

Integrated Physics and Chemistry

Integrated Physics and Chemistry is a physical science course designed for high school students needing an entry-level science course covering basic concepts found in chemistry and physics. Topics included in this study are:

- matter,
- motion and forces,
- work and energy,
- electricity and magnetism, and
- waves.

Throughout the course, students will have opportunities to observe simulations, investigate ideas, and solve problems—both on screen and away from the computer.

The course seeks to help students expand their knowledge and skills so that they may achieve the following goals:

- Gain an understanding of foundational concepts in physics and chemistry.
- Make careful observations of the surrounding environment.
- Analyze problems and solutions scientifically.
- Integrate science knowledge with real world situations at local, regional, national, and international levels.
- Appreciate the impact of science discovery on everyday life.

Unit 1: Explorations in Physical Science	
Integrated Physics and Chemistry	Assignments
	1. Course Overview
	2. What is Science?
	3. The Scientific Method
	4. Experiment: Making Observations
	5. Quiz 1: Nature of Science
	6. The Metric System
	7. Scales
	8. Volume
	9. Experiment: Determining Volume
	10. Mass and Density
	11. Experiment: Determining Density*
	12. Experiment: Density Column
	13. Quiz 2: Measuring Matter
	14. Special Project*
	15. Review
	16. Test
	17. Alternate Test*
18. Glossary and Credits	

Unit 2: The Structure of Matter	
Integrated Physics and Chemistry	Assignments
	1. The History of Atomic Theory
	2. Experiment: Atomic Structure
	3. The Atomic Model
	4. Quiz 1: Atomic Structure
	5. Elements and Their Properties
	6. The Periodic Table
	7. Trends on the Periodic Table
	8. Experiment: Identifying an Unknown
	9. Compounds
	10. Quiz 2: Pure Substances
	11. Mixtures
	12. Separating Mixtures
	13. Experiment: Separating a Mixture
	14. Quiz 3: Mixtures
	15. Special Project*
	16. Review
	17. Test
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Unit 3: The Structure of Matter																									
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Unit 4: States of Matter																							
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Unit 5: Motion and Forces																							
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Unit 6: Semester Review and Exam					
IPC	Assignments				
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	2. Exam	4. Alternate Exam - Form B*			

Unit 7: Work and Energy	
Integrated Physics and Chemistry	Assignments
	1. Forms of Energy
	2. Work
	3. Mechanical Energy
	4. Conservation of Energy
	5. Experiment: Potential and Kinetic Energy
	6. Power
	7. Quiz 1: Work, Energy, and Power
	8. Simple Machines; Levers
	9. Mechanical Advantage and Efficiency
10. Pulleys; Wheels and Axles	
11. Inclined Planes, Wedges, and Screws	
12. Project: Virtual Lab - Simple Machines	
13. Experiment: Inclined Planes	
14. Quiz 2: Simple Machines	
15. Project: Virtual Lab - Projectiles	
16. Special Project*	
17. Review	
18. Test	
19. Alternate Test*	
20. Glossary and Credits	

Unit 8: Heat Flow	
Integrated Physics and Chemistry	Assignments
	1. Thermodynamics and Entropy
	2. Specific Heat Capacity
	3. Heat Flow
	4. Experiment: Insulators
	5. Quiz 1: Energy Transfer
	6. Heating Systems
	7. Experiment: Heat and Expansion
	8. Cooling and Refrigeration
	9. Heat Engines
10. Quiz 2: Heat Flow and Technology	
11. Special Project*	
12. Review	
13. Test	
14. Alternate Test*	
15. Glossary and Credits	

Unit 9: Electricity and Magnetism	
Integrated Physics and Chemistry	Assignments
	1. Electric Charges
	2. Static Electricity
	3. Experiment: Electrostatic Investigations
	4. Electric Current
	5. Circuits
	6. Electrical Energy and Power
	7. Project: Virtual Lab - Circuits
	8. Quiz 1: Electricity
	9. Magnetism
10. Magnetism and Electricity	
11. Experiment: Diverting a Magnetic Field	
12. Magnetic Fields in Space	
13. Quiz 2: Magnetism	
14. Special Project*	
15. Review	
16. Test	
17. Alternate Test*	
18. Glossary and Credits	

Unit 10: Waves	
Integrated Physics and Chemistry	Assignments
	1. Waves and Energy Transfer
	2. Types of Waves
	3. Properties of Waves
	4. Experiment: Changing the Speed of a Wave
	5. The Behavior of Waves
	6. Quiz 1: Wave Characteristics and Properties
	7. Sound Vibrations
	8. Detecting Sound
	9. Project: Virtual Lab - Sound
10. Experiment: Using Vibrations to Produce Sound	
11. Doppler Effect	
12. Project: Virtual Lab - Doppler Effect	
13. Beats, Resonance, and Harmonics	
14. Quiz 2: Sound	
15. Light and the Electromagnetic Spectrum	
16. Properties of Light	
17. Reflection and Mirrors	
18. Experiment: Law of Reflection	
19. Lenses	
20. Quiz 3: Light	
21. Project: Virtual Lab - Light	
22. Special Project*	
23. Review	
24. Test	
25. Alternate Test*	
26. Glossary and Credits	

Integrated Physics and Chemistry	Unit 11: Chemistry and Physics in Our World		
	Assignments		
	1. Carbon Dioxide and Global Warming	9. Kepler and the Motion of the Spheres	
	2. Experiment: Carbon Dioxide and Water Acidity	10. Experiment: Kepler's Second Law	
	3. Fossil Fuels' Effect on the Environment	11. Quiz 2: Space Physics	
	4. Media and Science	12. Special Project*	
	5. Experiment: Water Acidity and the Environment	13. Review	
	6. Quiz 1: Environmental Chemistry	14. Test	
	7. Atomic Spectra and Moving Stars	15. Alternate Test*	
	8. The Temperature of Stars	16. Glossary and Credits	
	Unit 12: Semester Review and Exam		
	IPC	Assignments	
		1. Review	3. Alternate Exam - Form A*
		2. Exam	4. Alternate Exam - Form B*
		Unit 6: Final Exam	
	IPC	Assignments	
1. Final Exam		3. Alternate Exam - Form B*	
2. Alternate Exam - Form A*			