CONCEPT: LEWIS DOT STRUCTURES: IONS

- In Lewis Dot Structures, cations have ____ valence electrons and anions have ____ valence electrons.

EXAMPLE: Determine the formal charge of the nitrogen atom in the following ion: NO_2^-.

STEP 1: Determine the total number of valence electrons of the structure.

□ Recall, Valence Electrons = group number of the element.

STEP 2: Place the **LEAST** electronegative element in the center and connect all elements with single bonds.

□ **Exception**: Hydrogen never goes in the center.

□ **Halogens:** Only make single bonds as a surrounding element.

STEP 3: Add electrons to all the surrounding elements until they have 8 electrons (Octet Rule).

□ **Exception**: Hydrogen only wants 2 electrons around it.

STEP 4: Place any remaining electrons on the central atom.

STEP 5: If any elements don't have 8 octet electrons, add **DOUBLE** and **TRIPLE** bonds between them.

STEP 6: The Formal Charge can be used to determine if a Lewis Dot Structure is drawn correctly.

□ The only allowable formal charges for an element = **–1**, **0**, or **+1**.

- For stability, draw the structure that gives fewer formal charges .
- **–1** formal charge on the more electronegative element tends to be more stable.

STEP 7: Place the ion in brackets and its charge in the top right corner.

PRACTICE: Draw the Lewis Dot Structure for the following cation: NH_4^+.

CONCEPT: LEWIS DOT STRUCTURES: IONS

Drawing Ionic Compounds

● An ionic compound contains a cation (positive ion) connected to an anion (negative ion).

EXAMPLE: Draw the Lewis Dot Structure for the ionic compound of $NaNO_3$

STEP 0: Break up the ionic compound into its 2 ionic forms.

□ For the polyatomic ion, follow Steps 1 to 7 to draw its Lewis Dot Structure.

STEP 8: Place both ions near one another because opposite charges _____.

PRACTICE: Draw the Lewis Dot Structure for potassium hypochlorite, KClO.

PRACTICE: Draw the Lewis Dot Structure for calcium cyanide, $Ca(CN)_2$.

CONCEPT: LEWIS DOT STRUCTURES: IONS

PRACTICE: Determine the Lewis Dot Structure for the following ion: O_2^{2-}.

PRACTICE: Determine the Lewis Dot Structure for the following ion: SCl_4^{2+}.

PRACTICE: Draw the Lewis Dot Structure for ammonium chloride, NH_4Cl.