

**Type 1**

List the charges the following elements would have as ions. Tell whether they are anions or cations, and name them:

- |       |                   |                   |                        |        |                   |                   |                   |
|-------|-------------------|-------------------|------------------------|--------|-------------------|-------------------|-------------------|
| 1. Li | <u>  1+  </u>     | <u>  cation  </u> | <u>  lithium ion  </u> | 6. Al  | <u>          </u> | <u>          </u> | <u>          </u> |
| 2. Cl | <u>          </u> | <u>          </u> | <u>          </u>      | 7. K   | <u>          </u> | <u>          </u> | <u>          </u> |
| 3. Mg | <u>          </u> | <u>          </u> | <u>          </u>      | 8. O   | <u>          </u> | <u>          </u> | <u>          </u> |
| 4. Na | <u>          </u> | <u>          </u> | <u>          </u>      | 9. F   | <u>          </u> | <u>          </u> | <u>          </u> |
| 5. I  | <u>          </u> | <u>          </u> | <u>          </u>      | 10. Be | <u>          </u> | <u>          </u> | <u>          </u> |

How many electrons does the neutral atom gain or lose when each ion forms?

- |                      |                                  |                      |                   |
|----------------------|----------------------------------|----------------------|-------------------|
| 11. Cr <sup>3+</sup> | <u>  loses 3 e<sup>-</sup>  </u> | 14. Ca <sup>2+</sup> | <u>          </u> |
| 12. P <sup>3-</sup>  | <u>          </u>                | 15. Cl <sup>-</sup>  | <u>          </u> |
| 13. Li <sup>1+</sup> | <u>          </u>                | 16. O <sup>2-</sup>  | <u>          </u> |

Solve the equations:

- |                                      |   |
|--------------------------------------|---|
| 17. (1+) + (1-) = <u>          </u>  | 22. (3+) + 3( <u>      </u> ) = 0               |
| 18. (2+) + (1-) = <u>          </u>  | 23. (4+) + <u>      </u> = 0                    |
| 19. (2+) + 2(1-) = <u>          </u> | 24. (4+) + 2( <u>      </u> ) = 0               |
| 20. (2+) + 3(1-) = <u>          </u> | 25. <u>      </u> (3+) + <u>      </u> (2-) = 0 |
| 21. (3+) + <u>      </u> = 0         | 26. <u>      </u> (2+) + <u>      </u> (3-) = 0 |

For each combination of ions, fill in the chart below:

	cation symbol	anion symbol	# cations needed to make a neutral compound	# anions needed to make a neutral compound	formula	compound name
magnesium ion + sulfide	Mg <sup>2+</sup>	S <sup>2-</sup>	1	1	MgS	magnesium sulfide
lithium ion + iodide						
potassium ion + bromide						
calcium ion + fluoride						
beryllium ion + oxide						
strontium ion + sulfide						
sodium ion + bromide						
aluminum ion + chloride						
gallium ion + iodide						
aluminum ion + sulfide						
gallium ion + fluoride						

**Type 2: (use chart on p 99 for charges)**

For each cation, list all the possible charges, and write the symbol and systematic name for each charge.

iron  $Fe^{3+}$  iron(III)  $Fe^{2+}$  iron(II) tin \_\_\_\_\_  
 copper \_\_\_\_\_ lead \_\_\_\_\_  
 cobalt \_\_\_\_\_ mercury \_\_\_\_\_

**For each combination of ions, fill in the chart below:**

	cation symbol	anion symbol	# cations needed	# anions needed	formula	compound name
mercury(II) + sulfide						
copper(I) + iodide						
tin(II) + bromide						
lead(IV) + fluoride						
iron(III) + oxide						
copper(II) + sulfide						
cobalt(III) + bromide						
gold(I) + chloride						
lead(II) + iodide						
tin(IV) + sulfide						
cobalt(II) + fluoride						

**Name the following binary ionic compounds:**

$CuCl_2$  copper(II) chloride

$CoF_3$  \_\_\_\_\_

$SnCl_4$  \_\_\_\_\_

$PbO$  \_\_\_\_\_

$FeCl_3$  \_\_\_\_\_

$Co_2S_3$  \_\_\_\_\_

$CoF_2$  \_\_\_\_\_

$Fe_2O_3$  \_\_\_\_\_

## Ternary Ionic Compounds

For each combination of ions, fill in the chart below:

	cation symbol	anion symbol	# cations needed	# anions needed	formula	compound name
calcium + nitrite						
barium + sulfate						
silver + acetate						
nickel(II) + phosphate						
sodium + carbonate						
lithium + bicarbonate						
ammonium + phosphate						
beryllium + hypochlorite						
calcium + hydroxide						
titanium (IV) + hydroxide						
copper(II) + sulfate						

Name the following ternary ionic compounds:

$\text{NH}_4\text{OH}$  ammonium hydroxide

$\text{AgSO}_4$  \_\_\_\_\_

$\text{Pb}_3(\text{PO}_4)_2$  \_\_\_\_\_

$\text{KNO}_3$  \_\_\_\_\_

$\text{Fe}(\text{C}_2\text{H}_3\text{O}_2)_2$  \_\_\_\_\_

$\text{CuCO}_3$  \_\_\_\_\_

$\text{CaSO}_4$  \_\_\_\_\_

$\text{Al}(\text{OH})_3$  \_\_\_\_\_