

# Course at a Glance

## Plan

The Course at a Glance provides a useful visual organization of the AP Physics 2 curricular components, including the following:

- Sequence of units, along with approximate weighting and suggested pacing. Please note, pacing is based on 45-minute class periods, meeting five days each week for a full academic year.
- Progression of topics within each unit.
- Spiraling of the big ideas and science practices across units.

## Teach

### SCIENCE PRACTICES

Science practices spiral throughout the course.

- |                                 |                               |
|---------------------------------|-------------------------------|
| <b>1</b> Modeling               | <b>4</b> Experimental Methods |
| <b>2</b> Mathematical Routines  | <b>5</b> Data Analysis        |
| <b>3</b> Scientific Questioning | <b>6</b> Argumentation        |
|                                 | <b>7</b> Making Connections   |

**+** Indicates 3 or more science practices for a given topic. The individual topic page will show all the science practices.

### BIG IDEAS

Big ideas spiral across topics and units.

- |                                 |                           |
|---------------------------------|---------------------------|
| <b>SYS</b> 1-Systems            | <b>CON</b> 5-Conservation |
| <b>FLD</b> 2-Fields             | <b>WAV</b> 6-Waves        |
| <b>INT</b> 3-Force Interactions | <b>PRO</b> 7-Probability  |
| <b>CHA</b> 4-Change             |                           |

## Assess

Assign the Personal Progress Checks—either as homework or in class—for each unit. Each Personal Progress Check contains formative multiple-choice and free-response questions. The feedback from these checks shows students the areas where they need to focus.

UNIT 1 Fluids

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~14–17 Class Periods
10–12% AP Exam Weighting

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<b>SYS</b>	1	7	<b>1.1 Fluid Systems</b>
<b>SYS</b>	4	6	<b>1.2 Density</b>
<b>INT</b>	+		<b>1.3 Fluids: Pressure and Forces</b>
<b>INT</b>	+		<b>1.4 Fluids and Free-Body Diagrams</b>
<b>INT</b>	6		<b>1.5 Buoyancy</b>
<b>CON</b>	2	6	<b>1.6 Conservation of Energy in Fluid Flow</b>
<b>CON</b>	2	7	<b>1.7 Conservation of Mass Flow Rate in Fluids</b>

UNIT 2 Thermodynamics

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~15–20 Class Periods
12–18% AP Exam Weighting

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<b>SYS</b>	1	7	<b>2.1 Thermodynamic Systems</b>
<b>PRO</b>	+		<b>2.2 Pressure, Thermal Equilibrium, and the Ideal Gas Law</b>
<b>INT</b>	+		<b>2.3 Thermodynamics and Forces</b>
<b>INT</b>	+		<b>2.4 Thermodynamics and Free-Body Diagrams</b>
<b>INT</b>	6		<b>2.5 Thermodynamics and Contact Forces</b>
<b>CHA</b>	6		<b>2.6 Heat and Energy Transfer</b>
<b>CON</b>	+		<b>2.7 Internal Energy and Energy Transfer</b>
<b>CON</b>	+		<b>2.8 Thermodynamics and Elastic Collisions: Conservation of Momentum</b>
<b>CON</b>	+		<b>2.9 Thermodynamics and Inelastic Collisions: Conservation of Momentum</b>
<b>SYS</b>	4	5	<b>2.10 Thermal Conductivity</b>
<b>CON</b>	6	7	<b>2.11 Probability, Thermal Equilibrium, and Entropy</b>

Personal Progress Check 1

Multiple-choice: ~40 questions  
Free-response: 2 questions

- Experimental Design
- Paragraph Argument Short Answer

Personal Progress Check 2

Multiple-choice: ~60 questions  
Free-response: 2 questions

- Quantitative/Qualitative Translation
- Short Answer

### UNIT 3

## Electric Force, Field, and Potential

~23–25 Class Periods 18–22% AP Exam Weighting

<b>SYS</b> 1 7	3.1 Electric Systems
<b>SYS</b> 6 7	3.2 Electric Charge
<b>CON</b> +	3.3 Conservation of Electric Charge
<b>CHA</b> +	3.4 Charge Distribution—Friction, Conduction, and Induction
<b>SYS</b>	3.5 Electric Permittivity
<b>INT</b> +	3.6 Introduction to Electric Forces
<b>INT</b> +	3.7 Electric Forces and Free-Body Diagrams
<b>INT</b> +	3.8 Describing Electric Force
<b>INT</b> 7	3.9 Gravitational and Electromagnetic Forces
<b>FLD</b>	3.10 Vector and Scalar Fields
<b>FLD</b> +	3.11 Electric Charges and Fields
<b>FLD</b> +	3.12 Isolines and Electric Fields
<b>CON</b> +	3.13 Conservation of Electric Energy

### Personal Progress Check 3

Multiple-choice: ~75 questions  
Free-response: 2 questions

- Experimental Design
- Paragraph Argument Short Answer

### UNIT 4

## Electric Circuits

~14–16 Class Periods 10–14% AP Exam Weighting

<b>SYS</b> 6 7	4.1 Definition and Conservation of Electric Charge
<b>SYS</b> 4	4.2 Resistivity and Resistance
<b>CHA</b> +	4.3 Resistance and Capacitance
<b>CON</b> +	4.4 Kirchoff's Loop Rule
<b>CON</b> +	4.5 Kirchoff's Junction Rule and the Conservation of Electric Charge

### Personal Progress Check 4

Multiple-choice: ~40 questions  
Free-response: 2 questions

- Quantitative/Qualitative Translation
- Short Answer

### UNIT 5

## Magnetism and Electromagnetic Induction

~13–15 Class Periods 10–12% AP Exam Weighting

<b>SYS</b> 1 7	5.1 Magnetic Systems
<b>SYS</b>	5.2 Magnetic Permeability and Magnetic Dipole Moment
<b>FLD</b>	5.3 Vector and Scalar Fields
<b>FLD</b> +	5.4 Monopole and Dipole Fields
<b>FLD</b> 1 2	5.5 Magnetic Fields and Forces
<b>INT</b> +	5.6 Magnetic Forces
<b>INT</b> +	5.7 Forces Review
<b>CHA</b> +	5.8 Magnetic Flux

### Personal Progress Check 5

Multiple-choice: ~35 questions  
Free-response: 2 questions

- Experimental Design
- Paragraph Argument Short Answer

**UNIT 6**

**Geometric and Physical Optics**

**~15–18** Class Periods

**12–14%** AP Exam Weighting

**WAV**  
+

**6.1 Waves**

**WAV**  
+

**6.2 Electromagnetic Waves**

**WAV**  
1

**6.3 Periodic Waves**

**WAV**  
+

**6.4 Refraction, Reflection, and Absorption**

**WAV**  
+

**6.5 Images from Lenses and Mirrors**

**WAV**  
+

**6.6 Interference and Diffraction**

**UNIT 7**

**Quantum, Atomic, and Nuclear Physics**

**~13–15** Class Periods

**10–12%** AP Exam Weighting

**SYS**  
**INT**  
1  
7

**7.1 Systems and Fundamental Forces**

**CON**  
+

**7.2 Radioactive Decay**

**CON**  
+

**7.3 Energy in Modern Physics (Energy in Radioactive Decay and  $E = mc^2$ )**

**SYS**  
**CHA**  
+

**7.4 Mass–Energy Equivalence**

**SYS**  
**WAV**  
+

**7.5 Properties of Waves and Particles**

**WAV**  
6  
7

**7.6 Photoelectric Effect**

**PRO**  
1  
6

**7.7 Wave Functions and Probability**

**Personal Progress Check 6**

**Multiple-choice: ~50 questions**

**Free-response: 2 questions**

- Experimental Design
- Short Answer

**Personal Progress Check 7**

**Multiple-choice: ~55 questions**

**Free-response: 2 questions**

- Quantitative/Qualitative Translation
- Paragraph Argument Short Answer