

# Atomic Structure

- atom - smallest unit of a substance that retain or keep the properties of that substance
- Inside the atom:
  - protons, neutrons, & electrons but it's mostly empty spaces

	location	charge	mass (kg)	relative mass (to $e^-$ )
protons $p^+$	nucleus	+1	$1.673 \times 10^{-27}$	1836 x's larger
neutrons $n^0$	nucleus	0	$1.675 \times 10^{-27}$	1839 x's larger
electrons $e^-$	$e^-$ cloud	-1	$9.11 \times 10^{-31}$	1

## Atomic Number (Z) - identifies an element

- number of protons ( $p^+$ ) in the nucleus
- number of electrons ( $e^-$ ) in the electron cloud

## Mass Number (A) \* is NOT on the Periodic Table

- sum of # $p^+$  and # $n^0$  in the nucleus

$$\text{Mass \#} = p^+ + n^0$$

Ex.) An element has an atomic # of 8 and a mass # of 17.

- what element is this? oxygen
- How many  $p^+$ ? 8
- How many  $n^0$ ?  $17 - 8 = 9$
- How many  $e^-$ ? 8

Ex.) An atom has 31  $p^+$  and 39  $n^0$ .

- what element is it? gallium
- what is the atomic #? 31
- what is the mass #?  $31 + 39 = 70$
- How many  $e^-$ ? 31

Ex.) An atom has 98  $e^-$  and 153  $n^0$ .

- what element is it? californium
- Atomic #? 98
- # $p^+$ ? 98
- Mass #?  $98 + 153 = 251$

Try these!

(1) atomic # 40  
mass # 90

How many:

$p^+$  ?

40

$n^0$  ?

$90 - 40 = 50$

$e^-$  ?

40

(2) #  $p^+$  = 49  
#  $n^0$  = 66

element ?

indium

atomic # ?

49

mass # ?

$49 + 66 = 115$

#  $e^-$  ?

49

(3) #  $e^-$  = 111  
mass # 272

element ? roentgenium

atomic # ?

111

#  $p^+$  ?

111

#  $n^0$  ?

$272 - 111 = 161$

Bring a calculator