

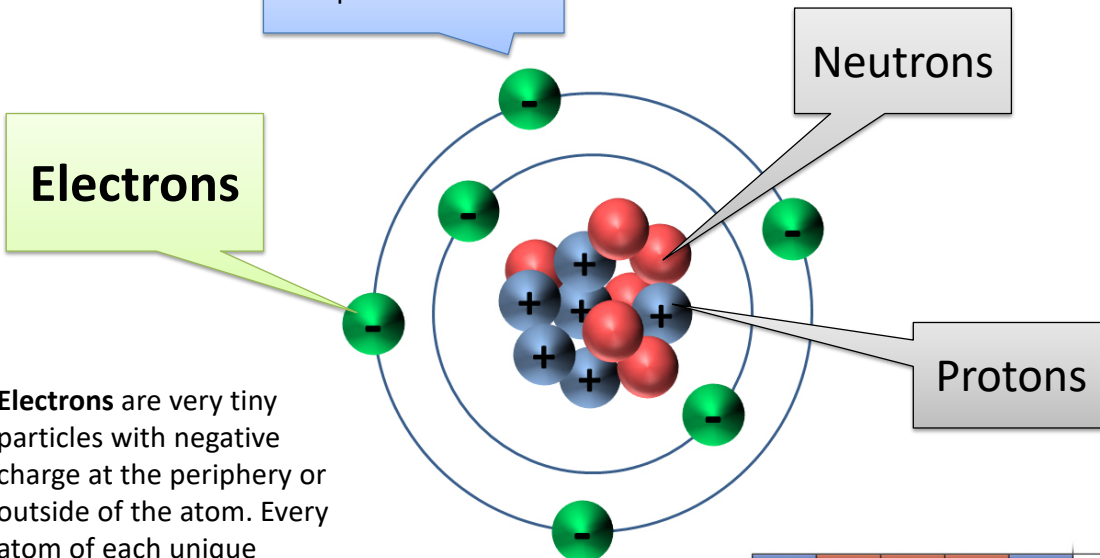


COVALENT BONDING



Covalent bonding uses electrons

Which atom/element is represented here?



Electrons are very tiny particles with negative charge at the periphery or outside of the atom. Every atom of each unique element has a specific number of electrons.

5	6	7	8	9	10
B	C	N	O	F	
boron	carbon	nitrogen	oxygen	fluorine	

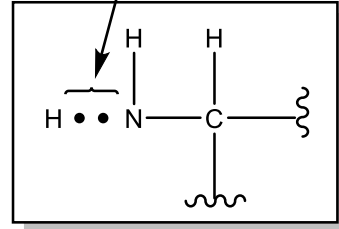
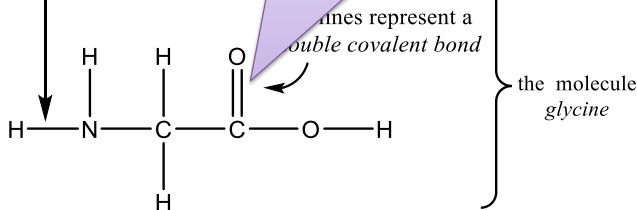


When at least two atoms are joined together by bonds, a **molecule** is formed. A **compound** is formed from the **bonding of atoms from at least two different elements.**

How many electrons would you expect between the C and O atoms joined with a **double covalent bond** (also called a "double bond")

The two electrons being *shared*. This joins the atoms together

A line between two atoms indicates they are joined by a *covalent bond*



A **covalent bond** is formed by the sharing of TWO electrons. The *straight line* represents these electrons.

Electrons are very tiny particles with negative charge at the periphery or outside of the atom. Every atom of each unique element has a specific number of electrons. For example, every hydrogen atom has one electron.

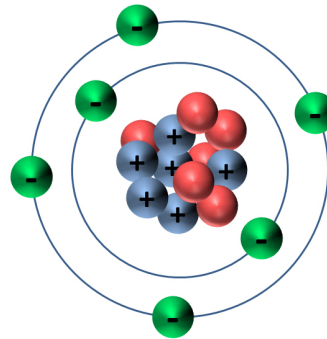
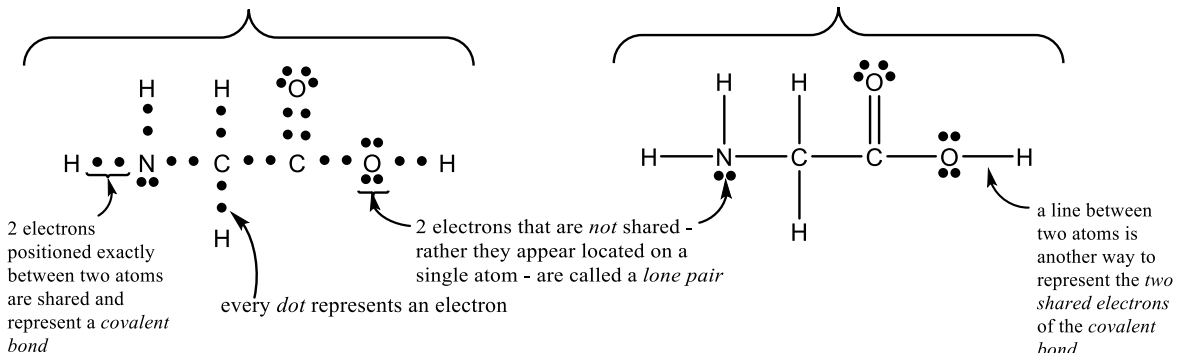


Fig. 1-7



Covalent bonds are made of 2 electrons

Two representations of the molecule glycine

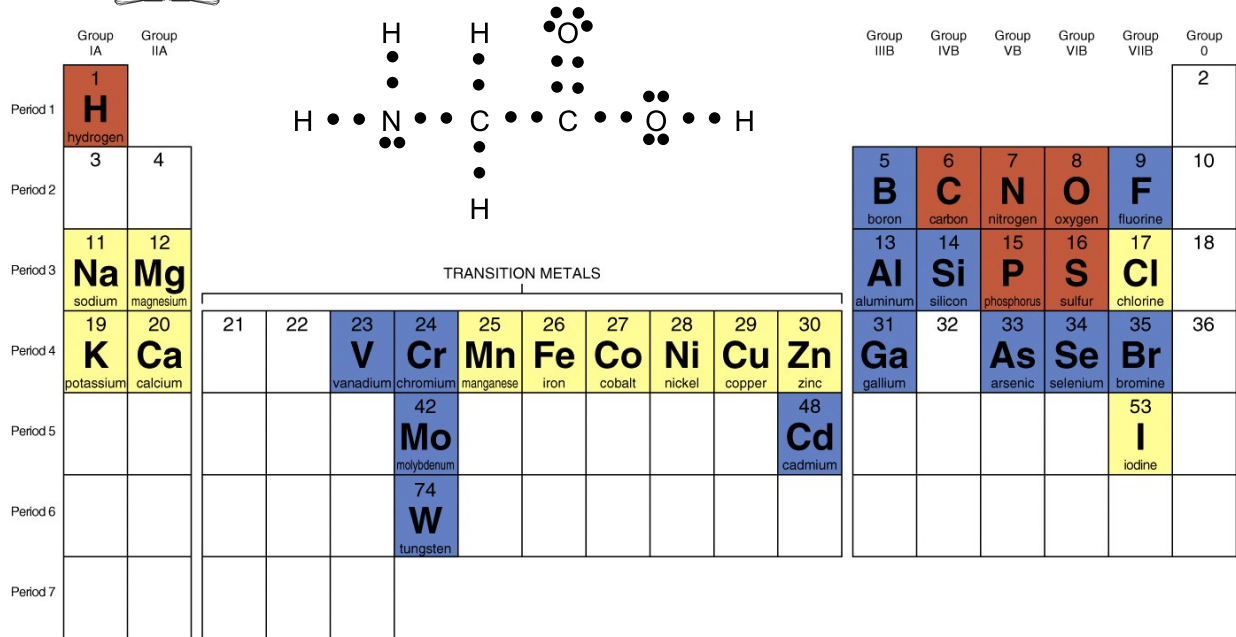


Every atom brings a certain number of electrons *with it* when it engages in bonding.

Hydrogen brings one electron, carbon brings 4, nitrogen brings 5, oxygen brings 6. For the elements most often found in food molecules (carbon, oxygen, nitrogen, hydrogen), you can tell how many electrons that atom will bring with it by checking that atom's position within its row on the Periodic Table.



The Periodic Table...of Food



This Periodic Table comes from Concepts in Biochemistry by Rodney Boyer (published by Wiley)

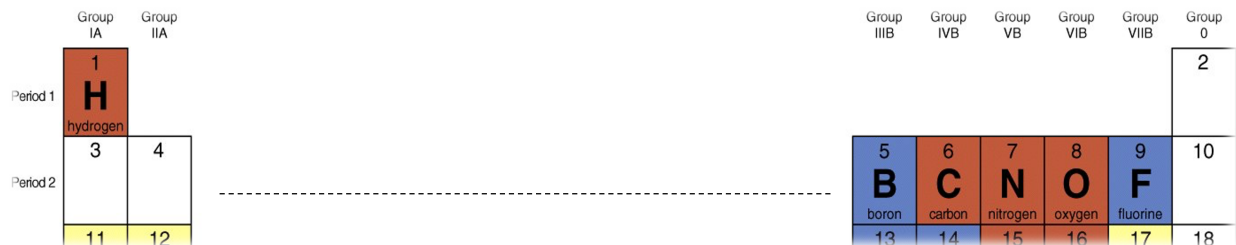
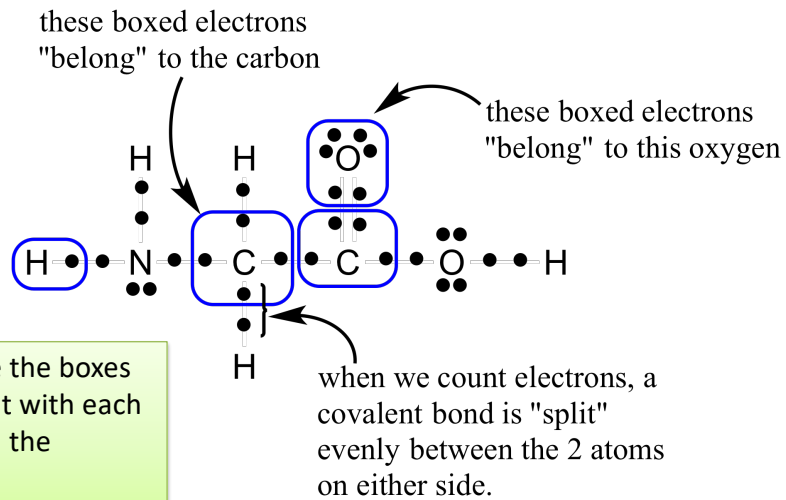
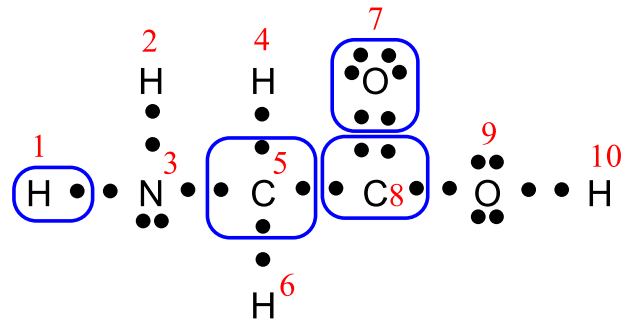


Fig. 1-8

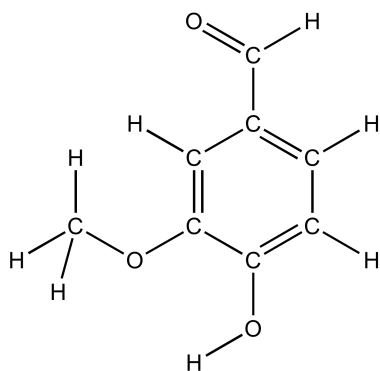
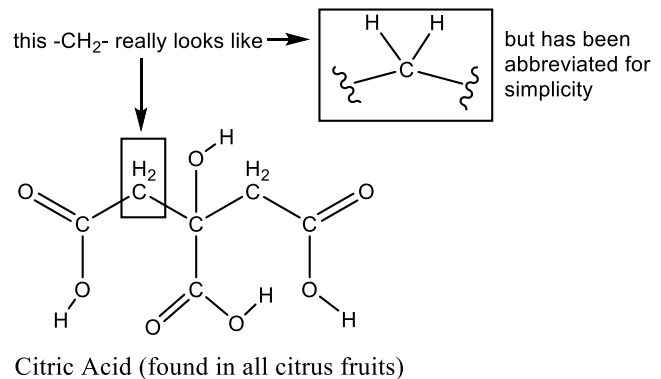
Complete the image below by drawing boxes around each atom in the molecule – include within the box electrons that “belong” to that atom. Then complete the table that follows.



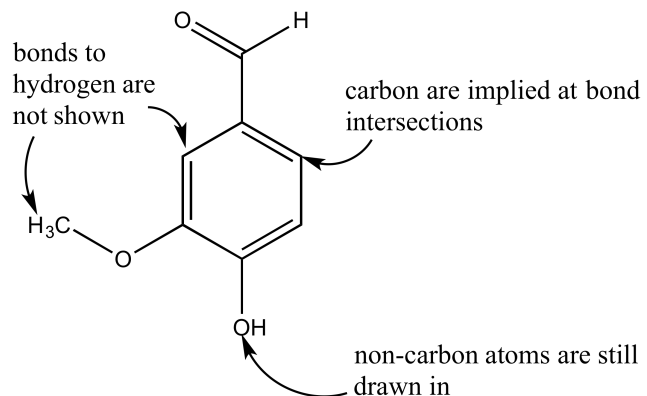
Atom	Number of electrons in the box	Group number for that element on the periodic table	Number of covalent bonds formed with the atom	Number (if any) of lone pairs on the atoms (electrons not in a bond)
1 (H)				
2 (H)				
3 (N)				
4 (H)				
5 (C)				
6 (H)				
7 (O)				
8 (C)				
9 (O)				
10 (H)				



Abbreviating structure



Vanillin - complete structural formula



Vanillin - Skeletal structure

Fig. 1-10