

AP PHYSICS –B

COURSE DESCRIPTION

-"It is a rough road that leads to the heights of greatness." -Seneca

The AP Physics B course is designed to challenge a wide range of student abilities. Its goal is to foster an atmosphere that supports curiosity, creativity, and absolute wonder about the world. Students will be expected to be active participants in all aspects of the process of developing investigative skills. With these skills, we will be better able to describe the phenomena we encounter and we will have the ability to make insightful predictions about them. In short, as physicists we will be about the business of describing and predicting the world. As the course unfolds we will develop the skills necessary for doing these two things with a high degree of accuracy. Further, we will learn the skills necessary to effectively communicate our findings with others. This includes the ability to express to your opinion, defend your reasoning, articulate an argument and apply ideas in new contexts.

COURSE GOALS: In AP Physics B, students are expected to learn

Skills

- Translate observations of the natural world into words and measurements that permit the student to identify meaningful patterns.
- Develop observed patterns into coherent conceptual models that accurately describe the natural world.
- Test their knowledge of physical concepts by executing controlled experiments in the lab.
- Apply their understanding of nature to the solution of carefully framed quantitative problems, particularly those commonly posed on the AP and SAT II examinations.
- Clearly and accurately communicate you findings to others.
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Knowledge

- Recognize underlying fundamental concepts at work in a complex array of physical phenomena, and form conceptual and mathematical models as a means to interpret the physical behavior.
- Develop and adeptly defend your reasoning and articulate arguments supporting your conclusions.

Habits of mind

- The ability to relate new phenomena to understood phenomena while distinguishing between significant similarities and differences.

COURSE OUTLINE

Text: Physics, Giancoli, 6th edition

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Unit 1: Models of linear motion / Vectors (16 days)

Class Work

Homework

Introductions: Books, syllabus, Survey Diagnostic tests	Review Syllabus, fill out survey Rdg/rfln # start Chapter 1
Discussion of reading, Group challenge: measure lab /metrics Turn in: surveys	Do p16 do every third problem 1,4,7,.... Read Chapter 1
Review/ discussion vectors/ measurement assignment	Do Lab
Review/ discussion vectors/lab assignment Turn in: worksheets	Start reading chapter 2
Review /Discussion/ one D acceleration lab /worksheets	Work on lab calculations
Review &... Intro to motion studies: Constant motion carts Post lab discussion: Types of graphs and math models discussion Turn in: Motion Graphs	Graphical reading Worksheets Read complete chapter 2 Do every third problem in chapter 2
Finish Graph Methods {five typical mathematical models} Intro. Motion maps Discuss motion	Motion map reading WS 1- Constant Velocity
Finish constant v Intro Sonic Ranger/data studio programs Discuss 2.4&2.5	WS 2- Motion maps & Graphs Do 12,14,16,17,18 Ch 2 Read 2.6
Go over WS 2 Review 2.6 Motion Lab 2	WS 3- Constant velocity Read 2.7
Review 2.7-8/ discussion / lab on acceleration due to Gravity	WS on acceleration
Go over results-Post Lab develop motion maps	WS on all 1 D motion
Go over worksheets	Team design challenge- Egg drop Worksheets
Do Team design Challenge: egg drop, Review/discussion	Reading/reflection#1.5 Sections 2.7 – 2.8 (Q: 18, 19. P: 33, 36, 37, 53, 59.) #1.6 challenge Process reflection paper
Lab day with discussion	Review

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Discuss Review Lab Practicum Motion	Study for test, prepare portfolio / prep labs
Test: Models of motion and scientific investigations Turn in: homework and Labs	

Class Work Chapter 3

Homework

Review Test Results-Key questions Prelab demo / 2 D lab on Projectiles	Test Corrections Read Chapter 3
Review / worksheets / lab continued	Concentrate Reading 3.1-3.3 Do every third problem ch 3
Go over Test results/review 31-3.3	worksheets
Review 3.4 -3.6 lab	Do problems white boards
Chapter review	Review for test / prepare portfolio/prep labs
Test chapter 3 / Homework & labs due	
Review test	Test corrections
Chapter 4 Forces and Newtonian Physics	
Introduction of Newton's Laws/ demo /collect corrections	Read sections 4.1-4.3
Discussion/lab / worksheets	Do Do every third problem Read 4.4-4.6
Review / discuss reading/ lab Newton's Law	Read 4.7-4.9
Review/ discuss /lab / worksheets	Ch 4 Do Work sheets
Review/ discuss / lab Atwood Machine / worksheets	worksheets
Lab day Coffee Filter lab	worksheets

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Review/discuss/lab Coefficient of friction lab	worksheets
Review chapter	Study for test Prep portfolio / Prep labs
Test chapter 4 Portfolio / labs due	
Test review	Test corrections
Review lab results Test corrections due	Complete labs for submission

Unit 3- Work energy power Chapter 6 (8 days)

Class Work

Homework

Introduction	Read 6.1 & 6.2
Work sheets/ reading review/lab	Do every third problem Worksheets/read 6.3 & 6.4
Review/ worksheets/ lab	Read 6.5 & 6.6 Worksheets
Review / demo/ lab pulley lab	Read 6.7-6.10
Review / demo/ lab	
Test review	Review for test Ch 6 / prep labs to pass in
Test Chapter 6 Pass in Labs/worksheets	
Chapter 7 IMPULSE & MOMENTUM (6 Days)	Read 7.1-7.2 & Test Corrections
Demo lab / Review/ Test Review	Final Test Corrections Do # 2,7,8,11,13 p 214-215 Do # 16,18,20,22,24
Examples of momentum and Impulse Demo/Review/ lab Conservation of Momentum	Worksheet, read 7.3 & 7.4
Review/lab Collision lab	Do# 27,29,32,36,38 Read 7.5

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Review	Do # 41,42,43,44
Review Chapter	Test review / prep labs/ prep portfolios
Test Chapter 7	
Chapter 5 Circular Motion (4 days)	
Pass pack tests / Intro Ch 5	Test corrections/ read Ch 5.1-5.3
Review test / Review reading/ start Whirligig lab/ worksheet	Prep Final test corrections Do every third problem
Test corrections due / review/Lab	Read 5.4-5.10
Review / lab / worksheets	Re read chapter
Review chapter	Review for test/ prep portfolio/ prep labs
Test Chapter 5 / pass in portfolio / pass in labs	

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Chapter 8 Rotational Kinematics (6 days)

Class Work

Homework

Pass back test/ Intro Kinematics Demo	Read 8.1.8.2 / test corrections
Review test / Review reading	Final test corrections Do# every third problem
Pass in test corrections / review	Read 8.3/8.4
Review/Lab / worksheets	
Review / lab problem in circular kinetics	Read 8.5-8.9
Lab / review/	
Review chapter	Prep for test/ prep labs/ prep portfolio
Test Ch 8 Pass in portfolio . pass in labs	
Chapter 9 Static Equilibrium	Read 9.1-9.2
Review / pass back tests	Test Corrections / Do every third problem Read 9.3& 9.4
Review test / Static lab /demo	final test corrections
Lab/ review Pass in test	Read 9.5 & 9.7
Review / demo / lab	
Review WS/ lab	Complete lab
Review chapter	Prepare for test
Test Ch 9 Turn in: Lab Turn in: Portfolio	

Fluids Chapter 10(6 Days)

Class Work

Homework

Intro. Spring systems Return tests	Do Test corrections , Read 10.1&2
Do Spring lab/ review test	

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Intro Harmonics	Read 10.3&10.4
Continue discussion / demo & film Test corrections due	Read 10.5&10.6
Worksheets, Hooke's Law lab , discussion	Read 10.7 - 10.14
Finish lab / review chapter Turn in: Lab	Review chapter
Test chapter 10 Chapter 11 Vibrations & waves	
Introduction to fluids/ pass back tests	Read 11.1-11.4 Do test corrections
Continue fluid discussion/ Test review	Finalize corrections to test/
Start lab/ discuss readings Test corrections due.	Read 11.5-11.16
Continue discussions/ lab Buoyancy lab	
Continue lab	
Review chapter	
Review problems	Review chapter
Test chapter 11	
Chapter 13 Temperature and heat	Read 12.1-12.4
Length expansion & Turn in: Test Corrections	
Intro Gas Laws	
Continue gas laws Graphs	Rdg/Refl # 5.7 sections 13.1-13.2
Intro Heat engines & Efficiency	Rdg/Refl # 5.8 sections 13.3-14
Energy of engines - Carnot Lab or Sterling engine lab	

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White board various homework questions	Take home test Energy, heat and Thermo.
Chapter 14 Temperature and heat	Read 14.1-14.4
Thermal heat of expansion lab a	
Turn in: Test Corrections	
Heat transfer	
Calorimeter	Rdg/Refl 14.5-8
Conduction/convection	
White board various homework questions	Take home test Energy, heat and Thermo.

Chapter 15 Thermodynamics	Read 15.1-15.4
Thermo lab	
Turn in: Test Corrections	
Heat transfer	
Calorimeter – Combustion thermal lab	Rdg/Refl 14.5-8
Conduction/convection	
White board various homework questions	Take home test Energy, heat and Thermo.

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Unit 7- Models of electricity (18 days)

Class Work

Homework

Go over test material Intro. Electricity and magnetism	Rdg/Rlfn #7.1 Sections 16.1-16.4
Electric fields and field representation	WS 1-Electrostatics
Finish field lines Intro. Coulomb's law WS 2 in class	Rdg/Ref #7.2 Sections 16.5-16.9 HW #7.2 Sections 16.5-16.9 (Q: 1, 8 P: 1-3,5)
Coulomb's law Lab In class examples	Finish WS 2-E fields WS 3- Coulomb's law
E fields and potentials	Rdg/Ref #7.3 Sections 17.1-17.2
Intro. Capacitors – big and small	WS 4 -Potentials
Intro. Electrodynamics	Rdg/Ref #7.4 Sections 17.3-4, 17.7-9
Bulbs and batteries Lab	HW 7.4 (Q: 1, 2, 5, 7, 9. P: 30, 35, 37, 39)
Bulbs and Batteries #2	Rdg/Ref #7.5 Sections 18.1-18.2
Bulbs and Batteries #3 Intro to circuits /Resistance	Rdg/Ref #7.6 Sections 18.3 – 18.4
Continue Resistance & circuits Ohm's Law lab	Rdg/Ref #7.6 Sections 18.3 – 18.4 Work on mini lab report
Finish lab, begin exploration Turn in Ohm's mini-lab	HW #7.6 Sections 18.3 – 18.4 (Q: 3, 6, 9, 11. P: 5, 7, 13)
Intro. to Resistive DC circuit design	Rdg/Ref #7.7 Sections 19.1-19.4
Continue DC circuits Circuit vision software	HW #7.7 Sections 19.1-19.4 (Q: 2-4, 6, 8, 9.)
Circuits mini-lab Capacitors in a circuit Investigation	Rdg/Ref #7.8 Sections 19.5-19.7 Circuit lab work
Continue Capacitors in circuits Turn in: Circuit mini-lab	Hw #7.8 Sections 19.5-19.7 (P: 1, 3, 13-15, 19, 43-45.)
Whiteboard homework/WS questions	Organize portfolio
Test Electric interactions	

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Turn in: Portfolio Unit 7	
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Unit 8- Models of Magnetism (6 days)

Class Work

Homework

Go over test results Intro. Magnetic fields	Test corrections
Continue Intro. To Magnetism	Rdg/Ref #8.1 Sections 20.1– 20.3
Forces on moving charges in B fields Magnetic field lab	HW #8.1 Sections 18.3 – 18.4 (Q: 2, 3, 9. P: 1, 3, 5, 7, 9.)
B field due to current carrying wires	Rdg/Ref #8.2 Sections 20.3-20.4
Continue field in wire Intro. Torque in wire	Rdg/Ref #8.3 Sections 20.5-20.6, 20.12-20.14 HW #8.3 Sections 20.5-20.6, 20.12-20.14 (Q: 11,13. P: 13, 17, 19, 21, 31, 53)
Electromagnetic induction Take-home test	Run/Ref #8.4 Sections 21.1-21.4 , 21.7 Take home test

Unit 9- Models of light (10 days + AP test)

Class Work

Homework

Light as an electromagnetic wave spectrum Turn in: Take-home test	Ref/Ref #9.1 Sections 22.4-22.5 HW #9.1 Sections 22.4-22.5 (Q: 2, 5, P: 10, 11, 13, 15)
Intro. Geometric optics, Mirrors	Ref/Ref #9.2 Sections 23.1-23.3
geometric optics lab Intro. Refraction	WS 1
Continue Refraction	Rdg/Ref #9.3 Sections 23.4-23.6, 23.8
Intro. Lenses	HW #9.3 Sections 23.4-23.6 (P: 9, 13, 27, 31, 34, 37, 41.)
Geometric optics of lenses Turn in: Test corrections	Ref/Ref #9.4 Sections 23.7– 23.8 WS 2
Diffraction of light	Ref/Ref #9.5 Sections 24.3, 24.5-6 HW #9.5 Chapter 24 (Q: 5, P: 3, 5, 13, 19,

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	21, 27.)
Diffraction of light & Color lab	Begin Review Packet
Go over review questions	Continue review packet
Continue review packet Taking the big test	Get a good nights sleep
Chapter 30-31 Nuclear Physics	Read 30-:1-13 Read 31:1-9
	Worksheets
Turn in: Test Corrections	
Photoelectric lab	Homework Do every third problem
Types of decay- Decay lab	Rdg/Refl 14.5-8
½ life	
Fusion / fision	
White board various homework questions	Take home test Energy, heat and Thermo.

Exam Projects (8+ days)

Class Work

Homework

Intro Final exam projects Turn in: Portfolio #9	Begin final project
Project time	final project proposal
Project time	final project proposal
Turn in: Project proposal/timeline	final project
Project time	final project proposal
Project time	final project proposal
Project time	final project proposal

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Presentations	
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EXPECTATION SHEET

Class Safety: AP Physics, as all science courses at Webb, is experimentally based. We will be doing science and will, therefore, be working with delicate equipment, high voltages, and tempting toys. If you follow instructions, work carefully, and use common sense, there will be no danger. Horseplay, foolish behavior, or unauthorized experiments will lead to your not being allowed in the science lab. If you do want to do further experiments with the lab or the demonstration equipment or some totally new experiment not covered in the curriculum, check with me. Almost always something can be worked out under supervision.

Attendance Policy: Attendance and active participation in the laboratory is vital to success in this course. You are expected in class at your seat with materials at the beginning of the period; otherwise you are late. If you are late, bring a note. Every day in science is important. If you are absent, for whatever reason, you will be expected to make up all work. Many absences you will know about beforehand (for example: field trips and away games.) It will be up to you to let me know as far ahead as possible when you will be missing and how you plan to make up the missed work. In most cases, schedule permitting, you will be expected to make up the work during a free period or after school.

Evaluations (Grading):

TESTS (45%): Tests are administered at the end of each major unit, roughly every 3-4 weeks with a great deal of advance notice. Make-up tests will be administered as soon as possible after returning to class. The time and place of the make-up test will be made with the instructor by appointment. Tests will be kept on file for reference.

QUIZZES (20%): Quizzes are given very frequently (as often as three times in a week), and are never announced. They are given at the beginning of class and their time allotment is strictly limited. The quiz is very often a homework problem from the most recent homework assignment or an example problem from a previous class discussion. These quizzes are never made up. If a student misses a quiz because of unexcused absence or tardy, they will receive a zero. If the absence or tardy is excused, the quiz will not be averaged into their grade.

LABS (15%): Lab reports are due after each lab exercise. If the student is legally absent from a lab exercise, it will be made up on their time within the next three class days (generally either before or after school). If they are present for a lab but absent ("excused") on the day the write-up is due, the write-up must be handed in on the day of return. If they are absent ("unexcused") on the day the report is due the grade will be

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lowered accordingly. All laboratory reports must follow the outline provided in the handout titled "Writing a Lab Report". Reports will be incorporated in the student's portfolio after grading.

HOMEWORK (20%): will be maintained in a student portfolio that will be collected the day of a unit test. This will consist of class notes, worksheets, homework problems from the book, and various readings (see next section). Homework is an internal part of the learning process. They must be complete, neat, and worked out as far as possible. Because homework is a learning and growth process, correct answers are not always expected, and full credit will always be given for timely, full efforts.

Readings/Reflections: During the year short selections from various print sources including the textbook will be assigned. The students will be expected to reflect on these readings. The reflections will elaborate on the impact the author had on their understanding of the topic covered, how it integrated into previous knowledge, and what additional thoughts it may have spawned. These readings will be turned in with other homework on the day of the unit test.

Semester and Final Exams

Exams will be given on the final days of the marking periods. They will count 20% toward the semester grade and will be a cumulative. The final exam will take the form of a year-end project. The project will challenge students in all competency areas. The final project will be fully explained at the beginning of the second semester.

Semester Grades

Quarter grades	40 % each
Exam	20%

Number-to-letter grade Conversion: The following scale will determine final course grades

97-100 A+	77- 79 C+
93- 97 A	73- 76 C
90- 92 A-	70- 72 C-
87- 89 B+	67- 69 D+
83- 86 B	63- 66 D
80- 82 B-	60- 62 D- 59 or below F

Open Grade Book: Your marks will be kept on a spreadsheet where they will be computed periodically. You will be given a five-digit identifying code number against which your marks will be posted in the Physics room on a regular basis. Feel free to inquire about your grade at any time.

Equipment for class: All students must come to class equipped¹³ as well as prepared¹³. Proper equipment consists of the following:

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A Pen and a pencil

Calculator must have basic arithmetic functions plus trig functions, log functions, exponential notation.

Textbook may be required only with given notice. (We will be using the textbook as a reference to support classroom lectures and labs. We will also use it for homework assignments when appropriate.

Science Portfolio As new work frequently builds on old, maintaining an organized portfolio is critical in physics. For this reason, you must organize and maintain a dedicated 1”3-ring binder for your class. It should have sectional tab dividers for each unit, and its pages will be accurately numbered. In it students will put readings with reflections, homework, worksheets, and lab reports.

The Honor Code and AP Physics

Tests, exams, and quizzes of course, are to be done by you and you alone. Lab reports (mostly), homework, and various projects however, should be done with lab partners or other classmates. The interactions in these settings have opportunity to provide a deeper understanding and insights to the material than you would gain otherwise. In these interactions there is a responsibility to be an equal participant in the learning process. We are sibilants not parasites! Remember that working together is not just copying -- this is cheating.

Please read the statement of “Academic Honesty” for The Webb Schools. All statements here of course apply to this class. Any violation of Academic Honesty policies will be referred to the Honor Committee or Honor Cabinet.

Detach and return the below section to your instructor

Sign here indicating that you have read and understand all that is included in the Webb AP physics course information and instructions for success document. **DO NOT SIGN IF YOU DO NOT UNDERSTAND!**

Printed Name

Block

Your signature

date

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Parents signature

date

Parents secured email address