

## Charge Particles

When an atom has the same number of protons and electrons it is called a neutral atom.

If an atom has a different number of electrons than protons (either extra electrons or missing electrons), it is called an ion.

# ions

Protons = Atomic #

Neutrons = Mass-Protons

An ion is an atom that has become charged by gaining or losing one or more electrons. (This can occur when energy is applied).

- the number of electrons change but the number of protons stay the same.

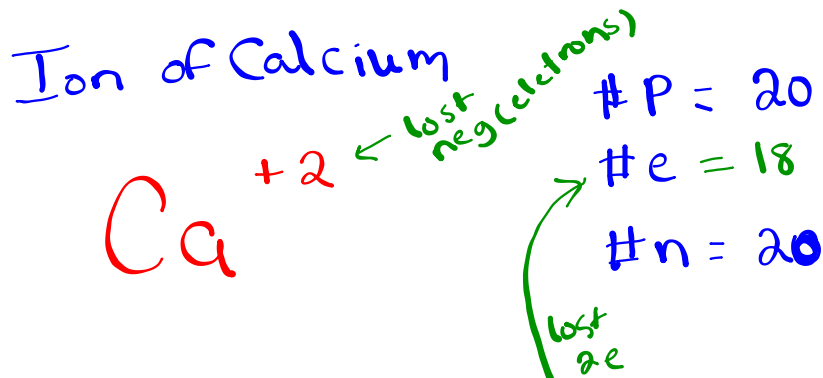
Example: **Sodium ion**  $\text{Na}^{+1}$  *lost 1e<sup>-</sup>*

neutral  
Regular  
Na || #p = atomic #  
|| #e  
23-11 #n  
12

# Protons = 11 ← atomic #  
# Electrons = 10  
# Neutrons = Mass - P  
23 - 11  
12

"+" charge → loss electrons

"-" charge → gain electrons



Neutral Ca

$$\#P = 20$$

$$\#e = 20$$

$$\#n = 40 - 20 = 20$$

Atomic  
# = 20  
mass = 40

$f^{-1}$

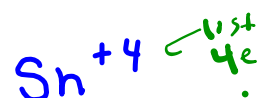
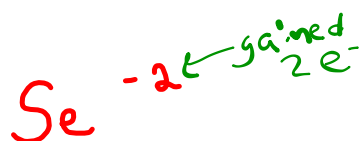
$$p = 9$$

$$e = 10$$

$$n = 19 - 9 = 10$$

electrons

protons



# Protons = 34

# Electrons = 36

# Neutrons = mass - protons  
79 - 34  
45

78.95  
↑

# Protons = 50

# Electrons = 46

# Neutrons = 119 - 50  
= 69

"+" charge → loss electrons

"-" charge → gain electrons

Name: \_\_\_\_\_  
 Hour: \_\_\_\_\_ Date: \_\_\_\_\_

**Chemistry: Ions and Subatomic Particles**

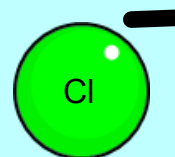
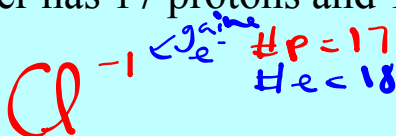
Directions: Complete the following table.

atomic#

<u>Ion Symbol</u>	<u>Protons</u>	<u>Electrons</u>	<u>Charge</u>
S <sup>2-</sup>	16	18	-2 gained e <sup>-</sup>
K <sup>1+</sup>			
Ba <sup>2+</sup>			
Fe <sup>3+</sup>			
Fe <sup>2+</sup>			
F <sup>1-</sup>			
O <sup>2-</sup>			
P <sup>3-</sup>			
Sn <sup>4+</sup>			
Sn <sup>2+</sup>			
N <sup>3-</sup>			
Br <sup>1-</sup>			
Mg <sup>2+</sup>			
Cu <sup>1+</sup>			
Cu <sup>2+</sup>			
U <sup>6+</sup>			
Mn <sup>5+</sup>			
Cl <sup>1-</sup>			
Se <sup>2-</sup>			

## Another Example

The chloride ion in water has 17 protons and 18 electrons so it has a charge of -1.



Ions are formed when electrons move from one atom to another.

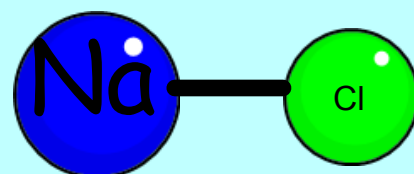
What does all this mean?

Sodium and Chlorine are attracted to one another.

They both want to fill their missing electrons.

Sodium has one extra and chlorine has one less.

When they join they are complete and happy and called Salt.





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Question 4

Did already so look at next  
page and move to Day 13  
come back to day 12

Try these  
Understanding Concepts pg 89  
#4

Also answer the following  
questions:

$$9(+)+10(-)=-1$$

1. A fluorine ion has 9 protons and 10 electrons. What charge will the fluorine ion have?



$$(+3)+(-2)=+1$$

2. A lithium ion has 3 protons and 2 electrons. What charge will the lithium ion have?



## Charged Atoms Page 89

Because sodium loses an electron to have a full valence. It still has 11 protons, but only 10 electrons therefore the sodium ion has a charge of +1.

It has one more proton than electron.



**Draw the Bohr diagram for chlorine**

**Answer the following questions:**

Is its outer orbit full?

How many electrons are missing in order to make it full?

Do you think chlorine will gain or lose electrons?

How many protons and electrons will the happy chlorine have?

An easy way to look at this is to write the number of protons and electrons in the element and then in the ion.

Determine if there are extra protons than electrons from the original (+ charge) or if there are less protons than electrons from the original (- charge)

i.e. Na	original	ion	( there is one extra P in the ion ) ( therefore Na has a charge of +1 )
	11P	11P	
	11E	10E	

Cl	original	ion	( there is one less P in the ion ) ( therefore Cl has a charge of -1 )
	17P	17P	
	17E	18E	

Warm-up:

1. If a chlorine ion has 12 protons and 14 electrons what charge will it have?

a. +2

b. -2

c. 0

d. +1

2. A aluminum ion has 13 protons. How many electrons will it have if it has a charge of +2?

a. 11

b. 10

c. 15

d. 16

## Isotopes Page 96

MC

Isotopes = atoms of the same element that differ only in their mass because they have a different number of neutrons, but the same number of protons.

We show which atoms are isotopes by placing the mass number after the symbol

Example:  $\overset{\text{Mass}}{\text{Cl-35}}$  and  $\overset{\text{Mass}}{\text{Cl-37}}$

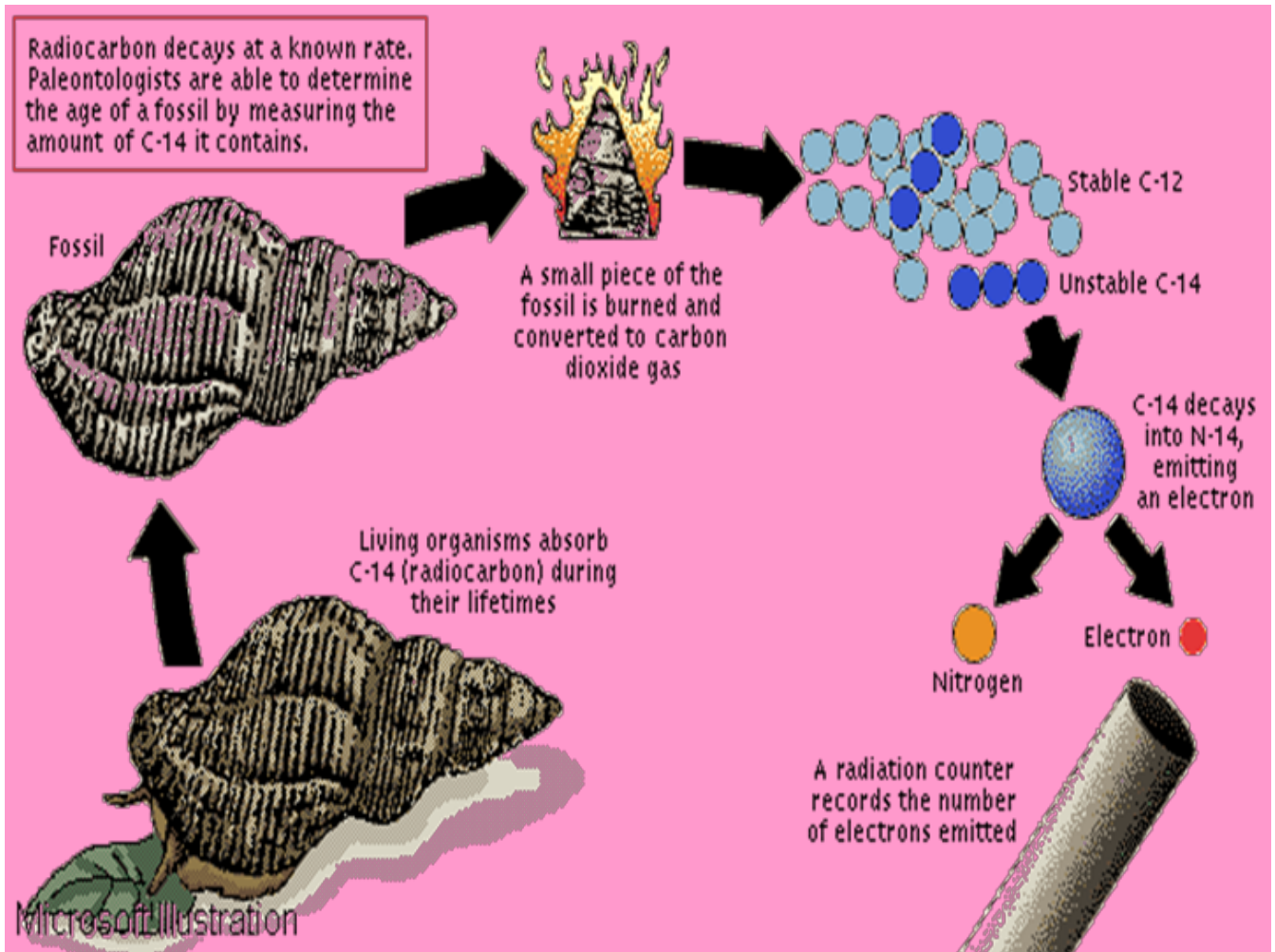
Cl- 35 has 17 protons and 18 neutrons

Cl- 37 has 17 protons and 20 neutrons

## Understanding Concepts

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## Attachments

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Protons, electrons neutrons assignments.docx