



**Integrated Physics & Chemistry -
Home Teacher Program**

ACADEMIC INSTRUCTIONAL LIBRARY



INTEGRATED PHYSICS & 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
- Waves

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

HOME TEACHER LABS

Labs for the Homeschool Plus program are those contained in the Ignitia Online Curriculum. No expensive equipment is required with only several requiring the purchase of small items or household items to conduct the experiments.

It is always advisable to be familiar with your surroundings and wear protective equipment when conducting any experiment. Never allow yourself to be distracted when completing an experiment.

UNIT 1 - EXPLORATIONS IN PHYSICAL SCIENCE

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. **Quiz 2: Measuring Matter**
13. **Review**
14. **Test**
15. **Alternate Test**
16. **Glossary and Credits**

UNIT 2 - THE STRUCTURE OF MATTER

1. **The History of Atomic Theory**
2. **The Atomic Model**
3. **Quiz 1: Atomic Structure**
4. **Elements and Their Properties**
5. **The Periodic Table**

6. **Trends on the Periodic Table**
7. **Experiment: Identifying an Unknown**
8. **Compounds**
9. **Quiz 2: Pure Substances**
10. **Mixtures**
11. **Separating Mixtures**
12. **Experiment: Separating a Mixture**
13. **Quiz 3: Mixtures**
14. **Review**
15. **Test**
16. **Alternate Test**
17. **Glossary and Credits**

UNIT 3 - MATTER AND CHANGE

1. **States of Matter**
2. **Changes of State**
3. **Experiment: Graphing Changes of State**
4. **Solutions—The Dissolving Process**
5. **Acids and Bases**
6. **Quiz 1: Physical Changes**
7. **Chemical Bonding**
8. **Atomic Structure and Bonding**
9. **Experiment: Chemical Changes**
10. **Chemical Reactions and Conservation of Mass**

11. **Types of Chemical Reactions**
12. **Quiz 2: Chemical Changes**
13. **Radioactivity**
14. **Nuclear Reactions**
15. **Experiment: Half-Life**
16. **Nuclear Energy**
17. **Quiz 3: Nuclear Changes**
18. **Review**
19. **Test**
20. **Alternate Test**
21. **Glossary and Credits**

UNIT 4 - STATES OF MATTER

1. **Properties of Solids**
2. **Elasticity and Strength in Solids**
3. **Electrical Conductivity in Solids**
4. **Quiz 1: Solids**
5. **Characteristics of Liquids**
6. **Pressure in Liquids**
7. **Archimedes' Principle and Flotation**
8. **Liquids and Capillary Action**
9. **Quiz 2: Liquids**
10. **General Characteristics of Gases**
11. **Pressure and Volume in Gases**

12. **Temperature and Volume Changes in Gases**
13. **Quiz 3: Gases**
14. **Review**
15. **Test**
16. **Alternate Test**
17. **Glossary and Credits**

UNIT 5 - MOTION AND FORCES

1. **Distance and Displacement**
2. **Speed and Velocity**
3. **Acceleration**
4. **Motion Graphs**
5. **Momentum**
6. **Project: Virtual Lab – Conservation of Momentum**
7. **Quiz 1: Motion**
8. **Forces**
9. **Friction**
10. **Newton's Laws**
11. **Project: Virtual Lab: Newton's Law**
12. **Centripetal Force**
13. **Quiz 2: Forces**
14. **Project: Virtual Lab – Circular Motion**
15. **Review**
16. **Test**

17. **Alternate Test**
18. **Glossary and Credits**

UNIT 6 – SEMESTER REVIEW AND EXAM

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

UNIT 7 – WORK AND ENERGY

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: Ignitia Virtual Labs - Simple Machines**
13. **Quiz 2: Simple Machines**
14. **Project: Virtual Lab - Projectiles**

15. **Review**
16. **Test**
17. **Alternate Test**
18. **Glossary and Credits**

UNIT 8 – HEAT FLOW

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. **Review**
12. **Test**
13. **Alternate Test**
14. **Glossary and Credits**

UNIT 9 – ELECTRICITY AND MAGNETISM

1. **Electric Charges**
2. **Static Electricity**

3. **Electric Current**
4. **Circuits**
5. **Electrical Energy and Power**
6. **Project: Virtual Lab - Circuits**
7. **Quiz 1: Electricity**
8. **Magnetism**
9. **Magnetism and Electricity**
10. **Magnetic Fields in Space**
11. **Quiz 2: Magnetism**
12. **Review**
13. **Test**
14. **Alternate Test**
15. **Glossary and Credits**

UNIT 10- WAVES

1. **Waves and Energy Transfer**
2. **Types of Waves**
3. **Properties of Waves**
4. **Experiment: Changing the Speed of Waves**
5. **The Behavior of Waves**
6. **Quiz 1: Wave Characteristics and Properties**
7. **Sound Vibrations**
8. **Detecting Sound**
9. **Doppler Effect**

10. **Project: 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. **Lenses**
17. **Quiz 3: Light**
18. **Project: Virtual Lab - Light**
19. **Review**
20. **Test**
21. **Alternate Test**
22. **Glossary and Credits**

UNIT 11- CHEMISTRY AND PHYSICS IN OUR WORLD

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. **Review**
13. **Test**
14. **Alternate Test**
15. **Glossary and Credits**

UNIT 12 - SEMESTER REVIEW AND EXAM

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

UNIT 13- FINAL EXAM

1. **Final Exam**
2. **Alternate Final Exam—Form A**
3. **Alternate Final Exam—Form B**