AP Physics 2

Goals

- You will focus on learning.  
  *Points and grades often get in the way of this.*
- You will develop critical thinking and problem solving skills.  
  *This requires you to take risks, make mistakes, and try again. You should be rewarded for this and not penalized.*
- You will know what you understand and demonstrate it to me.  
  *This requires frequent, useful feedback. 8/10 is not useful feedback.*
- You will be responsible for your own learning.  
  *This requires you to have the information, tools, and freedom to do so.*
- Your final grade will reflect your understanding of the standards for this course.  
  *This requires grades to be associated with standards and you to have multiple opportunities to demonstrate your understanding.*

Contact Info

- Canvas: http://naperville.instructure.com/
- Email: mrowzee@naperville203.org, Google Chat
- Office: 150; Classrooms: 142, 154
- Office hours: Contact me, let me know you’d like to meet (most am’s, pm by appointment).

Materials

- Textbook, eTextbook
- Scientific calculator (AP-Exam suitable)
- Homework and note-taking notebook (quad-ruled composition lab notebook recommended)
- Pencil, paper

Fall Semester Units

- Relativity
- Fluid Mechanics
- Thermodynamics
- Electrostatics
- Electric Circuits

Spring Semester Units

- Magnetostatics and Electromagnetism
- Geometric and Physical Optics
- Quantum, Atomic, Nuclear Physics
- Particle Physics and Cosmology
Instructor: Mr. Rowzee

I graduated from NNHS in 1989. I obtained two engineering degrees from Iowa State University and applied them in my work for 10 years. I then attended Benedictine University and entered the teaching profession, and have never regretted the past or present. This is my 16th year teaching full-time. I love inspiring students about science, technology, and especially engineering (and also art).

Purpose

The purpose of this course is to contribute to the achievement of the District’s Mission, which is to educate students to be self-directed learners, collaborative workers, complex thinkers, quality producers and community contributors; and to master the learning that comprises this physics course. To achieve this, you will develop a conceptual understanding of our physical world. You will learn how to think critically, solve challenging problems, and reflect on your understandings. Through this process you will become better prepared for the structure of college classes and the expectations placed on professionals in the workplace. This is a demanding course designed for college-bound students interested in science and, potentially but not necessarily, planning a career in science or engineering. We use a college e-text, but move at a slower pace than a college course. This course is the equivalent of a one-semester college algebra-based physics course. You will be well prepared for the AP Physics 2 exam. However, this course often explores topics beyond the AP Physics 2 curriculum. You will learn through a combination of self-study, and classroom collaboration.

Learning Activities and Summative Assessments

You develop understanding of the learning standards for this physics course by completing a variety of learning activities such as homework reading, questions, and problems; peer instruction; computational modeling; whiteboarding in groups; quizzes; and lab activities. While these activities don’t directly affect your grade, they are essential in that they are your opportunity to explore, discover, take risks, make mistakes, ask questions, help each other, practice, and get feedback before having to demonstrate your understanding. You demonstrate your understanding through summative exams at the end of the unit and your lab portfolio throughout the unit. Your grade directly reflects your demonstration of your understanding.

Homework Reading, Questions, and Problems. The calendar lists the reading, questions, and problems to be completed as homework as needed to reinforce and practice the learning objectives. Homework is a learning activity – an opportunity to develop understanding or determine areas needing more work. Your homework problem solutions should be complete, detailed, and well organized (e.g., diagram, givens, unknowns, equations, substitution, answer with units). Homework is assigned almost daily and your homework must be submitted by the date/dates discussed in class or on the calendar. Furthermore, homework NOT completed prior to the unit test review day will result in you being unable to take, and benefit from, a testing retake.

Whiteboarding. Whiteboarding consists of small groups collaboratively presenting their solution to a problem that they sign up for on the front board. The questions that are asked, debated, and answered during the discussion is critical to the learning of the class.

Peer Instruction. Peer instruction is a process in which the instructor presents a conceptual question. Some questions are from the homework and some are new. Students individually submit their answer to the question. The instructor then displays the percentage of students who reported each possible answer and students then question, discuss, debate, and defend their answers to each other. Students then resubmit
their answer to the question, which may have changed. The instructor then presents and explains the correct answer.

**Lecture and Demonstrations.** At times, I will introduce new concepts by presenting the new material with a lecture or demonstration. Sometimes, I will model how to solve problems by leading the class through sample problems.

**Labs.** At times, you will explore new concepts starting with a lab and we will discuss our observations and results afterward. You will develop understanding of many learning standards through these activities and associated notes in your lab portfolio as you perform the AP Science Practices. This is an excellent opportunity to practice and receive feedback on your understanding of the concepts and performance of the science practices.

**Quizzes.** You will typically take one or more quizzes for each unit to help you assess your understanding of the more challenging concepts.

**Lab Portfolio.** You will demonstrate performance of the AP Science Practices through the selection of labs from your Lab Notebook in your electronic Lab Portfolio. Your lab portfolio is organized around the AP Science Practices. You curate your lab portfolio such that you demonstrate your understanding of each of the AP Science Practices and reflect on why the labs you have selected are excellent examples of your performance. The portfolio of labs are shared with the instructor electronically will typically be graded (electronically) AT (or near) THE END OF THE SEMESTER without a grace period for missing labs. There are no re-takes on these labs. The initial labs will be submitted during the course of semester 1 and will have detailed comments and suggestions and will serve as a guide for what should be included in future lab submittals. Labs not properly shared in a timely fashion will not be accepted for late credit. Labs that do not constitute your own work will be given zero credit. If you have questions about what may or may not be shared with all lab partners, please ask. Common sense usually prevails in these matters.

**Summative Exam.** You will demonstrate your understanding of most learning standards through summative exams. Summative exams are a combination of multiple choice and free-response problems. On the exam, you are allowed to use a calculator and the AP Physics 2 Table of Information and Equation sheets. You must show all your work to earn credit on free-response problems as they are assessed in the same manner as on the AP Physics 2 exam. Your work, rather than the final answer, demonstrates your understanding. That is, you can demonstrate almost complete understanding of a learning standard even though you obtained the wrong answer if you have the correct process. Similarly, you cannot demonstrate understanding if your process is incorrect even though your final answer is correct.

**Reassessments.** If you are still developing your understanding after the summative exam (scores of 1, 2, or 3), you may, at my discretion, have another opportunity to demonstrate your understanding. Please note that reassessments are designed to be at least as challenging as the summative exam- however, AP-level content is not always available or readily creatable for all topics. Before you attempt a reassessment, you will complete additional practice to prepare. At a minimum, you are required to make corrections to your summative exam and discuss your learning with me. You are responsible for completing the additional practice before the reassessment. Reassessments must be requested in advance and are scheduled at my convenience- usually before or after school. The maximum score on a reassessment is a 4. Your lab portfolio is an ongoing representation of your understanding of the AP Science Practices and, therefore, you have the
opportunity to respond to feedback and demonstrate your understanding before the lab portfolio is submitted for a score. Homework standards (mentioned above) must also be met in order to take retakes.

**Absences on Test Days.** If you miss test days, you will be given a make-up version of the exam at a later date and time of my choosing. However, due to a limited supply of “AP-worthy” test material, you may forfeit your ability to have any opportunity to re-take the exam after make-ups are complete. When an in-class test is given, it may at times be split up into multiple days due to in-class time constraints. Re-take/Make-up exams for split exams will be given in single sittings before or after school. Arrive on time for all make-up/re-take exams.

**Policy on Re-takes of Exams.** Retakes of exams are not a ‘right’, they are a privilege that can be lost temporarily or permanently in the class. Not studying and preparing for an exam because you know you will have access to a re-take is not acceptable and can result in your inability to take a re-take for one or more exams. Cheating and/or habitual missing of exams are examples of ways to lose access to this privilege.

*Capstone Project.* You will complete a capstone project. This is considered the “final exam.” However, it is an iterative process and you need to receive and incorporate feedback throughout the project. There is a great deal of flexibility in both the content and form of your capstone project. More details will be provided during the semester.

**Communication**

Learning activities and summative assessments are enumerated on the calendar for each unit. Class resources are typically posted to Canvas. Please feel free to contact me. If you can’t arrange to talk with me in person, e-mail is an excellent way to reach me. I will typically respond the same night to all messages that are received by 9 p.m. While class time will be conducted on ZOOM, If you need to talk to me in person, I prefer you use Google Chat. From there, we can also use Google Meet if needed for more substantive conversations.

Peer help can be obtained by using our Class Google Chat Rooms, for which you will receive an invite.

**Class Expectations**

- We help each other learn.
- We respect each other’s learning. For example:
  - We have our materials and are learning from the bell until I dismiss the class.
  - We handle lab equipment, textbooks, and technology with care.
  - We accept and respect each other’s differences.
  - We help create a safe environment in which we all feel comfortable asking questions.
- If you are absent, you are responsible for obtaining handouts and notes and then also checking with me to make arrangements for extra help or to make-up exams, labs, or activities.
- Assignments are no longer accepted two weeks after they are due.
- We do not use other classes’ equipment without permission since our class space is shared.

**Academic Integrity**

- Please make sure you are intimately familiar with the District’s Academic Integrity Code.
- A few examples to ensure everyone interprets the code in the same manner for this class:
  - Copying data from another lab group without the instructor’s permission is plagiarism.
- Paraphrasing another student’s or an outside source’s work in the analysis, discussion, or conclusion sections of a lab report is plagiarism. The purpose of these sections of the lab report is for you to demonstrate your understanding through original thought. Paraphrasing someone else’s original thoughts fails to demonstrate this understanding. Since making your analysis, discussion, or conclusion sections of a lab report available to others either physically or electronically also violates the Code, the instructor doesn’t have to determine whose lab is original and whose is paraphrased since both students have violated the Code.
- Removing any exam materials or copies of exam materials (questions, answer sheets, scratch paper) from the classroom, either intentionally or accidentally or accessing exam materials outside of the classroom, is considered theft and is a Level 3 violation of the Code, regardless of whether any of these materials are shared with others.
- If you are ever in doubt, just ask me.

Grading

Grading is done on an individual basis, you are not competing with your classmates. Most summative assessments are graded on a 1-5 scale in a manner consistent with the AP Physics 2 exam:

- 5: Extremely well qualified; 4: Well qualified; 3: Qualified; 2: Possibly qualified; 1: No recommendation

This scale is converted to percentages as reported in Infinite Campus. A 5 corresponds to a 100%; a 4, 88%; a 3, 75%, a 2, 62%; a 1, 50%.

The units and lab portfolio are weighted to comprise the overall coursework grade:

- **Fall:** Special Relativity: 4%; Fluid Mechanics: 13%; Thermodynamics: 17%; Electrostatics: 17%; Electric Circuits: 9%; Lab Portfolio: 40%
- **Spring:** Magnetostatics and Electromagnetism: 20%; Geometric and Physical Optics: 20%; Quantum, Atomic, and Nuclear Physics: 20%; Lab Portfolio: 40%

*The fall semester grade is determined by a combination of the coursework grade (85%) and the capstone project (15%). The spring semester grade is determined by a combination of the coursework grade (85%) and the AP practice final exam (15%).

The semester grade is determined by percentage:

- A: 100% - 90%  
- B: < 90% - 80%  
- C: < 80% - 70%  
- D: < 70% - 60%  
- F: < 60% - 0%

Any questions about grades will be addressed outside of class time. Please keep all graded materials until the end of the semester. The most current grade that I have for you is available on the school website but may not reflect all lab portfolio content immediately. **Lab portfolios** are typically graded near the end of the semester, and are a ‘work in progress’- meaning, you should learn from previous feedback (written and/or verbal) and incorporate improvements in your labs. Grades of A, B, and C are counted as weighted grades.

Miscellaneous

We will use a variety of external web sites and services in the course of our learning.

**NOTE:** You must be proficient in regularly checking and using the class CANVAS (Daily Agenda, Course Materials, and Announcements) as they are published. **AP Classroom** and **Pearson’s Mastering Physics** portal for our online textbook, or the regular **Textbook** will be used extensively as well.
*- indicates that the starred item may not apply to a remote semester