

AP Physics 2 Scope & Sequence

Days	Unit	Standard(s)/Outcome(s)	Essential/Guiding Questions
10	Unit 9: Thermodynamics <i>Students investigate what they cannot see by examining the properties of ideal gases.</i>	<u>BIG IDEAS:</u> • Systems • Change • Conservation • Probability <u>SCIENCE PRACTICES:</u> • Creating Representations • Mathematical Routines • Scientific Questioning and Argumentation	Why does the tile floor in the bathroom feel so much colder than the bathroom mat? How cold can something get? How would our lives be different without heat engines? How do the laws of thermodynamics help us understand the limitations in function and efficiency of technological systems?
12	Unit 10: Electric Force, Field and Potential <i>Students will be introduced to the model of field forces.</i>	<u>BIG IDEAS:</u> • Systems • Fields • Force Interactions • Change • Conservation <u>SCIENCE PRACTICES:</u> • Creating Representations • Mathematical Routines • Scientific Questioning and Argumentation	How can you suspend a charged water droplet in the air? Since balloons are made of rubber, how can they be “charged” so that they stick to the wall? Where is the safest place to be during a lightning storm? How can you protect your electronics from an EMP?

12	Unit 11: Electric Circuits <i>Students revisit the behavior of charged particles to deepen their understanding of the law of conservation of energy and its application to electric circuits.</i>	<u>BIG IDEAS:</u> • Systems • Change • Conservation <u>SCIENCE PRACTICES:</u> • Creating Representations • Mathematical Routines • Scientific Questioning and Argumentation	Why do lights on electronics dim slowly and then go out when unplugged? Why do several bulbs on a string of lights go out when one bulb is unplugged? How can we effectively store electrical energy to use later? How can you make a 120 Watt bulb brighter than a 40 Watt bulb?
8	Unit 12: Magnetism and Electromagnetism <i>Students will build upon their knowledge of electrostatic forces, fields, free charges, and circuits by exploring the relationships between moving charges, the magnetic fields they generate, and the magnetic forces that act on other moving charges in those fields.</i>	<u>BIG IDEAS:</u> • Fields • Force Interactions • Change <u>SCIENCE PRACTICES:</u> • Creating Representations • Mathematical Routines • Scientific Questioning and Argumentation	How does an induction stovetop heat a pan without heating the cooktop? How would our world look different without induction? How would modern medicine be different without powerful magnets? Why is it dangerous to wear metal inside an MRI machine? How does an electric motor work?

8	Unit 13: Geometric Optics <i>Students will be introduced to the different ways of thinking about and modeling light.</i>	<u>BIG IDEAS:</u> • Waves <u>SCIENCE PRACTICES:</u> • Creating Representations • Mathematical Routines • Scientific Questioning and Argumentation	Why can't a flat lens focus light? Why does a mirror flip words? How can we make things invisible? Why does a straw in a glass of water look bent?
13	Unit 14: Waves, Sound, and Physical Optics <i>Students investigate the behavior of waves, including sound waves.</i>	<u>BIG IDEAS:</u> • Waves <u>SCIENCE PRACTICES:</u> • Creating Representations • Mathematical Routines • Scientific Questioning and Argumentation	Why does an ambulance siren sound different when it is moving toward you than when it is moving away from you? Why does it look like a rainbow when you see a puddle of water with oil in it at a gas station? Why do two notes an octave apart sound the same? Why can you hear a person around a corner, but you can't see them? What makes a sonic boom?
13	Unit 15: Modern Physics <i>Students will make connections between this unit's content, the fundamental principles of physics, principles of conservation, and models and representations used earlier in the course.</i>	<u>BIG IDEAS:</u> • Systems • Force Interactions • Change • Conservation • Probability <u>SCIENCE PRACTICES:</u> • Creating Representations • Mathematical Routines	What are the benefits and dangers of radioactivity? How do we measure things we cannot see? Why do infrared telescopes need to be cooled? How does the ultraviolet

		• Scientific Questioning and Argumentation	catastrophe link thermodynamics and modern physics?
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