A Correlation of

College Physics:
A Strategic Approach

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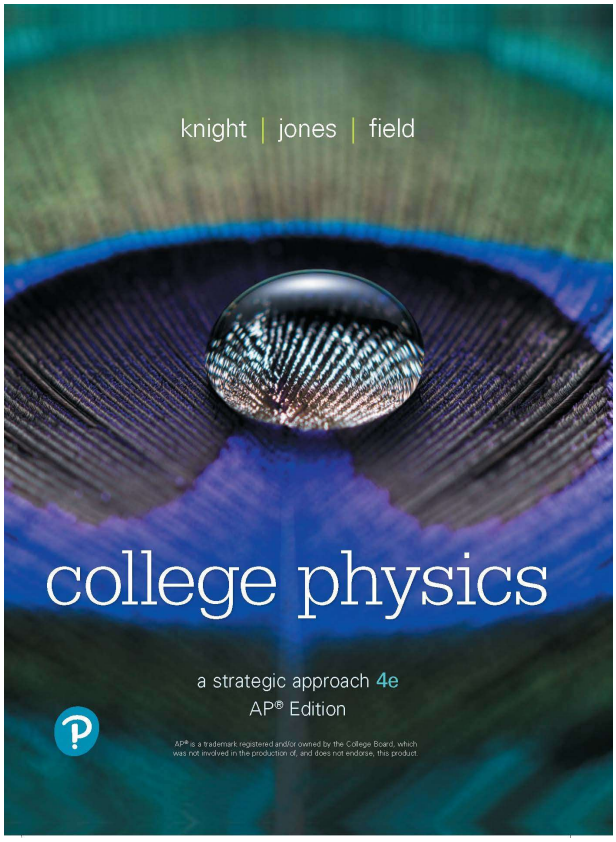

To the

AP® Physics 2
Curriculum Framework
Effective Fall 2019

Pearson

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The units above reflect the College Board's AP® Physics 1 Curriculum Framework.

Big Idea Summary

Big Idea 1: [SYS] Systems
Objects and systems have properties such as mass and charge. Systems may have internal structure.

Big Idea 2: [FLD] Fields
Fields existing in space can be used to explain interactions.

Big Idea 3: [INT] Interactions
The interactions of an object with other objects can be described by forces.

Big Idea 4: [CHA] Change
Interactions between systems can result in changes in those systems.

Big Idea 5: [CON] Conservation
Changes that occur as a result of interactions are constrained by conservation laws.

Big Idea 6: [WAV] 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: [PRO] Probability
The mathematics of probability can be used to describe the behavior of complex systems and to interpret the behavior of quantum mechanical systems.

Unit 1: Fluids (7 topics) AP® Physics 2 Curriculum Framework		
Big Ideas	**Enduring Understandings**	**College Physics: Explore & Apply Chapters, Sections, and Science Practices**

Big Idea 1: [SYS] Systems	**1.A:** The internal structure of a system determines many properties of the system.	1.A.5: Section: 13.2, 13.3, 13.4, 13.5, 13.6 Science Practices: 1.1, 1.4, 7.1 1.E.1: Section: 13.1 Science Practices: 4.1, 4.2, 6.4
Big Idea 3 [INT] Force Interactions	3.A: All forces share certain common characteristics when considered by observers in inertial reference frames.	3.A.2: Section: 13.5, 13.6 Science Practices: 1.1 3.A.3: Section: 13.5, 13.6 Science Practices: 1.4, 6.1, 6.4 3.A.4: Section: 13.5, 13.6, 13.7 Science Practices: 1.4, 6.2, 7.2
	3.B: Classically, the acceleration of an object interacting with other objects can be predicted by using $\vec{a} = \frac{\sum \vec{F}}{m}$.	3.B.1: Section: 13.3, 13.5, 13.6, 13.7 Science Practices: 1.5, 2.2, 6.4, 7.2 3.B.2: Section: 13.5, 13.6 Science Practices: 1.1, 1.4, 2.2
	3.C: At the macroscopic level, forces can be categorized as either long-range (action-at-a-distance) forces or contact forces	3.C.4: Section: 13.1, 13.5, 13.6, 13.7 Science Practices: 6.1, 6.2
Big Idea 5: [CON] Conservation	**5.B:** The energy of a system is conserved.	5.B.10: Section: 14.1, 14.4, 14.5 Science Practices: 2.2, 6.2
	5.F: Classically, the mass of a system is conserved.	5.F.1: Section: 14.2 Science Practices: 2.1, 2.2, 7. 2

Unit 2: Thermodynamics (11 topics) AP® Physics 2 Curriculum Framework		
Big Ideas	**Enduring Understandings**	**College Physics: Explore & Apply Chapters, Sections, and Science Practices**

Big Idea 1: [SYS] Systems	**1.A:** The internal structure of a system determines many properties of the system.	1.A.5: Section: 12.1 Science Practice: 1.1, 1.4, 7.1
	1.E: Materials have many macroscopic properties that result from the arrangement and interactions of the atoms and molecules that make up the material.	1.E.3: Chapter 15.7 Science Practice: 4.1, 4.2, 5.1
Big Idea 3: [INT] Interactions	**3.A:** All forces share certain common characteristics when considered by observers in inertial reference frames.	3.A.2: Sections: 12.2, 12.3, 15.1 Science Practice 1.1 3.A.3 Sections: 12.3, 15.1 Science Practice 1.4, 6.1, 6.4, 7.2 3.A.4: Sections: 12.2, 12.3, 15.1 Science Practice 1.4, 6.2, 6.4, 7.2
	3.B: Classically, the acceleration of an object interacting with other objects can be predicted by using $\vec{a} = \frac{\Sigma \vec{F}}{m}$.	3.B.1: Sections: 12.2, 12.3, 15.1 Science Practice: 1.5, 2.2, 6.4, 7.2 3.B.2: Sections: 12.3, 15.1 Science Practice 1.1, 1.4, 2.2
	3.C: At the macroscopic level, forces can be categorized as either long-range (action-at-a-distance) forces or contact forces.	3.C.4: Sections: 12.2, 12.3 Science Practices: 6.1, 6.2
Big Idea 4 [CHA] Change	**4.C:** Interactions with other objects or systems can change the total energy of a system.	4.C.3: Sections: 15.7, 16.2 Science Practices: 6.4
Big Idea 5: [CON] Conservation	**5.B:** The energy of a system is conserved	5.B.2: Sections: 12.1, 12.8 Science Practices: 1.4, 2.1 5.B.4:

		Sections: 12.8, 15.1 Science Practices: 1.4, 2.1, 2.2, 6.4, 7.2 5.B.5: Sections: 15.1, 15.2, 15.3, 15.4 Science Practices: 2.2, 4.2, 5.1, 6.4, 7.2 5.B.6: Sections: 15.2, 15.7, 16.3 Science Practices: 2.2, 4.2, 5.1, 6.4, 7.2 5.B.7: Sections: 15.3, 15.4, 15.7, 16.1, 16.4 Science Practices: 1.1, 1.4, 2.2, 6.4, 7.2
	5.D: The linear momentum of a system is conserved.	5.D.1: Sections: 12.3 Science Practices: 2.1, 2.2, 6.4 5.D.2: Sections: 12.3 Science Practices: 2.1, 2.2, 6.4, 7.2
Big Idea 7: [PRO] Probability	**7.A:** The properties of an ideal gas can be explained in terms of a small number of macroscopic variables, including temperature and pressure.	7.A.1: Sections: 12.2, 12.3 Science Practices: 1.4, 2.2, 6.4, 7.2 7.A.2: Sections: 12.4, 12.5, 12.6, 12.8, 15.1, 15.2 Science Practices: 7.1 7.A.3: Sections: 12.4, 12.5, 12.7 Science Practices: 3.2, 4.2, 5.1, 6.4, 7.2
	7.B: The tendency of isolated systems to move toward states with higher disorder is described by probability	7.B.1: Sections: 12.4, 15.5, 15.6 Science Practices: 6.2 7.B.2: Sections: 16.1, 16.2, 16.3, 16.4 Science Practices: 7.1

Unit 3: Electric Force, Field, and Potential (13 topics) AP® Physics 2 Curriculum Framework		
Big Ideas	**Enduring Understandings**	**College Physics: Explore & Apply Chapters, Sections, and Science Practices**

Big Idea 1 [SYS] Systems	**1.A:** The internal structure of a system determines many properties of the system.	1.A.5: Chapter: 17.1, 17.3, 18.5 Science Practice: 1.1, 1.4, 7.1
	1.B: Electric charge is a property of an object or system that affects its interactions with other objects or systems containing charge.	1.B.1: Chapter: 17.3 Science Practice: 6.4, 7.2 1.B.2: Chapter: 17.1, 17.2 Science Practice: 6.1, 6.2, 6.4, 7.2 1.B.3: Chapter: 17.2, 17.3 Science Practice: 1.5, 6.1, 7.2
	1.E: Materials have many macroscopic properties that result from the arrangement and interactions of the atoms and molecules that make up the material.	1.E.4: Chapter: 18.6
Big Idea 2: [FLD] Fields	**2.A:** A field associates a value of some physical quantity with every point in space. Field models are useful for describing interactions that occur at a distance (long-range forces), as well as a variety of other physical phenomena.	2.A.1: Sections: 18.1, 18.2 Science Practice: 2.2, 6.4, 7.2
	2.C: An electric field is caused by an object with electric charge.	2.C.1: Sections: 18.1 Science Practice: 2.2 2.C.2: Sections: 18.1 Science Practice: 2.2, 6.2 2.C.3: Sections: 18.1, 18.2, 18.5 Science Practice: 6.2 2.C.4: Sections: 18.1, 18.2 Science Practice: 1.4, 2.2, 6.2, 7.2 2.C.5: Sections: 18.7 Science Practice: 1.1, 2.2, 7.1
	2.E: Physicists often construct a map of isolines connecting points of equal value for some quantity related to a field and use these maps to help visualize the field.	2.E.1: Sections: 18.3 Science Practice: 1.4, 6.4, 7.2 2.E.2:

		Sections: 18.3 Science Practice: 1.4, 6.4, 7.2 2.E.3: Sections: 18.4, 18.7 Science Practice: 1.4, 2.2, 6.4
Big Idea 3: [INT] Interactions	**3.A:** All forces share certain common characteristics when considered by observers in inertial reference frames	3.A.2: Sections: 17.1, 17.2, 17.4, 18.1, 18.2, 18.4 Science Practice: 1.1 3.A.3: Section: 17.1, 17.2, 17.4 Science Practice: 1.4, 6.1, 6.4 3.A.4: Sections: 17.1, 17.2, 17.4 Science Practices: 1.4, 6.2, 6.4, 7.2
	3.B: Classically, the acceleration of an object interacting with other objects can be predicted by using $\vec{a} = \frac{\Sigma \vec{F}}{m}$.	3.B.1: Sections: 17.4, 17.6 Science Practices: 1.5, 2.2, 6.4, 7.2 3.B.2: Sections: 17.4, 17.6 Science Practices: 1.1, 1.4, 2.2
	3.C: At the macroscopic level, forces can be categorized as either long-range (action-at-a-distance) forces or contact forces.	3.C.2: Section: 17.1, 17.2, 17.4, 18.1 Science Practices: 2.2, 6.4, 7.2
	3.G: Certain types of forces are considered fundamental	3.G.1: Section: 18.1, 30.2 Science Practices: 7.1 3.G.1: Section: 17.4, 18.1, 30.2 Science Practices: 7.1
Big Idea 4: [CHA] Change	**4.E:** The electric and magnetic properties of a system can change in response to the presence of, or changes in, other objects or systems.	4.E.3: Section: 17.1, 17.7, 18.5 Science Practices: 1.1, 1.4, 3.2, 4.1, 4.2, 5.1, 5.3, 6.4, 7.1
Big Idea 5: [CON] Conservation	**5.B:** The energy of a system is conserved.	5.B.2: Section: 17.5, 17.6 Science Practices: 1.4, 2.1 5.B.4: Section: 17.5, 17.6, 18.3, 18.4

		Science Practices: 1.4, 2.1, 2.2, 6.4, 7.2 5.B.5: Section: 17.5, 17.6 Science Practices: 2.2, 6.4, 7.2
	5.C: The electric charge of a system is conserved.	5.C.2: Section: 17.2, 17.3, 18.5 Science Practices: 4.1, 4.2, 5.1, 6.4

Unit 4: Electric Circuits (5 topics) AP® Physics 2 Curriculum Framework		
Big Ideas	**Enduring Understandings**	**College Physics: Explore & Apply Chapters, Sections, and Science Practices**
Big Idea 1: [SYS] Systems	**1.B:** Electric charge is a property of an object or system that affects its interactions with other objects or systems containing charge.	1.B.1: Sections: 19.1, 19.3 Science Practices: 6.4, 7.2 1.B.2: Sections: 19.1, 19.3 Science Practices: 6.1, 6.2, 6.4, 7.2
	1.E: Materials have many macroscopic properties that result from the arrangement and interactions of the atoms and molecules that make up the material.	1.E.2: Sections: 19.10 Science Practices: 4.1
Big Idea 4: [CHA] Change	**4.E:** The electric and magnetic properties of a system can change in reonse to the presence of, or changes in, other objects of systems.	4.E.4: Section: 19.4, 19.10 Science Practices: 2.2, 4.1, 4.2, 5.1, 6.4 4.E.5: Sections: 19.4, 19.5, 19.8 Science Practices: 2.2, 4.2, 5.1, 6.4
Big Idea 5: [CON] Conservation	**5.B:** The energy of a system is conserved.	5.B.9: Section: 19.2, 19.5, 19.6, 19.7 Science Practice: 2.1, 2.2, 4.1, 4.2, 5.1, 5.3, 6.4
	5.C: The electric charge of a system is conserved.	5.C.3: Section: 19.7 Science Practices: 1.4, 2.2, 6.4, 7.2

Unit 5: Magnetism and Electromagnetic Induction (8 topics) AP® Physics 2 Curriculum Framework		
Big Ideas	**Enduring Understandings**	**College Physics: Explore & Apply Chapters, Sections, and Science Practices**

Big Idea 1: [SYS] Systems	**1.A:** The internal structure of a system determines many properties of the system.	1.A.5: Sections: 20.7 Science Practices: 1.1, 4.1, 7.1
	1.E: Materials have many macroscopic properties that result from the arrangement and interactions of the atoms and molecules that make up the material.	1.E.5: Sections: 20.5 1.A.6: Sections: 20.7
Big Idea 2: [FLD] Fields	**2.A:** A field associates a value of some physical quantity with every point in space. Field models are useful for describing interactions that occur at a distance (long-range forces) as well as a variety of other physical phenomena.	2.A.1: Sections: 20.2 2.A.2: Sections: 18.3, 20.3
	2.C: An electric field is caused by an object with electric charge.	2.C.4: Sections: 18.1, 18.2, 20.1, 20.3 Science Practices: 2.2, 6.4, 7.2
	2.D: A magnetic field is caused by a magnet or moving electrically charged object. Magnetic fields observed in nature always seem to be produced either by moving charged objects of by magnetic dipoles or combinations of dipoles and never by single poles.	2.D.1: Sections: 20.3, 20.4, 20.5, 20.6 Science Practices: 1.1, 1.2, 1.4, 2.2
Big Idea 3: [INT] Interactions	**3.A:** All forces share certain common characteristics when considered by observers in inertial reference frames.	3.A.2: Sections: 20.3, 20.4, 20.5, 20.6, 21.5 Science Practices: 1.1 3.A.3: Sections: 20.3, 20.4, 20.6, 21.5 Science Practices: 1.4, 6.1, 6.4 3.A.4: Sections: 20.3, 20.4, 20.5, 20.6, 21.5 Science Practices: 1.4, 6.2, 6.4, 7.4

	3.B: Classically, the acceleration of an object interacting with other objects can be predicted by using $\vec{a} = \frac{\sum \vec{F}}{m}$.	3.B.1: Sections: 20.3, 20.4 Science Practices: 1.5, 2.2, 6.4, 7.2 3.B.2: Sections: 20.3, 20.4 Science Practices: 1.5, 2.2, 6.4, 7.2
	3.C: At the macroscopic level, forces can be categorized as either long-range (action-at-a- distance) forces or contact forces.	3.C.3: Sections: 20.1, 20.3, 20.4, 20.5, 20.6, 21.1 Science Practices 4.1
	3.G: Certain types of forces are considered fundamental.	3.G.2: Sections: 20.3, 30.2 Science Practice: 7.1
Big Idea 4: [CHA] Change	**4.E:** The electric and magnetic properties of a system can change in response to the presence of, or changes in, other objects or systems.	4.E.1: Section: 20.7 Science Practices: 1.1, 1.4, 2.2 4.E.2: Sections: 21.1, 21.3, 21.4, 21.5, 21.7 Science Practices: 6.4

Unit 6: Geometric and Physical Optics (6 topics) AP® Physics 1 Curriculum Framework		
Big Ideas	**Enduring Understandings**	**College Physics: Explore & Apply Chapters, Sections, and Science Practices**
Big Idea 6: [WAV] Waves	**6.A:** A wave is a traveling disturbance that transfers energy and momentum	6.A.1: Sections: 11.1, 22.7 Science Practices: 1.2, 5.1, 6.2 6.A.2 Sections: 11.1, 24.1 Science Practices: 6.4, 7.2
	6.B: A periodic wave is one that repeats as a function of both time and position and can be described by its amplitude, frequency, wavelength, speed, and energy.	6.B.3: Sections: 11.2, 11.6 Science Practices: 1.5

	6.C: Only waves exhibit interference and diffraction.	6.C.1: Sections: 11.6, 11.7, 24.4 Science Practices: 1.4, 6.4, 7.2 6.C.2: Sections: 24.5, 24.6 Science Practices: 1.4, 6.4, 7.2 6.C.3: Sections: 24.1, 24.3 Science Practices: 1.4, 6.4 6.C.4: Sections: 11.2, 11.3, 24.2, 24.3 Science Practices: 1.4, 6.4
	6.E: The direction of propagation of a wave such as light may be changed when the wave encounters an interface between two media.	6.E.1: Sections: 11.5, 22.3 Science Practices: 1.4, 6.4 6.E.2: Sections: 22.3, 22.4, 23.4, 23.5, 24.2 Science Practices: 6.4, 7.2 6.E.3: Sections: 22.3, 22.4, 23.4, 23.5, 24.2 Science Practices: 1.1, 1.4, 4.1, 5.1, 5.2, 5.3, 6.4, 7.2 6.E.4: Sections: 23.2, 23.3 Science Practices: 1.4, 2.2, 3.2, 4.1, 5.1, 5.2, 5.3 6.E.5: Sections: 23.4, 23.5, 23.7, 23.8, 23.9 Science Practices: 1.4, 2.2, 3.2, 4.1, 5.1, 5.2, 5.3
	6.F: Electromagnetic radiation can be modeled as waves or as fundamental particles.	6.F.1: Sections: 25.3, 25.4 Science Practices: 1.1, 6.4, 7.2

Unit 7: Quantum, Atomic, and Nuclear Physics (7 topics) AP® Physics 1 Curriculum Framework		
Big Ideas	**Enduring Understandings**	**College Physics: Explore & Apply Chapters, Sections, and Science Practices**
Big Idea 1: [SYS] Systems	**1.A:** The internal structure of a system determines many properties of the system.	1.A.2: Sections: 28.1, 28.2, 30.3 Science Practice: 1.1, 7.1 1.A.3: Sections: 29.1, 29.2, 29.6 1.A.4: Sections: 27.2, 27.6, 28.1, 28.2, 28.3 Science Practice: 1.1, 7.1
	1.C: Objects and systems have properties of inertial mass and gravitational mass that are experimentally verified to be the same and satisfy conservation principles.	1.C.4: Sections: 26.9, 29.3, 29.4, 29.5, 30.1 Science Practice: 6.3
	1.D: Classical mechanics cannot describe all properties of objects.	1.D.1: Sections: 28.6 Science Practice: 6.3 1.D.2: Sections: 27.1, 27.3, 27.4 1.D.3: Sections: 26.3, 26.4, 26.5, 26.5, 26.11, 26.12 Science Practice: 6.3, 7.1
Big Idea 4: [CHA] Change	**4.C:** Interactions with other objects or systems can change the total energy of a system.	4.C4: Sections: 26.9, 29.3, 29.4, 30.1 Science Practices: 2.2, 2.3, 7.2

Big Idea 5: [CON] Conservation	**5.B:** The energy of a system is conserved.	5.B.2: Section: 28.1, 28.2, 28.3 Science Practices: 2.1, 2.2, 6.4, 7.2 5.B.4: Sections: 27.2, 27.3, 28.3 Science Practices: 1.4, 2.1, 2.2 5.B.5: Sections: 27.2, 27.3 Science Practices: 6.4, 7.1 5.B.8: Sections: 28.1, 28.2, 28.3 Science Practices: 1.2, 7.2 5.B.11: Sections: 29.3, 29.4, 29.5, 30.1 Science Practices: 2.2, 7.2
	5.C: The electric charge of a system is conserved.	5.C.1: Sections: 29.4, 29.6 Science Practices: 6.4, 7.2
	5.D: The linear momentum of a system is conserved.	5.D.1: Sections: 28.6, 29.1 Science Practices: 2.1, 2.2, 6.4 5.D.2: Sections: 28.6, 29.1 Science Practices: 2.1, 2.2, 6.4, 7.2 5.D.3: Sections: 28.6, 29.1 Science Practices: 6.4
	5.G: Nucleon number is conserved.	5.G.1: Sections: 29.4, 29.6 Science Practices: 6.4
Big Idea 6: [WAV] Waves	**6.C:** Only waves exhibit interference and diffraction.	6.C.1: Section: 24.4 Science Practice 6.4, 7.2 6.C.2: Sections: 24.5, 24.6 Science Practice 1.4, 6.4, 7.2 6.C.3: Sections: 24.1, 24.3 Science Practice 1.4, 6.4 6.C.4: Sections: 24.5 Science Practice 6.4, 7.2

	6.F Electromagnetic radiation can be modeled as waves or as fundamental particles.	6.F.3: Sections: 27.1, 27.2, 27.3, 27.4 Science Practices: 6.4 6.F.4: Sections: 27.3 Science Practices: 6.4, 7.1
	6.G: All matter can be modeled as waves or particles.	6.G.1: Section: 28.6 Science Practice 6.4, 7.1 6.G.2: Section: 28.6 Science Practice: 6.4
Big Idea 7: [PRO] Probability	**7.C:** At the quantum scale, matter is described by a wave function, which leads to a probabilistic description of the microscopic world.	7.C.1: Sections: 28.6, 28.8 Science Practice: 1.4 7.C.2: Sections: 28.2, 28.6 Science Practice: 1.4 7.C.3: Sections: 29.7, 29.8 Science Practice: 6.4 7.C.4: Sections: 28.2, 28.4 Science Practice: 1.1, 1.2