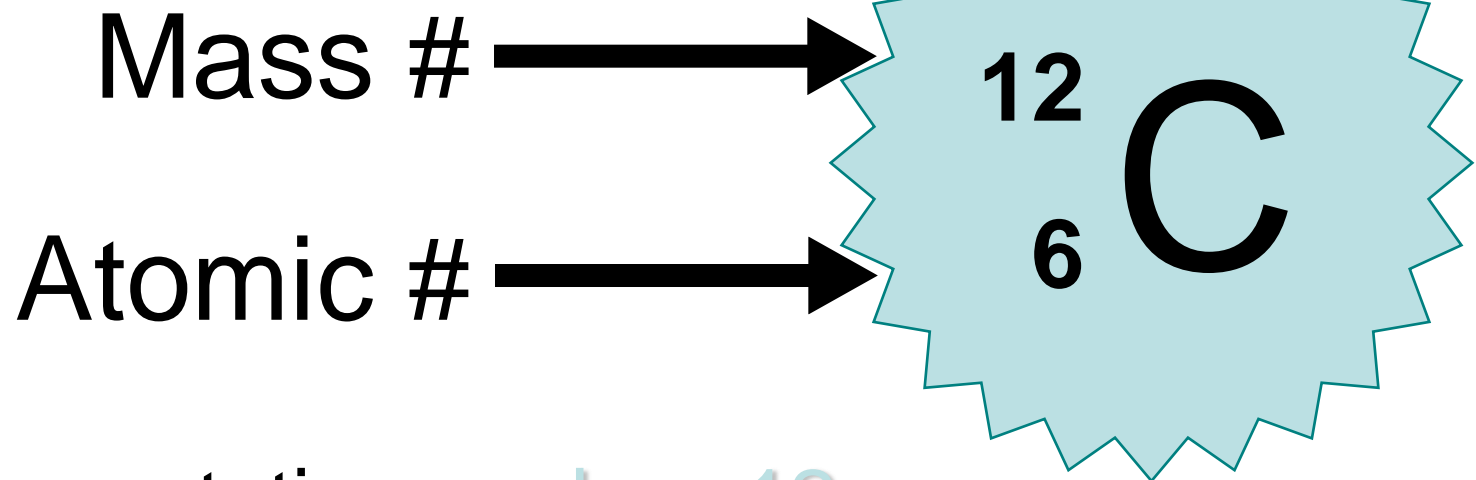


# Isotopes

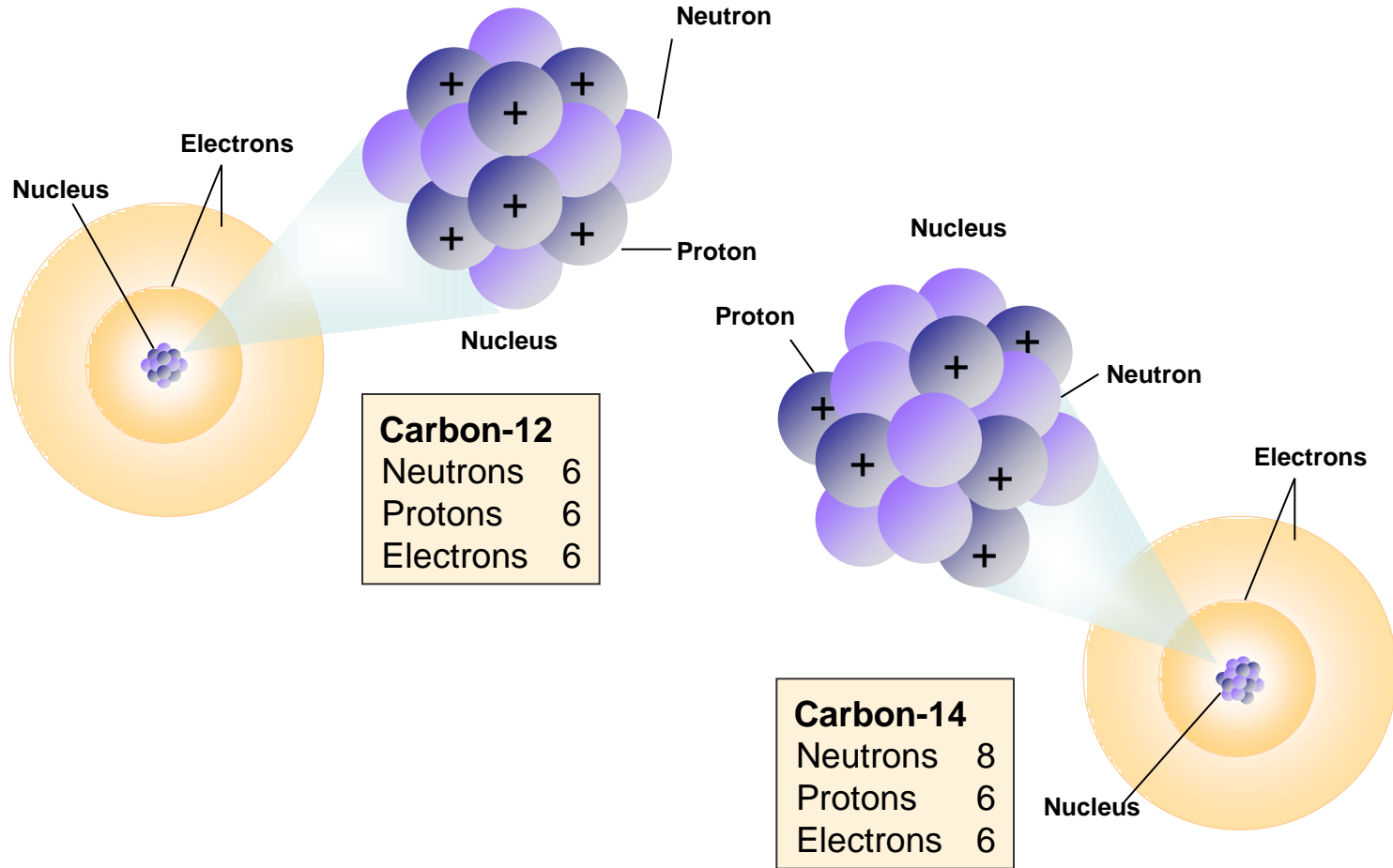
- Atoms of the same element with different mass numbers.

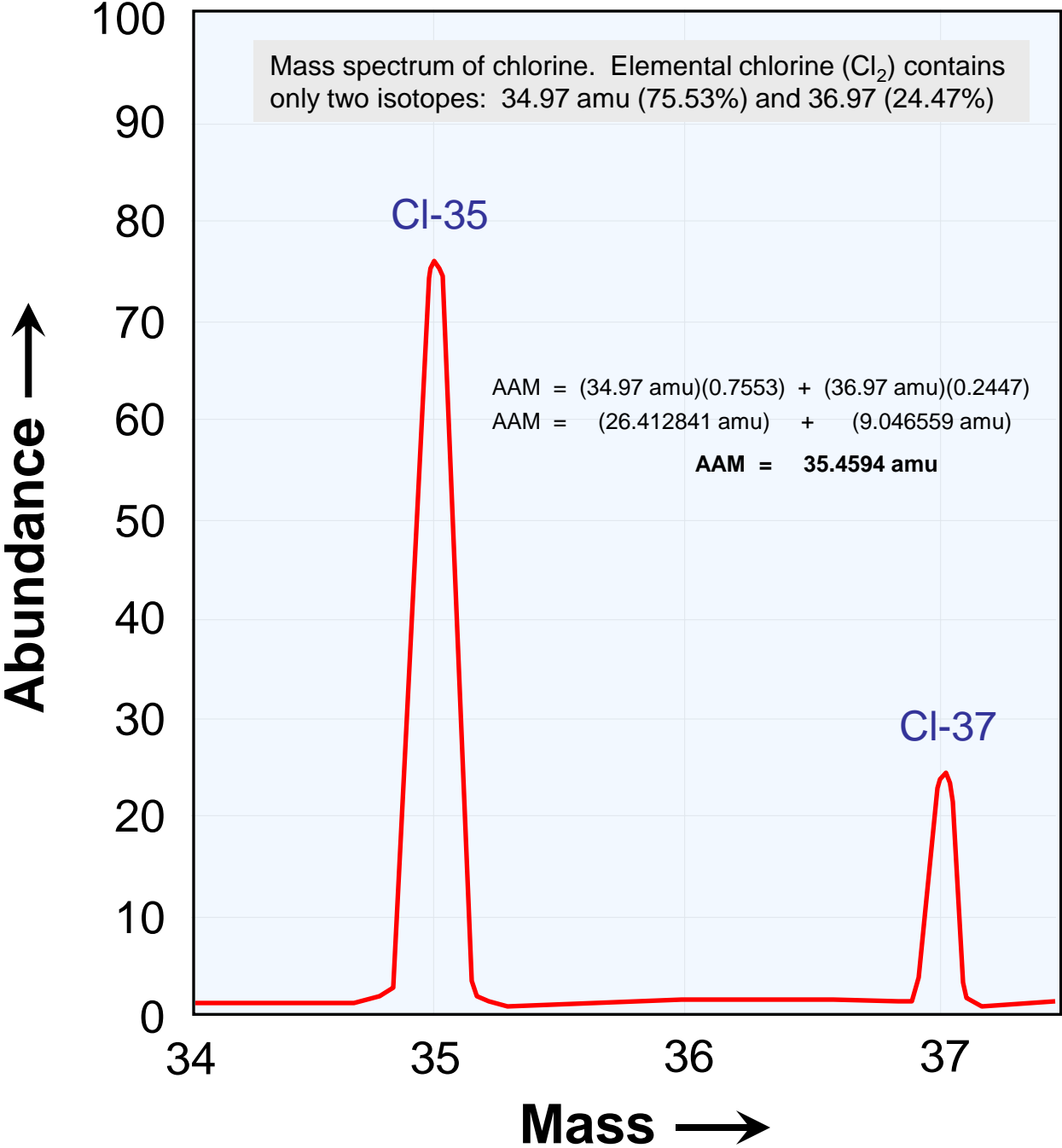
- Nuclear symbol:



- Hyphen notation: carbon-12

# Isotopes



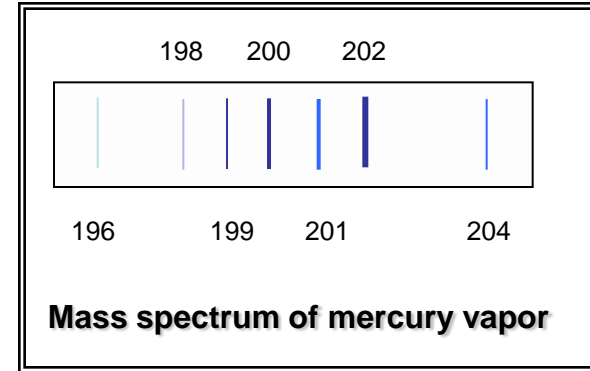
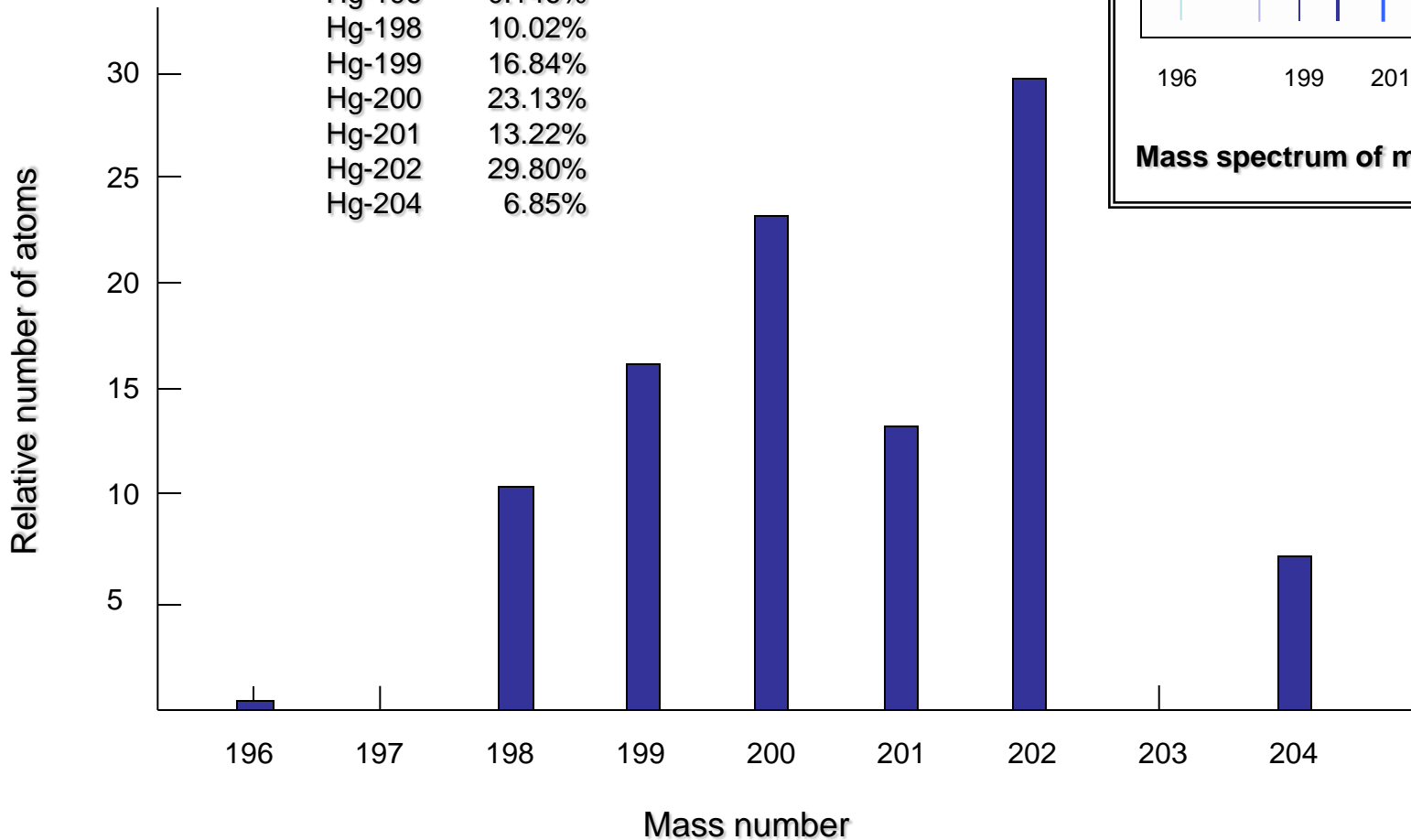


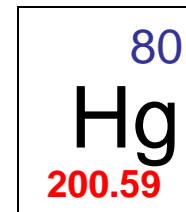
# Mass Spectrum for Mercury

(The photographic record has been converted to a scale of relative number of atoms)

The percent natural abundances for mercury isotopes are:

Hg-196	0.146%
Hg-198	10.02%
Hg-199	16.84%
Hg-200	23.13%
Hg-201	13.22%
Hg-202	29.80%
Hg-204	6.85%





The percent natural abundances  
for mercury isotopes are:

A	Hg-196	0.146%
B	Hg-198	10.02%
C	Hg-199	16.84%
D	Hg-200	23.13%
E	Hg-201	13.22%
F	Hg-202	29.80%
G	Hg-204	6.85%

$$(\% \text{ "A"}) (\text{mass "A"}) + (\% \text{ "B"}) (\text{mass "B"}) + (\% \text{ "C"}) (\text{mass "C"}) + (\% \text{ "D"}) (\text{mass "D"}) + (\% \text{ "E"}) (\text{mass "E"}) + (\% \text{ F}) (\text{mass F}) + (\% \text{ G}) (\text{mass G}) = \text{AAM}$$

$$(0.00146)(196) + (0.1002)(198) + (0.1684)(199) + (0.2313)(200) + (0.1322)(201) + (0.2980)(202) + (0.0685)(204) = x$$

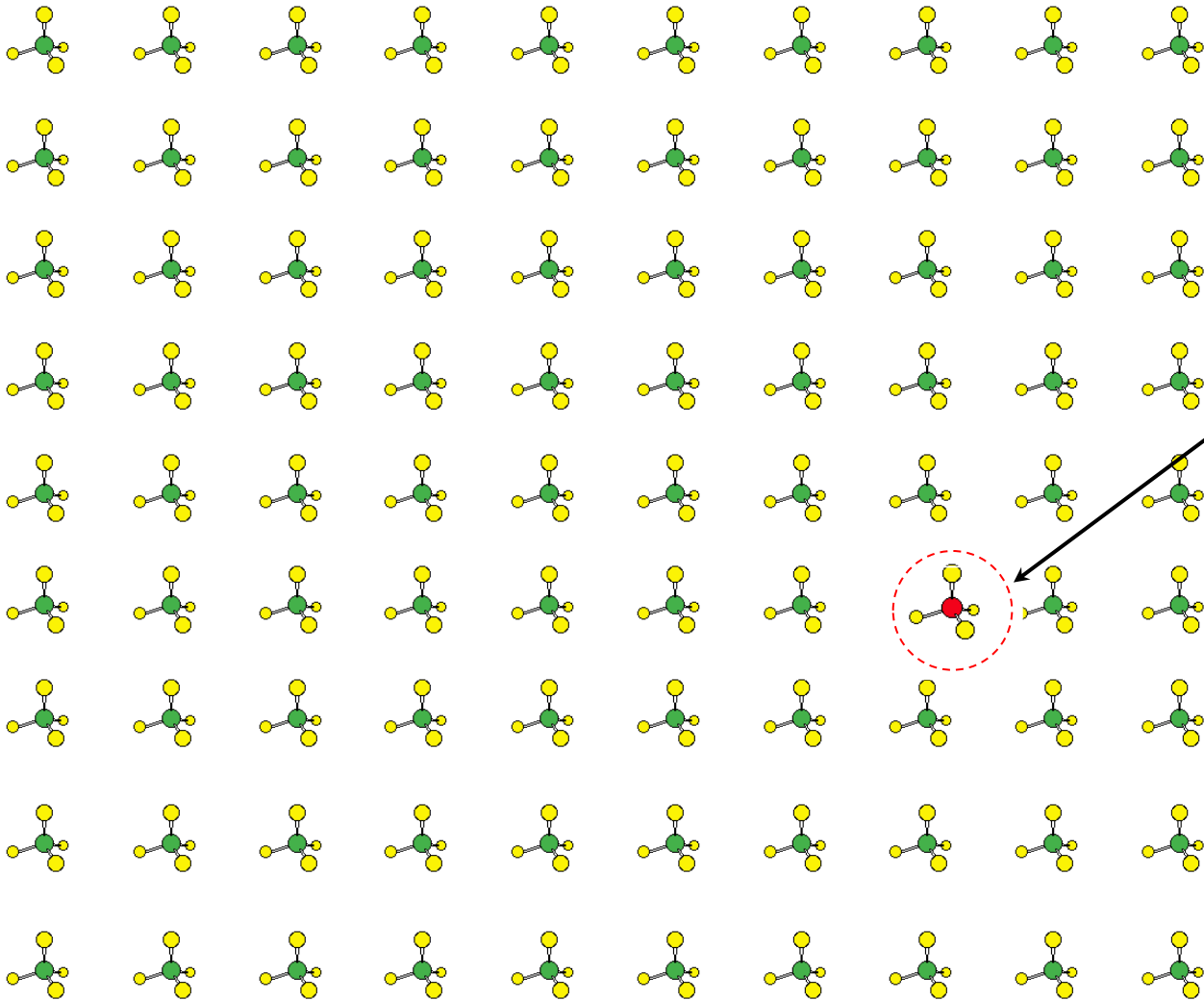
$$0.28616 + 19.8396 + 33.5116 + 46.2600 + 26.5722 + 60.1960 + 13.974 = x$$

$$x = 200.63956 \text{ amu}$$

Mass spectrums reflect the abundance of naturally occurring isotopes.

### Natural Abundance of Common Elements

Hydrogen	$^1\text{H} = 99.985\%$	$^2\text{H} = 0.015\%$	
Carbon	$^{12}\text{C} = 98.90\%$	$^{13}\text{C} = 1.10\%$	
Nitrogen	$^{14}\text{N} = 99.63\%$	$^{15}\text{N} = 0.37\%$	
Oxygen	$^{16}\text{O} = 99.762\%$	$^{17}\text{O} = 0.038\%$	$^{18}\text{O} = 0.200\%$
Sulfur	$^{32}\text{S} = 95.02\%$	$^{33}\text{S} = 0.75\%$	
	$^{34}\text{S} = 4.21\%$	$^{36}\text{S} = 0.02\%$	
Chlorine	$^{35}\text{Cl} = 75.77\%$	$^{37}\text{Cl} = 24.23\%$	
Bromine	$^{79}\text{Br} = 50.69\%$	$^{81}\text{Br} = 49.31\%$	



C-13

Where's Waldo?