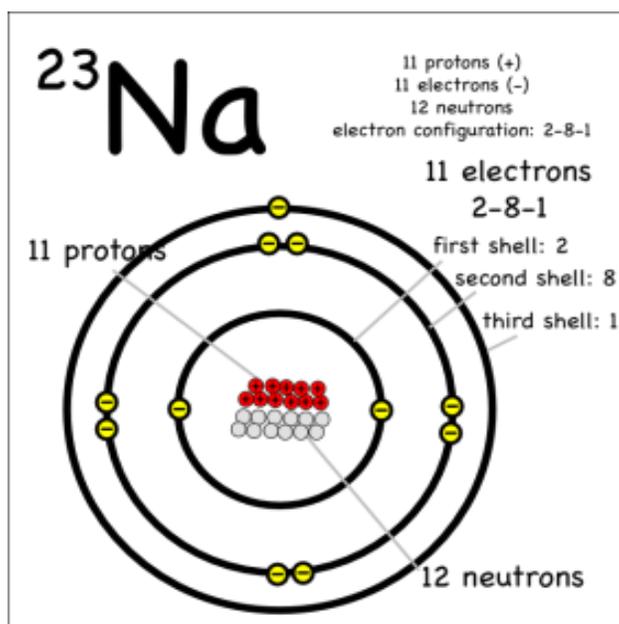


# AN INTRODUCTION TO IONIC BONDING

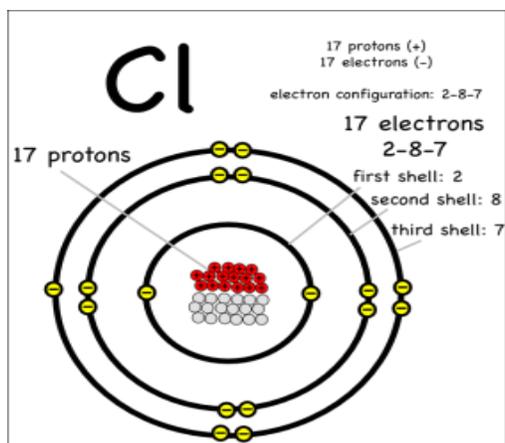
Now that we've learned how to draw individual atoms (and have an online reference for the first 20 elements), let's consider ionic bonding.

The key thing to remember is that atoms all "want" to have their outer electron shells filled. So while a sodium (symbol: Na) atom is happy\* enough that it has the same number of protons and electrons (11 each) it could be happier if it got rid of the extra electron in its outer shell.



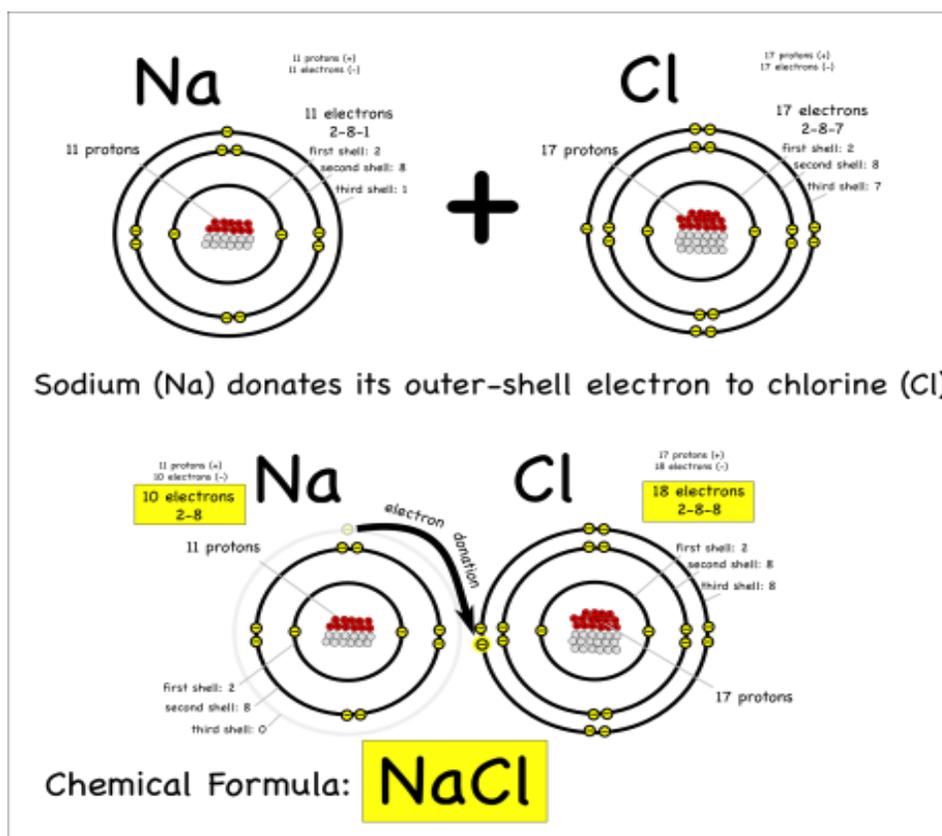
This sodium atom has one electron in its outer shell. It could be happier without it.

It can get rid of the electron by donating it to another atom that would be happier with an extra electron. Something like chlorine (symbol: Cl) that only has 7 electrons in its outer shell, but wants to have 8.



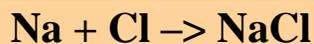
Chlorine needs one more electron in its outer shell to be happy.

When one atom donates electrons to other atoms this creates a bond called an **ionic bond**. The molecule created is called an ionic molecule. In this case, sodium and chloride react to produce sodium chloride (chemical formula: NaCl).



Sodium and chloride bond ionically when sodium donates an electron to chlorine. This produces the ionic compound, sodium chloride (NaCl).

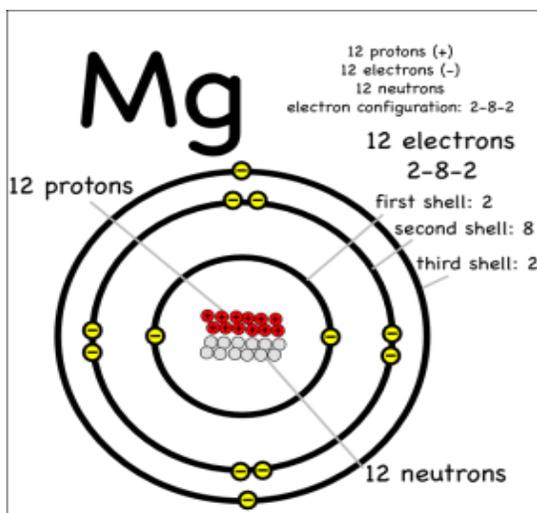
The chemical reaction can be written as:



## MgCl<sub>2</sub>

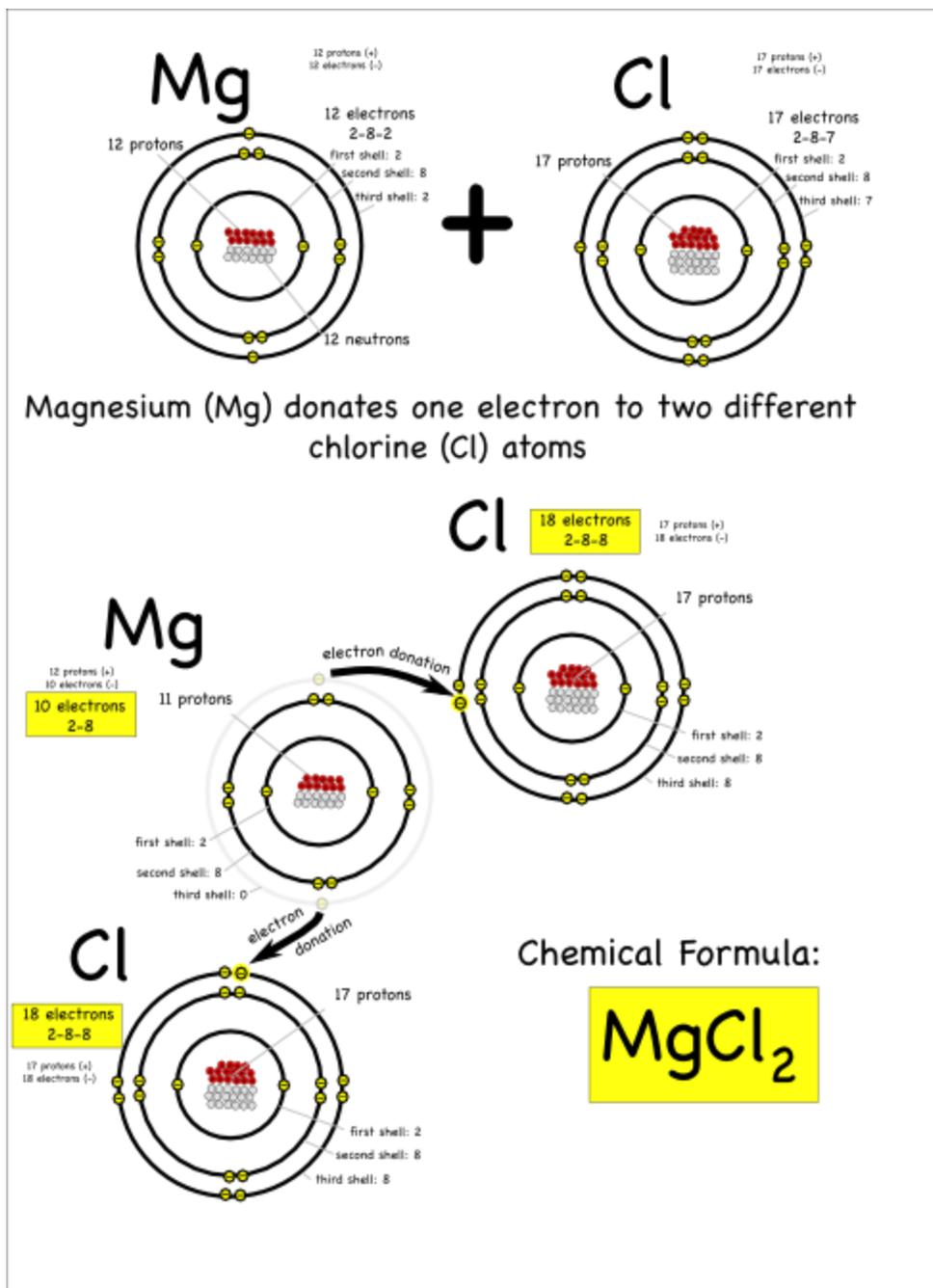
Now consider what happens when magnesium (symbol: Mg) reacts with chlorine.

Magnesium has two electrons in its outer shell that it wants to get rid of.



A magnesium (Mg) atom, which has two electrons in its outer shell that it would like to, if possible, get rid of by bonding.

A single chlorine atom can't take both, since chlorine only needs one electron to fill its outer electron shell. However, magnesium can give one electron to two *different* chlorine atoms to create a molecule with three atoms total.

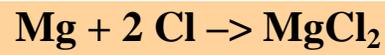


Magnesium gives one electron to each of the two chlorines to create magnesium chloride.

The resulting compound is called magnesium chloride, and is written as MgCl<sub>2</sub>.

The subscripted 2 indicates that there are two chlorine atoms in each magnesium chloride molecule.

The chemical reaction can be written as:



Notice that each magnesium atom reacts with two chlorine atoms (**Mg + 2 Cl**) to produce a compound with one magnesium and two chlorines bonded together (chemical formula: **MgCl<sub>2</sub>**).