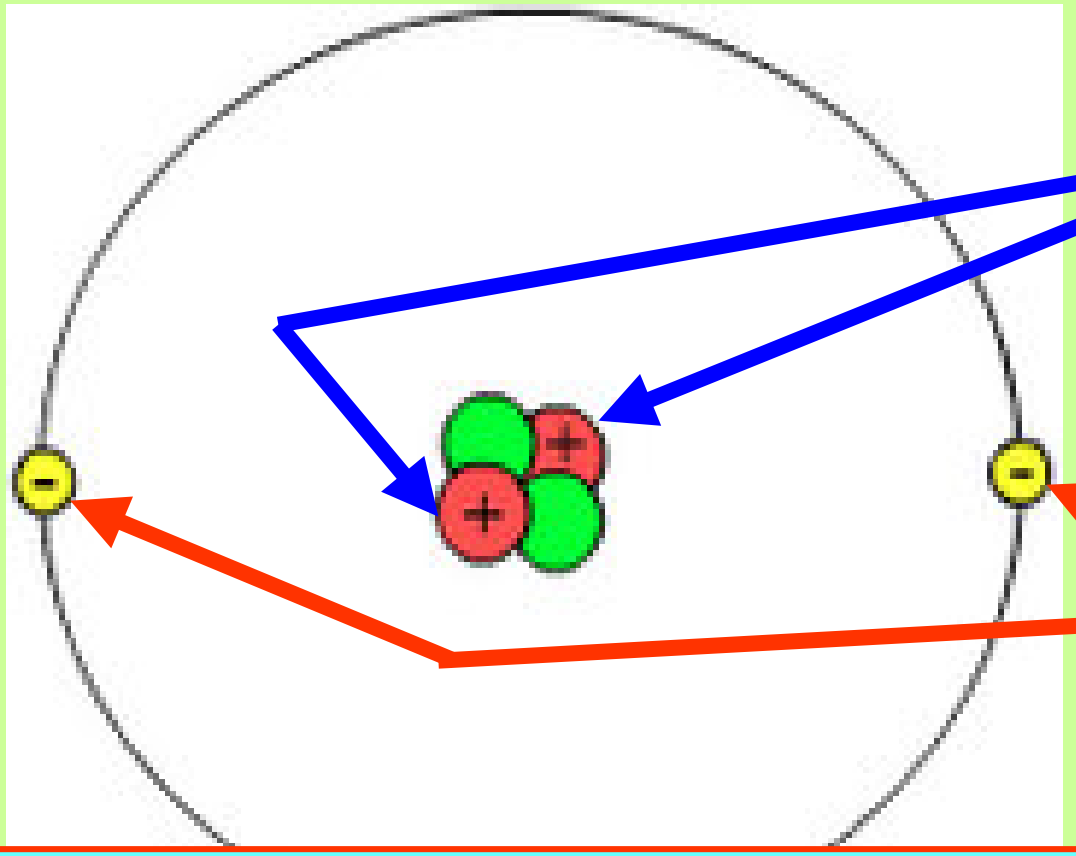
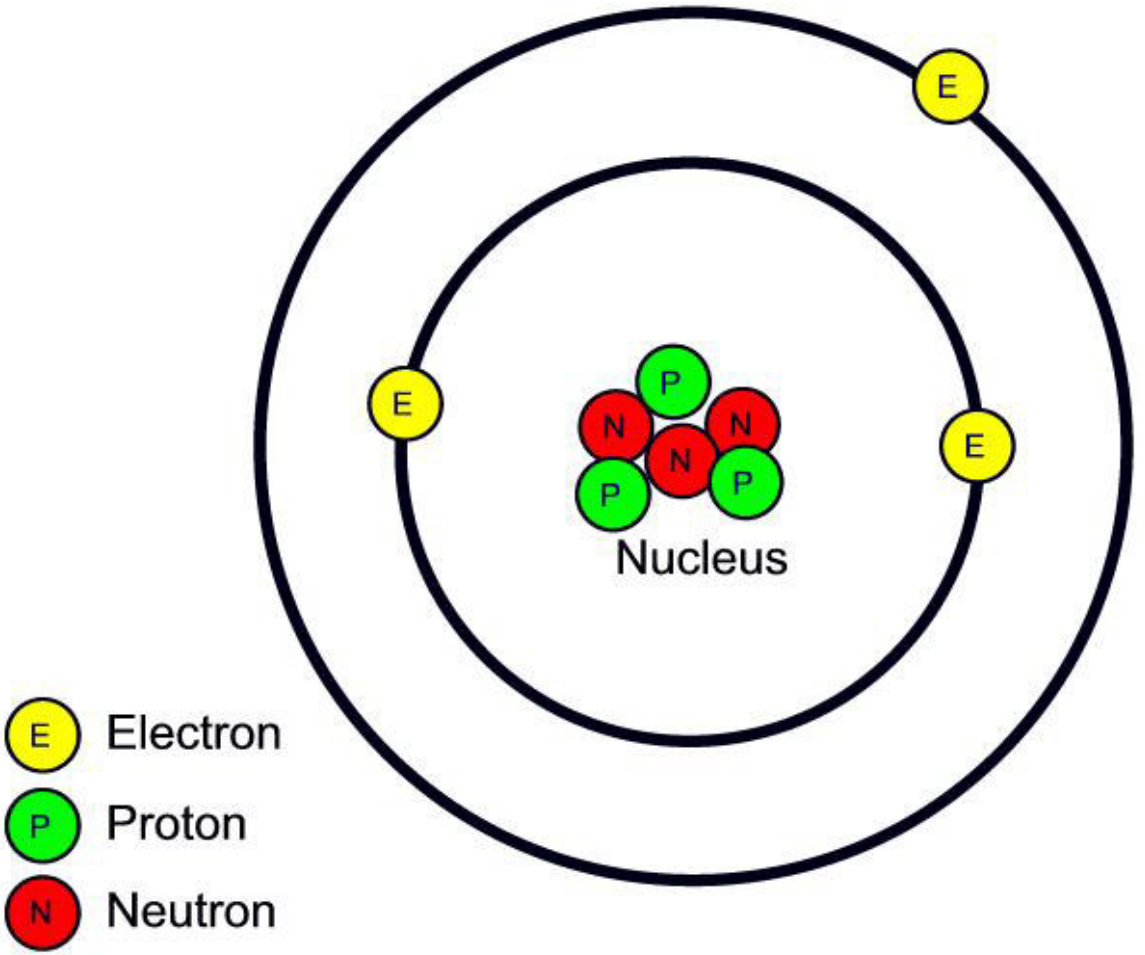
Atoms and Ions

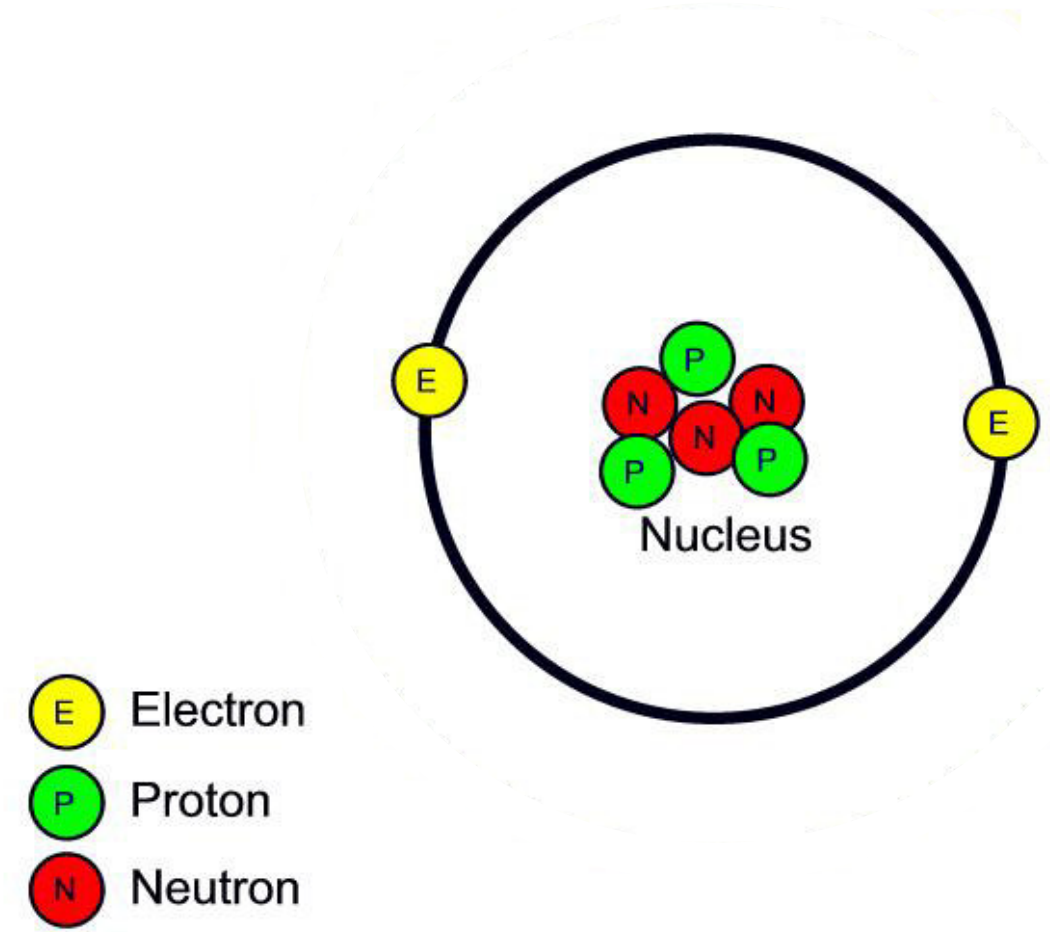


In a Neutral Atom of an Element:

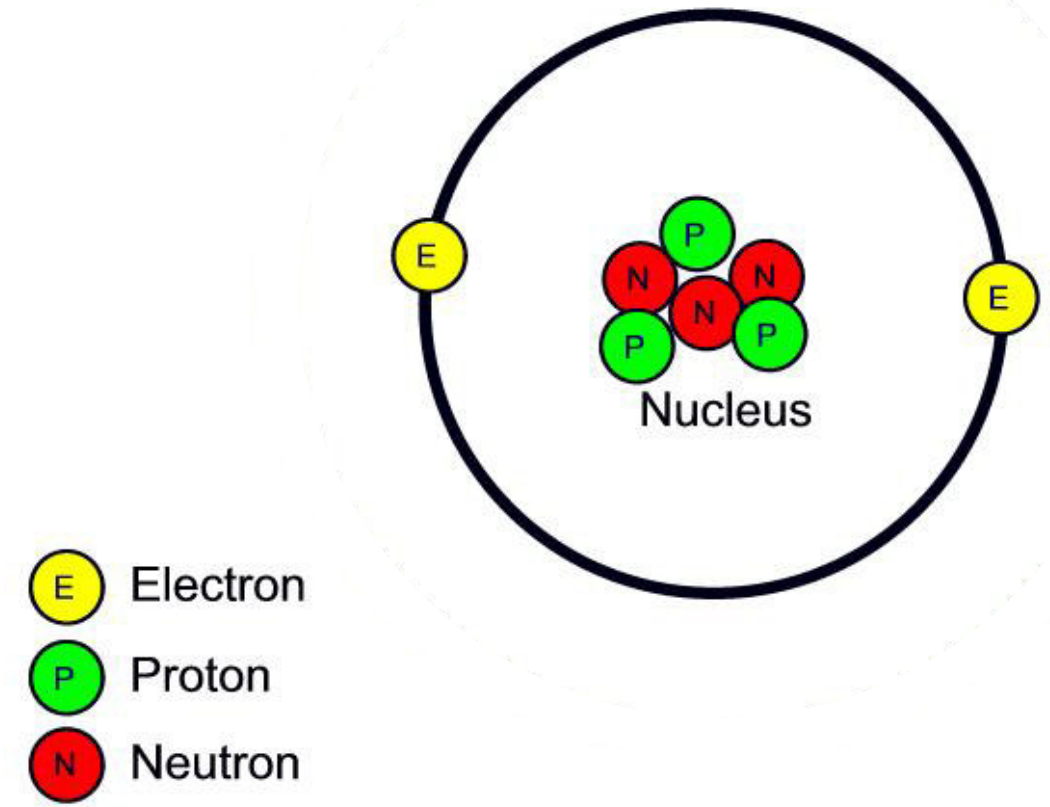
The # of _____(-) = The # of _____(+)



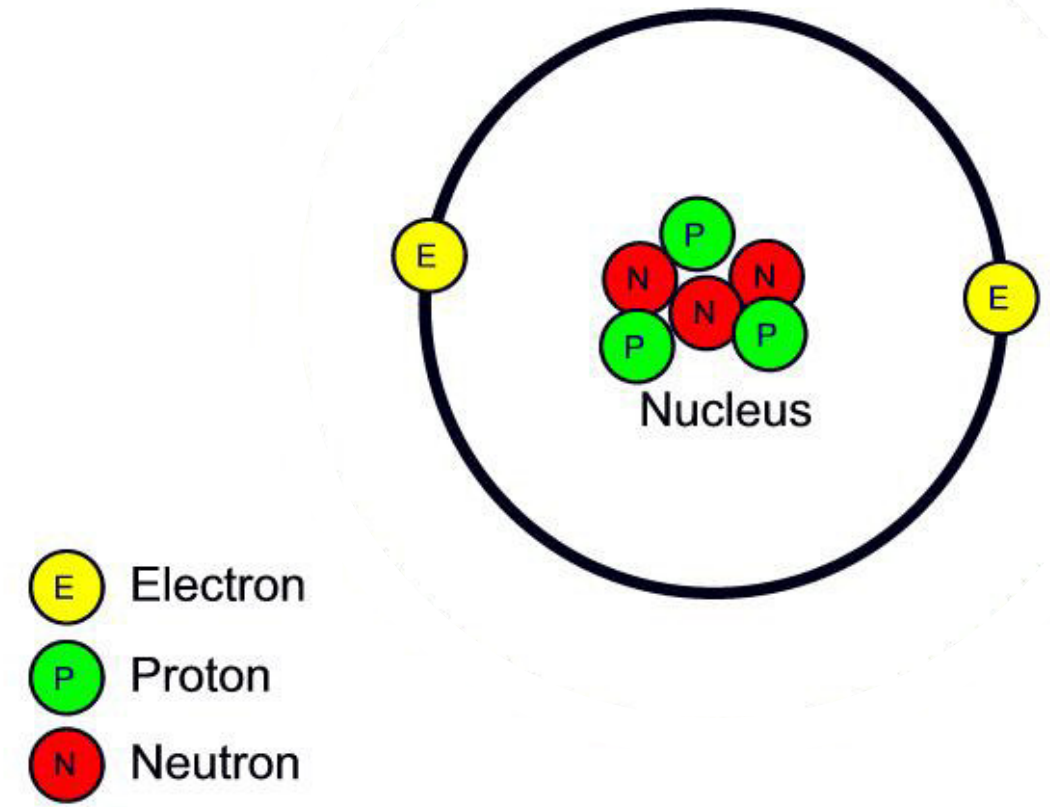
This represents an _____ of the element _____ (__P's & __ e^-'s)



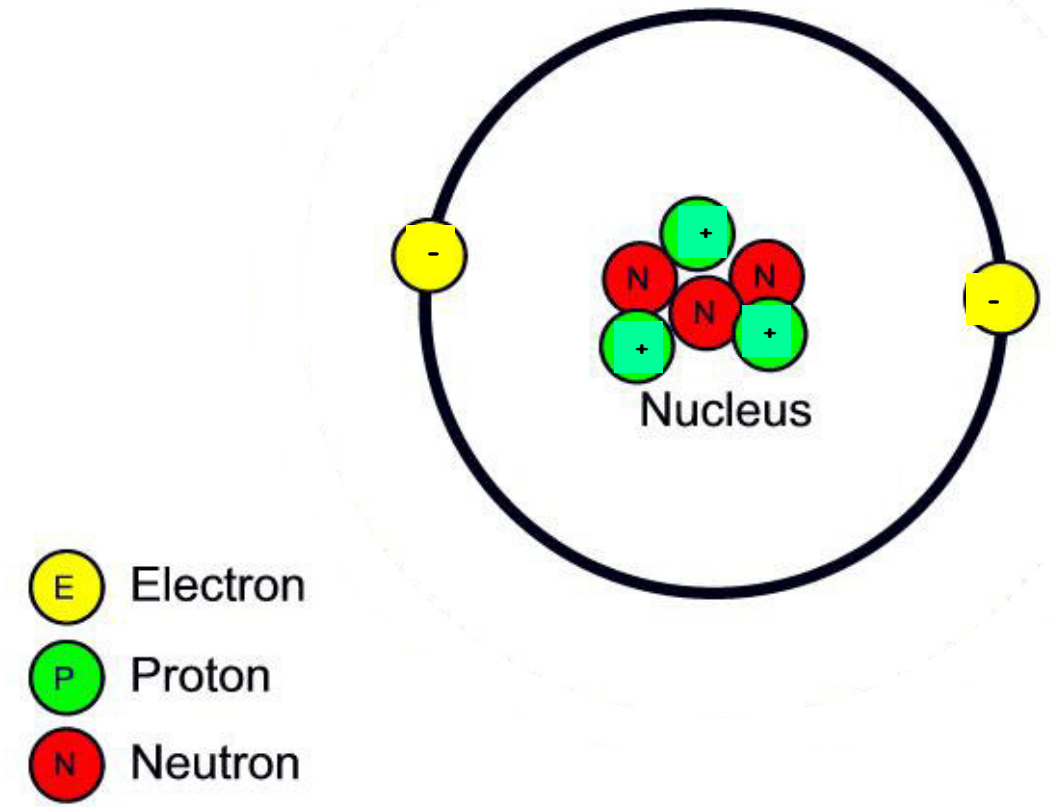
We have now taken one electron away from Lithium!



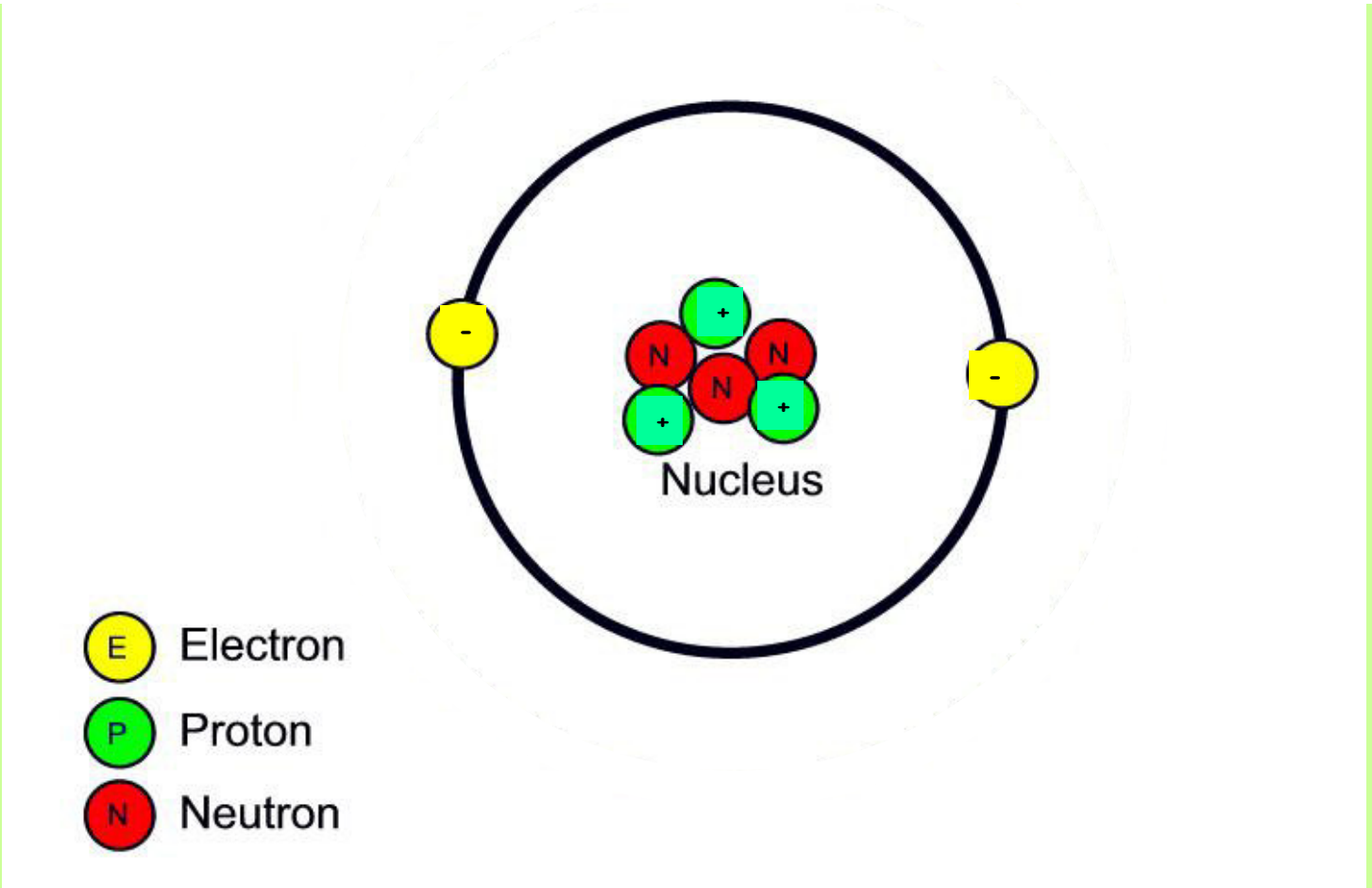
It still has _ Protons, but now only _ electrons! (Neutrons haven't changed)



This is no longer called "A Lithium Atom". It is now called a Lithium ____.



Because Protons are Positive (+) and Electrons are Negative (-), this Lithium Ion has 3+'s and 2 -'s.



Because Protons are Positive (+) and Electrons are Negative (-), this Lithium Ion has 3+'s and 2 -'s. It has a "Net Charge" of ___. (+3 and -2 = ___)

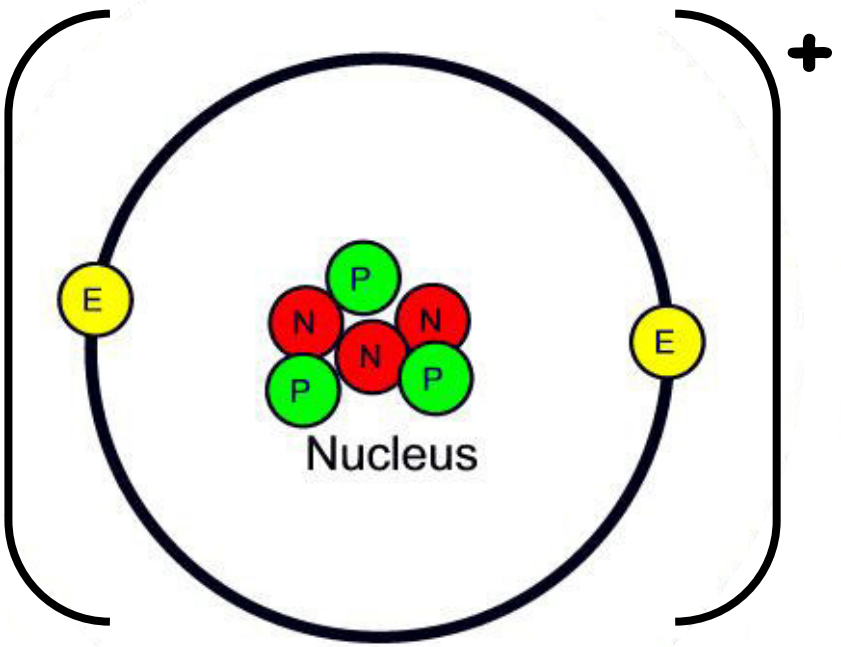
An **Ion** is an atom in which

# of _____ ≠ # of _____

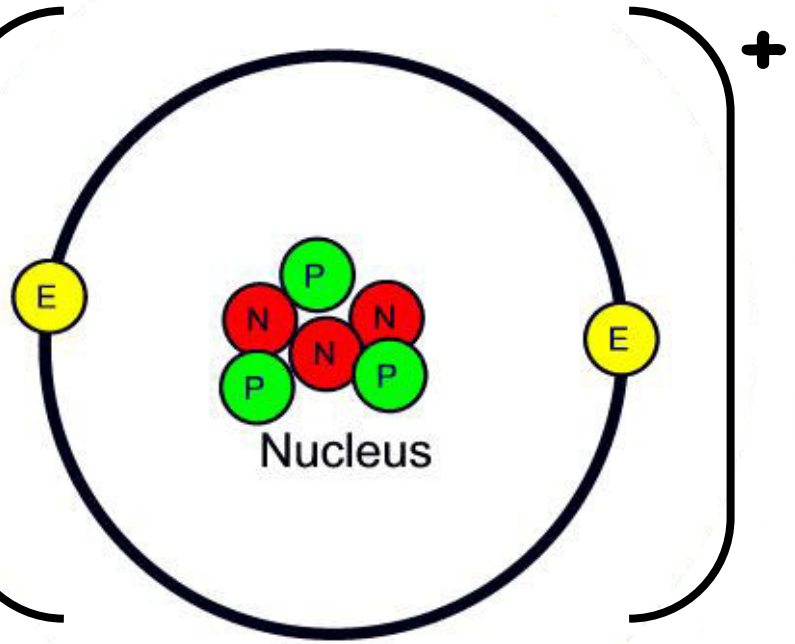
(*Neutrons don't matter here*)

An **Ion** can also be defined as an atom with a _____ _____

(Protons or Electrons are "left over")



A Lithium ____ is shown as having a net +1 charge.



Li^+

The symbol for a Lithium Ion is ____

(Take out your Periodic Table!)

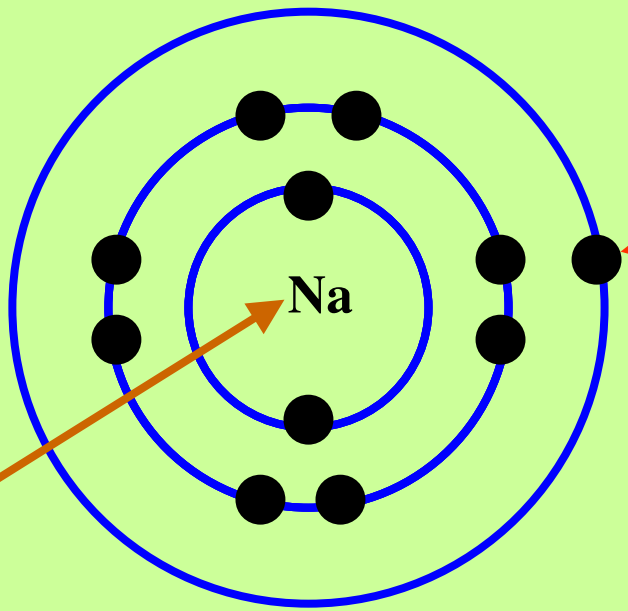
A Neutral Sodium (Na) Atom has

____ Protons(+) and ___ Electrons(-)

(Take out your Periodic Table!)

A Neutral Sodium (Na) Atom has

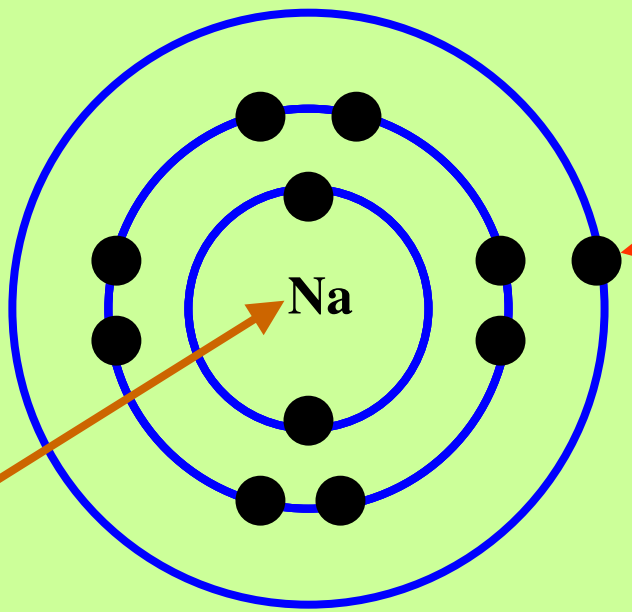
__ Protons(+) and __ Electrons(-)



Has __ Protons(+) in the Nucleus

Has __ Electrons(-) around the outside.

A Neutral Sodium atom has a net charge of _____



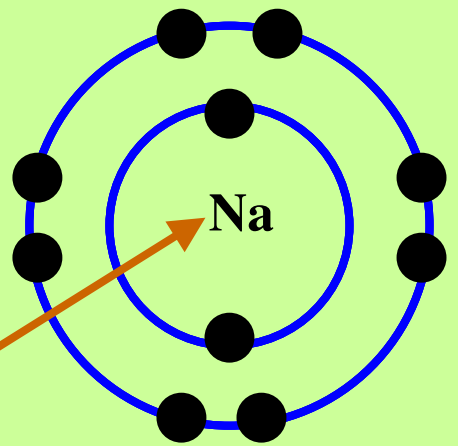
Has __ Protons(+) in the Nucleus

Has __ Electrons(-) around the outside.

OKAY. Let's REMOVE an electron from the Sodium Atom!

It still has ___ Protons(+), but now it only has ___ Electrons(-)

(There is ONE P(+) left over!)



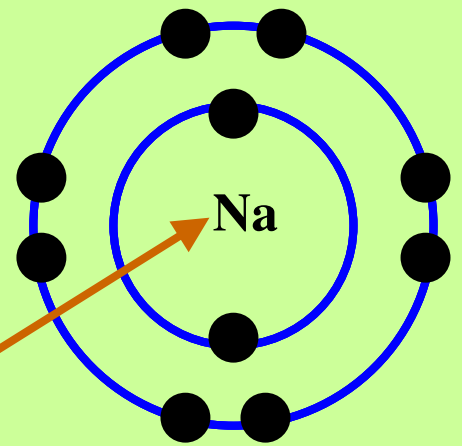
Has ___ Protons(+) in the Nucleus

Has ___ Electrons(-) around the outside.

It still has ___ Protons(+), but now it only has ___ Electrons(-)

(There is ONE P(+) left over!)

The NET CHARGE is ___

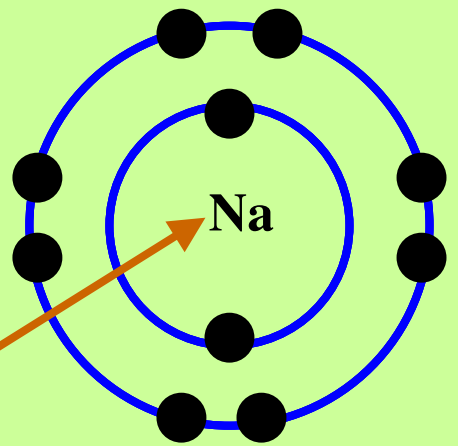


Has ___ Protons(+) in the Nucleus

Has ___ Electrons(-) around the outside.

It still has ___ Protons(+), but now it only has ___ Electrons(-)(*There is ONE P(+) left over!*)The NET CHARGE is ___

A Sodium Ion has the symbol ____



Has ___ Protons(+) in the Nucleus

Has ___ Electrons(-) around the outside.

(Take out your Periodic Table!)

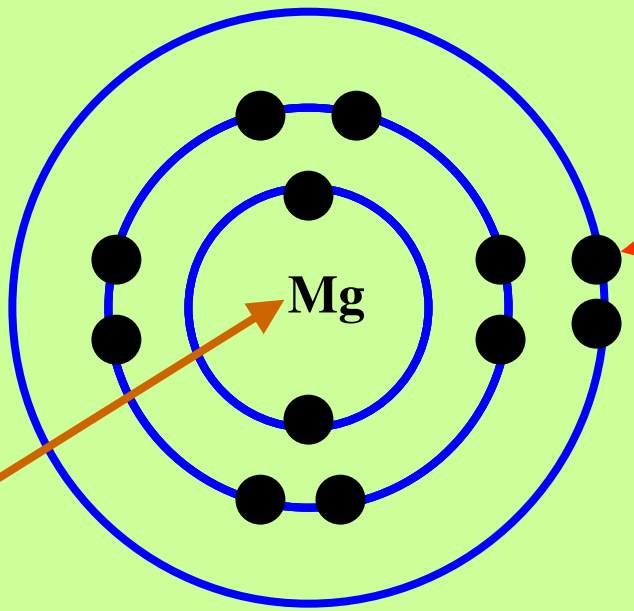
A Neutral Magnesium (Mg) Atom has

____ Protons(+) and ___ Electrons(-)

(Take out your Periodic Table!)

A Neutral Magnesium (Mg) Atom has

__ Protons(+) and __ Electrons(-)



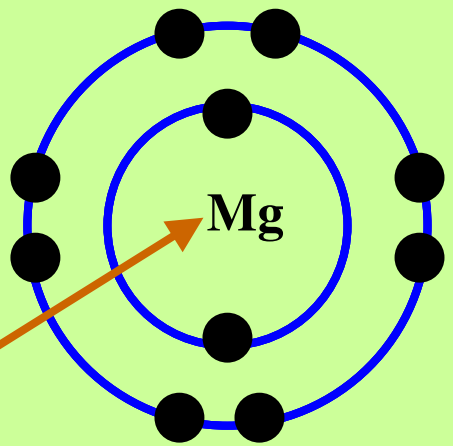
Has __ Protons(+) in the Nucleus

Has __ Electrons(-) around the outside.

Magnesium tends to easily lose 2 electrons!

It now has

___ Protons(+) and ___ Electrons(-)



Has ___ Protons(+) in the Nucleus

Has ___ Electrons(-) around the outside.

The NET CHARGE on this Magnesium ion is now _____

And the symbol for a Magnesium ion is:

_____

So an Mg^{2+} ion has

___Protons(+) and ___Electrons(-)

So an Mg^{2+} ion has

___ Protons(+) and ___ Electrons(-)

The ATOMIC NUMBER on the Periodic Table

If the NET CHARGE is 2+, it means it has 2 LESS Electrons than Protons!
(Protons don't change, only Electrons!)

An Al^{3+} ion has

___Protons(+) and ___Electrons(-)

So an Al^{3+} ion has

___ Protons(+) and ___ Electrons(-)

The ATOMIC NUMBER on the Periodic Table

If the NET CHARGE is 3+, it means it has 3 LESS Electrons than Protons!
(Protons don't change, only Electrons!)

Electrons can be ADDED to Neutral Atoms to make IONS. If an Ion has MORE Electrons(-) than Protons(+), the NET CHARGE on that ion is (*positive/negative*) _____

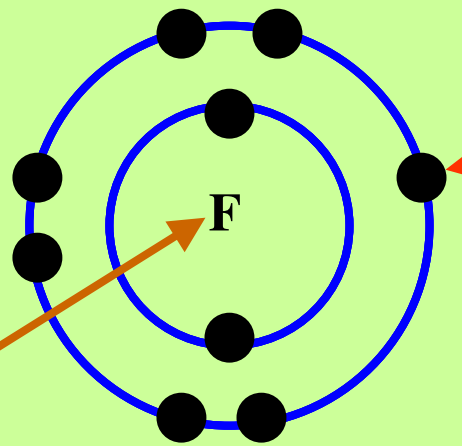
(Take out your Periodic Table!)

A Neutral Fluorine (F) Atom has

____ Protons(+) and ___ Electrons(-)

A Neutral Fluorine (F) Atom has

__ Protons(+) and ___ Electrons(-)



Has __ Protons(+) in the Nucleus

Has __ Electrons(-) around the outside.

So a Neutral Fluorine Atom (9P's and $9e^{-}$'s) has a NET CHARGE of

_____

If we add ONE Electron to a Neutral Fluorine Atom, it will now have ____P's(+) and ____e^-'s(-) and the NET CHARGE on the ion will be ____.

The symbol for a Fluoride Ion is

_____

The ion O^{2-} has

___Protons and ___Electrons.

The ion O^{2-} has

___ Protons and ___ Electrons.

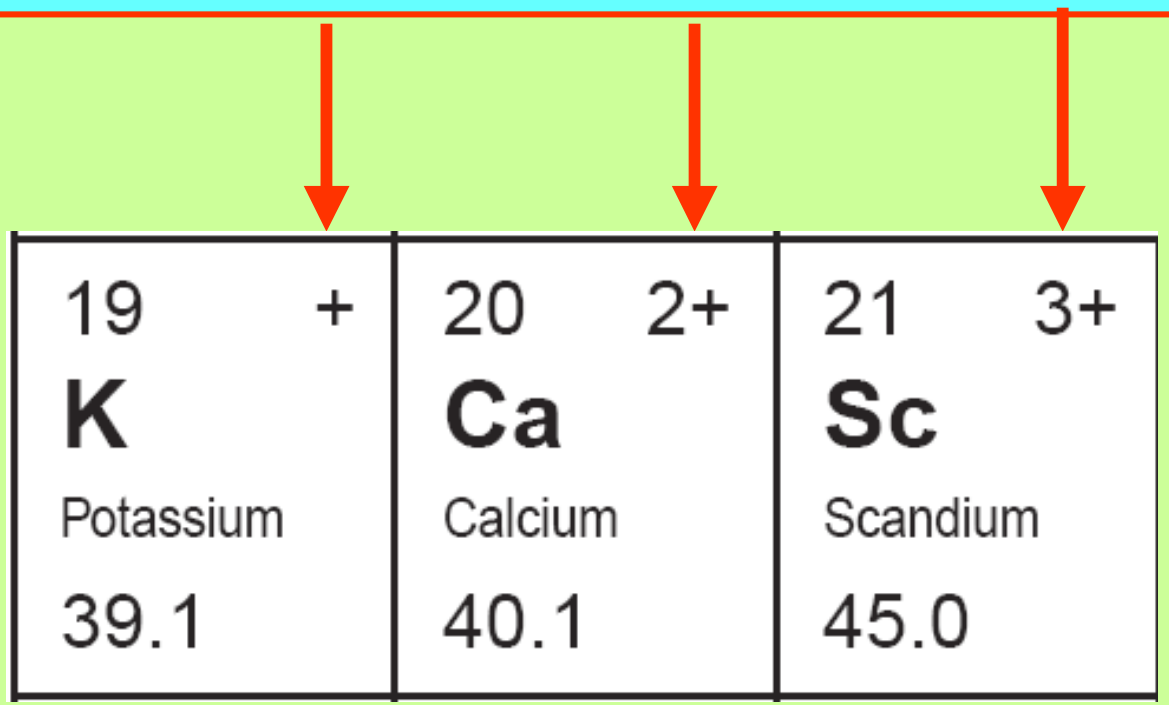
This is the ATOMIC NUMBER of Oxygen

A NET CHARGE of 2- means it has 2 MORE Electrons(-) than Protons(+)

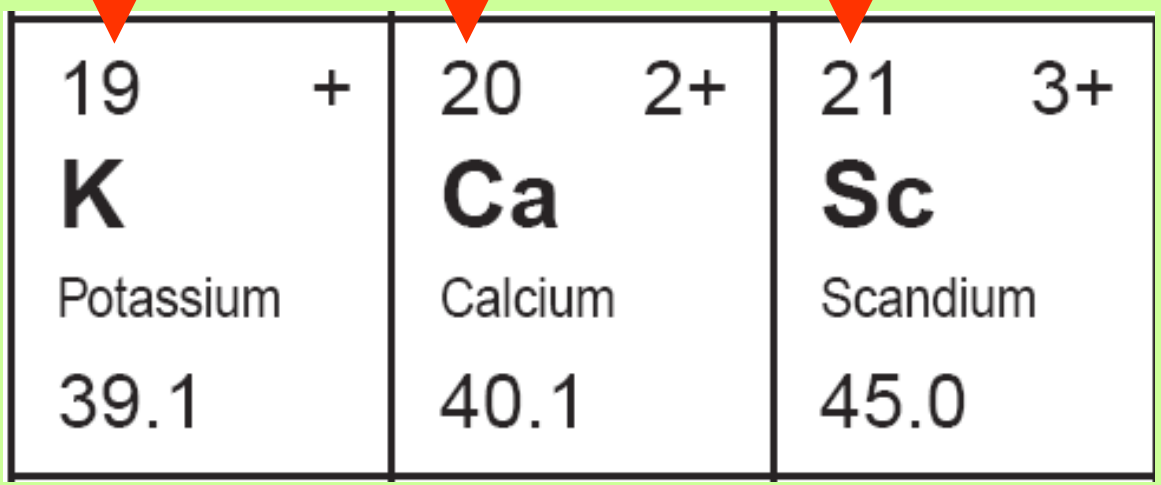
The ion As^{3-} has

___Protons and ___Electrons.

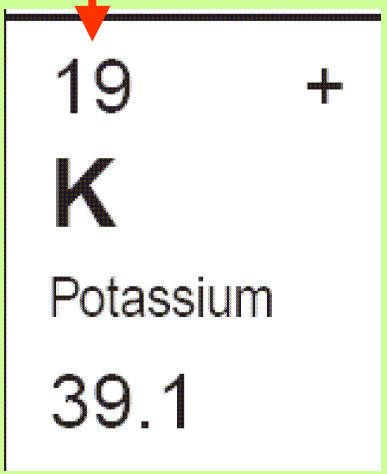
On the top right of each element on the Periodic Table is the _____ _____ of the most common ion of each element.



The top left on the Periodic Table shows the _____ NUMBER or # of _____.



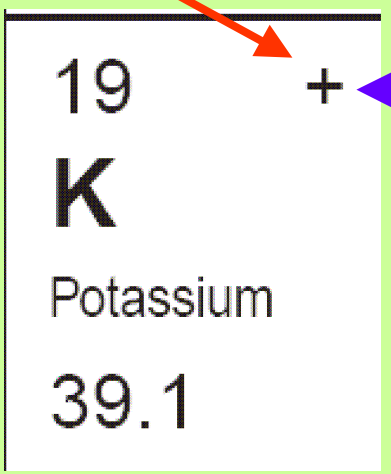
In a Neutral Atom (Atom) of an Element, the # of e^-'s = # of P's



So a (neutral) potassium atom has

___ protons and ___ electrons

The NET CHARGE on a potassium ION is + (*means* +1)

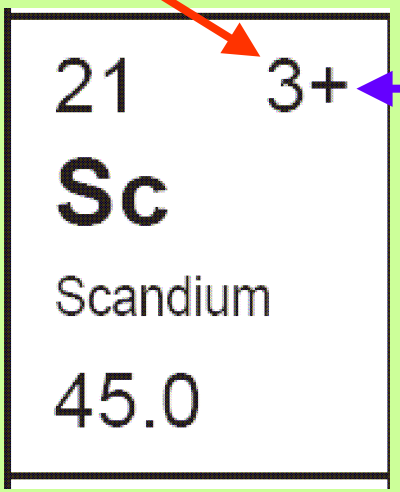


This means that there is ONE LESS electron than protons

So a potassium ION has

___ protons and ___ electrons

The NET CHARGE on a Scandium ION is 3+ (*means* +3)

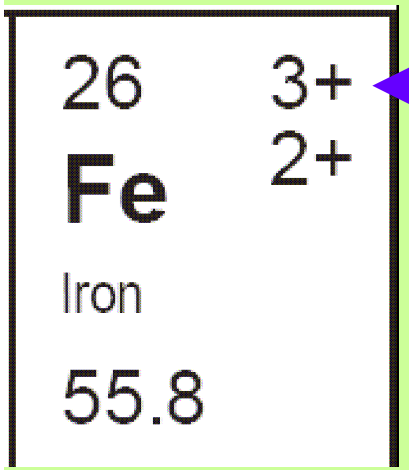


This means that there are THREE LESS electrons than protons

So a Scandium ION has

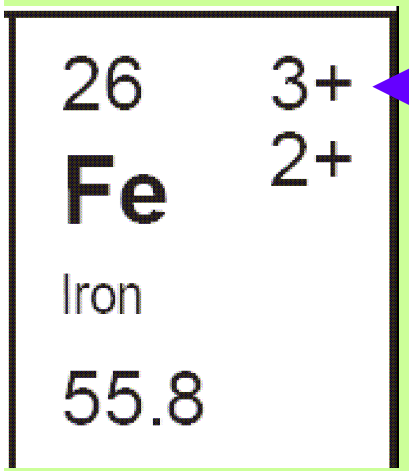
___ protons and ___ electrons

Iron (Fe) can form TWO DIFFERENT ions:



One with a net charge of 3+

Iron (Fe) can form TWO DIFFERENT ions:

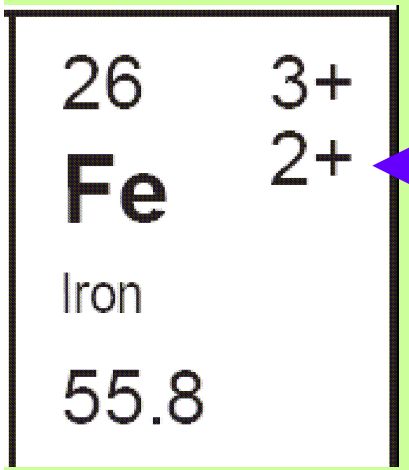


One with a net charge of 3+

This ion Fe^{3+} would have

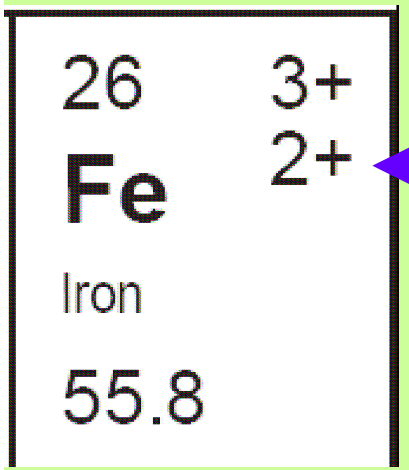
___ Protons and ___ Electrons

Iron (Fe) can form TWO DIFFERENT ions:



The other ion would have a net charge of 2+(*Iron(II)*)

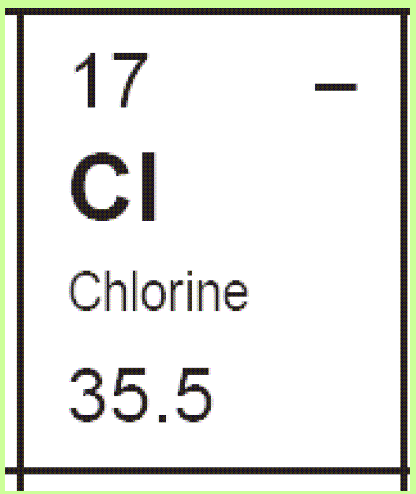
Iron (Fe) can form TWO DIFFERENT ions:



The other ion would have a net charge of 2+(*Iron(II)*)

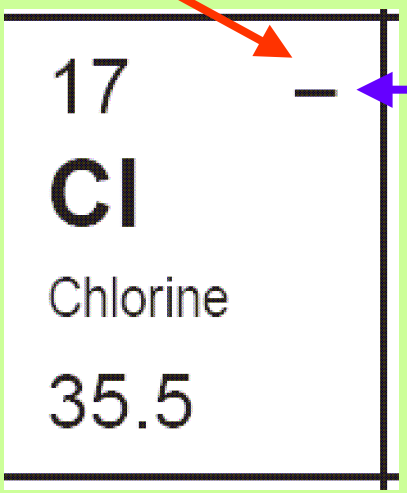
This ion Fe^{2+} would have

___ Protons and ___ Electrons



Negative Ions (Ions of NON-METALS) change the ending of their names to IDE,
So Cl^- is called a CHLORIDE ion.

The NET CHARGE on a Chloride ION is - (*means* -1)

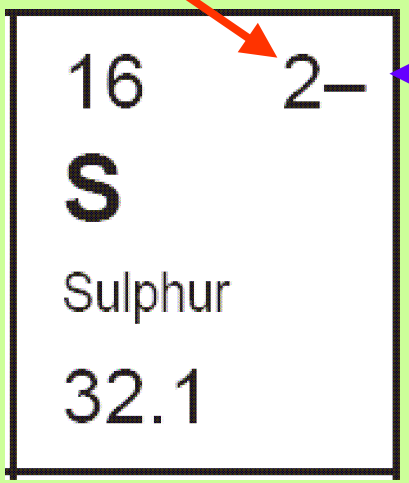


This means that there is ONE MORE electron than protons

So a chloride ION (Cl^-) has

___ protons and ___ electrons

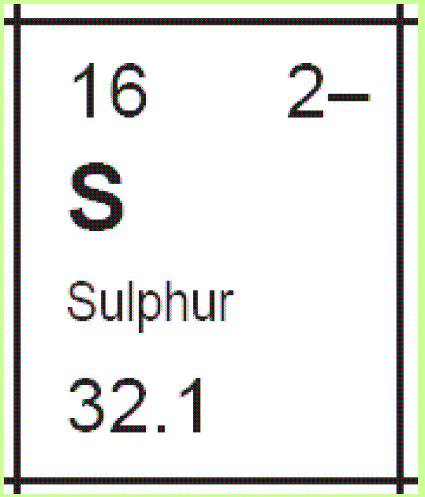
The NET CHARGE on a Sulphide ION is 2- (*means* -2)



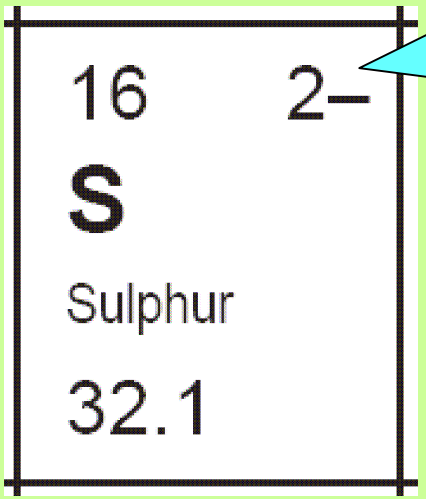
This means that there is TWO MORE electrons than protons

So a Sulphide ION (S^{2-}) has

___ protons and ___ electrons



A Sulphur atom has __ Protons and __ Electrons.



Remember, this means the **NET CHARGE** on an **ION**, **not** on an **ATOM**

Use your Periodic Table to find the # of Protons and # of Electrons in each of the following:

	Symbol	# of Protons	# of Electrons
A Barium ion			
A Phosphide ion			
A Nitrogen atom			
A Nitrogen ion			
A Gallium atom			
A Gallium ion			

Remember that given Nuclear Notation, we can find the number of Protons and Neutrons:

To find P's and N's from Nuclear Notation

Mass # = P + N

To find # of Neutrons, put Atomic Number Here:

^{41}Ca

Subtract to get # of Neutrons

Calcium's atomic Number = ____

So it has __ Protons

So it has __ Neutrons

We can also find the Number of Electrons!

If we are given this:

^{41}Ca

There is NO number on the top right, so this must be a _____ ATOM and the
NET CHARGE = ____

If we are given this:

^{41}Ca

There is NO number on the top right, so this must be a NEUTRAL ATOM and the NET CHARGE = 0

In a neutral atom #of _'s = # of _'s

If we are given this:

^{41}Ca

There is NO number on the top right, so this must be a NEUTRAL ATOM and the NET CHARGE = 0

In a neutral atom #of P's = # of e^-'s

So this atom has:
___ protons and ___ electrons

To Summarize:

^{41}Ca

Has: ___ Protons (Atomic Number)
___ Neutrons (41-20 = 21)
and ___ Electrons (e^-'s = P's)

Now try this one:

$$^{41}Ca^{2+}$$

Has ___ Protons
___ Neutrons
___ Electrons

Now try this one:

$^{37}Br^-$

Has ___ Protons
___ Neutrons
___ Electrons

Now try this one:

$$^{238}U^{4+}$$

Has ___ Protons
___ Neutrons
___ Electrons

Now try this one:

$^{33}P^{3-}$

Has ___ Protons
___ Neutrons
___ Electrons

The isotope:

$^{76}As^{3-}$

has __ protons

__ neutrons

__ electrons

The isotope:

$^{201}Au^{+}$

has __ protons

___ neutrons

__ electrons

An isotope has 46 protons, 58 neutrons and 42 electrons. Write the nuclear notation:

An isotope has 52 protons,
79 neutrons and 54 electrons.
Write the nuclear notation: