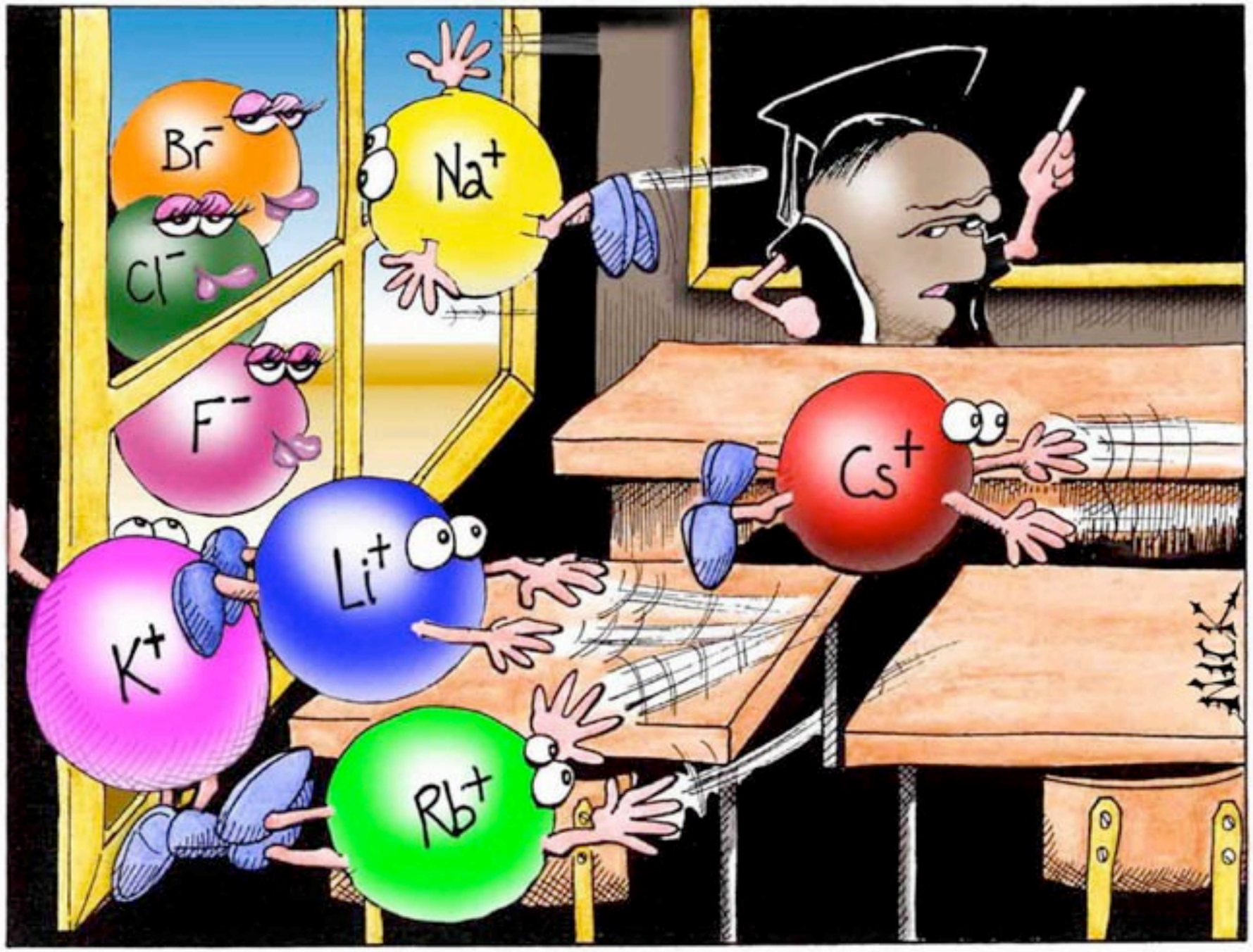
Ionic Compounds



"Perhaps one of you gentlemen would mind telling me just what it is outside the window that you find so attractive..?"

Compounds

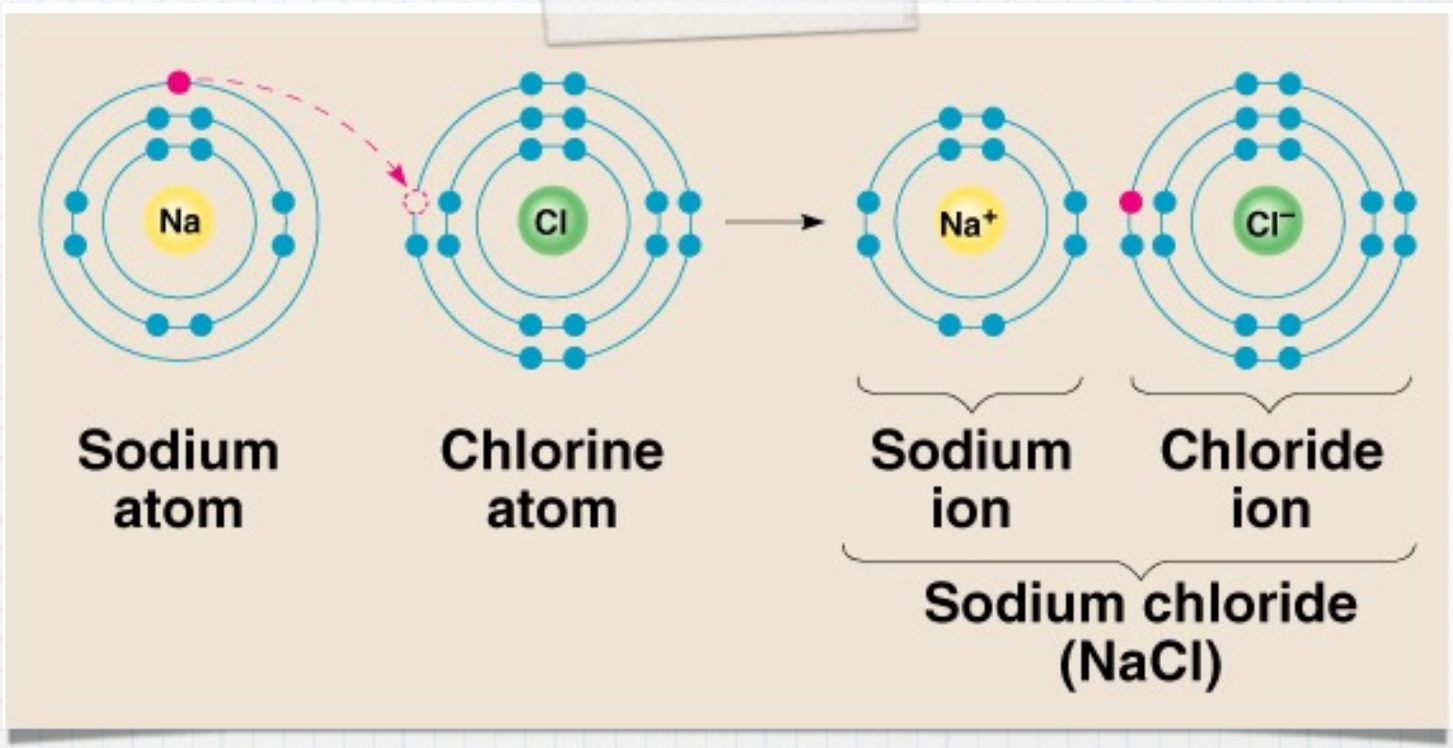
* Compound: Two or more elements chemically combined.

Ionic Compounds

* Called an ionic compound because it is made up of negative and positive ions that have resulted from the transfer of electrons from a metal to a non-metal.

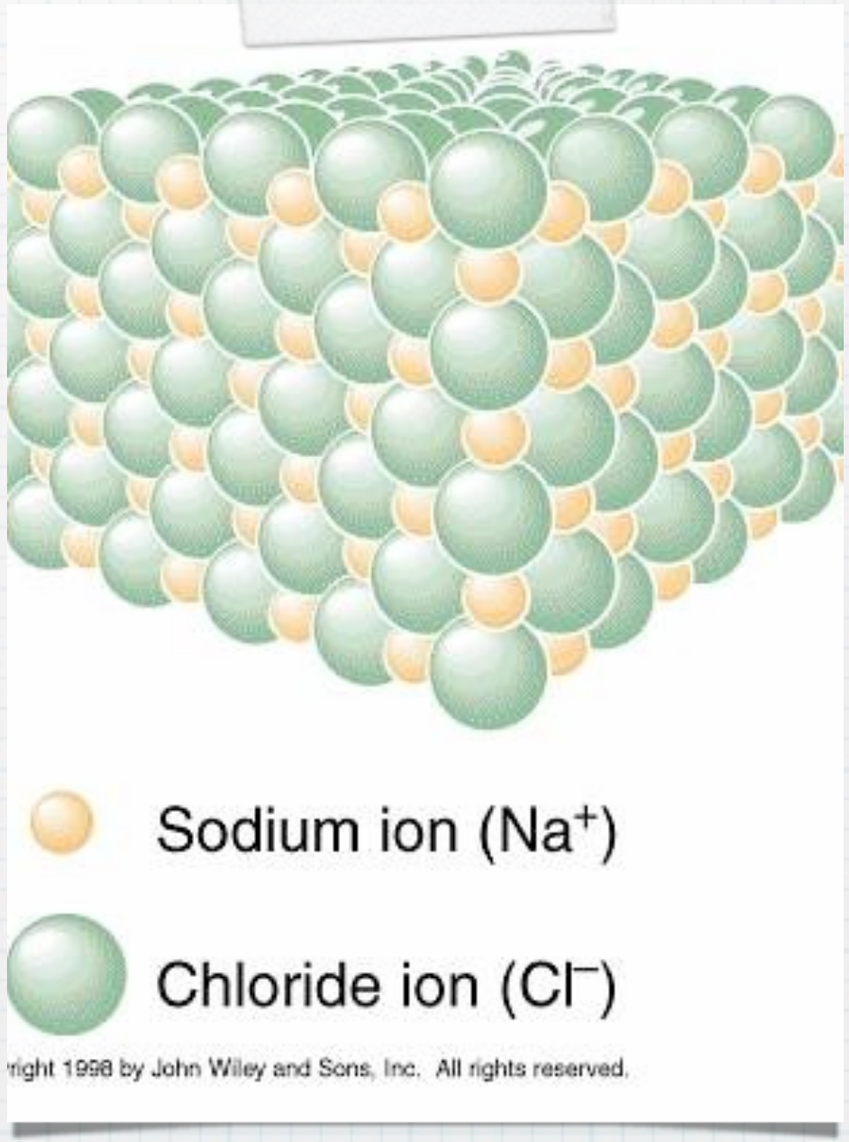
Electrostatic Attraction

* This electrostatic attraction is called an ionic bond.
* The resulting compound is an ionic compound.



Properties of Ionic Compounds

* In nature, this electrostatic attraction produces regular crystal lattice structures:



Properties of Ionic Compounds

* Ionic compounds:
  * at room temperature, are usually hard, brittle solids that can be crushed
  * have high melting and boiling points
  * (often) dissolve easily in water

Ionic Formula

* An ionic formula
  * consists of positively and negatively charged ions.
  * is neutral.
  * has charge balance.
  * total positive charge = total negative charge
* The symbol of the metal is written first, followed by the symbol of the nonmetal.

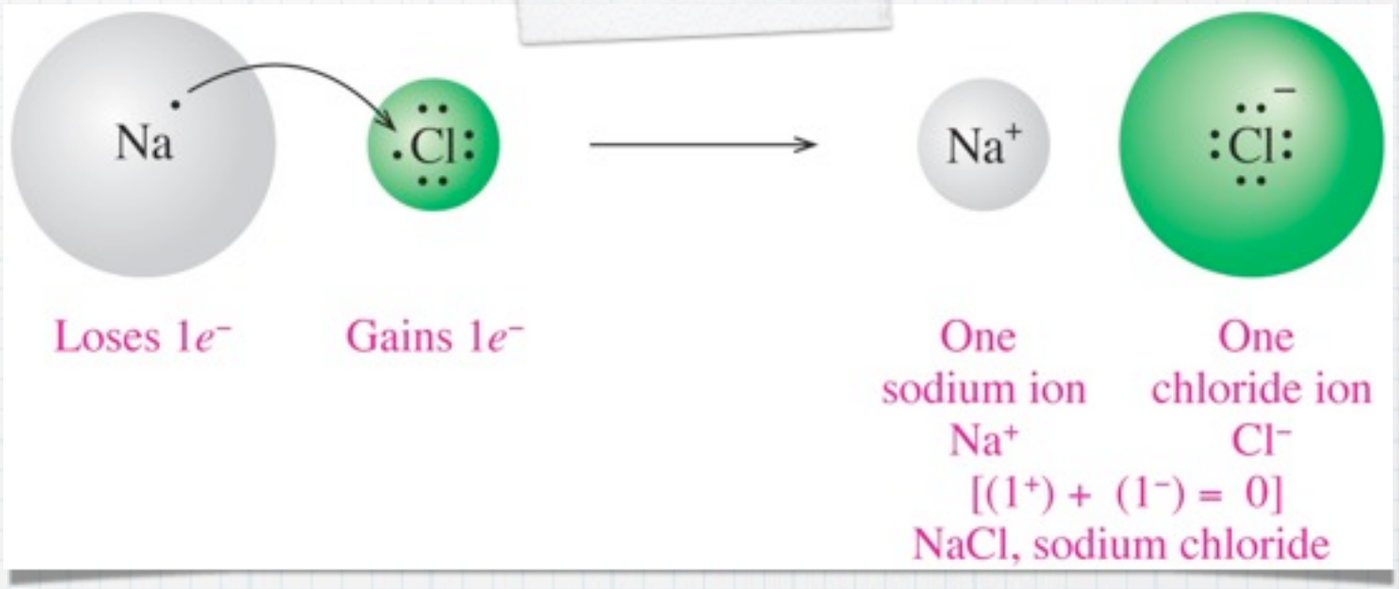
Ionic Formula

* In the chemical formula the symbols of elements are written with a subscript which indicates how many of that element are present in the compound
* Only numbers above one are written

You don't need to write, just listen. :)

Example: Charge Balance for Salt

* In NaCl,
  * a Na atom loses its valence electron.
  * a Cl atom gains an electron.
  * the symbol of the metal is written first, followed by the symbol of the nonmetal.



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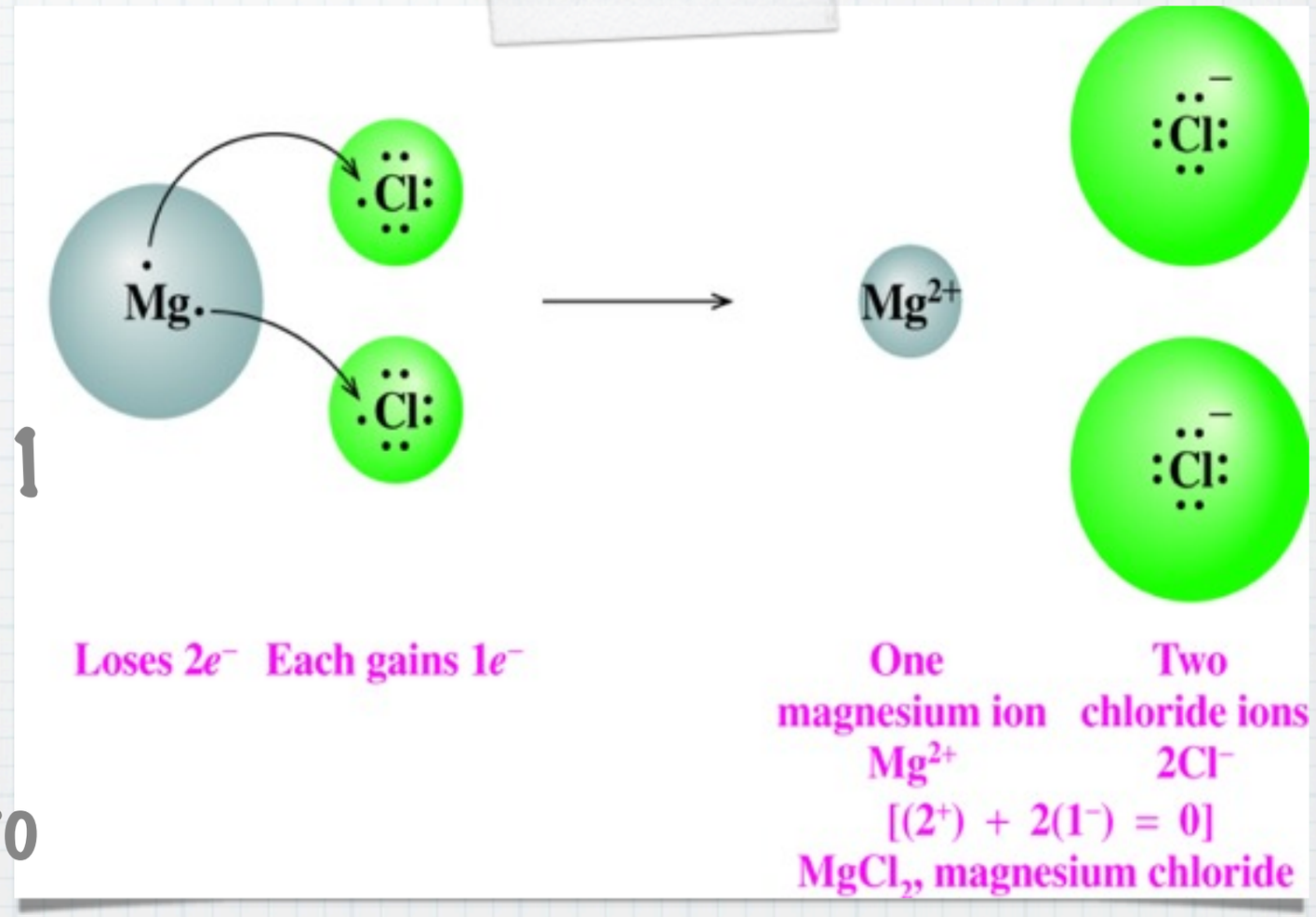
Example: Charge Balance for $MgCl_2$

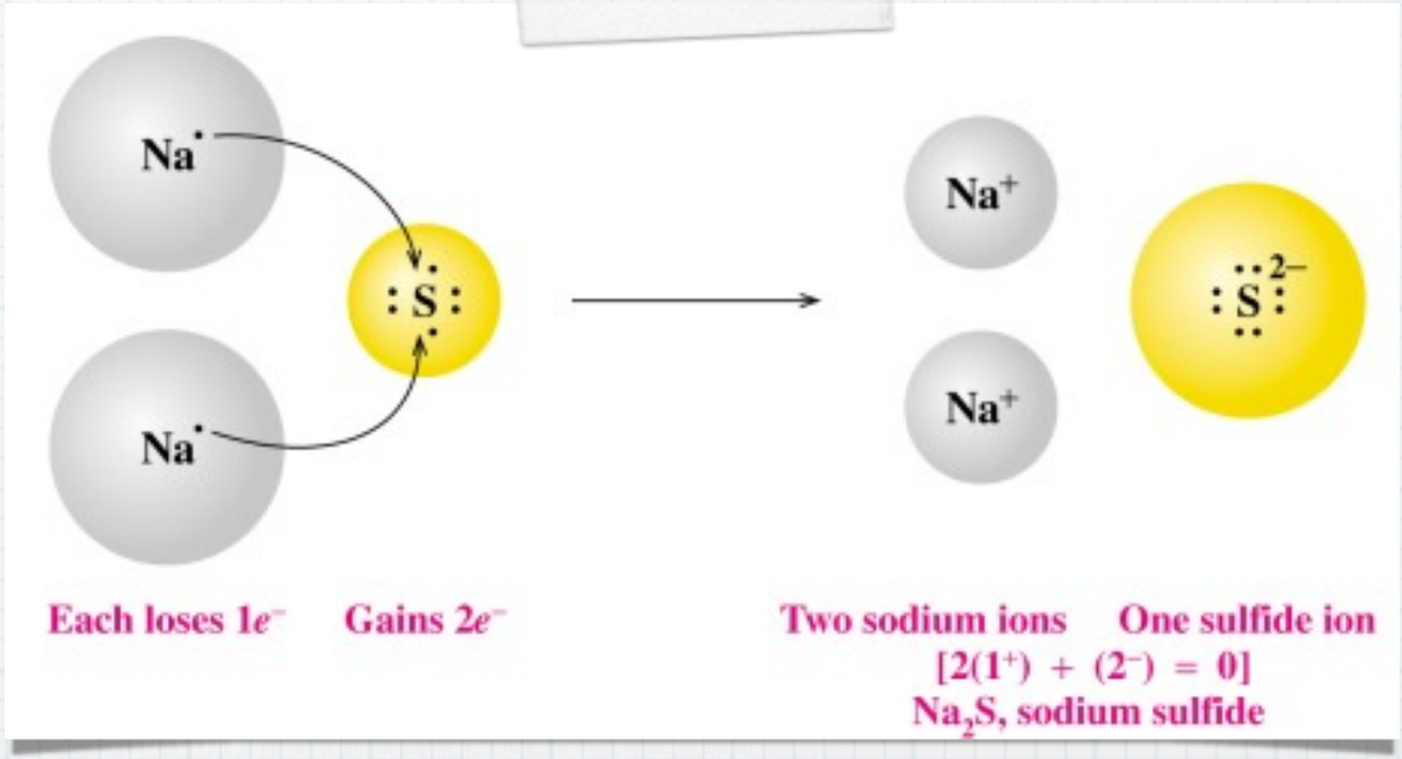
* In $MgCl_2$,
  * a Mg atom loses 2 valence electrons.
  * two Cl atoms each gain 1 electron.
  * subscripts indicate the number of ions needed to give charge balance.



You don't need to write, just listen. :)

Example: Charge Balance for Na_2S

* In Na_2S,
* two Na atoms lose 1 valence electron each.
* one S atom gains 2 electrons.
* subscripts show the number of ions needed to give charge balance.



Formula from Ionic Charges

* Write the ionic formula of the compound with Ba^{2+} and Cl^{-}.
* Write the symbols of the ions.
  * Ba^{2+} Cl^{-}
* Balance the charges.
  * Ba^{2+} Cl^{-} (two Cl^{-} needed)
* Write the ionic formula using a subscript 2 for two chloride ions. $BaCl_2$

Now you try . . .

* Select the correct formula for each of the following ionic compounds.
* A. Na^{+} and O^{2-}
  * 1) NaO 2) Na_2O 3) NaO_2
* B. Al^{3+} and Cl^{-}
  * 1) $AlCl_3$ 2) AlCl 3) Al_3Cl
* C. Mg^{2+} and N^{3-}
  * 1) MgN 2) Mg_2N_3 3) Mg_3N_2