

Objective

This laboratory project is to introduce you to more authentic experiences in science with a focus on physics. By choosing and designing your own experiment you will take ownership of the project. I will provide you with an example project with data and a report. We will take class-time to learn how to use a video analysis software called Tracker. You will need to have something in the video you know the value of so that an error analysis can be performed.

This project can be alone or a group of at most two. The mark on the written report and draft will be the same for a group, however, there will be peer and self-assessments for each project at three-to-four week intervals and a classwork mark (assessed by me) given at the end. This project accounts for 15% of your grade.

There will be some class time dedicated for the project, but you will still need to work outside of class. Efficient time management will be very important. I suggest you set a schedule (even if you are working individually) and adhere to it. Proper experiment planning will save you a lot of time and frustration (I speak from experience). Communication with your partner, friends and/or myself should happen often. Feel free to set a time with me (a day's heads up would be ideal). I am usually at school by 7:45, here at lunch, and I usually hang around until at around 4pm. Contact me via email or twitter if you need to arrange a time if you'd rather not track me down at school.

Type up a summary of what you want to study for your project – The Project Plan Sheet

- Do you have a hypothesis or are you performing a scientific investigation?
- What are your independent and dependent variables?
- What question are you testing?
- Write a summary of what you want to do, show or investigate with this project.
- How will you collect your data? (be as specific as you can)
- Outline where and when you want to collect your data (really important, I need dates!).
- How will you communicate your data – what will be important?
- What equipment do you require? (include everything, even if the school may not own it)

Physics 122 students are expected to produce a project with more depth and at a higher level of physics concepts.

Project Evaluation

Project	Value
Plan Sheet	5
Peer/Self Evaluation	10
Classwork	15
Draft	20
Final Report	50
Total	100

Physics 112/122 Experiment Project: Self-Evaluation

My Name: _____

/48

Project: _____

Weeks of Apr. 4 – 15, 2016

Poor

Excellent

/12

- | | | | | |
|---------------------------------------|---|---|---|---|
| 1. Focus and staying on task | 1 | 2 | 3 | 4 |
| 2. Participation in group discussions | 1 | 2 | 3 | 4 |
| 3. Contribution to project | 1 | 2 | 3 | 4 |
| 4. Task(s) during this week was/were: | | | | |

5. Some steps I took advantage of to better understand this concept were: _____

Weeks of Apr. 18 – 29, 2016

Poor

Excellent

/12

- | | | | | |
|---------------------------------------|---|---|---|---|
| 1. Focus and staying on task | 1 | 2 | 3 | 4 |
| 2. Participation in group discussions | 1 | 2 | 3 | 4 |
| 3. Contribution to project | 1 | 2 | 3 | 4 |
| 4. Task(s) during this week was/were: | | | | |

5. Some steps I took advantage of to better understand this concept were: _____

Weeks of May 2 – 13, 2016

Poor

Excellent

/12

- | | | | | |
|---------------------------------------|---|---|---|---|
| 1. Focus and staying on task | 1 | 2 | 3 | 4 |
| 2. Participation in group discussions | 1 | 2 | 3 | 4 |
| 3. Contribution to project | 1 | 2 | 3 | 4 |
| 4. Task(s) during this week was/were: | | | | |

5. Some steps I took advantage of to better understand this concept were: _____

Weeks of May 16 – 23, 2016

Poor

Excellent

/12

- | | | | | |
|---------------------------------------|---|---|---|---|
| 1. Focus and staying on task | 1 | 2 | 3 | 4 |
| 2. Participation in group discussions | 1 | 2 | 3 | 4 |
| 3. Contribution to project | 1 | 2 | 3 | 4 |
| 4. Task(s) during this week was/were: | | | | |

5. Some steps I took advantage of to better understand this concept were: _____

Physics 112/122 Experiment Project: Peer Evaluation

My Name: _____

Peer: _____

Project: _____

Weeks of Apr. 4 – 15, 2016	/16	Poor			Excellent
1. Attendance		1	2	3	4
2. Focus and staying on task		1	2	3	4
3. Participation in group discussions		1	2	3	4
4. Contribution to project		1	2	3	4
5. Task(s) during this week was/were:	_____				
6. Concerns/Comments:	_____				

Weeks of Apr. 18 – 29, 2016	/16	Poor			Excellent
1. Attendance		1	2	3	4
2. Focus and staying on task		1	2	3	4
3. Participation in group discussions		1	2	3	4
4. Contribution to project		1	2	3	4
5. Task(s) during this week was/were:	_____				
6. Concerns/Comments:	_____				

Weeks of May 2 – 13, 2016	/16	Poor			Excellent
1. Attendance		1	2	3	4
2. Focus and staying on task		1	2	3	4
3. Participation in group discussions		1	2	3	4
4. Contribution to project		1	2	3	4
5. Task(s) during this week was/were:	_____				
6. Concerns/Comments	_____				

Weeks of May 16 – 30, 2016	/16	Poor			Excellent
1. Attendance		1	2	3	4
2. Focus and staying on task		1	2	3	4
3. Participation in group discussions		1	2	3	4
4. Contribution to project		1	2	3	4
5. Task(s) during this week was/were:	_____				
6. Concerns/Comments:	_____				

Name _____

Date _____

Category	Excellent (4)	Good (3)	Satisfactory (2)	Needs Improvement (1)
Attitude	Student is always respectful of his or her self, others, and teacher and has a positive attitude.	Often has a positive attitude about the task(s). Usually treats others and self with respect.	Occasionally has a positive attitude about the task(s) and behaves in a respectful manner.	Rarely behaves in a respectful manner.
Focus on Class Work	Consistently stays focused on in-class work and what needs to be done. Very self-directed.	Focuses on in-class work and what needs to be done most of the time.	Often must be reminded by the teacher or group about what needs to get done.	Rarely focuses on class work and what needs to be done.
Contributions	Routinely provides useful ideas when participating in discussions. A definite leader who contributes a lot of effort.	Usually provides useful ideas when participating in discussions. A strong student who tries hard.	Sometimes provide useful ideas in discussion. A satisfactory student who does what is required.	Rarely provides useful ideas when participating in discussions. May refuse to participate.
Working with Others	Almost always listens to, shares with, and supports the efforts of others. Students can feel safe volunteering in this student's presence.	Usually listens to, shares with, and supports the efforts of others.	Often listens to, shares with, and supports the efforts of others, but sometimes is not actively listening or responding.	Rarely listens to, shares with, and supports the efforts of others. Often disrupts or discourages others' attempts to participate.
Time-Management	Routinely uses time well to ensure things get done on time. Student never asks to adjust deadlines.	Usually uses time well, rarely misses deadlines.	Tends to procrastinate, does not use school time or schedule provided to get work completed.	Rarely gets work done by deadlines, always asks for extensions or does not submit work despite time in school.
Behavior	Student is engaged in class on a daily basis, and shows no disruptive behavior.	Student is engaged in class nearly every day, and shows no disruptive behavior.	Student has done nothing for a few classes. Shows some disruptive behavior.	Student frequently disrupts group or class.

Comments

Group _____ Project _____

Category	Excellent	Satisfactory	Needs Improvement	Unsatisfactory
Submission (3) ***Note: Draft not accepted after May 20, 2016***	(3) Draft submitted by the due date.	N/A	(1) Not submitted by due date.	(0) Not submitted at all.
Content (10)	(10) All parts of the project are included and mostly complete. (see exemplar)	(7) Underdeveloped or missing one or two sections of the project.	(5) Underdeveloped or missing three sections of the project.	(2) Underdeveloped or missing more than three sections.
Video Analysis (7)	(7) All relevant images and data included.	(5) Missing one graph/data table.	(2) Missing two graphs/data tables or data from the analysis.	(1 or 0) Missing more than two graphs/data tables.

Comments



Physics 112/122 Report Rubric. Due Friday May 27. Not accepted after Friday June 3. -1 Mark/day late.

Criteria	1	2	3	4	5
Abstract (÷2)	<ul style="list-style-type: none"> Abstract not well thought out or written 	<ul style="list-style-type: none"> Abstract gives little insight as to the contents of the report 	<ul style="list-style-type: none"> Abstract summarizes the contents of the report and experiment 	<ul style="list-style-type: none"> Abstract is a well written summary of the report and experiment Weakly intrigues the reader 	<ul style="list-style-type: none"> Abstract is excellent in its summary of the report and experiment as it includes all key points Strongly intrigues the reader
Introduction & Hypothesis	<ul style="list-style-type: none"> Predicted results and hypothesized relationship between variables not stated 	<ul style="list-style-type: none"> Predicted results and hypothesized relationship between variables are unclear 	<ul style="list-style-type: none"> Predicted results and hypothesized relationship between variables stated and appear reasonable 	<ul style="list-style-type: none"> Predicted results and hypothesized relationship between variables stated Adequate background research 	<ul style="list-style-type: none"> Predicted results and hypothesized relationship between variables clearly stated and reasonable Background research relevant and integrated into the introduction
Materials (÷2)	<ul style="list-style-type: none"> There is not a list of the necessary lab materials 	<ul style="list-style-type: none"> Most lab materials included 	<ul style="list-style-type: none"> All necessary lab materials included but not listed in any particular order 	<ul style="list-style-type: none"> All necessary lab materials included and listed 	<ul style="list-style-type: none"> All necessary lab materials included and listed in an organized manner
Procedure	<ul style="list-style-type: none"> Procedures are not listed 	<ul style="list-style-type: none"> Procedures are included but not it is not clear and information is missing 	<ul style="list-style-type: none"> Procedures are included but not clearly written Procedures are not coherent 	<ul style="list-style-type: none"> Procedures are included and written in the correct order Procedures are written with excellent grammar that the reader can understand 	<ul style="list-style-type: none"> Procedures are written in the correct order with excellent grammar that the reader can understand Diagrams/images are included to describe the set-up (if no diagrams/images possible then clearly describe the apparatus)
Data (×2)	<ul style="list-style-type: none"> Data is not represented or is not accurate 	<ul style="list-style-type: none"> Data lacks precision Data loosely related to hypothesis 	<ul style="list-style-type: none"> Good representation of the data using tables and/or graphs Precision is acceptable 	<ul style="list-style-type: none"> Accurate representation of the data using tables and/or graphs Data is fairly precise Graphs and tables are referred to in the text 	<ul style="list-style-type: none"> Accurate representation of the data using tables and/or graphs Graphs and tables are labeled and titled for easy referral from the text Data is precise Graphs and tables are referred to in the text
Analysis (×2)	<ul style="list-style-type: none"> Trends/patterns are not analyzed Analysis is not relevant 	<ul style="list-style-type: none"> Trends/patterns are not analyzed Analysis is inconsistent 	<ul style="list-style-type: none"> Trends/patterns are logically analyzed for the most part Analysis is general 	<ul style="list-style-type: none"> Trends/patterns are logically analyzed Analysis is thoughtful Evidence of research 	<ul style="list-style-type: none"> Trends/patterns are logically analyzed Analysis is insightful Compared to similar experiments found in research
Error Analysis (×2)	<ul style="list-style-type: none"> There is no discussion of experimental errors 	<ul style="list-style-type: none"> Some experimental errors are identified 	<ul style="list-style-type: none"> Experimental errors and their effects are discussed 	<ul style="list-style-type: none"> Experimental errors are determined Their effects are discussed SD and % error are calculated 	<ul style="list-style-type: none"> Experimental errors are determined Their effect and ways to reduce errors are discussed SD and % error are calculated
Conclusion	<ul style="list-style-type: none"> No conclusion was included or shows little effort on the experiment 	<ul style="list-style-type: none"> A statement of the results is incomplete with little reflection on the experiment 	<ul style="list-style-type: none"> A statement of the results of the experiment indicates whether results support the hypothesis 	<ul style="list-style-type: none"> Accurate statement of the results of the experiment indicates whether results support the hypothesis Possible sources of error identified 	<ul style="list-style-type: none"> Accurate statement of the results of experiment indicates whether results support hypothesis Possible sources of error and what was learned from the experiment are discussed



Physics 112/122 Report Rubric. Due Friday May 27. Not accepted after Friday June 3. -1 Mark/day late.

Comments

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