



2017-2018 Curriculum Catalog

Integrated Physics and Chemistry

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Integrated Physics and Chemistry Course Overview

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
	18. Alternate Test*
19. Glossary and Credits	

Unit 3: The Structure of Matter		
Assignments		
Integrated Physics and Chemistry	1. States of Matter	13. Quiz 2: Chemical Changes
	2. Changes of State	14. Radioactivity
	3. Experiment: Graphing Changes of State	15. Nuclear Reactions
	4. Solutions - The Dissolving Process	16. Experiment: Half-Life
	5. Acids and Bases	17. Nuclear Energy
	6. Experiment: The Cabbage Indicator	18. Quiz 3: Nuclear Changes
	7. Quiz 1: Physical Changes	19. Special Project*
	8. Chemical Bonding	20. Review
	9. Atomic Structure and Bonding	21. Test
	10. Experiment: Chemical Changes	22. Alternate Test*
	11. Chemical Reactions and Conservation of Mass	23. Glossary and Credits
	12. Types of Chemical Reactions	

Unit 4: States of Matter		
Assignments		
Integrated Physics and Chemistry	1. Properties of Solids	11. Quiz 2: Liquids
	2. Experiment: Comparing Hardness and Density of Solids	12. General Characteristics of Gases
	3. Elasticity and Strength in Solids	13. Pressure and Volume in Gases
	4. Electrical Conductivity in Solids	14. Experiment: Pressure in Gases
	5. Quiz 1: Solids	15. Temperature and Volume Changes in Gases
	6. Characteristics of Liquids	16. Quiz 3: Gases
	7. Experiment: Viscosity	17. Special Project
	8. Pressure in Liquids	18. Review
	9. Archimedes' Principle and Flotation	19. Test
	10. Liquids and Capillary Action	20. Alternate Test*
	21. Glossary and Credits	

Unit 5: Motion and Forces		
Assignments		
Integrated Physics and Chemistry	1. Distance and Displacement	11. Newton's Laws
	2. Speed and Velocity Acceleration	12. Project: Virtual Lab - Newton's Laws
	3. Motion Graphs	13. Experiment: Propulsion
	4. Experiment: Motion Graphs	14. Centripetal Force
	5. Momentum	15. Quiz 2: Forces
	6. Project: Virtual lab - Conservation of Momentum	16. Project: Virtual Lab - Circular Motion
	7. Quiz 1: Motion	17. Special Project*
	8. Forces	18. Review
	9. Friction	19. Test
	10. Distance and Displacement	20. Alternate Test*
	21. Glossary and Credits	

Unit 6: Semester Review and Exam		
Assignments		
IPC	1. Review	3. Alternate Exam - Form A*
	2. Exam	4. Alternate Exam - Form B*

Unit 7: Work and Energy	
Assignments	
Integrated Physics and Chemistry	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	
Assignments	
Integrated Physics and Chemistry	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	
Assignments	
Integrated Physics and Chemistry	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	
Assignments	
Integrated Physics and Chemistry	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	

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

Unit 12: Semester Review and Exam	
Assignments	
IPC	1. Review
	2. Exam
	3. Alternate Exam - Form A*
	4. Alternate Exam - Form B*

Unit 6: Final Exam	
Assignments	
IPC	1. Final Exam
	2. Alternate Exam - Form A*
	3. Alternate Exam - Form B*

(*) Indicates alternative assignment