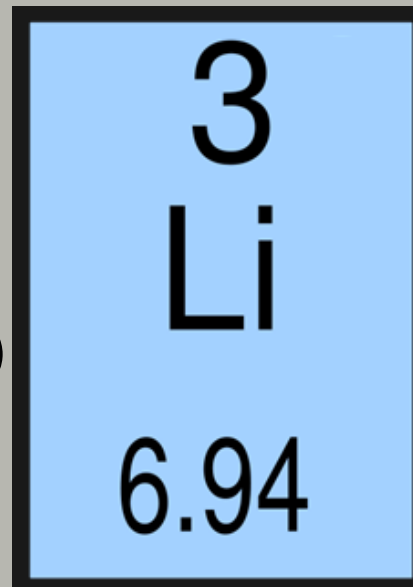


# Atomic Mass & Number

**We know:** Nucleus has protons ( $p^+$ ), neutrons ( $n^0$ ), and electrons are on the outside of nucleus ( $e^-$ )

• **But how many of each???**

**Atomic Mass Number**  
(round to the nearest whole #)  
# of protons + # of neutrons  
→



← **Atomic Number**  
**# of protons**

**# of electrons**  
=  
**# of protons**

**M.** = Mass  **minus**

**A.** = Atomic #

**N.** = # of Neutrons

**A.** = Atomic #  
is the same as

**P.** = # of **PROTONS**

is the same as  
**E.** = # of **ELECTRONS**



11

Na

Sodium

22.99

Atomic Number = 11

Mass Number = 23

# of Protons = Atomic # = 11

# of Electrons = # of protons = 11

# of Neutrons = Mass # - Atomic #  
= 23 - 11 = 12

# Isotopes

- Same element
- Same # of protons
- Same # of electrons
- **Different number of neutrons**

## Element name-Mass #

Silver-107

Silver-108 ← 1 extra neutron

**Example:** Cesium with 82 neutrons

1) Look up atomic # of cesium = 55 = # protons

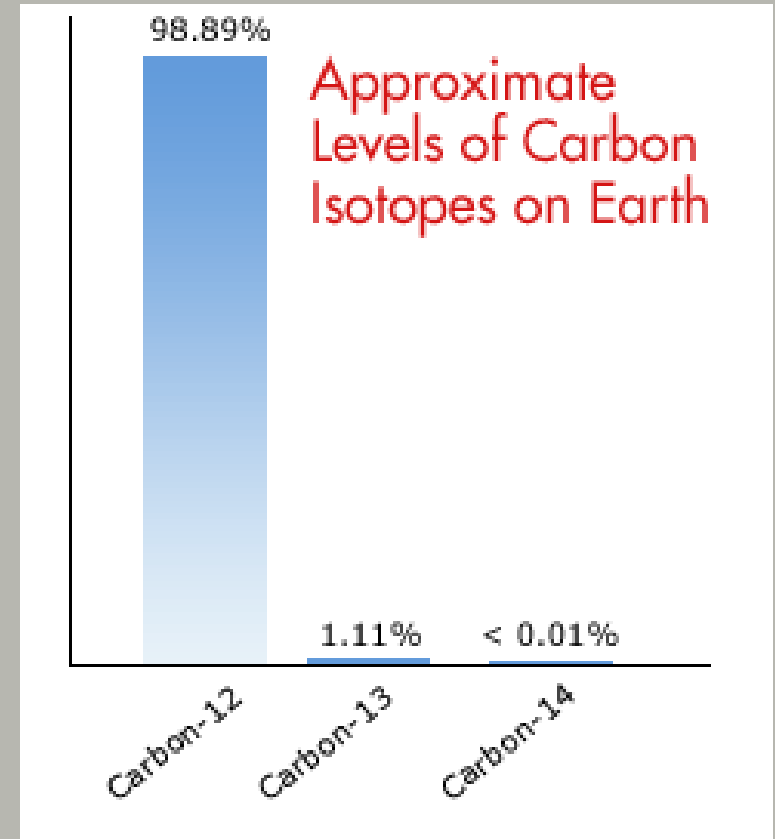
2) Neutrons + Protons = Atomic Mass #

$82 + 55 = 137$  ← Periodic table says 133!

Cesium-137 **NOT** Cesium-133

# Isotopes

Mass #'s on periodic table are the average of all the different isotope masses!



# Isotopes

You don't  
need to  
write this

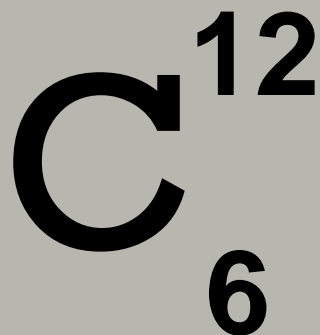
## Special Examples of isotopes

- Hydrogen-1 = 1 proton, 0 neutrons → “protium”
- Hydrogen-2 = 1 proton, 1 neutron → “deuterium”
- Hydrogen-3 = 1 proton, 2 neutrons → “tritium”
- Carbon-12 = 6 protons, 6 neutrons (normal carbon)
- Carbon-14 = 6 protons, 8 neutrons (for carbon dating)

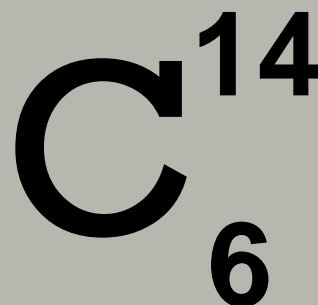
Some elements have lots of isotopes,  
some don't have any.



## Two ways of writing isotopes:



**Carbon-12**



**Carbon-14**

**Problem:** Opposite of how periodic table writes the symbols...  
So be careful!!!

# What are Isotopes Video

<https://www.youtube.com/watch?v=Eb0WeWmh5Pg>



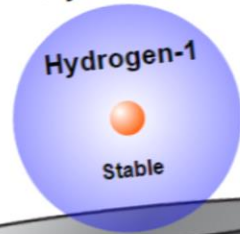
# Atomic Isotope PhET

Protons: ●  
Neutrons: ●  
Electrons: ●

periodic table

Symbol

My Isotope



Abundance in Nature



1

Mass Number  
 Atomic Mass (amu)

