

# Periodic Table

Collection of  
Elements based  
on the elements  
Properties

## Groups

Top to Bottom  
Similar Elements

## Periods

Left to Right  
Element properties  
change as you go right

# Periodic Table of the Elements

Atomic Number → 13  
Symbol ← Al  
Name → Aluminum  
Atomic Weight ← 26.98  
Electrons per shell → 2-8-3

State of matter (color of name): GAS LIQUID SOLID UNKNOWN

Subcategory in the metal-metalloid-nonmetal trend (color of background):  
 III Alkali metals  
 II Alkaline earth metals  
 I Transition metals  
 III Lanthanides  
 II Actinides  
 III Post-transition metals  
 III Metalloids  
 III Reactive nonmetals  
 III Noble gases  
 III Unknown chemical properties

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# Elements

The *atomic number* ( $Z$ , # protons,  $p^+$ ) can be used to identify the type of element being studied on the periodic table

Atomic number — 26  
Chemical symbol — Fe  
Element name — Iron  
Atomic mass — 55.847

## Atomic Number

# of  $p^+$  and  $e^-$

Determines name and  
symbol of element

## Avg Atomic Mass

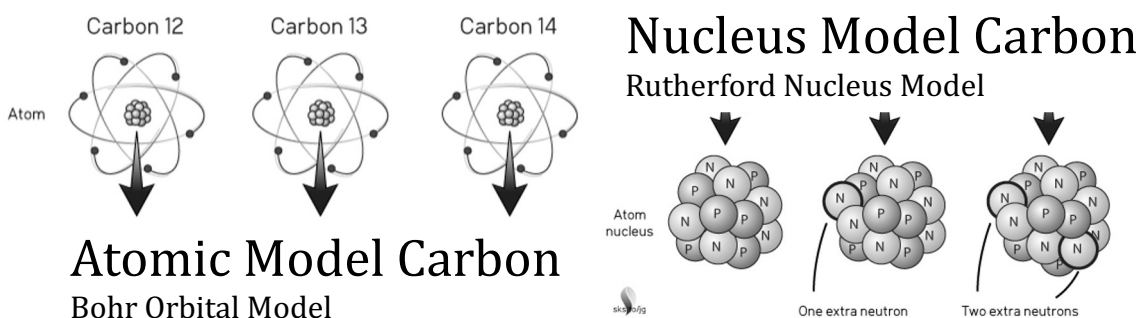
The *mass* of an atom in  
atomic mass units (*amu*)

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## Atoms and Subatomic Particles

Atoms are made of the three main subatomic particles  
electrons ( $e^-$ ), protons ( $p^+$ ) and neutrons ( $n^0$ )

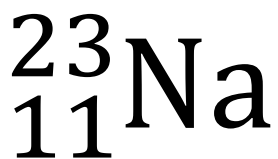
An *isotope* is the forms of the atoms of an element based  
on the ratio of protons ( $p^+$ ) to neutrons ( $n^0$ )      $[p^+ : n^0]$



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## Isotope Notation

Isotopes are commonly written in two notation forms, based on the  
Atomic Number, Mass Number, and/or number of neutrons ( $n^0$ )



23 = Mass Number (*Top*)  
11 = Atomic Number (*Bottom*)  
Na = Element (*Sodium*)



Sodium-23

23 = Mass Number (*Left*)  
Sodium = Element (*Na*)  
Also: Na-23

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## Isotope Series and Atomic Mass

Most Elements have multiple isotopes, with some being more common than other isotopes

The atomic mass of an isotope is given in atomic mass units (*amu*) = Mass  $1p^+$  = Mass  $1n^0$

$^{12}_6\text{C}$  Carbon - 12  
6 $p^+$ , 6 $e^-$ , 6 $n^0$   $^{23}_{11}\text{Na}$

Mass Number = 12  
Atomic Mass = 12amu

$^{13}_6\text{C}$  Carbon - 13  
6 $p^+$ , 6 $e^-$ , 7 $n^0$

Mass Number = 13  
Atomic Mass = 13amu

$^{14}_6\text{C}$  Carbon - 14  
6 $p^+$ , 6 $e^-$ , 8 $n^0$

Mass Number = 14  
Atomic Mass = 14amu

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## Isotope Recap

Isotopes are Based on the Following Recap Table

### Isotope Notation



Element A - X

### Subatomic Particles

Y = Atomic Number

Element Name, Element Symbol (A)

Number protons ( $p^+$ )

Number electrons ( $e^-$ )

X = Mass Number

Protons ( $p^+$ ) + Neutrons ( $n^0$ )

Neutrons ( $n^0$ ) = Mass # - Atomic #

Neutrons ( $n^0$ ) = X - Y

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