



# Chemistry - Unit 4 - Nomenclature and Types of Reactions

## Unit Focus

In Unit 4, students focus on a study of nomenclature, the highly structured process of writing names and formulas of ionic compounds, molecular compounds, and organic compounds. Next, they will apply the nomenclature they learned to help develop formulas within chemical reactions. Students will continue by learning how to balance chemical equations and then identifying the types of reactions by looking given reactants. To finalize students will be asked to predict the states of matter of reactants and products, to predict the products of given reactions based on the observations of the reactions and classify the types of reactions observed.

## Stage 1: Desired Results - Key Understandings

| Standard(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Transfer                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <p><b>Next Generation Science Standards</b><br/>Performance Expectations: High School Physical Sciences</p> <ul style="list-style-type: none"> <li>Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. (HS-PS1-1)</li> <li>Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. (HS-PS1-2)</li> <li>Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. (HS-PS1-7)</li> </ul> <p><b>Next Generation Science Standards (DCI)</b><br/>Science: 11</p> <ul style="list-style-type: none"> <li>Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (PS1.9.B1)</li> <li>The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (PS1.9.B3)</li> </ul> <p><b>Madison Public Schools Profile of a Graduate</b></p> <ul style="list-style-type: none"> <li>Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions,</li> </ul> | <p><i>Students will be able to independently use their learning to...</i><br/> <b>T1</b> Analyze qualitative and quantitative data to interpret patterns, draw conclusions, and/or make predictions.<br/> <b>T2</b> Communicate effectively based on purpose, task, and audience to promote collective understanding and/or recommend actions.</p>                                |                                                                                                                                                                                                                                                                                                                                                                                                                           |
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## Stage 1: Desired Results - Key Understandings

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| <p>patterns, and relationships in order to make inferences. (POG.1.2)</p> <ul style="list-style-type: none"> <li>Product Creation: Effectively use a medium to communicate important information. (POG.3.2)</li> </ul> | <p><b>K2</b> Ionic compounds are made of cations and anions.<br/> <b>K3</b> Outer level electrons are transferred from metals to nonmetals, in the formation of ionic compounds.<br/> <b>K4</b> Valence electrons are shared between atoms of nonmetals and/or metalloids, in molecular compounds.<br/> <b>K5</b> Atoms of transition metals tend to form more than one charge, and therefore the Stock system is used in their name.<br/> <b>K6</b> Organic compounds are made of carbon and hydrogen.<br/> <b>K7</b> Vocabulary: atom, molecule, ion, formula unit, salt, ionic compound, molecular compound, organic compound, polyatomic ion, valence electron, metal, nonmetal, transition metal, metalloid, isotope, atomic mass, noble gases, halides, alkalis, alkalines<br/> <b>K8</b> Chemical formulas describe the ratio of elements in a compound.<br/> <b>K9</b> The metal activity series, and independently the nonmetal activity series, allow for determination that a single replacement reaction will or will not occur.<br/> <b>K10</b> The solubility rules enable us to predict which substances will form precipitates when combined in an aqueous solution.</p> | <p><b>S3</b> Apply rules of nomenclature to write chemical names and formulas for ions, and ionic compounds.<br/> <b>S4</b> Analyze a common chemical compound and classify as ionic, molecular, or organic.<br/> <b>S5</b> Write a complete balanced equation, given only the reactants, by name.<br/> <b>S6</b> Assess whether a reaction will occur by referring to an activity series.<br/> <b>S7</b> Predict precipitates by referring to solubility rules.</p> |
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