Project

For your last lab, you will be doing an extension of one of the previous experiments you've done this quarter in an effort to clear up a previously inconclusive result or to test a new hypothesis. You aren't required to do the idea you considered at the end of last week's lab, but you may want to use that as a starting place.

Surveys (30-45 min)

If you recall, you completed two assessment pre-surveys during the first lab of the quarter. Today, we would like you to now complete the corresponding post-surveys which will be used to track changes in student attitudes over the quarter. Your TA will provide time for you to complete these surveys at the start of lab. You may access the surveys from a lab computer, your personal laptop, or your phone.

Please complete the correct survey for your course!

E-CLASS Survey
- Link for PHYS 121
- Link for PHYS 131
- Link for PHYS 141

PLIC Survey
- Link for PHYS 121
- Link for PHYS 131
- Link for PHYS 141

Asking a question (10 min)

To start, first come up with a hypothesis and use that to ask an experimental question that you'd like to answer.

You should have something concrete that you would like to accomplish. For instance, in the cratering lab, "Testing different ball sizes" is not sufficient. "Determining the relationship between ball size and crater diameter for the same kinetic energies" would be acceptable.

Possible starting points

If you aren't sure what you want to do, here are some general questions that you might try and answer. Note that these will require a bit of work to fill in details, and you should still get TA approval for your final idea.

Introduction to Experimental Physics

Can you distinguish between two sizes of paper by how long they take to fall?

The Period of a Pendulum

Can you better determine at what angle experimental measurements deviate significantly from the theoretical predictions?

Cratering

Do different diameter balls with the same kinetic energy produce the same size of crater?

Tissue Rupture

Is there a linear relationship between number of tissues and the energy required to break through them?

Rotational Dynamics

Does the magnitude of the applied torque affect the water's moment of inertia?

Experimentation (60 min)

Conduct your revised experiment, keeping a record of your measurements as you go. You will have access to all the equipment you've used throughout the semester, plus a few additional options.
If you need access to any of the prior Jupyter notebooks, they are linked below. Some small adjustments have been made to improve their functionality.

**Lab 1 Notebook (Paper Drop & Water Absorption)**

**Lab 2 Notebook (The Period of a Pendulum)**

- Photogate timers are available for measuring time
- Additional pendulum masses are available
- Jupyter notebook now allows for entering arbitrary angles

**Lab 3 Notebook (Cratering)**

- Rooms have brass and rubber balls available for testing
- Jupyter notebook improved to better display final plot

Be careful moving the sand! If it spills you should clean it up promptly to keep it from being a slipping hazard.

**Lab 4 Notebook (Tissue Rupture)**

- Larger holders for tissues are available
- Different tissue materials are available
- Carbon paper is available for better marking the ball’s impact position
- Your browser does not support the HTML5 video element

**Lab 5 Logger Pro File (Rotational Dynamics)**

- Each room has a glycerine filled can available to use in experiments

**Composing presentations (15 min)**

Now that you’ve done your revised experiment, process your data enough that you can present your results to your peers. If you want to share a plot or table, you should either make a sketch on the blackboard or print out a few copies to share with other groups.

Your presentation should include (at minimum) the following:

- Your experimental question
- Your procedure
- Your interpretation of results

Keep in mind you will only have a few minutes, so less is more.

**Presentations (30 min)**

During this time, each group will take turns reporting on their investigation and answering 1-2 questions about their results from classmates. Your record-keeper should keep track of the questions that come up, along with any advice from your TA.

Be kind with your questions, and don’t be distracting while others are presenting.

**Revising (any remaining time)**
With your remaining time, work to finalize your lab report. You may want to take some more data to address questions that came up in the reporting session, or you may be able to answer them by interpreting the results you already have.

Use this link to submit your report

Remember to log out of your Google account after you submit!

Please return any equipment you used to where you found it.