

Hopefully you did your homework and practice by reading NS 4.1 & 4.2 and doing P 4.1 – Binary Ionic Compounds  
You would have work with writing and naming Ionic compounds involving Groups 1, 2, & 3 combining with Groups 5, 6, & 7

### So what about the rest of the metals? (Your text called these Type II)

So far the discussion has included only some of the metals in the periodic chart, NS 4.2 will look at the transition metals and the “other six” metals under the staircase ( $_{31}\text{Ge}$ ,  $_{50}\text{Sn}$ ,  $_{51}\text{Sb}$ ,  $_{82}\text{Pb}$ ,  $_{83}\text{Bi}$ ,  $_{84}\text{Po}$ ).

So far the discussion has included only some of the elements in the periodic chart, now its time to look at the transition and heavy metals. You know who the transition metals are, and the heavy metals are the six elements under the nonmetal/metal staircase – Ge, Sn, Sb, Pb, Bi, and Po.

Because these elements are metals, they must lose electrons, but because they have transition metal electrons (those 10 electrons stuffed deep inside) they can lose varying amounts of electrons producing ions that are “sort-of” satisfied.

What to do with an atom such as lead? The presence of transition metal electrons (those 10 electrons stuffed deep inside) in lead cause it to be able to lose either 2 or 4 valence electrons and thus it can form,  $2+$  &  $4+$  ions. Since you have no way of predicting which of these two options occurs, the name of a lead chloride compound must give more information or you wouldn't be able to tell which lead ion has formed. That information comes in the form of a Roman Numeral indicating the charge.

The players (atoms)	The ions they want to form	The method these atoms (players) must combine to ensure that the number of electrons transferred satisfies both players (atoms).	The resulting chemical formula (the team)	The name of the ionic compound
Pb & Cl	$\text{Pb}^{+?}$ $\text{Cl}^-$	Without being told the charge on the lead, you would have no way of knowing what charge is formed.		Lead(??) chloride

So you first need to be told it is lead (II) chloride or lead (IV) chloride, so you need the name.  
The Roman numeral tells you the + charge on the lead.

The name of the ionic compound	The players (atoms)	The ions they want to form	The method these atoms (players) must combine to ensure that the number of electrons transferred satisfies both players (atoms).	The resulting chemical formula (the team)
Lead(II) chloride	Pb & Cl	$\text{Pb}^{+2}$ $\text{Cl}^-$	Two chlorines ( $-1$ each) needed to satisfy the one lead	$\text{PbCl}_2$
Lead(IV) chloride	Pb & Cl	$\text{Pb}^{+4}$ $\text{Cl}^-$	For lead (IV) chloride the charge on the lead is $4+$ thus 4 chlorines are needed to satisfy the	$\text{PbCl}_4$
Tin (IV) oxide	Sn & O	$\text{Sn}^{+4}$ $\text{O}^{2-}$	If you criss-cross this time the tin and oxygen would combine as $\text{Sn}_2\text{O}_4$ however you must write the chemical formula in the lowest whole number ratio. So reduce and write the formula as shown in the last column.	$\text{SnO}_2$

### Working the process “backwards”

This might get tricky when given the formula and asked to determine the correct name.

The correct formula	The charge on nonmetal	The total negative charge	must balance the total positive charge	The name of the ionic compound
$\text{NiF}_3$	$\text{F}^-$	three $\text{F}^- = -3$ total	thus the Ni must be $+3$ to balance the total $-3$ This results in a Roman numeral of III needed to identify the charge in the name of the compound.	nickel(III) fluoride
$\text{CrP}_2$	$\text{P}^{-3}$	two $\text{P}^{3-} = -6$	Thus the Cr must be a $+6$ to balance the total $-6$ . This results in the need of a Roman numeral VI needed to identify the charge in the name of the compound	Chromium (VI) phosphide
$\text{Cu}_2\text{S}$	$\text{S}^{-2}$	one $\text{S}^{2-}$ is of course a charge of $-2$	Thus the total + charge must be $+2$ to balance the $-2$ , but there are two copper ions together that are causing the total $+2$ , this means that each one of them is $+1$ , requiring a Roman numeral of I	Copper (I) sulfide