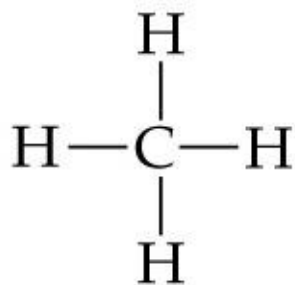


GENERAL CHEMISTRY

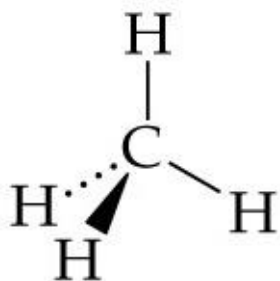
STANDARD 6.1

6.1: Identify the oxidation number for an element or polyatomic ion and write the correct formula for the ion and vice versa

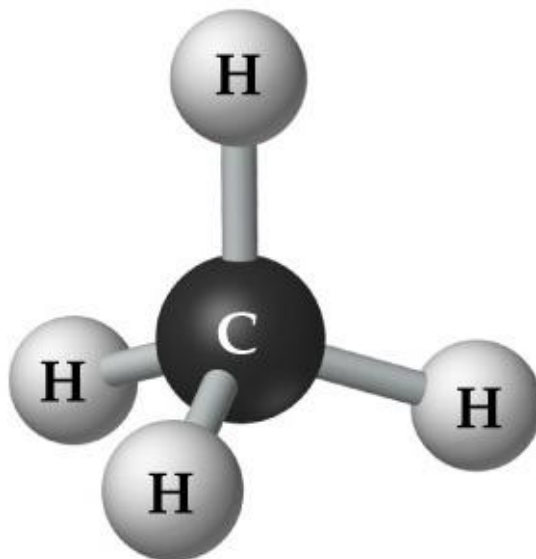
Picturing Molecules



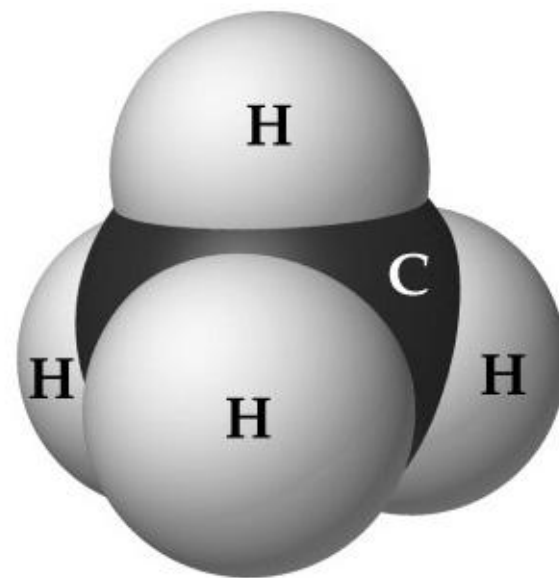
Structural formula



Perspective drawing



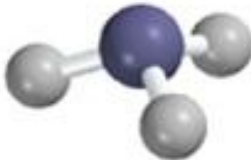






Ball-and-stick model



Space-filling model

Standard Types of Formulas and Models

	Hydrogen	Water	Ammonia	Methane
Molecular formula	H_2	H_2O	NH_3	CH_4
Structural formula	$H-H$	$H-O-H$	$\begin{array}{c} H-N-H \\ \\ H \end{array}$	$\begin{array}{c} H \\ \\ H-C-H \\ \\ H \end{array}$
Ball-and-stick model				
Space-filling model				

6.1: Identify the oxidation number for an element or polyatomic ion and write the correct formula for the ion and vice versa

Oxidation Numbers

- An indicator of the degree of oxidation (loss of electrons) of an atom in a chemical compound
 - Positive oxidation numbers indicate a loss of electrons
 - Negative oxidation numbers indicate a gain of electrons
- Elements have oxidation states that are directly related to their valence electrons

Valence Electrons	Oxidation Number
1	+1
2	+2
3	+3
4	+4 or -4
5	-3
6	-2
7	-1
8	0

6.1: Identify the oxidation number for an element or polyatomic ion and write the correct formula for the ion and vice versa

Naming Monatomic (one) Ions

- Metal atoms lose valence electrons to form positively charged ions, called cations
- To name cations from an A group, name the metal then add the word *ion*.

Element Name + ion

- Li^+ → Lithium Ion
- Ba^{2+} → Barium Ion
- Mg^{2+} → Magnesium Ion
- Nonmetal atoms gain valence electrons to form negatively charged ions, called anions
- To name anions, replace the ending of the element with “ide” and add the word *ion*.

Element Stem Name + “ide” + ion

- O^{2-} → Oxide Ion
- N^{3-} → Nitride Ion
- Cl^- → Chloride Ion

Naming Monatomic Cations from Transition Metals

- The *Stock System* is used to name transition metals and other metals that form more than one ion.
 - For example, Iron can form a +2 ion or a +3 ion depending on the situation
 - There is no way to know the oxidation number of these metals without more information
 - When a metal can form more than one ion, Roman Numerals are used for the oxidation #:

Element Name (charge in Roman Numerals) + ion

- Cu^+ → Copper (I) Ion
- Cu^{2+} → Copper (II) Ion
- Fe^{3+} → Iron (III) Ion

Naming Polyatomic Ions

- Ions that are made up of more than one atom are *polyatomic ions*
- Polyatomic ions behave as single ions
- To name polyatomic ions, simply state their name with the ion ending
- Polyatomic ions are located on Page 4 of your foldable
 - NH_4^+ → Ammonium Ion
 - OH^- → Hydroxide Ion
 - CrO_4^{2-} → Cyanide Ion

6.1: Identify the oxidation number for an element or polyatomic ion and write the correct formula for the ion and vice versa