

## RULES

### Writing Formulas for Multivalent Metals

Steps	Example: iron(III) sulphide	Example: lead(IV) oxide
1. Identify each <b>ion</b> and its <b>charge</b>	iron(III): Fe <sup>3+</sup> sulphide: S <sup>2-</sup>	lead(IV): Pb <sup>4+</sup> oxide: O <sup>2-</sup>
2. Total charges needed to balance the positive and negative ions	$\begin{array}{r} \text{Fe}^{3+} = +3 +3 = +6 \\ \text{S}^{2-} = -2 -2 -2 = -6 \\ \hline 0 \end{array}$	$\begin{array}{r} \text{Pb}^{4+} = +4 = +4 \\ \text{O}^{2-} = -2 -2 = -4 \\ \hline 0 \end{array}$
3. Ratio of positive to negative	2 Fe <sup>3+</sup> ions for every 3 S <sup>2-</sup> ions	1 Pb <sup>4+</sup> ion for every 2 O <sup>2-</sup> ions
4. State the formula	Fe <sub>2</sub> S <sub>3</sub>	PbO <sub>2</sub>

## RULES

### Naming Multivalent Metals

Steps	Examples:	
	Cu <sub>3</sub> P	MnO <sub>2</sub>
1. Identify the metal	copper (Cu)	manganese (Mn)
2. Can it form more than one kind of ion?	Cu <sup>2+</sup> and Cu <sup>+</sup>	Mn <sup>2+</sup> Mn <sup>3+</sup> Mn <sup>4+</sup>
3. Ratio of positive to negative	Cu <sub>3</sub> P means 3 Cu ions for every 1 P ion	MnO <sub>2</sub> means 1 Mn ion for every 2 O ions
4. What's the charge of the negative ion?	Phosphide = P = 3-	Oxide = O = 2-
5. Now balance: Negative ions must balance positive ions	$\begin{array}{r} \text{Cu} = +1 +1 +1 = +3 \\ \text{P} = -3 = -3 \end{array}$	$\begin{array}{r} \text{Mn} = +4 = +4 \\ \text{O} = -2 -2 = -4 \end{array}$
6. Write the compound	copper(I) phosphide	Manganese(IV) oxide

## Multivalent Compounds

Please use your notes to complete questions

Write the formulas of the following compounds:

1. chromium(II) chloride \_\_\_\_\_
2. chromium(III) chloride \_\_\_\_\_
3. copper(I) sulphide \_\_\_\_\_
4. copper(I) iodide \_\_\_\_\_
5. iron(II) phosphide \_\_\_\_\_
6. iron(III) phosphide \_\_\_\_\_
7. manganese(II) oxide \_\_\_\_\_
8. manganese(IV) oxide \_\_\_\_\_
9. mercury(II) bromide \_\_\_\_\_
10. tin(II) sulphide \_\_\_\_\_
11. tin(II) nitride \_\_\_\_\_
12. tin(IV) nitride \_\_\_\_\_
13. copper(I) nitride \_\_\_\_\_
14. lead(IV) chloride \_\_\_\_\_

## Multivalent Compounds Naming

Please use your notes to complete questions

Each of these compounds contains a multivalent metal ion. That means that the name of the metal ion will contain a roman numeral, which you will need to determine. Write the names of the following compounds.

1.  $\text{CrBr}_2$  \_\_\_\_\_
2.  $\text{CrBr}_3$  \_\_\_\_\_
3.  $\text{FeI}_2$  \_\_\_\_\_
4.  $\text{FeI}_3$  \_\_\_\_\_
5.  $\text{PbF}_2$  \_\_\_\_\_
6.  $\text{PbF}_4$  \_\_\_\_\_
7.  $\text{MnO}$  \_\_\_\_\_
8.  $\text{PbS}$  \_\_\_\_\_
9.  $\text{Fe}_2\text{O}_3$  \_\_\_\_\_
10.  $\text{Hg}_3\text{P}_2$  \_\_\_\_\_
11.  $\text{Hg}_3\text{N}_2$  \_\_\_\_\_
12.  $\text{HgI}_2$  \_\_\_\_\_
13.  $\text{MnS}$  \_\_\_\_\_
14.  $\text{MnS}_2$  \_\_\_\_\_
15.  $\text{Sn}_3\text{P}_4$  \_\_\_\_\_