

Be Comfortable With The Octet Rule

Why do atoms react to make molecules?

- The Periodic Table is an organization of elements in their **atomic** form before they react to form molecules. Apart from the Nobel (inert) gasses, which already have the complete valence shell, elements lose or share electrons to match the Noble gasses.
- On the left of the table (think Li, Na, Mg), atoms have 1 or 2 valence electrons (and low EN values) so it will be easier to **lose** electrons than share or pick them up. Atoms on the right (think O, F, Br) will **pick up** electrons to achieve the octet. Those in the middle will **share** electrons in covalent bonds. How many electrons each atom needs depends on how many they have to begin with, which comes from the Periodic Table.
- Don't forget about non-bonding electrons (lone pairs, l.p.), which count towards the octet: N (also P) has 1; O (also S) has 2, F (also Cl, Br, I) has 3.

How each element will get to the nearest Noble gas octet.

Needs to:	lose 1 electron	lose 2 electrons	share 3 electrons	share 4 electrons	share 3 electrons	share 2 electrons	share 1 electron	
	↓	↓	↓	↓	↓	↓	↓	
Starts with #electrons:	1	2	3	4	5	6	7	8
	H	Be	B	<u>C</u>	N	O	F	He
	Li	Mg	Al	Si	P	S	Cl	Ar
	K						Br	
							I	

- How an atom gets to the octet is a function of its own electronegativity and what element(s) it is bonding to. Each of the elements above is capable of forming either covalent or ionic bonds depending upon the other elements involved.
- Do not worry about elements that can expand their octet (S, P, etc.) at this point; that will come later in the Organic courses. For now the abbreviated table above shows you how each of the important elements will achieve the octet.