

Science 12: Physics (Calculus based)

Course Syllabus

2006-2007

❖ Course Description

This course covers two areas of classical physics: mechanics, and electricity & magnetism. The goal is to deeply understand these areas. The students' eleventh grade physics course, their introduction to differential calculus at the end of eleventh grade, and their concurrent enrollment in twelfth grade calculus provide the background and skills necessary to accomplish this goal. Topics in mechanics include: Newton's laws, particle dynamics, dynamics of systems of particles, rotational kinematics and dynamics, work, energy, oscillations and gravitation. Topics in electricity & magnetism include: electrostatics, conductors, capacitors, dielectrics, electric circuits, electric fields, magnetic fields, electromagnetic induction, and Maxwell's equations.

❖ Textbooks

Fundamentals of Physics, Second Edition, Extended Version, David Halliday & Robert Resnick

❖ Mastery Grade

Your trimester mastery grade is determined by full period exams, brief quizzes, and any graded assignments. Homework is *not* figured into the mastery grade. Your scores on quizzes and any graded assignments will make up 20% of your trimester grade. Exams will make up 80%.

❖ Quizzes and Exams

You can expect

- a quiz nearly every week,
- an exam at the end of a topic or at the end of a group of related topics.

A quiz may be given at any time without prior announcement. Your lowest quiz score will be dropped.

Exams will be announced well in advance and will generally be 60 minutes long.

If you are absent for a quiz or an exam, *you* are expected to arrange to make it up.

❖ Effort

Good effort is shown when

- you do all homework carefully and thoughtfully, even if you do not get the correct answer;
- you ask specific questions rather than saying, “I don’t get it”;
- you are eager to learn at the very start of class, as evidenced by being quietly seated at an uncluttered desk, and equipped with pencil (not pen), eraser, notebook, and homework;
- you thoughtfully, respectfully, and politely contribute to class discussions;
- you ask questions to better understand a topic or to explore it;
- you start without delay on in-class work and stick to it; and
- you take notes during class and keep an organized notebook.

❖ Behavior

Good behavior is shown when

- you meet customary social expectations (for example, speaking politely);
- you follow our class guidelines.

We will decide on guidelines that create an environment of joyful and purposeful learning for everyone.

❖ Notebooks

An organized three-ring binder is required.

❖ Class Notes

In physics class, every important point is made audibly in spoken words, visually in words, symbols, drawings, and often with physical objects and experimental apparatus. When you take notes on a solution, a formula’s derivation, an experiment, or demonstration, you do the physics along with your teacher. Taking notes raises your thinking to a higher level, because you interpret, judge, evaluate, and organize what you are seeing and hearing in class while it is happening.

❖ Homework

In physics, your learning depends on your thoughtfully working the assigned problems and staying caught up. This is the best way to prepare for exams and to understand new material as it is presented in class. **Expect 50 minutes of work outside of class for every class meeting** (since class meets three out of five days, this is 2-½ hours a week).

In sports, music, and theater you play or perform like you practice. Sloppy practice, sloppy performance. Just as you would insist on doing your personal best when practicing a sport at which you desire to excel, so too you should insist on your best when you practice physics.

❖ Calculators

Purchase the graphing calculator of your choice. My intention is that this will be the last expensive calculator you buy. Therefore, your choice should depend on the use you intend for it this year and later in college. If you anticipate pursuing mathematics intensive social sciences, physical sciences, or engineering, the top of the line HP49G might be the best choice. Those who do not expect to pursue such fields, may find the Casio fx-9860G ideal. The difference in cost is over \$100. I will be happy to give advice on this purchase based on your plans.

❖ Web resource

I will maintain a simple web site at <http://math.mnrt.net/> . I hope that parents and students will make use of this. If you are absent, you can get the day's assignment and any handouts from class at this site. I usually update it by about 5:30 p.m.

Here you will find

- the current assignment and all past assignments,
- copies of everything handed out in class including problem sets, and solutions to selected problems,
- my notes when the day's topic was especially complex.

This is not intended as a substitute for keeping an assignment notebook, which you are required to do. If you are absent from class, check here for the day's assignment and any handouts given during class. Parents will find the definitive answer to the question: "Do you have any physics homework?"

❖ Help

Please seek my help outside of class. The student who makes the extra effort to get help when needed makes a very good impression on the teacher. Do not expect the impossible, though. If you have not kept up with assignments, meeting with me for an hour as the exam date approaches is not going to do you much good. If that was all it would take for you to do well, I would not be giving all these assignments in the first place.

❖ Learning, understanding, and applying physics

Physics' power lies in its explaining an enormous variety of phenomena on the basis of a few fundamental principles. Our goal is not merely to memorize a collection of facts and formulae. We want to apply understanding and insight to our everyday experiences and to objects and events that are too small, too fast, too big, or too distant for us to experience directly. We wish to explain all of this by reasoning with principles that are as believable and simple as will get the job done.

Since the principles are simple, and the textbook and class explanations so reasonable, you may be tempted to think you could easily work problems similar to those discussed in class when they appear on an exam, so why bother doing them for homework. Do not be lulled into thinking this. You will only understand and be able to do physics by wrestling with the problems yourself. The time to discover that a problem is not as easy as it looked in class is that evening, not two weeks later on the exam.

❖ **Parents**

Thank you for reviewing this with your student. Throughout the school year, please contact me when you have questions, comments, or concerns. I check e-mail whenever I return to my desk. E-mail will catch my attention the quickest, then we can arrange to talk by phone or meet in person. I try to check phone messages at the end of the day.

❖ **Parent signature**

Please review this with your parents and ask a parent to sign it below. I will not collect this, but I will check in class for a parent's signature.

Parent signature _____