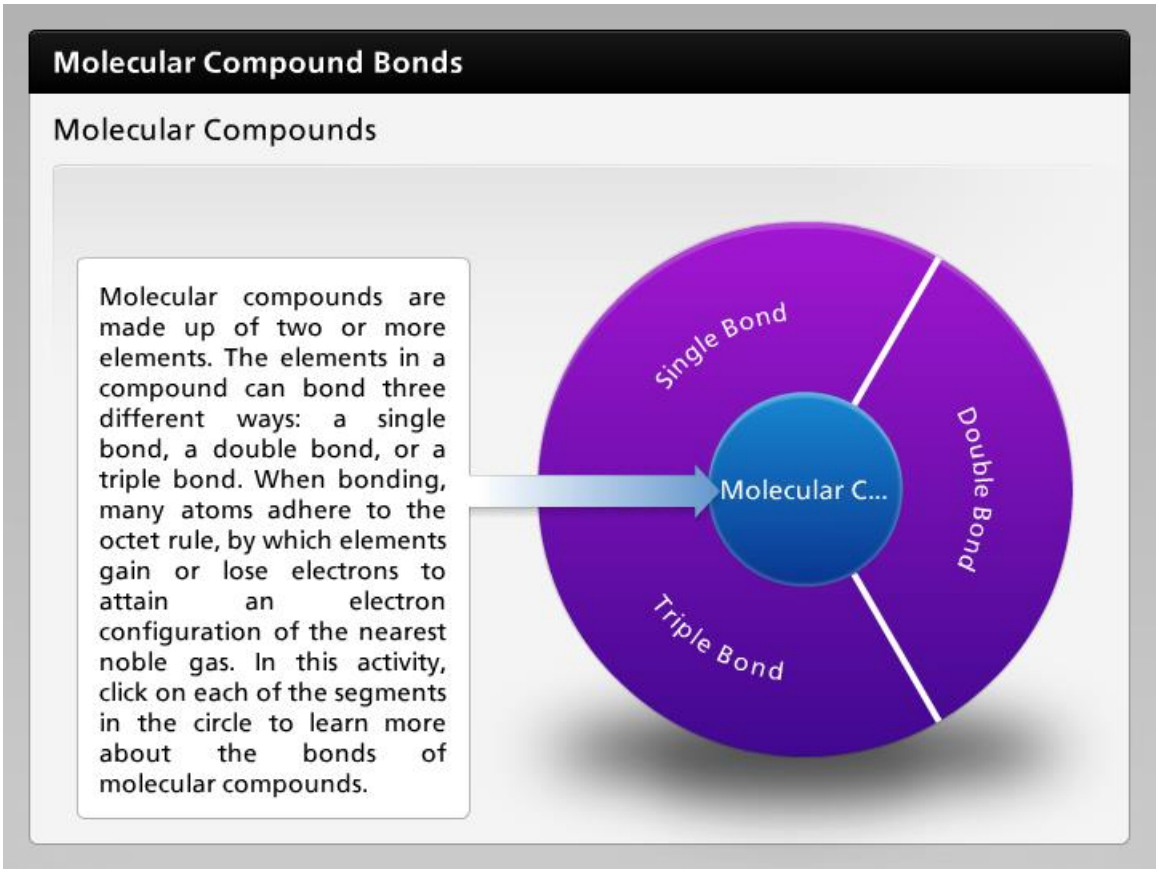
Module 4: Bonding, Formula Writing, and Nomenclature

Topic 5 Content: Molecular Compound Bonds Notes

Molecular Compounds



Molecular compounds are made up of two or more elements. The elements in a compound can bond three different ways: a single bond, a double bond, or a triple bond. When bonding, many atoms adhere to the octet rule, by which elements gain or lose electrons to attain an electron configuration of the nearest noble gas. In this activity, click on each of the segments in the circle to learn more about the bonds of molecular compounds.

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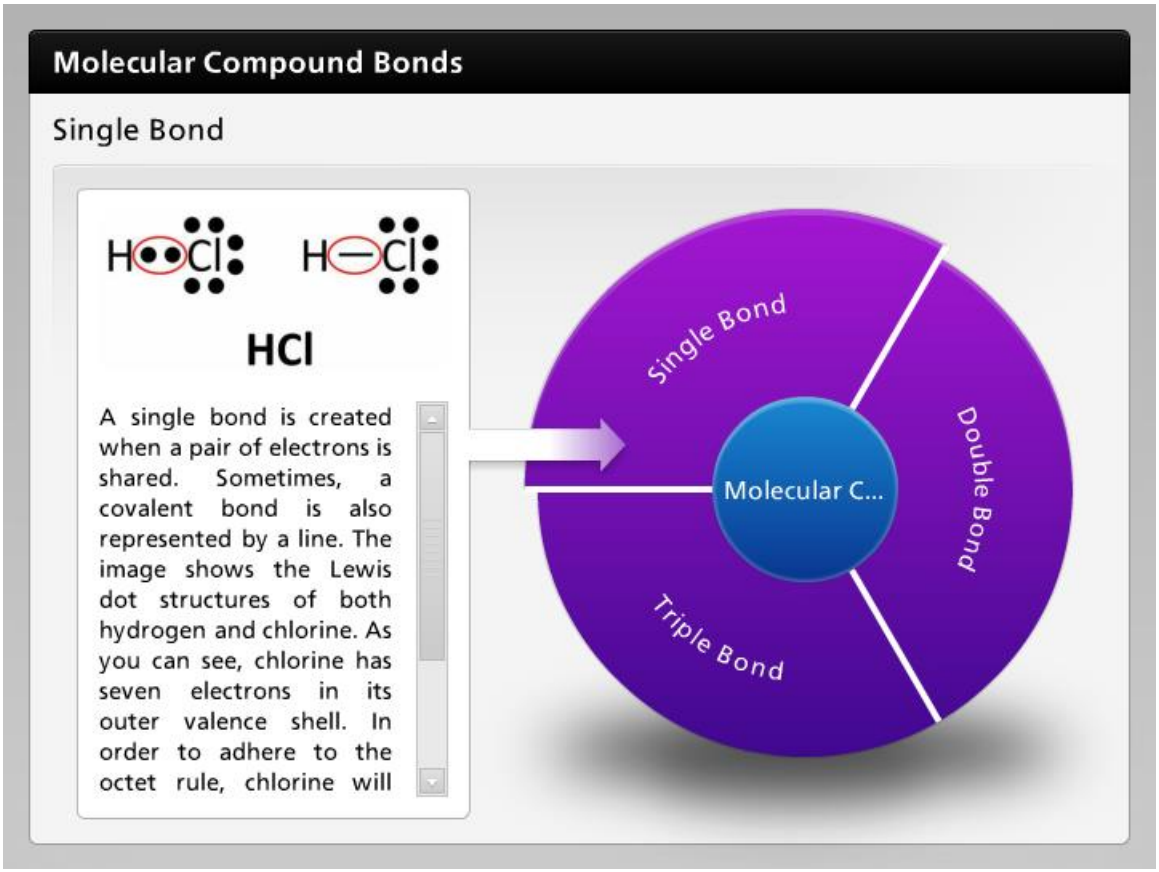
Single Bond



A single bond is created when a pair of electrons is shared. Sometimes, a covalent bond is also represented by a line. The image shows the Lewis dot structures of both hydrogen and chlorine. As you can see, chlorine has seven electrons in its outer valence shell. In order to adhere to the octet rule, chlorine will need to fill this energy level, so it bonds with hydrogen. The resulting bond is a single bond, as only one pair of electrons is shared.

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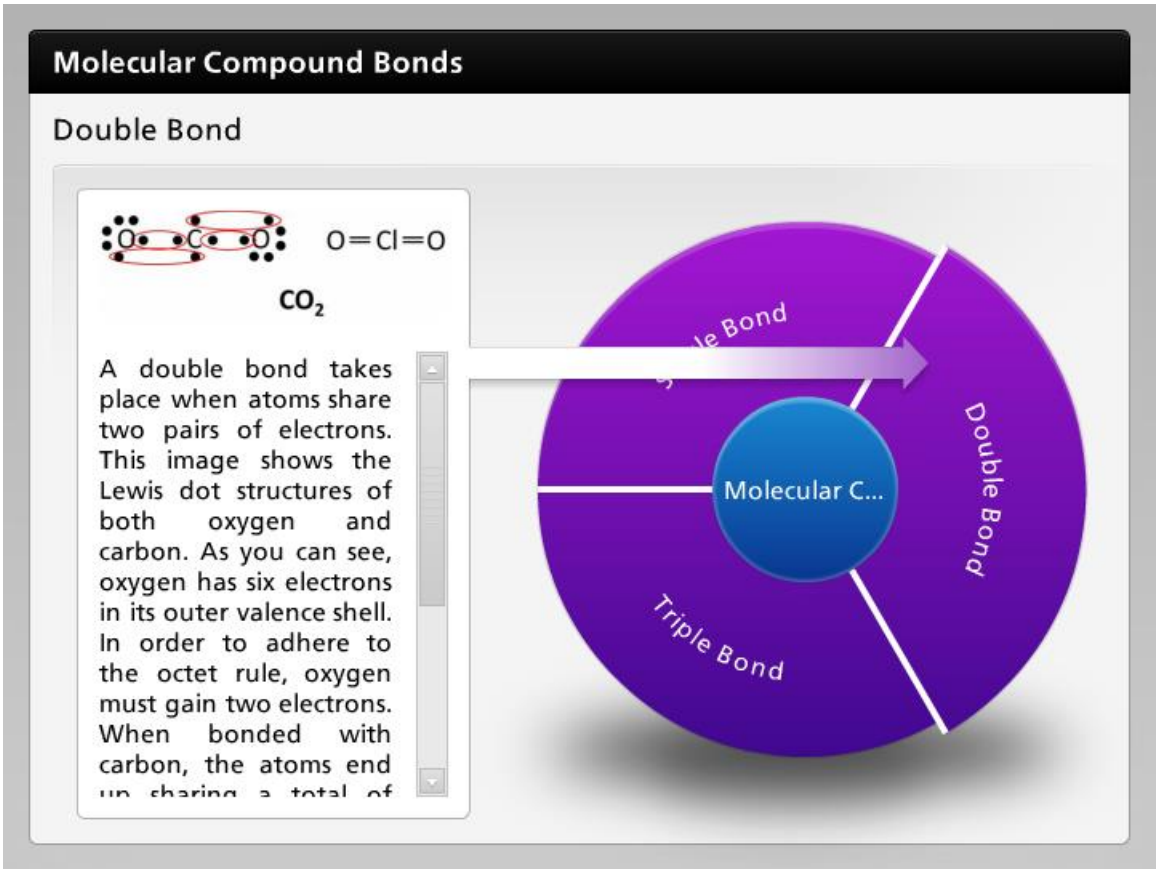
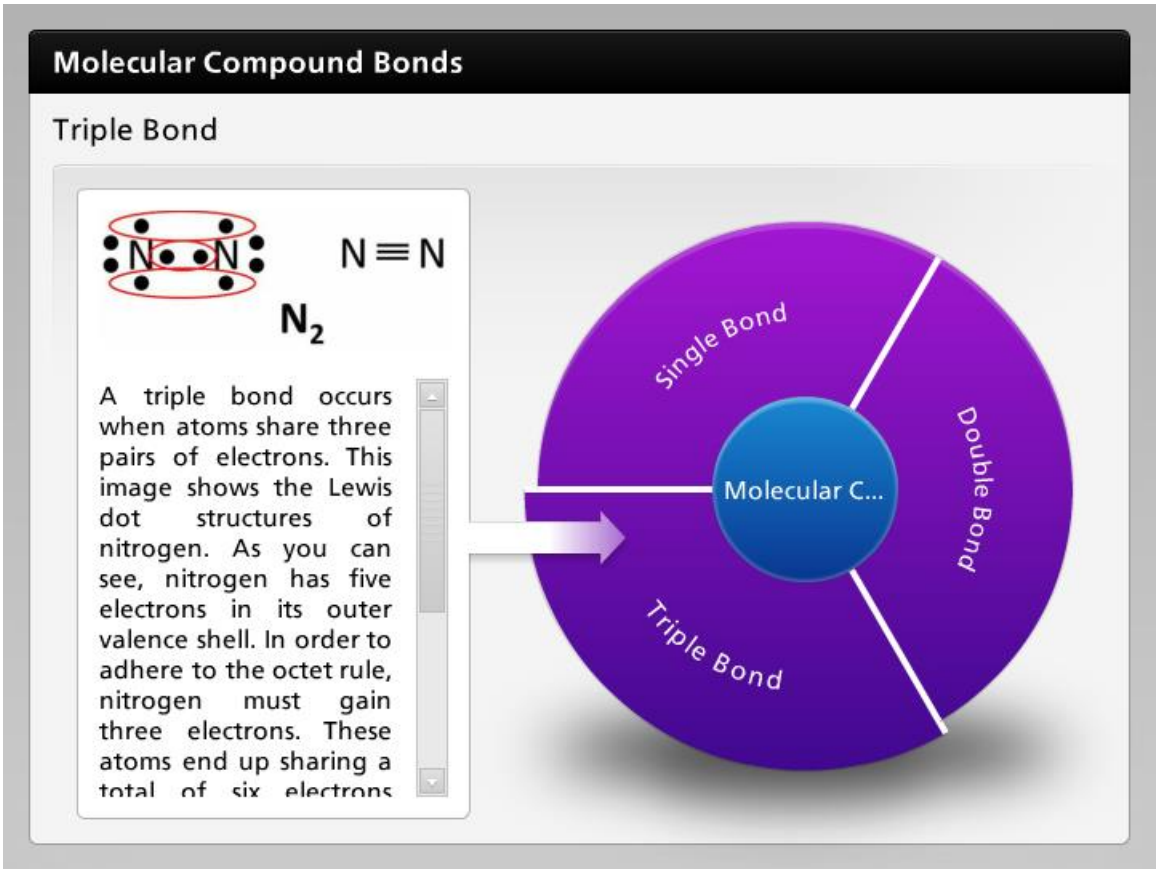
Double Bond



A double bond takes place when atoms share two pairs of electrons. This image shows the Lewis dot structures of both oxygen and carbon. As you can see, oxygen has six electrons in its outer valence shell. In order to adhere to the octet rule, oxygen must gain two electrons. When bonded with carbon, the atoms end up sharing a total of two electrons. This bond is represented by two lines. Double bonding occurs when atoms need to share more than one pair of electrons. This type of bonding occurs in the molecular compound carbon dioxide, CO_2.

Triple Bond



A triple bond occurs when atoms share three pairs of electrons. This image shows the Lewis dot structures of nitrogen. As you can see, nitrogen has five electrons in its outer valence shell. In order to adhere to the octet rule, nitrogen must gain three electrons. These atoms end up sharing a total of six electrons through three bonds. The bond is represented by three lines. Triple bonding occurs when atoms need to share more than two pairs of electrons. This type of bonding occurs in the molecular compound nitrogen, or N_2.