

# AP Physics 2 Syllabus

Mr. Carman

kentschools.net/ccarman

2020-2021

***Please note: this syllabus is subject to change due to COVID-19!***

## Q1 – Particle Physics

### I. Nuclear Physics

- a. atomic number, mass & mass number
- b. nuclear processes
- c. mass-energy equivalence

### II. Atomic Physics

- a. the electron & atomic nucleus
- b. photons & photoelectric effect
- c. quantum effects
- d. DeBroglie wavelength
- e. x-rays & Compton scattering

### III. Thermal Physics

- a. temperature & heat
- b. kinetic theory (gas laws)
- c. thermodynamic processes
- d. First & Second Laws of Thermodynamics

## Q2 – Electricity & Magnetism

### I. Electricity

- a. electrostatics & Coulomb's Law
- b. electric fields & electric potential
- c. capacitors
- d. electric current
- e. Ohm's Law & resistance
- f. DC circuits, schematic diagrams & Kirchhoff's Laws

### II. Magnetism

- a. magnetostatics & magnetic fields
- b. magnetic flux, Faraday's Law & Lenz's Law
- c. induced emf & induced current

## Q3 – Optics & Fluid Physics

### I. Optics

- a. waves (review)
- b. Michelson-Morley experiment
- c. physical optics: slits & filters
- d. electromagnetic spectrum
- e. interference & diffraction
- f. geometric optics: lens & mirrors
- g. reflection & refraction

### II. Fluid Mechanics

- a. density & specific gravity
- b. pressure, Pascal's Law & Bernoulli's Equation
- c. buoyancy, Archimedes' Principle
- d. fluid flow continuity

## Q4 – Review for the AP Exam

### I. Review for the AP Exam

<b>The AP Physics 2 Exam is Wednesday, May 7<sup>th</sup>, 2021 at noon.</b>
--

## “Big Ideas” for AP Physics – from the AP College Board

- **Big Idea 1: Systems**
  - Objects and systems have properties such as mass and charge. Systems may have internal structure.
- **Big Idea 2: Fields**
  - Fields existing in space can be used to explain interactions.
- **Big Idea 3: Forces**
  - The interactions of an object with other objects can be described by forces.
- **Big Idea 4: Interactions**
  - Interactions between systems can result in changes in those systems.
- **Big Idea 5: Conservation**
  - Changes that occur as a result of interactions are constrained by conservation laws.
- **Big Idea 6: Waves**
  - 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: Probability**
  - 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 for AP Physics – from the AP College Board

- 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.