

IPC Bundles

<b>BUNDLE 1: WEEK 1-3</b>		
<b>Introduction to IPC</b>		
<b>TEKS Knowledge &amp; Skills</b>	<b>TEKS Student Expectation</b>	<b>Specification/Examples</b>
<p><b>7 The student knows relationships exist between properties of matter and its components.</b></p> <p><b>8 The student knows that changes in matter affect everyday life.</b></p>	<p><b>7A Investigate and identify properties of fluids</b></p> <p><b>8A Distinguish between physical and chemical changes in matter.</b></p>	<ul style="list-style-type: none"> <li>• Describe the properties of a variety of fluids in terms of               <ul style="list-style-type: none"> <li>▪ Density <math>D=M/V</math></li> </ul> </li> <li>• Describe variables that may affect the outcomes of physical and chemical experiments</li> </ul>





<p><b>6 The student knows the impact of energy transformations in everyday life.</b></p> <p><b>7 The student knows relationships exist between properties of matter and its components.</b></p>	<p><b>6H</b> Analyze the effects of heating and cooling processes in systems.</p> <p><b>7D Relate the chemical behavior of an element to its placement on the periodic table.</b></p> <p><b>7A. Investigate and identify properties of fluids</b></p>	<ul style="list-style-type: none"> <li>• Evaporation</li> <li>• Condensation</li>   <li>• Bonding <ul style="list-style-type: none"> <li>▪ Ionic <ul style="list-style-type: none"> <li>○ Ionic compound</li> </ul> </li> <li>▪ Covalent <ul style="list-style-type: none"> <li>○ Molecule</li> </ul> </li> <li>▪ Metallic <ul style="list-style-type: none"> <li>○ Alloy</li> </ul> </li> </ul> </li> <li>• Polyatomic ions</li> <li>• Apply the octet rule using electron dot diagram</li>   <li>• Describe the properties of a variety of fluids in terms of <ul style="list-style-type: none"> <li>▪ Density <math>D=M/V</math></li> <li>▪ Viscosity</li> </ul> </li> </ul>
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**BUNDLE 4: WEEK 10-12**

**Compounds and Reactions**

<p><b>TEKS Knowledge &amp; Skills</b></p>	<p><b>TEKS Student Expectation</b></p>	<p><b>Specification/Examples</b></p>
<p><b>7 The student knows relationships exist between properties of matter and its components.</b></p> <p><b>8 The student knows that changes in matter affect everyday life.</b></p>	<p><b>7D Relate the chemical behavior of an element to its placement on the periodic table.</b></p> <p><b>8B</b> Analyze energy changes that accompany chemical reactions to classify them as endergonic or exergonic reactions.</p> <p><b>8C Investigate and identify the law of conservation of mass.</b></p>	<ul style="list-style-type: none"> <li>• Write formulas using charges</li> <li>• Naming compounds</li>   <li>• Heat packs</li> <li>• Cold packs</li> <li>• Glow sticks</li> <li>• Evaluate energy diagrams of reactions</li> <li>• Explain             <ul style="list-style-type: none"> <li>▪ Exothermic reactions</li> <li>▪ Endothermic reactions</li> <li>▪ Activation energy</li> <li>▪ Catalysts</li> </ul> </li>   <li>• Recognize that atoms are rearranged in a reaction.</li> <li>• Explain and demonstrate the law of conservation of mass</li> <li>• Identify the parts of a chemical equation:             <ul style="list-style-type: none"> <li>▪ Reactants</li> <li>▪ Yield sign</li> <li>▪ Product</li> </ul> </li> <li>• Balance simple chemical equations</li> <li>• Classify different reaction types             <ul style="list-style-type: none"> <li>▪ Synthesis</li> <li>▪ Decomposition</li> </ul> </li> </ul>

	<p><b>8D</b> Describe types of nuclear reactions and their roles in applications including medicine and energy production.</p> <p><b>8E</b> Research and describe the environmental and economic impact of the end-products of chemical reactions.</p>	<ul style="list-style-type: none"><li>▪ Combustion</li><li>▪ Single displacement</li><li>▪ Double displacement</li> <li>• Radioisotopes</li><li>• Explain how a nuclear fission reaction occurs</li><li>• Explain how a nuclear fusion reaction occurs</li><li>• Explain the importance of nuclear reactions<ul style="list-style-type: none"><li>▪ Medicine</li><li>▪ Solar and nuclear energy</li><li>▪ Fission</li><li>▪ Fusion</li></ul></li> <li>• Heavy metals</li><li>• Sulfur dioxide</li></ul>
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**BUNDLE 5: WEEK 13-15**

**Solution Chemistry**

<p><b>TEKS Knowledge &amp; Skills</b></p>	<p><b>TEKS Student Expectation</b></p>	<p><b>Specification/Examples</b></p>
<p><b>7 The student knows relationships exist between properties of matter and its components.</b></p> <p><b>9 The student knows how solution chemistry is a part of everyday life.</b></p>	<p><b>7E Classify samples of matter from everyday life.</b></p> <p><b>7A Investigate and identify properties of fluids</b></p> <p><b>9A Relate the structure of water to its function as the universal solvent.</b></p>	<ul style="list-style-type: none"> <li>• Elements</li> <li>• Compounds</li> <li>• Mixtures               <ul style="list-style-type: none"> <li>▪ Heterogeneous mixture</li> <li>▪ Homogeneous mixture</li> <li>▪ Solution</li> <li>▪ Suspensions</li> <li>▪ Colloid</li> </ul> </li> <li>▪ Density <math>D=M/V</math></li> <li>▪ Viscosity</li> <li>• Structure of water               <ul style="list-style-type: none"> <li>▪ Solid</li> <li>▪ Liquid</li> </ul> </li> <li>• Solubility</li> <li>• Solvents</li> <li>• Solutes</li> <li>• Solutions</li> <li>• Describe the properties of water including hydrogen bonding</li> <li>• Explain why water is called the universal solvent</li> <li>• Polarity</li> <li>• Intra and Inter molecular</li> </ul>

**BUNDLE 6: WEEK 16-18**

**Acids and Bases**

<p><b>TEKS Knowledge &amp; Skills</b></p>	<p><b>TEKS Student Expectation</b></p>	<p><b>Specification/Examples</b></p>
<p><b>9 The student knows how solution chemistry is a part of everyday life.</b></p>	<p><b>9D Demonstrate how various factors influence solubility.</b></p> <p><b>9E</b> Demonstrate how factors influence the rate of dissolving.</p> <p><b>9B Relate the concentration of ions in a solution to physical and chemical properties</b></p> <p><b>9C</b> Simulate the effects of acid rain on soil, buildings, statues, or microorganisms.</p>	<ul style="list-style-type: none"> <li>• Temperature</li> <li>• Pressure</li> <li>• Nature of the solute and solvent</li> <li>• Particle size (surface area)</li> <li>• Apply the solubility rules for ionic compounds</li> <li>• Interpret solubility curves</li>   <li>• Particle size</li> <li>• Temperature</li> <li>• Pressure</li> <li>• Nature of the solute and solvent</li> <li>• Agitation</li>   <li>• pH                             <ul style="list-style-type: none"> <li>▪ The disassociation of strong and weak acids and bases</li> </ul> </li> <li>• Electrolytic behavior</li> <li>• Reactivity</li> <li>• Saturated solutions</li> <li>• Unsaturated solutions</li> <li>• Supersaturated solutions</li> <li>• Know the pH scale, common acids and bases</li> <li>• Introduce molarity</li>   <li>• Explain the chemical effects of acid rain on soils, buildings, and living things</li> <li>• Propose ways to neutralize the effects of acid rain</li> <li>• Describe the importance of solutions in</li> </ul>

		<p>geological, biological, and physical processes</p> <ul style="list-style-type: none"><li>• Rock cycle</li><li>• Water cycle</li></ul>
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**BUNDLE 7: WEEK 19-21****Conservation of Energy**

<b>TEKS Knowledge &amp; Skills</b>	<b>TEKS Student Expectation</b>	<b>Specification/Examples</b>
<b>6 The student knows the impact of energy transformations in everyday life.</b>	<b>6A Describe the law of conservation of energy.</b>	<ul style="list-style-type: none"><li>• Gravitational potential energy</li><li>• Kinetic energy</li><li>• Conversions between<ul style="list-style-type: none"><li>▪ KE</li><li>▪ GPE</li><li>▪ How they relate to ME<ul style="list-style-type: none"><li>○ <math>ME = GPE + KE</math></li></ul></li></ul></li><li>• Calculate the kinetic energy of an object, given its mass and velocity.<ul style="list-style-type: none"><li>○ <math>KE = mv^2/2</math></li></ul></li><li>• Calculate the gravitational potential energy of an object, given its mass and its height.<ul style="list-style-type: none"><li>○ <math>PE = mgh</math></li></ul></li><li>• Introduce chemical potential energy</li><li>• Analyze energy transformations<ul style="list-style-type: none"><li>▪ Potential to kinetic</li><li>▪ Solar to electrical</li><li>▪ Mechanical to thermal</li><li>▪ Chemical to mechanical</li></ul></li></ul>

**BUNDLE 8: WEEK 22-24**

**Heat, Electrical Energy and Energy Sources**

<p><b>TEKS Knowledge &amp; Skills</b></p>	<p><b>TEKS Student Expectation</b></p>	<p><b>Specification/Examples</b></p>
<p><b>6 The student knows the impact of energy transformations in everyday life.</b></p>	<p><b>6B Investigate and demonstrate the movement of heat.</b></p> <p><b>6C</b> Analyze energy conversions that are responsible for the production of electricity.</p> <p><b>6D Investigate and compare economic and environmental impacts of using various energy sources.</b></p>	<ul style="list-style-type: none"> <li>• Convection</li> <li>• Conduction</li> <li>• Radiation</li> <li>• Energy transfer</li> <li>• Conductors</li> <li>• Insulators</li> <li>• Temperature conversions (K, &amp; °C)</li> <li>• Calculate specific heat               <ul style="list-style-type: none"> <li>○ <math>Q=(m)(\Delta T)(C_p)</math></li> </ul> </li> <li>• Radiant (solar)</li> <li>• The movement of water or wind</li> <li>• Nuclear</li> <li>• Geothermal sources</li> <li>• Fossil fuels               <ul style="list-style-type: none"> <li>▪ Coal</li> <li>▪ Gas</li> <li>▪ Oil</li> </ul> </li> <li>• Efficiency</li> <li>• Renewable vs Nonrenewable</li> <li>• Rechargeable or disposable batteries</li> <li>• Solar cells</li> <li>• Determine the amount of electric power in a system.               <ul style="list-style-type: none"> <li>▪ Electrical energy = power X time (<math>E=Pt</math>)</li> <li>▪ Electrical power = voltage X current (<math>P=VI</math>)</li> </ul> </li> </ul>

	<p><b>6E</b> Measure the thermal and electrical conductivity of various materials and explain results.</p> <p><b>6F Investigate and compare series and parallel circuits.</b></p> <p><b>6G</b> Analyze the relationship between an electric current and the strength of its magnetic field using simple electromagnets.</p> <p><b>6H</b> Analyze the effects of heating and cooling processes in systems.</p>	<ul style="list-style-type: none"> <li>• Explain why people are continually trying to conserve energy sources.</li> <li>• Differentiate between batteries and generators.</li>   <li>• Investigate the electrical and thermal conductivity of a variety of materials</li>   <li>• Describe the difference in open and closed circuits.</li> <li>• Build series and parallel circuits.</li> <li>• Calculate resistance using voltage and current. <ul style="list-style-type: none"> <li>▪ <math>I = V/R</math></li> </ul> </li> <li>• Identify the symbols in a schematic diagram.</li> <li>• Describe the flow of electrons as they travel through a circuit.</li>   <li>• Describe how a compass uses magnetic fields in relationship to the Earth's polarity.</li> <li>• Describe an electric field</li> <li>• Identify the role of <ul style="list-style-type: none"> <li>▪ Transformers</li> <li>▪ Generators</li> </ul> </li>   <li>• Weather systems</li> <li>• Living organisms <ul style="list-style-type: none"> <li>▪ Sweating</li> <li>▪ Panting</li> <li>▪ Fever</li> </ul> </li> <li>• Mechanical (heat pumps)</li> <li>• Evaporation</li> <li>• Condensation</li> <li>• Insulation</li> </ul>
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**BUNDLE 10: WEEK 28-30**

**EMR and Sound**

<p><b>TEKS Knowledge &amp; Skills</b></p>	<p><b>TEKS Student Expectation</b></p>	<p><b>Specification/Examples</b></p>
<p><b>5 The student knows the effects of waves on everyday life.</b></p>	<p><b>5A Demonstrate wave types and their characteristics through a variety of activities.</b></p> <p><b>5C</b> Identify uses of electromagnetic waves in various technological applications.</p> <p><b>5D</b> Demonstrate the application of acoustic principles.</p>	<ul style="list-style-type: none"> <li>• Analyze the light spectrum based on frequency and wave length</li> <li>• Explain how light frequency and wavelength apply to light intensity</li> <li>• Classify electromagnetic waves based on <math>\lambda</math> and <math>f</math></li>   <li>• Fiber optics</li> <li>• Optical scanners</li> <li>• Microwaves</li> <li>• Holograms</li> <li>• Radar</li> <li>• Laser</li> <li>• Magnetic Resonance Imaging (MRI)</li>   <li>• Echolocation</li> <li>• Musical instruments</li> <li>• Noise pollution</li> <li>• Sonograms</li> <li>• Sonar</li> <li>• Describe how sound waves are produced</li> <li>• Describe how loudness and pitch of a sound are determined</li> <li>• Describe the cause and importance of the Doppler effect</li> <li>• Illustrate the diffraction of sound waves</li> <li>• Distinguish between the causes and effects of resonance</li> </ul>

<b>7 The student knows relationships exist between properties of matter and its components.</b>	<b>7C</b> Identify constituents of various materials or objects.	<ul style="list-style-type: none"><li>• Metal salts</li><li>• Light sources</li><li>• Fireworks displays</li><li>• Stars using spectral-analysis techniques</li></ul>
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<b>7 The student knows relationships exist between properties of matter and its components.</b>	<b>7A Investigate and identify properties of fluids</b>	<ul style="list-style-type: none"><li>• Calculate the net force in a simple system</li><li>• Describe the properties of a variety of fluids in terms of<ul style="list-style-type: none"><li>▪ Buoyancy</li></ul></li><li>• Describe Bernoulli's Principle and its application</li><li>• Describe Pascal's principal and its applications</li></ul>
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	<p><b>4D Investigate and demonstrate mechanical advantage and efficiency of various machines.</b></p>	<p>that make up different complex machines</p> <ul style="list-style-type: none"><li>• Recognize how each type of simple machine reduces the force required by either changing the direction of the force or increasing the distance over which the force is applied.</li><li>• Levers</li><li>• Motors</li><li>• Wheels and axles</li><li>• Pulleys</li><li>• Ramps</li><li>• Calculate mechanical advantage and efficiency for all simple machines and motors.</li><li>• Explain the relationship between mechanical advantage and efficiency.</li><li>• Explain the relationship between friction and efficiency.</li></ul>
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**BUNDLE 1-12****PROCESSES**

<b>TEKS Knowledge &amp; Skills</b>	<b>TEKS Student Expectation</b>
<p><b>1 The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.</b></p> <p><b>2 The student uses scientific methods during field and laboratory investigations.</b></p> <p><b>3 The student uses critical thinking and scientific problem solving to make informed decisions.</b></p>	<p><b>1A demonstrate safe practices during field and laboratory investigations</b></p> <p><b>1B</b> make wise choices in the use and conservation of resources and the disposal or recycling of materials</p> <p><b>2A plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology</b></p> <p><b>2B collect data and make measurements with precision</b></p> <p><b>2C organize, analyze, evaluate, make inferences, and predict trends from data</b></p> <p><b>2D communicate valid conclusions</b></p> <p><b>3A analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information</b></p> <p><b>3B draw inferences based on data related to promotional materials for products and services</b></p> <p><b>3C</b> evaluate the impact of research on scientific thought, society, and the environment</p>

**3D** describe connections between physics and chemistry, and future careers

**3E** research and describe the history of physics, chemistry, and contributions of scientists