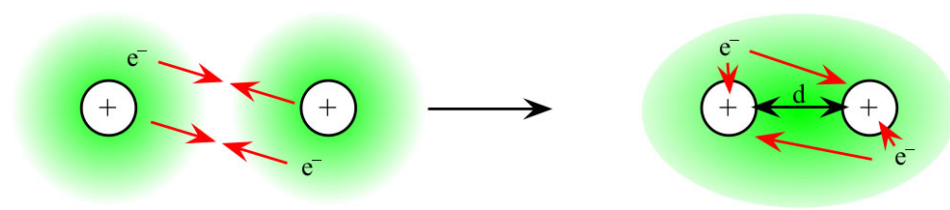


WKS
Covalent Bonding Worksheet
Single Bonds

NAME Answer Key
Period _____ Date _____

1. What is a covalent bond? How does it differ from an ionic bond? Why does it form?
A covalent bond is the electrostatic attraction between the nucleus of one atom and the electron(s) of another. It involves *sharing* electrons rather than transferring electrons, and forms so that each atom can fill its valence shell—usually eight electrons (octet rule), except hydrogen, which forms a duet.
2. On the atomic diagram below, indicate with arrows this attraction, then redraw the atoms to show the covalent bond formation and label the bond length, d .



3. Describe the differences between single, double & triple bonds. How many sigma and pi bonds are in each?
There are 2 electrons in a single covalent bond. A single bond has one *sigma* (σ) bond.
There are 4 electrons in a double covalent bond. A double bond has one σ and one *pi* (π) bond.
There are 6 electrons in a triple covalent bond. A triple bond has one σ and two π bonds.
4. Describe the relationship between length and strength of covalent bonds.
Single bond is the longest and weakest (but still very strong)
Double bond is shorter and stronger than a single bond.
Triple bond is shortest and strongest.
Thus, as bond strength increases, bond length decreases.
5. Breaking bonds (**absorbs energy**, releases energy) therefore is (**endothermic**, exothermic). Forming bonds (**absorbs energy**, **releases energy**) therefore is (endothermic, **exothermic**).
6. List at least three properties of a covalent compound.
Bonds within molecules are strong, but intermolecular forces are weak; form crystals in the solid state; soft & flexible, with relatively low melting and boiling points, except for network covalent solids; poor conductors of heat or electricity, even when dissolved in H₂O.