



Switched-On
SCHOOLHOUSE

2015 Curriculum Catalog

Integrated Physics and Chemistry

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

UNIT 2: THE STRUCTURE OF MATTER			
INTEGRATED PHYSICS AND CHEMISTRY	Assignment Titles		
	1.	The History of Atomic Theory	11. Mixtures
	2.	Experiment: Atomic Structure	12. Separating Mixtures
	3.	The Atomic Model	13. Experiment: Separating a Mixture
	4.	Quiz 1: Atomic Structure	14. Quiz 3: Mixtures
	5.	Elements and Their Properties	15. Special Project*
	6.	The Periodic Table	16. Review
	7.	Trends on the Periodic Table	17. Test
	8.	Experiment: Identifying an Unknown	18. Alternate Test*
	9.	Compounds	19. Glossary and Credits
	10.	Quiz 2: Pure Substances	

UNIT 3: MATTER AND CHANGE				
Assignment Titles				
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				
Assignment Titles				
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				
Assignment Titles				
INTEGRATED PHYSICS AND CHEMISTRY	1.	Distance and Displacement	10.	Newton's Laws
	2.	Speed and Velocity	11.	Experiment: Propulsion
	3.	Acceleration	12.	Centripetal Force
	4.	Motion Graphs	13.	Quiz 2: Forces
	5.	Experiment: Motion Graphs	14.	Special Project*
	6.	Momentum	15.	Review
	7.	Quiz 1: Motion	16.	Test
	8.	Forces	17.	Alternate Test*
	9.	Friction	18.	Glossary and Credits

UNIT 6: SEMESTER REVIEW AND EXAM				
Assignment Titles				
INTEGRATED PHYSICS AND CHEMISTRY	1.	Review	3.	Alternate Exam - Form A*
	2.	Exam	4.	Alternate Exam - Form B*

UNIT 7: WORK AND ENERGY	
INTEGRATED PHYSICS AND CHEMISTRY	Assignment Titles
	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. Experiment: Inclined Planes
	13. Quiz 2: Simple Machines
	14. Special Project*
	15. Review
	16. Test
	17. Alternate Test*
18. Glossary and Credits	

UNIT 8: HEAT FLOW	
INTEGRATED PHYSICS AND CHEMISTRY	Assignment Titles
	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	Assignment Titles
	1. Electric Charges
	2. Static Electricity
	3. Experiment: Electrostatic Investigations
	4. Electric Current
	5. Circuits
	6. Electrical Energy and Power
	7. Quiz 1: Electricity
	8. Magnetism
	9. Magnetism and Electricity
	10. Experiment: Diverting a Magnetic Field
	11. Magnetic Fields in Space
	12. Quiz 2: Magnetism
	13. Special Project*
	14. Review
	15. Test
	16. Alternate Test*
17. Glossary and Credits	

UNIT 10: WAVES	
INTEGRATED PHYSICS AND CHEMISTRY	Assignment Titles
	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. Experiment: Using Vibrations to Produce Sound
	10. Doppler Effect
	11. Beats, Resonance, and Harmonics
	12. Quiz 2: Sound
	13. Light and the Electromagnetic Spectrum
	14. Properties of Light
	15. Reflection and Mirrors
	16. Experiment: Law of Reflection
	17. Lenses
	18. Quiz 3: Light
	19. Special Project*
	20. Review
	21. Test
	22. Alternate Test*
23. Glossary and Credits	

INTEGRATED PHYSICS AND CHEMISTRY	UNIT 11: CHEMISTRY AND PHYSICS IN OUR WORLD			
	Assignment Titles			
	1.	Carbon Dioxide and Global Warming	9.	Experiment: Kepler's Second Law
	2.	Experiment: Carbon Dioxide and Water Acidity	10.	Quiz 2: Space Physics
	3.	Fossil Fuels' Effect on the Environment	11.	Special Project*
	4.	Experiment: Water Acidity and the Environment	12.	Review
	5.	Quiz 1: Environmental Chemistry	13.	Test
	6.	Atomic Spectra and Moving Stars	14.	Alternate Test*
	7.	The Temperature of Stars	15.	Glossary and Credits
	8.	Kepler and the Motion of the Spheres		

INTEGRATED PHYSICS AND CHEMISTRY	UNIT 12: SEMESTER REVIEW AND EXAM			
	Assignment Titles			
	1.	Review	3.	Alternate Exam - Form A*
	2.	Exam	4.	Alternate Exam - Form B*

INTEGRATED PHYSICS AND CHEMISTRY	UNIT 13: FINAL EXAM			
	Assignment Titles			
	1.	Exam	3.	Alternate Exam - Form B*
	2.	Alternate Exam - Form A*		

(*) Indicates alternate assignment