

Welcome to AP Physics

Syllabus for 1st Semester

Your teacher will be me, Mr. Dale Brabec. This will be an interesting/exciting/thought provoking class, if you understand the following.

Expectations
1. Respect everybody
2. Be prepared for class
3. Be a good listener.
4. Stay on task.
5. Do a little physics everyday

In this class you will be required to follow **all West High School rules** including the tardy policy.

You might be wondering what will be included in this AP Physics class.

This course provides a systematic introduction to the main principles of physics and emphasizes the development of conceptual understanding and problem-solving ability using algebra and trigonometry, but rarely calculus. In most colleges, this is a one-year terminal course and is not the usual preparation for more advanced physics and engineering courses. However, the B course provides a foundation in physics for students in the life sciences, premedicine, and some applied sciences, as well as other fields not directly related to science.

The Physics B course includes topics in both classical and modern physics. A knowledge of algebra and basic trigonometry is required for the course; the basic ideas of calculus may be introduced in the theoretical development of some physical concepts, such as acceleration and work. Understanding of the basic principles involved and the ability to apply these principles in the solution of problems should be the major goals of the course.

Newtonian Mechanics

35%

A. Kinematics (including vectors, vector algebra, components of vectors, coordinate systems, displacement, velocity, and acceleration)

7%

1. Motion in one dimension
2. Motion in two dimensions, including projectile motion

B. Newton's laws of motion (including friction and centripetal force)

9%

1. Static equilibrium (first law)
2. Dynamics of a single particle (second law)
3. Systems of two or more bodies (third law)

C. Work, energy, power

5%

1. Work and work-energy theorem
2. Forces and potential energy
3. Conservation of energy
4. Power

D. Systems of particles, linear momentum

4%

1. Impulse and momentum
2. Conservation of linear momentum, collisions

E. Circular motion and rotation	4%
1. Uniform circular motion	
2. Torque and rotational statics	
F. Oscillations and gravitation	6%
1. Simple harmonic motion (dynamics and energy relationships)	
2. Mass on a spring	
3. Pendulum and other oscillations	
4. Newton's law of gravity	
5. Orbits of planets and satellites	
a. Circular	
II. Fluid Mechanics and Thermal Physics	15%
A. Fluid Mechanics	6%
1. Hydrostatic pressure	
2. Buoyancy	
3. Fluid flow continuity	
4. Bernoulli's equation	
B. Temperature and heat	2%
1. Mechanical equivalent of heat	
2. Heat transfer and thermal expansion	
C. Kinetic theory and thermodynamics	7%
1. Ideal gases	
a. Kinetic model	
b. Ideal gas law	
2. Laws of thermodynamics	
a. First law (including processes on pV diagrams)	
b. Second law (including heat engines)	
III. Electricity and Magnetism	25%
A. Electrostatics	5%
1. Charge and Coulomb's law	
2. Electric field and electric potential (including point charges)	
B. Conductors, capacitors, dielectrics	4%
1. Electrostatics with conductors	
2. Capacitors	
a. Capacitance	
b. Parallel plate	
C. Electric circuits	7%
1. Current, resistance, power	
2. Steady-state direct current circuits with batteries and resistors only	
3. Capacitors in circuits	
a. Steady state	
D. Magnetic Fields	4%
1. Forces on moving charges in magnetic fields	
2. Forces on current-carrying wires in magnetic fields	
3. Fields of long current-carrying wires	
E. Electromagnetism	5%
1. Electromagnetic induction (including Faraday's law and Lenz's law)	

IV. Waves and Optics **15%**

A. Wave motion (including sound) **5%**

1. Traveling waves
2. Wave propagation
3. Standing waves
4. Superposition

B. Physical optics **5%**

1. Interference and diffraction
2. Dispersion of light and the electromagnetic spectrum

C. Geometric optics **5%**

1. Reflection and refraction
2. Mirrors
3. Lenses

V. Atomic and Nuclear Physics **10%**

A. Atomic physics and quantum effects **7%**

1. Photons, the photoelectric effect, Compton scattering, x-rays
2. Atomic energy levels
3. Wave-particle duality

B. Nuclear physics **3%**

1. Nuclear reactions (including conservation of mass number and charge)
2. Mass-energy equivalence

VI. Laboratory and experimental situations –

- A. Each examination will include one or more questions or parts of questions posed in a laboratory or experimental setting. These questions are classified according to the content area that provides the setting for the situation, and each content area may include such questions. These questions generally assess some understanding of content as well as experimental skills.

You will have to bring certain things to class everyday.

1. Your Physics textbook (Cutnell, John D. and Kenneth W. Johnson, *Physics*, 5th ed. New York, John Wiley & Sons, 2001)
2. Your physics notebook which will include
 - a. Your notes
 - b. Your classwork/homework
 - c. Your tests/quizzes
 - d. Your projects
3. Your physics lab book
4. Pen, paper, and calculator

Attendance policy:

Daily attendance is necessary for success in this class. It is the responsibility of the student to get notes and work if a class is missed. You are expected to be on time for class. Any work or quizzes missed when tardy will receive a 0.

Late work policy:

Work will be due on the day assigned. Late work will be considered at the option of the instructor. You will be allowed 1 day per excused absence day up to a maximum of 4 days to make up work and tests.

Your grade will be based on weighted categories.

Lab/Demos 25%

You will be performing hands-on labs that will help you understand physics concepts. Normally we will have labs once every week or 2. Sometimes you will be working in a group and other times alone. You will have to maintain a formal lab notebook. I will be checking your lab writeup randomly and your weekly quizzes there will normally be a question concerning some aspect of your recent labs/demos. You will be able to use your lab notebook on the quizzes. I will tell you what needs to be included in each lab.

Homework/classwork 25%

Every night you will have homework. Normally this homework will be from your textbook. It is very important to do a little physics homework every night.

Quizzes 25%

You will have a quiz about once a week. These quizzes will be a review of the material recently covered. They will normally be short in length (2-4 questions). I might have shorter quizzes but more frequently.

Tests 25%

You will have test about every 3 weeks. Each test will have a multiple-choice part and a free response part. This is exactly what the AP test will be like. The questions on the tests will be very similar to the AP questions of previous tests.

Grading Scale (this might change)

90 – 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
less than 60%	F

Please take this syllabus home and have your parents read it. If you or your parents have any questions, please contact me at school.

Dale Brabec

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I have read and understand the course syllabus and I accept the expectations associated with this class.

(Student Name, printed)

(Student ID)

(Student Signature)

(Parent Signature)

(Date)