

# NEUTRAL ATOMS, IONS, & ISOTOPES

---

## (1.) NEUTRAL ATOMS:

→ INFORMATION IN THE PERIODIC TABLE IS ALL BASED ON NEUTRAL ATOMS.

SO... WHAT DOES IT MEAN TO BE A NEUTRAL ATOM?

- NO OVERALL CHARGE  
( $p^+ = e^-$ )

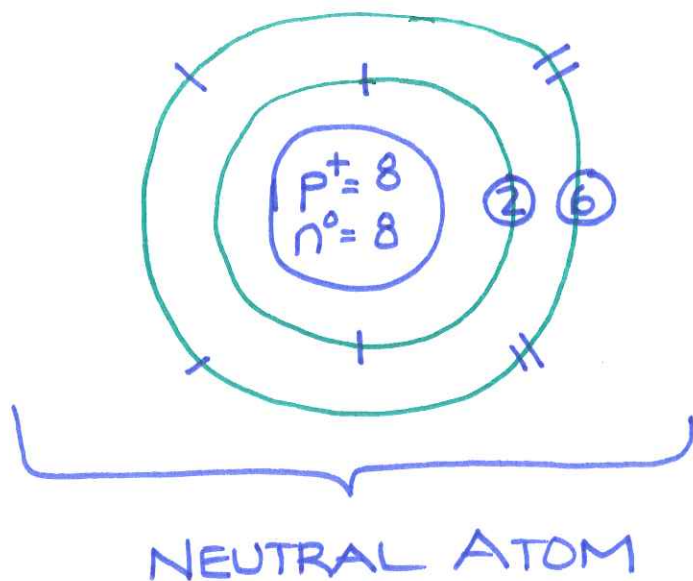
Ex: OXYGEN  
(O)

A.N. = 8  
M.N. = 16

	<u>CHARGE</u>
$p^+ = 8$	(+8)
$n^0 = 8$	( $\emptyset$ )
$e^- = 8$	(-8)

---

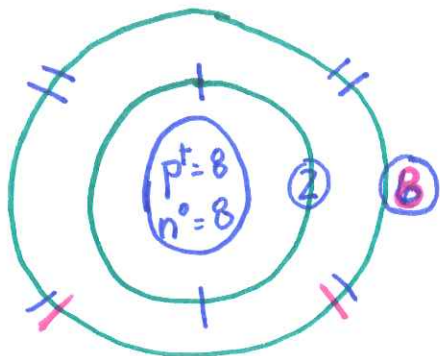
OVERALL CHARGE =  $\emptyset$



## (2.) IONS: CHARGED PARTICLE

→ IT GAINS OR LOSES ELECTRONS

Ex: OXYGEN



$$p^+ = 8$$

$$\text{CHARGE} \\ (+8)$$

$$n^0 = 8$$

$$(\emptyset)$$

$$e^- = 10$$

$$(-10)$$

---

$$\text{OVERALL CHARGE } (-2)$$

OXYGEN ION →  $O^{-2}$



LEITHER WAY OK.

Exponent tells the charge.

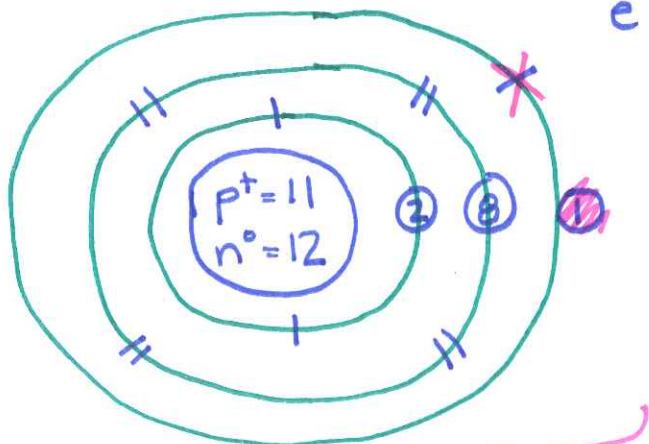
⊗ BE SURE TO ALWAYS INCLUDE THE SIGN!!

Na: A.N = 11  
M.N = 23

$$p^+ = 11$$

$$n^0 = 12$$

$$e^- = 11$$



$$p^+ = 11 \quad (+11)$$

$$n^0 = 12 \quad (\emptyset)$$

$$e^- = 10 \quad (-10)$$

---

$$\text{overall charge } \rightarrow (+1)$$

Na ION →  $Na^{+1}$

⊗ IF THE CHARGE OF AN ION IS POSITIVE  $\rightarrow$  LOST  $e^-$   
(+)

$$p^+ > e^-$$

$\rightarrow$  called a CATION

⊗ IF THE CHARGE OF AN ION IS NEGATIVE  $\rightarrow$  GAINED  $e^-$   
(-)

$$p^+ < e^-$$

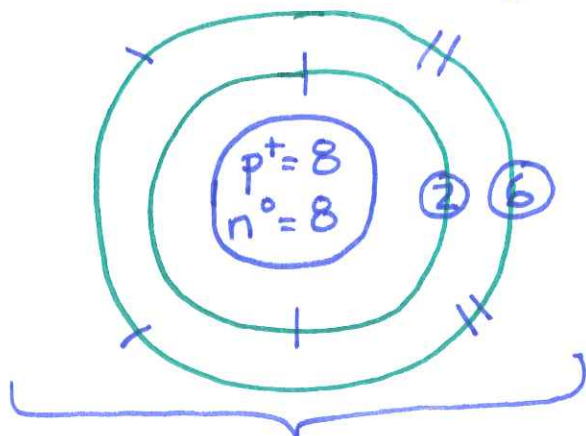
$\rightarrow$  called an ANION

### (3.) ISOTOPES:

$\rightarrow$  AN ATOM IN WHICH THE # OF NEUTRONS HAS CHANGED (GAINED OR LOST.)

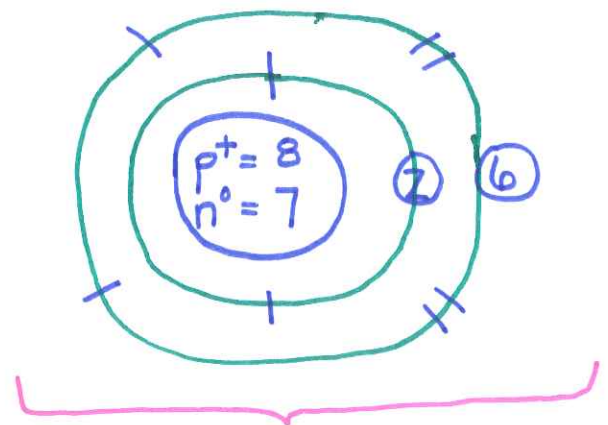
$\rightarrow$  THEREFORE... THE MASS # WILL ALSO BE DIFFERENT THAN THE # LISTED IN THE PERIODIC TABLE.

EX. OXYGEN  $p^+ = 8$   
 $n^0 = 8$   
 $e^- = 8$



NEUTRAL ATOM

M.N. = 16



ISOTOPE

M.N. = 15

# HELPFUL TIPS

TO FIND/CALCULATE  $e^-$ :

IF NEUTRAL ATOM OR ISOTOPE:

$$p^+ = e^-$$

IF ION:

$$e^- = p^+ - (\text{overall charge})$$

(A.N.)

↳ include sign!!  
;

---

How To IDENTIFY AN ION, ISOTOPE, OR NEUTRAL ATOM

---

(1) IF MASS # IN PERIODIC TABLE  $\neq$  MASS # GIVEN (CALCULATED) } ISOTOPE

(2)  $p^+ \neq e^-$  } ION

⊗ BE SURE TO INCLUDE THE CHARGE  
EX: +2 ION  
-3 ION

(3) MASS # IN PERIODIC TABLE = MASS # GIVEN (CALCULATED) } NEUTRAL ATOM

⊕

$$p^+ = e^-$$