

# Designing, Developing and Implementing your own Lab Experience

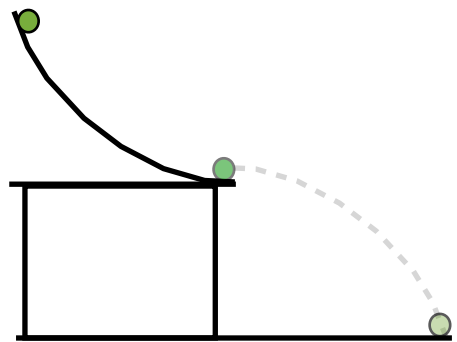
This assignment is worth two labs (100 points) and 100 classwork points. You are expected to turn in a neat (typed), organized and complete lab write-up. This lab is to be done on Tuesday and Wednesday. Groups of two or three, no more! The write-up is **due on Friday Dec. 2, 2011**.

On Tuesday, you will be required to have a rough draft of the diagram, your data table and the derivation. You will need to prove to me that you have completed most of your work (50 classwork points). You are expected to run the lab at least twice to work the kinks out and improve on your lab skills. You must show me what your group has done to help you write the lab up on both days. (50 classwork points on both Tuesday and Thursday). I will require you to sign-off on your points.

## Experiment Purpose, Diagram and Set-up

20 points

1. Write up a **purpose**. Talk about what it is that you want to discover. Ask an overall question.
2. Develop a procedure to gather your relevant data.
3. Draw a **diagram**. This diagram should be done in a neat, organized and complete manner. Color code where necessary. You will need to practice drawing the diagram then redraw it when you have figured it out.



## Data Acquisition

30 points

1. Develop and create a **table** to record relevant data, before Tuesday.
2. Gather your equipment and set up the experiment as shown.
3. Fix the **height of the bottom of the ramp** ( $h_1$ ) and vary the **height of the top of the ramp** ( $h_2$ ) from  $\sim 20$  cm to  $\sim 1.2$  m. You determine and set optimum parameters.
4. Let the ball roll and record the **range of the ball** ( $\Delta x$ ) and all other relevant data.

## Data Analysis and Discussion

30 points

1. Using energy methods (KE and PE), the conservation of energy and the motion equations derive a relationship between the **range of the ball** ( $\Delta x$ ) in terms of both the **height of the bottom of the ramp** ( $h_1$ ) and the **height of the top of the ramp** ( $h_2$ ).
2. Graph your relevant data. Your graphs should be relevant, neat, organized and complete.
3. Include detailed discussion of your mathematical derivation, the graphs and comparison of your experimental data with your theoretical calculations.

## Conclusion

20 points

1. Create 5 relevant questions that you will answer in the conclusion. These questions should consider the experimental set-up, data acquisition, data analysis, error handling and possible future experimental considerations.
2. Answer your overall question or statement you asked in the purpose.

I will grade you according to the parameters shown below. You must show me what you and your group accomplished on each day. On Thursday, I expect to see improvements on each parameter. The best way to get all the points is to focus on the experiment and work toward improving your lab skills. Keep your work. Try to understand how you can get great results and think beyond the scope of the concepts.

<b>Tuesday</b>	<b>Pts</b>	<b>Team Member</b> _____	<b>Team Member</b> _____	<b>Team Member</b> _____
Rough Exp Purpose and Procedure	10			
Rough Exp Diagram	5			
Rough Derivation	5			
Rough Graphs	5			
Rough Data Table and Data Collection	10			
Brief Discussion Notes	5			
Group Collaboration	10			
<b>Total Points</b>	<b>50</b>			
<b>Wednesday</b>	<b>Pts</b>	<b>Team Member</b> _____	<b>Team Member</b> _____	<b>Team Member</b> _____
2nd Exp Purpose and Procedure	10			
2nd Exp Diagram	5			
2nd Derivation	5			
2nd Graphs	5			
2nd Data Table and Data Collection	10			
Discussion Notes	5			
Group Collaboration	10			
<b>Total Points</b>	<b>50</b>			