



Switched-On

SCHOOLHOUSE® 2012 EDITION

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

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

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

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|---|------------------------------|
| 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

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|---|---|
| 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

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|------------------------------|----------------------------|
| 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

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|-----------|--------------------------|
| 1. Review | 3. Alternate Exam—Form A |
| 2. Exam | 4. Alternate Exam—Form B |

UNIT 7: WORK AND ENERGY
Assignment Titles

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|--|---|
| 1. Forms of Energy | 10. Pulleys; Wheels and Axles |
| 2. Work | 11. Inclined Planes, Wedges, and Screws |
| 3. Mechanical Energy | 12. Experiment: Inclined Planes |
| 4. Conservation of Energy | 13. Quiz 2: Simple Machines |
| 5. Experiment: Conservation of Energy | 14. Special Project |
| 6. Power | 15. Review |
| 7. Quiz 1: Work, Energy, and Power | 16. Test |
| 8. Simple Machines; Levers | 17. Alternate Test |
| 9. Mechanical Advantage and Efficiency | 18. Glossary and Credits |

UNIT 8: HEAT FLOW
Assignment Titles

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

UNIT 9: ELECTRICITY AND MAGNETISM
Assignment Titles

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

UNIT 10: WAVES
Assignment Titles

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

UNIT 11: CHEMISTRY AND PHYSICS IN OUR WORLD
Assignment Titles

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| 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 | |

UNIT 12: SEMESTER REVIEW AND EXAM
Assignment Titles

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|-----------|--------------------------|
| 1. Review | 3. Alternate Exam—Form A |
| 2. Exam | 4. Alternate Exam—Form B |

UNIT 13: FINAL EXAM
Assignment Titles

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|--------------------------------|--------------------------------|
| 1. Final Exam | 3. Alternate Final Exam—Form B |
| 2. Alternate Final Exam—Form A | |