

**CHM 110 / 111: Chapter 9 study guide / learning objectives**

Chapter 9 in your textbook deals with chemical bonding. You are required to know the terminology of bonding and how to draw Lewis structures representing atomic species, ions, and covalently-bonded molecules.

**At the end of this chapter, you should be able to:**

*[Definitions]*

- Define terms related to chemical bonding: **bond, ionic bond, covalent bond, metallic bond, ionic compound, molecular compound, polar, nonpolar, electronegativity, delocalized bonding, resonance, formal charge, octet rule, bond length, bond order, bond energy.**

*[Chemical bonds]*

- Describe the three major types of bonding: ionic, covalent, and metallic.
- Tell how many electrons are involved in a given ionic reaction.
- Determine whether a bond between two atoms is ionic or covalent.
- Use the periodic table to estimate whether the electronegativity of one atom is higher or lower than another. (hint: the closer to fluorine the element is in the periodic table, the higher the electronegativity tends to be)
- Determine whether a *bond* is polar or nonpolar.
- Describe how the number of electrons shared by two atoms relates to the distance between the atoms (bond length) and the energy required to break the bond (bond energy).

*[Simple Lewis structures]*

- Draw **Lewis structures** for a given molecule (or polyatomic ion) using the four rules we discussed in class.
- Use the **octet rule** to determine whether or not atoms share more than one pair of electrons in a bond.

*[More complex Lewis structures]*

- Draw **resonance structures** for compounds that have delocalized bonds.
- Draw Lewis structures for compounds that contain *exceptions* to the octet rule (Ex: some P compounds, some B compounds, some Xe compounds).
- Calculate **formal charges**.
- Use formal charges to determine which possible Lewis structure for a compound is the best.

*[Practice problems from the textbook]*

- 9.35, 9.37, 9.51, 9.55, 9.61, 9.63, 9.67, 9.69, 9.71, 9.75, 9.77, 9.83