

# Unit 5 - Find your Matter - Ionic vs Covalent Bond

Content Area: **Science**  
Course(s): **Chemistry CP**  
Time Period: **January**  
Length: **6 weeks**  
Status: **Published**

## Transfer Skills

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The arrangement of atoms influences the bond character and causes the substance to have either ionic, covalent, or metallic bonds.

## Enduring Understandings

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An atom's electron configuration determines who it interacts with to form bonds.

The octet rule is used to determine how atoms bond covalently with one another by sharing electrons.

Transfer of electrons influences the structure of ionic compounds.

## Essential Questions

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How does chemical bonding determine the properties of a substance?

How do the electronic structures of atoms determine the way in which they form chemical compounds?

How does the molecular structure influence the properties of a substance?

How does the degree of polarity between two different atoms affect bonding?

## Content

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cation, anion, octet rule, metallic bond, multiple bond, polar covalent, non-polar covalent, polyatomic ion, dipole interaction, van der Waals forces

## Skills

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Draw electron dot structures of the representative elements.

Use the theory of metallic bonding to explain the physical properties of metals.

Differentiate between polar covalent, non-polar covalent, and ionic bonds using electronegativity differences as well as location of elements on the periodic table.

Distinguish between ionic and covalent bonds.

Explain the role and location of electrons in a covalent bond.

Use electron dot structures to show covalent bond formation.

Draw electron dot structures for simple covalent molecules containing single, double and triple bonds.

Describe the various intermolecular forces in a molecule and the affect they have on properties.

## Resources

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## Standards

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SCI.9-12.5.1.12.B.1	Design investigations, collect evidence, analyze data, and evaluate evidence to determine measures of central tendencies, causal/correlational relationships, and anomalous data.
SCI.9-12.5.1.12.B.2	Build, refine, and represent evidence-based models using mathematical, physical, and computational tools.
SCI.9-12.5.1.12.B.d	Scientific reasoning is used to evaluate and interpret data patterns and scientific conclusions.
SCI.9-12.5.2.12	All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.
SCI.9-12.5.2.12.A.1	Use atomic models to predict the behaviors of atoms in interactions.
SCI.9-12.5.2.12.A.2	Account for the differences in the physical properties of solids, liquids, and gases.
SCI.9-12.5.2.12.A.a	Electrons, protons, and neutrons are parts of the atom and have measurable properties, including mass and, in the case of protons and electrons, charge. The nuclei of atoms are composed of protons and neutrons. A kind of force that is only evident at nuclear distances holds the particles of the nucleus together against the electrical repulsion between the protons.
SCI.9-12.5.2.12.A.b	Differences in the physical properties of solids, liquids, and gases are explained by the ways in which the atoms, ions, or molecules of the substances are arranged, and by the strength of the forces of attraction between the atoms, ions, or molecules.
SCI.9-12.5.2.12.B.1	Model how the outermost electrons determine the reactivity of elements and the nature of the chemical bonds they tend to form.
SCI.9-12.5.2.12.B.a	An atom's electron configuration, particularly of the outermost electrons, determines how the atom interacts with other atoms. Chemical bonds are the interactions between atoms that hold them together in molecules or between oppositely charged ions.

SCI.9-12.5.2.12.B.b

A large number of important reactions involve the transfer of either electrons or hydrogen ions between reacting ions, molecules, or atoms. In other chemical reactions, atoms interact with one another by sharing electrons to create a bond.