedure and at least one question about something that could be changed, added, or omitted that would improve the procedure.

Video an explanation of your set up and procedure, explaining what you expect to happen and what you expect to measure. You will post this video to YouTube and will link this video to your final Blog post that contains your lab report.

You need to write a script or at least story board your video and rehearse before actually filming. Groups can begin filming as early as today during X block. My room will be open Thursday before and after school as well. After school, groups may take equipment into coach Blythe’s room to film as well.

Your lab report will be submitted as a blog post due by Friday, Nov 10, 2017. You can submit one lab report per group on the class blog above. In this blog post, you will need to link your graphs of position vs time and a graph that you used to determine the acceleration of your cart, and you will need to explain how you determined the acceleration starting with a kinematics equation showing how this equation relates to your graph.

You will need to include free body diagrams or links to free body diagrams and explain how Newton’s 2nd law applies to this situation.

You conclusion will be your determined value of the magnitude friction experienced by the cart as well as an explanation of how it was determined.

Procedure Rubric

|  |  |  |  |
| --- | --- | --- | --- |
| Category | Basic (1) | Proficient (2) | Advanced (3) |
| Clearly written | Procedure is written in narrative form or does not contain sequenced steps | Procedure is bulleted or numbered, but each bullet contains more than one step | Procedure is bulleted or numbered with each bullet containing a single step. |
| Complete | Procedure does not lead to proper data collection or desired outcome | Procedure is mostly complete, allows for proper data collection but may be missing steps | Procedure is complete, allowing for proper data collection |
| Understanding | Procedure does not follow a logical progression or is difficult to understand | Procedure follows a logical progression but has a few areas of ambiguity | Procedure is easy to understand and follow |
| Comments:  Peer review will make comments about areas of **Strength** and specific areas for improvement with the procedure.  **Example:** *In step three, it is unclear how to set up the motion detector so it will record data.* |  |  |  |

Video Assessment:

15 Points of overall grade: See rubric below

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | Basic (1) | Proficient (3) | Advanced (5) |
| Audio | Volume fluctuates or is hard to hear | Volume is consistent, at least one speaker(s) is/are audible | Volume is correctly set, all speakers are audible |
| Flow | The video looks unrehearsed. Speakers seem unprepared or not knowledgeable with procedure | Video is passable, but with some breaks in the speaking parts or takes time to prepare lab equipment | Video flows smoothly and lab equipment is ready to assemble and demonstrate. |
| Follows Procedure | The video does not follow the procedure or leaves out multiple steps | Follows the procedure but does not seem well organized | Follows the procedure and presentation is seamless. |
| Sum |  |  | Total Points \_\_\_\_\_\_ |

Lab Report Blog Post 85 points (points indicated in parentheses)

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | Basic | Proficient | Advanced |
| Newton’s Laws  15 points | Newton’s Laws stated but little or no explanation of the laws (5) | Newton’s Laws stated and explained, but no mention of how they relate to the lab (10) | Newton’s Laws stated and thorough explanation of how they apply to the lab.  (15) |
| Data table  10 Points | Report contains no data or data that is not in table form.  (3) | Contains some data in a table, but does not contain the calculated data that is used to produce graphs (6) | Contains measured data as well as calculated data that will be used to produce graphs in one clear table. (10) |
| Graphs  15 Points | Contains only one graph without titles and labels on the axes.  Does not contain an equation for the curve on the graph.  (5) | Contains two graphs, but the axes are not labeled or the graph lacks titles. The graphs contain equations for the curves that are graphed. (10) | Contains two graphs that have titles, the axes are labeled and the equations for the curves are present.  (15) |
| Calculations and Analysis  (15 Points) | Report does not contain any calculations that involve data.  (5) | Report contains sample calculations involving data, but no explanation of why they exist.  (10) | Report contains sample calculations involving data and a verbal explanation of why the calculation was used.  (15) |
| Free body Diagram  15 Points | Does not contain free body diagrams or they are incomplete with not all forces drawn and labeled.  (5) | Contains free body diagrams with all forces, but do not contain proper labels.  (10) | Contains properly drawn and labeled free body diagrams.  (15) |
| Conclusion  5 points | Conclusion not stated or is incorrect based upon analytical method. (0) | Conclusion is not clearly stated but is correct based upon analytical method. (3) | Correct conclusion is drawn from analysis and is stated clearly.  (5) |
| Grammar  10 points | Report contains 3 – 5 grammatical or formatting errors (3) | Report contains 1 – 2 grammatical or formatting errors. Looks good but needs review (5) | Contains zero grammatical or formatting errors.  (10) |
| Total /85 |  |  |  |