

Below are the activities assigned for the week of April 14th-17th. Like last week, the material covered this week will be a review for most of you. Feel free to skip the sections that you feel you already know well enough.

I have broken up the material into 3 different sections. They are:

1. Parts of an Atom
2. How Are Electrons Arranged Around the Nucleus?
3. Ions

Reminders:

- Your Periodic Table of Elements can be found here:
<https://ptable.com/> OR <https://www.fishersci.com/us/en/periodic-table.html>
- Your Periodic Table of Ions can be found here:
https://www.sciencegeek.net/tables/PT_ions.pdf
- A Periodic Table of Elements that shows the grouping of metals/non-metals/metalloids can be found [here](#).

1. Parts of an Atom

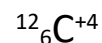
An atom is made up of protons and neutrons (which are in the nucleus), and electrons (which are in the electron cloud surrounding the atom).

The atomic number equals the number of protons. The electrons in a neutral atom equal the number of protons. The mass number equals the sum of protons and neutrons.

The charge indicates the number of electrons that have been lost or gained. A positive charge indicates the number of electrons (which have a negative charge) lost. A negative charge indicates the number of electrons gained.

This structure can be written as part of a chemical symbol.

EXAMPLE:



Mass # = 12
Atomic # = 6
Charge = +4

The carbon atom has
6 protons, 6 neutrons,
and 2 electrons.

COMPLETE THE FOLLOWING CHART:

ELEMENT/ION	ATOMIC NUMBER	MASS NUMBER	CHARGE	PROTONS	NEUTRONS	ELECTRONS
$^{24}_{12}\text{Mg}$						
$^{39}_{19}\text{K}$						
$^{23}_{11}\text{Na}^{+1}$						
$^{19}_9\text{F}^{-1}$						
$^{27}_{13}\text{Al}^{+3}$						
^1_1H						
$^{24}\text{Mg}^{2+}$						
Ag						
S⁻²						
^2_1H						
$^{35}\text{Cl}^{-}$						
Be²⁺						

ANSWER KEY:

ELEMENT/ION	ATOMIC NUMBER	MASS NUMBER	CHARGE	PROTONS	NEUTRONS	ELECTRONS
$^{24}_{12}\text{Mg}$	12	24	0	12	12	12
$^{39}_{19}\text{K}$	19	39	0	19	20	19
$^{23}_{11}\text{Na}^{+1}$	11	23	+1	11	12	10
$^{19}_9\text{F}^{-1}$	9	19	-1	9	10	10
$^{27}_{13}\text{Al}^{+3}$	13	27	+3	13	14	10
^1_1H	1	1	0	1	0	1
$^{24}\text{Mg}^{2+}$	12	24	+2	12	12	10
Ag	47	108	0	47	61	47
S⁻²	16	32	-2	16	16	18
^2_1H	1	2	0	1	1	1
$^{35}\text{Cl}^{-}$	17	35	-1	17	18	18
Be²⁺	4	9	+2	4	5	2

2. How Are Electrons Arranged Around the Nucleus?

Electrons spin very fast. They spin in orbits around the nucleus. The spinning is so fast that they seem to form a solid shell around the nucleus. All atoms except hydrogen and helium atoms have more than one shell.

We label the shells of electrons. Each shell is labeled with a capital letter. The first shell is the “K” shell. It is the shell closest to the nucleus. The next shell is the “L” shell. After that comes the “M” shell. And so on.

Each shell can only hold a certain number of electrons:

The “K” shell can hold 2 electrons.

The “L” shell can hold 8 electrons.

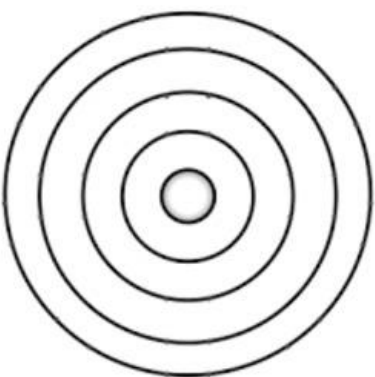
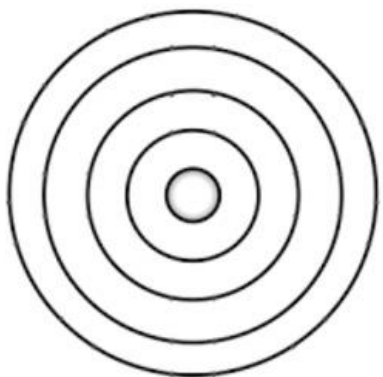
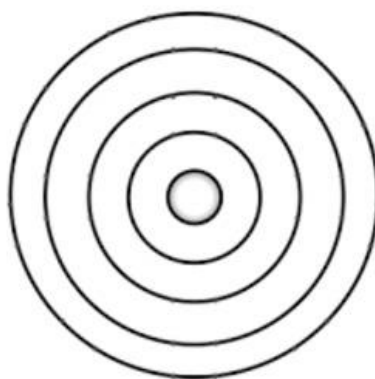
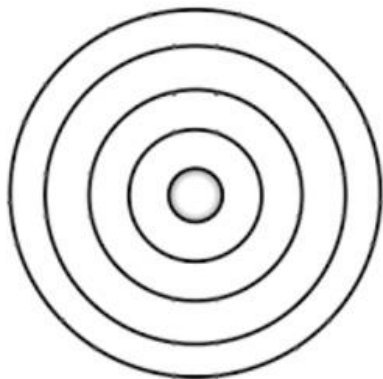
The “M” shell can hold 18 electrons.

The number of shell an atom has depends on the number of electrons for that atom. Each shell must have its full number of electrons before a new shell starts. If there are more electrons than a shell can hold, a new shell starts.

The outer shell of most atoms is not full. Only the atoms in the elements of Group O on the Periodic Table have full outer shells.

FILL IN THE DIAGRAMS BELOW FOR THE FOLLOWING ELEMENTS:

Nickel, Magnesium, Iron, and Aluminum



3. Ions

Atoms may lose or gain electrons to form ions in which the number of electrons is different from the number of protons. The numerical value of the electric charge of an ion with a plus (+) or minus (-) sign is called ionic charge.

Metals tend to lose electrons to produce cations (positive ions).

Non-Metals tend to gain electrons to produce anions (negative ions).

COMPLETE THE FOLLOWING CHART:

Ion Symbol	Protons	Electrons	Charge
S ²⁻			
K ¹⁺			
Ba ²⁺			
Fe ³⁺			
Fe ²⁺			
F ¹⁻			
O ²⁻			

ANSWER KEY:

Ion Symbol	Protons	Electrons	Charge
S ²⁻	16	18	2-
K ¹⁺	19	18	1+
Ba ²⁺	56	54	2+
Fe ³⁺	26	23	3+
Fe ²⁺	26	24	2+
F ¹⁻	9	10	1-
O ²⁻	8	10	2-

Note: If you have any questions, please e-mail me at: katie.tozer@nbed.nb.ca