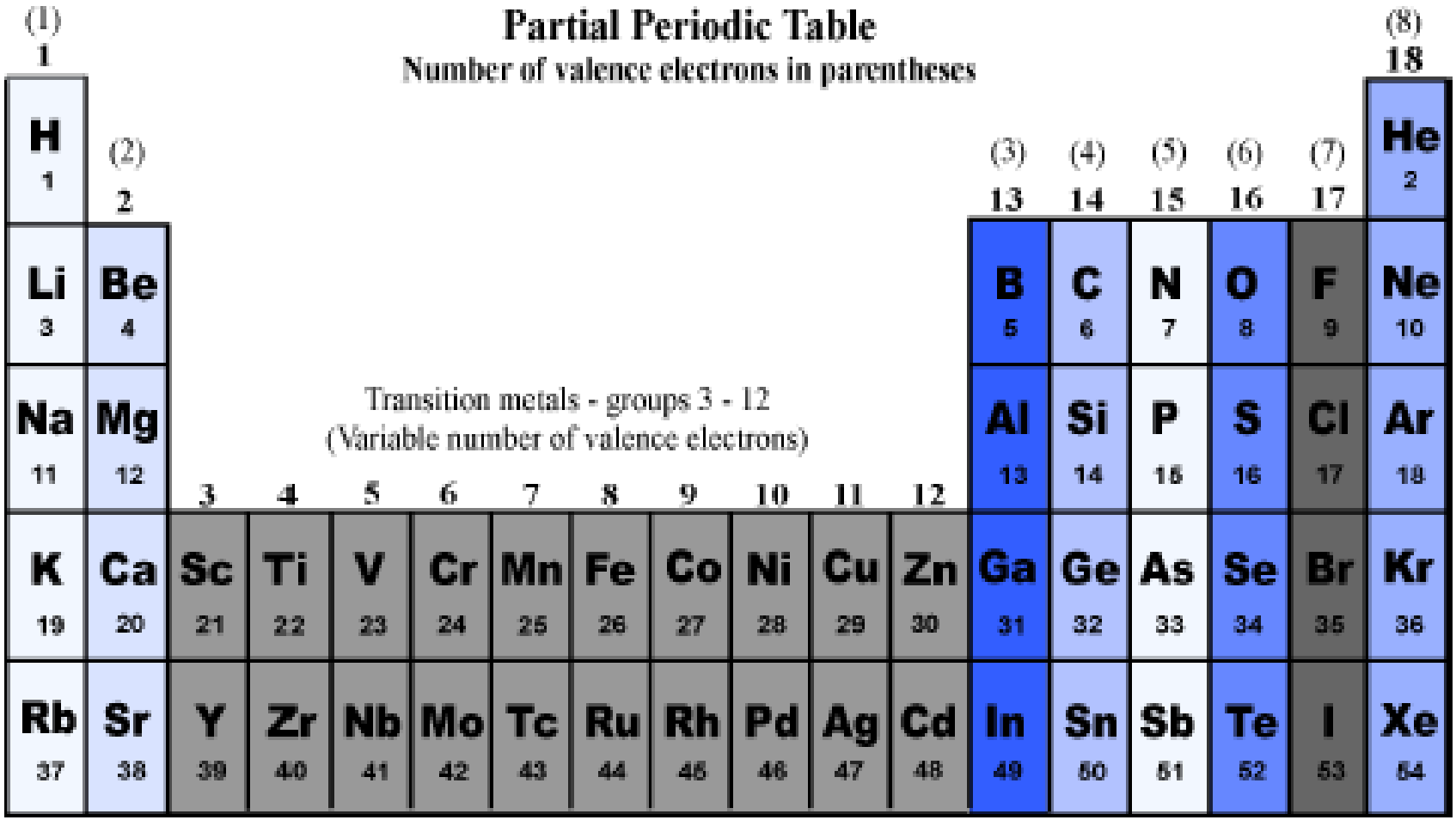
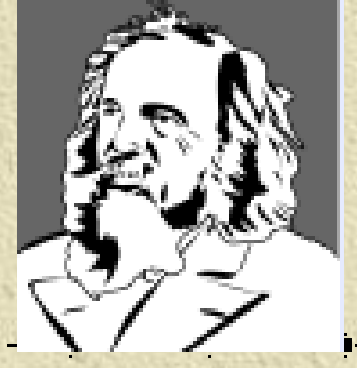
18.3 The Periodic Table of Elements



The Periodic Table



In 1871, Dimitri Mendeleev organized information about all known elements in a periodic table, based on similar physical and chemical properties.

It became known as the periodic table of elements.

- **The modern periodic table contains 111 different kinds of elements.**
- **<u>Groups (families) of elements</u> – elements arranged in columns with similar chemical properties.**

The Periodic Table of Elements

- Elements listed by increasing atomic number.
- Rows (side-to-side) tell how many electrons in each region of the electron cloud.

- **Ex. Carbon, in row 2, has 6 electrons.**

  2 in the 1st energy level & 4 in the 2nd (2,4)

<u>Valence</u> <u>electrons</u>- electrons in the <u>outermost</u> region of the electron cloud (valence shell) and are involved in forming chemical bonds.

Reading the periodic table

Periodic table can show different information.

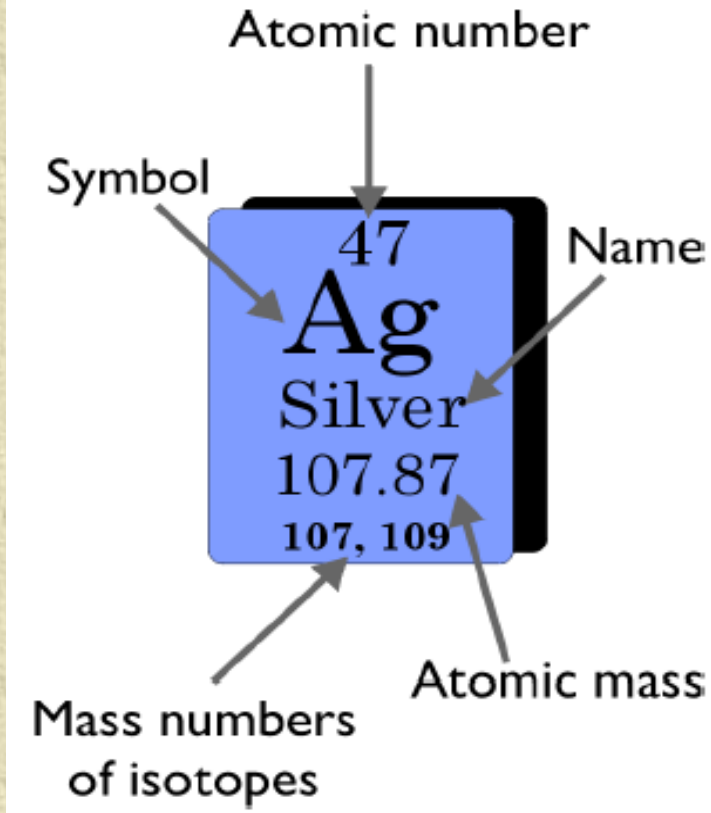


Figure 18.17: *The breadth of information the periodic table can provide.*

Chemical Symbols

- **Chemical symbol - an abbreviation of an element's name. May come from element's Latin or German name. The first letter in a symbol is upper case and the second is lower case.**

element	symbol	origin
copper	Cu	*cuprium*
gold	Au	*aurum*
iron	Fe	*ferrum*
lead	Pb	*plumbum*
potassium	K	*kalium*
silver	Ag	*argentum*
sodium	Na	*natrium*
tin	Sn	*stannum*

Figure 18.18: *The symbols for some elements don't always obviously match their names.*

Atomic number, Mass number, Atomic mass

- **Atomic number- number of protons.**
- **Mass number- protons (P) + neutrons (N).**

ex. Silver has two mass numbers:

Ag107 (47 P + 60 N)

Ag109 (47 P + 62 N) They are isotopes.

Cont.

Atomic mass- average mass of all known isotopes of an element.

Expressed in atomic mass units, or amu.

Partial Periodic Table