DESIGN YOUR OWN LAB

Choose a physics question that you will try to answer experimentally. Design the investigation so that it relates to a physics topic, but it does not have to be something we got to this year.

- Choose a question to investigate (samples below).
- Choose an independent variable that you can change and tools to measure it.
- Choose a dependent variable that will change as a result and tools to measure it.
- Repeat trials and take averages to minimize error.
- Choose variables to keep constant and tools to measure their values.
- Collect and record data in a neat and labeled data table with units.
- Take a picture or make a diagram of your lab setup.
- Analyze the data in the form of a graph or calculation.
- Present your conclusions based on the analysis.

Create a report including these things in a digital format and share it with Mr. Mont.

Sample questions (you don't have to choose one of these; you could think of your own):

- What is the best knee angle for the highest vertical jump?
- How does the angle of a ramp affect the speed of a toy car?
- Is there an optimal angle for best range for a toy projectile launcher?
- Does the inflation of a basketball affect its bounce height?
- How does the size of a hole in a container affect how long it takes for water to empty from the container?
- How does adding surface area to a toy car affect its speed down a ramp?
- How does the coefficient of friction of your shoes on different surfaces affect running times?
- How does decreasing the weight of a barbell affect the number of reps you can do?
- How does the shape of a piece of clay affect the angle at which it tips over?

Sample measuring devices: rulers, timers (smart phones have them), Logger Pro dot patterns, bathroom scales, protractors, video analysis, apps on smart phones…

GRADE	VALIDITY	METHOD	FORMAT	ANALYSIS AND CONCLUSION
A	The variables you chose are relevant to answering your question.	The measuring tools were appropriate and used correctly. You took multiple steps to minimize error. You kept other variables constant.	The data table is neat, has column headers and units. Graphs have titles and axes are labeled with variable and unit.	Graphs or calculations are correctly done and support the conclusion you draw.
B	The variables you chose are relevant to answering your question.	The measuring tools were appropriate and used correctly. You took some steps to minimize error. You kept other variables constant.	The data table is readable, has column headers and units. Graphs have titles and axes are labeled.	Graphs or calculations are correctly done and support the conclusion you draw.
C	The variables you chose are relevant to answering your question.	You may have made minor errors using the measuring tools. You should have taken more steps to minimize error. You kept some but not all other variables constant	The data table could be neater. You may have forgotten some but not all units and labels on data table and graphs.	You may made minor errors in graphing or calculating, or the conclusions you draw are only partially supported by your data.
D	You chose variables that are not relevant to your question.	You used measuring devices incorrectly, or took no steps to minimize error, or took no steps to keep other variables constant.	You completely omitted units or labels from data table or graph.	Graphs or calculations have major errors, or your conclusion is not supported by your data.