Andrew J Hamm
Physics, Chemistry, Math Teacher
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AP Physics Syllabus

2018-2019

AP Physics is a course in Physics that covers Newtonian Mechanics, dynamics, energy, momentum, rotational kinematics and dynamics, waves, and introductory electricity concepts. Success in this course requires hard work and dedication. You should expect I strongly recommend you to form study groups with your classmates. If you ever have questions, including homework questions and conceptual questions**, do not hesitate to ask me!**

Textbook: Serway, Raymond A., and Chris Vuille. *College Physics*. 8th ed. Belmont, CA: Brooks/Cole, Cengage Learning, 2009.

Standards-Based Grading

I will be using Standards-Based Grading into this course. There are several reasons for this research-based[1] grading method, including:

- The qualitative differences between the grades A, B, C, D, and F are clarified for students and parents, reducing questions and confusion about grades
- More data is provided to me about student learning, allowing me to adjust instruction based on student learning
- Students focus shifts from grades to learning by providing students multiple opportunities to demonstrate proficiency in the standards
- Student grades are calculated based on final student proficiency, not an average of all grades earned during the quarter
- Student grades become much more consistent by reducing subjectivity and clarifying student objectives for learning
- Students are encouraged to develop a high level of critical-thinking skills, preparing them well for life after high school

Students will earn a score of from 0.0 – 4.0 for each objective in the course on an assessment[1]. Students will have one in-class assessment on each objective and will be allowed re-assessments only when showing proof of completed practice. Students must initiate each re-assessment. Midterm (1st and 3rd quarters) and Final (2nd and 4th quarters) exams will include an additional opportunity to demonstrate emerging understanding of these standards, with a maximum score of 2.0 possible on standards assessed on these exams (due to their multiple-choice nature).

The student's ***highest score*** on every standard will be recorded for grading purposes.

Scale	Description
4.0	Student can demonstrate a complete understanding of all topics related to the standard. Student can also apply knowledge of the standard to situations not specifically described in class without any assistance.
3.0	Student can demonstrate a complete understanding of all topics related to the standard without any assistance.
2.0	With help student can demonstrate complete understanding of standard or student demonstrates partial understanding of standard without any help
1.0	With help student can demonstrate partial understanding of standard
0.0	Even with help, student cannot demonstrate any understanding of standard

Half-steps (3.5, 2.5, 1.5, 0.5) are earned for non-conceptual errors (algebra mistakes, calculator mistakes, etc.)

[1] Marzano, Robert J. *Formative Assessment & Standards-based Grading.* Bloomington, IN: Marzano Research Laboratory, 2010. Print.

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Letter grades will still be assigned in this course each quarter, with the semester grades resulting in awarding of credit and remaining on the student's transcript. ***Standards-Based Grading of Content Objectives will be worth 50% of the overall grade.*** The following qualitative definitions of grades will be used in this course, and are based on Marzano's research:

Letter Grade	Standard Average	Letter Grade	Standard Average
A+	4.0	C	2.50 - 2.64
A	3.60 - 3.99	C-	2.40 - 2.49
A-	3.40 - 3.59	D+	2.30 - 2.39
B+	3.20 - 3.39	D	2.15 - 2.29
B	3.00 - 3.19	D-	2.00 – 2.14
B-	2.80 - 2.99	F	0 – 1.99
C+	2.65 - 2.79		

Grades will be calculated using the following weights:

Standards-Based Content Objectives	50%
Standards-Based Laboratory Objectives	20%
Summative Assessments	15%
Midterm/Final Exam	15%

Summative Assessments and Midterm/Final Exams will be standards-based and completed in class. Summative Assessments will allow for one retake per standard to be initiated by the student.

Feel free to contact me if you have questions. E-mail is preferred.

Teacher:	Mr. Hamm	**E-mail:**	andyha@boyceville.k12.wi.us
School Phone:	715-643-3647 x432	**Website:**	http://www.boycevillescience.com

Mr. Hamm is available for student questions and assistance before school by appointment from 7:30 - 8:05 as well as during his advertised preparation period. Appointments are needed because this is also the time where Mr. Hamm will be preparing for classes, including making copies and creating other instructional materials, meeting administrative requirements, contacting parents, and examining new technologies and classroom materials. Daily intervention time is also an opportunity for student assistance. Mr. Hamm is rarely available after school due to other commitments.

Attendance Expectations

Regular attendance is **very important** to success in this course. Please do your best to attend class every day. If you cannot attend class, please get any notes missed from a friend or the class website and copy them into your notebook as soon as possible. ***Students must be seated in their seats and ready to learn when the bell rings or they will be marked tardy*** and will be disciplined starting at step one and increasing steps for every subsequent unexcused tardy.

Students that miss an assessment due to an excused absence must make the assessment up on their own time within two days of returning to class. Failure to make up the assessment will result in a loss of the first opportunity to demonstrate mastery of the objectives and will result in the student needing to complete the practice assignments and complete a re-assessment.

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Classroom Behavior Expectations

- Respect everyone, including the teacher, other teachers, staff, administrators, other students, and yourself *at all times*.
- Put forth your best effort *at all times.*
- Ask questions if you are confused, need something clarified, or seek help…I am here to help!

Specific Classroom Rules

- Raise your hand to talk and respect others while they talk, including the teacher.
- This class is not your nap time. Please refrain from sleeping *at all times.*
- Cheating is **not tolerated under any circumstances** and will result in an automatic zero and referral under the district/school policy. Talking is **not allowed** during assessments.
- Please come to class prepared to learn *every day*. This includes bringing a pencil, a notebook, your textbook, your folder/binder, and any completed practice. ***You will not be allowed to go to your locker if you forget anything.***
- Students on the weekly detention list are not allowed to leave the classroom.
- Stay on task! If you are given time to work on practice, then work on practice. If you should be taking notes, then take notes. If you have a question, ask Mr. Hamm! Come to class on time. You must be seated in your seat ready to learn when the bell rings or you will be marked tardy. Unexcused tardiness will not be tolerated.
- The tools available in the classroom are for everyone's use. Please do not remove anything from the classroom without Mr. Hamm's permission.
- Keep your area clean. You are asked to clean your area at the end of the period and make sure that it at least as clean as it was when you arrived.
- Keep your cell phone out of the room or packed away. I don't want to see it!
- Be respectful to substitute instructors. Any students who cause problems for a substitute teacher will automatically escalate to step 2.

Classroom Consequences

Step 1: You will serve 30 minutes with Mr. Hamm before school. You will lose all pass privileges for the remainder of the quarter and must remain in the classroom for the entire period.

Step 2: You will serve 60 minutes of detention with Mr. Hamm before school. Additionally, your parents will be contacted regarding your behavior. Failure to serve your time results in an escalation to Step 3.

Step 3. You will be required to attend a parent/student/teacher conference to discuss your behavior and the options available to you to improve your behavior. This conference will be set up after your parents have been contacted and will be completed as soon as possible. A Behavior Improvement Plan will be designed during this conference. Failure to adhere to the plan will result in an escalation to Step 4

Step 4. You will be referred to the appropriate administrator and your parents will be contacted and informed that you have violated the plan. Significant violations will result in an escalation to step 4. All further disciplinary action will be handled by the appropriate administrator and the instructor.

Positive behavior will be rewarded in a variety of ways, which will be communicated to students each quarter. Students with no disciplinary actions in class each quarter will be eligible for the positive behavior rewards. Disciplinary actions in regards to positive behavior will be reset every quarter.

Laboratory Expectations

All laboratory reports will be written in pen in a composition-style notebook, with writing on only one side of each page. These lab reports will be graded according to the rubric that students will be provided with at the beginning of the course. There is a sample laboratory activity in the lab manuals that students are given at the beginning of the course. Safety is the most important concern in the laboratory environment and unsafe actions or procedures will be corrected immediately. Horseplay in the lab will not be tolerated and will be resolved immediately and repeated issues may result in the removal of the student from the course.

Electronic Device Expectations

Possession and/or use of a cell phone is not required or needed to complete the math curriculum at Boyceville High School. Students are expected to keep their phones and other small personal electronic devices in their locker unless prior approval is obtained from the instructor and all electronic devices must be registered according to school policy. Any student in violation of this policy will have their phone taken away and the student handbook guidelines will be applied.

Laptops, IPADs, and other tablets or similar (non-small) electronic devices may be used throughout the year in class. Any student wishing to use personal electronic devices must have the approval of the instructor before they will be allowed to be used in class and these devices must be registered according to school policy.

Resource Expectations

The following materials will be needed for this course:

- One two-inch binder or larger for handouts and assignments
- One 70-page spiral notebook for note-taking
- White loose-leaf paper for assignments
- A scientific calculator though a graphing calculator (TI-83 or similar) is highly recommended
- Several pens for writing laboratory reports
- A composition-style notebook for laboratory reports
- Several pencils for completing assessments, taking notes, and completing practice assignments.

General Course Timeline Expectations

The content and laboratory practice standards for this course are listed on the coming pages. Below is a tentative timeline for standards per quarter

Quarter 1: 1.1 through 4.8, L1 through L5, P1
Quarter 2: 4.9 through 7.5, L6 through L7, P2
Quarter 3: 8.1 through 11.4, L8 through L11
Quarter 4: 12.1 through 12.5, L12 through L14, Preparation for AP Test in May

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AP Physics 1 Standards

1.1	Identify the seven fundamental SI units and use dimensional analysis to convert units.
1.2	Use orders of magnitude to estimate very large or very small quantities.
1.3	Use trigonometry to solve right triangle problems.
2.1	Differentiate among displacement, distance, velocity, speed, average velocity, average speed, and average acceleration.
2.2	Determine the displacement, average velocity, instantaneous velocity, average acceleration, and instantaneous acceleration from a graph.
2.3	Use the three basic kinematic equations to describe motion in a straight line under constant acceleration.
2.4	Define free fall and apply the kinematic equations to describe the motion of objects in free fall.
3.1	Define a vector and resolve a vector into its *x* and *y* components.
3.2	Apply the mathematical processes of addition, subtraction, and scalar multiplication on vectors.
3.3	Differentiate among the three types of projectile problems.
3.4	Use the kinematic equations to describe the motion of type I projectiles.
3.5	Use the kinematic equations to describe the motion of type II projectiles.
3.6	Use the kinematic equations to describe the motion of type III projectiles.
3.7	Use the kinematic equations to describe the motion of all types of projectiles.
3.8	Define frame of reference and use it to solve relative velocity problems.
4.1	Differentiate among Newton's Three Laws of Motion and apply the concept of a force.
4.2	Draw a free body diagram to represent all forces acting on an object.
4.3	Use Newton's Second Law of Motion to describe the motion of an object being acted upon by a force.
4.4	Use Newton's Law of Gravitation to calculate the gravitational force between two objects.
4.5	Use Newton's Third Law of Motion to describe the motion of a two-object system in contact with each other when acted upon by a force.
4.6	Use vectors and free body diagrams to describe the forces involved in simple statics situations.
4.7	Use vectors and free body diagrams to describe the forces involved in more complex statics situations.
4.8	Use Newton's Second Law of Motion and free body diagrams to describe the motion of two bodies within a system in a frictionless environment.
4.9	Define the frictional force and differentiate between static and kinetic friction.
4.10	Use Newton's Second Law of Motion and free body diagrams to describe the motion of two bodies within a simple system in a friction environment.
4.11	Use Newton's Second Law of Motion and free body diagrams to describe the motion of two bodies within a complex system in a friction environment.
4.12	Define contact forces and explain how they arise from interatomic electric forces and therefore have certain directions.
5.1	Define energy, the types of energy, and relate energy to work.
5.2	Differentiate between kinetic and potential energy, and use the Work-Energy theorem to relate mechanical energy to work.
5.3	Calculate the work done to move an object.
5.4	Calculate the mechanical energy (both kinetic and potential) associated with an object.
5.5	Use the conservation of mechanical energy to describe the motion of an object.
5.6	Use Hooke's Law to describe the motion of an object connected to a spring.
5.7	Calculate the potential energy of an object with internal potential energy (e.g., spring, bomb) and use it to describe the object's motion.

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5.8	Calculate the power delivered to an object by a force.
5.9	Use graphical representations to determine energy transfer or work done on an object.
6.1	Calculate the linear momentum of an object and relate it to force using the impulse-momentum theorem.
6.2	Use the law of conservation of linear momentum to describe the motion of an object that exerts an external force.
6.3	Use graphical representations of force vs. time to predict changes in the momentum of a system.
6.4	Use the law of conservation of linear momentum to describe the motion of two objects involved in an inelastic collision.
6.5	Use the law of conservation of linear momentum to describe the motion of two objects involved in an elastic collision.
6.6	Use the law of conservation of linear momentum to describe the motion of two objects involved in a glancing (2D) collision.
7.1	Relate the angular variables of position, displacement, velocity, and acceleration to their linear counterparts.
7.2	Calculate the centripetal acceleration of an object moving in a circlular path and relate it to the centripetal force.
7.3	Use Newton's Law of Gravitation and the centripetal force to describe orbital motion.
7.4	Use Newton's Law of Gravitation to calculate the gravitational potential energy associated with an object a large distance from Earth.
7.5	Use Newton's Law of Gravitation to calculate the escape speed from a planet.
8.1	Relate torque to force and use it to describe the motion of rotating objects.
8.2	Use rotational equilibrium to calculate the center of mass of an object or system of objects.
8.3	Use rotational equilibrium to describe situations where systems of objects are in static equilibrium.
8.4	Use rotational equilibrium to describe situations involving ladders.
8.5	Relate torque to angular acceleration through the moment of inertia, and calculate a simple object's moment of inertia.
8.6	Calculate rotational kinetic inergy for an object and apply it to describe the motion of a rotating object.
8.7	Calculate the angular momentum for an object and apply it to describe the motion of a rotating object.
8.8	Use the conservation of angular momentum to describe the motion of a rotating object.
9.1	Define simple harmonic motion and use it to describe the motion of a harmonic oscillator.
9.2	Calculate the period and frequency and describe the motion of a simple harmonic spring oscillator
9.3	Calculate the period and frequency and describe the motion of a simple pendulum.
9.4	Define a wave as a transfer of energy, differentiate among types of waves, and identify the parts of a wave.
9.5	Use the wave equation to describe the motion of a wave.
9.6	Use the principal of superposition to describe the interference of waves.
10.1	Describe sound waves and relate them to the vibratory motions of molecules.
10.2	Apply standing wave concepts to describe the motion of a standing wave with two fixed ends.
10.3	Apply standing wave concepts to describe the motion of a standing wave with one fixed end and one open end.
10.4	Apply standing wave concepts to describe the motion of a standing wave with two open ends.
10.5	Define beats and relate them to interference and frequency.
11.1	Relate the concept of electricity to the movement of electrons and describe basic electrostatics concepts.
11.2	Use Coulomb's Law to calculate the electrostatic force and describe the motion of electrically-charged objects.
11.3	Calculate the electric field around a point charge and use it to describe the motion of electrically-charged objects in the vicinity.
11.4	Draw electric field lines around a point charge to qualitatively describe the motion of electrically-charged objects in the vicinity.
12.1	Define electrical current and relate it to the motion of electrons and electric charge.

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12.2	Define electrical resistance and use resistivity to calculate the resistance of a substance, relating it to intermolecular forces.
12.3	Use Ohm's Law to describe the motion of electrons in a simple electronic circuit.
12.4	Using the concepts of potential difference, resistance, current, and electrical power, describe the resultant effect of a simple electronic circuit.
12.5	Use Kirchoff's loop and junction rules to describe the resultant effect of a complex electronic circuit.
L1	Use technology to graph motion
L2	Use kinematics to describe motion experimentally
L3	Use a force table to describe the vector addition of forces
L4	Experimentally determine the coefficient of friction
L5	Experimentally determine the factors that affect the acceleration of a system
L6	Use springs to experimentally verify the conservation of energy
L7	Use collisions on a low friction track to verify conservation of linear momentum
L8	Use torques and rotational equilibrium to experimentally find the certer of gravity of an object
L9	Determine the period of harmonic motion of a pendulum experimentally
L10	Determine the relationship between the tension and the wavelength of a standing wave experimentally
L11	Experimentally determine the speed of sound
L12	Compare experimentally determined electric field lines with known patters
L13	Demonstrate proficiency in using voltmeters and ammeters in an electronic circuit
L14	Construct electronic circuits and experimentally verify Kirchoff's Rules
P1	Construct a boomilever to maximize structural efficiency using knowledge of statics
P2	Construct a rubber band powered airplane to maximize lift time using knowledge of forces and free body diagrams

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Please complete, detach, and return this portion of the Course Syllabus to Mr. Hamm

I have read the Course Syllabus and pledge to give my best effort.

_____

Student Printed Name Student Signature Date

I have read the Course Syllabus and will contact Mr. Hamm if I have any questions.

_____

Parent/Guardian Printed Name Parent/Guardian Signature Date