Course Title: Integrated Physics and Chemistry

Grades Levels: 10-12

Board Adoption Date: 04/14/2014

Course Code: R0407-408

Content Area: Science

GPA Scale: 0.0 – 4.0

Date Course Submitted: 04/14/2014

Credential(s) Required: Physical Science/Chemistry/Physics

Graduation Subject Areas: Science

UC/CSU “A-G” Area Approvals: To be submitted for “D” (Laboratory Science)

School Site that wrote and submitted the course: Newport Harbor High School

Recommend Skills: 2.5 Grade Point Average (GPA) and passing grades in Biology and Math

Next course(s): Chemistry, Physics, or Marine Science

COURSE DESCRIPTION (catalog summary):
This integrated physical science course will focus on the principles and laws of physics and chemistry. Curriculum and laboratory exercises will strengthen critical thinking, problem-solving, and laboratory skills and techniques. Topics will include kinematics, dynamics, energy, momentum, waves, fluid mechanics, thermodynamics, electricity, magnetism, sound, and light, structure of matter, matter (including atoms, elements, and compounds), and different types of physical and chemical processes. Additional chemistry topics covered in this class include molecular formulas, molar relationships, chemical bonding, the geometry of molecules, and types and properties of solutions. Laboratory and classroom activities objectives are mastery of California State Science Standards (Grades 9-12) and Next Generation Science Standards (NGSS) incorporating International Baccalaureate (IB) experimental methods and assessments.

GOALS (expected performance outcomes for students):
Mastery of California State Science Standards (Grades 9-12) and Next Generation Science Standards (NGSS) including experimental design, scientific writing, and statistical analysis of data with application of Common Core Literacy and Math standards.

CALIFORNIA CONTENT STANDARDS AND NEXT GENERATION SCIENCE STANDARDS (NGSS) (how the course aligns with curriculum standards):
California State Science Standards: see each section below.
The NGSS are in the adoption phase for California and NMUSD. The Disciplinary Core Ideas and Science and Engineering Practices methodologies will be incorporated into curriculum and laboratory activities.

EVALUATION (how the effectiveness of the course will be monitored and assessed):
Formal assessments will include multiple assessment tools including homework worksheets, laboratory reports, end-of-units tests and quizzes, and district benchmarks. In addition, NGSS Performance Expectations and NGSS Testing Benchmarks will be used to assess student progress. Students will pursue additional college preparatory science coursework and science related careers.
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Integrated Physics and Chemistry

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<thead>
<tr>
<th>Unit 1</th>
<th>Length of Unit: Four weeks</th>
<th>Standards (referenced)</th>
<th>Model / Tasks</th>
<th>Tools / Texts</th>
</tr>
</thead>
</table>
| Science and Measurement | Unit | Investigation & Experimentation - Grades 9 To 12 | 1. Measurement  
   a. Students will measure an assortment of solids and fluids to demonstrate an understanding and use of SI and derived units. | CPO Textbook |
| Lab Safety | SI Units | 2. Unit Dimensional Analysis  
   a. Students will practice and master unit dimensional analysis and the application in stoichiometry. | Density of Unknown |
| Science Skills | Distance | 3. Solving for Unknowns in Mathematical Expressions  
   a. Students will perform experiments and use a variety of scientific formulas (i.e. D=m/v, F=ma, P=F/A) to rearrange and solve for an unknown variable. | Liquids and Solids Kits |
| The Scientific Process | Length | 4. Density of solids and fluids  
   a. Students will measure mass and volume of solids and fluids and calculate density. | Analytical Balance |
| Scientific Writing | Meter (m) | 5. Experimental design  
   a. Students will design an experiment, identify the relationship of the controlled and manipulated variables, and graph results. | Cat-A-Pult Launchers |
| Statistical Analysis | Conversion factor |  
   b. Students will evaluate the importance of performing multiple trials and use statistical analysis to identify experimental error. | Bill Nye Videos |
|  | Dimensional analysis |  
   c. Students will write a comprehensive scientific report  
   a. Report will include an abstract, | Modern Marvels Science Videos |
|  | Significant figures |  
   d. Graph results. | Crash Course Video Series |
|  | Accuracy |  
   e. Students will graph results. | Khan Academy Videos |
|  | Precision |  
   f. Students will evaluate the importance of performing multiple trials and use statistical analysis to identify experimental error. | |
|  | Qualitative observations |  
   g. Students will evaluate the importance of performing multiple trials and use statistical analysis to identify experimental error. | |
|  | Quantitative observations | | | |
|  | Mass (m) | | | |
|  | Volume (V) | | | |
|  | Weight | | | |
|  | Newton (N) | | | |
|  | Density (D) | | | |
|  | Line of best fit | | | |
|  | Slope (m) | | | |
|  | Extrapolate | | | |
|  | Independent variable | | | |
|  | Dependent variable | | | |
|  | Direct relationship | | | |
|  | Inverse relationship | | | |
|  | Natural laws | | | |
|  | Scientific theory | | | |
|  | Deduce | | | |
|  | Scientific method | | | |
|  | Abstract | | | |
|  | Hypothesis | | | |
|  | Trial | | | |
|  | Procedure | | | |
|  | Data | | | |
|  | Analysis | | | |
# Integrated Physics and Chemistry

## Course Code
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### Conclusion

h. Analyze situations and solve problems that require combining and applying concepts from more than one area of science. materials list, procedure, data collection, organization of data tables and graphs, analysis, and conclusion.

### Differentiation

**Support -- for students who are struggling with the content**

**Process:** Strategies for Struggling Students: see attached (www.minisink.com)

**Extension -- for high achieving students.**

**Process:** GATE Strategies: see attached

### Evaluation

**Formative Assessments (ongoing & mid-lesson):**
- WebAssign and CPO Investigations Workbook
- Student Developed/Guided Lecture and Discussions including Power Point Presentations
- Data Tables and Graphing in Excel
- Scientific Writing: Laboratory Report(s)

**Summative Assessments (unit final evaluation):**
- Comprehensive Unit Exam
- Multiple Choice, Short Answer, and Constructed Response
- Power Point or Scientific Poster Presentation
# Integrated Physics and Chemistry

**Course Title:** Integrated Physics and Chemistry  
**Course Code:** R0407-408

<table>
<thead>
<tr>
<th>Unit 2</th>
<th>Length of Unit: Six weeks</th>
<th>Standards (referenced)</th>
<th>Model / Tasks</th>
<th>Tools / Texts</th>
</tr>
</thead>
</table>
| **Motion and Forces** | | Motion and Forces | 1. Speed/Velocity/Acceleration  
a. Students will perform experiments to calculate and graph position vs. time (speed graph) and velocity vs. time (acceleration graph). | CPO Textbook  
Energy Car Kits  
Electronic Timers  
Probe ware  
Spring scales  
Water Balloon Launchers  
Bill Nye Videos  
Modern Marvels Science Videos  
Crash Course Video Series  
Khan Academy Videos |
| Motion Forces Laws of Motion Buoyant Force | | 2. Newton's laws predict the motion of most objects. As a basis for understanding this concept:  
a. Students know how to solve problems that involve constant speed and average speed.  
b. Students know that when forces are balanced, no acceleration occurs; therefore, an object continues to move at a constant speed or stays at rest (Newton's first law).  
c. Students know how to apply the law F=ma to solve one-dimensional motion problems that involve constant forces (Newton's second law).  
d. Students know that when one object exerts a force on a second object, the second object always exerts a force of equal magnitude and in the opposite direction (Newton's third law).  
e. Students know the relationship between the universal law of gravitation and the effect of gravity on an object at the surface of Earth.  
f. Students know applying a force to an object perpendicular to the direction of its motion causes the object to change direction but not speed. | 2. Gravity Drop  
a. Students will perform experiments to calculate the acceleration of Earth’s gravitational force and the effect of air resistance.  
3. Measuring newtons (N)  
a. Students will use spring scales to measure directional forces and determine net force with vector diagrams.  
4. Cat-A-Pult  
a. Students will determine force and graph the projectile motion using a spring platform and foam cats.  
5. Friction  
a. Students will determine the coefficient of friction using a variety of different textured surfaces.  
6. Water Balloon Launchers  
a. Students will apply Newton’s Laws of Motion and calculate forces and spring constant of water balloon launchers. | |
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<tbody>
<tr>
<td>Differentiation</td>
<td>g. Students know circular motion requires the application of a constant force directed toward the center of the circle.</td>
<td>Process: Strategies for Struggling Students: see attached (<a href="http://www.minisink.com">www.minisink.com</a>)</td>
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<tr>
<td>Extension – for high achieving students.</td>
<td>Process: GATE Strategies: see attached</td>
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<tr>
<td>Evaluation</td>
<td><strong>Formative Assessments (ongoing &amp; mid-lesson):</strong></td>
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<td>WebAssign and CPO Investigations Workbook</td>
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<td>Student Developed/Guided Lecture and Discussions including Power Point Presentations</td>
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<td>Data Tables and Graphing in Excel</td>
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<td>Scientific Writing: Laboratory Report(s)</td>
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<td><strong>Summative Assessments (unit final evaluation):</strong></td>
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<td>Comprehensive Unit Exam</td>
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<td>Multiple Choice, Short Answer, and Constructed Response</td>
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<td>Power Point or Scientific Poster Presentation</td>
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<td>Unit 3</td>
<td>Length of Unit: Five weeks</td>
<td>Standards (referenced)</td>
<td>Model / Tasks</td>
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<tr>
<td><strong>Work and Energy</strong></td>
<td><strong>Energy</strong></td>
<td><strong>Work and Power</strong></td>
<td><strong>Simple Machines</strong></td>
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<tr>
<td>Work and Energy</td>
<td>Energy</td>
<td>Work and Power</td>
<td>Simple Machines</td>
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# Integrated Physics and Chemistry

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## Differentiation
- **Support – for students who are struggling with the content**
  - **Process:** Strategies for Struggling Students: see attached ([www.minisink.com](http://www.minisink.com))

- **Extension – for high achieving students.**
  - **Process:** GATE Strategies: see attached

## Evaluation
- **Formative Assessments (ongoing & mid-lesson):**
  - WebAssign and CPO Investigations Workbook
  - Student Developed/Guided Lecture and Discussions including Power Point Presentations
  - Data Tables and Graphing in Excel
  - Scientific Writing: Laboratory Report(s)

- **Summative Assessments (unit final evaluation):**
  - Comprehensive Unit Exam
  - Multiple Choice, Short Answer, and Constructed Response
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## Course Title
Integrated Physics and Chemistry

### Course Code
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<th>Unit 4</th>
<th>Length of Unit: Five Weeks</th>
<th>Standards (referenced)</th>
<th>Model / Tasks</th>
<th>Tools / Texts</th>
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<tbody>
<tr>
<td><strong>Matter and Energy</strong></td>
<td><strong>Key Vocabulary</strong></td>
<td><strong>Chemical Thermodynamics</strong></td>
<td>1. Pure substance or Mixture&lt;br&gt;a. Students will run diagnostic physical and chemical property tests to determine if unknowns are a pure substance or mixture.</td>
<td>CPO Textbook&lt;br&gt;CPO Equipment&lt;br&gt;NHHS Science Department&lt;br&gt;Lab Kits&lt;br&gt;Molecule Model Kits&lt;br&gt;PASCO and CPO Temperature Probes&lt;br&gt;Bill Nye Videos&lt;br&gt;Modern Marvels Science Videos&lt;br&gt;Crash Course Video Series&lt;br&gt;Khan Academy Videos&lt;br&gt;Archimedes Block Buoyancy Kits&lt;br&gt;Plasma Globe</td>
</tr>
<tr>
<td><strong>Matter and Temperature</strong>&lt;br&gt;Heat Properties of Matter The Behavior of Gases</td>
<td>Element&lt;br&gt;Atom&lt;br&gt;Compound&lt;br&gt;Molecule&lt;br&gt;Pure substance&lt;br&gt;Mixture&lt;br&gt;Homogeneous mixture&lt;br&gt;Heterogeneous mixture&lt;br&gt;Celsius/Fahrenheit/Kelvin&lt;br&gt;Thermal energy&lt;br&gt;Absolute zero&lt;br&gt;Solid/Liquid/Gas/Plasma&lt;br&gt;Intermolecular forces&lt;br&gt;Melting Point&lt;br&gt;Freezing Point&lt;br&gt;Boiling Point&lt;br&gt;Condensation Point&lt;br&gt;Sublimation&lt;br&gt;Deposition&lt;br&gt;Heat/Specific heat&lt;br&gt;Conduction&lt;br&gt;Convection&lt;br&gt;Thermal equilibrium&lt;br&gt;Thermal radiation&lt;br&gt;Physical properties&lt;br&gt;Chemical properties&lt;br&gt;Amorphous/Crystalline&lt;br&gt;Ductility&lt;br&gt;Elasticity&lt;br&gt;Malleability&lt;br&gt;Tensile strength&lt;br&gt;Viscosity&lt;br&gt;Pressure&lt;br&gt;Buoyancy</td>
<td>7. Energy is exchanged or transformed in all chemical reactions and physical changes of matter. As a basis for understanding this concept:&lt;br&gt;a. Students know how to describe temperature and heat flow in terms of the motion of molecules (or atoms).&lt;br&gt;b. Students know chemical processes can either release (exothermic) or absorb (endothermic) thermal energy.&lt;br&gt;c. Students know energy is released when a material condenses or freezes and is absorbed when a material evaporates or melts.</td>
<td>2. Determining Freezing/Boiling Point&lt;br&gt;a. Students will use temperature probes and equipment to determine the freezing and boiling point of known and unknown liquids.</td>
<td>3. Temperature and Heat&lt;br&gt;a. Students will use temperature probe and equipment to determine the difference between temperature and thermal energy.</td>
</tr>
</tbody>
</table>
### Course Title
**Integrated Physics and Chemistry**

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7. Buoyancy  
   a. Students will use a displacement chamber to calculate buoyant forces using Archimedes Principle.

8. Boyle’s Law/Charles’ Law  
   a. Students will use gases and syringes to identify the relationship of temperature, pressure, and volume.

9. Graphing and Calculating Absolute Zero  
   a. Students will graph and calculate Absolute Zero using the data from an Absolute Zero Device.

### Differentiation
**Support -- for students who are struggling with the content**  
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**Extension -- for high achieving students.**  
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### Evaluation
**Formative Assessments (ongoing & mid-lesson):**  
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**Summative Assessments (unit final evaluation):**  
- Comprehensive Unit Exam  
  - Multiple Choice, Short Answer, and Constructed Response  
- Power Point or Scientific Poster Presentation
### Unit 5

**Length of Unit:** Six weeks

#### Key Vocabulary

<table>
<thead>
<tr>
<th>Atoms, Elements, and Compounds</th>
<th>Atomic and Molecular Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atoms</td>
<td>1. The periodic table displays the elements in increasing atomic number and shows how periodicity of the physical and chemical properties of the elements relates to atomic structure. As a basis for understanding this concept:</td>
</tr>
<tr>
<td>Elements and The Periodic Table of Elements</td>
<td>a. Students know how to relate the position of an element in the periodic table to its atomic number and atomic mass.</td>
</tr>
<tr>
<td>Compounds</td>
<td>b. Students know how to use the periodic table to identify metals, semimetals, nonmetals, and halogens.</td>
</tr>
</tbody>
</table>

#### Standards (referenced)

<table>
<thead>
<tr>
<th>1. Atomic Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Students will build models of atoms identifying the location and role of subatomic particles.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Electron Orbitals Battleship</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Students will use the Periodic Table of Elements to identify the electron configuration of s, p, d, and f block elements.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Rutherford's Atomic Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Students will use Flinn Scientific kit (Atomic Target Practice) to determine the shape of an unknown geometric shape representing the nucleus of an atom.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Building Isotopes</th>
</tr>
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<tbody>
<tr>
<td>a. Students will build isotopes of elements and calculate the Atomic Mass of 23 elements.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Atomic Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Students will use CPO Atom Building Kit to identify the bonding characteristics of metals, metalloids, and nonmetals.</td>
</tr>
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</table>

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<thead>
<tr>
<th>6. The Periodic Table Tile Kits</th>
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</thead>
<tbody>
<tr>
<td>a. Students will use CPO Periodic Table Tile Kits to identify the groups, periods, and chemical and physical properties of elements.</td>
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</tbody>
</table>

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<thead>
<tr>
<th>7. Chemical Bonds</th>
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<tbody>
<tr>
<td>a. Students will perform synthesis, decomposition, single-replacement, and double-replacement reactions to demonstrate the Law of</td>
</tr>
</tbody>
</table>
Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

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</table>

### Chemical Bonds

2. Biological, chemical, and physical properties of matter result from the ability of atoms to form bonds from electrostatic forces between electrons and protons and between atoms and molecules. As a basis for understanding this concept:
   a. Students know atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds.
   b. Students know chemical bonds between atoms in molecules such as H₂, CH₄, NH₃, H₂, N₂, Cl₂, and many large biological molecules are covalent.
   c. Students know salt crystals, such as NaCl, are repeating patterns of positive and negative ions held together by electrostatic attraction.
   d. Students know how to draw Lewis dot structures.

### Conservation of Mass and Law of Conservation of Energy

8. Alloy lab: Zinc plating of copper and making brass
   a. Students will plate a copper coin with zinc and covert the zinc-plated coin to brass to observe metallic bonding and formation of an alloy.

9. VSERP/Geometry of Molecules
   a. Students will use molecule model kits to understand the electron and molecule geometry of binary compounds.

10. Determining the Formula of a Hydrate
    a. Students will perform experiments to calculate the molar ratio of water to an anhydrous salt.

11. Melting Point of Ionic and Covalent Compounds
    a. Students will use a variety of ionic and covalent compounds to determine melting points and solubility.

12. Students will produce a Chemistry of Living System Poster or Power Point Presentation demonstrating the role of Carbon in Organic Compounds.

### Differentiation

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**Summative Assessments (unit final evaluation):**
- Comprehensive Unit Exam
- Multiple Choice, Short Answer, and Constructed Response
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## Integrated Physics and Chemistry

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<th>Standards (referenced)</th>
<th>Model / Tasks</th>
<th>Tools / Texts</th>
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</thead>
<tbody>
<tr>
<td>Changes in Matter</td>
<td></td>
<td>Chemical reaction</td>
<td>1. Conservation of Mass</td>
<td>CPO Textbook</td>
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</tr>
<tr>
<td>Physical Change</td>
<td></td>
<td>Reactant</td>
<td>a. Students will measure and analyze the reactants and products of known chemicals to demonstrate understanding of the Law of Conservation of Mass.</td>
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<tr>
<td>Chemical Change</td>
<td></td>
<td>Product</td>
<td>2. Energy and Chemical changes</td>
<td></td>
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<tr>
<td>Energy and Reactions</td>
<td></td>
<td>Precipitate</td>
<td>a. Students will perform experiments and measure temperature change to determine endothermic and exothermic reactions.</td>
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<tr>
<td>Solutions</td>
<td></td>
<td>Chemical equation</td>
<td>3. Thermodynamics of Hot Packs/Cold Packs</td>
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<td>Formula mass</td>
<td>a. Students will use Hot Packs and Cold Packs to determine the heat gained or lost during the respective chemical reactions.</td>
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<td>Law of Conservation of Mass</td>
<td>4. Electrolysis of Water</td>
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<td>Coefficient</td>
<td>a. Students will use electrical energy to separate water into Hydrogen Gas and Oxygen Gas. Students will calculate the moles of gas produced from the electrolysis reaction.</td>
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<td>Mole/Avogadro’s number</td>
<td>5. Solubility Curve of Salts</td>
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<td>Molecular mass</td>
<td>a. Students will use a variety of water soluble salts to graph and determine solubility curves.</td>
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<td>Polymerization</td>
<td>6. Acid, Bases, and pH of Unknown Solutions</td>
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<td>Single-replacement reaction</td>
<td>a. Students will use red cabbage</td>
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<td>Double-replacement reaction</td>
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<td>Synthesis reaction</td>
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<td>Decomposition reaction</td>
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<td>Combustion</td>
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<td>Activation energy</td>
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<td>Exothermic/Endothermic</td>
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<td>Percent yield</td>
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<td>Inhibitor/catalyst</td>
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<td>Chemical equilibrium</td>
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## Differentiation

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## Evaluation

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<td>Unit 7</td>
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</table>
| **Electricity and Magnetism** | **Electricity** | Electric and magnetic phenomena are related and have many practical applications. As a basis for understanding this concept: | 1. Electricity  
a. Students will measure voltage and current in electric circuits. | CPO Textbook  
CPO Equipment  
Flinn Ion Kits  
NHHS Science Department Lab Kits  
Bill Nye Videos  
Modern Marvels Science Videos  
Crash Course Video Series  
Khan Academy Videos |
|  |  |  
a. Students know how to predict the voltage or current in simple direct current (DC) electric circuits constructed from batteries, wires, resistors, and capacitors. | 2. Building a Motor  
a. Students will build a simple motor using a battery, magnets, and copper wire. |
|  |  |  
b. Students know how to solve problems involving Ohm’s law. | 3. Maglev  
a. Students will build, test, and improve design of a magnetic levitating sled. |
|  |  |  
c. Students know any resistive element in a DC circuit dissipates energy, which heats the resistor. Students can calculate the power (rate of energy dissipation) in any resistive circuit element by using the formula Power = I^2R. | 4. Resistance and Ohm’s Law  
a. Students will design electric circuits to test and calculate Ohm’s Law, the law that relates voltage, current, and resistance. |
|  |  |  
d. Students know the properties of transistors and the role of transistors in electric circuits. | 5. Electric Circuits  
a. Students will design, build, and calculate voltage in series circuits, short circuits, and parallel circuits. |
|  |  |  
e. Students know charged particles are sources of electric fields and are | 6. Electrical Energy and Power  
a. Students will design different systems to explore and understand the relationship between voltage, current, and power. |
|  |  |  | 7. Magnetism/Electromagnets  
a. Students will design and build electromagnets to understand the use and application of electrical and mechanical energy. |
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*Integrated Physics and Chemistry*

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### Key Vocabulary
- Restoring force
- Pendulum
- Oscillator
- Frequency
- Cycle
- Linear motion
- Harmonic motion
- Period
- Hertz
- Resonance
- Amplitude
- Periodic force
- Natural frequency
- Wave/Wavelength
- Reflection
- Absorption
- Wave front
- Plane waves
- Refraction/Diffraction
- Circular waves
- Destructive interference
- Constructive interference
- Longitudinal wave
- Transverse wave

### Standards (referenced)
Not applicable

### Model / Tasks
1. **Harmonic motion**
   - a. Students will use a pendulum to measure amplitude, oscillation, and period.
2. **Natural Frequency and Resonance**
   - a. Students will measure the amplitude, frequency, resonance, and energy of waves.
3. **Properties of Sound**
   - a. Students will use a sound generator to measure beats, consonance, and dissonance, interference, and resonance.
4. **Resonance in Other Systems**
   - a. Students will use a variety of containers (glasses, bottles, etc.) and observe the resonance associated with different levels of water.
5. **Reflection and Refraction**
   - a. Students will measure the angles of incidence and angles of reflection using different mediums (air, glass, water, etc.).

### Tools / Texts
- CPO Textbook
- CPO Equipment
- NHHS Science Department Lab Kits
- Bill Nye Videos
- Modern Marvels Science Videos
- Crash Course Video Series
- Khan Academy Videos

### Differentiation
**Support -- for students who are struggling with the content**

**Process:** Strategies for Struggling Students: see attached ([www.minisink.com](http://www.minisink.com))

**Extension -- for high achieving students.**

**Process:** GATE Strategies: see attached

### Evaluation
**Formative Assessments (ongoing & mid-lesson):**
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STRATEGIES FOR STRUGGLING STUDENTS

ACADEMIC

- **Instructional Strategies:**
  - List objectives and goals for lesson and/or day at a glance
  - Differentiate instruction into tiers or by learning style / multiple intelligence
  - Use of formative, summative, formal, and informal assessments
  - Data: Use data from classroom tests and assignments to inform instruction and re-teach where necessary
  - Provide rubrics with expectations before assigning a task or project
  - Present information in multiple formats (visual, graphic organizer, auditory, etc.)
  - Mnemonics and memory aides
  - Cooperative learning strategies with clearly defined roles (ex. Think-Pair-Share)
  - Flexible grouping for ability based instruction
  - Use review games to make learning fun
  - Use of flashcards to aid in study and recall
  - Cross-content integration
  - Repetition and repeated practice
  - Instructional model: Introduction → Guided practice → Independent practice
  - Instruction in test-taking strategies
  - Peer tutoring: same age or cross age
  - Allow students to recycle assignments and tests
  - Have students write their own study questions or tests.
  - Prioritize tasks with stars or by highlighting
  - Pre-teach content vocabulary across content areas

- **Modifications and Accommodations:**
  - **Time:** extended time on classroom assignments, tasks, tests, and quizzes
  - **Directions:** read directions aloud, restate and clarify directions, highlight key words, have students repeat directions back to teacher or class
  - Grade content area work on content, not mechanics, grammar, and punctuation
  - Use of timer to cue student as to timeline / deadline
  - Line guide or index card to keep place when reading
  - Use of graphic organizers
  - Use of manipulatives and hands-on materials
  - Modify assignments and homework to be on student’s instructional level
  - Use of Alpha-Smart or computer to complete tasks
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- Provide a copy of class notes or an outline on which student can take notes
- Provide work samples as a model (examples and non-examples)
- Limit number of items on a page
- Use of word bank

Communication:
- Frequent communication between home and school
- AIS (Academic Intervention Services)
- AIS Services on a consult basis
- AIS services on a regular basis
- Consistency and communication between AIS and classroom instruction

Reading
- Use of intervention components in reading series
- Use of online resources in reading series
- Vocabulary development
- Pre-read in small groups
- Books on tape / auditory recordings of stories
- High interest/low level reading materials

Math
- Vocabulary development
- Pre-teach concepts in small groups
- Use of online resources of math series
- Use of manipulatives

Speech / Language
- Model correct speech
- Encourage eye contact with speaker
- Extra time to process
- Prompts to expand use of language
- Prompts to slow down for sake of articulation
- Prompts to remain on topic
- Verbal cues to encourage verbal communication
- Teach signal words and key words

BEHAVIORAL AND SOCIAL
- Classroom-based strategies:
  - Structure and consistency in classroom environment
  - Establish classroom rules and expectations
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- Provide options and choices (i.e. where to complete work in the room)
- Use of timer
- Preferential seating; sit next to peer-model
- Incorporate opportunities for movement within the classroom
- Integration of character education into curriculum
- Logical consequences
- Opportunities for breaks and “time-outs”

#### Cueing, Prompting, and Praising systems:
- Catch them doing right!
- Positive attention and specific praise
- Make a “connection” with student through 1:1 attention or interest in his/her interests
- Visual prompts and signals
- Physical prompts and signals, including the use of teacher proximity
- Advance warning of transitions and changes in schedule

#### Reinforcements:
- Reward system: *daily, weekly behavior charts*
- Self-monitoring behavior charts
- Behavior contracts
- Behavior plan or chart
- Give student a “job” or classroom responsibility
- Involve student in a greater cause -- community service (K-Kids)
- Communication between home and school (email, phone, communication journal, planner, etc.)
- Support from the office or administration

#### Social Skills:
- Social role-play activities in class
- Non-mandated social skills group

#### Organization
- Structure and consistency in classroom environment
- To-do list - break down into small increments if necessary
- List objectives for lesson
- Provide schedule of daily activities or post in a visible location
- Study-buddy / Pack-up buddy
- Back-pack check before dismissal
- Copy of class notes or outline on which to take notes
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• After note taking, allow students time to compare their notes  
• Separate / Color coded folders  
• Extended time on classroom tests, quizzes, and assignments  
• Repetition and consistency  
• Homework chart tied to incentives  
• Advance warning of transitions / changes in schedule  
• Provide examples and non-examples

• Desk:  
  • Neat desk awards  
  • Photos / examples of neat desk  
  • Store textbooks in an alternate location  

• Communication:  
  • Frequent communication between home and school via planner, email, phone, communication journal  
  • Use of teacher web page with relevant resources  
  • Use of online components of reading / math series to be able to access the textbook from home  
  • Keep extra planner pages in the classroom in case student forgets planner at home.  
  • Parent/Teacher conference

ATTENTION

• Directions: *read directions aloud, restate and clarify directions, highlight key words, have students repeat directions back to teacher or class*  
• To-do list - break down into small increments of time if necessary  
• Incorporate opportunities for movement within the classroom  
• Breaks between papers / assignments  
• Provide alternate workspace (two desks)  
• Redirect to task  
• Use of timer  
• Provide options and choices (i.e. where to complete work in the room)  
• Preferential seating  
• Study-buddy  
• Cooperative learning with clearly defined roles in-group work  
• Use of manipulatives and hands-on materials  
• Use of a “fidget” item like a squeeze ball, Velcro strip, or carpet under chair  
• Target area of strength to boost area of weakness/concern

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• Parent/teacher conference

**MISCELLANEOUS**

• Teacher to teacher assistance (ex. use of mentor, peer observation, etc.)
• Make small, manageable, and achievable goals. Do not set up for failure!
• Set reasonable goals and expectations
• Recommend / model good health and nutrition habits
• Enrichment centers and assignments for students who finish early.

Source:  www.minisink.com

**GIFTED STUDENTS: RECOMMENDATIONS FOR TEACHERS**

It is estimated that students who are gifted and highly talented encompass 5 to 15% of the school age population. These advances students can have increased capabilities in academics, creativity, music, dance, art, and/or leadership. The following strategies are recommended:

1. **Compact the curriculum and provide enrichment activities.** Provide environments that are stimulating, and address cognitive, physical, emotional, and social needs of gifted children in the curriculum. Let the students move quickly through the required curriculum content and onto more advanced material. Allow for academic rigor.

2. **Implement a multi-level and multi-dimensional curriculum.** Differentiate the curriculum in order to address differences in the rate, depth, and pace of learning. This will enable all students in the class to learn about a specific area by creating projects at their own ability level. For example, if students are learning about the modern atomic theory, students of different ability levels can be assigned to different types of tasks. At the conclusion of the class, all of the students can present what they have learned to the entire group.

3. **Be flexible with the curriculum.** Take advantage of real-life experiences that can be translated into problem-solving academics for all students. For example, an impending snowstorm can be used to instruct students. Students of different ability levels are given different tasks, such as figuring out the hydrogen bonding in ice and snow and determining the biological importance of ice being less dense than water.

4. **Make the curriculum student-centered.** Engage gifted students in the curriculum decision-making process, giving them an opportunity to learn how to take responsibility for their own learning. Draw the curriculum from the students’ interests and educational needs.

5. **Allow students to pursue independent projects based on their own individual interests.** Independent projects can be assigned on the basis of ability level. Encourage creativity and original thinking among gifted students. Allow them to explore ways of connecting unrelated issues in creative ways.

6. **Allow gifted children to assume ownership of their own learning through curriculum acceleration.** Instruct them to work ahead to problems of skills that they do not know. To help children learn the value of attaining knowledge in their lives, encourage learning for its own sake, rather than emphasizing the end results or accomplishments. Teach research skills for accessing information; higher level thinking skills for processing it; creative thinking and problem-solving skills for flexibility in approach and generation of information; and communication skills for sharing it.
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7. **Try to maximize your students’ potential by expecting them to do their best.** Encourage them to advance as quickly as they can. Assist in developing projects that allow them to achieve success one step at a time.

8. **Teach interactively.** Have students work together, teach one another, and actively participate in their own and their classmates’ education. Note: This does not advocate gifted children being peer tutors in the classroom; the gifted student should be challenged as well. Emphasis should be on working together in the classroom. Cluster gifted children together as a table within the regular classroom and utilize advanced materials, as well as other suggested resources and modification, to meet their exceptional needs.

9. **Explore many points of view about contemporary topics and allow opportunity to analyze and evaluate material.** Allow open forums and debates in the classroom about controversial issues. As a teacher of gifted children, take an active stance. Be an advocate for gifted students. Utilize specialized training to ensure the ability to meet the needs of gifted students. Share personal interests with all students, to enrich and expand their world.

10. **Consider team teaching, collaboration, and consultation with other teachers.** Use the knowledge, skills, and support of other educators or professionals in the schools.

11. **Provide opportunities for gifted children to interact with other gifted children across grade levels and schools through competitions or collaborative projects.**

12. **Encourage gifted students to participate in extracurricular activities that involve academic skills.** Examples include math and debate teams. Because gifted children are often natural leaders, it is important to invite them to use their talents and abilities in beneficial, rather than disruptive, manners. For example, encourage the gifted student to run for office in student council, or another extracurricular activity in which he/she is involved.

13. **Involve students in academic contests.** Gifted students tend to be competitive by nature. Therefore, participating in regional and national competitions such as spelling bees, science fairs, and essay competitions will be fun challenges.

14. **Allow gifted children to create and publish a class newspaper to distribute.** This consists of assisting students in understanding their special capabilities and the training necessary for them to reach their full potential.

15. **Set individual goals.** Help guide students in creating their own goals and set goals that are specific, measurable, aggressive, realistic, and within a reasonable time frame. Be sure not to place expectations that are too high or too low.

16. **Consider parental input about the education of their gifted children.**

17. **Always remember that gifted children are similar in many ways to the average child in the classroom.** Do not place unrealistic expectations and pressures on gifted children.

18. **Address the counseling needs of each student to support emotional growth, as needed.** Some gifted students have issues regarding anger, boredom, bullying, delinquency, isolation, depression, peer relations, perfectionism, dropping out of school, stress, frustration, and underachievement. About 20-25% of gifted students have emotional difficulties.

19. **Remember that gifted children may not excel in all areas.** They may be ahead of other students in some areas and behind in some areas. Become aware of the strengths and weaknesses of the children in your class.

20. **Do not assign extra work to gifted children who finish assignments early.** This is unfair and frustrating to them. Simply offering more of the same only restricts further learning. Instead, allow those children to work on independent projects or other unfinished work when they finish an assignment early.

21. **If a child attends resource rooms, communicate with the specialist for suggestions on how to enrich daily classwork.** Avoid penalizing the child for special class attendance. Have another child in the regular classroom take notes and assignments for him/her.

22. **Provide plenty of opportunities for gifted children and average children to engage in social activities.** Some gifted children may need help in developing social skills.

23. **Try to find the joy and uniqueness in each child.** Children may exhibit their gifts on non-typical levels, rather than in general intellectual aptitude of specific academic abilities. Keep in mind that every child will have different needs.
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24. Organize resources in order to free yourself to work with individual children and give the children greater control of the learning situation. Supplementary books and learning tools, community resources, and the use of community members with specific skills as mentors can be helpful.

25. **Establish and maintain a warm, accepting classroom.** Teach your classroom community to embrace diversity and honor differences. Provide an environment in which the child can demonstrate his or her potential or aptitude to learn and perform. Teachers should strive to establish a noncompetitive, individualized, and open classroom, which allows all students to advance at their own rate of learning.

26. Remember that implementing some of these strategies will benefit all of the children in the classroom, not just the gifted ones.
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Resources:
www.canteach.ca/links/linkgifted.html: Challenging Gifted Students in Regular Classrooms.
www.nagc.org: National Association for Gifted Students: Supporting the needs of high potential learners.

Contributors:
Stephanie Bauer
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