23) · the number and arrangement of electrons in an atom determine how the atom will react with other atoms.
- the electrons determine the chemical properties of an atom
- the number of neutrons present determines the isotope

25) - For lighter, stable isotopes, the number of protons in the nucleus is about equal to the number of neutrons
- when the number of protons and neutrons are equal, the mass # is twice the atomic number
- therefore, for lighter isotopes, the ratio of mass # to atomic # is close to 2
- For heavier isotopes, there are more neutrons than protons
- the ratio of mass # to atomic # steadily increases from 2

35) Law of multiple proportions:

When two elements form a series of compounds, the ratio of the masses of the second element that combine one gram of the first element can always be reduced to small whole numbers

	mass of hydrogen that combines with 1.00g of nitrogen
A) Hydrazine	1.44×10^{-1} g
B) ammonia	2.16×10^{-1} g
C) Hydrogen azide	2.40×10^{-2} g

* For this law to hold true, the ratios of the masses of hydrogen combining with 1.00 g of nitrogen should be small whole numbers

$\frac{A}{C} = \frac{0.144}{0.0240}$ $\quad \frac{B}{C} = \frac{0.216}{0.0240}$ $\quad \frac{B}{A} = \frac{0.216}{0.144}$

$\frac{6.00}{1}$ $\quad \frac{9.00}{1}$ $\quad \frac{1.50}{1} = \frac{3}{2}$

37) to get hydrogen to be 1.00

$$\frac{0.126}{0.126} = 1.00$$

to get Na, Mg and O on the same scale, we will divide each value by 0.126

Na: $\frac{2.875}{0.126} = 22.8$

Mg: $\frac{1.500}{0.126} = 11.9$

O: $\frac{1.00}{0.126} = 7.94$

	H	O	Na	Mg
relative value	1.00	7.94	22.8	11.9
actual value	1.01	16.00	22.99	24.31

H and Na are close, but O and Mg are not... because we assumed the formulas were HO, NaO, MgO. They are really H_2O, Na_2O, MgO