



AP Physics C E&M
Year at a Glance (YAG)
2023-2024



First Semester		Second Semester	
1 st Nine Weeks		3 rd Nine Weeks	
<p>Unit 1 ACT1.1 FIE1.2 CNV1.3 CNV1.4 CNV1.5</p> <p>Unit 2 ACT2.1 CNV2.2 FIE2.3</p>	<p>Unit 1: Electrostatics In Unit 1, students will begin the study of electric force, which acts on all objects with a property called charge. The electric force, in contrast to gravitational force, is one of attraction or repulsion and therefore leads to different effects on objects. This knowledge will help students understand the role electrostatics has in common devices such as photocopiers, defibrillators, and printers, as well as television, radio, and radar industries. In the units that follow, students will apply their knowledge of electric charges and force to electric circuits, and how the motion of electric charges helps create magnetic fields.</p> <p>Unit 2 : Conductors capacitors and dielectrics Previously, students investigated why all objects have an electric charge. In Unit 2, students will examine how that charge can move through an object. Conductors, capacitors, and dielectrics are presented to demonstrate that a charge’s movement is dependent on an object’s material. In electronics, each of these are important based on the type of movement or desired object behavior. Additionally, this unit examines how the behavior of these elements is impacted by electric fields. Students should be provided with opportunities (laboratory investigations or activities) to describe and examine the function of each of these elements, along with capacitors. Knowledge of conductors, capacitors, and dielectrics will prepare students for understanding how electric circuits work in Unit 3 and how they behave when one or more electrical element is altered or modified.</p>	<p>Unit 3 CNG4.1 FIE4.2 FIE4.3 CNV4.4</p>	<p>Unit 4 : Magnetic Fields In previous units, students discovered that the electric field allows charged objects to interact without contact. Unit 4 introduces students to magnetism and how magnetic fields are generated, behave, and relate to electricity. Students will learn how magnetic fields impact motion and interact with other magnetic fields. Laboratory investigations and/or activities should be provided for students to apply both the Biot–Savart Law (using calculations to determine the strength of a magnetic field) and Ampère’s Law (deriving mathematical relationships which relate the magnitude of the magnetic field to current). This knowledge from previous units helps students to make connections between electric fields and magnetic fields as well as between Gauss’s Law and Ampère’s Law.</p>
2 nd Nine Weeks		4 th Nine Weeks	



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<p>Unit 2 ACT2.1 CNV2.2 FIE2.3</p> <p>Unit 3 FIE3.1 CNV3.2 CNV3.3 CNV3.4</p>	<p>Unit 2 : Conductors capacitors and dielectrics (continued)</p> <p>Unit 3 : Electric Circuits Whether or not they're aware, students interact with electric circuits regularly through charging their phones, powering up their laptops, or simply switching on a light. Unit 3 serves to illuminate how, and why, our various appliances function by exploring the nature and importance of electric currents, circuits, and resistance. Through activities and lab investigations, students will have opportunities to relate knowledge across the course by using the electrical components they learned about in Unit 2 and will come to discover in Unit 3 to create, modify, and analyze circuits. Students will also analyze the relationships that exist between current, resistance, and power, in addition to exploring and applying Ohm's Law and Kirchhoff's Rules.</p>	<p>Unit 5 FIE/CNV/ACT 5.1 CNV5.2 CNV5.3</p>	<p>Unit 5: Electromagnetism Throughout the course, students explored the vital roles electricity and magnetism play in our daily lives. Unit 5 examines electromagnetism through the concept of electromagnetic induction and the application of Maxwell's equations. Through activities and detailed laboratory investigations, students will study, apply, and analyze the concept of induction, as well as investigate the relationship between Faraday's Law and Lenz's Law. Additionally, students are expected to call upon their knowledge obtained in earlier units—particularly that of charges, currents, and electric and magnetic fields—to better understand Maxwell's equations and to be able to mathematically demonstrate, as well as reason with, how these fields are generated.</p>
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Resources

1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
<u>Physics for scientists and engineers</u>	<u>Physics for scientists and engineers</u>	<u>Physics for scientists and engineers</u>	<u>Physics for scientists and engineers</u>