Syllabus: Practices & Policies

2021-2022	Franklin High School

Section 1: Course Overview

Course Title	AP Physics Part 1
Instructor Info	Name: David Stroup Contact Info: dstroup@pps.net
Grade Level(s)	10–12
Room # for class	Room: S-012
Credit	Type of credit: Science Elective # of credits per semester: 1
Prerequisites (if applicable)	Student should be comfortable with algebra
General Course Description	Advanced Placement Physics Part 1 is an algebra-based course in general physics, roughly equivalent to an introductory algebra-based university-level physics "mechanics" (motion and forces) course. This course will be covered in two semesters, and will include mechanics, Newtonian physics, gravity, circular motion, harmonic motion, waves, sound, and the fundamentals of electrostatics and electrical currents. The emphasis in the course is on gaining an understanding of essential physics concepts and skills, and using the concepts and formulae to solve problems. Laboratory work will be covered as an integral part of this course.

Section 2: Welcome Statement & Course Connections

Personal Welcome	**Welcome to AP Physics Part 1!** This is going to be an exciting and very different school year. In this class we'll take a year-long journey of learning through the fundamental physics principals that

	explain how the world works — what Sir Isaac Newton called the "System of the World."
Course Highlights *(topics, themes, areas of study)*	Class meets for approximately 90 minutes every other day. The school year starts in early September, and we will have about 28 weeks to cover the material, with *hopefully* two weeks for review before the AP Physics Part 1 test the afternoon of Thursday, May 12, 2022 (test starts at noon). Whatever time remains is spent covering topics we choose together, likely including water-bottle rockets and a "Rube Goldberg" simple machines lab. **Students will sign up for an account with the AP College Board and add this class during the first few weeks of school** (this will be an in-class activity). You will sign up for the AP test at this time. Registration on the AP website is required, and will be needed to access online resources and workbooks. It is expected tat everyone wil take the AP test. Financial assistance is available to anyone who wants to take the AP test and may have difficulty affording it. If you get a "3" on the AP test, I will raise your grade to a "B." If you get a "4" or "5" I will rise your grade to an "A." For more information about the AP Exam, visit www.apcentral.collegeboard.com Peer coaching, peer teaching and peer review are an essential part of our course. Students are encouraged from the first day to create or join a study group to work with in and out of class — nobody works in a vacuum. Course goals include developing each student's intuition, creativity, and investigative skills to do the following (abbreviated from the 2014-15 College Board AP Physics Course Description): • *Use representations and models to communicate scientific phenomena and solve scientific problems.* • *Use mathematics appropriately.* • *Engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.* • *Plan and implement data collection strategies in relation to a particular scientific question.* • *Perform data analysis and evaluation of evidence.* • *Work with scientific explanations and theories.* • *Connect and relate knowledge across various scales, concepts, and representations in and across domains.* ## *Behavior & Expectations:* This is a high-intensity course equivalent to college physics. It is important that everyone be on their best behavior. Respect for your classmates is expected at all times; disrespect for your fellow scholars will not be tolerated. **Academic dishonesty** will result in an assignment grade of F (ZERO). Plagiarism is considered academic dishonesty: on papers, any material that you copy from a source must be obviously a quote (for example, in quotation marks), and must be attributed. Excessive use of quoted material may be considered plagiarism—only quote primary sources. Copying from another student is also plagiarism. On a test, a pattern of identical wrong answers among people sitting next to each other may be taken as a sign of cheating! **Absences and Late Work:** As a general rule, due dates are not negotiable, but see the instructor for special cases. If students have an excused absence on a due date, material is due when they return to school. If students are absent for a lab it must be made up before school, lunchtime, or after school by appointment with the teacher within one week of the assigned date. The teacher is under no obligation to accept late work if it is due on a day that the student has an unexcused absence. *It is student's responsibility to obtain assignments for the time that they are absent and to make*

	appointments with the teacher for lab make-up. **Safety:** Since this is a laboratory class, students are expected to adhere to common sense safety rules for their protection as well as the protection of others in the classroom, no running, or using equipment as a toy or weapon. We will use lasers in this class, and their improper use can result in eye damage; unsafe behavior may result in removal from the lab! Respect for lab equipment is imperative, and deliberate mistreatment of lab equipment will also result in exclusion from labs until it is determined that the student can be trusted. The student or group of students responsible for broken equipment will be charged for its replacement. **Tutorials:** Tutorials are part of the school day, and will be used to hold periodic recitation sessions which may be integral to your success in the class. A recitation session in college is a period dedicated to going over material and problems in depth, focusing on problem solving, practicing the material, and responding to student questions. Because of the amount of material covered in AP Physics it may not always be possible to cover all types of problems during the normal class period! It is an expectation of this class that you attend one or more recitation session per unit, and material covered in depth in a recitation session — but mentioned only briefly in class — may appear on tests. You will be informed of dates for recitation sessions for particular material or problem types. (Some tutorials will be used for other classes or periods, or for catch-up work.) **Cell phone policy:** Call phones and related devices are **not to be used except with the explicit permission of the instructor, and only as a scientific instrument (timer, to take videos of an experiment, etc.)!** If a cell phone is being used inappropriately (which is almost at any time without permission) you will be told to put it away; if you don't, or if the phone comes out again, it will be confiscated, and may be sent to the office (as per school rules). You may be given permission to take out your phones to use in connection with the class; please be familiar with apps such as your scientific calculator, stopwatch, inclinometer (look it up), etc. High-speed video camera apps (240+ fps) are available free, as are lots of other cool tools. **In general, phones or other connected devices will not be permitted as a substitute for a calculator on a test; bring your calculator!** *Labs:* Labs are open-ended and inquiry-based; at least 25% of class time will be spent on labs and related activities (preparation, write-up). At least 12 will be assigned during the course of the year. Students are given an objective, e.g. "Determine the coefficient of static friction of wood on wood," and standard materials such as string, ruler, protractor, mass set, light pulley, etc. Students are allowed to create their own experimental design, but ultimately most of the lab designs must lead to the collection of data which can be analyzed through graphical methods. Students are encouraged to use whatever technology is available to them, including smartphones and laptops (note that shooting a video and analyzing it is an acceptable practice). Students work in small groups, but each student must submit independent lab papers. In addition to the papers described below, you may be asked about labs on following quizzes or tests. You are still responsible for these questions if you missed (and failed to make up) the lab, and the question will be phrased in such a way that you could apply what you have learned and answer it (e.g. 'how would you set up a lab to…). This is practice for the AP test!
Course Connections to PPS ReImagined Vision	By providing a college-preparatory experience with challenging inquiry-based labs and a focus on writing, this course is designed to help students grow to meet the goals of the Graduate Portrait — to become problem solvers, critical thinkers, and lifelong learners. By creating a community of scholars

	in which all students are welcome and diversity is honored, it also aims to foster them as equity leaders and communicators.

Section 3: Student Learning

Prioritized Standards	The following standards will be explored in the course: **Next Generation Science Standards:** HS.Forces and Interaction, including HS-PS2-1 through HS-PS2-1 through 5; HS.Energy, including HS-PS3-1 through 5; parts of HS.Waves and Electromagnetic Radiation. In addition, the course is built around the objectives, practices, and "Big Ideas" of the College Board's AP Physics program: AP Physics is organized around a set of seven "Big Ideas" that we will revisit throughout the class: **Big Idea 1:** Objects and systems have properties such as mass and charge. **Big Idea 2:** Fields existing in space can be used to explain interactions. **Big Idea 3:** The interactions of an object with other objects can be described by forces **Big Idea 4:** Interactions between systems can result in changes in those systems **Big Idea 5:** Changes that occur as a result of interactions are constrained by conservation laws **Big Idea 6:** Waves can transfer energy and momentum from one location to another without the permanent transfer of mass and serve as a mathematical model for the description of other phenomena **Big Idea 7:** The mathematics of probability can be used to describe the behavior of complex systems and to interpret the behavior of quantum mechanical systems **Science Practices:** **Science practice 1:** The student can use representations and models to communicate scientific phenomena and solve scientific problems. **Science practice 2:** The student can use mathematics appropriately. **Science practice 3:** The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course. **Science practice 4:** The student can plan and implement data collection strategies in relation to a particular scientific question. **Science practice 5:** The student can perform data analysis and evaluation of evidence. **Science practice 6:** The student can work with scientific explanations and theories. **Science practice 7:** The student is able to connect and relate knowledge across various scales, concepts, and representations in and across domains. **Learning Objectives:** Learning objectives are outlined at the start of each chapter of OpenStax College Physics for AP Courses. *Syllabus:*

UNIT 1. KINEMATICS [CR2a]
• Kinematics in one-dimension: constant velocity and uniform accelerated motion
• Vectors: vector components and resultant
• Kinematics in two-dimensions: projectile motion
Big Idea 3
Learning Objectives: 3.A.1.1, 3.A.1.2, 3.A.1.3

UNIT 2. DYNAMICS [CR2b]
• Forces, types, and representation (FBD)
• Newton's First Law
• Newton's Third Law
• Newton's Second Law
• Applications of Newton's Second Law
• Friction
• Interacting objects: ropes and pulleys
Big Ideas 1, 2, 3, 4
Learning Objectives: 1.C.1.1, 1.C.1.3, 2.B.1.1, 3.A.2.1, 3.A.3.1, 3.A.3.2, 3.A.3.3, 3.A.4.1, 3.A.4.2, 3.A.4.3, 3.B.1.1, 3.B.1.2, 3.B.1.3, 3.B.2.1, 3.C.4.1, 3.C.4.2, 4.A.1.1, 4.A.2.1, 4.A.2.2, 4.A.2.3, 4.A.3.1, 4.A.3.2

UNIT 3. CIRCULAR MOTION AND GRAVITATION [CR2c]
• Uniform circular motion
• Dynamics of uniform circular motion
• Universal Law of Gravitation
Big Ideas 1, 2, 3, 4
Learning Objectives: 1.C.3.1, 2.B.1.1, 2.B.2.1, 2.B.2.2, 3.A.3.1, 3.A.3.3, 3.B.1.2, 3.B.1.3, 3.B.2.1, 3.C.1.1, 3.C.1.2, 3.C.2.1, 3.C.2.2, 3.G.1.1, 4.A.2.2

UNIT 4. ENERGY [CR2f]
• Work
• Power
• Kinetic energy
• Potential energy: gravitational and elastic
• Conservation of energy
Big Ideas 3, 4, 5
Learning Objectives: 3.E.1.1, 3.E.1.2, 3.E.1.3, 3.E.1.4, 4.C.1.1, 4.C.1.2, 4.C.2.1, 4.C.2.2, 5.A.2.1, 5.B.1.1, 5.B.1.2, 5.B.2.1, 5.B.3.1, 5.B.3.2, 5.B.3.3, 5.B.4.1, 5.B.4.2, 5.B.5.1, 5.B.5.2, 5.B.5.3, 5.B.5.4, 5.B.5.5, 5.D.1.1, 5.D.1.2, 5.D.1.3, 5.D.1.4, 5.D.1.5, 5.D.2.1, 5.D.2.3

UNIT 5. MOMENTUM [CR2e]
• Impulse
• Momentum
• Conservation of momentum
• Elastic and inelastic collisions
Big Ideas 3, 4, 5
Learning Objectives: 3.D.1.1, 3.D.2.1, 3.D.2.2, 3.D.2.3, 3.D.2.4, 4.B.1.1, 4.B.1.2, 4.B.2.1, 4.B.2.2, 5.A.2.1, 5.D.1.1, 5.D.1.2, 5.D.1.3, 5.D.1.4, 5.D.1.5, 5.D.2.1, 5.D.2.2, 5.D.2.3, 5.D.2.4 , 5.D.2.5, 5.D.3.1

UNIT 6. SIMPLE HARMONIC MOTION [CR2d]
• Linear restoring forces and simple harmonic motion

	• Simple harmonic motion graphs • Simple pendulum • Mass-spring systems **Big Ideas 3, 5** **Learning Objectives:** 3.B.3.1, 3.B.3.2, 3.B.3.3, 3.B.3.4, 5.B.2.1, 5.B.3.1, 5.B.3.2, 5.B.3.3, 5.B.4.1, 5.B.4.2 **UNIT 7. ROTATIONAL MOTION [CR2g]** • Torque • Center of mass • Rotational kinematics • Rotational dynamics and rotational inertia • Rotational energy • Angular momentum • Conservation of angular momentum **Big Ideas 3, 4, 5** **Learning Objectives:** 3.F.1.1, 3.F.1.2, 3.F.1.3, 3.F.1.4, 3.F.1.5, 3.F.2.1, 3.F.2.2, 3.F.3.1, 3.F.3.2, 3.F.3.3, 4.A.1.1**,** 4.D.1.1, 4.D.1.2, 4.D.2.1, 4.D.2.2, 4.D.3.1, 4.D.3.2, 5.E.1.1, 5.E.1.2, 5.E.2.1 **UNIT 8. MECHANICAL WAVES [CR2j]** • Traveling waves • Wave characteristics • Sound • Superposition • Standing waves on a string • Standing sound waves **Big Idea 6** **Learning Objectives:** 6.A.1.1, 6.A.1.2, 6.A.1.3, 6.A.2.1, 6.A.3.1, 6.A.4.1, 6.B.1.1, 6.B.2.1, 6.B.4.1, 6.B.5.1, 6.D.1.1, 6.D.1.2, 6.D.1.3, 6.D.2.1, 6.D.3.1, 6.D.3.2, 6.D.3.3, 6.D.3.4, 6.D.4.1, 6.D.4.2, 6.D.5.1 **UNIT 9. ELECTROSTATICS [CR2h]** • Electric charge and conservation of charge • Electric force: Coulomb's Law **Big Ideas 1, 3, 5** **Learning Objectives:** 1.B.1.1, 1.B.1.2, 1.B.2.1, 1.B.3.1, 3.C.2.1, 3.C.2.2, 5.A.2.1 **UNIT 10. DC CIRCUITS [CR2i]** • Electric resistance • Ohm's Law • DC circuits • Series and parallel connections • Kirchhoff's Laws **Big Ideas 1, 5** **Learning Objectives:** 1.B.1.1, 1.B.1.2, 1.E.2.1, 5.B.9.1, 5.B.9.2, 5.B.9.3, 5.C.3.1, 5.C.3.2, 5.C.3.3

PPS Graduate Portrait Connections **8/27 Work**	I will help students grow their knowledge and skills in the following aspects of PPS's Graduate Portrait: • Inclusive and Collaborative Problem Solvers — every lab is an opportunity for problem solving with the lab group. • Inquisitive Critical Thinkers with Deep Knowledge — inquiry-based practices in the sciences foster this aspect of the Portrait. • Resilient and Adaptable Lifelong Learners — this is the goal of an education in the sciences. • Powerful and Effective Communicators — on emphasis on writing in lab papers and written responses support college-level writing skills. • Influential and Informed Global Stewards — this science class will include important issues facing the globe, such as climate change and resource depletion. • Optimistic, Future-Oriented Graduates — science education is designed to create a mindset of optimism about the future and our ability to meet global challenges.
Differentiation/ accessibility strategies and supports:	I will provide the following supports specifically for students in the following programs: *Special Education:* Additional time on exams, "chunking" of projects into easily managed segments, opportunities to retake tests. *504 Plans:* Additional time on exams, "chunking" of projects into easily managed segments, opportunities to retake tests. *English Language Learners:* Additional language support, help with unfamiliar terms, written notes and additional time on projects/tests. *Talented & Gifted:* Opportunities for "honors" work and extra credit going beyond the basic expectations of the class. *Differentiation:* The nature of inquiry labs and the emphasis on writing projects (in the form of science journal articles) a re inter allow students to go beyond the "bare bones" of the class and challenge themselves to come up with their own procedures and conduct research outside class. Honors will be available to students who complete additional pr including an optional video project of science fair project.
Personalized Learning Graduation Requirements (as applicable in this course):	• Career Related Learning Experience (CRLE) #1 • Career Related Learning Experience (CRLE) #2 *-The experience(s) will be:* • Complete a resume • Complete the My Plan Essay

8/27 Work

Section 4: Cultivating Culturally Sustaining Communities

Tier 1 SEL Strategies	
Shared Agreements	I will facilitate the creation of our Shared Agreements that respects and celebrates each student's race, ability, language, and gender in the following way(s): • We will work collaboratively to brainstorm rules and norms that celebrate student diversity. • We will incorporate rules developed into a consensus document that all students agree to.
	I will display our Agreements in the following locations: • In the classroom • In our Canvas online "classroom."
	My plan for ongoing feedback through year on their effectiveness is: I will maintain a good relationship with the students, checking in with them as the year progresses and soliciting their opinions on how well the classroom agreements are working.
Student's Perspective & Needs	I will cultivate culturally sustaining relationships with students by: • I have solicited information on their preferences and attitudes towards learning with a "Getting to Know You" document. I will work to incorporate their lived experiences and cultural references that are relevant to them. • I will use a mixture of teaching techniques, including story-telling and alternative ways of showing understanding.

	Families can communicate what they know of their student's needs with me in the following ways: • Remind • My email: dstroup@pps.net.
Empowering Students	I will celebrate student successes in the following ways: • Many assignments will be in the form of projects that will be displayed in the classroom. • I will personally talk with students to acknowledge when they do well.
	I will solicit student feedback on my pedagogy, policies and practices by: • Personal conversations. • Openness to feedback through Remind and other channels.
	When class agreements aren't maintained (i.e. behavior) by a student I will approach it in the following ways: • I will remind the class of our agreements. • I will talk individually with a student who may not be following our agreements. • I will communicate with parents and counselors when a problem is serious.
Showcasing Student Assets	I will provided opportunities for students to choose to share and showcase their work by: • Offering options for turning in some work — e.g. to deliver a project in class, or individually to me if talking in class makes the student uncomfortable.

	• Displaying projects in the classroom.

Section 5: Classroom Specific Procedures

Safety issues and requirements (if applicable):	**Safety:** Since this is a laboratory class, students are expected to adhere to common sense safety rules for their protection as well as the protection of others in the classroom, no running, or using equipment as a toy or weapon. We will use lasers in this class, and their improper use can result in eye damage; unsafe behavior may result in removal from the lab! Respect for lab equipment is imperative, and deliberate mistreatment of lab equipment will also result in exclusion from labs until it is determined that the student can be trusted. The student or group of students responsible for broken equipment will be charged for its replacement. COVID Safety: • Masks must be worn at all times, over mouth *and* nose. Opportunities will be provided to e.g. drink water, etc. • At least one meter of separation will be maintained at all times when it is possible. • There will be no maskless eating in the classroom.
Coming & Going from class	I understand the importance of students taking care of their needs. Please use the following guidelines when coming and going from class: • Please arrive ready to learn! Be prepared to answer in discussion, and to set aside conversations with friends once we start class. • When leaving class during the period (e.g. a restroom break), check with the teacher and obtain a written hall pass. • Wait for the end-of-class bell without crowding near the door (practice social distancing!) and make your way without crowding to the next class.
Submitting Work	I will collect work from students in the following way:

	Work is primarily turned into me directly. When needed (if a student is home sick or in quarantine, or for certain online projects) some assignments may be turned in through Canvas.
	If a student misses a deadline, I will partner with the student in the following ways so they have the ability to demonstrate their abilities: Students are always given a chance to make up missing work. Older assignments remain available in Canvas. Students who miss an assignment must negotiate anew due date with me, and create a new due date that they agree to adhere to. Some formative assignments and quizzes may be dropped to help a student catch up with summative work (e.g. exams and major projects) that make up the majority of the grade. Although the grading is "A to F," the class is "performance based" in that in the end it is proof of proficiency on key tests and projects that will determine the grade.
Returning Your Work	My plan to return student work is the following: Work is returned as soon after grading as possible. Projects and papers are returned with mark-up to provide feedback. Some tests may be temporarily returned so that students can peruse them while we discuss the class in class, and then collected again.
Formatting Work *(if applicable)*	Directions on how to format submitted work (ex. formal papers, lab reports, etc) can be found here: Any work requiring specific formatting will be discussed in class in advance, and clear rubrics and graphic organizers will be provided (which the student should keep in their portfolio/three-ring binder).
Attendance	If a student is absent, I can help them get caught up by: All material will be available in the Canvas version of the class, and students who are behind can get caught up at any time.

Section 6: Course Resources & Materials

Materials Provided	I will provided the following materials to students: • Classroom set of textbooks. • Access to lab materials. • Downloadable free textbooks (OpenStax College Physics for AP Courses).
Materials Needed	Please have the following materials for this course:

	• Scientific Calculator (graphing preferred). • A composition book (stitched) or similar book to serve as a lab note-book. You may be asked about lab results on a test, in which case that part of the test will be 'open notebook' for this book — so you'd better have it on you. • Some way of taking and keeping notes separate from the lab notebook. • A three ring binder WITH DIVIDERS to keep handouts and homework, AP documents, formal lab write-ups, and tests. You will be expected to maintain this jotebook by the instructor *and possibly by your college*, if you want college credit for this course! *Franklin can help with any materials you may need as well. Please reach out to me privately and I will help you get what you need.*
Course Resources	Here is a link to resources that are helpful to students during this course: **The OpenStax collection for AP Physics:** https://openstax.org/details/books/college-physics-ap-courses
Empowering Families	The following are resources available for families to assist and support students through the course: For additional understanding of physics, practice problems, examples, and tutorials, I recommend the Physics Classroom online: https://www.physicsclassroom.com/
Section 7: Assessment of Progress and Achievement	
Formative Assessments	As students move through the learning journey during specific units/topics, I will assess & communicate their *progress* in the following ways: • Feedback on work completes. • Up-to-date grades in Synergy.
Summative Assessments	As we complete specific units/topics I will provide the following types of opportunities for students to provide evidence of their *learned* abilities: In addition to work in class (projects, labs, and assessments), I will provide opportunities for extra credit.

Student Role in Assessment	Students and I will partner to determine how they can demonstrate their abilities in the following ways: Students will have the opportunity to work with me and my feedback to redo work and revise papers.

Section 8: Grades
Progress Report Cards & Final Report Cards

Accessing Grades	Students & Families can go to the following location for up-to-date information about their grades throughout the semester: Synergy (FHS's online parent and student portal for grades and attendance).
	I will update student grades at the following frequency: Grades are updated as soon after assignments are turned in as is possible.
Progress Reports	I will communicate the following marks on a progress report: I use standard letter grades. An "A" in an AP course indicates a high level of understanding of and mastery over the material. Because of the way assignments and grades are weighted, it is rare for a student to have a grade of "F" (below 60%) unless they are missing one or more major grades (tests or quarter projects) completely.
Final Report Card Grades	The following system is used to determine a student's grade at the end of the semester: A: 90–100% B: 80–89% C: 70–79% D: 60–69% F: <60% *Evaluation:* • Tests 45% • Labs Papers: 45% • Bi-weekly quizzes, "pop" quizzes (waem-ups and exit tickets), lab hand outs, other projects: 10% This break-down is approximate. **Homework** will be issued in the form of packets at the start of each unit, and/or assigned online (as those resources become available). It will be discussed in class and collected, and may be entered in the

	gradebook for a small number of points. Homework packets include an answer key, so to get credit for having done the homework you must, naturally, show all work. You must be up to date on homework to take advantage of options like re-tests and test corrections. Not up to date? Get up to date! **Tests** are at the end of major units. Re-tests are allowed with no penalty, but only if you are up to date on all homework and papers! The first semester final will be a larger test with cumulative elements; there will be no final for everyone who takes the AP test. If you do not take the AP test, there will be a final. **Lab Papers** are major projects, and are considered to be an important summative (test-like) component of the hands-on lab practices part of this class. In other words, you demonstrate that you "get" this part of the class by doing the paper. There will be just four of these papers throughout the year, and they will be in science journal format. The intent will be for you to learn to do college-level work in this format. Don't panic if you don't know this yet! Before your first paper is due we will discuss this extensively, read sample papers, and go over a rubric for the work you are expected to do. We'll learn it together. **If you turn in the paper on time** you will be allowed to revise for points. If you don't get it in in on time you still owe me a paper—see me to make a commitment as to when you will turn it in. **Quizzes** are about every two weeks, and are a "quick check" for what we learned over the past two weeks. If you do better on the test than you did on the quiz, I may drop the quiz. **Pop quizzes** include 'warm-ups' and 'exit tickets.' They will be irregular, filling in between tests and quizzes, and aren't worth a lot of points. There are no re-takes on pop quizzes. In addition to tests and quizzes, **pre-assessments** will be delivered before key units, including the unit on Newton's physics, forces, and gravity. In addition, **we will be using new on-line resources** (especially periodic self-checks and workbooks) provided by the AP College Board. These resources were just made available to us in August, so we will be rolling out their use as the year goes on.
	I use this system for the following reasons/each of these grade marks mean the following: This system is easiest for parents and students to understand, and is what students can expect to see in college.
Other Needed info (if applicable)	
	This course has a strong college-level writing component, so expectations for labs and lab papers deserve special attention:

Lab papers, rubric, and format:

Although participation in all labs is mandatory (and anything covered in a lab is fair game on a test), only two full lab write-ups will be assigned per semester. Each will be worth 100 points. The expected format is based on the expectations of college lab courses. We will go over this at length and do practice pre-write exercises! Here is a sample resource for this style of writing and why it is important: http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWsections.html

I expect the whole report to be **at least three pages in length**, typed, in a readable font, with normal margins, etc. Three pages is an absolute minimum! I will reject it (and tell you top try again) if it isn't at least three full pages. Not two and a bit! Not two and ¾!

Instead of individual paragraphs for items like hypothesis, background, etc, the report should have these parts:

0) The report needs a title, your name, date, and period. In addition, it needs an **abstract** — a short (two to five sentence) summary of the entire paper. It should state what you did and what your results were in a brief, clear fashion. A very simple example would be "We investigated force and acceleration with cart and weights. We determined that F=ma and confirmed Newton's second law." (5 pts.)

1) Introduction: A statement of the question to be tested, why it is important, and any relevant background, as well as your hypothesis. This is one area where you could do a little research and cite a source to list in your References section (below). (15 pts.)

2) Methods and materials: This is where you explain what you did and how you did it. Include a discussion of your materials, how you conducted the experiment, and any modifications you had to make along the way. **At least one illustration is mandatory here**; it may be a hand drawing, an illustration done in Word or with another application, or a well-labeled and clear photograph with explanatory text. (25 pts.)

3) Results: Include a narrative of what you found along with all relevant data. Use whatever combinations of graphs, tables and photographs you need. Anything you show (in a table or graph, for example) should also be explained in the narrative. In other words, don't just say "see fig. 1," write something along the lines of "as you can see from fig. 1, we found that force increases…" etc. Make sure all graphs and tables are properly labeled and explained. (30 pts.)

4) Discussion and conclusions: Discuss what you found **and what it means**. Make a scientific argument: "We claim we found X, our evidence was Y, and we think our evidence means we're right because…" Analyze error. This is another area where you could do some research, find someone else's findings, and cite that source, listing it in your References section (below). (20 pts.)

5) References: I expect you to provice at least one reference (more on later papers), in proper format (see owl.english.purdue.edu/owl/ if necessary). This may be an on-line source, but you already know Wikipedia doesn't count, right? Good. (5 pts.)

Academic honesty on lab papers: Just to be absolutely clear about this, plagiarism is considered academic

	dishonesty. Any material quoted from another source must be placed in quotation marks (or otherwise set off from the text by font choice, indentation, etc.) and properly attributed, and quoted material should be kept to a minimum — less than 10% of the word count. You should also provide attribution for your sources, even if you didn't quote directly from them (and you get points for doing so in the "References" section). Copying from another student is also plagiarism! As a resource, here's one good guide to plagiarism from a college you may have heard of: http://usingsources.fas.harvard.edu/icb/icb.do?keyword=k70847&pageid=icb.page342054