Principal Energy Levels Principal energy levels are identified by principal quantum number, n, a series of integers: $n = 1, 2, 3, \ldots 7$. *Generally,* energy increases with increasing n: $n = 1 < n = 2 < n = 3$.

Sublevels

Each principal energy level—each value of n—has n sublevels. These sublevels are identified by the principal quantum number followed by the letter s, p, d, or f. Sublevels that are not needed by the elements that are known today are shown below in color.

Energy Trend	n	Number of Sublevels	Identification of Sublevels
Increasing energy ↓	1	1	1*s*
	2	2	2*s*, 2*p*
	3	3	3*s*, 3*p*, 3*d*
	4	4	4*s*, 4*p*, 4*d*, 4*f*
	5	5	5*s*, 5*p*, 5*d*, 5*f*, 5*g*
	6	6	6*s*, 6*p*, 6*d*, 6*f*, 6*g*, 6*h*
	7	7	7*s*, 7*p*, 7*d*, 7*f*, 7*g*, 7*h*, 7*i*
			Increasing energy →

For any given value of n, energy increases through the sublevels in the order of s, p, d, f: $2s < 2p$; $3s < 3p < 3d$; $4s < 4p < 4d < 4f$; etc.

Note: The *range* of energies in consecutive principal energy levels may overlap. Example: $4s < 3d < 4p$. However, for any given *sublevel,* energy and orbital size increase with increasing n: $1s < 2s < 3s \ldots$; $2p < 3p < 4p \ldots$; etc.

Orbitals and Orbital Occupancy

Each kind of sublevel contains a definite number of orbitals that begin with 1 and increase in order with odd numbers: *s*, 1; *p*, 3; *d*, 5; *f*, 7.

An orbital may be occupied by 0, 1, or 2 electrons, but never more than 2. Therefore, the maximum number of electrons in a sublevel is twice the number of orbitals in the sublevel.

Sublevel	Orbitals	Maximum Electrons per Sublevels
s	1	2
p	3	6
d	5	10
f	7	14