Odysseyware®

CURRICULUM OVERVIEW

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 course 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 online and away from the computer.

- **Explorations in Physical Science:** Students will employ the scientific method, measurements and calculations to conduct experiments.
- **The Structure of Matter:** Students will explore the structure of matter, including atomic structure, elements, compounds, and mixtures.
- **Matter and Change:** Students will explore the chemical changes that matter can go through.
- **States of Matter:** Students will explore the states of matter and the process that matter goes through for its state to change.
- **Motion and Forces:** Students will describe the motion of objects, Newton's laws that predict that motion, and how the motion is measured.
- **Work and Energy:** Students will explore various types of energy, simple machines, and the work that they can do.
- **Heat Flow:** Students will describe heat, heat flow, and the laws of thermodynamics, as well as explore uses of heat flow.
- **Electricity and Magnetism:** Students will explore the relationship between electricity and magnetism.
- **Waves:** Students will explore the properties and characteristics of waves.
- **Chemistry and Physics in Our World:** Students will discuss how chemistry and physics are at work in our daily lives and explore basic astronomical principles.

Integrated Physics and Chemistry

Unit 1: EXPLORATIONS IN PHYSICAL SCIENCE

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

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Unit 2: THE STRUCTURE OF MATTER

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

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Unit 3: MATTER AND CHANGE

Assignments

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

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Unit 4: STATES OF MATTER

Assignments

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

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Unit 5: MOTION AND FORCES

Assignments

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

Unit 6: SEMESTER REVIEW AND EXAM

Assignments

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

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Unit 7: WORK AND ENERGY

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

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Unit 8: HEAT FLOW

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

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Unit 9: ELECTRICITY AND MAGNETISM

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

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Unit 10: WAVES

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

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Unit 11: CHEMISTRY AND PHYSICS IN OUR WORLD

Assignments

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

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

Unit 13: FINAL EXAM

Assignments

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

(*) Indicates alternative assignment