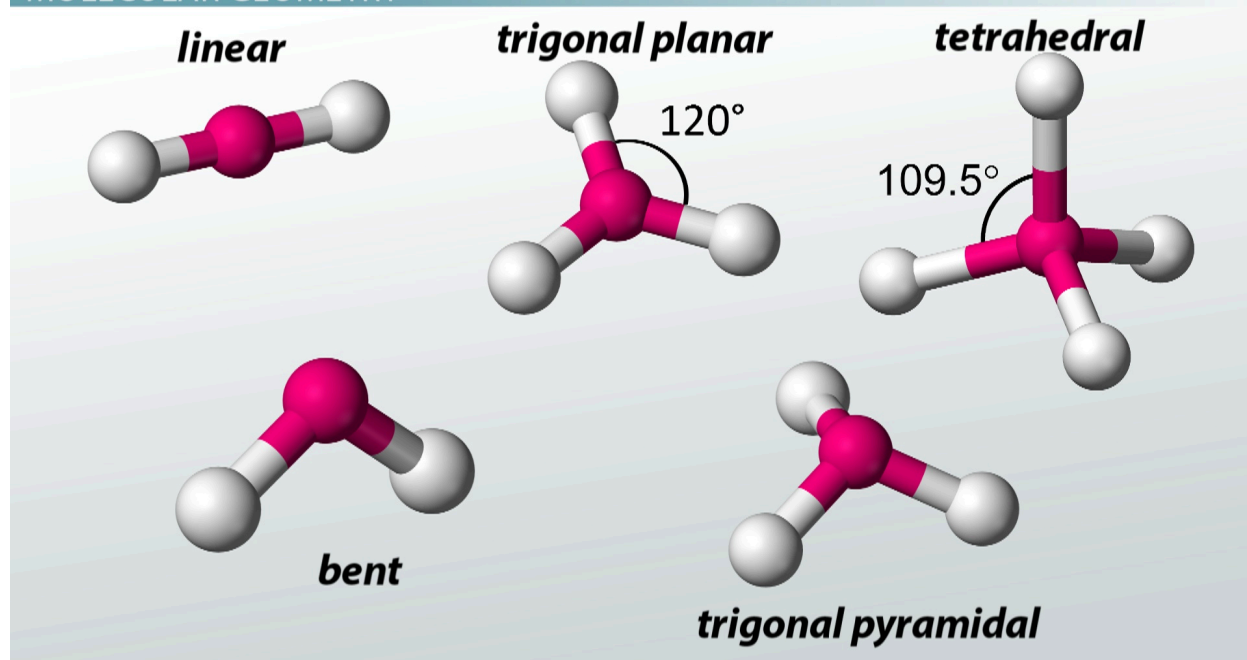


# Chemical Bonding

## MOLECULAR GEOMETRY



## Unit Introduction

In our last unit, we learned that electrons, and each element's unique electron configuration, are what give elements their unique properties. How does that cause different substances (ionic vs. molecular compounds) to have different properties? In this unit, we will explore the four different types of bonds, how they are classified, and the ways in which electrons are interacting in each type of bond that causes different types of compounds to have different properties.

# Unit Priority Standards

- **SS.SCI.CHEM.2.3** - Develop & Using Models  
Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.
- **SS.SCI.CHEM.2.5** - Analyzing & Interpreting Data  
Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Essential Question
1. Why do different substances have different properties?
Enduring Understandings
1. The type of bonding in a substance gives rise to its intrinsic properties.
Essential Knowledge
<ol style="list-style-type: none"> <li>1. Ionic bonds typically form between a metal and a nonmetal, covalent bonds typically form between two nonmetals, metallic bonds form between two metals.</li> <li>2. In ionic bonds, electrons are transferred to form ions of opposite charges, which are held together by electrostatic attraction.</li> <li>3. In covalent bonds, electrons are shared such that there is an electrostatic attraction between the two nuclei and the shared pair(s) of electrons.</li> <li>4. Polar covalent compounds have an unequal distribution of charge, caused by unequal sharing of electrons in bonds and an asymmetrical molecular geometry.</li> <li>5. Ionic compounds are characterized by high melting and boiling points, solubility in water, conductivity in water, low volatility, brittleness.</li> <li>6. Polar covalent compounds are characterized by solubility in water, conductivity in water.</li> <li>7. Pure covalent compounds are characterized by solubility in hexanes, high volatility, low melting and boiling points.</li> </ol>
Essential Skills
<ol style="list-style-type: none"> <li>1. Determination of bonding type based on the elements in the compound or molecule</li> <li>2. Determination of the bonding type in solids based on the properties of the solid</li> <li>3. Drawing Lewis dot structures</li> <li>4. Identifying molecular geometries and polarity</li> <li>5. Model intermolecular forces</li> <li>6. Write chemical formulas and name ionic and molecular compounds</li> </ol>

# Unit Outline

<b>Week 1</b>	<ul style="list-style-type: none"><li>• Types of chemical bonds</li><li>• Lewis structures</li><li>• Molecular geometry</li></ul>
<b>Week 2</b>	<ul style="list-style-type: none"><li>• Lewis structures</li><li>• Molecular geometry</li><li>• Polarity</li><li>• Molecular nomenclature</li></ul>
<b>Week 3</b>	<ul style="list-style-type: none"><li>• <b>Formative assessment</b></li><li>• Ionic nomenclature</li></ul>
<b>Week 4</b>	<ul style="list-style-type: none"><li>• Ionic nomenclature with polyatomic ions</li><li>• Review of Lewis structures, molecular geometry, and polarity, including polyatomic ions</li></ul>
<b>Week 5</b>	<ul style="list-style-type: none"><li>• Types of Bonding in Solids lab</li><li>• Properties &amp; structures of chemical bonds</li><li>• Intermolecular forces</li></ul>
<b>Week 6</b>	<ul style="list-style-type: none"><li>• <b>Formative Assessment</b></li><li>• Unit Review</li><li>• <b>Summative Assessment</b></li></ul>

# Assessment Details

Evidence	
I will check students' understanding throughout the unit by...	
<b>Summative</b> <ul style="list-style-type: none"><li>Unit 2 Test (includes lab data analysis)</li></ul>	<b>Formative</b> <ul style="list-style-type: none"><li>Check for understanding quizzes (not entered in PowerSchool)</li><li>Formative Quiz #1: Types of bonds, Lewis structures, molecular geometry and polarity, molecular nomenclature</li><li>Formative Quiz #2: Properties of different types of bonds, ionic &amp; molecular nomenclature, intermolecular forces, lab data analysis</li></ul>