

AP PHYSICS B

Mr. O'Neil

THIS PAPER WILL BE THE FIRST PAGE IN YOUR NOTEBOOK

Name: _____ Period: _____

CONTACT INFORMATION

- E-mail: Matthew_O'Neil@mcpsmd.org
- Science Department Phone: 301-929-2074
- My Office is room 303A

CLASS POLICYEach student must bring the following materials to **every class**

- **Loose-leaf notebook** or **1 subject spiral-binder** for daily notes
- Black/white **Composition Notebook** (*kept in Room 303*)
- pencils
- black or blue pens
- **Scientific calculator** (any calculator with sine, cosine and tangent functions)
- Extra paper
- Equation Sheet (*extras are available in 303, but only **one** copy is yours to keep!*)
- **YOU DO NOT HAVE TO BRING YOUR BOOK TO CLASS!**
*Take your book home and use it to complete the **homework** assignments*

Students are expected to have these materials by the beginning of the second week of the semester. You will receive a notebook grade. This grade will be based on notes taken from the textbook and laboratory journals with or without warning. Homework is not checked daily, but progress checks will be made throughout the semester. The policies in this syllabus is subject to change as per the instructor's judgment.

Your grade for the marking period will be determined as follows:

Tests	30%
Labs & Projects	25%
Quizzes	20%
Journals	15%
Homework	10%

Each **Semester Final Exam (or Final Project)** will account for **25%** of that semester's *overall* grade.

Class Expectations

1. I expect success and achievement from every student.
2. I won't give up on you, but YOU MUST **THINK!!!** I can't do that for you.
3. Every learner, an active learner from bell to bell: You will be in your assigned seat and working when the bell rings to start class until the teacher dismisses class.
4. You will have all your supplies with you everyday (**notebook, pencil, calculator, paper**) Your **Lab Data Book** (composition book) will remain in the class room.
5. Treat yourself and others with respect
(REMEMBER THE GOLDEN RULE: treat others as you would like to be treated).
6. Promptly follow all teacher instructions and safety rules.
7. **NO** eating / drinking in class. (Water bottles **are** allowed.)
8. This course is based on the AP Central Curriculum guide for an Advanced Placement Physics course. You will be graded based on your performance on each individual assignment and **you will not be able to "redo" any assessment** except quizzes.
9. Consider this as a college-level course. Your success in this course will be dependent on your willingness to invest in your own learning. Be an **active** learner. Read the chapter assignments even though they are not always graded; attempt the homework even though it is not collected; ask questions even though you may feel 'foolish' for doing so; work together even if you can't stand each other! In college, and in the "real world" you will have to depend on your own impetus to get where you want to be. Practice that drive now, perfect that drive after high school, and excel driving yourself in the future.

Class Consequences

1. Verbal or written warning
2. Lunch detention and/or phone call home
3. Phone call home
4. Administrative referral (Certain extreme infractions will receive an automatic detention or administrative referral)

NOTICE:

- To show **respect** for your teacher and those next to you, cell phones, music players and all other portable electronic devices should be **turned off** and **out of sight** as soon as you enter my room. Mr. O'Neil may give permission for special occasions.
- Out of **respect**, hats and hoods are also prohibited from being worn and should be removed for the entire school day.
- Be warned that any prohibited device can be **confiscated** on the first offense.

Class Procedures/Rules

Below are certain procedures that we will be using in Physics this year to help the class run smoother. You are not expected to memorize the list it is here for your reference.

1. This course is equivalent to a college-level course. I expect you to be motivated to learn and to conduct yourself in a manner that will only benefit others around you.
2. Be responsible for your own learning and find others you can work with outside of class. You **WILL** have work that must be done outside of the school day. It is up to you if you want to do it all on your own or not.
3. If you are absent it is your responsibility to find out what you missed and get the work at an appropriate time. *NOTE: If you are late 5 times, your grade will fall to an “E” for the semester!*
4. For your safety during Fire drills, Lockdown (Code Red), Shelter (Code Blue) or severe weather emergency: Immediately stop what you are doing and look at the teacher for directions. To ensure that all commands are heard, please **DO NOT SPEAK**. Only follow Mr. O’Neil’s instructions.
5. Students are expected to maintain a **Lab Portfolio** using a Composition Notebook to be provided by the student. The portfolio will remain in Room 303 (unless specific permission is given to remove it) for the entirety of the school year and beyond. *Students will not be permitted to keep the lab reports/data created. These will be used to demonstrate evidence of laboratory experience.*
6. Throughout the year you will be working in groups to perform labs at different times. When in a group you are expected to participate to the fullest of your ability.
7. Any deviation from the safety procedures, inappropriate behavior or unsafe behavior will result in the immediate removal of the student from the lab. Such removals will result in a **ZERO** grade for said lab.
8. **Do not** enter the physics storage room. Also, do not touch the demo table or Demo/lab preps without teacher permission. The computers in the room are to be used **ONLY** when Mr. O’Neil gives instructions for them to be utilized. *Any unauthorized use of the lab computers will result in immediate disciplinary action.*
9. **MONITOR YOUR GRADES** – Daily progress reports will be available on Edline (automatically updated on MTWR at midnight). If your grade falls **below “C” level**, Mr. O’Neil will expect you to come to Room 303 during **lunch** to be tutored/makeup work. Note that on **MONDAYS** the Science department is **CLOSED** to students.
10. Mr. O’Neil will be available to offer help during lunch (Rm 303), after school in the “Homework Center” (Media Center), and on Saturdays with the George B. Thomas Learning Academy (Wheaton HS, Rm 303). **You are not required to attend any help, but it is STRONGLY ENCOURAGED!** I cannot help those that do not ask for help...

What do we study in this course?

AP Physics B

This course is for highly motivated students with interest in the physical sciences. Students should have a knowledge of algebra and basic trigonometry. The course includes topics in both classical and modern physics. Topics include Newtonian mechanics, thermal physics, electricity and magnetism, waves and optics, and atomic and nuclear physics. Students are prepared to take the Advanced Placement Physics B examination at the end of this course.

Content Break-Down

Semester A – Topics Breakdown

TOPIC SETS
Introduction Significant Figures Unit Analysis
Kinematics (1D) Motion Equations Free fall
Kinematics (2D) Projectile Motion
Newton's Laws 3 Laws of Motion Friction 1 st Condition of Equilibrium Static Equilibrium Centripetal Force
Work, Energy, and Power K and U Energy Law of Conservation of Energy Non-Conservative Systems Kinetic Energy Work Theorem
Linear Momentum Conservation of Linear Momentum Impulse – Momentum Theorem Collisions (Elastic vs. Inelastic)

Circular/Rotational Motion Rotational Kinematics Torque 2 nd Condition of Equilibrium
Simple Harmonic Motion Hooke's Law Simple Pendulum Compound Pendulum
Universal Gravitation Law of Universal Gravitation Kepler's Laws Circular Orbits
Fluid Mechanics Hydrostatic Pressure Buoyancy Continuity Theorem Bernoulli's Equation
Temperature and Heat Mechanical Equivalent of Heat Linear/Volumetric Expansion
Kinetic Theory and Thermodynamics PV Diagrams 3 Laws of Thermodynamics Heat Engines
Electrostatics Charge Coulomb's Law Electric Field & Electric Potential
SEMESTER A FINAL EXAM

Semester B – Topics Breakdown

TOPIC SETS
Conductors, Capacitors, Electrostatics w/Conductors Capacitors Potential Capacitance Parallel Plate Capacitors
Electronics Current Resistance & Resistivity Power Ohm's Law for a component
DC Circuits Kirchhoff's Rules DC Circuits with a Capacitor
Magnetostatics Forces on charged particle in Magnetic Fields Forces on Wires in Magnetic Fields Fields of current carrying wires
Electromagnetism Electromagnetic Induction Faraday's Law Lenz's Law
Wave Motion and Sound Properties of Traveling Waves Wave Propagation Properties of Standing Waves Superposition Theory
Wave Optics Interference Diffraction Dispersion Electromagnetic Spectrum
Geometric Optics Reflection & Refraction Mirrors (Planar / Spherical) Lenses (Diverging/Converging)

Atomic and Quantum Physics Photons Photoelectric Effect Energy Levels Wave Particle Duality
Nuclear Physics/Radioactivity Nuclear Reactions Mass-Energy Equivalence
Mock AP Tests (MC and FR)
AP PHYSICS B EXAM
Final Project

Possible LABORATORY EXERCISES may consist of these (and more!)

- | | | |
|----------------------------------|-------------------------|---------------------------------------|
| 1. Density Lab | 9. Ohm's Law | 18. Wave Reflection |
| 2. Inclined Plane | 10. Wheatstone Bridge | 19. Resonance Tube |
| 3. Projectile Motion | 11. Kirchoff's Laws | 20. Refraction Trough |
| 4. Simple Pendulum | 12. RC Time Constant | 21. Young's Double Slit
Experiment |
| 5. Atwood Machine | 13. Mass of an Electron | 22. Photoelectric Effect |
| 6. Ballistic Pendulum | 14. Electric Balance | 23. Young's Modulus |
| 7. Coefficient of
Restitution | 15. Millikan Oil Drop | 24. Atomic Spectra |
| 8. Linear Expansion | 16. Cloud Chamber | 25. Radioactive Decay |
| | 17. Wave motion | |

ONLINE HOMEWORK RESPONSIBILITIES (UT Homework)

In addition to your Lab work and readings, you will be responsible for completing practice homework assignments on the University of Texas's Quest website. This website is specifically registered for Wheaton High School students and will allow you to work on, submit, and verify answers for various Physics problems.

You **WILL** be able to work in groups on these problems and I **STRONGLY** encourage you to work with others!! Each assignment will have **MANY** questions, so working alone will not be very easy to do. Make sure that all questions are at least **ATTEMPTED** before the due date.

Any submissions after the due date will be worth **NO POINTS**. I will release the answer keys to all homework assignments within one week of the due date (to leave room for any excused absences to submit the work).

You can / will work on these problems on your own time, but you are always able to ask me for help during class and/or during lunch and/or after school and/or via Edline and/or via my school email (Matthew_O'Neil@mcpsmd.org)

Name: _____ Period: _____

STUDENT CONTRACT

I _____ hereby acknowledge that I have received, read, and fully understand the Course Syllabus package (including Course Description, Course Materials, Classroom Rules, and Grading System).

I agree to abide by the classroom rules and other class policy, to attend class daily and on time.

Student's Name: _____

Student's Signature: _____ Date: _____

Parent's Name: _____

Parent's Signature: _____ Date: _____

Home Number: _____ Work Number: _____

Cell Phone Number: _____ E-mail address: _____