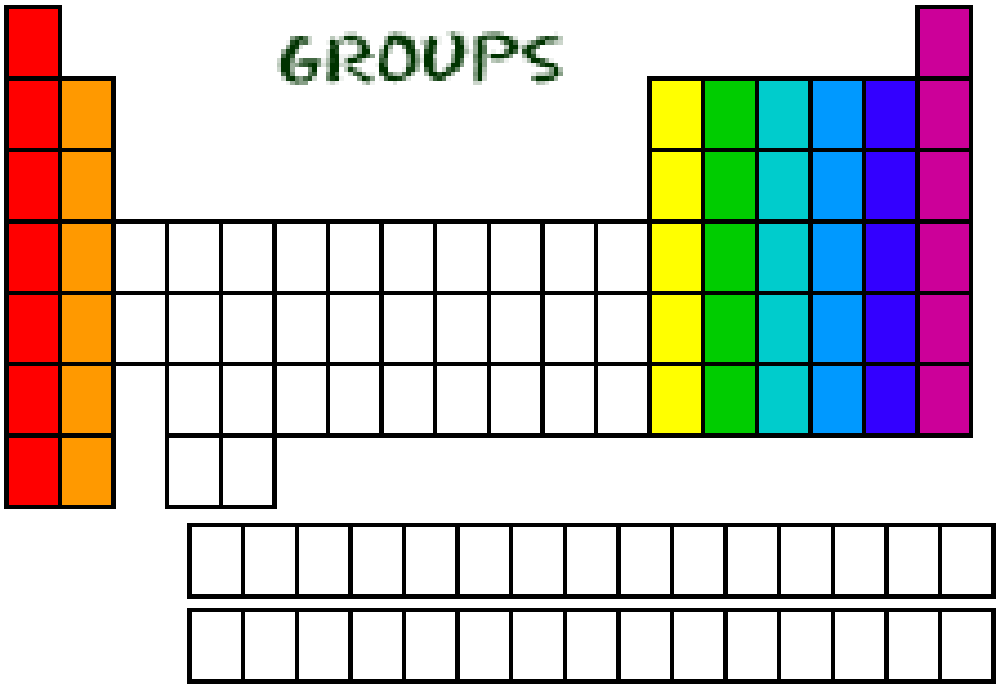
Valance Electrons, Lewis electron Dot Structures and the Periodic Table

Groups - Review

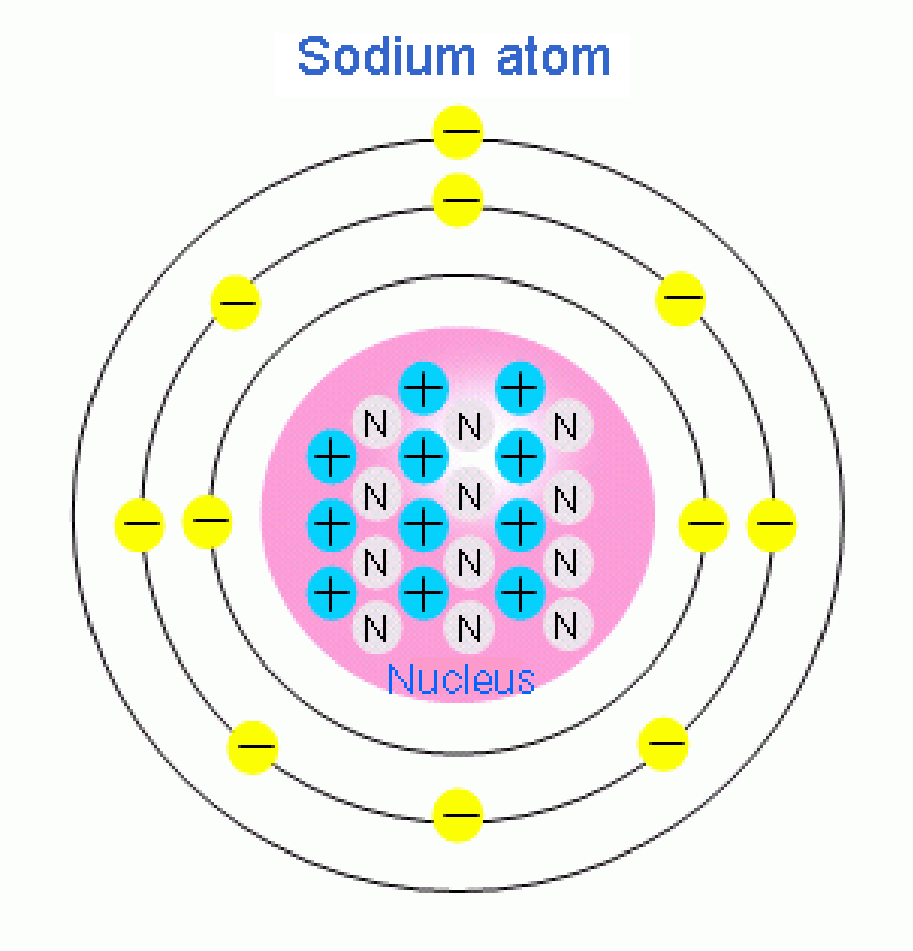


- **Each column is called a "group"**
- **Each period represents an energy level within the atom (where electrons reside).**
- **Each element in a group has the same number of electrons in their outer energy level (the valence level).**
- **The electrons in the outer shell are called "valence electrons"**

Valence Electrons

- Valence electrons are the electrons in the highest occupied energy level of the atom.
- Valence electrons are the only electrons generally involved in bond formation.

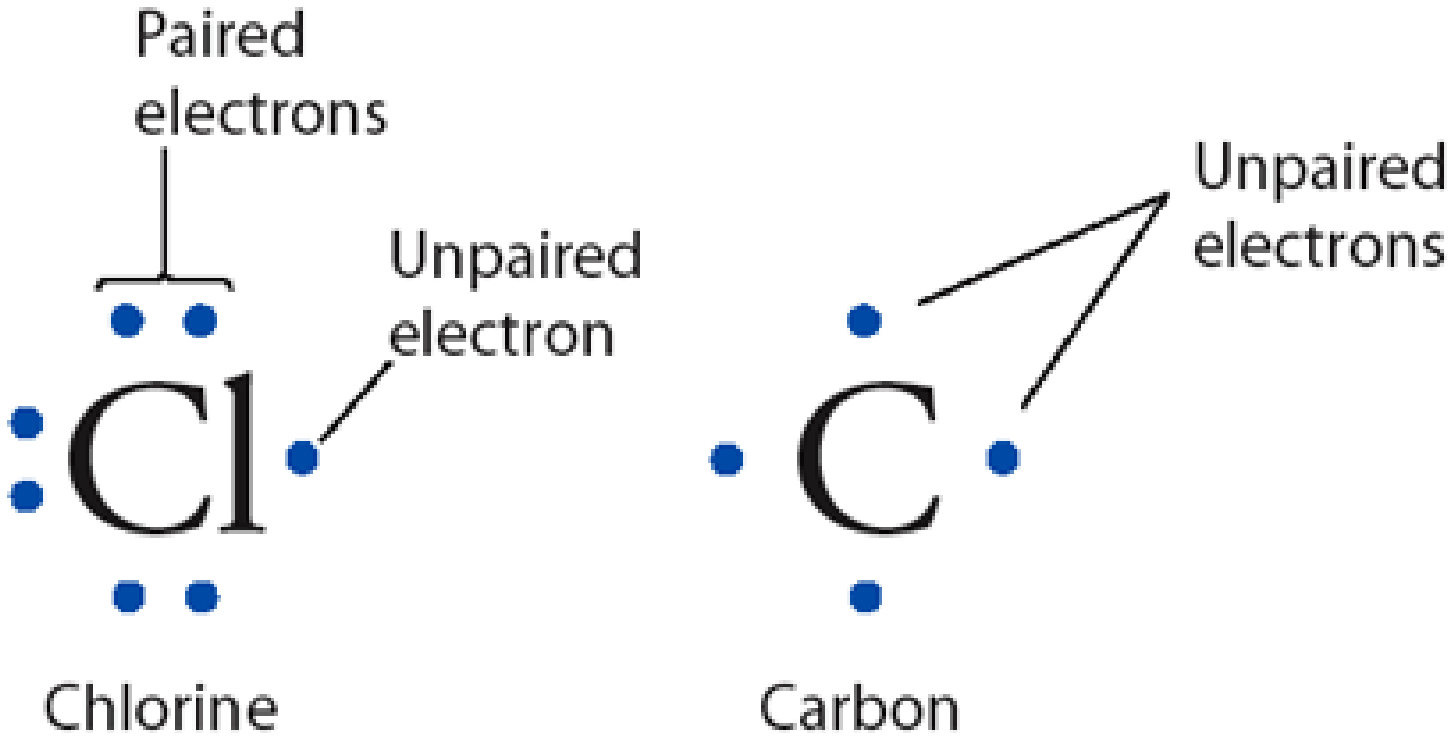
Bohr Atomic Structures



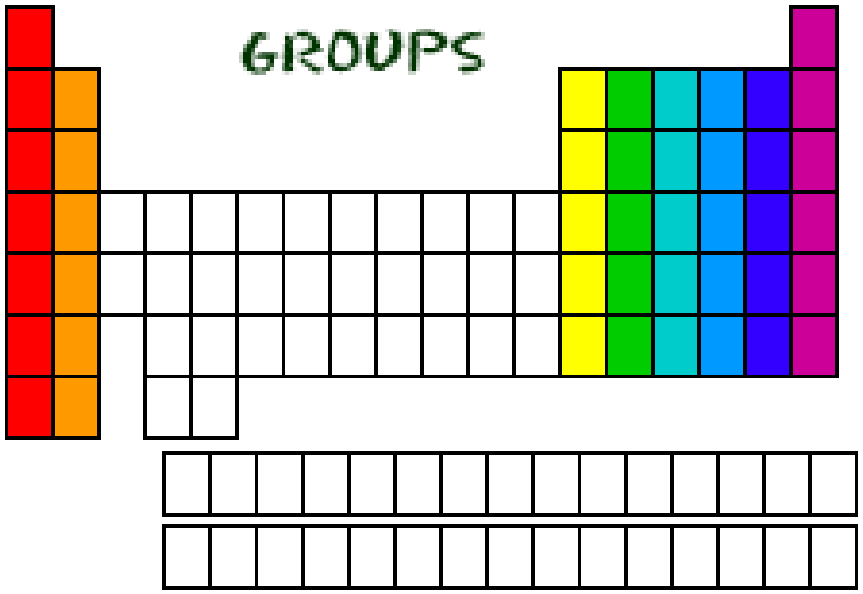
- The first energy level can contain 2 electrons.
- The second and third levels can contain 8 electrons.
- Beyond the third level, energy levels can contain 18 or even 32 electrons.

Electron Dot Structure or Lewis Dot Diagram (Gilbert Lewis)

A notation showing the valence electrons surrounding the atomic symbol.

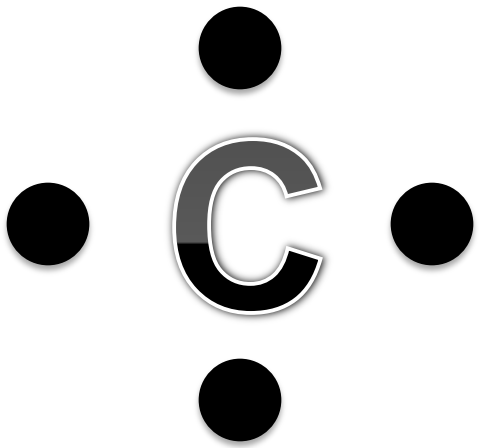


Lewis Structures



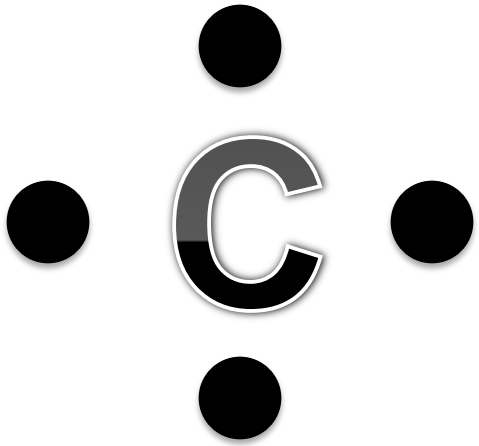
- Find out which group (column) your element is in.
- This will tell you the number of valence electrons your element has.
- You will only draw the valence electrons.

Lewis Structures



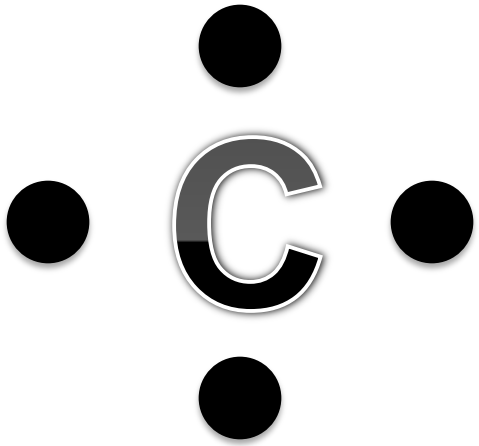
1) Write the element symbol.
2) Carbon is in the 4th group, so it has 4 valence electrons.
3) Starting at the right, draw 4 electrons, or dots, counter-clockwise around the element symbol.

Lewis Structures



1) Check your work.
2) Using your periodic table, check that Carbon is in the 4^{th} group.
3) You should have 4 total electrons, or dots, drawn in for Carbon.

Lewis Structures



On your worksheet, try these elements on your own:

a) H
b) P
c) Ca
d) Ar
e) Cl
f) Al

Lewis Structures

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a) H
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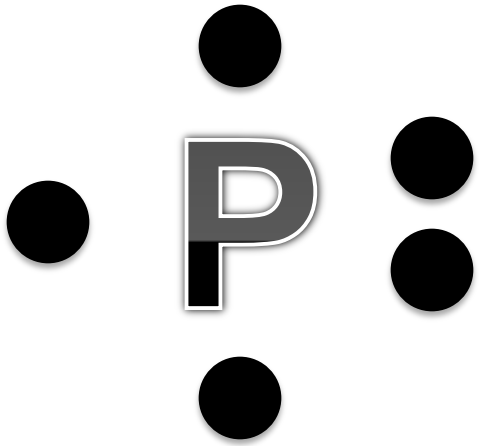
Lewis Structures



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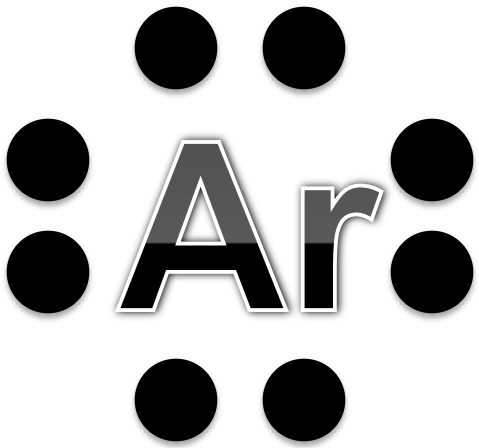

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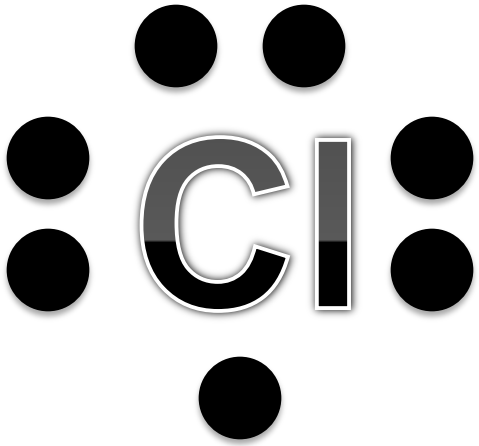
Lewis Structures



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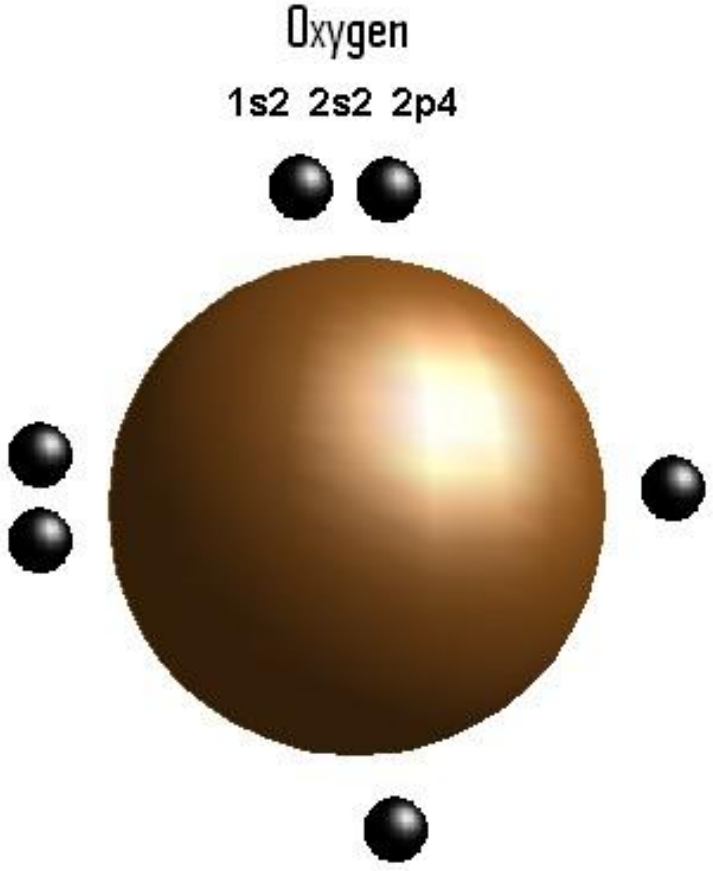
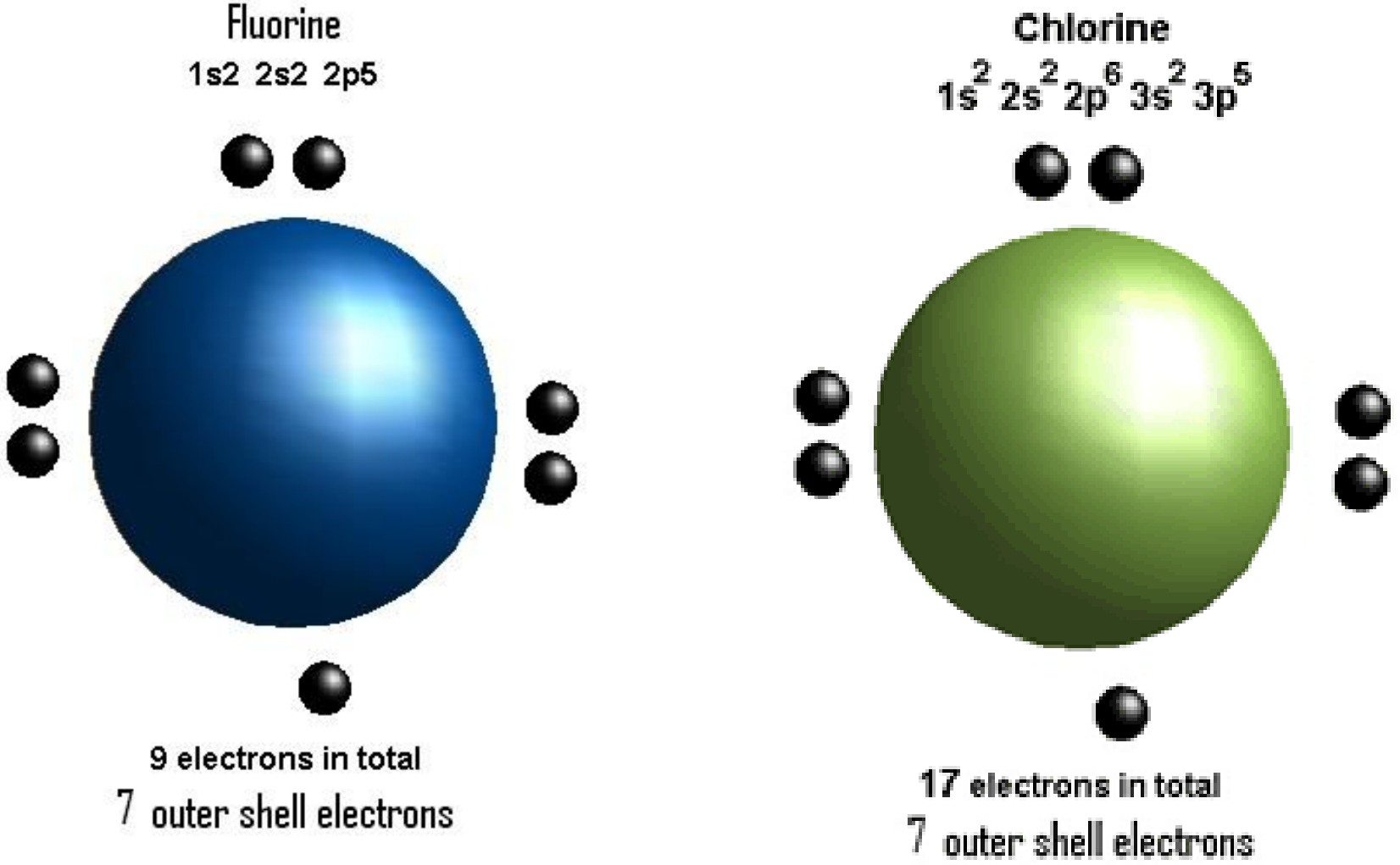
Oxygen Atom


Oxygen
1s2 2s2 2p4
8 electrons in total
6 outer shell electrons

Fluorine Atom - Chlorine Atom



Lewis Structures

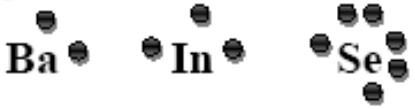
Name:

- Lewis structures, or dot diagrams, are a simplified way to show how the valence electrons are arranged in the outer shell. This is where the chemical reactions take place. Atoms will either share or give away these electrons to form bonds.
- Using your periodic table, determine the number of valence electrons for each element.
- Draw a dot to represent each valence electron around the element symbol.
- Follow the pattern below starting with position number 1.

H							He
Li	Be	B	C	N	O	F	Ne
Na	Mg	Al	Si	P	S	Cl	Ar
K	Ca						

6 2
3 Xe 1
7 5
8 4

Examples:



Elements within the same group have the same electron-dot structure.