

2010-2011 AP Physics Final Project

Objective:

- Investigate a physics phenomenon, concept, problem, theory, etc.
- Design and execute a more involved experiment than what is normally done in a physics lab
- Collect and analyze real data
- Make conclusions about how well physics theory applies to real world situations

Starting Point: Was there any concept, situation, problem, etc. you came across this year that surprised you or challenged your preconceptions? Is there an area of physics that you would like to investigate further? You must come up with an experimental problem in physics at least tangentially related to something we learned this year. You will then design an experiment, take data, analyze that data, and make conclusions. Think about it as a "Science Project."

The popular TV show MythBusters does this type of "real-world science" all the time. They also do an excellent job of quantifying their experiments. An experiment is only valid if it takes repeatable data that can be analyzed, which theirs' do. You can use any reasonable method of data collection. If you require the use of a school owned transducer, you may arrange to borrow it once you are able to fully articulate how it will be used. It is preferred that you use other methods of data collection, like calibrating a spring to correlate stretched distance to applied load. Many projects would benefit from video recording.

The project may be done in groups of two or three. No two groups may do exactly the same project. Two projects could theoretically be done on the same topic, just looking to answer different questions. Projects must be approved first and are accepted on a first-come first-served basis.

You will be graded on:

- Introduction and Development of an experimental problem or question
- Description of Experimental Method
- Quality of Experimental Method
- Data Collection
- Data Analysis
- Error Analysis
- Conclusions
- Overall quality/amount of work done

Final projects can be presented in a variety of formats, but must include all the above listed items.

View the AP Physics Course Objectives section titled: Laboratory and Experimental Situations.

The rubric for your report will be based largely on the description provided there.

AP Central has it in pdf format

Timeline:

Wed 5/11: Introduction to Project

Mon 5/16: Group Selection, Experimental Question, and Basic Method of Data Collection due
submit at: <http://bit.ly/physicsproject>

Thu 5/19: Equipment list, procedure, data collection methods, data analysis methods, and safety concerns due
submit at: <http://bit.ly/physicsdetails>

Tue 5/24: Preliminary Data presentation due (ie: show that you are on track)
submit (show) in class

Tue 5/31: Final report due and in class presentation of results

Examples of some real life physics topics:
Elastic and inelastic collisions between objects
Two source interference with sound waves
Friction in systems previously assumed to be frictionless
Diffraction of sound waves through openings
Interference between water waves
Factors influencing water wave speed
Tension in a rope with non-negligible mass
Rotational motion (angular momentum, moment of inertia, etc.)
Airplane wing design and lift
Beat production in sound waves
Current induced by a changing magnetic flux
Self inductance of circuit elements
Thin film interference
Doppler effect
Snell's law and production of rainbows
Parabolic motion of projectiles
Bernoulli and spinning projectiles
Bernoulli and wings
Volume flow rate in a pipe
Temperature dependence on speed of sound
Resonance in free or fixed end pipes
Drag force and terminal velocity
Surface effects on the coefficient of friction
Pulleys with non-negligible mass and friction
Mechanical advantage
Harmonic motion of guitar strings
Circuits with resistors and capacitors
Effect of height on gravitational acceleration
Magnetic field strength
Energy dissipation in waves
Measurement of indexes of refraction
Spherical aberration in optical instruments
Photoelectric effect

Note that these are broad topics and not a specific problem statement, question, or hypothesis