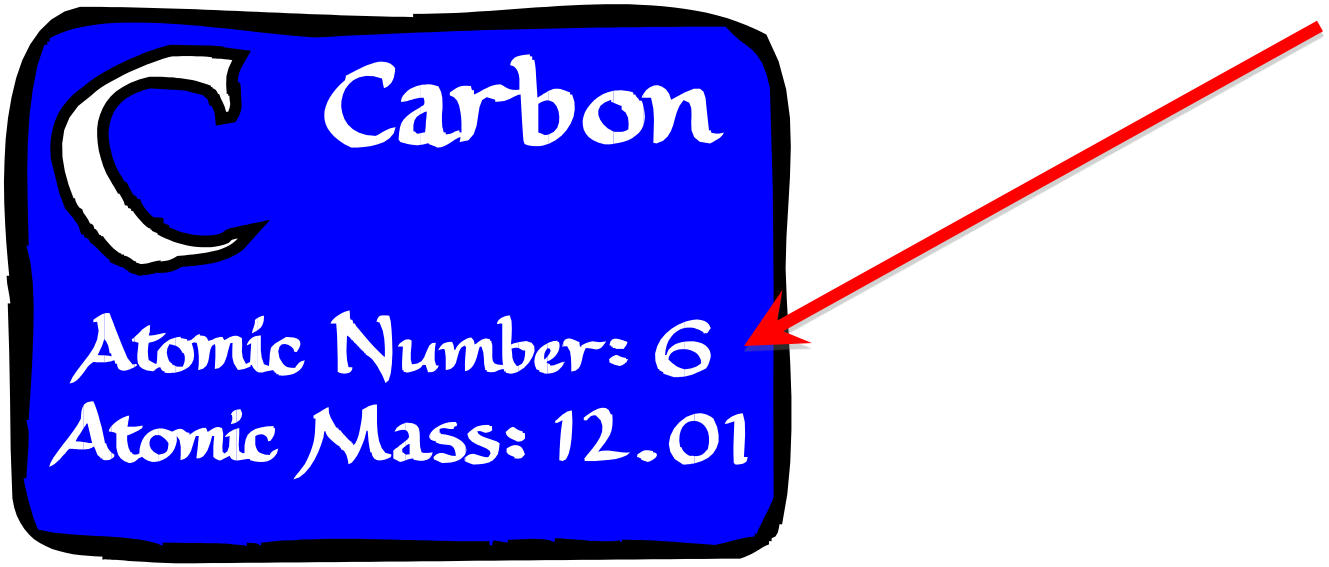
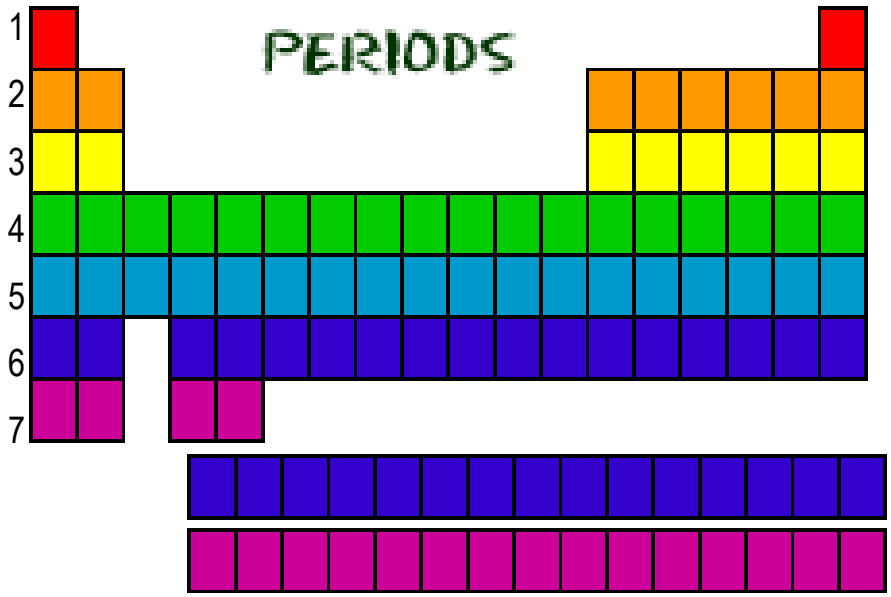
Bohr Model Diagrams
and
Lewis Structures

Bohr Diagrams

1) Find the element on the periodic table.
2) Determine the number of electrons--it is the same as the atomic number.
3) This is how many electrons you will draw.

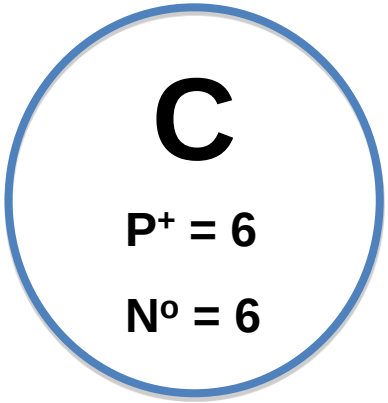


Bohr Model Diagrams



- Find out which period (row) your element is in.
- Elements in the **1st period** have one energy level.
- Elements in the **2nd period** have two energy levels, and so on.

Bohr Model Diagrams



1) Draw a nucleus with the element symbol inside.
2) Write the number of Protons and Neutrons the element has inside the nucleus. Put a $^{+}$ by the P and a little ^{o} by the N

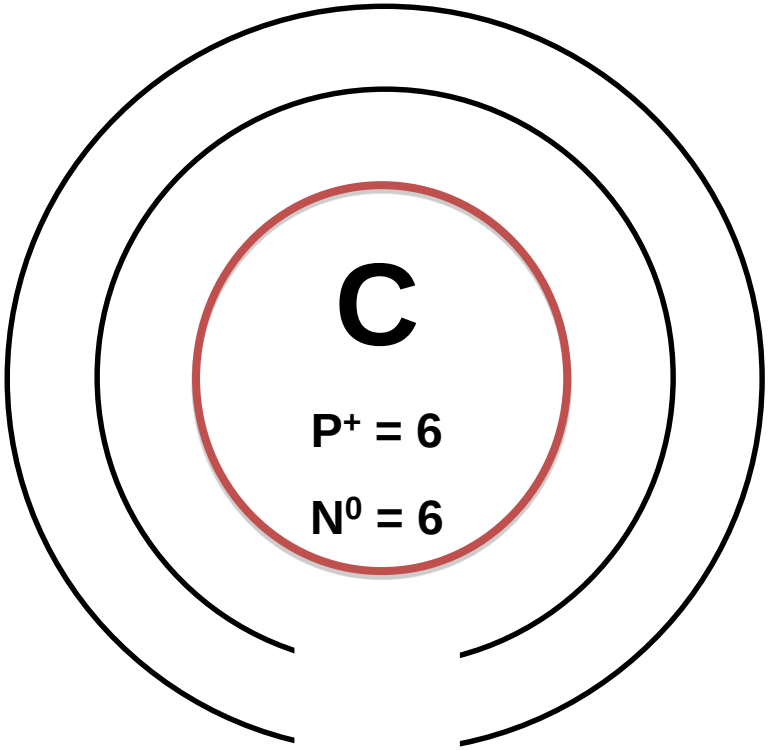
Note: Round mass to nearest 1 when figuring neutrons.

The energy levels surrounding the nucleus each hold a maximum number of electrons.

	Maximum e^-
Level 1	**$2e^-$**
Level 2	**$8e^-$**
Level 3	**$18e^-$**
Level 4	**$32e^-$**

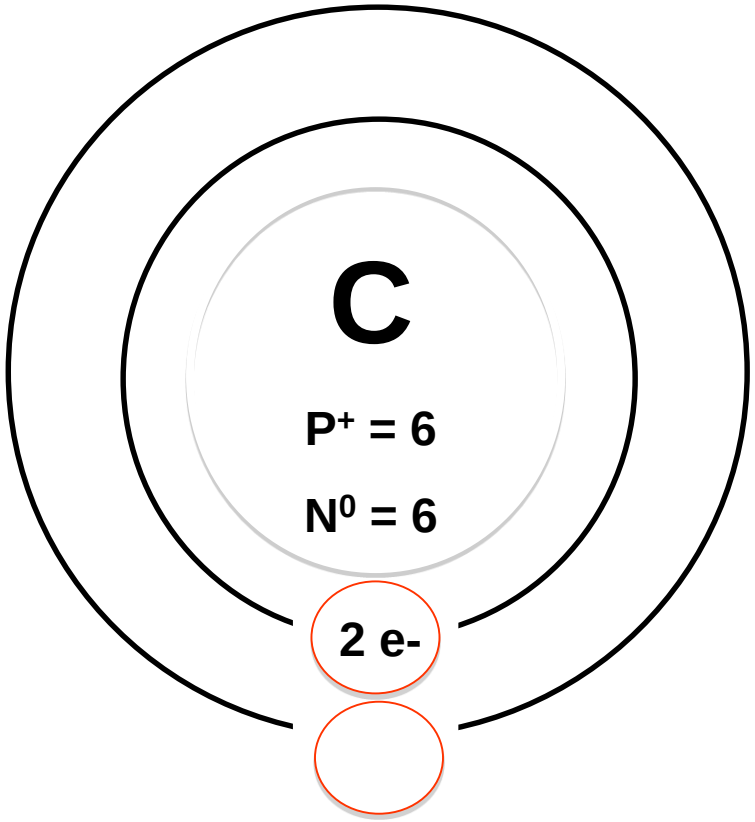
IMPORTANT: *The outer-most shell of an atom (no matter what level) can only hold 8 electrons!*

Bohr Diagrams



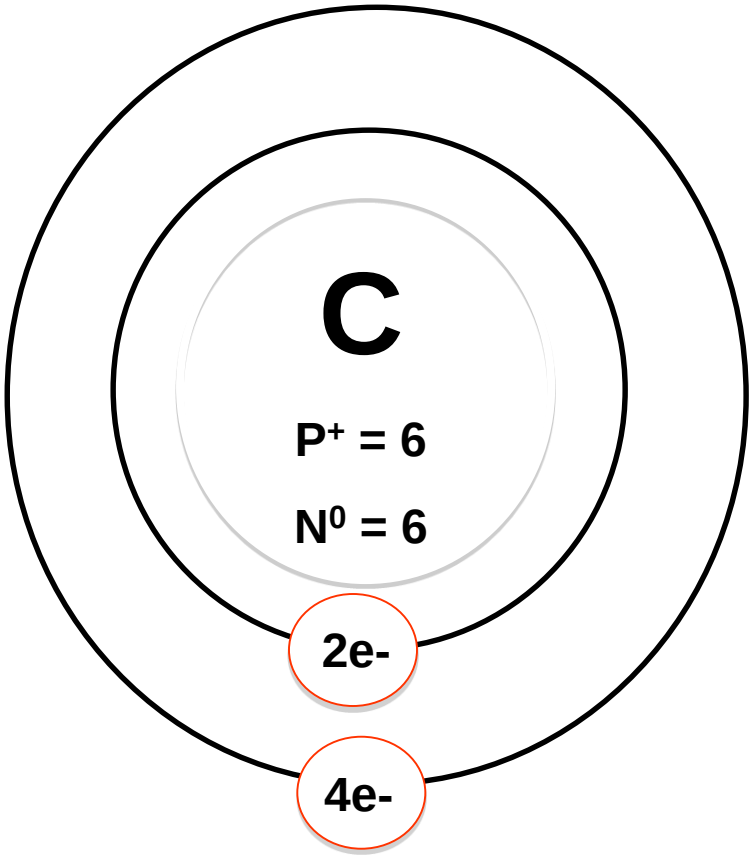
1) Carbon is in the 2nd period, so it has two energy levels.
2) Draw the energy levels around the nucleus.

Bohr Diagrams



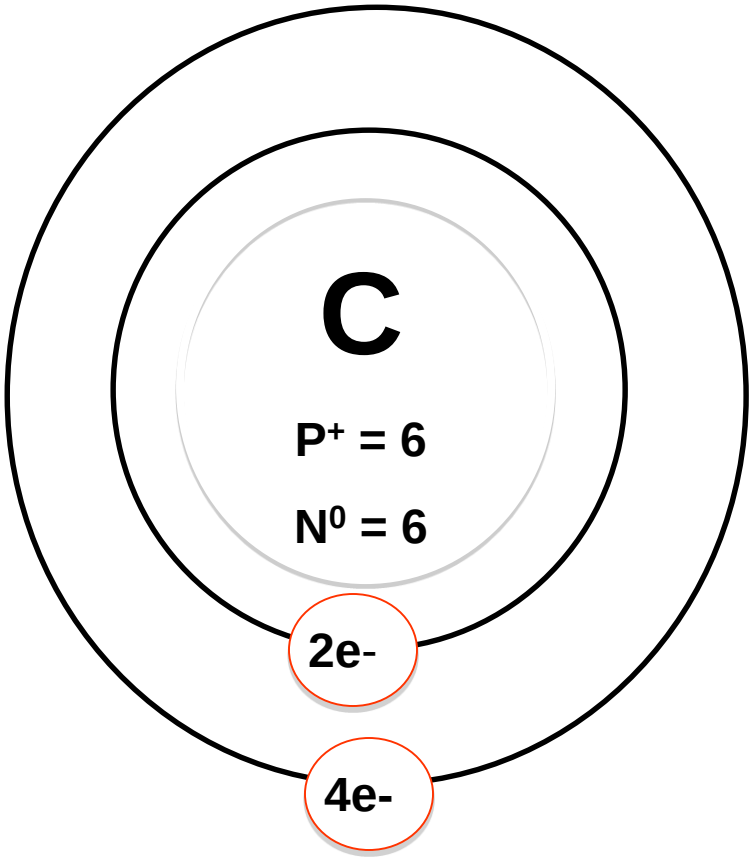
1) Add the electrons.
2) Carbon has 6 electrons.
3) The first energy level can only hold 2 electrons.
4) Write the number of electrons that energy level holds and **e-** for electrons and their charge.
5) How many electrons are in the outer energy level?

Bohr Diagrams



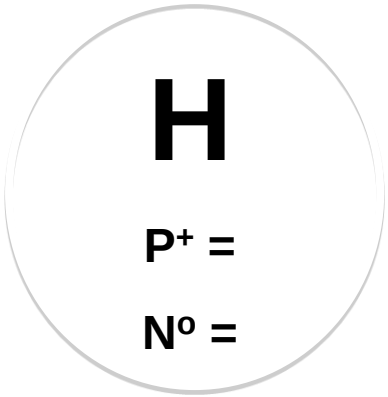
1) Since you have 2 electrons in the first energy level, you need to add 4 more.
2) These go in the 2nd energy level.
3) Again, write e- and the number of electrons.

Bohr Diagrams



1) Check your work.
2) You should have 6 total electrons for Carbon.
3) Only two electrons can fit in the 1st energy level.
4) The 2nd energy level can hold up to 8 electrons.
5) The 3rd energy level can hold 18, but the outer shell can only hold 8 electrons.

Bohr Diagrams



Try Hydrogen:

Atomic Mass:

Atomic Number:

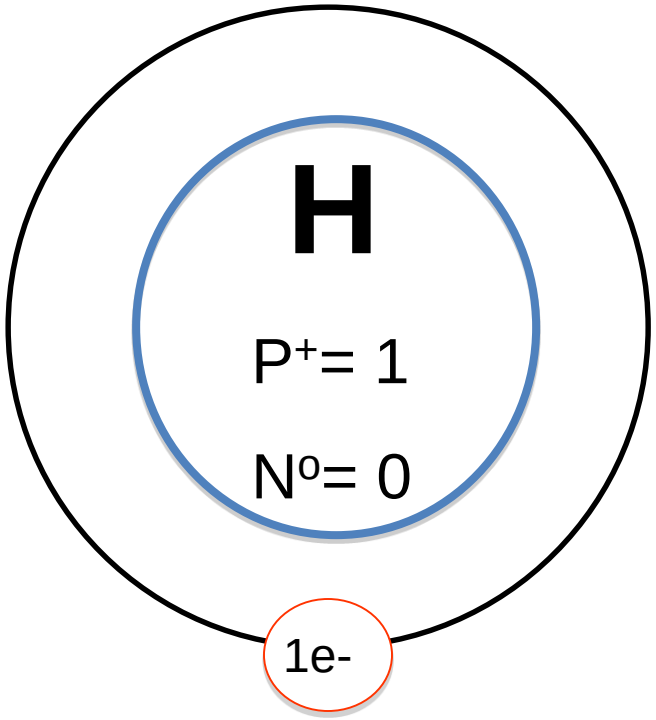
Protons:

Electrons:

Neutrons:

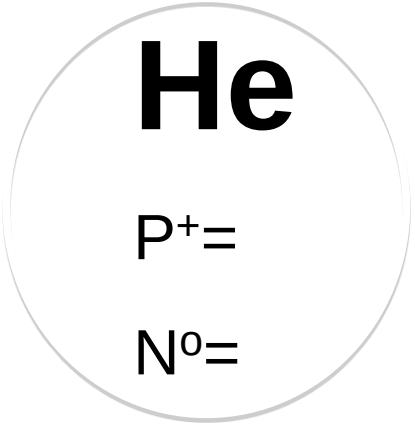
Energy Levels:

Bohr Diagrams



Check Yourself.

Bohr Diagrams



Try Helium:

Atomic Mass:

Atomic Number:

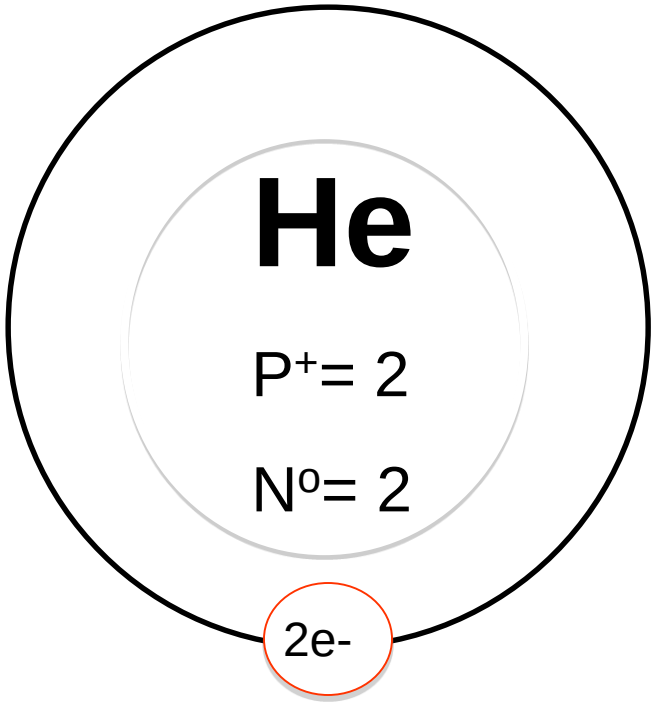
Protons:

Electrons:

Neutrons:

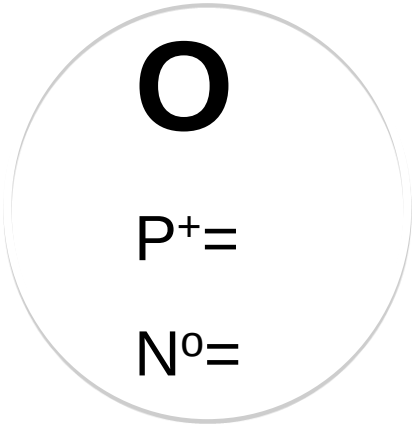
Energy Levels:

Bohr Diagrams



Check Yourself!

Bohr Diagrams



Try Oxygen:

Atomic Mass:

Atomic Number:

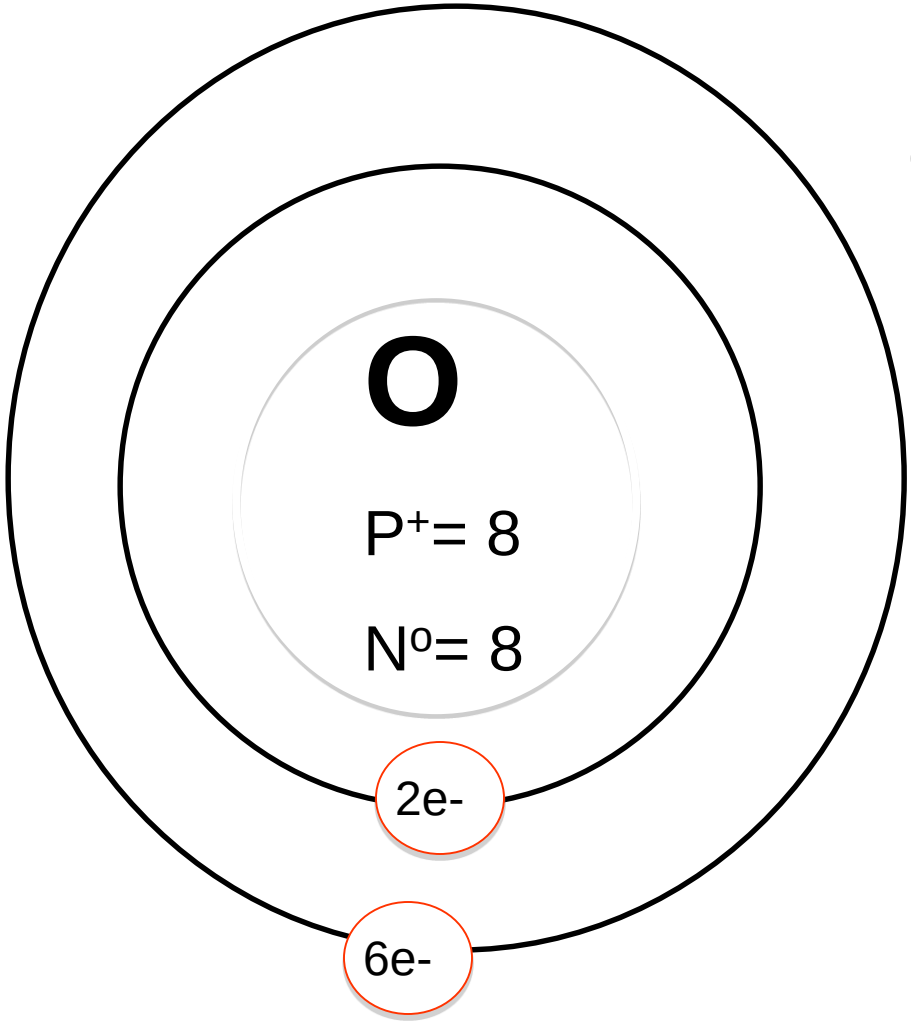
Protons:

Electrons:

Neutrons:

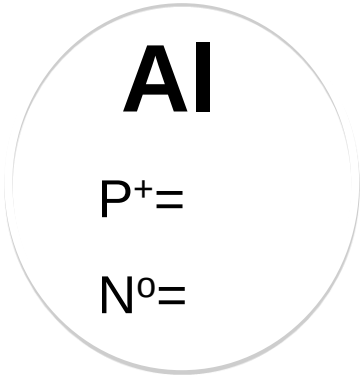
Energy Levels:

Bohr Diagrams



Check Yourslef!

Bohr Diagrams



Try Aluminum:

Atomic Mass:

Atomic Number:

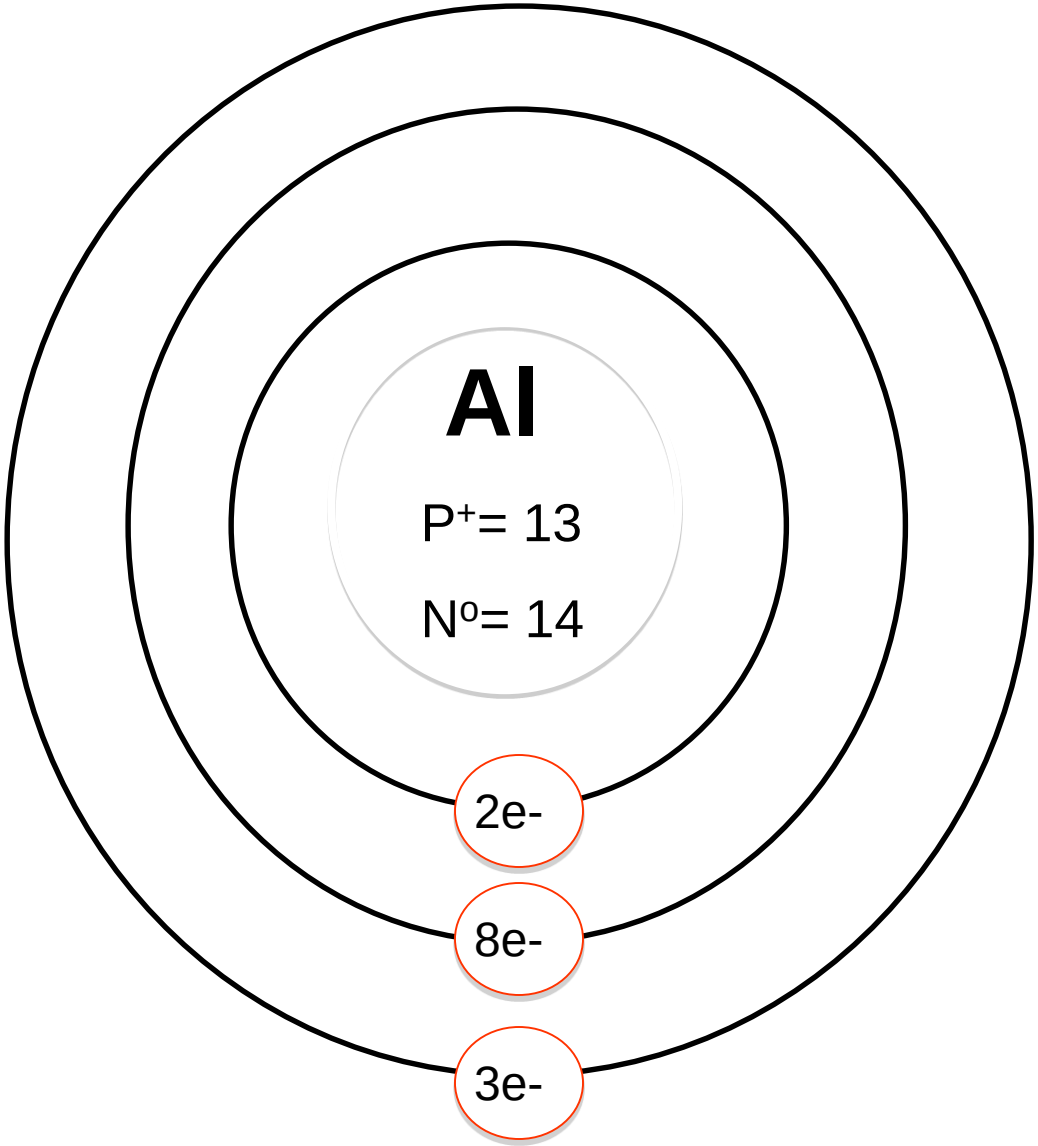
Protons:

Electrons:

Neutrons:

Energy Levels:

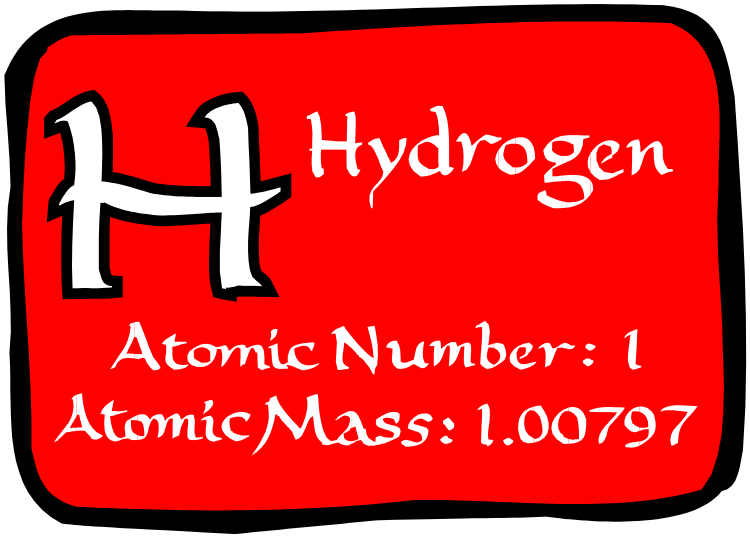
Bohr Diagrams



Check Yourself!

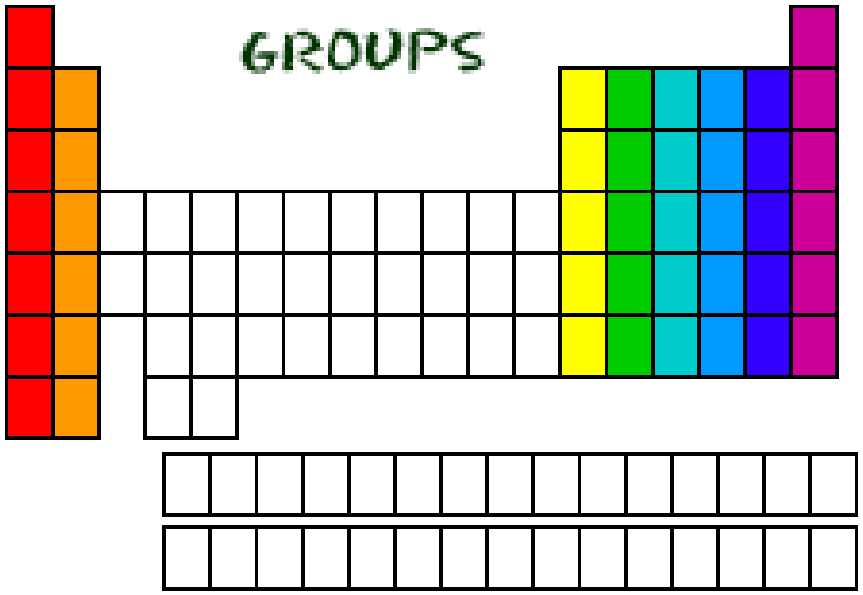
Lewis Structures

1) Find the element on the periodic table.
2) Determine the number of valence electrons.
3) This is how many electrons you will draw.



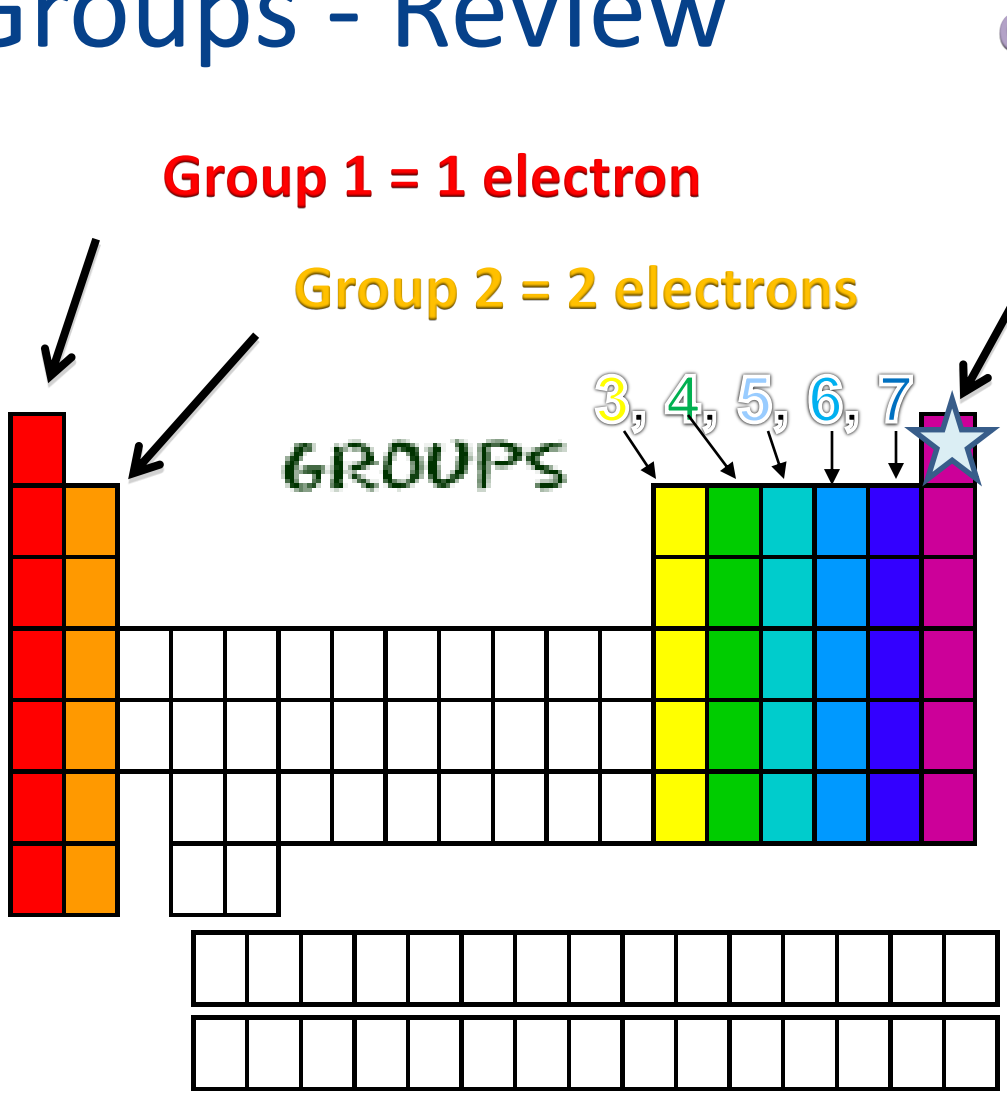
For a chemist, the valence electrons are quite possibly the most important electrons an atom has. The valence electrons are the electrons in the highest energy level. They are the most exposed of all the electrons ... and, consequently, they are the electrons that get most involved in chemical reactions. Chemists use a notation called electron dot diagrams, also known as Lewis Structures, to show how many valence electrons a particular element has. An electron dot diagram consists of the element's symbol surrounded by dots that represent the valence electrons. Typically the dots are drawn as if there is a square surrounding the element symbol with up to two dots per side. (An element will never have more than eight valence electrons.)

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.

Groups - Review



Group 8 = 8 electrons

Except for He, it has 2 electrons

- **Each column is called a "group"**
- **Each element in a group has the same number of electrons in their outer orbital, also known as "shells".**
- **The electrons in the outer shell are called "valence electrons."**

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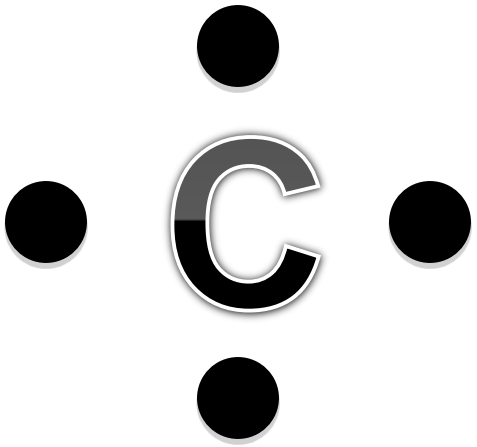
Lewis Structures



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.

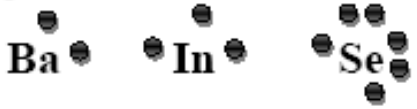
Lewis Structures

Name:

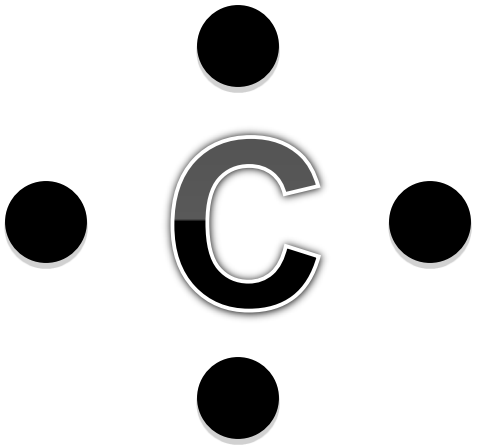
- Lewis structures, or dot diagrams, are a simplified way to show how the valence electrons are arranged in the outer shell. This is where the chemical reactions take place. Atoms will either share or give away these electrons to form bonds.
- Using your periodic table, determine the number of valence 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						

Examples:

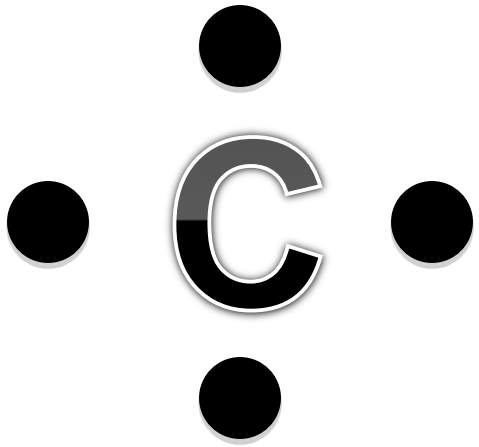


Lewis Structures



1) Check your work.
2) Using your periodic table, check that Carbon is in the 4th 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

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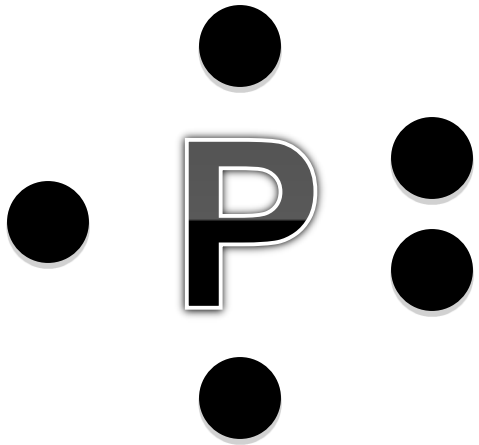

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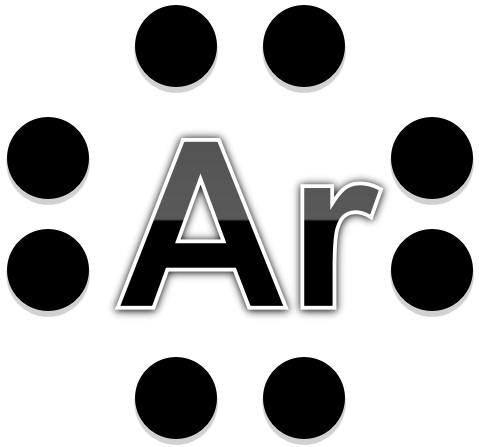

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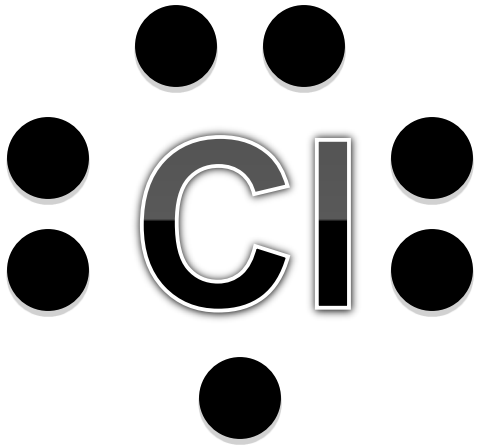

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